G.M.T.	ARIES	VENUS −4.2		MARS +1.4		JUPITER −1.3		SATURN +1.0	
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
24 00	62 51.8	132 50.7	S25 29.1	252 16.9	N 6 03.7	215 08.5	S10 13.3	224 57.1	S 5 07.3
01	77 54.2	147 50.7	28.7	267 18.1	03.2	230 10.5	13.5	239 59.3	07.4
02	92 56.7	162 50.7	28.3	282 19.3	02.7	245 12.5	13.7	255 01.5	07.5
03	107 59.2	177 50.7	·· 27.9	297 20.6	·· 02.3	260 14.5	·· 13.8	270 03.8	·· 07.6
04	123 01.6	192 50.8	27.5	312 21.8	01.8	275 16.5	14.0	285 06.0	07.7
05	138 04.1	207 50.8	27.1	327 23.0	01.3	290 18.5	14.2	300 08.2	07.8
06	153 06.6	222 50.8	S25 26.7	342 24.3	N 6 00.8	305 20.5	S10 14.4	315 10.5	S 5 07.8
07	168 09.0	237 50.8	26.3	357 25.5	6 00.3	320 22.4	14.5	330 12.7	07.9
08	183 11.5	252 50.8	25.9	12 26.7	5 59.8	335 24.4	14.7	345 14.9	08.0
T 09	198 14.0	267 50.9	·· 25.5	27 28.0	·· 59.3	350 26.4	·· 14.9	0 17.1	·· 08.1
U 10	213 16.4	282 50.9	25.1	42 29.2	58.8	5 28.4	15.0	15 19.4	08.2
E 11	228 18.9	297 50.9	24.7	57 30.4	58.3	20 30.4	15.2	30 21.6	08.3
S 12	243 21.4	312 50.9	S25 24.3	72 31.7	N 5 57.8	35 32.4	S10 15.4	45 23.8	S 5 08.4
D 13	258 23.8	327 51.0	23.9	87 32.9	57.3	50 34.4	15.6	60 26.1	08.5
A 14	273 26.3	342 51.0	23.5	102 34.1	56.9	65 36.4	15.7	75 28.3	08.5
Y 15	288 28.7	357 51.0	·· 23.1	117 35.4	·· 56.4	80 38.4	·· 15.9	90 30.5	·· 08.6
16	303 31.2	12 51.1	22.7	132 36.6	55.9	95 40.4	16.1	105 32.7	08.7
17	318 33.7	27 51.1	22.3	147 37.8	55.4	110 42.3	16.3	120 35.0	08.8
18	333 36.1	42 51.2	S25 21.9	162 39.1	N 5 54.9	125 44.3	S10 16.4	135 37.2	S 5 08.9
19	348 38.6	57 51.2	21.5	177 40.3	54.4	140 46.3	16.6	150 39.4	09.0
20	3 41.1	72 51.2	21.1	192 41.5	53.9	155 48.3	16.8	165 41.7	09.1
21	18 43.5	87 51.3	·· 20.6	207 42.8	·· 53.4	170 50.3	·· 16.9	180 43.9	·· 09.2
22	33 46.0	102 51.3	20.2	222 44.0	52.9	185 52.3	17.1	195 46.1	09.3
23	48 48.5	117 51.4	19.8	237 45.2	52.4	200 54.3	17.3	210 48.4	09.3
25 00	63 50.9	132 51.4	S25 19.4	252 46.5	N 5 52.0	215 56.3	S10 17.5	225 50.6	S 5 09.4
01	78 53.4	147 51.5	19.0	267 47.7	51.5	230 58.3	17.6	240 52.8	09.5
02	93 55.9	162 51.5	18.6	282 48.9	51.0	246 00.3	17.8	255 55.0	09.6
03	108 58.3	177 51.6	·· 18.2	297 50.2	·· 50.5	261 02.2	·· 18.0	270 57.3	·· 09.7
04	124 00.8	192 51.6	17.7	312 51.4	50.0	276 04.2	18.1	285 59.5	09.8
05	139 03.2	207 51.7	17.3	327 52.7	49.5	291 06.2	18.3	301 01.7	09.9
06	154 05.7	222 51.7	S25 16.9	342 53.9	N 5 49.0	306 08.2	S10 18.5	316 04.0	S 5 09.9
07	169 08.2	237 51.8	16.5	357 55.1	48.5	321 10.2	18.7	331 06.2	10.0
W 08	184 10.6	252 51.9	16.1	12 56.4	48.0	336 12.2	18.8	346 08.4	10.1
E 09	199 13.1	267 51.9	·· 15.6	27 57.6	·· 47.6	351 14.2	·· 19.0	1 10.7	·· 10.2
D 10	214 15.6	282 52.0	15.2	42 58.8	47.1	6 16.2	19.2	16 12.9	10.3
N 11	229 18.0	297 52.1	14.8	58 00.1	46.6	21 18.2	19.3	31 15.1	10.4
E 12	244 20.5	312 52.1	S25 14.4	73 01.3	N 5 46.1	36 20.2	S10 19.5	46 17.4	S 5 10.5
S 13	259 23.0	327 52.2	14.0	88 02.6	45.6	51 22.2	19.7	61 19.6	10.6
D 14	274 25.4	342 52.3	13.5	103 03.8	45.1	66 24.1	19.9	76 21.8	10.6
A 15	289 27.9	357 52.3	·· 13.1	118 05.0	·· 44.6	81 26.1	·· 20.0	91 24.1	·· 10.7
Y 16	304 30.3	12 52.4	12.7	133 06.3	44.1	96 28.1	20.2	106 26.3	10.8
17	319 32.8	27 52.5	12.3	148 07.5	43.6	111 30.1	20.4	121 28.5	10.9
18	334 35.3	42 52.6	S25 11.8	163 08.8	N 5 43.2	126 32.1	S10 20.5	136 30.7	S 5 11.0
19	349 37.7	57 52.6	11.4	178 10.0	42.7	141 34.1	20.7	151 33.0	11.1
20	4 40.2	72 52.7	11.0	193 11.2	42.2	156 36.1	20.9	166 35.2	11.2
21	19 42.7	87 52.8	·· 10.5	208 12.5	·· 41.7	171 38.1	·· 21.1	181 37.4	·· 11.3
22	34 45.1	102 52.9	10.1	223 13.7	41.2	186 40.1	21.2	196 39.7	11.3
23	49 47.6	117 53.0	09.7	238 15.0	40.7	201 42.1	21.4	211 41.9	11.4
26 00	64 50.1	132 53.0	S25 09.2	253 16.2	N 5 40.2	216 44.1	S10 21.6	226 44.1	S 5 11.5
01	79 52.5	147 53.1	08.8	268 17.5	39.7	231 46.1	21.7	241 46.4	11.6
02	94 55.0	162 53.2	08.4	283 18.7	39.2	246 48.0	21.9	256 48.6	11.7
03	109 57.5	177 53.3	·· 07.9	298 19.9	·· 38.8	261 50.0	·· 22.1	271 50.8	·· 11.8
04	124 59.9	192 53.4	07.5	313 21.2	38.3	276 52.0	22.2	286 53.1	11.9
05	140 02.4	207 53.5	07.1	328 22.4	37.8	291 54.0	22.4	301 55.3	11.9
06	155 04.8	222 53.6	S25 06.6	343 23.7	N 5 37.3	306 56.0	S10 22.6	316 57.5	S 5 12.0
07	170 07.3	237 53.7	06.2	358 24.9	36.8	321 58.0	22.8	331 59.8	12.1
T 08	185 09.8	252 53.8	05.8	13 26.2	36.3	337 00.0	22.9	347 02.0	12.2
H 09	200 12.2	267 53.9	·· 05.3	28 27.4	·· 35.8	352 02.0	·· 23.1	2 04.2	·· 12.3
U 10	215 14.7	282 54.0	04.9	43 28.6	35.3	7 04.0	23.3	17 06.5	12.4
R 11	230 17.2	297 54.1	04.4	58 29.9	34.9	22 06.0	23.4	32 08.7	12.5
S 12	245 19.6	312 54.2	S25 04.0	73 31.1	N 5 34.4	37 08.0	S10 23.6	47 10.9	S 5 12.5
D 13	260 22.1	327 54.3	03.6	88 32.4	33.9	52 10.0	23.8	62 13.2	12.6
A 14	275 24.6	342 54.4	03.1	103 33.6	33.4	67 12.0	23.9	77 15.4	12.7
Y 15	290 27.0	357 54.5	·· 02.7	118 34.9	·· 32.9	82 14.0	·· 24.1	92 17.6	·· 12.8
16	305 29.5	12 54.6	02.2	133 36.1	32.4	97 15.9	24.3	107 19.9	12.9
17	320 32.0	27 54.7	01.8	148 37.4	31.9	112 17.9	24.5	122 22.1	13.0
18	335 34.4	42 54.8	S25 01.3	163 38.6	N 5 31.4	127 19.9	S10 24.6	137 24.3	S 5 13.1
19	350 36.9	57 55.0	00.9	178 39.9	31.0	142 21.9	24.8	152 26.6	13.1
20	5 39.3	72 55.1	00.4	193 41.1	30.5	157 23.9	25.0	167 28.8	13.2
21	20 41.8	87 55.2	25 00.0	208 42.4	·· 30.0	172 25.9	·· 25.1	182 31.0	·· 13.3
22	35 44.3	102 55.3	24 59.5	223 43.6	29.5	187 27.9	25.3	197 33.3	13.4
23	50 46.7	117 55.4	59.1	238 44.9	29.0	202 29.9	25.5	212 35.5	13.5
Mer. Pass	h m 19 41.4	v 0.1	d 0.4	v 1.2	d 0.5	v 2.0	d 0.2	v 2.2	d 0.1

STARS		
Name	S.H.A.	Dec.
	° ′	° ′
Acamar	315 36.2	S40 22.8
Achernar	335 44.2	S57 20.0
Acrux	173 36.7	S62 59.5
Adhara	255 31.2	S28 56.7
Aldebaran	291 16.7	N16 28.4
Alioth	166 42.2	N56 03.4
Alkaid	153 18.3	N49 24.2
Al Na'ir	28 14.0	S47 03.2
Alnilam	276 10.5	S 1 12.8
Alphard	218 19.7	S 8 34.6
Alphecca	126 31.8	N26 46.6
Alpheratz	358 08.3	N28 59.5
Altair	62 32.0	N 8 49.3
Ankaa	353 39.2	S42 24.5
Antares	112 56.3	S26 23.4
Arcturus	146 18.0	N19 16.7
Atria	108 20.4	S68 59.7
Avior	234 27.6	S59 26.8
Bellatrix	278 57.6	N 6 20.0
Betelgeuse	271 27.1	N 7 24.3
Canopus	264 06.4	S52 41.0
Capella	281 09.7	N45 58.8
Deneb	49 48.1	N45 13.2
Denebola	182 58.4	N14 40.5
Diphda	349 19.9	S18 05.3
Dubhe	194 21.3	N61 50.8
Elnath	278 42.8	N28 35.5
Eltanin	90 57.9	N51 29.7
Enif	34 10.9	N 9 47.6
Fomalhaut	15 50.5	S29 43.3
Gacrux	172 28.2	S57 00.3
Gienah	176 17.3	S17 26.2
Hadar	149 22.8	S60 16.8
Hamal	328 27.7	N23 22.6
Kaus Aust.	84 16.1	S34 23.7
Kochab	137 20.2	N74 13.8
Markab	14 02.3	N15 06.5
Menkar	314 40.0	N 4 01.1
Menkent	148 36.4	S36 16.6
Miaplacidus	221 44.5	S69 38.2
Mirfak	309 14.5	N49 47.8
Nunki	76 28.5	S26 19.2
Peacock	53 57.4	S56 47.9
Pollux	243 57.0	N28 04.2
Procyon	245 24.7	N 5 16.4
Rasalhague	96 29.2	N12 34.5
Regulus	208 09.1	N12 03.4
Rigel	281 34.9	S 8 13.3
Rigil Kent.	140 25.4	S60 45.3
Sabik	102 40.6	S15 42.1
Schedar	350 07.8	N56 26.4
Shaula	96 55.1	S37 05.4
Sirius	258 54.7	S16 41.4
Spica	158 57.0	S11 03.8
Suhail	223 10.1	S43 21.2
Vega	80 55.7	N38 46.2
Zuben'ubi	137 32.5	S15 57.8

	S.H.A.	Mer. Pass.
	° ′	h m
Venus	69 00.5	15 09
Mars	188 55.5	7 08
Jupiter	152 05.3	9 35
Saturn	161 59.7	8 55

G.M.T.	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
24 00	183 21.3	S20 29.2	210 09.3	15.2	S 7 51.0	10.4	54.3
01	198 21.1	29.7	224 43.5	15.2	8 01.4	10.4	54.3
02	213 21.0	30.2	239 17.7	15.2	8 11.8	10.4	54.3
03	228 20.8	·· 30.7	253 51.9	15.1	8 22.2	10.3	54.2
04	243 20.6	31.2	268 26.0	15.2	8 32.5	10.3	54.2
05	258 20.4	31.7	283 00.2	15.1	8 42.8	10.2	54.2
06	273 20.2	S20 32.2	297 34.3	15.1	S 8 53.0	10.2	54.2
07	288 20.0	32.7	312 08.4	15.1	9 03.2	10.2	54.2
08	303 19.9	33.2	326 42.5	15.0	9 13.4	10.1	54.2
T 09	318 19.7	·· 33.7	341 16.5	15.1	9 23.5	10.1	54.2
U 10	333 19.5	34.2	355 50.6	15.0	9 33.6	10.0	54.2
E 11	348 19.3	34.7	10 24.6	15.0	9 43.6	10.0	54.2
S 12	3 19.1	S20 35.2	24 58.6	15.0	S 9 53.6	10.0	54.2
D 13	18 18.9	35.7	39 32.6	14.9	10 03.6	9.9	54.2
A 14	33 18.8	36.2	54 06.5	15.0	10 13.5	9.9	54.1
Y 15	48 18.6	·· 36.7	68 40.5	14.9	10 23.4	9.8	54.1
16	63 18.4	37.2	83 14.4	14.9	10 33.2	9.8	54.1
17	78 18.2	37.7	97 48.3	14.8	10 43.0	9.8	54.1
18	93 18.0	S20 38.2	112 22.1	14.9	S10 52.8	9.7	54.1
19	108 17.8	38.7	126 56.0	14.8	11 02.5	9.6	54.1
20	123 17.7	39.2	141 29.8	14.7	11 12.1	9.6	54.1
21	138 17.5	·· 39.7	156 03.5	14.8	11 21.7	9.6	54.1
22	153 17.3	40.2	170 37.3	14.7	11 31.3	9.5	54.1
23	168 17.1	40.7	185 11.0	14.7	11 40.8	9.4	54.1
25 00	183 16.9	S20 41.2	199 44.7	14.7	S11 50.2	9.4	54.1
01	198 16.7	41.7	214 18.4	14.7	11 59.6	9.4	54.1
02	213 16.5	42.2	228 52.1	14.6	12 09.0	9.3	54.1
03	228 16.3	·· 42.7	243 25.7	14.6	12 18.3	9.3	54.1
04	243 16.1	43.2	257 59.3	14.6	12 27.6	9.2	54.0
05	258 16.0	43.7	272 32.9	14.5	12 36.8	9.1	54.0
06	273 15.8	S20 44.2	287 06.4	14.5	S12 45.9	9.1	54.0
W 07	288 15.6	44.7	301 39.9	14.5	12 55.0	9.0	54.0
E 08	303 15.4	45.2	316 13.4	14.4	13 04.0	9.0	54.0
D 09	318 15.2	·· 45.6	330 46.8	14.4	13 13.0	9.0	54.0
N 10	333 15.0	46.1	345 20.2	14.4	13 22.0	8.8	54.0
E 11	348 14.8	46.6	359 53.6	14.4	13 30.8	8.8	54.0
S 12	3 14.6	S20 47.1	14 27.0	14.3	S13 39.6	8.8	54.0
D 13	18 14.4	47.6	29 00.3	14.3	13 48.4	8.7	54.0
A 14	33 14.2	48.1	43 33.6	14.2	13 57.1	8.6	54.0
Y 15	48 14.1	·· 48.6	58 06.8	14.3	14 05.7	8.6	54.0
16	63 13.9	49.0	72 40.1	14.1	14 14.3	8.6	54.0
17	78 13.7	49.5	87 13.2	14.2	14 22.9	8.4	54.0
18	93 13.5	S20 50.0	101 46.4	14.1	S14 31.3	8.4	54.0
19	108 13.3	50.5	116 19.5	14.1	14 39.7	8.4	54.0
20	123 13.1	51.0	130 52.6	14.1	14 48.1	8.2	54.0
21	138 12.9	·· 51.5	145 25.7	14.0	14 56.3	8.2	54.0
22	153 12.7	51.9	159 58.7	14.0	15 04.5	8.2	54.0
23	168 12.5	52.4	174 31.7	13.9	15 12.7	8.1	54.0
26 00	183 12.3	S20 52.9	189 04.6	13.9	S15 20.8	8.0	54.0
01	198 12.1	53.4	203 37.5	13.9	15 28.8	8.0	54.0
02	213 11.9	53.9	218 10.4	13.8	15 36.8	7.8	53.9
03	228 11.7	·· 54.3	232 43.2	13.9	15 44.6	7.9	53.9
04	243 11.5	54.8	247 16.1	13.7	15 52.5	7.7	53.9
05	258 11.3	55.3	261 48.8	13.8	16 00.2	7.7	53.9
06	273 11.1	S20 55.8	276 21.6	13.7	S16 07.9	7.6	53.9
07	288 10.9	56.2	290 54.3	13.6	16 15.5	7.6	53.9
T 08	303 10.7	56.7	305 26.9	13.6	16 23.1	7.4	53.9
H 09	318 10.5	·· 57.2	319 59.5	13.6	16 30.5	7.4	53.9
U 10	333 10.3	57.6	334 32.1	13.6	16 37.9	7.4	53.9
R 11	348 10.1	58.1	349 04.7	13.5	16 45.3	7.2	53.9
S 12	3 09.9	S20 58.6	3 37.2	13.5	S16 52.5	7.2	53.9
D 13	18 09.7	59.1	18 09.7	13.4	16 59.7	7.1	53.9
A 14	33 09.5	20 59.5	32 42.1	13.4	17 06.8	7.1	53.9
Y 15	48 09.3	21 00.0	47 14.5	13.4	17 13.9	7.0	53.9
16	63 09.1	00.5	61 46.9	13.3	17 20.9	6.8	53.9
17	78 08.9	00.9	76 19.2	13.3	17 27.7	6.9	53.9
18	93 08.7	S21 01.4	90 51.5	13.3	S17 34.6	6.7	53.9
19	108 08.5	01.9	105 23.8	13.2	17 41.3	6.7	53.9
20	123 08.3	02.3	119 56.0	13.2	17 48.0	6.6	53.9
21	138 08.1	·· 02.8	134 28.2	13.1	17 54.6	6.5	53.9
22	153 07.9	03.3	149 00.3	13.1	18 01.1	6.4	53.9
23	168 07.7	03.7	163 32.4	13.1	18 07.5	6.4	53.9
	S.D. 16.2	d 0.5	S.D. 14.8		14.7		14.7

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 24	Moonrise 25	Moonrise 26	Moonrise 27
°	h m	h m	h m	h m	h m	h m	h m
N 72	07 33	09 21	▬	06 07	07 59	10 14	▬
N 70	07 19	08 49	11 30	05 52	07 33	09 22	11 33
68	07 07	08 26	10 02	05 41	07 14	08 50	10 29
66	06 58	08 08	09 25	05 31	06 58	08 26	09 54
64	06 49	07 53	08 59	05 23	06 46	08 08	09 28
62	06 42	07 40	08 38	05 17	06 35	07 53	09 09
60	06 36	07 29	08 22	05 11	06 26	07 41	08 53
N 58	06 30	07 20	08 08	05 06	06 18	07 30	08 39
56	06 25	07 12	07 56	05 01	06 11	07 21	08 28
54	06 20	07 04	07 46	04 57	06 05	07 12	08 18
52	06 15	06 58	07 36	04 54	06 00	07 05	08 08
50	06 11	06 51	07 28	04 50	05 55	06 58	08 00
45	06 02	06 38	07 11	04 43	05 44	06 44	07 43
N 40	05 53	06 27	06 56	04 37	05 35	06 32	07 29
35	05 45	06 17	06 44	04 32	05 27	06 23	07 17
30	05 38	06 07	06 33	04 28	05 21	06 14	07 07
20	05 24	05 51	06 15	04 20	05 09	05 59	06 50
N 10	05 10	05 36	05 59	04 13	04 59	05 46	06 34
0	04 56	05 21	05 43	04 07	04 50	05 34	06 20
S 10	04 39	05 05	05 28	04 01	04 41	05 22	06 06
20	04 19	04 47	05 11	03 54	04 31	05 09	05 51
30	03 53	04 26	04 52	03 46	04 20	04 55	05 33
35	03 37	04 12	04 41	03 42	04 13	04 47	05 23
40	03 17	03 57	04 28	03 37	04 06	04 37	05 12
45	02 52	03 37	04 13	03 32	03 57	04 26	04 58
S 50	02 16	03 12	03 53	03 25	03 47	04 13	04 42
52	01 56	03 00	03 44	03 22	03 43	04 06	04 34
54	01 31	02 46	03 34	03 19	03 38	03 59	04 26
56	00 54	02 29	03 23	03 15	03 32	03 52	04 16
58	////	02 08	03 09	03 11	03 26	03 43	04 05
S 60	////	01 41	02 54	03 06	03 18	03 33	03 53

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 24	Moonset 25	Moonset 26	Moonset 27
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	14 12	16 00	14 07	13 45	13 03	▬
N 70	12 04	14 44	16 14	14 23	14 12	13 56	13 21
68	13 31	15 07	16 26	14 36	14 33	14 29	14 25
66	14 09	15 26	16 35	14 47	14 49	14 53	15 01
64	14 35	15 41	16 44	14 56	15 03	15 12	15 27
62	14 55	15 53	16 51	15 04	15 14	15 28	15 47
60	15 12	16 04	16 58	15 11	15 24	15 41	16 03
N 58	15 26	16 13	17 04	15 16	15 32	15 52	16 17
56	15 37	16 22	17 09	15 22	15 40	16 02	16 29
54	15 48	16 29	17 14	15 27	15 47	16 11	16 40
52	15 57	16 36	17 18	15 31	15 53	16 18	16 49
50	16 05	16 42	17 22	15 35	15 58	16 25	16 57
45	16 23	16 56	17 32	15 43	16 10	16 40	17 15
N 40	16 38	17 07	17 40	15 50	16 20	16 53	17 30
35	16 50	17 17	17 48	15 57	16 29	17 03	17 42
30	17 01	17 26	17 56	16 02	16 36	17 13	17 53
20	17 19	17 43	18 10	16 11	16 49	17 29	18 11
N 10	17 35	17 58	18 24	16 20	17 00	17 43	18 27
0	17 51	18 13	18 39	16 27	17 11	17 56	18 43
S 10	18 06	18 29	18 55	16 35	17 22	18 09	18 58
20	18 23	18 47	19 15	16 44	17 33	18 23	19 14
30	18 42	19 09	19 41	16 53	17 46	18 40	19 33
35	18 53	19 22	19 57	16 59	17 54	18 49	19 44
40	19 07	19 38	20 17	17 05	18 03	19 00	19 56
45	19 22	19 58	20 43	17 12	18 13	19 13	20 11
S 50	19 41	20 23	21 20	17 21	18 25	19 28	20 29
52	19 50	20 35	21 40	17 25	18 31	19 36	20 38
54	20 01	20 50	22 05	17 30	18 37	19 44	20 47
56	20 12	21 07	22 45	17 35	18 45	19 53	20 58
58	20 26	21 28	////	17 41	18 53	20 03	21 11
S 60	20 42	21 56	////	17 47	19 02	20 15	21 25

Day	SUN Eqn. of Time 00ʰ	SUN Eqn. of Time 12ʰ	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
24	13 26	13 17	11 47	10 17	22 39	28	
25	13 08	12 59	11 47	11 00	23 23	29	●
26	12 50	12 40	11 47	11 45	24 08	30	

G.M.T.	ARIES	VENUS −4.3		MARS +1.4		JUPITER −1.3		SATURN +1.0	
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
27 00	65 49.2	132 55.6	S24 58.6	253 46.1	N 5 28.5	217 31.9	S10 25.6	227 37.7	S 5 13.6
01	80 51.7	147 55.7	58.2	268 47.3	28.0	232 33.9	25.8	242 40.0	13.7
02	95 54.1	162 55.8	57.7	283 48.6	27.6	247 35.9	26.0	257 42.2	13.7
03	110 56.6	177 56.0	·· 57.3	298 49.8	·· 27.1	262 37.9	·· 26.1	272 44.5	·· 13.8
04	125 59.1	192 56.1	56.8	313 51.1	26.6	277 39.9	26.3	287 46.7	13.9
05	141 01.5	207 56.2	56.4	328 52.3	26.1	292 41.9	26.5	302 48.9	14.0
06	156 04.0	222 56.3	S24 55.9	343 53.6	N 5 25.6	307 43.9	S10 26.7	317 51.2	S 5 14.1
07	171 06.5	237 56.5	55.5	358 54.8	25.1	322 45.9	26.8	332 53.4	14.2
08	186 08.9	252 56.6	55.0	13 56.1	24.6	337 47.9	27.0	347 55.6	14.3
M 09	201 11.4	267 56.8	·· 54.6	28 57.3	·· 24.2	352 49.9	·· 27.2	2 57.9	·· 14.3
O 10	216 13.8	282 56.9	54.1	43 58.6	23.7	7 51.8	27.3	18 00.1	14.4
N 11	231 16.3	297 57.0	53.6	58 59.8	23.2	22 53.8	27.5	33 02.3	14.5
D 12	246 18.8	312 57.2	S24 53.2	74 01.1	N 5 22.7	37 55.8	S10 27.7	48 04.6	S 5 14.6
A 13	261 21.2	327 57.3	52.7	89 02.3	22.2	52 57.8	27.8	63 06.8	14.7
Y 14	276 23.7	342 57.5	52.3	104 03.6	21.7	67 59.8	28.0	78 09.0	14.8
15	291 26.2	357 57.6	·· 51.8	119 04.8	·· 21.2	83 01.8	·· 28.2	93 11.3	·· 14.8
16	306 28.6	12 57.8	51.3	134 06.1	20.8	98 03.8	28.3	108 13.5	14.9
17	321 31.1	27 57.9	50.9	149 07.4	20.3	113 05.8	28.5	123 15.8	15.0
18	336 33.6	42 58.1	S24 50.4	164 08.6	N 5 19.8	128 07.8	S10 28.7	138 18.0	S 5 15.1
19	351 36.0	57 58.2	50.0	179 09.9	19.3	143 09.8	28.9	153 20.2	15.2
20	6 38.5	72 58.4	49.5	194 11.1	18.8	158 11.8	29.0	168 22.5	15.3
21	21 40.9	87 58.6	·· 49.0	209 12.4	·· 18.3	173 13.8	·· 29.2	183 24.7	·· 15.4
22	36 43.4	102 58.7	48.6	224 13.6	17.8	188 15.8	29.4	198 26.9	15.4
23	51 45.9	117 58.9	48.1	239 14.9	17.4	203 17.8	29.5	213 29.2	15.5
28 00	66 48.3	132 59.0	S24 47.6	254 16.1	N 5 16.9	218 19.8	S10 29.7	228 31.4	S 5 15.6
01	81 50.8	147 59.2	47.2	269 17.4	16.4	233 21.8	29.9	243 33.6	15.7
02	96 53.3	162 59.4	46.7	284 18.6	15.9	248 23.8	30.0	258 35.9	15.8
03	111 55.7	177 59.6	·· 46.2	299 19.9	·· 15.4	263 25.8	·· 30.2	273 38.1	·· 15.9
04	126 58.2	192 59.7	45.7	314 21.1	14.9	278 27.8	30.4	288 40.4	15.9
05	142 00.7	207 59.9	45.3	329 22.4	14.5	293 29.8	30.5	303 42.6	16.0
06	157 03.1	223 00.1	S24 44.8	344 23.7	N 5 14.0	308 31.8	S10 30.7	318 44.8	S 5 16.1
07	172 05.6	238 00.2	44.3	359 24.9	13.5	323 33.8	30.9	333 47.1	16.2
S 08	187 08.1	253 00.4	43.9	14 26.2	13.0	338 35.8	31.0	348 49.3	16.3
A 09	202 10.5	268 00.6	·· 43.4	29 27.4	·· 12.5	353 37.8	·· 31.2	3 51.5	·· 16.4
T 10	217 13.0	283 00.8	42.9	44 28.7	12.0	8 39.8	31.4	18 53.8	16.4
U 11	232 15.4	298 01.0	42.4	59 29.9	11.6	23 41.8	31.5	33 56.0	16.5
R 12	247 17.9	313 01.2	S24 42.0	74 31.2	N 5 11.1	38 43.8	S10 31.7	48 58.3	S 5 16.6
D 13	262 20.4	328 01.3	41.5	89 32.5	10.6	53 45.8	31.9	64 00.5	16.7
A 14	277 22.8	343 01.5	41.0	104 33.7	10.1	68 47.8	32.0	79 02.7	16.8
Y 15	292 25.3	358 01.7	·· 40.5	119 35.0	·· 09.6	83 49.7	·· 32.2	94 05.0	·· 16.9
16	307 27.8	13 01.9	40.0	134 36.2	09.1	98 51.7	32.4	109 07.2	17.0
17	322 30.2	28 02.1	39.6	149 37.5	08.6	113 53.7	32.5	124 09.5	17.0
18	337 32.7	43 02.3	S24 39.1	164 38.7	N 5 08.2	128 55.7	S10 32.7	139 11.7	S 5 17.1
19	352 35.2	58 02.5	38.6	179 40.0	07.7	143 57.7	32.9	154 13.9	17.2
20	7 37.6	73 02.7	38.1	194 41.3	07.2	158 59.7	33.0	169 16.2	17.3
21	22 40.1	88 02.9	·· 37.6	209 42.5	·· 06.7	174 01.7	·· 33.2	184 18.4	·· 17.4
22	37 42.6	103 03.1	37.1	224 43.8	06.2	189 03.7	33.4	199 20.6	17.5
23	52 45.0	118 03.3	36.7	239 45.0	05.8	204 05.7	33.5	214 22.9	17.5
29 00	67 47.5	133 03.5	S24 36.2	254 46.3	N 5 05.3	219 07.7	S10 33.7	229 25.1	S 5 17.6
01	82 49.9	148 03.7	35.7	269 47.6	04.8	234 09.7	33.9	244 27.4	17.7
02	97 52.4	163 03.9	35.2	284 48.8	04.3	249 11.7	34.0	259 29.6	17.8
03	112 54.9	178 04.1	·· 34.7	299 50.1	·· 03.8	264 13.7	·· 34.2	274 31.8	·· 17.9
04	127 57.3	193 04.4	34.2	314 51.3	03.3	279 15.7	34.4	289 34.1	17.9
05	142 59.8	208 04.6	33.7	329 52.6	02.9	294 17.7	34.5	304 36.3	18.0
06	158 02.3	223 04.8	S24 33.3	344 53.9	N 5 02.4	309 19.7	S10 34.7	319 38.6	S 5 18.1
07	173 04.7	238 05.0	32.8	359 55.1	01.9	324 21.7	34.9	334 40.8	18.2
08	188 07.2	253 05.2	32.3	14 56.4	01.4	339 23.7	35.0	349 43.0	18.3
S 09	203 09.7	268 05.4	·· 31.8	29 57.6	·· 00.9	354 25.7	·· 35.2	4 45.3	·· 18.4
U 10	218 12.1	283 05.7	31.3	44 58.9	00.4	9 27.7	35.4	19 47.5	18.4
N 11	233 14.6	298 05.9	30.8	60 00.2	S 00.0	24 29.7	35.5	34 49.8	18.5
D 12	248 17.0	313 06.1	S24 30.3	75 01.4	N 4 59.5	39 31.7	S10 35.7	49 52.0	S 5 18.6
A 13	263 19.5	328 06.4	29.8	90 02.7	59.0	54 33.7	35.9	64 54.2	18.7
Y 14	278 22.0	343 06.6	29.3	105 04.0	58.5	69 35.7	36.0	79 56.5	18.8
15	293 24.4	358 06.8	·· 28.8	120 05.2	·· 58.0	84 37.7	·· 36.2	94 58.7	·· 18.9
16	308 26.9	13 07.1	28.3	135 06.5	57.6	99 39.7	36.4	110 01.0	18.9
17	323 29.4	28 07.3	27.8	150 07.8	57.1	114 41.7	36.5	125 03.2	19.0
18	338 31.8	43 07.5	S24 27.3	165 09.0	N 4 56.6	129 43.7	S10 36.7	140 05.4	S 5 19.1
19	353 34.3	58 07.8	26.8	180 10.3	56.1	144 45.7	36.9	155 07.7	19.2
20	8 36.8	73 08.0	26.3	195 11.5	55.6	159 47.7	37.0	170 09.9	19.3
21	23 39.2	88 08.3	·· 25.8	210 12.8	·· 55.1	174 49.7	·· 37.2	185 12.2	·· 19.4
22	38 41.7	103 08.5	25.3	225 14.1	54.7	189 51.7	37.4	200 14.4	19.4
23	53 44.2	118 08.7	24.8	240 15.3	54.2	204 53.7	37.5	215 16.7	19.5
Mer. Pass	h m 19 29.6	v 0.2	d 0.5	v 1.3	d 0.5	v 2.0	d 0.2	v 2.2	d 0.1

STARS		
Name	S.H.A.	Dec.
	° ′	° ′
Acamar	315 36.2	S40 22.8
Achernar	335 44.2	S57 20.0
Acrux	173 36.7	S62 59.5
Adhara	255 31.2	S28 56.7
Aldebaran	291 16.7	N16 28.4
Alioth	166 42.1	N56 03.4
Alkaid	153 18.2	N49 24.2
Al Na'ir	28 14.0	S47 03.2
Alnilam	276 10.5	S 1 12.8
Alphard	218 19.7	S 8 34.6
Alphecca	126 31.8	N26 46.6
Alpheratz	358 08.3	N28 59.5
Altair	62 32.0	N 8 49.3
Ankaa	353 39.2	S42 24.5
Antares	112 56.3	S26 23.4
Arcturus	146 18.0	N19 16.7
Atria	108 20.3	S68 59.7
Avior	234 27.5	S59 26.8
Bellatrix	278 57.6	N 6 20.0
Betelgeuse	271 27.1	N 7 24.2
Canopus	264 06.4	S52 41.0
Capella	281 09.6	N45 58.8
Deneb	49 48.1	N45 13.1
Denebola	182 58.3	N14 40.5
Diphda	349 19.9	S18 05.3
Dubhe	194 21.2	N61 50.8
Elnath	278 42.7	N28 35.5
Eltanin	90 57.9	N51 29.6
Enif	34 10.9	N 9 47.6
Fomalhaut	15 50.5	S29 43.3
Gacrux	172 28.2	S57 00.3
Gienah	176 17.3	S17 26.2
Hadar	149 22.8	S60 16.8
Hamal	328 27.7	N23 22.6
Kaus Aust.	84 16.1	S34 23.6
Kochab	137 20.1	N74 13.8
Markab	14 02.3	N15 06.5
Menkar	314 40.0	N 4 01.1
Menkent	148 36.4	S36 16.6
Miaplacidus	221 44.5	S69 38.2
Mirfak	309 14.5	N49 47.9
Nunki	76 28.5	S26 19.2
Peacock	53 57.4	S56 47.9
Pollux	243 56.9	N28 04.2
Procyon	245 24.7	N 5 16.3
Rasalhague	96 29.2	N12 34.5
Regulus	208 09.1	N12 03.4
Rigel	281 34.9	S 8 13.3
Rigil Kent.	140 25.4	S60 45.3
Sabik	102 40.6	S15 42.1
Schedar	350 07.8	N56 26.4
Shaula	96 55.1	S37 05.4
Sirius	258 54.7	S16 41.4
Spica	158 56.9	S11 03.8
Suhail	223 10.0	S43 21.3
Vega	80 55.7	N38 46.2
Zuben'ubi	137 32.5	S15 57.8

	S.H.A.	Mer. Pass.
	° ′	h m
Venus	66 10.7	15 08
Mars	187 27.8	7 02
Jupiter	151 31.5	9 25
Saturn	161 43.1	8 45

G.M.T.	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
27 00	183 07.5	S21 04.2	178 04.5	13.0	S18 13.9	6.2	53.9
01	198 07.3	04.6	192 36.5	13.0	18 20.1	6.2	53.9
02	213 07.1	05.1	207 08.5	13.0	18 26.3	6.1	53.9
03	228 06.9	05.6	221 40.5	12.9	18 32.4	6.1	53.9
04	243 06.7	06.0	236 12.4	12.9	18 38.5	5.9	53.9
05	258 06.5	06.5	250 44.3	12.9	18 44.4	5.9	53.9
06	273 06.3	S21 06.9	265 16.2	12.8	S18 50.3	5.8	53.9
07	288 06.1	07.4	279 48.0	12.8	18 56.1	5.7	53.9
08	303 05.9	07.9	294 19.8	12.7	19 01.8	5.6	53.9
F 09	318 05.7	08.3	308 51.5	12.7	19 07.4	5.5	53.9
R 10	333 05.5	08.8	323 23.2	12.7	19 12.9	5.5	53.9
I 11	348 05.3	09.2	337 54.9	12.6	19 18.4	5.3	53.9
D 12	3 05.1	S21 09.7	352 26.5	12.6	S19 23.7	5.3	53.9
A 13	18 04.9	10.1	6 58.1	12.6	19 29.0	5.2	53.9
Y 14	33 04.6	10.6	21 29.7	12.5	19 34.2	5.1	53.9
15	48 04.4	11.0	36 01.2	12.5	19 39.3	5.0	53.9
16	63 04.2	11.5	50 32.7	12.5	19 44.3	4.9	54.0
17	78 04.0	11.9	65 04.2	12.4	19 49.2	4.9	54.0
18	93 03.8	S21 12.4	79 35.6	12.4	S19 54.1	4.7	54.0
19	108 03.6	12.8	94 07.0	12.4	19 58.8	4.7	54.0
20	123 03.4	13.3	108 38.4	12.3	20 03.5	4.6	54.0
21	138 03.2	13.7	123 09.7	12.3	20 08.1	4.4	54.0
22	153 03.0	14.2	137 41.0	12.3	20 12.5	4.4	54.0
23	168 02.8	14.6	152 12.3	12.2	20 16.9	4.3	54.0
28 00	183 02.6	S21 15.1	166 43.5	12.2	S20 21.2	4.2	54.0
01	198 02.3	15.5	181 14.7	12.2	20 25.4	4.1	54.0
02	213 02.1	16.0	195 45.9	12.1	20 29.5	4.1	54.0
03	228 01.9	16.4	210 17.0	12.1	20 33.6	3.9	54.0
04	243 01.7	16.8	224 48.1	12.1	20 37.5	3.8	54.0
05	258 01.5	17.3	239 19.2	12.0	20 41.3	3.8	54.0
06	273 01.3	S21 17.7	253 50.2	12.0	S20 45.1	3.6	54.0
07	288 01.1	18.2	268 21.2	12.0	20 48.7	3.6	54.0
S 08	303 00.9	18.6	282 52.2	12.0	20 52.3	3.4	54.0
A 09	318 00.6	19.0	297 23.2	11.9	20 55.7	3.4	54.0
T 10	333 00.4	19.5	311 54.1	11.9	20 59.1	3.2	54.0
U 11	348 00.2	19.9	326 25.0	11.9	21 02.3	3.2	54.0
R 12	3 00.0	S21 20.4	340 55.9	11.8	S21 05.5	3.1	54.0
D 13	17 59.8	20.8	355 26.7	11.8	21 08.6	2.9	54.0
A 14	32 59.6	21.2	9 57.5	11.8	21 11.5	2.9	54.1
Y 15	47 59.4	21.7	24 28.3	11.8	21 14.4	2.8	54.1
16	62 59.1	22.1	38 59.1	11.7	21 17.2	2.7	54.1
17	77 58.9	22.5	53 29.8	11.7	21 19.9	2.6	54.1
18	92 58.7	S21 23.0	68 00.5	11.7	S21 22.5	2.4	54.1
19	107 58.5	23.4	82 31.2	11.7	21 24.9	2.4	54.1
20	122 58.3	23.8	97 01.9	11.6	21 27.3	2.3	54.1
21	137 58.1	24.3	111 32.5	11.7	21 29.6	2.2	54.1
22	152 57.8	24.7	126 03.2	11.6	21 31.8	2.1	54.1
23	167 57.6	25.1	140 33.8	11.5	21 33.9	2.0	54.1
29 00	182 57.4	S21 25.5	155 04.3	11.6	S21 35.9	1.8	54.1
01	197 57.2	26.0	169 34.9	11.5	21 37.7	1.8	54.1
02	212 57.0	26.4	184 05.4	11.5	21 39.5	1.7	54.1
03	227 56.8	26.8	198 35.9	11.5	21 41.2	1.6	54.2
04	242 56.5	27.3	213 06.4	11.5	21 42.8	1.5	54.2
05	257 56.3	27.7	227 36.9	11.5	21 44.3	1.4	54.2
06	272 56.1	S21 28.1	242 07.4	11.4	S21 45.7	1.2	54.2
07	287 55.9	28.5	256 37.8	11.4	21 46.9	1.2	54.2
08	302 55.7	29.0	271 08.2	11.4	21 48.1	1.1	54.2
S 09	317 55.4	29.4	285 38.6	11.4	21 49.2	0.9	54.2
U 10	332 55.2	29.8	300 09.0	11.4	21 50.1	0.9	54.2
N 11	347 55.0	30.2	314 39.4	11.3	21 51.0	0.8	54.2
D 12	2 54.8	S21 30.6	329 09.7	11.4	S21 51.8	0.6	54.2
A 13	17 54.6	31.1	343 40.1	11.3	21 52.4	0.6	54.2
Y 14	32 54.3	31.5	358 10.4	11.3	21 53.0	0.4	54.3
15	47 54.1	31.9	12 40.7	11.3	21 53.4	0.4	54.3
16	62 53.9	32.3	27 11.0	11.3	21 53.8	0.2	54.3
17	77 53.7	32.7	41 41.3	11.3	21 54.0	0.2	54.3
18	92 53.4	S21 33.1	56 11.6	11.2	S21 54.2	0.0	54.3
19	107 53.2	33.6	70 41.8	11.3	21 54.2	0.1	54.3
20	122 53.0	34.0	85 12.1	11.2	21 54.1	0.1	54.3
21	137 52.8	34.4	99 42.3	11.3	21 54.0	0.3	54.3
22	152 52.5	34.8	114 12.6	11.2	21 53.7	0.4	54.3
23	167 52.3	35.2	128 42.8	11.2	21 53.3	0.5	54.4
	S.D. 16.2	d 0.4	S.D. 14.7		14.7		14.8

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 27	Moonrise 28	Moonrise 29	Moonrise 30
°	h m	h m	h m	h m	h m	h m	h m
N 72	07 42	09 36	▬	▬	▬	▬	▬
N 70	07 27	09 00	▬	▬	▬	▬	▬
68	07 15	08 35	10 18	10 29	12 11	13 55	14 14
66	07 04	08 16	09 36	09 54	11 16	12 24	13 07
64	06 55	08 00	09 07	09 28	10 43	11 46	12 31
62	06 48	07 47	08 46	09 09	10 19	11 19	12 06
60	06 41	07 35	08 28	08 53	10 00	10 58	11 45
N 58	06 35	07 25	08 14	08 39	09 44	10 41	11 29
56	06 29	07 17	08 02	08 28	09 31	10 27	11 15
54	06 24	07 09	07 51	08 18	09 19	10 15	11 03
52	06 19	07 02	07 41	08 08	09 09	10 04	10 52
50	06 15	06 55	07 32	08 00	09 00	09 54	10 42
45	06 05	06 41	07 14	07 43	08 40	09 34	10 22
N 40	05 56	06 30	06 59	07 29	08 25	09 17	10 06
35	05 48	06 19	06 47	07 17	08 11	09 03	09 52
30	05 40	06 10	06 36	07 07	08 00	08 51	09 40
20	05 26	05 53	06 17	06 50	07 40	08 30	09 19
N 10	05 12	05 38	06 00	06 34	07 23	08 12	09 02
0	04 56	05 22	05 44	06 20	07 07	07 56	08 45
S 10	04 39	05 06	05 28	06 06	06 51	07 39	08 28
20	04 19	04 47	05 11	05 51	06 34	07 21	08 10
30	03 52	04 25	04 52	05 33	06 15	07 01	07 50
35	03 36	04 11	04 40	05 23	06 04	06 49	07 38
40	03 15	03 55	04 27	05 12	05 51	06 35	07 24
45	02 49	03 35	04 11	04 58	05 36	06 19	07 08
S 50	02 11	03 09	03 51	04 42	05 17	05 59	06 48
52	01 50	02 56	03 42	04 34	05 08	05 49	06 38
54	01 23	02 41	03 31	04 26	04 58	05 38	06 27
56	00 39	02 24	03 19	04 16	04 47	05 26	06 15
58	////	02 02	03 05	04 05	04 34	05 12	06 01
S 60	////	01 32	02 48	03 53	04 19	04 56	05 44

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 27	Moonset 28	Moonset 29	Moonset 30
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	13 59	15 53	▬	▬	▬	▬
N 70	▬	14 35	16 08	13 21	▬	▬	▬
68	13 17	15 00	16 21	14 25	14 22	14 19	15 43
66	14 00	15 20	16 31	15 01	15 17	15 51	16 50
64	14 28	15 36	16 40	15 27	15 50	16 29	17 25
62	14 50	15 49	16 48	15 47	16 15	16 55	17 51
60	15 07	16 00	16 55	16 03	16 34	17 16	18 11
N 58	15 22	16 10	17 01	16 17	16 50	17 33	18 27
56	15 34	16 19	17 06	16 29	17 04	17 48	18 41
54	15 45	16 27	17 11	16 40	17 16	18 00	18 53
52	15 55	16 34	17 16	16 49	17 26	18 11	19 04
50	16 03	16 40	17 21	16 57	17 35	18 21	19 13
45	16 21	16 54	17 31	17 15	17 55	18 41	19 33
N 40	16 36	17 06	17 40	17 30	18 11	18 58	19 49
35	16 49	17 17	17 48	17 42	18 25	19 12	20 03
30	17 00	17 26	17 55	17 53	18 36	19 24	20 15
20	17 19	17 43	18 10	18 11	18 57	19 45	20 35
N 10	17 36	17 58	18 24	18 27	19 14	20 03	20 52
0	17 52	18 14	18 40	18 43	19 31	20 19	21 09
S 10	18 08	18 30	18 57	18 58	19 47	20 36	21 25
20	18 25	18 49	19 17	19 14	20 05	20 54	21 42
30	18 45	19 11	19 44	19 33	20 25	21 15	22 02
35	18 56	19 25	20 01	19 44	20 37	21 27	22 14
40	19 10	19 42	20 21	19 56	20 50	21 41	22 27
45	19 26	20 02	20 48	20 11	21 06	21 57	22 43
S 50	19 46	20 28	21 26	20 29	21 26	22 17	23 02
52	19 55	20 41	21 47	20 38	21 35	22 27	23 12
54	20 06	20 56	22 16	20 47	21 46	22 38	23 22
56	20 18	21 14	23 03	20 58	21 58	22 50	23 33
58	20 32	21 36	////	21 11	22 12	23 04	23 47
S 60	20 49	22 07	////	21 25	22 28	23 21	24 02

Day	SUN Eqn. of Time 00^h	SUN Eqn. of Time 12^h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
27	12 30	12 21	11 48	12 31	00 08	01	
28	12 11	12 00	11 48	13 19	00 55	02	●
29	11 50	11 40	11 48	14 08	01 43	03	

G.M.T.	ARIES	VENUS −4.3		MARS +1.3		JUPITER −1.3		SATURN +1.0		STARS		
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	Name	S.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′		° ′	° ′
30 00	68 46.6	133 09.0	S24 24.3	255 16.6	N 4 53.7	219 55.7	S10 37.7	230 18.9	S 5 19.6	Acamar	315 36.2	S40 27.8
01	83 49.1	148 09.2	23.8	270 17.9	53.2	234 57.7	37.9	245 21.1	19.7	Achernar	335 44.2	S57 20.0
02	98 51.5	163 09.5	23.3	285 19.1	52.7	249 59.7	38.0	260 23.4	19.8	Acrux	173 36.7	S62 59.5
03	113 54.0	178 09.8	·· 22.8	300 20.4	·· 52.3	265 01.7	·· 38.2	275 25.6	·· 19.8	Adhara	255 31.1	S28 56.7
04	128 56.5	193 10.0	22.3	315 21.7	51.8	280 03.7	38.4	290 27.9	19.9	Aldebaran	291 16.7	N16 28.4
05	143 58.9	208 10.3	21.8	330 22.9	51.3	295 05.7	38.5	305 30.1	20.0			
06	159 01.4	223 10.5	S24 21.3	345 24.2	N 4 50.8	310 07.7	S10 38.7	320 32.3	S 5 20.1	Alioth	166 42.1	N56 03.4
07	174 03.9	238 10.8	20.8	0 25.5	50.3	325 09.7	38.9	335 34.6	20.2	Alkaid	153 18.2	N49 24.2
08	189 06.3	253 11.1	20.3	15 26.7	49.9	340 11.7	39.0	350 36.8	20.3	Al Na'ir	28 14.0	S47 03.2
M 09	204 08.8	268 11.3	·· 19.8	30 28.0	·· 49.4	355 13.7	·· 39.2	5 39.1	·· 20.3	Alnilam	276 10.5	S 1 12.8
O 10	219 11.3	283 11.6	19.3	45 29.3	48.9	10 15.7	39.3	20 41.3	20.4	Alphard	218 19.7	S 8 34.6
N 11	234 13.7	298 11.9	18.8	60 30.6	48.4	25 17.7	39.5	35 43.6	20.5			
D 12	249 16.2	313 12.1	S24 18.3	75 31.8	N 4 47.9	40 19.7	S10 39.7	50 45.8	S 5 20.6	Alphecca	126 31.8	N26 46.6
A 13	264 18.7	328 12.4	17.8	90 33.1	47.5	55 21.8	39.8	65 48.0	20.7	Alpheratz	358 08.3	N28 59.5
Y 14	279 21.1	343 12.7	17.3	105 34.4	47.0	70 23.8	40.0	80 50.3	20.7	Altair	62 32.0	N 8 49.3
15	294 23.6	358 13.0	·· 16.8	120 35.6	·· 46.5	85 25.8	·· 40.2	95 52.5	·· 20.8	Ankaa	353 39.2	S42 24.5
16	309 26.0	13 13.2	16.2	135 36.9	46.0	100 27.8	40.3	110 54.8	20.9	Antares	112 56.2	S26 23.4
17	324 28.5	28 13.5	15.7	150 38.2	45.5	115 29.8	40.5	125 57.0	21.0			
18	339 31.0	43 13.8	S24 15.2	165 39.4	N 4 45.1	130 31.8	S10 40.7	140 59.3	S 5 21.1	Arcturus	146 18.0	N19 16.7
19	354 33.4	58 14.1	14.7	180 40.7	44.6	145 33.8	40.8	156 01.5	21.1	Atria	108 20.3	S68 59.7
20	9 35.9	73 14.4	14.2	195 42.0	44.1	160 35.8	41.0	171 03.7	21.2	Avior	234 27.5	S59 26.8
21	24 38.4	88 14.7	·· 13.7	210 43.3	·· 43.6	175 37.8	·· 41.2	186 06.0	·· 21.3	Bellatrix	278 57.5	N 6 20.0
22	39 40.8	103 14.9	13.2	225 44.5	43.1	190 39.8	41.3	201 08.2	21.4	Betelgeuse	271 27.1	N 7 24.2
23	54 43.3	118 15.2	12.6	240 45.8	42.7	205 41.8	41.5	216 10.5	21.5			
1 00	69 45.8	133 15.5	S24 12.1	255 47.1	N 4 42.2	220 43.8	S10 41.7	231 12.7	S 5 21.6	Canopus	264 06.3	S52 41.0
01	84 48.2	148 15.8	11.6	270 48.3	41.7	235 45.8	41.8	246 15.0	21.6	Capella	281 09.6	N45 58.8
02	99 50.7	163 16.1	11.1	285 49.6	41.2	250 47.8	42.0	261 17.2	21.7	Deneb	49 48.2	N45 13.1
03	114 53.1	178 16.4	·· 10.6	300 50.9	·· 40.8	265 49.8	·· 42.1	276 19.5	·· 21.8	Denebola	182 58.3	N14 40.5
04	129 55.6	193 16.7	10.1	315 52.2	40.3	280 51.8	42.3	291 21.7	21.9	Diphda	349 19.9	S18 05.3
05	144 58.1	208 17.0	09.5	330 53.4	39.8	295 53.8	42.5	306 23.9	22.0			
06	160 00.5	223 17.3	S24 09.0	345 54.7	N 4 39.3	310 55.8	S10 42.6	321 26.2	S 5 22.0	Dubhe	194 21.2	N61 50.7
07	175 03.0	238 17.6	08.5	0 56.0	38.8	325 57.8	42.8	336 28.4	22.1	Elnath	278 42.7	N28 35.5
08	190 05.5	253 18.0	08.0	15 57.3	38.4	340 59.8	43.0	351 30.7	22.2	Eltanin	90 57.9	N51 29.6
T 09	205 07.9	268 18.3	·· 07.5	30 58.5	·· 37.9	356 01.8	·· 43.1	6 32.9	·· 22.3	Enif	34 10.9	N 9 47.5
U 10	220 10.4	283 18.6	06.9	45 59.8	37.4	11 03.8	43.3	21 35.2	22.4	Fomalhaut	15 50.5	S29 43.3
E 11	235 12.9	298 18.9	06.4	61 01.1	36.9	26 05.8	43.5	36 37.4	22.4			
S 12	250 15.3	313 19.2	S24 05.9	76 02.4	N 4 36.5	41 07.8	S10 43.6	51 39.7	S 5 22.5	Gacrux	172 28.1	S57 00.3
D 13	265 17.8	328 19.5	05.4	91 03.6	36.0	56 09.8	43.8	66 41.9	22.6	Gienah	176 17.3	S17 26.2
A 14	280 20.3	343 19.9	04.8	106 04.9	35.5	71 11.8	43.9	81 44.1	22.7	Hadar	149 22.7	S60 16.8
Y 15	295 22.7	358 20.2	·· 04.3	121 06.2	·· 35.0	86 13.8	·· 44.1	96 46.4	·· 22.8	Hamal	328 27.7	N23 22.6
16	310 25.2	13 20.5	03.8	136 07.5	34.5	101 15.8	44.3	111 48.6	22.8	Kaus Aust.	84 16.1	S34 23.6
17	325 27.6	28 20.8	03.3	151 08.7	34.1	116 17.9	44.4	126 50.9	22.9			
18	340 30.1	43 21.2	S24 02.7	166 10.0	N 4 33.6	131 19.9	S10 44.6	141 53.1	S 5 23.0	Kochab	137 20.1	N74 13.8
19	355 32.6	58 21.5	02.2	181 11.3	33.1	146 21.9	44.8	156 55.4	23.1	Markab	14 02.3	N15 06.5
20	10 35.0	73 21.8	01.7	196 12.6	32.6	161 23.9	44.9	171 57.6	23.2	Menkar	314 40.0	N 4 01.1
21	25 37.5	88 22.2	·· 01.1	211 13.8	·· 32.2	176 25.9	·· 45.1	186 59.9	·· 23.2	Menkent	148 36.4	S36 16.6
22	40 40.0	103 22.5	00.6	226 15.1	31.7	191 27.9	45.3	202 02.1	23.3	Miaplacidus	221 44.4	S69 38.2
23	55 42.4	118 22.8	24 00.1	241 16.4	31.2	206 29.9	45.4	217 04.4	23.4			
2 00	70 44.9	133 23.2	S23 59.6	256 17.7	N 4 30.7	221 31.9	S10 45.6	232 06.6	S 5 23.5	Mirfak	309 14.4	N49 47.9
01	85 47.4	148 23.5	59.0	271 19.0	30.3	236 33.9	45.7	247 08.9	23.6	Nunki	76 28.5	S26 19.2
02	100 49.8	163 23.9	58.5	286 20.2	29.8	251 35.9	45.9	262 11.1	23.6	Peacock	53 57.4	S56 47.9
03	115 52.3	178 24.2	·· 58.0	301 21.5	·· 29.3	266 37.9	·· 46.1	277 13.3	·· 23.7	Pollux	243 56.9	N28 04.2
04	130 54.8	193 24.6	57.4	316 22.8	28.8	281 39.9	46.2	292 15.6	23.8	Procyon	245 24.7	N 5 16.3
05	145 57.2	208 24.9	56.9	331 24.1	28.3	296 41.9	46.4	307 17.8	23.9			
06	160 59.7	223 25.3	S23 56.4	346 25.4	N 4 27.9	311 43.9	S10 46.6	322 20.1	S 5 24.0	Rasalhague	96 29.2	N12 34.5
07	176 02.1	238 25.6	55.8	1 26.6	27.4	326 45.9	46.7	337 22.3	24.0	Regulus	208 09.1	N12 03.4
W 08	191 04.6	253 26.0	55.3	16 27.9	26.9	341 47.9	46.9	352 24.6	24.1	Rigel	281 34.9	S 8 13.3
E 09	206 07.1	268 26.3	·· 54.7	31 29.2	·· 26.4	356 49.9	·· 47.0	7 26.8	·· 24.2	Rigil Kent.	140 25.3	S60 45.3
D 10	221 09.5	283 26.7	54.2	46 30.5	26.0	11 52.0	47.2	22 29.1	24.3	Sabik	102 40.6	S15 42.1
N 11	236 12.0	298 27.0	53.7	61 31.8	25.5	26 54.0	47.4	37 31.3	24.4			
E 12	251 14.5	313 27.4	S23 53.1	76 33.0	N 4 25.0	41 56.0	S10 47.5	52 33.6	S 5 24.4	Schedar	350 07.8	N56 26.5
S 13	266 16.9	328 27.8	52.6	91 34.3	24.5	56 58.0	47.7	67 35.8	24.5	Shaula	96 55.1	S37 05.4
D 14	281 19.4	343 28.1	52.1	106 35.6	24.1	72 00.0	47.9	82 38.1	24.6	Sirius	258 54.7	S16 41.4
A 15	296 21.9	358 28.5	·· 51.5	121 36.9	·· 23.6	87 02.0	·· 48.0	97 40.3	·· 24.7	Spica	158 56.9	S11 03.8
Y 16	311 24.3	13 28.9	51.0	136 38.2	23.1	102 04.0	48.2	112 42.6	24.7	Suhail	223 10.0	S43 21.3
17	326 26.8	28 29.3	50.4	151 39.5	22.6	117 06.0	48.3	127 44.8	24.8			
18	341 29.2	43 29.6	S23 49.9	166 40.7	N 4 22.2	132 08.0	S10 48.5	142 47.1	S 5 24.9	Vega	80 55.7	N38 46.2
19	356 31.7	58 30.0	49.4	181 42.0	21.7	147 10.0	48.7	157 49.3	25.0	Zuben'ubi	137 32.5	S15 57.8
20	11 34.2	73 30.4	48.8	196 43.3	21.2	162 12.0	48.8	172 51.6	25.1		S.H.A.	Mer. Pass.
21	26 36.6	88 30.8	·· 48.3	211 44.6	·· 20.7	177 14.0	·· 49.0	187 53.8	·· 25.1		° ′	h m
22	41 39.1	103 31.2	47.7	226 45.9	20.3	192 16.0	49.1	202 56.1	25.2	Venus	63 29.8	15 07
23	56 41.6	118 31.6	47.2	241 47.2	19.8	207 18.0	49.3	217 58.3	25.3	Mars	186 01.3	6 56
	h m									Jupiter	150 58.0	9 16
Mer. Pass.	19 17.8	v 0.3	d 0.5	v 1.3	d 0.5	v 2.0	d 0.2	v 2.2	d 0.1	Saturn	161 27.0	8 34

G.M.T.	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
30 00	182 52.1	S21 35.6	143 13.0	11.2	S21 52.8	0.6	54.4
01	197 51.9	36.0	157 43.2	11.2	21 52.2	0.7	54.4
02	212 51.6	36.5	172 13.4	11.2	21 51.5	0.8	54.4
03	227 51.4	36.9	186 43.6	11.2	21 50.7	0.9	54.4
04	242 51.2	37.3	201 13.8	11.2	21 49.8	1.0	54.4
05	257 51.0	37.7	215 44.0	11.1	21 48.8	1.1	54.4
06	272 50.7	S21 38.1	230 14.1	11.2	S21 47.7	1.2	54.4
07	287 50.5	38.5	244 44.3	11.2	21 46.5	1.3	54.5
08	302 50.3	38.9	259 14.5	11.2	21 45.2	1.4	54.5
M 09	317 50.1	39.3	273 44.7	11.1	21 43.8	1.6	54.5
O 10	332 49.8	39.7	288 14.8	11.2	21 42.2	1.6	54.5
N 11	347 49.6	40.1	302 45.0	11.1	21 40.6	1.8	54.5
D 12	2 49.4	S21 40.5	317 15.1	11.2	S21 38.8	1.8	54.5
A 13	17 49.1	40.9	331 45.3	11.1	21 37.0	2.0	54.5
Y 14	32 48.9	41.3	346 15.4	11.2	21 35.0	2.0	54.6
15	47 48.7	41.7	0 45.6	11.2	21 33.0	2.2	54.6
16	62 48.5	42.1	15 15.8	11.1	21 30.8	2.2	54.6
17	77 48.2	42.5	29 45.9	11.2	21 28.6	2.4	54.6
18	92 48.0	S21 42.9	44 16.1	11.1	S21 26.2	2.5	54.6
19	107 47.8	43.3	58 46.2	11.2	21 23.7	2.6	54.6
20	122 47.5	43.7	73 16.4	11.2	21 21.1	2.6	54.7
21	137 47.3	44.1	87 46.6	11.1	21 18.5	2.8	54.7
22	152 47.1	44.5	102 16.7	11.2	21 15.7	2.9	54.7
23	167 46.8	44.9	116 46.9	11.2	21 12.8	3.0	54.7
1 00	182 46.6	S21 45.3	131 17.1	11.2	S21 09.8	3.1	54.7
01	197 46.4	45.7	145 47.3	11.2	21 06.7	3.2	54.7
02	212 46.1	46.1	160 17.5	11.2	21 03.5	3.3	54.8
03	227 45.9	46.5	174 47.7	11.2	21 00.2	3.4	54.8
04	242 45.7	46.9	189 17.9	11.2	20 56.8	3.5	54.8
05	257 45.5	47.3	203 48.1	11.2	20 53.3	3.6	54.8
06	272 45.2	S21 47.6	218 18.3	11.2	S20 49.7	3.7	54.8
07	287 45.0	48.0	232 48.5	11.2	20 46.0	3.8	54.9
08	302 44.8	48.4	247 18.7	11.3	20 42.2	4.0	54.9
T 09	317 44.5	48.8	261 49.0	11.2	20 38.2	4.0	54.9
U 10	332 44.3	49.2	276 19.2	11.2	20 34.2	4.1	54.9
E 11	347 44.0	49.6	290 49.4	11.3	20 30.1	4.2	54.9
S 12	2 43.8	S21 50.0	305 19.7	11.3	S20 25.9	4.3	54.9
D 13	17 43.6	50.4	319 50.0	11.3	20 21.6	4.5	55.0
A 14	32 43.3	50.7	334 20.3	11.3	20 17.1	4.5	55.0
Y 15	47 43.1	51.1	348 50.6	11.3	20 12.6	4.6	55.0
16	62 42.9	51.5	3 20.9	11.3	20 08.0	4.7	55.0
17	77 42.6	51.9	17 51.2	11.3	20 03.3	4.9	55.0
18	92 42.4	S21 52.3	32 21.5	11.3	S19 58.4	4.9	55.1
19	107 42.2	52.7	46 51.8	11.4	19 53.5	5.0	55.1
20	122 41.9	53.0	61 22.2	11.3	19 48.5	5.1	55.1
21	137 41.7	53.4	75 52.5	11.4	19 43.4	5.3	55.1
22	152 41.4	53.8	90 22.9	11.4	19 38.1	5.3	55.2
23	167 41.2	54.2	104 53.3	11.4	19 32.8	5.4	55.2
2 00	182 41.0	S21 54.5	119 23.7	11.4	S19 27.4	5.5	55.2
01	197 40.7	54.9	133 54.1	11.4	19 21.9	5.6	55.2
02	212 40.5	55.3	148 24.5	11.4	19 16.3	5.7	55.2
03	227 40.3	55.7	162 54.9	11.5	19 10.6	5.8	55.3
04	242 40.0	56.1	177 25.4	11.4	19 04.8	5.9	55.3
05	257 39.8	56.4	191 55.8	11.5	18 58.9	6.0	55.3
06	272 39.5	S21 56.8	206 26.3	11.5	S18 52.9	6.1	55.3
W 07	287 39.3	57.2	220 56.8	11.5	18 46.8	6.2	55.4
E 08	302 39.1	57.5	235 27.3	11.5	18 40.6	6.3	55.4
D 09	317 38.8	57.9	249 57.8	11.5	18 34.3	6.4	55.4
N 10	332 38.6	58.3	264 28.3	11.5	18 27.9	6.5	55.4
E 11	347 38.3	58.6	278 58.8	11.6	18 21.4	6.5	55.5
S 12	2 38.1	S21 59.0	293 29.4	11.6	S18 14.9	6.7	55.5
D 13	17 37.9	59.4	308 00.0	11.5	18 08.2	6.8	55.5
A 14	32 37.6	21 59.8	322 30.5	11.6	18 01.4	6.8	55.5
Y 15	47 37.4	22 00.1	337 01.1	11.6	17 54.6	6.9	55.6
16	62 37.1	00.5	351 31.7	11.7	17 47.7	7.1	55.6
17	77 36.9	00.8	6 02.4	11.6	17 40.6	7.1	55.6
18	92 36.6	S22 01.2	20 33.0	11.6	S17 33.5	7.2	55.6
19	107 36.4	01.6	35 03.6	11.7	17 26.3	7.3	55.7
20	122 36.2	01.9	49 34.3	11.7	17 19.0	7.4	55.7
21	137 35.9	02.3	64 05.0	11.7	17 11.6	7.5	55.7
22	152 35.7	02.7	78 35.7	11.7	17 04.1	7.6	55.7
23	167 35.4	03.0	93 06.4	11.7	16 56.5	7.6	55.8
	S.D. 16.2	d 0.4	S.D. 14.9		15.0		15.1

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 30	Moonrise 1	Moonrise 2	Moonrise 3
°	h m	h m	h m	h m	h m	h m	h m
N 72	07 51	09 50	▬	▬	▬	16 08	14 57
N 70	07 35	09 11	▬	▬	▬	14 46	14 26
68	07 21	08 44	10 36	14 14	14 10	14 07	14 03
66	07 10	08 23	09 47	13 07	13 29	13 39	13 45
64	07 01	08 06	09 16	12 31	13 00	13 18	13 30
62	06 53	07 52	08 53	12 06	12 39	13 01	13 17
60	06 46	07 41	08 35	11 45	12 21	12 47	13 07
N 58	06 39	07 30	08 20	11 29	12 06	12 35	12 58
56	06 33	07 21	08 07	11 15	11 54	12 24	12 49
54	06 28	07 13	07 55	11 03	11 42	12 15	12 42
52	06 23	07 06	07 45	10 52	11 33	12 07	12 36
50	06 18	06 59	07 37	10 42	11 24	11 59	12 30
45	06 08	06 45	07 18	10 22	11 05	11 43	12 17
N 40	05 59	06 32	07 02	10 06	10 50	11 30	12 06
35	05 50	06 22	06 49	09 52	10 37	11 19	11 57
30	05 43	06 12	06 38	09 40	10 26	11 09	11 49
20	05 28	05 55	06 19	09 19	10 07	10 52	11 35
N 10	05 13	05 39	06 01	09 02	09 50	10 37	11 23
0	04 57	05 23	05 45	08 45	09 34	10 23	11 12
S 10	04 40	05 06	05 29	08 28	09 19	10 09	11 00
20	04 19	04 47	05 12	08 10	09 02	09 54	10 48
30	03 52	04 24	04 51	07 50	08 42	09 37	10 34
35	03 35	04 10	04 39	07 38	08 31	09 27	10 26
40	03 13	03 54	04 26	07 24	08 18	09 16	10 17
45	02 46	03 33	04 09	07 08	08 03	09 02	10 06
S 50	02 07	03 06	03 49	06 48	07 44	08 46	09 52
52	01 45	02 53	03 39	06 38	07 35	08 38	09 46
54	01 15	02 38	03 28	06 27	07 25	08 29	09 39
56	00 18	02 19	03 16	06 15	07 13	08 20	09 32
58	////	01 55	03 01	06 01	07 00	08 09	09 23
S 60	////	01 23	02 44	05 44	06 45	07 56	09 13

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 30	Moonset 1	Moonset 2	Moonset 3
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	13 48	15 47	▬	▬	17 16	20 07
N 70	▬	14 27	16 03	▬	▬	18 37	20 37
68	13 02	14 54	16 16	15 43	17 29	19 15	20 59
66	13 51	15 15	16 27	16 50	18 10	19 41	21 16
64	14 22	15 31	16 37	17 25	18 38	20 02	21 30
62	14 45	15 45	16 45	17 51	19 00	20 18	21 41
60	15 03	15 57	16 52	18 11	19 17	20 31	21 51
N 58	15 18	16 07	16 58	18 27	19 31	20 43	22 00
56	15 31	16 16	17 04	18 41	19 44	20 53	22 07
54	15 42	16 25	17 10	18 53	19 55	21 02	22 14
52	15 52	16 32	17 15	19 04	20 04	21 10	22 20
50	16 01	16 39	17 19	19 13	20 13	21 17	22 25
45	16 20	16 53	17 30	19 33	20 31	21 32	22 37
N 40	16 35	17 05	17 39	19 49	20 45	21 45	22 47
35	16 48	17 16	17 47	20 03	20 58	21 55	22 55
30	17 00	17 26	17 55	20 15	21 09	22 04	23 02
20	17 19	17 43	18 10	20 35	21 27	22 20	23 14
N 10	17 37	17 59	18 25	20 52	21 43	22 34	23 25
0	17 53	18 15	18 41	21 09	21 58	22 47	23 35
S 10	18 09	18 32	18 59	21 25	22 13	22 59	23 45
20	18 27	18 51	19 20	21 42	22 29	23 13	23 55
30	18 47	19 14	19 47	22 02	22 47	23 28	24 07
35	18 59	19 28	20 04	22 14	22 57	23 37	24 14
40	19 13	19 45	20 25	22 27	23 09	23 47	24 22
45	19 29	20 06	20 53	22 43	23 24	23 59	24 31
S 50	19 50	20 33	21 33	23 02	23 41	24 13	00 13
52	20 00	20 46	21 55	23 12	23 49	24 20	00 20
54	20 11	21 02	22 26	23 22	23 58	24 27	00 27
56	20 24	21 21	23 31	23 33	24 08	00 08	00 36
58	20 38	21 45	////	23 47	24 20	00 20	00 45
S 60	20 56	22 18	////	24 02	00 02	00 33	00 55

Day	SUN Eqn. of Time 00ʰ	SUN Eqn. of Time 12ʰ	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
30	11 29	11 18	11 49	14 57	02 32	04	
1	11 07	10 56	11 49	15 46	03 22	05	◑
2	10 44	10 33	11 49	16 35	04 11	06	

G.M.T	ARIES	VENUS −4.3		MARS +1.3		JUPITER −1.3		SATURN +1.0	
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
3 00	71 44.0	133 31.9	S23 46.6	256 48.4	N 4 19.3	222 20.1	S10 49.5	233 00.5	S 5 25.4
01	86 46.5	148 32.3	46.1	271 49.7	18.8	237 22.1	49.6	248 02.8	25.5
02	101 49.0	163 32.7	45.5	286 51.0	18.4	252 24.1	49.8	263 05.0	25.5
03	116 51.4	178 33.1	·· 45.0	301 52.3	·· 17.9	267 26.1	·· 50.0	278 07.3	·· 25.6
04	131 53.9	193 33.5	44.4	316 53.6	17.4	282 28.1	50.1	293 09.5	25.7
05	146 56.4	208 33.9	43.9	331 54.9	16.9	297 30.1	50.3	308 11.8	25.8
06	161 58.8	223 34.3	S23 43.3	346 56.2	N 4 16.5	312 32.1	S10 50.4	323 14.0	S 5 25.8
07	177 01.3	238 34.7	42.8	1 57.4	16.0	327 34.1	50.6	338 16.3	25.9
T 08	192 03.7	253 35.1	42.3	16 58.7	15.5	342 36.1	50.8	353 18.5	26.0
H 09	207 06.2	268 35.5	·· 41.7	32 00.0	·· 15.1	357 38.1	·· 50.9	8 20.8	·· 26.1
U 10	222 08.7	283 35.9	41.2	47 01.3	14.6	12 40.1	51.1	23 23.0	26.2
R 11	237 11.1	298 36.4	40.6	62 02.6	14.1	27 42.2	51.2	38 25.3	26.2
S 12	252 13.6	313 36.8	S23 40.0	77 03.9	N 4 13.6	42 44.2	S10 51.4	53 27.5	S 5 26.3
D 13	267 16.1	328 37.2	39.5	92 05.2	13.2	57 46.2	51.6	68 29.8	26.4
A 14	282 18.5	343 37.6	38.9	107 06.5	12.7	72 48.2	51.7	83 32.0	26.5
Y 15	297 21.0	358 38.0	·· 38.4	122 07.7	·· 12.2	87 50.2	·· 51.9	98 34.3	·· 26.6
16	312 23.5	13 38.4	37.8	137 09.0	11.7	102 52.2	52.0	113 36.5	26.6
17	327 25.9	28 38.9	37.3	152 10.3	11.3	117 54.2	52.2	128 38.8	26.7
18	342 28.4	43 39.3	S23 36.7	167 11.6	N 4 10.8	132 56.2	S10 52.4	143 41.0	S 5 26.8
19	357 30.9	58 39.7	36.2	182 12.9	10.3	147 58.2	52.5	158 43.3	26.9
20	12 33.3	73 40.1	35.6	197 14.2	09.8	163 00.2	52.7	173 45.5	26.9
21	27 35.8	88 40.6	·· 35.1	212 15.5	·· 09.4	178 02.3	·· 52.8	188 47.8	·· 27.0
22	42 38.2	103 41.0	34.5	227 16.8	08.9	193 04.3	53.0	203 50.0	27.1
23	57 40.7	118 41.4	33.9	242 18.1	08.4	208 06.3	53.2	218 52.3	27.2
4 00	72 43.2	133 41.9	S23 33.4	257 19.3	N 4 08.0	223 08.3	S10 53.3	233 54.6	S 5 27.2
01	87 45.6	148 42.3	32.8	272 20.6	07.5	238 10.3	53.5	248 56.8	27.3
02	102 48.1	163 42.8	32.3	287 21.9	07.0	253 12.3	53.6	263 59.1	27.4
03	117 50.6	178 43.2	·· 31.7	302 23.2	·· 06.5	268 14.3	·· 53.8	279 01.3	·· 27.5
04	132 53.0	193 43.7	31.1	317 24.5	06.1	283 16.3	54.0	294 03.6	27.6
05	147 55.5	208 44.1	30.6	332 25.8	05.6	298 18.3	54.1	309 05.8	27.6
06	162 58.0	223 44.6	S23 30.0	347 27.1	N 4 05.1	313 20.3	S10 54.3	324 08.1	S 5 27.7
07	178 00.4	238 45.0	29.5	2 28.4	04.7	328 22.4	54.4	339 10.3	27.8
08	193 02.9	253 45.5	28.9	17 29.7	04.2	343 24.4	54.6	354 12.6	27.9
F 09	208 05.4	268 45.9	·· 28.3	32 31.0	·· 03.7	358 26.4	·· 54.8	9 14.8	·· 27.9
R 10	223 07.8	283 46.4	27.8	47 32.3	03.2	13 28.4	54.9	24 17.1	28.0
I 11	238 10.3	298 46.8	27.2	62 33.6	02.8	28 30.4	55.1	39 19.3	28.1
D 12	253 12.7	313 47.3	S23 26.6	77 34.9	N 4 02.3	43 32.4	S10 55.2	54 21.6	S 5 28.2
A 13	268 15.2	328 47.8	26.1	92 36.2	01.8	58 34.4	55.4	69 23.8	28.3
Y 14	283 17.7	343 48.2	25.5	107 37.4	01.4	73 36.4	55.6	84 26.1	28.3
15	298 20.1	358 48.7	·· 24.9	122 38.7	·· 00.9	88 38.5	·· 55.7	99 28.3	·· 28.4
16	313 22.6	13 49.2	24.4	137 40.0	4 00.4	103 40.5	55.9	114 30.6	28.5
17	328 25.1	28 49.7	23.8	152 41.3	3 59.9	118 42.5	56.0	129 32.8	28.6
18	343 27.5	43 50.1	S23 23.2	167 42.6	N 3 59.5	133 44.5	S10 56.2	144 35.1	S 5 28.6
19	358 30.0	58 50.6	22.7	182 43.9	59.0	148 46.5	56.4	159 37.3	28.7
20	13 32.5	73 51.1	22.1	197 45.2	58.5	163 48.5	56.5	174 39.6	28.8
21	28 34.9	88 51.6	·· 21.5	212 46.5	·· 58.1	178 50.5	·· 56.7	189 41.9	·· 28.9
22	43 37.4	103 52.1	21.0	227 47.8	57.6	193 52.5	56.8	204 44.1	28.9
23	58 39.8	118 52.6	20.4	242 49.1	57.1	208 54.6	57.0	219 46.4	29.0
5 00	73 42.3	133 53.0	S23 19.8	257 50.4	N 3 56.7	223 56.6	S10 57.2	234 48.6	S 5 29.1
01	88 44.8	148 53.5	19.3	272 51.7	56.2	238 58.6	57.3	249 50.9	29.2
02	103 47.2	163 54.0	18.7	287 53.0	55.7	254 00.6	57.5	264 53.1	29.2
03	118 49.7	178 54.5	·· 18.1	302 54.3	·· 55.2	269 02.6	·· 57.6	279 55.4	·· 29.3
04	133 52.2	193 55.0	17.5	317 55.6	54.8	284 04.6	57.8	294 57.6	29.4
05	148 54.6	208 55.5	17.0	332 56.9	54.3	299 06.6	57.9	309 59.9	29.5
06	163 57.1	223 56.0	S23 16.4	347 58.2	N 3 53.8	314 08.7	S10 58.1	325 02.1	S 5 29.5
07	178 59.6	238 56.5	15.8	2 59.5	53.4	329 10.7	58.3	340 04.4	29.6
S 08	194 02.0	253 57.0	15.2	18 00.8	52.9	344 12.7	58.4	355 06.6	29.7
A 09	209 04.5	268 57.6	·· 14.7	33 02.1	·· 52.4	359 14.7	·· 58.6	10 08.9	·· 29.8
T 10	224 07.0	283 58.1	14.1	48 03.4	52.0	14 16.7	58.7	25 11.2	29.8
U 11	239 09.4	298 58.6	13.5	63 04.7	51.5	29 18.7	58.9	40 13.4	29.9
R 12	254 11.9	313 59.1	S23 12.9	78 06.0	N 3 51.0	44 20.7	S10 59.1	55 15.7	S 5 30.0
D 13	269 14.3	328 59.6	12.4	93 07.3	50.6	59 22.8	59.2	70 17.9	30.1
A 14	284 16.8	344 00.1	11.8	108 08.6	50.1	74 24.8	59.4	85 20.2	30.2
Y 15	299 19.3	359 00.7	·· 11.2	123 09.9	·· 49.6	89 26.8	·· 59.5	100 22.4	·· 30.2
16	314 21.7	14 01.2	10.6	138 11.2	49.2	104 28.8	59.7	115 24.7	30.3
17	329 24.2	29 01.7	10.0	153 12.5	48.7	119 30.8	10 59.8	130 26.9	30.4
18	344 26.7	44 02.2	S23 09.5	168 13.8	N 3 48.2	134 32.8	S11 00.0	145 29.2	S 5 30.5
19	359 29.1	59 02.8	08.9	183 15.1	47.8	149 34.8	00.2	160 31.5	30.5
20	14 31.6	74 03.3	08.3	198 16.4	47.3	164 36.9	00.3	175 33.7	30.6
21	29 34.1	89 03.8	·· 07.7	213 17.7	·· 46.8	179 38.9	·· 00.5	190 36.0	·· 30.7
22	44 36.5	104 04.4	07.2	228 19.0	46.3	194 40.9	00.6	205 38.2	30.8
23	59 39.0	119 04.9	06.6	243 20.3	45.9	209 42.9	00.8	220 40.5	30.8
	h m								
Mer. Pass.	19 06.0	*v* 0.5	*d* 0.6	*v* 1.3	*d* 0.5	*v* 2.0	*d* 0.2	*v* 2.3	*d* 0.1

STARS		
Name	S.H.A.	Dec.
	° ′	° ′
Acamar	315 36.2	S40 22.8
Achernar	335 44.2	S57 20.0
Acrux	173 36.6	S62 59.5
Adhara	255 31.1	S28 56.7
Aldebaran	291 16.7	N16 28.4
Alioth	166 42.1	N56 03.4
Alkaid	153 18.2	N49 24.2
Al Na'ir	28 14.0	S47 03.2
Alnilam	276 10.5	S 1 12.8
Alphard	218 19.6	S 8 34.7
Alphecca	126 31.8	N26 46.6
Alpheratz	358 08.4	N28 59.5
Altair	62 32.0	N 8 49.3
Ankaa	353 39.2	S42 24.5
Antares	112 56.2	S26 23.4
Arcturus	146 18.0	N19 16.7
Atria	108 20.3	S68 59.6
Avior	234 27.5	S59 26.8
Bellatrix	278 57.5	N 6 20.0
Betelgeuse	271 27.1	N 7 24.2
Canopus	264 06.3	S52 41.1
Capella	281 09.6	N45 58.8
Deneb	49 48.2	N45 13.1
Denebola	182 58.3	N14 40.4
Diphda	349 19.9	S18 05.3
Dubhe	194 21.1	N61 50.7
Elnath	278 42.7	N28 35.5
Eltanin	90 57.9	N51 29.6
Enif	34 10.9	N 9 47.5
Fomalhaut	15 50.5	S29 43.3
Gacrux	172 28.1	S57 00.3
Gienah	176 17.3	S17 26.2
Hadar	149 22.7	S60 16.8
Hamal	328 27.7	N23 22.6
Kaus Aust.	84 16.1	S34 23.6
Kochab	137 20.1	N74 13.7
Markab	14 02.3	N15 06.5
Menkar	314 40.0	N 4 01.1
Menkent	148 36.4	S36 16.6
Miaplacidus	221 44.4	S69 38.2
Mirfak	309 14.4	N49 47.9
Nunki	76 28.5	S26 19.2
Peacock	53 57.5	S56 47.9
Pollux	243 56.9	N28 04.2
Procyon	245 24.7	N 5 16.3
Rasalhague	96 29.2	N12 34.5
Regulus	208 09.1	N12 03.4
Rigel	281 34.9	S 8 13.3
Rigil Kent.	140 25.3	S60 45.3
Sabik	102 40.5	S15 42.1
Schedar	350 07.8	N56 26.5
Shaula	96 55.1	S37 05.4
Sirius	258 54.7	S16 41.4
Spica	158 56.9	S11 03.8
Suhail	223 10.0	S43 21.3
Vega	80 55.7	N38 46.1
Zuben'ubi	137 32.4	S15 57.8

	S.H.A.	Mer. Pass.
	° ′	h m
Venus	60 58.7	15 05
Mars	184 36.2	6 50
Jupiter	150 25.1	9 06
Saturn	161 11.4	8 23

G.M.T.	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
3 00	182 35.2	S22 03.4	107 37.1	11.7	S16 48.9	7.8	55.8
01	197 34.9	03.7	122 07.8	11.8	16 41.1	7.8	55.8
02	212 34.7	04.1	136 38.6	11.7	16 33.3	7.9	55.9
03	227 34.4	·· 04.5	151 09.3	11.8	16 25.4	8.0	55.9
04	242 34.2	04.8	165 40.1	11.8	16 17.4	8.1	55.9
05	257 34.0	05.2	180 10.9	11.8	16 09.3	8.2	55.9
06	272 33.7	S22 05.5	194 41.7	11.8	S16 01.1	8.3	56.0
07	287 33.5	05.9	209 12.5	11.8	15 52.8	8.4	56.0
T 08	302 33.2	06.2	223 43.3	11.8	15 44.4	8.4	56.0
H 09	317 33.0	·· 06.6	238 14.1	11.9	15 36.0	8.5	56.1
U 10	332 32.7	06.9	252 45.0	11.8	15 27.5	8.6	56.1
R 11	347 32.5	07.3	267 15.8	11.9	15 18.9	8.7	56.1
S 12	2 32.2	S22 07.6	281 46.7	11.9	S15 10.2	8.8	56.2
D 13	17 32.0	08.0	296 17.6	11.8	15 01.4	8.8	56.2
A 14	32 31.7	08.3	310 48.4	11.9	14 52.6	9.0	56.2
Y 15	47 31.5	·· 08.7	325 19.3	11.9	14 43.6	9.0	56.2
16	62 31.2	09.0	339 50.2	12.0	14 34.6	9.1	56.3
17	77 31.0	09.4	354 21.2	11.9	14 25.5	9.2	56.3
18	92 30.7	S22 09.7	8 52.1	11.9	S14 16.3	9.2	56.3
19	107 30.5	10.1	23 23.0	11.9	14 07.1	9.3	56.4
20	122 30.2	10.4	37 53.9	12.0	13 57.8	9.5	56.4
21	137 30.0	·· 10.8	52 24.9	12.0	13 48.3	9.4	56.4
22	152 29.7	11.1	66 55.9	11.9	13 38.9	9.6	56.5
23	167 29.5	11.4	81 26.8	12.0	13 29.3	9.6	56.5
4 00	182 29.2	S22 11.8	95 57.8	12.0	S13 19.7	9.8	56.5
01	197 29.0	12.1	110 28.8	11.9	13 09.9	9.8	56.6
02	212 28.7	12.5	124 59.7	12.0	13 00.1	9.8	56.6
03	227 28.5	·· 12.8	139 30.7	12.0	12 50.3	10.0	56.6
04	242 28.2	13.1	154 01.7	12.0	12 40.3	10.0	56.7
05	257 28.0	13.5	168 32.7	12.0	12 30.3	10.1	56.7
06	272 27.7	S22 13.8	183 03.7	12.0	S12 20.2	10.1	56.7
07	287 27.5	14.2	197 34.7	12.0	12 10.1	10.2	56.8
08	302 27.2	14.5	212 05.7	12.0	11 59.9	10.3	56.8
F 09	317 27.0	·· 14.8	226 36.7	12.1	11 49.6	10.4	56.8
R 10	332 26.7	15.2	241 07.8	12.0	11 39.2	10.4	56.9
I 11	347 26.5	15.5	255 38.8	12.0	11 28.8	10.6	56.9
D 12	2 26.2	S22 15.8	270 09.8	12.0	S11 18.2	10.5	56.9
A 13	17 26.0	16.2	284 40.8	12.0	11 07.7	10.7	57.0
Y 14	32 25.7	16.5	299 11.8	12.0	10 57.0	10.7	57.0
15	47 25.5	·· 16.8	313 42.8	12.0	10 46.3	10.8	57.0
16	62 25.2	17.2	328 13.8	12.1	10 35.5	10.8	57.1
17	77 24.9	17.5	342 44.9	12.0	10 24.7	10.9	57.1
18	92 24.7	S22 17.8	357 15.9	12.0	S10 13.8	11.0	57.1
19	107 24.4	18.1	11 46.9	12.0	10 02.8	11.0	57.2
20	122 24.2	18.5	26 17.9	12.0	9 51.8	11.1	57.2
21	137 23.9	·· 18.8	40 48.9	11.9	9 40.7	11.2	57.3
22	152 23.7	19.1	55 19.8	12.0	9 29.5	11.2	57.3
23	167 23.4	19.4	69 50.8	12.0	9 18.3	11.3	57.3
5 00	182 23.2	S22 19.8	84 21.8	12.0	S 9 07.0	11.3	57.4
01	197 22.9	20.1	98 52.8	11.9	8 55.7	11.4	57.4
02	212 22.6	20.4	113 23.7	12.0	8 44.3	11.5	57.4
03	227 22.4	·· 20.7	127 54.7	11.9	8 32.8	11.5	57.5
04	242 22.1	21.1	142 25.6	12.0	8 21.3	11.5	57.5
05	257 21.9	21.4	156 56.6	11.9	8 09.8	11.7	57.5
06	272 21.6	S22 21.7	171 27.5	11.9	S 7 58.1	11.7	57.6
07	287 21.4	22.0	185 58.4	11.9	7 46.4	11.7	57.6
S 08	302 21.1	22.3	200 29.3	11.9	7 34.7	11.8	57.7
A 09	317 20.8	·· 22.6	215 00.2	11.9	7 22.9	11.8	57.7
T 10	332 20.6	23.0	229 31.1	11.8	7 11.1	11.9	57.7
U 11	347 20.3	23.3	244 01.9	11.9	6 59.2	12.0	57.8
R 12	2 20.1	S22 23.6	258 32.8	11.8	S 6 47.2	12.0	57.8
D 13	17 19.8	23.9	273 03.6	11.8	6 35.2	12.0	57.8
A 14	32 19.5	24.2	287 34.4	11.8	6 23.2	12.1	57.9
Y 15	47 19.3	·· 24.5	302 05.2	11.8	6 11.1	12.1	57.9
16	62 19.0	24.8	316 36.0	11.7	5 59.0	12.2	58.0
17	77 18.8	25.2	331 06.7	11.7	5 46.8	12.3	58.0
18	92 18.5	S22 25.5	345 37.4	11.7	S 5 34.5	12.2	58.0
19	107 18.2	25.8	0 08.1	11.7	5 22.3	12.4	58.1
20	122 18.0	26.1	14 38.8	11.7	5 09.9	12.3	58.1
21	137 17.7	·· 26.4	29 09.5	11.6	4 57.6	12.4	58.2
22	152 17.5	26.7	43 40.1	11.7	4 45.2	12.5	58.2
23	167 17.2	27.0	58 10.8	11.6	4 32.7	12.5	58.2
	S.D. 16.3	d 0.3	S.D. 15.3		15.5		15.8

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 3	Moonrise 4	Moonrise 5	Moonrise 6
°	h m	h m	h m	h m	h m	h m	h m
N 72	07 59	10 04	▬	14 57	14 31	14 12	13 56
N 70	07 41	09 20	▬	14 26	14 13	14 03	13 54
68	07 28	08 51	10 55	14 03	13 59	13 56	13 52
66	07 16	08 30	09 57	13 45	13 48	13 49	13 51
64	07 06	08 12	09 24	13 30	13 38	13 44	13 49
62	06 58	07 58	09 00	13 17	13 30	13 39	13 48
60	06 50	07 46	08 41	13 07	13 22	13 35	13 47
N 58	06 43	07 35	08 25	12 58	13 16	13 32	13 47
56	06 37	07 26	08 11	12 49	13 10	13 29	13 46
54	06 32	07 17	08 00	12 42	13 05	13 26	13 45
52	06 27	07 10	07 50	12 36	13 00	13 23	13 45
50	06 22	07 03	07 40	12 30	12 56	13 21	13 44
45	06 11	06 48	07 21	12 17	12 47	13 15	13 43
N 40	06 02	06 35	07 05	12 06	12 40	13 11	13 42
35	05 53	06 24	06 52	11 57	12 33	13 07	13 41
30	05 45	06 14	06 40	11 49	12 27	13 04	13 40
20	05 29	05 57	06 21	11 35	12 17	12 58	13 39
N 10	05 14	05 40	06 03	11 23	12 08	12 53	13 38
0	04 58	05 24	05 47	11 12	12 00	12 48	13 37
S 10	04 40	05 07	05 30	11 00	11 51	12 43	13 36
20	04 19	04 48	05 12	10 48	11 43	12 38	13 35
30	03 51	04 24	04 51	10 34	11 32	12 32	13 33
35	03 34	04 10	04 39	10 26	11 26	12 29	13 33
40	03 12	03 53	04 25	10 17	11 20	12 25	13 32
45	02 44	03 32	04 08	10 06	11 12	12 20	13 31
S 50	02 03	03 04	03 47	09 52	11 02	12 15	13 30
52	01 40	02 50	03 37	09 46	10 58	12 12	13 29
54	01 07	02 34	03 26	09 39	10 53	12 10	13 29
56	////	02 15	03 13	09 32	10 48	12 06	13 28
58	////	01 50	02 58	09 23	10 42	12 03	13 27
S 60	////	01 15	02 40	09 13	10 35	11 59	13 27

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 3	Moonset 4	Moonset 5	Moonset 6
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	13 36	15 41	20 07	22 14	24 14	00 14
N 70	▬	14 20	15 58	20 37	22 30	24 21	00 21
68	12 45	14 49	16 12	20 59	22 42	24 26	00 26
66	13 43	15 10	16 24	21 16	22 52	24 31	00 31
64	14 16	15 28	16 34	21 30	23 01	24 34	00 34
62	14 40	15 42	16 42	21 41	23 08	24 37	00 37
60	14 59	15 55	16 50	21 51	23 14	24 40	00 40
N 58	15 15	16 05	16 57	22 00	23 20	24 43	00 43
56	15 29	16 15	17 03	22 07	23 25	24 45	00 45
54	15 40	16 23	17 08	22 14	23 29	24 47	00 47
52	15 51	16 31	17 14	22 20	23 33	24 49	00 49
50	16 00	16 37	17 18	22 25	23 36	24 50	00 50
45	16 19	16 52	17 29	22 37	23 44	24 54	00 54
N 40	16 35	17 05	17 39	22 47	23 50	24 56	00 56
35	16 48	17 16	17 47	22 55	23 56	24 59	00 59
30	17 00	17 26	17 56	23 02	24 01	00 01	01 01
20	17 20	17 44	18 11	23 14	24 09	00 09	01 05
N 10	17 37	18 00	18 26	23 25	24 16	00 16	01 08
0	17 54	18 16	18 42	23 35	24 23	00 23	01 11
S 10	18 11	18 33	19 00	23 45	24 29	00 29	01 14
20	18 29	18 53	19 22	23 55	24 36	00 36	01 17
30	18 49	19 17	19 49	24 07	00 07	00 44	01 21
35	19 02	19 31	20 07	24 14	00 14	00 49	01 23
40	19 16	19 48	20 29	24 22	00 22	00 54	01 25
45	19 33	20 09	20 57	24 31	00 31	01 00	01 27
S 50	19 54	20 37	21 38	00 13	00 42	01 07	01 31
52	20 04	20 51	22 02	00 20	00 47	01 10	01 32
54	20 15	21 07	22 36	00 27	00 52	01 14	01 33
56	20 29	21 27	////	00 36	00 58	01 18	01 35
58	20 44	21 52	////	00 45	01 05	01 22	01 37
S 60	21 02	22 29	////	00 55	01 13	01 27	01 39

Day	SUN Eqn. of Time 00ʰ	SUN Eqn. of Time 12ʰ	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
3	10 21	10 09	11 50	17 23	04 59	07	
4	09 57	09 45	11 50	18 11	05 47	08	◐
5	09 33	09 21	11 51	18 59	06 35	09	

G.M.T.	ARIES	VENUS −4.3		MARS +1.3		JUPITER −1.3		SATURN +1.0	
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
6 00	74 41.5	134 05.5	S23 06.0	258 21.6	N 3 45.4	224 44.9	S11 00.9	235 42.7	S 5 30.9
01	89 43.9	149 06.0	05.4	273 22.9	44.9	239 46.9	01.1	250 45.0	31.0
02	104 46.4	164 06.6	04.8	288 24.2	44.5	254 49.0	01.3	265 47.3	31.1
03	119 48.8	179 07.1	·· 04.2	303 25.5	·· 44.0	269 51.0	·· 01.4	280 49.5	·· 31.1
04	134 51.3	194 07.7	03.6	318 26.8	43.5	284 53.0	01.6	295 51.8	31.2
05	149 53.8	209 08.2	03.1	333 28.1	43.1	299 55.0	01.7	310 54.0	31.3
06	164 56.2	224 08.8	S23 02.5	348 29.5	N 3 42.6	314 57.0	S11 01.9	325 56.3	S 5 31.4
07	179 58.7	239 09.3	01.9	3 30.8	42.1	329 59.0	02.0	340 58.5	31.4
08	195 01.2	254 09.9	01.3	18 32.1	41.7	345 01.1	02.2	356 00.8	31.5
S 09	210 03.6	269 10.5	·· 00.7	33 33.4	·· 41.2	0 03.1	·· 02.4	11 03.1	·· 31.6
U 10	225 06.1	284 11.0	23 00.1	48 34.7	40.7	15 05.1	02.5	26 05.3	31.7
N 11	240 08.6	299 11.6	22 59.5	63 36.0	40.3	30 07.1	02.7	41 07.6	31.7
D 12	255 11.0	314 12.2	S22 58.9	78 37.3	N 3 39.8	45 09.1	S11 02.8	56 09.8	S 5 31.8
A 13	270 13.5	329 12.7	58.4	93 38.6	39.4	60 11.1	03.0	71 12.1	31.9
Y 14	285 15.9	344 13.3	57.8	108 39.9	38.9	75 13.2	03.1	86 14.3	31.9
15	300 18.4	359 13.9	·· 57.2	123 41.2	·· 38.4	90 15.2	·· 03.3	101 16.6	·· 32.0
16	315 20.9	14 14.5	56.6	138 42.5	38.0	105 17.2	03.5	116 18.9	32.1
17	330 23.3	29 15.0	56.0	153 43.8	37.5	120 19.2	03.6	131 21.1	32.2
18	345 25.8	44 15.6	S22 55.4	168 45.1	N 3 37.0	135 21.2	S11 03.8	146 23.4	S 5 32.2
19	0 28.3	59 16.2	54.8	183 46.4	36.6	150 23.2	03.9	161 25.6	32.3
20	15 30.7	74 16.8	54.2	198 47.8	36.1	165 25.3	04.1	176 27.9	32.4
21	30 33.2	89 17.4	·· 53.6	213 49.1	·· 35.6	180 27.3	·· 04.2	191 30.2	·· 32.5
22	45 35.7	104 18.0	53.0	228 50.4	35.2	195 29.3	04.4	206 32.4	32.5
23	60 38.1	119 18.6	52.4	243 51.7	34.7	210 31.3	04.5	221 34.7	32.6
7 00	75 40.6	134 19.2	S22 51.9	258 53.0	N 3 34.2	225 33.3	S11 04.7	236 36.9	S 5 32.7
01	90 43.1	149 19.8	51.3	273 54.3	33.8	240 35.4	04.9	251 39.2	32.8
02	105 45.5	164 20.4	50.7	288 55.6	33.3	255 37.4	05.0	266 41.4	32.8
03	120 48.0	179 21.0	·· 50.1	303 56.9	·· 32.8	270 39.4	·· 05.2	281 43.7	·· 32.9
04	135 50.4	194 21.6	49.5	318 58.2	32.4	285 41.4	05.3	296 46.0	33.0
05	150 52.9	209 22.2	48.9	333 59.5	31.9	300 43.4	05.5	311 48.2	33.1
06	165 55.4	224 22.8	S22 48.3	349 00.9	N 3 31.4	315 45.5	S11 05.6	326 50.5	S 5 33.1
07	180 57.8	239 23.4	47.7	4 02.2	31.0	330 47.5	05.8	341 52.7	33.2
08	196 00.3	254 24.0	47.1	19 03.5	30.5	345 49.5	05.9	356 55.0	33.3
M 09	211 02.8	269 24.7	·· 46.5	34 04.8	·· 30.1	0 51.5	·· 06.1	11 57.3	·· 33.3
O 10	226 05.2	284 25.3	45.9	49 06.1	29.6	15 53.5	06.3	26 59.5	33.4
N 11	241 07.7	299 25.9	45.3	64 07.4	29.1	30 55.5	06.4	42 01.8	33.5
D 12	256 10.2	314 26.5	S22 44.7	79 08.7	N 3 28.7	45 57.6	S11 06.6	57 04.0	S 5 33.6
A 13	271 12.6	329 27.2	44.1	94 10.0	28.2	60 59.6	06.7	72 06.3	33.6
Y 14	286 15.1	344 27.8	43.5	109 11.4	27.7	76 01.6	06.9	87 08.6	33.7
15	301 17.6	359 28.4	·· 42.9	124 12.7	·· 27.3	91 03.6	·· 07.0	102 10.8	·· 33.8
16	316 20.0	14 29.1	42.3	139 14.0	26.8	106 05.7	07.2	117 13.1	33.9
17	331 22.5	29 29.7	41.7	154 15.3	26.4	121 07.7	07.3	132 15.3	33.9
18	346 24.9	44 30.3	S22 41.1	169 16.6	N 3 25.9	136 09.7	S11 07.5	147 17.6	S 5 34.0
19	1 27.4	59 31.0	40.5	184 17.9	25.4	151 11.7	07.7	162 19.9	34.1
20	16 29.9	74 31.6	39.9	199 19.3	25.0	166 13.7	07.8	177 22.1	34.2
21	31 32.3	89 32.3	·· 39.3	214 20.6	·· 24.5	181 15.8	·· 08.0	192 24.4	·· 34.2
22	46 34.8	104 32.9	38.7	229 21.9	24.0	196 17.8	08.1	207 26.7	34.3
23	61 37.3	119 33.6	38.1	244 23.2	23.6	211 19.8	08.3	222 28.9	34.4
8 00	76 39.7	134 34.2	S22 37.5	259 24.5	N 3 23.1	226 21.8	S11 08.4	237 31.2	S 5 34.4
01	91 42.2	149 34.9	36.9	274 25.8	22.7	241 23.8	08.6	252 33.4	34.5
02	106 44.7	164 35.6	36.3	289 27.1	22.2	256 25.9	08.7	267 35.7	34.6
03	121 47.1	179 36.2	·· 35.7	304 28.5	·· 21.7	271 27.9	·· 08.9	282 38.0	·· 34.7
04	136 49.6	194 36.9	35.1	319 29.8	21.3	286 29.9	09.0	297 40.2	34.7
05	151 52.0	209 37.5	34.5	334 31.1	20.8	301 31.9	09.2	312 42.5	34.8
06	166 54.5	224 38.2	S22 33.8	349 32.4	N 3 20.3	316 33.9	S11 09.4	327 44.8	S 5 34.9
07	181 57.0	239 38.9	33.2	4 33.7	19.9	331 36.0	09.5	342 47.0	34.9
08	196 59.4	254 39.6	32.6	19 35.1	19.4	346 38.0	09.7	357 49.3	35.0
T 09	212 01.9	269 40.2	·· 32.0	34 36.4	·· 19.0	1 40.0	·· 09.8	12 51.5	·· 35.1
U 10	227 04.4	284 40.9	31.4	49 37.7	18.5	16 42.0	10.0	27 53.8	35.2
E 11	242 06.8	299 41.6	30.8	64 39.0	18.0	31 44.1	10.1	42 56.1	35.2
S 12	257 09.3	314 42.3	S22 30.2	79 40.3	N 3 17.6	46 46.1	S11 10.3	57 58.3	S 5 35.3
D 13	272 11.8	329 43.0	29.6	94 41.7	17.1	61 48.1	10.4	73 00.6	35.4
A 14	287 14.2	344 43.7	29.0	109 43.0	16.7	76 50.1	10.6	88 02.9	35.4
Y 15	302 16.7	359 44.3	·· 28.4	124 44.3	·· 16.2	91 52.2	·· 10.7	103 05.1	·· 35.5
16	317 19.2	14 45.0	27.8	139 45.6	15.7	106 54.2	10.9	118 07.4	35.6
17	332 21.6	29 45.7	27.2	154 46.9	15.3	121 56.2	11.0	133 09.6	35.7
18	347 24.1	44 46.4	S22 26.5	169 48.3	N 3 14.8	136 58.2	S11 11.2	148 11.9	S 5 35.7
19	2 26.5	59 47.1	25.9	184 49.6	14.4	152 00.2	11.4	163 14.2	35.8
20	17 29.0	74 47.8	25.3	199 50.9	13.9	167 02.3	11.5	178 16.4	35.9
21	32 31.5	89 48.5	·· 24.7	214 52.2	·· 13.4	182 04.3	·· 11.7	193 18.7	·· 36.0
22	47 33.9	104 49.3	24.1	229 53.6	13.0	197 06.3	11.8	208 21.0	36.0
23	62 36.4	119 50.0	23.5	244 54.9	12.5	212 08.3	12.0	223 23.2	36.1
	h m								
Mer. Pass	18 54.2	v 0.6	d 0.6	v 1.3	d 0.5	v 2.0	d 0.2	v 2.3	d 0.1

STARS		
Name	S.H.A.	Dec.
	° ′	° ′
Acamar	315 36.2	S40 22.8
Achernar	335 44.2	S57 20.0
Acrux	173 36.6	S62 59.5
Adhara	255 31.1	S28 56.7
Aldebaran	291 16.7	N16 28.4
Alioth	166 42.0	N56 03.4
Alkaid	153 18.2	N49 24.1
Al Na'ir	28 14.0	S47 03.2
Alnilam	276 10.5	S 1 12.8
Alphard	218 19.6	S 8 34.7
Alphecca	126 31.8	N26 46.6
Alpheratz	358 08.4	N28 59.5
Altair	62 32.0	N 8 49.3
Ankaa	353 39.3	S42 24.6
Antares	112 56.2	S26 23.4
Arcturus	146 18.0	N19 16.6
Atria	108 20.3	S68 59.6
Avior	234 27.4	S59 26.8
Bellatrix	278 57.5	N 6 20.0
Betelgeuse	271 27.0	N 7 24.2
Canopus	264 06.3	S52 41.1
Capella	281 09.6	N45 58.8
Deneb	49 48.2	N45 13.1
Denebola	182 58.3	N14 40.4
Diphda	349 19.9	S18 05.3
Dubhe	194 21.1	N61 50.7
Elnath	278 42.7	N28 35.5
Eltanin	90 57.9	N51 29.6
Enif	34 10.9	N 9 47.5
Fomalhaut	15 50.5	S29 43.3
Gacrux	172 28.1	S57 00.3
Gienah	176 17.2	S17 26.3
Hadar	149 22.7	S60 16.8
Hamal	328 27.7	N23 22.6
Kaus Aust.	84 16.1	S34 23.6
Kochab	137 20.1	N74 13.7
Markab	14 02.3	N15 06.5
Menkar	314 40.0	N 4 01.1
Menkent	148 36.3	S36 16.6
Miaplacidus	221 44.3	S69 38.2
Mirfak	309 14.4	N49 47.9
Nunki	76 28.5	S26 19.2
Peacock	53 57.5	S56 47.9
Pollux	243 56.9	N28 04.2
Procyon	245 24.7	N 5 16.3
Rasalhague	96 29.2	N12 34.5
Regulus	208 09.0	N12 03.4
Rigel	281 34.9	S 8 13.4
Rigil Kent.	140 25.3	S60 45.3
Sabik	102 40.5	S15 42.1
Schedar	350 07.8	N56 26.5
Shaula	96 55.1	S37 05.4
Sirius	258 54.7	S16 41.4
Spica	158 56.9	S11 03.8
Suhail	223 09.9	S43 21.3
Vega	80 55.7	N38 46.1
Zuben'ubi	137 32.4	S15 57.8

	S.H.A.	Mer. Pass.
	° ′	h m
Venus	58 38.6	15 02
Mars	183 12.4	6 44
Jupiter	149 52.7	8 57
Saturn	160 56.3	8 12

G.M.T.	SUN G.H.A.	SUN Dec.		MOON G.H.A.	v	MOON Dec.	d	H.P.
d h	° ′	° ′		° ′	′	° ′	′	′
6 00	182 16.9	S22 27.3		72 41.4	11.5	S 4 20.2	12.5	58.3
01	197 16.7	27.6		87 11.9	11.6	4 07.7	12.6	58.3
02	212 16.4	27.9		101 42.5	11.5	3 55.1	12.6	58.4
03	227 16.1	28.2		116 13.0	11.5	3 42.5	12.6	58.4
04	242 15.9	28.5		130 43.5	11.4	3 29.9	12.7	58.4
05	257 15.6	28.8		145 13.9	11.4	3 17.2	12.7	58.5
06	272 15.4	S22 29.1		159 44.3	11.4	S 3 04.5	12.8	58.5
07	287 15.1	29.4		174 14.7	11.4	2 51.7	12.8	58.5
08	302 14.8	29.7		188 45.1	11.3	2 38.9	12.8	58.6
S 09	317 14.6	30.0		203 15.4	11.3	2 26.1	12.8	58.6
U 10	332 14.3	30.3		217 45.7	11.2	2 13.3	12.9	58.7
N 11	347 14.0	30.6		232 15.9	11.3	2 00.4	12.9	58.7
D 12	2 13.8	S22 30.9		246 46.2	11.1	S 1 47.5	12.9	58.7
A 13	17 13.5	31.2		261 16.3	11.2	1 34.6	13.0	58.8
Y 14	32 13.2	31.5		275 46.5	11.1	1 21.6	13.0	58.8
15	47 13.0	31.8		290 16.6	11.1	1 08.6	13.0	58.9
16	62 12.7	32.1		304 46.7	11.0	0 55.6	13.0	58.9
17	77 12.4	32.4		319 16.7	11.0	0 42.6	13.0	58.9
18	92 12.2	S22 32.7		333 46.7	10.9	S 0 29.6	13.1	59.0
19	107 11.9	33.0		348 16.6	10.9	0 16.5	13.1	59.0
20	122 11.6	33.3		2 46.5	10.9	S 0 03.4	13.1	59.0
21	137 11.4	33.5		17 16.4	10.8	N 0 09.7	13.1	59.1
22	152 11.1	33.8		31 46.2	10.7	0 22.8	13.2	59.1
23	167 10.8	34.1		46 15.9	10.8	0 36.0	13.1	59.2
7 00	182 10.6	S22 34.4		60 45.7	10.6	N 0 49.1	13.2	59.2
01	197 10.3	34.7		75 15.3	10.6	1 02.3	13.2	59.2
02	212 10.0	35.0		89 44.9	10.6	1 15.5	13.2	59.3
03	227 09.8	35.3		104 14.5	10.5	1 28.7	13.2	59.3
04	242 09.5	35.6		118 44.0	10.5	1 41.9	13.2	59.4
05	257 09.2	35.8		133 13.5	10.4	1 55.1	13.2	59.4
06	272 09.0	S22 36.1		147 42.9	10.4	N 2 08.3	13.2	59.4
07	287 08.7	36.4		162 12.3	10.3	2 21.5	13.3	59.5
08	302 08.4	36.7		176 41.6	10.2	2 34.8	13.2	59.5
M 09	317 08.2	37.0		191 10.8	10.2	2 48.0	13.2	59.5
O 10	332 07.9	37.2		205 40.0	10.2	3 01.2	13.3	59.6
N 11	347 07.6	37.5		220 09.2	10.0	3 14.5	13.2	59.6
D 12	2 07.4	S22 37.8		234 38.2	10.1	N 3 27.7	13.2	59.7
A 13	17 07.1	38.1		249 07.3	9.9	3 40.9	13.2	59.7
Y 14	32 06.8	38.4		263 36.2	9.9	3 54.1	13.3	59.7
15	47 06.5	38.6		278 05.1	9.8	4 07.4	13.2	59.8
16	62 06.3	38.9		292 33.9	9.8	4 20.6	13.2	59.8
17	77 06.0	39.2		307 02.7	9.7	4 33.8	13.2	59.8
18	92 05.7	S22 39.5		321 31.4	9.7	N 4 47.0	13.2	59.9
19	107 05.5	39.7		336 00.1	9.6	5 00.2	13.2	59.9
20	122 05.2	40.0		350 28.7	9.5	5 13.4	13.1	59.9
21	137 04.9	40.3		4 57.2	9.4	5 26.5	13.2	60.0
22	152 04.7	40.5		19 25.6	9.4	5 39.7	13.1	60.0
23	167 04.4	40.8		33 54.0	9.3	5 52.8	13.1	60.0
8 00	182 04.1	S22 41.1		48 22.3	9.3	N 6 05.9	13.1	60.1
01	197 03.8	41.3		62 50.6	9.2	6 19.0	13.1	60.1
02	212 03.6	41.6		77 18.8	9.1	6 32.1	13.0	60.1
03	227 03.3	41.9		91 46.9	9.0	6 45.1	13.0	60.2
04	242 03.0	42.1		106 14.9	9.0	6 58.1	13.0	60.2
05	257 02.7	42.4		120 42.9	8.8	7 11.1	13.0	60.2
06	272 02.5	S22 42.7		135 10.7	8.9	N 7 24.1	12.9	60.3
07	287 02.2	42.9		149 38.6	8.7	7 37.0	13.0	60.3
08	302 01.9	43.2		164 06.3	8.7	7 50.0	12.8	60.3
T 09	317 01.6	43.5		178 34.0	8.6	8 02.8	12.9	60.4
U 10	332 01.4	43.7		193 01.6	8.5	8 15.7	12.8	60.4
E 11	347 01.1	44.0		207 29.1	8.4	8 28.5	12.7	60.4
S 12	2 00.8	S22 44.2		221 56.5	8.4	N 8 41.2	12.8	60.5
D 13	17 00.5	44.5		236 23.9	8.3	8 54.0	12.7	60.5
A 14	32 00.3	44.8		250 51.2	8.2	9 06.7	12.6	60.5
Y 15	47 00.0	45.0		265 18.4	8.1	9 19.3	12.6	60.6
16	61 59.7	45.3		279 45.5	8.0	9 31.9	12.6	60.6
17	76 59.4	45.5		294 12.5	8.0	9 44.5	12.5	60.6
18	91 59.2	S22 45.8		308 39.5	7.9	N 9 57.0	12.4	60.6
19	106 58.9	46.0		323 06.4	7.8	10 09.4	12.4	60.7
20	121 58.6	46.3		337 33.2	7.7	10 21.8	12.4	60.7
21	136 58.3	46.5		351 59.9	7.6	10 34.2	12.3	60.7
22	151 58.1	46.8		6 26.5	7.6	10 46.5	12.2	60.8
23	166 57.8	47.0		20 53.1	7.5	10 58.7	12.2	60.8
	S.D. 16.3	d 0.3		S.D. 16.0		16.3		16.5

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 6	Moonrise 7	Moonrise 8	Moonrise 9
°	h m	h m	h m	h m	h m	h m	h m
N 72	08 06	10 17	▬	13 56	13 39	13 21	12 57
N 70	07 48	09 29	▬	13 54	13 44	13 34	13 22
68	07 33	08 59	11 18	13 52	13 48	13 45	13 42
66	07 21	08 36	10 07	13 51	13 52	13 54	13 58
64	07 11	08 18	09 31	13 49	13 55	14 01	14 11
62	07 02	08 03	09 06	13 48	13 57	14 08	14 22
60	06 54	07 50	08 46	13 47	14 00	14 14	14 31
N 58	06 47	07 39	08 30	13 47	14 02	14 19	14 39
56	06 41	07 29	08 16	13 46	14 04	14 23	14 47
54	06 35	07 21	08 04	13 45	14 05	14 27	14 53
52	06 30	07 13	07 53	13 45	14 07	14 31	14 59
50	06 25	07 06	07 44	13 44	14 08	14 34	15 05
45	06 14	06 51	07 24	13 43	14 11	14 42	15 16
N 40	06 04	06 38	07 08	13 42	14 14	14 48	15 26
35	05 55	06 27	06 55	13 41	14 16	14 53	15 34
30	05 47	06 17	06 43	13 40	14 18	14 58	15 42
20	05 31	05 59	06 22	13 39	14 21	15 06	15 55
N 10	05 16	05 42	06 05	13 38	14 24	15 13	16 06
0	04 59	05 25	05 48	13 37	14 27	15 20	16 17
S 10	04 41	05 08	05 31	13 36	14 30	15 27	16 27
20	04 19	04 48	05 13	13 35	14 33	15 35	16 39
30	03 51	04 24	04 51	13 33	14 37	15 43	16 52
35	03 33	04 10	04 39	13 33	14 39	15 48	17 00
40	03 11	03 52	04 25	13 32	14 41	15 54	17 09
45	02 42	03 31	04 07	13 31	14 44	16 01	17 19
S 50	02 00	03 02	03 46	13 30	14 48	16 09	17 32
52	01 36	02 48	03 36	13 29	14 49	16 12	17 38
54	01 00	02 32	03 24	13 29	14 51	16 17	17 45
56	////	02 11	03 11	13 28	14 53	16 21	17 52
58	////	01 45	02 55	13 27	14 55	16 26	18 00
S 60	////	01 07	02 36	13 27	14 57	16 32	18 10

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 6	Moonset 7	Moonset 8	Moonset 9
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	13 26	15 37	00 14	02 16	04 23	06 43
N 70	▬	14 13	15 55	00 21	02 14	04 12	06 20
68	12 24	14 44	16 09	00 26	02 13	04 04	06 02
66	13 36	15 07	16 21	00 31	02 12	03 57	05 47
64	14 12	15 25	16 32	00 34	02 11	03 51	05 36
62	14 37	15 40	16 41	00 37	02 10	03 46	05 26
60	14 57	15 53	16 48	00 40	02 09	03 41	05 17
N 58	15 13	16 04	16 55	00 43	02 08	03 38	05 10
56	15 27	16 13	17 02	00 45	02 08	03 34	05 03
54	15 39	16 22	17 08	00 47	02 07	03 31	04 58
52	15 49	16 30	17 13	00 49	02 07	03 28	04 52
50	15 59	16 37	17 18	00 50	02 06	03 26	04 48
45	16 19	16 52	17 29	00 54	02 05	03 20	04 38
N 40	16 35	17 05	17 39	00 56	02 05	03 16	04 29
35	16 48	17 16	17 48	00 59	02 04	03 12	04 22
30	17 00	17 26	17 56	01 01	02 03	03 08	04 16
20	17 21	17 44	18 12	01 05	02 02	03 02	04 05
N 10	17 38	18 01	18 27	01 08	02 01	02 57	03 55
0	17 55	18 18	18 44	01 11	02 00	02 52	03 46
S 10	18 12	18 35	19 02	01 14	01 59	02 47	03 38
20	18 30	18 55	19 24	01 17	01 58	02 42	03 28
30	18 52	19 19	19 52	01 21	01 57	02 36	03 17
35	19 04	19 34	20 10	01 23	01 57	02 32	03 11
40	19 19	19 51	20 32	01 25	01 56	02 28	03 04
45	19 36	20 13	21 01	01 27	01 55	02 24	02 56
S 50	19 58	20 41	21 44	01 31	01 54	02 19	02 46
52	20 08	20 55	22 09	01 32	01 53	02 16	02 42
54	20 20	21 12	22 45	01 33	01 53	02 14	02 37
56	20 33	21 33	////	01 35	01 52	02 11	02 32
58	20 49	21 59	////	01 37	01 52	02 07	02 26
S 60	21 08	22 39	////	01 39	01 51	02 04	02 19

Day	SUN Eqn. of Time 00ʰ	SUN Eqn. of Time 12ʰ	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
6	09 08	08 56	11 51	19 49	07 24	10	
7	08 43	08 30	11 51	20 39	08 14	11	◐
8	08 17	08 04	11 52	21 33	09 06	12	

G.M.T.	ARIES	VENUS −4.4		MARS +1.2		JUPITER −1.3		SATURN +1.0		STARS		
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	Name	S.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′		° ′	° ′
9 00	77 38.9	134 50.7	S22 22.9	259 56.2	N 3 12.1	227 10.4	S11 12.1	238 25.5	S 5 36.2	Acamar	315 36.2	S40 22.8
01	92 41.3	149 51.4	22.3	274 57.5	11.6	242 12.4	12.3	253 27.8	36.2	Achernar	335 44.3	S57 20.0
02	107 43.8	164 52.1	21.6	289 58.8	11.1	257 14.4	12.4	268 30.0	36.3	Acrux	173 36.5	S62 59.5
03	122 46.3	179 52.8	·· 21.0	305 00.2	·· 10.7	272 16.4	·· 12.6	283 32.3	·· 36.4	Adhara	255 31.1	S28 56.8
04	137 48.7	194 53.6	20.4	320 01.5	10.2	287 18.5	12.7	298 34.6	36.4	Aldebaran	291 16.7	N16 28.4
05	152 51.2	209 54.3	19.8	335 02.8	09.8	302 20.5	12.9	313 36.8	36.5			
06	167 53.7	224 55.0	S22 19.2	350 04.1	N 3 09.3	317 22.5	S11 13.0	328 39.1	S 5 36.6	Alioth	166 42.0	N56 03.3
W 07	182 56.1	239 55.7	18.6	5 05.5	08.8	332 24.5	13.2	343 41.4	36.7	Alkaid	153 18.2	N49 24.1
E 08	197 58.6	254 56.5	18.0	20 06.8	08.4	347 26.6	13.3	358 43.6	36.7	Al Na'ir	28 14.0	S47 03.2
D 09	213 01.0	269 57.2	·· 17.3	35 08.1	·· 07.9	2 28.6	·· 13.5	13 45.9	·· 36.8	Alnilam	276 10.5	S 1 12.8
N 10	228 03.5	284 58.0	16.7	50 09.4	07.5	17 30.6	13.6	28 48.1	36.9	Alphard	218 19.6	S 8 34.7
E 11	243 06.0	299 58.7	16.1	65 10.8	07.0	32 32.6	13.8	43 50.4	36.9			
S 12	258 08.4	314 59.4	S22 15.5	80 12.1	N 3 06.6	47 34.7	S11 13.9	58 52.7	S 5 37.0	Alphecca	126 31.7	N26 46.6
D 13	273 10.9	330 00.2	14.9	95 13.4	06.1	62 36.7	14.1	73 54.9	37.1	Alpheratz	358 08.4	N28 59.5
A 14	288 13.4	345 00.9	14.3	110 14.8	05.6	77 38.7	14.3	88 57.2	37.2	Altair	62 32.0	N 8 49.3
Y 15	303 15.8	0 01.7	·· 13.6	125 16.1	·· 05.2	92 40.7	·· 14.4	103 59.5	·· 37.2	Ankaa	353 39.3	S42 24.6
16	318 18.3	15 02.4	13.0	140 17.4	04.7	107 42.8	14.6	119 01.7	37.3	Antares	112 56.2	S26 23.4
17	333 20.8	30 03.2	12.4	155 18.7	04.3	122 44.8	14.7	134 04.0	37.4			
18	348 23.2	45 03.9	S22 11.8	170 20.1	N 3 03.8	137 46.8	S11 14.9	149 06.3	S 5 37.4	Arcturus	146 18.0	N19 16.6
19	3 25.7	60 04.7	11.2	185 21.4	03.4	152 48.9	15.0	164 08.5	37.5	Atria	108 20.3	S68 59.6
20	18 28.1	75 05.5	10.5	200 22.7	02.9	167 50.9	15.2	179 10.8	37.6	Avior	234 27.4	S59 26.8
21	33 30.6	90 06.2	·· 09.9	215 24.0	·· 02.4	182 52.9	·· 15.3	194 13.1	·· 37.6	Bellatrix	278 57.5	N 6 20.0
22	48 33.1	105 07.0	09.3	230 25.4	02.0	197 54.9	15.5	209 15.3	37.7	Betelgeuse	271 27.0	N 7 24.2
23	63 35.5	120 07.8	08.7	245 26.7	01.5	212 57.0	15.6	224 17.6	37.8			
10 00	78 38.0	135 08.6	S22 08.1	260 28.0	N 3 01.1	227 59.0	S11 15.8	239 19.9	S 5 37.9	Canopus	264 06.3	S52 41.1
01	93 40.5	150 09.3	07.4	275 29.4	00.6	243 01.0	15.9	254 22.1	37.9	Capella	281 09.6	N45 58.8
02	108 42.9	165 10.1	06.8	290 30.7	S 00.2	258 03.0	16.1	269 24.4	38.0	Deneb	49 48.2	N45 13.1
03	123 45.4	180 10.9	·· 06.2	305 32.0	2 59.7	273 05.1	·· 16.2	284 26.7	·· 38.1	Denebola	182 58.2	N14 40.4
04	138 47.9	195 11.7	05.6	320 33.4	59.2	288 07.1	16.4	299 29.0	38.1	Diphda	349 19.9	S18 05.3
05	153 50.3	210 12.5	04.9	335 34.7	58.8	303 09.1	16.5	314 31.2	38.2			
06	168 52.8	225 13.3	S22 04.3	350 36.0	N 2 58.3	318 11.2	S11 16.7	329 33.5	S 5 38.3	Dubhe	194 21.0	N61 50.7
07	183 55.3	240 14.0	03.7	5 37.4	57.9	333 13.2	16.8	344 35.8	38.3	Elnath	278 42.7	N28 35.5
T 08	198 57.7	255 14.8	03.1	20 38.7	57.4	348 15.2	17.0	359 38.0	38.4	Eltanin	90 57.9	N51 29.6
H 09	214 00.2	270 15.6	·· 02.4	35 40.0	·· 57.0	3 17.2	·· 17.1	14 40.3	·· 38.5	Enif	34 10.9	N 9 47.5
U 10	229 02.6	285 16.4	01.8	50 41.4	56.5	18 19.3	17.3	29 42.6	38.6	Fomalhaut	15 50.5	S29 43.3
R 11	244 05.1	300 17.2	01.2	65 42.7	56.1	33 21.3	17.4	44 44.8	38.6			
S 12	259 07.6	315 18.0	S22 00.6	80 44.0	N 2 55.6	48 23.3	S11 17.6	59 47.1	S 5 38.7	Gacrux	172 28.0	S57 00.3
D 13	274 10.0	330 18.9	21 59.9	95 45.4	55.2	63 25.4	17.7	74 49.4	38.8	Gienah	176 17.2	S17 26.3
A 14	289 12.5	345 19.7	59.3	110 46.7	54.7	78 27.4	17.9	89 51.6	38.8	Hadar	149 22.6	S60 16.8
Y 15	304 15.0	0 20.5	·· 58.7	125 48.0	·· 54.2	93 29.4	·· 18.0	104 53.9	·· 38.9	Hamal	328 27.7	N23 22.7
16	319 17.4	15 21.3	58.1	140 49.4	53.8	108 31.4	18.2	119 56.2	39.0	Kaus Aust.	84 16.1	S34 23.6
17	334 19.9	30 22.1	57.4	155 50.7	53.3	123 33.5	18.3	134 58.4	39.0			
18	349 22.4	45 22.9	S21 56.8	170 52.0	N 2 52.9	138 35.5	S11 18.5	150 00.7	S 5 39.1	Kochab	137 20.0	N74 13.7
19	4 24.8	60 23.7	56.2	185 53.4	52.4	153 37.5	18.6	165 03.0	39.2	Markab	14 02.4	N15 06.5
20	19 27.3	75 24.6	55.6	200 54.7	52.0	168 39.6	18.8	180 05.3	39.2	Menkar	314 40.0	N 4 01.1
21	34 29.8	90 25.4	·· 54.9	215 56.0	·· 51.5	183 41.6	·· 18.9	195 07.5	·· 39.3	Menkent	148 36.3	S36 16.6
22	49 32.2	105 26.2	54.3	230 57.4	51.1	198 43.6	19.1	210 09.8	39.4	Miaplacidus	221 44.3	S69 38.2
23	64 34.7	120 27.1	53.7	245 58.7	50.6	213 45.6	19.2	225 12.1	39.5			
11 00	79 37.1	135 27.9	S21 53.0	261 00.0	N 2 50.2	228 47.7	S11 19.4	240 14.3	S 5 39.5	Mirfak	309 14.4	N49 47.9
01	94 39.6	150 28.7	52.4	276 01.4	49.7	243 49.7	19.5	255 16.6	39.6	Nunki	76 28.5	S26 19.2
02	109 42.1	165 29.6	51.8	291 02.7	49.2	258 51.7	19.7	270 18.9	39.7	Peacock	53 57.5	S56 47.8
03	124 44.5	180 30.4	·· 51.2	306 04.1	·· 48.8	273 53.8	·· 19.8	285 21.1	·· 39.7	Pollux	243 56.8	N28 04.2
04	139 47.0	195 31.3	50.5	321 05.4	48.3	288 55.8	20.0	300 23.4	39.8	Procyon	245 24.6	N 5 16.3
05	154 49.5	210 32.1	49.9	336 06.7	47.9	303 57.8	20.1	315 25.7	39.9			
06	169 51.9	225 33.0	S21 49.3	351 08.1	N 2 47.4	318 59.9	S11 20.3	330 28.0	S 5 39.9	Rasalhague	96 29.2	N12 34.5
07	184 54.4	240 33.8	48.6	6 09.4	47.0	334 01.9	20.4	345 30.2	40.0	Regulus	208 09.0	N12 03.4
08	199 56.9	255 34.7	48.0	21 10.7	46.5	349 03.9	20.6	0 32.5	40.1	Rigel	281 34.9	S 8 13.4
F 09	214 59.3	270 35.6	·· 47.4	36 12.1	·· 46.1	4 06.0	·· 20.7	15 34.8	·· 40.1	Rigil Kent.	140 25.3	S60 45.3
R 10	230 01.8	285 36.4	46.7	51 13.4	45.6	19 08.0	20.9	30 37.0	40.2	Sabik	102 40.5	S15 42.1
I 11	245 04.3	300 37.3	46.1	66 14.8	45.2	34 10.0	21.0	45 39.3	40.3			
D 12	260 06.7	315 38.1	S21 45.5	81 16.1	N 2 44.7	49 12.0	S11 21.2	60 41.6	S 5 40.3	Schedar	350 07.9	N56 26.5
A 13	275 09.2	330 39.0	44.8	96 17.4	44.3	64 14.1	21.3	75 43.9	40.4	Shaula	96 55.1	S37 05.4
Y 14	290 11.6	345 39.9	44.2	111 18.8	43.8	79 16.1	21.5	90 46.1	40.5	Sirius	258 54.6	S16 41.5
15	305 14.1	0 40.8	·· 43.6	126 20.1	·· 43.4	94 18.1	·· 21.6	105 48.4	·· 40.5	Spica	158 56.8	S11 03.8
16	320 16.6	15 41.6	42.9	141 21.5	42.9	109 20.2	21.8	120 50.7	40.6	Suhail	223 09.9	S43 21.3
17	335 19.0	30 42.5	42.3	156 22.8	42.5	124 22.2	21.9	135 52.9	40.7			
18	350 21.5	45 43.4	S21 41.7	171 24.1	N 2 42.0	139 24.2	S11 22.1	150 55.2	S 5 40.7	Vega	80 55.7	N38 46.1
19	5 24.0	60 44.3	41.0	186 25.5	41.6	154 26.3	22.2	165 57.5	40.8	Zuben'ubi	137 32.4	S15 57.8
20	20 26.4	75 45.2	40.4	201 26.8	41.1	169 28.3	22.4	180 59.8	40.9			
21	35 28.9	90 46.1	·· 39.8	216 28.2	·· 40.7	184 30.3	·· 22.5	196 02.0	·· 40.9		S.H.A.	Mer. Pass.
22	50 31.4	105 47.0	39.1	231 29.5	40.2	199 32.4	22.7	211 04.3	41.0		° ′	h m
23	65 33.8	120 47.9	38.5	246 30.9	39.8	214 34.4	22.8	226 06.6	41.1	Venus	56 30.5	14 59
	h m									Mars	181 50.0	6 38
Mer. Pass.	18 42.4	v 0.8	d 0.6	v 1.3	d 0.5	v 2.0	d 0.2	v 2.3	d 0.1	Jupiter	149 21.0	8 47
										Saturn	160 41.9	8 01

G.M.T.	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
9 00	181 57.5	S22 47.3	35 19.6	7.4	N11 10.9	12.1	60.8
01	196 57.2	47.5	49 46.0	7.3	11 23.0	12.1	60.8
02	211 57.0	47.8	64 12.3	7.2	11 35.1	11.9	60.9
03	226 56.7	·· 48.0	78 38.5	7.1	11 47.0	12.0	60.9
04	241 56.4	48.3	93 04.6	7.1	11 59.0	11.8	60.9
05	256 56.1	48.5	107 30.7	6.9	12 10.8	11.8	60.9
06	271 55.8	S22 48.8	121 56.6	6.9	N12 22.6	11.7	61.0
07	286 55.6	49.0	136 22.5	6.8	12 34.3	11.7	61.0
W 08	301 55.3	49.3	150 48.3	6.7	12 46.0	11.6	61.0
E 09	316 55.0	·· 49.5	165 14.0	6.7	12 57.6	11.4	61.0
D 10	331 54.7	49.8	179 39.7	6.5	13 09.0	11.5	61.0
N 11	346 54.5	50.0	194 05.2	6.5	13 20.5	11.3	61.1
E 12	1 54.2	S22 50.2	208 30.7	6.3	N13 31.8	11.2	61.1
S 13	16 53.9	50.5	222 56.0	6.3	13 43.0	11.2	61.1
D 14	31 53.6	50.7	237 21.3	6.2	13 54.2	11.1	61.1
A 15	46 53.3	·· 51.0	251 46.5	6.1	14 05.3	11.0	61.1
Y 16	61 53.1	51.2	266 11.6	6.1	14 16.3	10.9	61.2
17	76 52.8	51.4	280 36.7	5.9	14 27.2	10.8	61.2
18	91 52.5	S22 51.7	295 01.6	5.9	N14 38.0	10.7	61.2
19	106 52.2	51.9	309 26.5	5.8	14 48.7	10.6	61.2
20	121 51.9	52.1	323 51.3	5.7	14 59.3	10.6	61.2
21	136 51.7	·· 52.4	338 16.0	5.6	15 09.9	10.4	61.2
22	151 51.4	52.6	352 40.6	5.5	15 20.3	10.3	61.3
23	166 51.1	52.8	7 05.1	5.4	15 30.6	10.2	61.3
10 00	181 50.8	S22 53.1	21 29.5	5.4	N15 40.8	10.2	61.3
01	196 50.5	53.3	35 53.9	5.3	15 51.0	10.0	61.3
02	211 50.3	53.5	50 18.2	5.2	16 01.0	9.9	61.3
03	226 50.0	·· 53.8	64 42.4	5.1	16 10.9	9.8	61.3
04	241 49.7	54.0	79 06.5	5.0	16 20.7	9.7	61.3
05	256 49.4	54.2	93 30.5	5.0	16 30.4	9.5	61.4
06	271 49.1	S22 54.4	107 54.5	4.9	N16 39.9	9.5	61.4
07	286 48.8	54.7	122 18.4	4.8	16 49.4	9.3	61.4
T 08	301 48.6	54.9	136 42.2	4.7	16 58.7	9.3	61.4
H 09	316 48.3	·· 55.1	151 05.9	4.7	17 08.0	9.1	61.4
U 10	331 48.0	55.3	165 29.6	4.5	17 17.1	8.9	61.4
R 11	346 47.7	55.6	179 53.1	4.5	17 26.0	8.9	61.4
S 12	1 47.4	S22 55.8	194 16.6	4.5	N17 34.9	8.7	61.4
D 13	16 47.1	56.0	208 40.1	4.3	17 43.6	8.6	61.4
A 14	31 46.9	56.2	223 03.4	4.3	17 52.2	8.5	61.4
Y 15	46 46.6	·· 56.4	237 26.7	4.2	18 00.7	8.4	61.4
16	61 46.3	56.7	251 49.9	4.2	18 09.1	8.2	61.4
17	76 46.0	56.9	266 13.1	4.0	18 17.3	8.1	61.4
18	91 45.7	S22 57.1	280 36.1	4.0	N18 25.4	7.9	61.4
19	106 45.4	57.3	294 59.1	4.0	18 33.3	7.8	61.5
20	121 45.1	57.5	309 22.1	3.9	18 41.1	7.7	61.5
21	136 44.9	·· 57.7	323 45.0	3.8	18 48.8	7.6	61.5
22	151 44.6	58.0	338 07.8	3.7	18 56.4	7.4	61.5
23	166 44.3	58.2	352 30.5	3.7	19 03.8	7.2	61.5
11 00	181 44.0	S22 58.4	6 53.2	3.7	N19 11.0	7.1	61.5
01	196 43.7	58.6	21 15.9	3.5	19 18.1	7.0	61.5
02	211 43.4	58.8	35 38.4	3.6	19 25.1	6.8	61.5
03	226 43.2	·· 59.0	50 01.0	3.4	19 31.9	6.7	61.5
04	241 42.9	59.2	64 23.4	3.4	19 38.6	6.5	61.5
05	256 42.6	59.4	78 45.8	3.4	19 45.1	6.4	61.5
06	271 42.3	S22 59.6	93 08.2	3.3	N19 51.5	6.3	61.4
07	286 42.0	22 59.9	107 30.5	3.3	19 57.8	6.0	61.4
08	301 41.7	23 00.1	121 52.8	3.2	20 03.8	6.0	61.4
F 09	316 41.4	·· 00.3	136 15.0	3.2	20 09.8	5.7	61.4
R 10	331 41.1	00.5	150 37.2	3.2	20 15.5	5.7	61.4
I 11	346 40.9	00.7	164 59.4	3.1	20 21.2	5.4	61.4
D 12	1 40.6	S23 00.9	179 21.5	3.0	N20 26.6	5.3	61.4
A 13	16 40.3	01.1	193 43.5	3.1	20 31.9	5.2	61.4
Y 14	31 40.0	01.3	208 05.6	3.0	20 37.1	5.0	61.4
15	46 39.7	·· 01.5	222 27.6	2.9	20 42.1	4.8	61.4
16	61 39.4	01.7	236 49.5	3.0	20 46.9	4.7	61.4
17	76 39.1	01.9	251 11.5	2.9	20 51.6	4.5	61.4
18	91 38.8	S23 02.1	265 33.4	2.9	N20 56.1	4.4	61.4
19	106 38.6	02.3	279 55.3	2.8	21 00.5	4.2	61.4
20	121 38.3	02.5	294 17.1	2.9	21 04.7	4.0	61.3
21	136 38.0	·· 02.7	308 39.0	2.8	21 08.7	3.9	61.3
22	151 37.7	02.9	323 00.8	2.8	21 12.6	3.7	61.3
23	166 37.4	03.1	337 22.6	2.8	21 16.3	3.5	61.3
	S.D. 16.3	d 0.2	S.D. 16.6		16.7		16.7

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 9	Moonrise 10	Moonrise 11	Moonrise 12
°	h m	h m	h m	h m	h m	h m	h m
N 72	08 12	10 29	▬	12 57	12 04	▭	▭
N 70	07 53	09 37	▬	13 22	13 04	▭	▭
68	07 38	09 05	▬	13 42	13 39	13 39	13 49
66	07 26	08 41	10 15	13 58	14 05	14 21	14 58
64	07 15	08 23	09 38	14 11	14 25	14 50	15 34
62	07 06	08 07	09 11	14 22	14 41	15 12	16 00
60	06 58	07 54	08 51	14 31	14 55	15 29	16 20
N 58	06 51	07 43	08 34	14 39	15 07	15 44	16 37
56	06 44	07 33	08 20	14 47	15 17	15 57	16 51
54	06 38	07 24	08 08	14 53	15 26	16 09	17 04
52	06 33	07 16	07 57	14 59	15 34	16 18	17 14
50	06 28	07 09	07 47	15 05	15 41	16 27	17 24
45	06 16	06 54	07 27	15 16	15 57	16 46	17 44
N 40	06 06	06 40	07 11	15 26	16 10	17 02	18 01
35	05 57	06 29	06 57	15 34	16 21	17 15	18 15
30	05 49	06 19	06 45	15 42	16 31	17 26	18 27
20	05 33	06 00	06 24	15 55	16 48	17 46	18 48
N 10	05 17	05 43	06 06	16 06	17 03	18 03	19 06
0	05 01	05 27	05 49	16 17	17 17	18 19	19 23
S 10	04 42	05 09	05 32	16 27	17 31	18 36	19 40
20	04 20	04 49	05 13	16 39	17 46	18 53	19 58
30	03 51	04 25	04 52	16 52	18 03	19 13	20 19
35	03 33	04 10	04 39	17 00	18 13	19 25	20 32
40	03 11	03 52	04 25	17 09	18 25	19 38	20 46
45	02 41	03 30	04 07	17 19	18 39	19 54	21 03
S 50	01 58	03 01	03 45	17 32	18 55	20 14	21 23
52	01 32	02 47	03 35	17 38	19 03	20 24	21 33
54	00 53	02 30	03 23	17 45	19 12	20 34	21 44
56	////	02 09	03 09	17 52	19 22	20 46	21 57
58	////	01 41	02 53	18 00	19 34	21 00	22 12
S 60	////	00 59	02 34	18 10	19 47	21 17	22 29

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 9	Moonset 10	Moonset 11	Moonset 12
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	13 16	15 33	06 43	09 40	▭	▭
N 70	▬	14 08	15 52	06 20	08 41	▭	▭
68	▬	14 40	16 07	06 02	08 07	10 18	12 22
66	13 30	15 04	16 20	05 47	07 43	09 37	11 13
64	14 08	15 23	16 30	05 36	07 24	09 08	10 37
62	14 34	15 38	16 39	05 26	07 08	08 47	10 11
60	14 55	15 51	16 47	05 17	06 55	08 29	09 51
N 58	15 11	16 03	16 55	05 10	06 44	08 15	09 34
56	15 26	16 12	17 01	05 03	06 34	08 02	09 20
54	15 38	16 21	17 07	04 58	06 26	07 51	09 08
52	15 49	16 29	17 13	04 52	06 18	07 42	08 57
50	15 58	16 36	17 18	04 48	06 11	07 33	08 48
45	16 18	16 52	17 29	04 38	05 57	07 15	08 27
N 40	16 35	17 05	17 39	04 29	05 45	07 00	08 11
35	16 49	17 17	17 48	04 22	05 35	06 47	07 57
30	17 01	17 27	17 57	04 16	05 26	06 36	07 45
20	17 21	17 45	18 13	04 05	05 10	06 18	07 24
N 10	17 39	18 02	18 29	03 55	04 57	06 01	07 06
0	17 57	18 19	18 45	03 46	04 45	05 46	06 50
S 10	18 14	18 37	19 04	03 38	04 32	05 31	06 33
20	18 32	18 57	19 26	03 28	04 19	05 15	06 15
30	18 54	19 21	19 54	03 17	04 04	04 56	05 54
35	19 07	19 36	20 13	03 11	03 55	04 45	05 42
40	19 21	19 54	20 35	03 04	03 45	04 33	05 28
45	19 39	20 16	21 05	02 56	03 34	04 18	05 12
S 50	20 01	20 45	21 49	02 46	03 20	04 00	04 52
52	20 11	20 59	22 15	02 42	03 13	03 52	04 42
54	20 23	21 17	22 54	02 37	03 06	03 43	04 31
56	20 37	21 38	////	02 32	02 58	03 32	04 19
58	20 53	22 06	////	02 26	02 49	03 20	04 05
S 60	21 13	22 49	////	02 19	02 38	03 07	03 48

Day	SUN Eqn. of Time 00ʰ	SUN Eqn. of Time 12ʰ	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
9	07 51	07 37	11 52	22 30	10 01	13	
10	07 24	07 10	11 53	23 31	11 00	14	○
11	06 57	06 43	11 53	24 35	12 03	15	

G.M.T.	ARIES	VENUS −4.4		MARS +1.2		JUPITER −1.3		SATURN +1.0	
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
12 00	80 36.3	135 48.8	S21 37.9	261 32.2	N 2 39.3	229 36.4	S11 23.0	241 08.9	S 5 41.1
01	95 38.7	150 49.7	37.2	276 33.6	38.9	244 38.5	23.1	256 11.1	41.2
02	110 41.2	165 50.6	36.6	291 34.9	38.4	259 40.5	23.3	271 13.4	41.3
03	125 43.7	180 51.5	·· 36.0	306 36.2	·· 38.0	274 42.5	·· 23.4	286 15.7	·· 41.4
04	140 46.1	195 52.4	35.3	321 37.6	37.5	289 44.6	23.6	301 17.9	41.4
05	155 48.6	210 53.3	34.7	336 38.9	37.1	304 46.6	23.7	316 20.2	41.5
06	170 51.1	225 54.2	S21 34.0	351 40.3	N 2 36.6	319 48.6	S11 23.9	331 22.5	S 5 41.6
07	185 53.5	240 55.2	33.4	6 41.6	36.2	334 50.7	24.0	346 24.8	41.6
S 08	200 56.0	255 56.1	32.8	21 43.0	35.7	349 52.7	24.1	1 27.0	41.7
A 09	215 58.5	270 57.0	·· 32.1	36 44.3	·· 35.3	4 54.7	·· 24.3	16 29.3	·· 41.8
T 10	231 00.9	285 57.9	31.5	51 45.7	34.8	19 56.8	24.4	31 31.6	41.8
U 11	246 03.4	300 58.9	30.8	66 47.0	34.4	34 58.8	24.6	46 33.9	41.9
R 12	261 05.9	315 59.8	S21 30.2	81 48.4	N 2 33.9	50 00.9	S11 24.7	61 36.1	S 5 42.0
D 13	276 08.3	331 00.7	29.6	96 49.7	33.5	65 02.9	24.9	76 38.4	42.0
A 14	291 10.8	346 01.7	28.9	111 51.0	33.0	80 04.9	25.0	91 40.7	42.1
Y 15	306 13.2	1 02.6	·· 28.3	126 52.4	·· 32.6	95 07.0	·· 25.2	106 43.0	·· 42.2
16	321 15.7	16 03.6	27.7	141 53.7	32.1	110 09.0	25.3	121 45.2	42.2
17	336 18.2	31 04.5	27.0	156 55.1	31.7	125 11.0	25.5	136 47.5	42.3
18	351 20.6	46 05.5	S21 26.4	171 56.4	N 2 31.2	140 13.1	S11 25.6	151 49.8	S 5 42.4
19	6 23.1	61 06.4	25.7	186 57.8	30.8	155 15.1	25.8	166 52.1	42.4
20	21 25.6	76 07.4	25.1	201 59.1	30.3	170 17.1	25.9	181 54.3	42.5
21	36 28.0	91 08.3	·· 24.5	217 00.5	·· 29.9	185 19.2	·· 26.1	196 56.6	·· 42.6
22	51 30.5	106 09.3	23.8	232 01.8	29.4	200 21.2	26.2	211 58.9	42.6
23	66 33.0	121 10.2	23.2	247 03.2	29.0	215 23.2	26.4	227 01.2	42.7
13 00	81 35.4	136 11.2	S21 22.5	262 04.5	N 2 28.5	230 25.3	S11 26.5	242 03.4	S 5 42.7
01	96 37.9	151 12.2	21.9	277 05.9	28.1	245 27.3	26.7	257 05.7	42.8
02	111 40.4	166 13.2	21.2	292 07.2	27.6	260 29.4	26.8	272 08.0	42.9
03	126 42.8	181 14.1	·· 20.6	307 08.6	·· 27.2	275 31.4	·· 26.9	287 10.3	·· 42.9
04	141 45.3	196 15.1	20.0	322 09.9	26.8	290 33.4	27.1	302 12.5	43.0
05	156 47.7	211 16.1	19.3	337 11.3	26.3	305 35.5	27.2	317 14.8	43.1
06	171 50.2	226 17.1	S21 18.7	352 12.6	N 2 25.9	320 37.5	S11 27.4	332 17.1	S 5 43.1
07	186 52.7	241 18.1	18.0	7 14.0	25.4	335 39.5	27.5	347 19.4	43.2
08	201 55.1	256 19.1	17.4	22 15.4	25.0	350 41.6	27.7	2 21.6	43.3
S 09	216 57.6	271 20.0	·· 16.7	37 16.7	·· 24.5	5 43.6	·· 27.8	17 23.9	·· 43.3
U 10	232 00.1	286 21.0	16.1	52 18.1	24.1	20 45.7	28.0	32 26.2	43.4
N 11	247 02.5	301 22.0	15.5	67 19.4	23.6	35 47.7	28.1	47 28.5	43.5
D 12	262 05.0	316 23.0	S21 14.8	82 20.8	N 2 23.2	50 49.7	S11 28.3	62 30.8	S 5 43.5
A 13	277 07.5	331 24.0	14.2	97 22.1	22.7	65 51.8	28.4	77 33.0	43.6
Y 14	292 09.9	346 25.0	13.5	112 23.5	22.3	80 53.8	28.6	92 35.3	43.7
15	307 12.4	1 26.1	·· 12.9	127 24.8	·· 21.8	95 55.8	·· 28.7	107 37.6	·· 43.7
16	322 14.9	16 27.1	12.2	142 26.2	21.4	110 57.9	28.8	122 39.9	43.8
17	337 17.3	31 28.1	11.6	157 27.5	21.0	125 59.9	29.0	137 42.1	43.9
18	352 19.8	46 29.1	S21 10.9	172 28.9	N 2 20.5	141 02.0	S11 29.1	152 44.4	S 5 43.9
19	7 22.2	61 30.1	10.3	187 30.3	20.1	156 04.0	29.3	167 46.7	44.0
20	22 24.7	76 31.1	09.7	202 31.6	19.6	171 06.0	29.4	182 49.0	44.1
21	37 27.2	91 32.2	·· 09.0	217 33.0	·· 19.2	186 08.1	·· 29.6	197 51.3	·· 44.1
22	52 29.6	106 33.2	08.4	232 34.3	18.7	201 10.1	29.7	212 53.5	44.2
23	67 32.1	121 34.2	07.7	247 35.7	18.3	216 12.2	29.9	227 55.8	44.3
14 00	82 34.6	136 35.3	S21 07.1	262 37.0	N 2 17.8	231 14.2	S11 30.0	242 58.1	S 5 44.3
01	97 37.0	151 36.3	06.4	277 38.4	17.4	246 16.2	30.2	258 00.4	44.4
02	112 39.5	166 37.4	05.8	292 39.8	17.0	261 18.3	30.3	273 02.7	44.4
03	127 42.0	181 38.4	·· 05.1	307 41.1	·· 16.5	276 20.3	·· 30.4	288 04.9	·· 44.5
04	142 44.4	196 39.4	04.5	322 42.5	16.1	291 22.4	30.6	303 07.2	44.6
05	157 46.9	211 40.5	03.8	337 43.8	15.6	306 24.4	30.7	318 09.5	44.6
06	172 49.3	226 41.5	S21 03.2	352 45.2	N 2 15.2	321 26.4	S11 30.9	333 11.8	S 5 44.7
07	187 51.8	241 42.6	02.5	7 46.5	14.7	336 28.5	31.0	348 14.1	44.8
08	202 54.3	256 43.7	01.9	22 47.9	14.3	351 30.5	31.2	3 16.3	44.8
M 09	217 56.7	271 44.7	·· 01.2	37 49.3	·· 13.9	6 32.6	·· 31.3	18 18.6	·· 44.9
O 10	232 59.2	286 45.8	21 00.6	52 50.6	13.4	21 34.6	31.5	33 20.9	45.0
N 11	248 01.7	301 46.9	20 59.9	67 52.0	13.0	36 36.6	31.6	48 23.2	45.0
D 12	263 04.1	316 47.9	S20 59.3	82 53.4	N 2 12.5	51 38.7	S11 31.8	63 25.5	S 5 45.1
A 13	278 06.6	331 49.0	58.7	97 54.7	12.1	66 40.7	31.9	78 27.7	45.2
Y 14	293 09.1	346 50.1	58.0	112 56.1	11.6	81 42.8	32.0	93 30.0	45.2
15	308 11.5	1 51.2	·· 57.4	127 57.4	·· 11.2	96 44.8	·· 32.2	108 32.3	·· 45.3
16	323 14.0	16 52.2	56.7	142 58.8	10.8	111 46.8	32.3	123 34.6	45.3
17	338 16.5	31 53.3	56.1	158 00.2	10.3	126 48.9	32.5	138 36.9	45.4
18	353 18.9	46 54.4	S20 55.4	173 01.5	N 2 09.9	141 50.9	S11 32.6	153 39.1	S 5 45.5
19	8 21.4	61 55.5	54.8	188 02.9	09.4	156 53.0	32.8	168 41.4	45.5
20	23 23.8	76 56.6	54.1	203 04.2	09.0	171 55.0	32.9	183 43.7	45.6
21	38 26.3	91 57.7	·· 53.5	218 05.6	·· 08.5	186 57.1	·· 33.0	198 46.0	·· 45.7
22	53 28.8	106 58.8	52.8	233 07.0	08.1	201 59.1	33.2	213 48.3	45.7
23	68 31.2	121 59.9	52.2	248 08.3	07.7	217 01.1	33.3	228 50.5	45.8
	h m								
Mer. Pass.	18 30.6	*v* 1.0	*d* 0.6	*v* 1.4	*d* 0.4	*v* 2.0	*d* 0.1	*v* 2.3	*d* 0.1

STARS		
Name	S.H.A.	Dec.
	° ′	° ′
Acamar	315 36.2	S40 22.8
Achernar	335 44.3	S57 20.0
Acrux	173 36.5	S62 59.5
Adhara	255 31.1	S28 56.8
Aldebaran	291 16.7	N16 28.4
Alioth	166 42.0	N56 03.3
Alkaid	153 18.1	N49 24.1
Al Na'ir	28 14.0	S47 03.2
Alnilam	276 10.5	S 1 12.8
Alphard	218 19.6	S 8 34.7
Alphecca	126 31.7	N26 46.6
Alpheratz	358 08.4	N28 59.5
Altair	62 32.0	N 8 49.3
Ankaa	353 39.3	S42 24.6
Antares	112 56.2	S26 23.4
Arcturus	146 17.9	N19 16.6
Atria	108 20.2	S68 59.6
Avior	234 27.4	S59 26.8
Bellatrix	278 57.5	N 6 20.0
Betelgeuse	271 27.0	N 7 24.2
Canopus	264 06.3	S52 41.1
Capella	281 09.6	N45 58.8
Deneb	49 48.2	N45 13.1
Denebola	182 58.2	N14 40.4
Diphda	349 19.9	S18 05.3
Dubhe	194 21.0	N61 50.7
Elnath	278 42.7	N28 35.5
Eltanin	90 57.9	N51 29.6
Enif	34 10.9	N 9 47.5
Fomalhaut	15 50.5	S29 43.3
Gacrux	172 28.0	S57 00.3
Gienah	176 17.2	S17 26.3
Hadar	149 22.6	S60 16.8
Hamal	328 27.7	N23 22.7
Kaus Aust.	84 16.1	S34 23.6
Kochab	137 20.0	N74 13.7
Markab	14 02.4	N15 06.5
Menkar	314 40.0	N 4 01.1
Menkent	148 36.3	S36 16.6
Miaplacidus	221 44.2	S69 38.3
Mirfak	309 14.4	N49 47.9
Nunki	76 28.5	S26 19.2
Peacock	53 57.5	S56 47.8
Pollux	243 56.8	N28 04.2
Procyon	245 24.6	N 5 16.3
Rasalhague	96 29.2	N12 34.4
Regulus	208 09.0	N12 03.4
Rigel	281 34.9	S 8 13.4
Rigil Kent.	140 25.2	S60 45.3
Sabik	102 40.5	S15 42.1
Schedar	350 07.9	N56 26.5
Shaula	96 55.0	S37 05.4
Sirius	258 54.6	S16 41.5
Spica	158 56.8	S11 03.8
Suhail	223 09.9	S43 21.3
Vega	80 55.7	N38 46.1
Zuben'ubi	137 32.4	S15 57.8

	S.H.A.	Mer. Pass.
	° ′	h m
Venus	54 35.8	14 54
Mars	180 29.1	6 31
Jupiter	148 49.9	8 37
Saturn	160 28.0	7 51

G.M.T.	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
12 00	181 37.1	S23 03.3	351 44.4	2.8	N21 19.8	3.4	61.3
01	196 36.8	03.4	6 06.2	2.7	21 23.2	3.2	61.3
02	211 36.5	03.6	20 27.9	2.8	21 26.4	3.1	61.3
03	226 36.2	03.8	34 49.7	2.7	21 29.5	2.8	61.2
04	241 35.9	04.0	49 11.4	2.8	21 32.3	2.8	61.2
05	256 35.7	04.2	63 33.2	2.7	21 35.1	2.5	61.2
06	271 35.4	S23 04.4	77 54.9	2.8	N21 37.6	2.4	61.2
07	286 35.1	04.6	92 16.7	2.7	21 40.0	2.2	61.2
S 08	301 34.8	04.8	106 38.4	2.8	21 42.2	2.1	61.2
A 09	316 34.5	05.0	121 00.2	2.8	21 44.3	1.8	61.1
T 10	331 34.2	05.1	135 22.0	2.8	21 46.1	1.7	61.1
U 11	346 33.9	05.3	149 43.8	2.8	21 47.8	1.6	61.1
R 12	1 33.6	S23 05.5	164 05.6	2.8	N21 49.4	1.4	61.1
D 13	16 33.3	05.7	178 27.4	2.8	21 50.8	1.2	61.1
A 14	31 33.0	05.9	192 49.2	2.8	21 52.0	1.0	61.0
Y 15	46 32.7	06.1	207 11.0	2.9	21 53.0	0.9	61.0
16	61 32.5	06.2	221 32.9	2.9	21 53.9	0.7	61.0
17	76 32.2	06.4	235 54.8	2.9	21 54.6	0.6	61.0
18	91 31.9	S23 06.6	250 16.7	3.0	N21 55.2	0.4	60.9
19	106 31.6	06.8	264 38.7	3.0	21 55.6	0.2	60.9
20	121 31.3	07.0	279 00.7	3.0	21 55.8	0.0	60.9
21	136 31.0	07.1	293 22.7	3.0	21 55.8	0.1	60.9
22	151 30.7	07.3	307 44.7	3.1	21 55.7	0.2	60.8
23	166 30.4	07.5	322 06.8	3.1	21 55.5	0.5	60.8
13 00	181 30.1	S23 07.7	336 28.9	3.2	N21 55.0	0.6	60.8
01	196 29.8	07.8	350 51.1	3.2	21 54.4	0.7	60.8
02	211 29.5	08.0	5 13.3	3.3	21 53.7	1.0	60.7
03	226 29.2	08.2	19 35.6	3.3	21 52.7	1.1	60.7
04	241 28.9	08.3	33 57.9	3.4	21 51.6	1.2	60.7
05	256 28.6	08.5	48 20.3	3.4	21 50.4	1.4	60.7
06	271 28.4	S23 08.7	62 42.7	3.5	N21 49.0	1.6	60.6
07	286 28.1	08.9	77 05.2	3.5	21 47.4	1.7	60.6
08	301 27.8	09.0	91 27.7	3.6	21 45.7	1.9	60.6
S 09	316 27.5	09.2	105 50.3	3.6	21 43.8	2.0	60.5
U 10	331 27.2	09.4	120 12.9	3.7	21 41.8	2.2	60.5
N 11	346 26.9	09.5	134 35.6	3.8	21 39.6	2.4	60.5
D 12	1 26.6	S23 09.7	148 58.4	3.8	N21 37.2	2.5	60.4
A 13	16 26.3	09.9	163 21.2	3.9	21 34.7	2.6	60.4
Y 14	31 26.0	10.0	177 44.1	4.0	21 32.1	2.8	60.4
15	46 25.7	10.2	192 07.1	4.1	21 29.3	3.0	60.3
16	61 25.4	10.3	206 30.2	4.1	21 26.3	3.1	60.3
17	76 25.1	10.5	220 53.3	4.2	21 23.2	3.2	60.3
18	91 24.8	S23 10.7	235 16.5	4.2	N21 20.0	3.4	60.2
19	106 24.5	10.8	249 39.7	4.4	21 16.6	3.6	60.2
20	121 24.2	11.0	264 03.1	4.4	21 13.0	3.7	60.2
21	136 23.9	11.1	278 26.5	4.5	21 09.3	3.8	60.1
22	151 23.6	11.3	292 50.0	4.6	21 05.5	4.0	60.1
23	166 23.3	11.5	307 13.6	4.7	21 01.5	4.1	60.1
14 00	181 23.0	S23 11.6	321 37.3	4.7	N20 57.4	4.3	60.0
01	196 22.7	11.8	336 01.0	4.9	20 53.1	4.4	60.0
02	211 22.4	11.9	350 24.9	4.9	20 48.7	4.5	60.0
03	226 22.1	12.1	4 48.8	5.0	20 44.2	4.7	59.9
04	241 21.9	12.2	19 12.8	5.1	20 39.5	4.8	59.9
05	256 21.6	12.4	33 36.9	5.2	20 34.7	5.0	59.9
06	271 21.3	S23 12.5	48 01.1	5.3	N20 29.7	5.1	59.8
07	286 21.0	12.7	62 25.4	5.4	20 24.6	5.2	59.8
08	301 20.7	12.8	76 49.8	5.5	20 19.4	5.3	59.7
M 09	316 20.4	13.0	91 14.3	5.6	20 14.1	5.5	59.7
O 10	331 20.1	13.1	105 38.9	5.6	20 08.6	5.6	59.7
N 11	346 19.8	13.3	120 03.5	5.8	20 03.0	5.7	59.6
D 12	1 19.5	S23 13.4	134 28.3	5.9	N19 57.3	5.8	59.6
A 13	16 19.2	13.6	148 53.2	5.9	19 51.5	6.0	59.6
Y 14	31 18.9	13.7	163 18.1	6.1	19 45.5	6.1	59.5
15	46 18.6	13.8	177 43.2	6.2	19 39.4	6.2	59.5
16	61 18.3	14.0	192 08.4	6.2	19 33.2	6.3	59.4
17	76 18.0	14.1	206 33.6	6.4	19 26.9	6.5	59.4
18	91 17.7	S23 14.3	220 59.0	6.4	N19 20.4	6.5	59.4
19	106 17.4	14.4	235 24.4	6.6	19 13.9	6.7	59.3
20	121 17.1	14.5	249 50.0	6.7	19 07.2	6.8	59.3
21	136 16.8	14.7	264 15.7	6.7	19 00.4	6.9	59.2
22	151 16.5	14.8	278 41.4	6.9	18 53.5	7.0	59.2
23	166 16.2	15.0	293 07.3	7.0	18 46.5	7.1	59.2
	S.D. 16.3	d 0.2	S.D. 16.6		16.5		16.2

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 12	Moonrise 13	Moonrise 14	Moonrise 15
°	h m	h m	h m	h m	h m	h m	h m
N 72	08 17	10 40	▬	▭	▭	▭	17 59
N 70	07 58	09 44	▬	▭	▭	16 12	18 43
68	07 42	09 10	▬	13 49	15 12	17 15	19 12
66	07 30	08 46	10 23	14 58	16 11	17 50	19 34
64	07 19	08 27	09 43	15 34	16 45	18 15	19 51
62	07 09	08 11	09 16	16 00	17 09	18 35	20 05
60	07 01	07 58	08 55	16 20	17 29	18 51	20 17
N 58	06 54	07 46	08 38	16 37	17 45	19 04	20 28
56	06 47	07 36	08 23	16 51	17 59	19 16	20 37
54	06 41	07 27	08 11	17 04	18 11	19 26	20 44
52	06 36	07 19	08 00	17 14	18 21	19 35	20 51
50	06 30	07 12	07 50	17 24	18 31	19 43	20 58
45	06 19	06 56	07 30	17 44	18 50	20 01	21 11
N 40	06 09	06 43	07 13	18 01	19 06	20 15	21 23
35	05 59	06 31	06 59	18 15	19 20	20 26	21 32
30	05 51	06 21	06 47	18 27	19 32	20 37	21 41
20	05 35	06 02	06 26	18 48	19 52	20 55	21 55
N 10	05 19	05 45	06 08	19 06	20 09	21 10	22 07
0	05 02	05 28	05 50	19 23	20 26	21 25	22 19
S 10	04 43	05 10	05 33	19 40	20 42	21 39	22 31
20	04 21	04 50	05 14	19 58	20 59	21 54	22 43
30	03 52	04 25	04 53	20 19	21 19	22 12	22 57
35	03 34	04 10	04 40	20 32	21 31	22 22	23 06
40	03 11	03 52	04 25	20 46	21 45	22 34	23 15
45	02 41	03 30	04 07	21 03	22 00	22 48	23 26
S 50	01 56	03 01	03 45	21 23	22 20	23 04	23 39
52	01 30	02 46	03 34	21 33	22 29	23 12	23 45
54	00 48	02 28	03 22	21 44	22 40	23 21	23 52
56	////	02 07	03 08	21 57	22 51	23 31	23 59
58	////	01 38	02 52	22 12	23 05	23 42	24 08
S 60	////	00 53	02 32	22 29	23 20	23 54	24 17

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 12	Moonset 13	Moonset 14	Moonset 15
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	13 08	15 31	▭	▭	▭	14 28
N 70	▬	14 04	15 50	▭	▭	14 18	13 43
68	▬	14 38	16 06	12 22	13 11	13 14	13 12
66	13 25	15 02	16 19	11 13	12 12	12 38	12 50
64	14 05	15 22	16 29	10 37	11 38	12 13	12 31
62	14 32	15 37	16 39	10 11	11 13	11 52	12 17
60	14 53	15 51	16 47	09 51	10 53	11 36	12 04
N 58	15 11	16 02	16 54	09 34	10 37	11 22	11 53
56	15 25	16 12	17 01	09 20	10 23	11 10	11 43
54	15 37	16 21	17 07	09 08	10 11	10 59	11 35
52	15 48	16 29	17 13	08 57	10 00	10 50	11 27
50	15 58	16 36	17 18	08 48	09 51	10 41	11 21
45	16 19	16 52	17 29	08 27	09 31	10 23	11 06
N 40	16 35	17 06	17 40	08 11	09 14	10 08	10 54
35	16 49	17 17	17 49	07 57	09 01	09 56	10 43
30	17 01	17 28	17 58	07 45	08 49	09 45	10 34
20	17 22	17 46	18 14	07 24	08 28	09 26	10 18
N 10	17 41	18 03	18 30	07 06	08 10	09 10	10 04
0	17 58	18 20	18 47	06 50	07 53	08 54	09 51
S 10	18 15	18 38	19 05	06 33	07 36	08 39	09 38
20	18 34	18 59	19 28	06 15	07 18	08 22	09 24
30	18 56	19 23	19 57	05 54	06 57	08 03	09 08
35	19 09	19 38	20 15	05 42	06 45	07 51	08 58
40	19 24	19 56	20 38	05 28	06 31	07 38	08 47
45	19 41	20 19	21 08	05 12	06 14	07 23	08 34
S 50	20 04	20 48	21 53	04 52	05 54	07 04	08 18
52	20 14	21 03	22 20	04 42	05 44	06 55	08 11
54	20 27	21 21	23 03	04 31	05 33	06 45	08 03
56	20 41	21 42	////	04 19	05 20	06 34	07 54
58	20 57	22 11	////	04 05	05 06	06 20	07 43
S 60	21 17	22 58	////	03 48	04 48	06 05	07 31

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
12	06 29	06 15	11 54	00 35	13 06	16	
13	06 01	05 47	11 54	01 38	14 09	17	○
14	05 33	05 18	11 55	02 40	15 09	18	

G.M.T.	ARIES	VENUS −4.4		MARS +1.1		JUPITER −1.4		SATURN +1.0		STARS		
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	Name	S.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′		° ′	° ′
15 00	83 33.7	137 01.0	S20 51.5	263 09.7	N 2 07.2	232 03.2	S11 33.5	243 52.8	S 5 45.9	Acamar	315 36.2	S40 22.9
01	98 36.2	152 02.1	50.9	278 11.1	06.8	247 05.2	33.6	258 55.1	45.9	Achernar	335 44.3	S57 20.1
02	113 38.6	167 03.2	50.2	293 12.4	06.3	262 07.3	33.8	273 57.4	46.0	Acrux	173 36.4	S62 59.5
03	128 41.1	182 04.3	·· 49.6	308 13.8	·· 05.9	277 09.3	·· 33.9	288 59.7	·· 46.0	Adhara	255 31.1	S28 56.8
04	143 43.6	197 05.4	48.9	323 15.2	05.5	292 11.4	34.1	304 02.0	46.1	Aldebaran	291 16.7	N16 28.4
05	158 46.0	212 06.6	48.3	338 16.5	05.0	307 13.4	34.2	319 04.2	46.2			
06	173 48.5	227 07.7	S20 47.6	353 17.9	N 2 04.6	322 15.4	S11 34.3	334 06.5	S 5 46.2	Alioth	166 41.9	N56 03.3
07	188 51.0	242 08.8	46.9	8 19.3	04.1	337 17.5	34.5	349 08.8	46.3	Alkaid	153 18.1	N49 24.1
08	203 53.4	257 09.9	46.3	23 20.6	03.7	352 19.5	34.6	4 11.1	46.4	Al Na'ir	28 14.0	S47 03.2
T 09	218 55.9	272 11.1	·· 45.6	38 22.0	·· 03.3	7 21.6	·· 34.8	19 13.4	·· 46.4	Alnilam	276 10.5	S 1 12.8
U 10	233 58.3	287 12.2	45.0	53 23.4	02.8	22 23.6	34.9	34 15.7	46.5	Alphard	218 19.5	S 8 34.7
E 11	249 00.8	302 13.4	44.3	68 24.7	02.4	37 25.7	35.1	49 17.9	46.5			
S 12	264 03.3	317 14.5	S20 43.7	83 26.1	N 2 01.9	52 27.7	S11 35.2	64 20.2	S 5 46.6	Alphecca	126 31.7	N26 46.5
D 13	279 05.7	332 15.6	43.0	98 27.5	01.5	67 29.8	35.3	79 22.5	46.7	Alpheratz	358 08.4	N28 59.5
A 14	294 08.2	347 16.8	42.4	113 28.8	01.1	82 31.8	35.5	94 24.8	46.7	Altair	62 32.0	N 8 49.2
Y 15	309 10.7	2 17.9	·· 41.7	128 30.2	·· 00.6	97 33.8	·· 35.6	109 27.1	·· 46.8	Ankaa	353 39.3	S42 24.6
16	324 13.1	17 19.1	41.1	143 31.6	2 00.2	112 35.9	35.8	124 29.4	46.9	Antares	112 56.2	S26 23.4
17	339 15.6	32 20.2	40.4	158 33.0	1 59.8	127 37.9	35.9	139 31.6	46.9			
18	354 18.1	47 21.4	S20 39.8	173 34.3	N 1 59.3	142 40.0	S11 36.1	154 33.9	S 5 47.0	Arcturus	146 17.9	N19 16.6
19	9 20.5	62 22.6	39.1	188 35.7	58.9	157 42.0	36.2	169 36.2	47.0	Atria	108 20.2	S68 59.6
20	24 23.0	77 23.7	38.5	203 37.1	58.4	172 44.1	36.3	184 38.5	47.1	Avior	234 27.3	S59 26.9
21	39 25.4	92 24.9	·· 37.8	218 38.4	·· 58.0	187 46.1	·· 36.5	199 40.8	·· 47.2	Bellatrix	278 57.5	N 6 20.0
22	54 27.9	107 26.1	37.2	233 39.8	57.6	202 48.2	36.6	214 43.1	47.2	Betelgeuse	271 27.0	N 7 24.2
23	69 30.4	122 27.3	36.5	248 41.2	57.1	217 50.2	36.8	229 45.3	47.3			
16 00	84 32.8	137 28.4	S20 35.9	263 42.5	N 1 56.7	232 52.3	S11 36.9	244 47.6	S 5 47.4	Canopus	264 06.3	S52 41.1
01	99 35.3	152 29.6	35.2	278 43.9	56.2	247 54.3	37.1	259 49.9	47.4	Capella	281 09.5	N45 58.8
02	114 37.8	167 30.8	34.6	293 45.3	55.8	262 56.3	37.2	274 52.2	47.5	Deneb	49 48.2	N45 13.1
03	129 40.2	182 32.0	·· 33.9	308 46.7	·· 55.4	277 58.4	·· 37.3	289 54.5	·· 47.5	Denebola	182 58.2	N14 40.4
04	144 42.7	197 33.2	33.2	323 48.0	54.9	293 00.4	37.5	304 56.8	47.6	Diphda	349 19.9	S18 05.3
05	159 45.2	212 34.4	32.6	338 49.4	54.5	308 02.5	37.6	319 59.1	47.7			
06	174 47.6	227 35.6	S20 31.9	353 50.8	N 1 54.1	323 04.5	S11 37.8	335 01.3	S 5 47.7	Dubhe	194 20.9	N61 50.7
07	189 50.1	242 36.8	31.3	8 52.2	53.6	338 06.6	37.9	350 03.6	47.8	Elnath	278 42.7	N28 35.5
W 08	204 52.6	257 38.0	30.6	23 53.5	53.2	353 08.6	38.0	5 05.9	47.8	Eltanin	90 57.9	N51 29.5
E 09	219 55.0	272 39.2	·· 30.0	38 54.9	·· 52.8	8 10.7	·· 38.2	20 08.2	·· 47.9	Enif	34 10.9	N 9 47.5
D 10	234 57.5	287 40.4	29.3	53 56.3	52.3	23 12.7	38.3	35 10.5	48.0	Fomalhaut	15 50.5	S29 43.3
N 11	249 59.9	302 41.6	28.7	68 57.7	51.9	38 14.8	38.5	50 12.8	48.0			
E 12	265 02.4	317 42.8	S20 28.0	83 59.0	N 1 51.4	53 16.8	S11 38.6	65 15.1	S 5 48.1	Gacrux	172 27.9	S57 00.3
S 13	280 04.9	332 44.0	27.4	99 00.4	51.0	68 18.9	38.7	80 17.3	48.2	Gienah	176 17.1	S17 26.3
D 14	295 07.3	347 45.2	26.7	114 01.8	50.6	83 20.9	38.9	95 19.6	48.2	Hadar	149 22.5	S60 16.8
A 15	310 09.8	2 46.5	·· 26.0	129 03.2	·· 50.1	98 23.0	·· 39.0	110 21.9	·· 48.3	Hamal	328 27.7	N23 22.7
Y 16	325 12.3	17 47.7	25.4	144 04.5	49.7	113 25.0	39.2	125 24.2	48.3	Kaus Aust.	84 16.1	S34 23.6
17	340 14.7	32 48.9	24.7	159 05.9	49.3	128 27.1	39.3	140 26.5	48.4			
18	355 17.2	47 50.2	S20 24.1	174 07.3	N 1 48.8	143 29.1	S11 39.5	155 28.8	S 5 48.5	Kochab	137 19.9	N74 13.7
19	10 19.7	62 51.4	23.4	189 08.7	48.4	158 31.2	39.6	170 31.1	48.5	Markab	14 02.4	N15 06.5
20	25 22.1	77 52.6	22.8	204 10.1	48.0	173 33.2	39.7	185 33.4	48.6	Menkar	314 40.0	N 4 01.1
21	40 24.6	92 53.9	·· 22.1	219 11.4	·· 47.5	188 35.3	·· 39.9	200 35.6	·· 48.6	Menkent	148 36.3	S36 16.6
22	55 27.1	107 55.1	21.5	234 12.8	47.1	203 37.3	40.0	215 37.9	48.7	Miaplacidus	221 44.2	S69 38.3
23	70 29.5	122 56.4	20.8	249 14.2	46.7	218 39.4	40.2	230 40.2	48.8			
17 00	85 32.0	137 57.6	S20 20.2	264 15.6	N 1 46.2	233 41.4	S11 40.3	245 42.5	S 5 48.8	Mirfak	309 14.4	N49 47.9
01	100 34.4	152 58.9	19.5	279 16.9	45.8	248 43.5	40.4	260 44.8	48.9	Nunki	76 28.5	S26 19.2
02	115 36.9	168 00.1	18.8	294 18.3	45.4	263 45.5	40.6	275 47.1	48.9	Peacock	53 57.5	S56 47.8
03	130 39.4	183 01.4	·· 18.2	309 19.7	·· 44.9	278 47.6	·· 40.7	290 49.4	·· 49.0	Pollux	243 56.8	N28 04.2
04	145 41.8	198 02.7	17.5	324 21.1	44.5	293 49.6	40.9	305 51.7	49.1	Procyon	245 24.6	N 5 16.3
05	160 44.3	213 03.9	16.9	339 22.5	44.1	308 51.7	41.0	320 53.9	49.1			
06	175 46.8	228 05.2	S20 16.2	354 23.9	N 1 43.6	323 53.7	S11 41.1	335 56.2	S 5 49.2	Rasalhague	96 29.1	N12 34.4
07	190 49.2	243 06.5	15.6	9 25.2	43.2	338 55.8	41.3	350 58.5	49.2	Regulus	208 09.0	N12 03.4
T 08	205 51.7	258 07.8	14.9	24 26.6	42.8	353 57.8	41.4	6 00.8	49.3	Rigel	281 34.8	S 8 13.4
H 09	220 54.2	273 09.0	·· 14.2	39 28.0	·· 42.3	8 59.9	·· 41.6	21 03.1	·· 49.4	Rigil Kent.	140 25.2	S60 45.3
U 10	235 56.6	288 10.3	13.6	54 29.4	41.9	24 01.9	41.7	36 05.4	49.4	Sabik	102 40.5	S15 42.1
R 11	250 59.1	303 11.6	12.9	69 30.8	41.5	39 04.0	41.8	51 07.7	49.5			
S 12	266 01.5	318 12.9	S20 12.3	84 32.1	N 1 41.0	54 06.0	S11 42.0	66 10.0	S 5 49.5	Schedar	350 07.9	N56 26.5
D 13	281 04.0	333 14.2	11.6	99 33.5	40.6	69 08.1	42.1	81 12.3	49.6	Shaula	96 55.0	S37 05.4
A 14	296 06.5	348 15.5	11.0	114 34.9	40.2	84 10.1	42.3	96 14.5	49.7	Sirius	258 54.6	S16 41.5
Y 15	311 08.9	3 16.8	·· 10.3	129 36.3	·· 39.7	99 12.2	·· 42.4	111 16.8	·· 49.7	Spica	158 56.8	S11 03.9
16	326 11.4	18 18.1	09.7	144 37.7	39.3	114 14.2	42.5	126 19.1	49.8	Suhail	223 09.9	S43 21.3
17	341 13.9	33 19.4	09.0	159 39.1	38.9	129 16.3	42.7	141 21.4	49.8			
18	356 16.3	48 20.7	S20 08.3	174 40.5	N 1 38.4	144 18.3	S11 42.8	156 23.7	S 5 49.9	Vega	80 55.7	N38 46.1
19	11 18.8	63 22.0	07.7	189 41.8	38.0	159 20.4	43.0	171 26.0	50.0	Zuben'ubi	137 32.4	S15 57.8
20	26 21.3	78 23.4	07.0	204 43.2	37.6	174 22.4	43.1	186 28.3	50.0			
21	41 23.7	93 24.7	·· 06.4	219 44.6	·· 37.2	189 24.5	·· 43.2	201 30.6	·· 50.1		S.H.A.	Mer. Pass.
22	56 26.2	108 26.0	05.7	234 46.0	36.7	204 26.5	43.4	216 32.9	50.1	Venus	° ′ 52 55.6	h m 14 49
23	71 28.7	123 27.3	05.1	249 47.4	36.3	219 28.6	43.5	231 35.2	50.2	Mars	179 09.7	6 25
	h m									Jupiter	148 19.4	8 27
Mer Pass.	18 18.8	v 1.2	d 0.7	v 1.4	d 0.4	v 2.0	d 0.1	v 2.3	d 0.1	Saturn	160 14.8	7 40

G.M.T.	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
15 00	181 15.9	S23 15.1	307 33.3	7.1	N18 39.4	7.2	59.1
01	196 15.6	15.2	321 59.4	7.1	18 32.2	7.4	59.1
02	211 15.3	15.4	336 25.5	7.3	18 24.8	7.4	59.0
03	226 15.0	·· 15.5	350 51.8	7.4	18 17.4	7.5	59.0
04	241 14.7	15.6	5 18.2	7.5	18 09.9	7.7	59.0
05	256 14.4	15.8	19 44.7	7.6	18 02.2	7.7	58.9
06	271 14.1	S23 15.9	34 11.3	7.7	N17 54.5	7.8	58.9
07	286 13.8	16.0	48 38.0	7.8	17 46.7	8.0	58.8
08	301 13.5	16.2	63 04.8	7.9	17 38.7	8.0	58.8
T 09	316 13.2	·· 16.3	77 31.7	8.1	17 30.7	8.1	58.8
U 10	331 12.9	16.4	91 58.8	8.1	17 22.6	8.2	58.7
E 11	346 12.6	16.5	106 25.9	8.2	17 14.4	8.3	58.7
S 12	1 12.3	S23 16.7	120 53.1	8.3	N17 06.1	8.4	58.6
D 13	16 12.0	16.8	135 20.4	8.5	16 57.7	8.5	58.6
A 14	31 11.7	16.9	149 47.9	8.5	16 49.2	8.5	58.6
Y 15	46 11.4	·· 17.0	164 15.4	8.7	16 40.7	8.7	58.5
16	61 11.1	17.2	178 43.1	8.7	16 32.0	8.7	58.5
17	76 10.8	17.3	193 10.8	8.9	16 23.3	8.8	58.4
18	91 10.5	S23 17.4	207 38.7	8.9	N16 14.5	8.9	58.4
19	106 10.2	17.5	222 06.6	9.1	16 05.6	8.9	58.3
20	121 09.9	17.6	236 34.7	9.1	15 56.7	9.1	58.3
21	136 09.6	·· 17.8	251 02.8	9.3	15 47.6	9.1	58.3
22	151 09.3	17.9	265 31.1	9.3	15 38.5	9.2	58.2
23	166 09.0	18.0	279 59.4	9.5	15 29.3	9.3	58.2
16 00	181 08.7	S23 18.1	294 27.9	9.6	N15 20.0	9.3	58.1
01	196 08.4	18.2	308 56.5	9.6	15 10.7	9.4	58.1
02	211 08.1	18.3	323 25.1	9.8	15 01.3	9.5	58.1
03	226 07.8	·· 18.5	337 53.9	9.9	14 51.8	9.5	58.0
04	241 07.5	18.6	352 22.8	9.9	14 42.3	9.6	58.0
05	256 07.2	18.7	6 51.7	10.1	14 32.7	9.7	57.9
06	271 06.9	S23 18.8	21 20.8	10.1	N14 23.0	9.8	57.9
W 07	286 06.5	18.9	35 49.9	10.3	14 13.2	9.8	57.9
E 08	301 06.2	19.0	50 19.2	10.3	14 03.4	9.8	57.8
D 09	316 05.9	·· 19.1	64 48.5	10.5	13 53.6	10.0	57.8
N 10	331 05.6	19.2	79 18.0	10.5	13 43.6	9.9	57.7
E 11	346 05.3	19.3	93 47.5	10.6	13 33.7	10.1	57.7
S 12	1 05.0	S23 19.4	108 17.1	10.8	N13 23.6	10.1	57.7
D 13	16 04.7	19.6	122 46.9	10.8	13 13.5	10.1	57.6
A 14	31 04.4	19.7	137 16.7	10.9	13 03.4	10.2	57.6
Y 15	46 04.1	·· 19.8	151 46.6	11.0	12 53.2	10.3	57.5
16	61 03.8	19.9	166 16.6	11.1	12 42.9	10.3	57.5
17	76 03.5	20.0	180 46.7	11.2	12 32.6	10.3	57.5
18	91 03.2	S23 20.1	195 16.9	11.2	N12 22.3	10.4	57.4
19	106 02.9	20.2	209 47.1	11.4	12 11.9	10.5	57.4
20	121 02.6	20.3	224 17.5	11.4	12 01.4	10.5	57.3
21	136 02.3	·· 20.4	238 47.9	11.6	11 50.9	10.5	57.3
22	151 02.0	20.5	253 18.5	11.6	11 40.4	10.6	57.3
23	166 01.7	20.6	267 49.1	11.7	11 29.8	10.6	57.2
17 00	181 01.4	S23 20.7	282 19.8	11.8	N11 19.2	10.7	57.2
01	196 01.1	20.8	296 50.6	11.8	11 08.5	10.7	57.1
02	211 00.8	20.9	311 21.4	12.0	10 57.8	10.7	57.1
03	226 00.5	·· 21.0	325 52.4	12.0	10 47.1	10.8	57.1
04	241 00.2	21.1	340 23.4	12.1	10 36.3	10.9	57.0
05	255 59.9	21.1	354 54.5	12.2	10 25.4	10.8	57.0
06	270 59.6	S23 21.2	9 25.7	12.3	N10 14.6	10.9	56.9
07	285 59.3	21.3	23 57.0	12.3	10 03.7	10.9	56.9
T 08	300 58.9	21.4	38 28.3	12.4	9 52.8	11.0	56.9
H 09	315 58.6	·· 21.5	52 59.7	12.5	9 41.8	11.0	56.8
U 10	330 58.3	21.6	67 31.2	12.6	9 30.8	11.0	56.8
R 11	345 58.0	21.7	82 02.8	12.6	9 19.8	11.1	56.8
S 12	0 57.7	S23 21.8	96 34.4	12.8	N 9 08.7	11.0	56.7
D 13	15 57.4	21.9	111 06.2	12.7	8 57.7	11.1	56.7
A 14	30 57.1	21.9	125 37.9	12.9	8 46.6	11.2	56.7
Y 15	45 56.8	·· 22.0	140 09.8	12.9	8 35.4	11.1	56.6
16	60 56.5	22.1	154 41.7	13.0	8 24.3	11.2	56.6
17	75 56.2	22.2	169 13.7	13.1	8 13.1	11.2	56.5
18	90 55.9	S23 22.3	183 45.8	13.1	N 8 01.9	11.3	56.5
19	105 55.6	22.4	198 17.9	13.2	7 50.6	11.2	56.5
20	120 55.3	22.4	212 50.1	13.3	7 39.4	11.3	56.4
21	135 55.0	·· 22.5	227 22.4	13.3	7 28.1	11.3	56.4
22	150 54.7	22.6	241 54.7	13.4	7 16.8	11.3	56.4
23	165 54.4	22.7	256 27.1	13.4	7 05.5	11.3	56.3
	S.D. 16.3	d 0.1	S.D. 16.0		15.7		15.5

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 15	Moonrise 16	Moonrise 17	Moonrise 18
°	h m	h m	h m	h m	h m	h m	h m
N 72	08 21	10 49	▬	17 59	20 23	22 23	24 13
N 70	08 02	09 49	▬	18 43	20 45	22 34	24 16
68	07 46	09 15	▬	19 12	21 01	22 43	24 18
66	07 33	08 50	10 29	19 34	21 15	22 50	24 20
64	07 22	08 30	09 47	19 51	21 26	22 56	24 22
62	07 12	08 14	09 20	20 05	21 35	23 01	24 24
60	07 04	08 01	08 58	20 17	21 43	23 06	24 25
N 58	06 56	07 49	08 41	20 28	21 50	23 10	24 26
56	06 50	07 39	08 26	20 37	21 56	23 13	24 27
54	06 44	07 30	08 14	20 44	22 02	23 16	24 28
52	06 38	07 22	08 03	20 51	22 07	23 19	24 29
50	06 33	07 14	07 53	20 58	22 11	23 22	24 30
45	06 21	06 58	07 32	21 11	22 21	23 27	24 32
N 40	06 11	06 45	07 15	21 23	22 29	23 32	24 33
35	06 01	06 33	07 01	21 32	22 36	23 36	24 34
30	05 53	06 23	06 49	21 41	22 42	23 40	24 36
20	05 36	06 04	06 28	21 55	22 52	23 46	24 37
N 10	05 20	05 46	06 09	22 07	23 01	23 51	24 39
0	05 03	05 29	05 52	22 19	23 10	23 56	24 41
S 10	04 44	05 11	05 34	22 31	23 18	24 01	00 01
20	04 22	04 51	05 16	22 43	23 27	24 07	00 07
30	03 53	04 26	04 54	22 57	23 37	24 13	00 13
35	03 34	04 11	04 41	23 06	23 43	24 16	00 16
40	03 11	03 53	04 26	23 15	23 50	24 20	00 20
45	02 41	03 30	04 08	23 26	23 58	24 25	00 25
S 50	01 56	03 01	03 45	23 39	24 07	00 07	00 30
52	01 28	02 46	03 34	23 45	24 11	00 11	00 33
54	00 44	02 28	03 22	23 52	24 16	00 16	00 36
56	////	02 06	03 08	23 59	24 21	00 21	00 39
58	////	01 37	02 51	24 08	00 08	00 27	00 42
S 60	////	00 48	02 31	24 17	00 17	00 33	00 46

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 15	Moonset 16	Moonset 17	Moonset 18
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	13 02	15 30	14 28	13 51	13 30	13 13
N 70	▬	14 02	15 50	13 43	13 27	13 17	13 07
68	▬	14 37	16 05	13 12	13 09	13 06	13 03
66	13 22	15 02	16 18	12 50	12 55	12 57	12 59
64	14 04	15 21	16 29	12 31	12 43	12 50	12 55
62	14 32	15 37	16 39	12 17	12 32	12 43	12 52
60	14 53	15 51	16 47	12 04	12 23	12 38	12 49
N 58	15 10	16 02	16 55	11 53	12 16	12 33	12 47
56	15 25	16 12	17 01	11 43	12 09	12 28	12 45
54	15 38	16 21	17 08	11 35	12 02	12 24	12 43
52	15 49	16 30	17 13	11 27	11 57	12 21	12 41
50	15 59	16 37	17 19	11 21	11 52	12 17	12 40
45	16 19	16 53	17 30	11 06	11 41	12 10	12 36
N 40	16 36	17 06	17 41	10 54	11 32	12 04	12 33
35	16 50	17 18	17 50	10 43	11 24	11 59	12 31
30	17 02	17 29	17 59	10 34	11 17	11 54	12 29
20	17 24	17 48	18 15	10 18	11 05	11 46	12 25
N 10	17 42	18 05	18 31	10 04	10 54	11 39	12 21
0	17 59	18 22	18 48	09 51	10 44	11 32	12 18
S 10	18 17	18 40	19 07	09 38	10 34	11 26	12 15
20	18 36	19 00	19 30	09 24	10 23	11 18	12 11
30	18 58	19 25	19 59	09 08	10 10	11 10	12 07
35	19 11	19 40	20 17	08 58	10 03	11 05	12 04
40	19 26	19 59	20 40	08 47	09 55	10 59	12 02
45	19 44	20 21	21 11	08 34	09 45	10 53	11 59
S 50	20 06	20 51	21 56	08 18	09 33	10 45	11 55
52	20 17	21 06	22 24	08 11	09 27	10 42	11 53
54	20 29	21 24	23 09	08 03	09 21	10 38	11 51
56	20 43	21 46	////	07 54	09 14	10 33	11 49
58	21 00	22 15	////	07 43	09 07	10 28	11 47
S 60	21 21	23 05	////	07 31	08 58	10 23	11 44

Day	SUN Eqn. of Time 00ʰ	SUN Eqn. of Time 12ʰ	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
15	05 04	04 50	11 55	03 38	16 05	19	
16	04 35	04 21	11 56	04 32	16 57	20	◑
17	04 06	03 52	11 56	05 21	17 44	21	

G.M.T.	ARIES	VENUS −4.4		MARS +1.1		JUPITER −1.4		SATURN +1.0	
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
18 00	86 31.1	138 28.7	S20 04.4	264 48.8	N 1 35.9	234 30.6	S11 43.6	246 37.5	S 5 50.3
01	101 33.6	153 30.0	03.8	279 50.2	35.4	249 32.7	43.8	261 39.7	50.3
02	116 36.0	168 31.3	03.1	294 51.5	35.0	264 34.8	43.9	276 42.0	50.4
03	131 38.5	183 32.7	·· 02.4	309 52.9	·· 34.6	279 36.8	·· 44.1	291 44.3	·· 50.4
04	146 41.0	198 34.0	01.8	324 54.3	34.1	294 38.9	44.2	306 46.6	50.5
05	161 43.4	213 35.3	01.1	339 55.7	33.7	309 40.9	44.3	321 48.9	50.6
06	176 45.9	228 36.7	S20 00.5	354 57.1	N 1 33.3	324 43.0	S11 44.5	336 51.2	S 5 50.6
07	191 48.4	243 38.0	19 59.8	9 58.5	32.9	339 45.0	44.6	351 53.5	50.7
08	206 50.8	258 39.4	59.2	24 59.9	32.4	354 47.1	44.8	6 55.8	50.7
F 09	221 53.3	273 40.8	·· 58.5	40 01.3	·· 32.0	9 49.1	·· 44.9	21 58.1	·· 50.8
R 10	236 55.8	288 42.1	57.8	55 02.7	31.6	24 51.2	45.0	37 00.4	50.9
I 11	251 58.2	303 43.5	57.2	70 04.0	31.1	39 53.2	45.2	52 02.7	50.9
D 12	267 00.7	318 44.9	S19 56.5	85 05.4	N 1 30.7	54 55.3	S11 45.3	67 05.0	S 5 51.0
A 13	282 03.2	333 46.2	55.9	100 06.8	30.3	69 57.4	45.4	82 07.2	51.0
Y 14	297 05.6	348 47.6	55.2	115 08.2	29.9	84 59.4	45.6	97 09.5	51.1
15	312 08.1	3 49.0	·· 54.6	130 09.6	·· 29.4	100 01.5	·· 45.7	112 11.8	·· 51.1
16	327 10.5	18 50.4	53.9	145 11.0	29.0	115 03.5	45.9	127 14.1	51.2
17	342 13.0	33 51.7	53.2	160 12.4	28.6	130 05.6	46.0	142 16.4	51.3
18	357 15.5	48 53.1	S19 52.6	175 13.8	N 1 28.1	145 07.6	S11 46.1	157 18.7	S 5 51.3
19	12 17.9	63 54.5	51.9	190 15.2	27.7	160 09.7	46.3	172 21.0	51.4
20	27 20.4	78 55.9	51.3	205 16.6	27.3	175 11.7	46.4	187 23.3	51.4
21	42 22.9	93 57.3	·· 50.6	220 18.0	·· 26.9	190 13.8	·· 46.5	202 25.6	·· 51.5
22	57 25.3	108 58.7	50.0	235 19.4	26.4	205 15.9	46.7	217 27.9	51.6
23	72 27.8	124 00.1	49.3	250 20.8	26.0	220 17.9	46.8	232 30.2	51.6
19 00	87 30.3	139 01.5	S19 48.6	265 22.2	N 1 25.6	235 20.0	S11 47.0	247 32.5	S 5 51.7
01	102 32.7	154 03.0	48.0	280 23.5	25.2	250 22.0	47.1	262 34.8	51.7
02	117 35.2	169 04.4	47.3	295 24.9	24.7	265 24.1	47.2	277 37.1	51.8
03	132 37.6	184 05.8	·· 46.7	310 26.3	·· 24.3	280 26.1	·· 47.4	292 39.4	·· 51.8
04	147 40.1	199 07.2	46.0	325 27.7	23.9	295 28.2	47.5	307 41.7	51.9
05	162 42.6	214 08.6	45.4	340 29.1	23.4	310 30.3	47.6	322 43.9	52.0
06	177 45.0	229 10.1	S19 44.7	355 30.5	N 1 23.0	325 32.3	S11 47.8	337 46.2	S 5 52.0
07	192 47.5	244 11.5	44.1	10 31.9	22.6	340 34.4	47.9	352 48.5	52.1
S 08	207 50.0	259 12.9	43.4	25 33.3	22.2	355 36.4	48.1	7 50.8	52.1
A 09	222 52.4	274 14.4	·· 42.7	40 34.7	·· 21.7	10 38.5	·· 48.2	22 53.1	·· 52.2
T 10	237 54.9	289 15.8	42.1	55 36.1	21.3	25 40.5	48.3	37 55.4	52.2
U 11	252 57.4	304 17.3	41.4	70 37.5	20.9	40 42.6	48.5	52 57.7	52.3
R 12	267 59.8	319 18.7	S19 40.8	85 38.9	N 1 20.5	55 44.7	S11 48.6	68 00.0	S 5 52.4
D 13	283 02.3	334 20.2	40.1	100 40.3	20.0	70 46.7	48.7	83 02.3	52.4
A 14	298 04.8	349 21.6	39.5	115 41.7	19.6	85 48.8	48.9	98 04.6	52.5
Y 15	313 07.2	4 23.1	·· 38.8	130 43.1	·· 19.2	100 50.8	·· 49.0	113 06.9	·· 52.5
16	328 09.7	19 24.5	38.1	145 44.5	18.8	115 52.9	49.1	128 09.2	52.6
17	343 12.1	34 26.0	37.5	160 45.9	18.3	130 55.0	49.3	143 11.5	52.6
18	358 14.6	49 27.5	S19 36.8	175 47.3	N 1 17.9	145 57.0	S11 49.4	158 13.8	S 5 52.7
19	13 17.1	64 28.9	36.2	190 48.7	17.5	160 59.1	49.6	173 16.1	52.8
20	28 19.5	79 30.4	35.5	205 50.1	17.1	176 01.1	49.7	188 18.4	52.8
21	43 22.0	94 31.9	·· 34.9	220 51.5	·· 16.7	191 03.2	·· 49.8	203 20.7	·· 52.9
22	58 24.5	109 33.4	34.2	235 52.9	16.2	206 05.3	50.0	218 23.0	52.9
23	73 26.9	124 34.9	33.6	250 54.3	15.8	221 07.3	50.1	233 25.3	53.0
20 00	88 29.4	139 36.3	S19 32.9	265 55.7	N 1 15.4	236 09.4	S11 50.2	248 27.6	S 5 53.0
01	103 31.9	154 37.8	32.2	280 57.1	15.0	251 11.4	50.4	263 29.9	53.1
02	118 34.3	169 39.3	31.6	295 58.5	14.5	266 13.5	50.5	278 32.2	53.1
03	133 36.8	184 40.8	·· 30.9	310 59.9	·· 14.1	281 15.6	·· 50.6	293 34.5	·· 53.2
04	148 39.3	199 42.3	30.3	326 01.3	13.7	296 17.6	50.8	308 36.8	53.3
05	163 41.7	214 43.8	29.6	341 02.7	13.3	311 19.7	50.9	323 39.1	53.3
06	178 44.2	229 45.4	S19 29.0	356 04.1	N 1 12.9	326 21.7	S11 51.0	338 41.4	S 5 53.4
07	193 46.6	244 46.9	28.3	11 05.5	12.4	341 23.8	51.2	353 43.7	53.4
08	208 49.1	259 48.4	27.7	26 07.0	12.0	356 25.9	51.3	8 46.0	53.5
S 09	223 51.6	274 49.9	·· 27.0	41 08.4	·· 11.6	11 27.9	·· 51.4	23 48.3	·· 53.5
U 10	238 54.0	289 51.4	26.4	56 09.8	11.2	26 30.0	51.6	38 50.6	53.6
N 11	253 56.5	304 53.0	25.7	71 11.2	10.7	41 32.1	51.7	53 52.9	53.7
D 12	268 59.0	319 54.5	S19 25.0	86 12.6	N 1 10.3	56 34.1	S11 51.9	68 55.2	S 5 53.7
A 13	284 01.4	334 56.0	24.4	101 14.0	09.9	71 36.2	52.0	83 57.5	53.8
Y 14	299 03.9	349 57.6	23.7	116 15.4	09.5	86 38.2	52.1	98 59.8	53.8
15	314 06.4	4 59.1	·· 23.1	131 16.8	·· 09.1	101 40.3	·· 52.3	114 02.1	·· 53.9
16	329 08.8	20 00.7	22.4	146 18.2	08.6	116 42.4	52.4	129 04.4	53.9
17	344 11.3	35 02.2	21.8	161 19.6	08.2	131 44.4	52.5	144 06.7	54.0
18	359 13.8	50 03.8	S19 21.1	176 21.0	N 1 07.8	146 46.5	S11 52.7	159 09.0	S 5 54.0
19	14 16.2	65 05.3	20.5	191 22.4	07.4	161 48.6	52.8	174 11.3	54.1
20	29 18.7	80 06.9	19.8	206 23.8	07.0	176 50.6	52.9	189 13.6	54.2
21	44 21.1	95 08.4	·· 19.2	221 25.3	·· 06.5	191 52.7	·· 53.1	204 15.9	·· 54.2
22	59 23.6	110 10.0	18.5	236 26.7	06.1	206 54.7	53.2	219 18.2	54.3
23	74 26.1	125 11.6	17.8	251 28.1	05.7	221 56.8	53.3	234 20.5	54.3
	h m								
Mer. Pass.	18 07.0	v 1.5	d 0.7	v 1.4	d 0.4	v 2.1	d 0.1	v 2.3	d 0.1

STARS		
Name	S.H.A.	Dec.
	° ′	° ′
Acamar	315 36.2	S40 22.9
Achernar	335 44.3	S57 20.1
Acrux	173 36.4	S62 59.5
Adhara	255 31.1	S28 56.8
Aldebaran	291 16.7	N16 28.4
Alioth	166 41.9	N56 03.3
Alkaid	153 18.1	N49 24.1
Al Na'ir	28 14.1	S47 03.2
Alnilam	276 10.4	S 1 12.8
Alphard	218 19.5	S 8 34.7
Alphecca	126 31.7	N26 46.5
Alpheratz	358 08.4	N28 59.5
Altair	62 32.0	N 8 49.2
Ankaa	353 39.3	S42 24.6
Antares	112 56.2	S26 23.4
Arcturus	146 17.9	N19 16.6
Atria	108 20.2	S68 59.6
Avior	234 27.3	S59 26.9
Bellatrix	278 57.5	N 6 20.0
Betelgeuse	271 27.0	N 7 24.2
Canopus	264 06.3	S52 41.1
Capella	281 09.5	N45 58.8
Deneb	49 48.2	N45 13.1
Denebola	182 58.2	N14 40.4
Diphda	349 19.9	S18 05.3
Dubhe	194 20.9	N61 50.7
Elnath	278 42.7	N28 35.5
Eltanin	90 57.9	N51 29.5
Enif	34 10.9	N 9 47.5
Fomalhaut	15 50.5	S29 43.3
Gacrux	172 27.9	S57 00.3
Gienah	176 17.1	S17 26.3
Hadar	149 22.5	S60 16.8
Hamal	328 27.7	N23 22.7
Kaus Aust.	84 16.1	S34 23.6
Kochab	137 19.9	N74 13.6
Markab	14 02.4	N15 06.5
Menkar	314 40.0	N 4 01.1
Menkent	148 36.2	S36 16.6
Miaplacidus	221 44.2	S69 38.3
Mirfak	309 14.4	N49 47.9
Nunki	76 28.5	S26 19.2
Peacock	53 57.5	S56 47.8
Pollux	243 56.8	N28 04.2
Procyon	245 24.6	N 5 16.3
Rasalhague	96 29.1	N12 34.4
Regulus	208 08.9	N12 03.4
Rigel	281 34.8	S 8 13.4
Rigil Kent.	140 25.2	S60 45.3
Sabik	102 40.5	S15 42.1
Schedar	350 07.9	N56 26.5
Shaula	96 55.0	S37 05.4
Sirius	258 54.6	S16 41.5
Spica	158 56.8	S11 03.9
Suhail	223 09.8	S43 21.3
Vega	80 55.7	N38 46.5
Zuben'ubi	137 32.3	S15 57.9

	S.H.A.	Mer. Pass.
	° ′	h m
Venus	51 31.3	14 42
Mars	177 51.9	6 18
Jupiter	147 49.7	8 18
Saturn	160 02.2	7 29

G.M.T.	SUN G.H.A.	SUN Dec.		MOON G.H.A.	v	MOON Dec.	d	H.P.
d h	° ′	° ′		° ′	′	° ′	′	′
18 00	180 54.1	S23 22.8		270 59.5	13.5	N 6 54.2	11.4	56.3
01	195 53.7	22.8		285 32.0	13.6	6 42.8	11.4	56.3
02	210 53.4	22.9		300 04.6	13.6	6 31.4	11.3	56.2
03	225 53.1	23.0		314 37.2	13.7	6 20.1	11.4	56.2
04	240 52.8	23.1		329 09.9	13.8	6 08.7	11.4	56.2
05	255 52.5	23.1		343 42.7	13.8	5 57.3	11.5	56.1
06	270 52.2	S23 23.2		358 15.5	13.8	N 5 45.8	11.4	56.1
07	285 51.9	23.3		12 48.3	13.9	5 34.4	11.4	56.1
08	300 51.6	23.4		27 21.2	14.0	5 23.0	11.5	56.0
F 09	315 51.3	23.4		41 54.2	14.0	5 11.5	11.5	56.0
R 10	330 51.0	23.5		56 27.2	14.1	5 00.0	11.4	56.0
I 11	345 50.7	23.6		71 00.3	14.1	4 48.6	11.5	55.9
D 12	0 50.4	S23 23.6		85 33.4	14.1	N 4 37.1	11.5	55.9
A 13	15 50.1	23.7		100 06.5	14.2	4 25.6	11.5	55.9
Y 14	30 49.7	23.8		114 39.7	14.3	4 14.1	11.5	55.8
15	45 49.4	23.8		129 13.0	14.3	4 02.6	11.5	55.8
16	60 49.1	23.9		143 46.3	14.3	3 51.1	11.5	55.8
17	75 48.8	24.0		158 19.6	14.4	3 39.6	11.5	55.7
18	90 48.5	S23 24.0		172 53.0	14.4	N 3 28.1	11.6	55.7
19	105 48.2	24.1		187 26.4	14.5	3 16.5	11.5	55.7
20	120 47.9	24.1		201 59.9	14.5	3 05.0	11.5	55.7
21	135 47.6	24.2		216 33.4	14.6	2 53.5	11.5	55.6
22	150 47.3	24.3		231 07.0	14.6	2 42.0	11.5	55.6
23	165 47.0	24.3		245 40.6	14.6	2 30.5	11.6	55.6
19 00	180 46.7	S23 24.4		260 14.2	14.6	N 2 18.9	11.5	55.5
01	195 46.4	24.4		274 47.8	14.7	2 07.4	11.5	55.5
02	210 46.1	24.5		289 21.5	14.8	1 55.9	11.5	55.5
03	225 45.7	24.5		303 55.3	14.7	1 44.4	11.5	55.5
04	240 45.4	24.6		318 29.0	14.8	1 32.9	11.5	55.4
05	255 45.1	24.7		333 02.8	14.9	1 21.4	11.5	55.4
06	270 44.8	S23 24.7		347 36.7	14.8	N 1 09.9	11.5	55.4
07	285 44.5	24.8		2 10.5	14.9	0 58.4	11.5	55.4
S 08	300 44.2	24.8		16 44.4	14.9	0 46.9	11.5	55.3
A 09	315 43.9	24.9		31 18.3	15.0	0 35.4	11.5	55.3
T 10	330 43.6	24.9		45 52.3	15.0	0 23.9	11.4	55.3
U 11	345 43.3	25.0		60 26.3	15.0	0 12.5	11.5	55.2
R 12	0 43.0	S23 25.0		75 00.3	15.0	N 0 01.0	11.4	55.2
D 13	15 42.7	25.1		89 34.3	15.0	S 0 10.4	11.5	55.2
A 14	30 42.3	25.1		104 08.3	15.1	0 21.9	11.4	55.2
Y 15	45 42.0	25.2		118 42.4	15.1	0 33.3	11.4	55.1
16	60 41.7	25.2		133 16.5	15.1	0 44.7	11.4	55.1
17	75 41.4	25.2		147 50.6	15.2	0 56.1	11.4	55.1
18	90 41.1	S23 25.3		162 24.8	15.1	S 1 07.5	11.3	55.1
19	105 40.8	25.3		176 58.9	15.2	1 18.8	11.4	55.1
20	120 40.5	25.4		191 33.1	15.2	1 30.2	11.3	55.0
21	135 40.2	25.4		206 07.3	15.2	1 41.5	11.4	55.0
22	150 39.9	25.5		220 41.5	15.2	1 52.9	11.3	55.0
23	165 39.6	25.5		235 15.7	15.2	2 04.2	11.3	55.0
20 00	180 39.2	S23 25.5		249 49.9	15.3	S 2 15.5	11.2	54.9
01	195 38.9	25.6		264 24.2	15.3	2 26.7	11.3	54.9
02	210 38.6	25.6		278 58.5	15.2	2 38.0	11.2	54.9
03	225 38.3	25.6		293 32.7	15.3	2 49.2	11.3	54.9
04	240 38.0	25.7		308 07.0	15.3	3 00.5	11.2	54.9
05	255 37.7	25.7		322 41.3	15.3	3 11.7	11.1	54.8
06	270 37.4	S23 25.7		337 15.6	15.3	S 3 22.8	11.2	54.8
07	285 37.1	25.8		351 49.9	15.4	3 34.0	11.1	54.8
08	300 36.8	25.8		6 24.3	15.3	3 45.1	11.2	54.8
S 09	315 36.5	25.8		20 58.6	15.3	3 56.3	11.0	54.8
U 10	330 36.1	25.9		35 32.9	15.4	4 07.3	11.1	54.7
N 11	345 35.8	25.9		50 07.3	15.3	4 18.4	11.1	54.7
D 12	0 35.5	S23 25.9		64 41.6	15.3	S 4 29.5	11.0	54.7
A 13	15 35.2	26.0		79 15.9	15.4	4 40.5	11.0	54.7
Y 14	30 34.9	26.0		93 50.3	15.3	4 51.5	10.9	54.7
15	45 34.6	26.0		108 24.6	15.4	5 02.4	11.0	54.6
16	60 34.3	26.0		122 59.0	15.3	5 13.4	10.9	54.6
17	75 34.0	26.1		137 33.3	15.4	5 24.3	10.9	54.6
18	90 33.7	S23 26.1		152 07.7	15.3	S 5 35.2	10.8	54.6
19	105 33.4	26.1		166 42.0	15.4	5 46.0	10.9	54.6
20	120 33.0	26.1		181 16.4	15.3	5 56.9	10.8	54.5
21	135 32.7	26.2		195 50.7	15.4	6 07.7	10.7	54.5
22	150 32.4	26.2		210 25.1	15.3	6 18.4	10.8	54.5
23	165 32.1	26.2		224 59.4	15.3	6 29.2	10.7	54.5
	S.D. 16.3	d 0.0		S.D. 15.2		15.0		14.9

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 18	Moonrise 19	Moonrise 20	Moonrise 21
°	h m	h m	h m	h m	h m	h m	h m
N 72	08 24	10 56	▬	24 13	00 13	01 58	03 43
N 70	08 04	09 53	▬	24 16	00 16	01 54	03 31
68	07 48	09 18	▬	24 18	00 18	01 51	03 22
66	07 35	08 52	10 33	24 20	00 20	01 48	03 15
64	07 24	08 33	09 51	24 22	00 22	01 46	03 08
62	07 15	08 17	09 22	24 24	00 24	01 44	03 03
60	07 06	08 03	09 01	24 25	00 25	01 42	02 58
N 58	06 59	07 51	08 43	24 26	00 26	01 41	02 54
56	06 52	07 41	08 28	24 27	00 27	01 39	02 50
54	06 46	07 32	08 16	24 28	00 28	01 38	02 47
52	06 40	07 24	08 05	24 29	00 29	01 37	02 44
50	06 35	07 16	07 55	24 30	00 30	01 36	02 41
45	06 23	07 00	07 34	24 32	00 32	01 34	02 35
N 40	06 13	06 47	07 17	24 33	00 33	01 32	02 31
35	06 03	06 35	07 03	24 34	00 34	01 31	02 26
30	05 54	06 24	06 51	24 36	00 36	01 30	02 23
20	05 38	06 05	06 29	24 37	00 37	01 27	02 16
N 10	05 22	05 48	06 11	24 39	00 39	01 25	02 11
0	05 05	05 31	05 53	24 41	00 41	01 23	02 06
S 10	04 46	05 13	05 36	00 01	00 42	01 22	02 01
20	04 23	04 52	05 17	00 07	00 44	01 20	01 55
30	03 54	04 27	04 55	00 13	00 46	01 18	01 49
35	03 35	04 12	04 42	00 16	00 47	01 16	01 46
40	03 12	03 54	04 27	00 20	00 48	01 15	01 42
45	02 41	03 31	04 09	00 25	00 50	01 13	01 37
S 50	01 56	03 01	03 46	00 30	00 51	01 11	01 32
52	01 28	02 46	03 35	00 33	00 52	01 11	01 29
54	00 41	02 28	03 23	00 36	00 53	01 10	01 26
56	////	02 06	03 09	00 39	00 54	01 09	01 23
58	////	01 36	02 52	00 42	00 55	01 08	01 20
S 60	////	00 46	02 31	00 46	00 56	01 06	01 16

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 18	Moonset 19	Moonset 20	Moonset 21
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	12 59	15 30	13 13	12 58	12 44	12 27
N 70	▬	14 01	15 50	13 07	12 59	12 50	12 41
68	▬	14 36	16 06	13 03	12 59	12 55	12 51
66	13 21	15 02	16 19	12 59	12 59	13 00	13 00
64	14 04	15 22	16 30	12 55	12 59	13 03	13 08
62	14 32	15 38	16 40	12 52	13 00	13 07	13 15
60	14 53	15 51	16 48	12 49	13 00	13 10	13 20
N 58	15 11	16 03	16 56	12 47	13 00	13 12	13 25
56	15 26	16 13	17 02	12 45	13 00	13 15	13 30
54	15 38	16 22	17 09	12 43	13 00	13 17	13 34
52	15 50	16 31	17 14	12 41	13 00	13 19	13 38
50	15 59	16 38	17 20	12 40	13 00	13 20	13 41
45	16 20	16 54	17 31	12 36	13 00	13 24	13 48
N 40	16 37	17 08	17 42	12 33	13 01	13 27	13 54
35	16 51	17 19	17 51	12 31	13 01	13 30	14 00
30	17 04	17 30	18 00	12 29	13 01	13 32	14 04
20	17 25	17 49	18 16	12 25	13 01	13 37	14 12
N 10	17 43	18 06	18 33	12 21	13 01	13 40	14 19
0	18 01	18 23	18 50	12 18	13 01	13 44	14 26
S 10	18 18	18 42	19 09	12 15	13 01	13 47	14 33
20	18 37	19 02	19 31	12 11	13 02	13 51	14 40
30	19 00	19 27	20 00	12 07	13 02	13 55	14 48
35	19 13	19 42	20 19	12 04	13 02	13 58	14 53
40	19 28	20 01	20 42	12 02	13 02	14 01	14 58
45	19 46	20 23	21 13	11 59	13 02	14 04	15 05
S 50	20 08	20 53	21 59	11 55	13 02	14 08	15 12
52	20 19	21 08	22 27	11 53	13 02	14 09	15 16
54	20 32	21 26	23 14	11 51	13 02	14 11	15 20
56	20 46	21 48	////	11 49	13 02	14 14	15 24
58	21 03	22 18	////	11 47	13 02	14 16	15 29
S 60	21 23	23 09	////	11 44	13 02	14 19	15 34

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
18	03 37	03 22	11 57	06 07	18 29	22	
19	03 07	02 52	11 57	06 51	19 12	23	◑
20	02 38	02 23	11 58	07 34	19 55	24	

	G.M.T.	ARIES	VENUS −4.4		MARS +1.0		JUPITER −1.4		SATURN +1.0	
		G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.
	d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
	21 00	89 28.5	140 13.1	S19 17.2	266 29.5	N 1 05.3	236 58.9	S11 53.5	249 22.8	S 5 54.4
	01	104 31.0	155 14.7	16.5	281 30.9	04.9	252 00.9	53.6	264 25.1	54.4
	02	119 33.5	170 16.3	15.9	296 32.3	04.4	267 03.0	53.7	279 27.4	54.5
	03	134 35.9	185 17.9	·· 15.2	311 33.7	·· 04.0	282 05.1	·· 53.9	294 29.7	·· 54.5
	04	149 38.4	200 19.5	14.6	326 35.1	03.6	297 07.1	54.0	309 32.0	54.6
	05	164 40.9	215 21.1	13.9	341 36.5	03.2	312 09.2	54.1	324 34.3	54.6
	06	179 43.3	230 22.6	S19 13.3	356 38.0	N 1 02.8	327 11.3	S11 54.3	339 36.6	S 5 54.7
	07	194 45.8	245 24.2	12.6	11 39.4	02.4	342 13.3	54.4	354 38.9	54.8
	08	209 48.2	260 25.8	12.0	26 40.8	01.9	357 15.4	54.5	9 41.2	54.8
M	09	224 50.7	275 27.5	·· 11.3	41 42.2	·· 01.5	12 17.5	·· 54.7	24 43.5	·· 54.9
O	10	239 53.2	290 29.1	10.7	56 43.6	01.1	27 19.5	54.8	39 45.8	54.9
N	11	254 55.6	305 30.7	10.0	71 45.0	00.7	42 21.6	54.9	54 48.1	55.0
D	12	269 58.1	320 32.3	S19 09.4	86 46.4	N 1 00.3	57 23.7	S11 55.1	69 50.4	S 5 55.0
A	13	285 00.6	335 33.9	08.7	101 47.9	0 59.8	72 25.7	55.2	84 52.7	55.1
Y	14	300 03.0	350 35.5	08.1	116 49.3	59.4	87 27.8	55.3	99 55.0	55.1
	15	315 05.5	5 37.2	·· 07.4	131 50.7	·· 59.0	102 29.9	·· 55.5	114 57.3	·· 55.2
	16	330 08.0	20 38.8	06.8	146 52.1	58.6	117 31.9	55.6	129 59.6	55.2
	17	345 10.4	35 40.4	06.1	161 53.5	58.2	132 34.0	55.7	145 01.9	55.3
	18	0 12.9	50 42.1	S19 05.4	176 54.9	N 0 57.8	147 36.1	S11 55.9	160 04.2	S 5 55.4
	19	15 15.4	65 43.7	04.8	191 56.3	57.4	162 38.1	56.0	175 06.5	55.4
	20	30 17.8	80 45.3	04.1	206 57.8	56.9	177 40.2	56.1	190 08.8	55.5
	21	45 20.3	95 47.0	·· 03.5	221 59.2	·· 56.5	192 42.3	·· 56.3	205 11.1	·· 55.5
	22	60 22.7	110 48.6	02.8	237 00.6	56.1	207 44.3	56.4	220 13.4	55.6
	23	75 25.2	125 50.3	02.2	252 02.0	55.7	222 46.4	56.5	235 15.7	55.6
	22 00	90 27.7	140 52.0	S19 01.5	267 03.4	N 0 55.3	237 48.5	S11 56.7	250 18.0	S 5 55.7
	01	105 30.1	155 53.6	00.9	282 04.9	54.9	252 50.5	56.8	265 20.3	55.7
	02	120 32.6	170 55.3	19 00.2	297 06.3	54.4	267 52.6	56.9	280 22.6	55.8
	03	135 35.1	185 57.0	18 59.6	312 07.7	·· 54.0	282 54.7	·· 57.0	295 24.9	·· 55.8
	04	150 37.5	200 58.6	58.9	327 09.1	53.6	297 56.7	57.2	310 27.2	55.9
	05	165 40.0	216 00.3	58.3	342 10.5	53.2	312 58.8	57.3	325 29.5	55.9
	06	180 42.5	231 02.0	S18 57.6	357 12.0	N 0 52.8	328 00.9	S11 57.4	340 31.8	S 5 56.0
	07	195 44.9	246 03.7	57.0	12 13.4	52.4	343 02.9	57.6	355 34.1	56.0
	08	210 47.4	261 05.4	56.3	27 14.8	52.0	358 05.0	57.7	10 36.4	56.1
T	09	225 49.9	276 07.1	·· 55.7	42 16.2	·· 51.5	13 07.1	·· 57.8	25 38.7	·· 56.2
U	10	240 52.3	291 08.7	55.0	57 17.6	51.1	28 09.2	58.0	40 41.1	56.2
E	11	255 54.8	306 10.4	54.4	72 19.1	50.7	43 11.2	58.1	55 43.4	56.3
S	12	270 57.2	321 12.1	S18 53.7	87 20.5	N 0 50.3	58 13.3	S11 58.2	70 45.7	S 5 56.3
D	13	285 59.7	336 13.9	53.1	102 21.9	49.9	73 15.4	58.4	85 48.0	56.4
A	14	301 02.2	351 15.6	52.5	117 23.3	49.5	88 17.4	58.5	100 50.3	56.4
Y	15	316 04.6	6 17.3	·· 51.8	132 24.8	·· 49.1	103 19.5	·· 58.6	115 52.6	·· 56.5
	16	331 07.1	21 19.0	51.2	147 26.2	48.7	118 21.6	58.8	130 54.9	56.5
	17	346 09.6	36 20.7	50.5	162 27.6	48.2	133 23.6	58.9	145 57.2	56.6
	18	1 12.0	51 22.4	S18 49.9	177 29.0	N 0 47.8	148 25.7	S11 59.0	160 59.5	S 5 56.6
	19	16 14.5	66 24.2	49.2	192 30.5	47.4	163 27.8	59.1	176 01.8	56.7
	20	31 17.0	81 25.9	48.6	207 31.9	47.0	178 29.9	59.3	191 04.1	56.7
	21	46 19.4	96 27.6	·· 47.9	222 33.3	·· 46.6	193 31.9	·· 59.4	206 06.4	·· 56.8
	22	61 21.9	111 29.4	47.3	237 34.7	46.2	208 34.0	59.5	221 08.7	56.8
	23	76 24.3	126 31.1	46.6	252 36.2	45.8	223 36.1	59.7	236 11.0	56.9
	23 00	91 26.8	141 32.9	S18 46.0	267 37.6	N 0 45.4	238 38.1	S11 59.8	251 13.3	S 5 56.9
	01	106 29.3	156 34.6	45.3	282 39.0	45.0	253 40.2	11 59.9	266 15.7	57.0
	02	121 31.7	171 36.4	44.7	297 40.5	44.5	268 42.3	12 00.1	281 18.0	57.0
	03	136 34.2	186 38.1	·· 44.0	312 41.9	·· 44.1	283 44.4	·· 00.2	296 20.3	·· 57.1
	04	151 36.7	201 39.9	43.4	327 43.3	43.7	298 46.4	00.3	311 22.6	57.1
	05	166 39.1	216 41.7	42.7	342 44.7	43.3	313 48.5	00.5	326 24.9	57.2
	06	181 41.6	231 43.4	S18 42.1	357 46.2	N 0 42.9	328 50.6	S12 00.6	341 27.2	S 5 57.3
	07	196 44.1	246 45.2	41.5	12 47.6	42.5	343 52.6	00.7	356 29.5	57.3
W	08	211 46.5	261 47.0	40.8	27 49.0	42.1	358 54.7	00.8	11 31.8	57.4
E	09	226 49.0	276 48.8	·· 40.2	42 50.5	·· 41.7	13 56.8	·· 01.0	26 34.1	·· 57.4
D	10	241 51.5	291 50.5	39.5	57 51.9	41.3	28 58.9	01.1	41 36.4	57.5
N	11	256 53.9	306 52.3	38.9	72 53.3	40.9	44 00.9	01.2	56 38.7	57.5
E	12	271 56.4	321 54.1	S18 38.2	87 54.8	N 0 40.4	59 03.0	S12 01.4	71 41.0	S 5 57.6
S	13	286 58.8	336 55.9	37.6	102 56.2	40.0	74 05.1	01.5	86 43.4	57.6
D	14	302 01.3	351 57.7	36.9	117 57.6	39.6	89 07.2	01.6	101 45.7	57.7
A	15	317 03.8	6 59.5	·· 36.3	132 59.1	·· 39.2	104 09.2	·· 01.7	116 48.0	·· 57.7
Y	16	332 06.2	22 01.3	35.7	148 00.5	38.8	119 11.3	01.9	131 50.3	57.8
	17	347 08.7	37 03.1	35.0	163 01.9	38.4	134 13.4	02.0	146 52.6	57.8
	18	2 11.2	52 05.0	S18 34.4	178 03.4	N 0 38.0	149 15.5	S12 02.1	161 54.9	S 5 57.9
	19	17 13.6	67 06.8	33.7	193 04.8	37.6	164 17.5	02.3	176 57.2	57.9
	20	32 16.1	82 08.6	33.1	208 06.2	37.2	179 19.6	02.4	191 59.5	58.0
	21	47 18.6	97 10.4	·· 32.4	223 07.7	·· 36.8	194 21.7	·· 02.5	207 01.8	·· 58.0
	22	62 21.0	112 12.3	31.8	238 09.1	36.4	209 23.8	02.7	222 04.1	58.1
	23	77 23.5	127 14.1	31.2	253 10.5	36.0	224 25.8	02.8	237 06.4	58.1
	Mer Pass	h m 17 55.2	v 1.7	d 0.6	v 1.4	d 0.4	v 2.1	d 0.1	v 2.3	d 0.1

STARS		
Name	S.H.A.	Dec.
	° ′	° ′
Acamar	315 36.3	S40 22.9
Achernar	335 44.3	S57 20.1
Acrux	173 36.4	S62 59.5
Adhara	255 31.1	S28 56.8
Aldebaran	291 16.7	N16 28.4
Alioth	166 41.9	N56 03.3
Alkaid	153 18.0	N49 24.1
Al Na'ir	28 14.1	S47 03.2
Alnilam	276 10.4	S 1 12.8
Alphard	218 19.5	S 8 34.7
Alphecca	126 31.7	N26 46.5
Alpheratz	358 08.4	N28 59.5
Altair	62 32.0	N 8 49.2
Ankaa	353 39.3	S42 24.6
Antares	112 56.1	S26 23.4
Arcturus	146 17.9	N19 16.6
Atria	108 20.2	S68 59.6
Avior	234 27.3	S59 26.9
Bellatrix	278 57.5	N 6 20.0
Betelgeuse	271 27.0	N 7 24.2
Canopus	264 06.3	S52 41.2
Capella	281 09.5	N45 58.8
Deneb	49 48.3	N45 13.1
Denebola	182 58.1	N14 40.4
Diphda	349 19.9	S18 05.3
Dubhe	194 20.9	N61 50.7
Elnath	278 42.7	N28 35.5
Eltanin	90 57.9	N51 29.5
Enif	34 10.9	N 9 47.5
Fomalhaut	15 50.6	S29 43.3
Gacrux	172 27.9	S57 00.3
Gienah	176 17.1	S17 26.3
Hadar	149 22.5	S60 16.8
Hamal	328 27.8	N23 22.7
Kaus Aust.	84 16.1	S34 23.6
Kochab	137 19.9	N74 13.6
Markab	14 02.4	N15 06.5
Menkar	314 40.0	N 4 01.1
Menkent	148 36.2	S36 16.6
Miaplacidus	221 44.1	S69 38.3
Mirfak	309 14.5	N49 47.9
Nunki	76 28.5	S26 19.2
Peacock	53 57.5	S56 47.8
Pollux	243 56.8	N28 04.2
Procyon	245 24.6	N 5 16.3
Rasalhague	96 29.1	N12 34.4
Regulus	208 08.9	N12 03.3
Rigel	281 34.8	S 8 13.4
Rigil Kent.	140 25.1	S60 45.3
Sabik	102 40.5	S15 42.1
Schedar	350 07.9	N56 26.5
Shaula	96 55.0	S37 05.4
Sirius	258 54.6	S16 41.5
Spica	158 56.8	S11 03.9
Suhail	223 09.8	S43 21.4
Vega	80 55.7	N38 46.1
Zuben'ubi	137 32.3	S15 57.9

	S.H.A.	Mer. Pass.
	° ′	h m
Venus	50 24.3	14 35
Mars	176 35.8	6 11
Jupiter	147 20.8	8 08
Saturn	159 50.3	7 18

G.M.T.	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
21 00	180 31.8	S23 26.2	239 33.7	15.4	S 6 39.9	10.7	54.5
01	195 31.5	26.2	254 08.1	15.3	6 50.6	10.6	54.5
02	210 31.2	26.2	268 42.4	15.3	7 01.2	10.6	54.5
03	225 30.9	·· 26.3	283 16.7	15.3	7 11.8	10.6	54.4
04	240 30.6	26.3	297 51.0	15.3	7 22.4	10.5	54.4
05	255 30.2	26.3	312 25.3	15.2	7 32.9	10.6	54.4
06	270 29.9	S23 26.3	326 59.5	15.3	S 7 43.5	10.4	54.4
07	285 29.6	26.3	341 33.8	15.3	7 53.9	10.5	54.4
08	300 29.3	26.3	356 08.1	15.2	8 04.4	10.4	54.4
M 09	315 29.0	·· 26.3	10 42.3	15.2	8 14.8	10.3	54.4
O 10	330 28.7	26.4	25 16.5	15.3	8 25.1	10.4	54.3
N 11	345 28.4	26.4	39 50.8	15.2	8 35.5	10.2	54.3
D 12	0 28.1	S23 26.4	54 25.0	15.1	S 8 45.7	10.3	54.3
A 13	15 27.8	26.4	68 59.1	15.2	8 56.0	10.2	54.3
Y 14	30 27.4	26.4	83 33.3	15.2	9 06.2	10.2	54.3
15	45 27.1	·· 26.4	98 07.5	15.1	9 16.4	10.1	54.3
16	60 26.8	26.4	112 41.6	15.1	9 26.5	10.1	54.3
17	75 26.5	26.4	127 15.7	15.1	9 36.6	10.0	54.3
18	90 26.2	S23 26.4	141 49.8	15.1	S 9 46.6	10.1	54.2
19	105 25.9	26.4	156 23.9	15.1	9 56.7	9.9	54.2
20	120 25.6	26.4	170 58.0	15.0	10 06.6	9.9	54.2
21	135 25.3	·· 26.4	185 32.0	15.0	10 16.5	9.9	54.2
22	150 25.0	26.4	200 06.0	15.0	10 26.4	9.8	54.2
23	165 24.6	26.4	214 40.0	15.0	10 36.2	9.8	54.2
22 00	180 24.3	S23 26.4	229 14.0	14.9	S10 46.0	9.8	54.2
01	195 24.0	26.4	243 47.9	15.0	10 55.8	9.7	54.2
02	210 23.7	26.4	258 21.9	14.9	11 05.5	9.6	54.2
03	225 23.4	·· 26.4	272 55.8	14.9	11 15.1	9.6	54.2
04	240 23.1	26.4	287 29.7	14.8	11 24.7	9.5	54.1
05	255 22.8	26.4	302 03.5	14.8	11 34.2	9.5	54.1
06	270 22.5	S23 26.4	316 37.3	14.8	S11 43.7	9.5	54.1
07	285 22.1	26.4	331 11.1	14.8	11 53.2	9.4	54.1
08	300 21.8	26.4	345 44.9	14.7	12 02.6	9.4	54.1
T 09	315 21.5	·· 26.4	0 18.6	14.8	12 12.0	9.3	54.1
U 10	330 21.2	26.4	14 52.4	14.7	12 21.3	9.2	54.1
E 11	345 20.9	26.4	29 26.1	14.6	12 30.5	9.2	54.1
S 12	0 20.6	S23 26.4	43 59.7	14.6	S12 39.7	9.1	54.1
D 13	15 20.3	26.3	58 33.3	14.6	12 48.8	9.1	54.1
A 14	30 20.0	26.3	73 06.9	14.6	12 57.9	9.1	54.1
Y 15	45 19.7	·· 26.3	87 40.5	14.5	13 07.0	8.9	54.1
16	60 19.3	26.3	102 14.0	14.6	13 15.9	9.0	54.1
17	75 19.0	26.3	116 47.6	14.4	13 24.9	8.8	54.0
18	90 18.7	S23 26.3	131 21.0	14.5	S13 33.7	8.8	54.0
19	105 18.4	26.3	145 54.5	14.4	13 42.5	8.8	54.0
20	120 18.1	26.2	160 27.9	14.3	13 51.3	8.7	54.0
21	135 17.8	·· 26.2	175 01.2	14.4	14 00.0	8.6	54.0
22	150 17.5	26.2	189 34.6	14.3	14 08.6	8.6	54.0
23	165 17.2	26.2	204 07.9	14.3	14 17.2	8.5	54.0
23 00	180 16.8	S23 26.2	218 41.2	14.2	S14 25.7	8.5	54.0
01	195 16.5	26.1	233 14.4	14.2	14 34.2	8.4	54.0
02	210 16.2	26.1	247 47.6	14.2	14 42.6	8.3	54.0
03	225 15.9	·· 26.1	262 20.8	14.1	14 50.9	8.3	54.0
04	240 15.6	26.1	276 53.9	14.1	14 59.2	8.2	54.0
05	255 15.3	26.1	291 27.0	14.1	15 07.4	8.1	54.0
06	270 15.0	S23 26.0	306 00.1	14.0	S15 15.5	8.1	54.0
W 07	285 14.7	26.0	320 33.1	14.0	15 23.6	8.0	54.0
E 08	300 14.3	26.0	335 06.1	13.9	15 31.6	8.0	54.0
D 09	315 14.0	·· 25.9	349 39.0	13.9	15 39.6	7.9	54.0
N 10	330 13.7	25.9	4 11.9	13.9	15 47.5	7.8	54.0
E 11	345 13.4	25.9	18 44.8	13.8	15 55.3	7.8	54.0
S 12	0 13.1	S23 25.9	33 17.6	13.8	S16 03.1	7.6	54.0
D 13	15 12.8	25.8	47 50.4	13.8	16 10.7	7.7	54.0
A 14	30 12.5	25.8	62 23.2	13.7	16 18.4	7.5	54.0
Y 15	45 12.2	·· 25.8	76 55.9	13.7	16 25.9	7.5	54.0
16	60 11.9	25.7	91 28.6	13.6	16 33.4	7.4	54.0
17	75 11.5	25.7	106 01.2	13.6	16 40.8	7.3	54.0
18	90 11.2	S23 25.7	120 33.8	13.6	S16 48.1	7.3	54.0
19	105 10.9	25.6	135 06.4	13.5	16 55.4	7.2	54.0
20	120 10.6	25.6	149 38.9	13.4	17 02.6	7.1	54.0
21	135 10.3	·· 25.6	164 11.3	13.5	17 09.7	7.1	54.0
22	150 10.0	25.5	178 43.8	13.4	17 16.8	6.9	54.0
23	165 09.7	25.5	193 16.2	13.3	17 23.7	6.9	54.0
	S.D. 16.3	d 0.0	S.D. 14.8		14.7		14.7

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 21	Moonrise 22	Moonrise 23	Moonrise 24
°	h m	h m	h m	h m	h m	h m	h m
N 72	08 26	10 58	▬	03 43	05 32	07 35	▬
N 70	08 06	09 55	▬	03 31	05 11	06 56	08 55
68	07 50	09 20	▬	03 22	04 54	06 29	08 07
66	07 37	08 54	10 35	03 15	04 41	06 09	07 37
64	07 26	08 34	09 53	03 08	04 30	05 53	07 14
62	07 16	08 18	09 24	03 03	04 21	05 39	06 56
60	07 08	08 05	09 03	02 58	04 13	05 28	06 41
N 58	07 00	07 53	08 45	02 54	04 06	05 18	06 29
56	06 53	07 43	08 30	02 50	04 00	05 10	06 18
54	06 47	07 34	08 17	02 47	03 55	05 02	06 08
52	06 42	07 25	08 06	02 44	03 50	04 56	06 00
50	06 36	07 18	07 56	02 41	03 46	04 50	05 52
45	06 24	07 02	07 36	02 35	03 36	04 37	05 36
N 40	06 14	06 48	07 19	02 31	03 28	04 26	05 23
35	06 05	06 36	07 05	02 26	03 22	04 17	05 12
30	05 56	06 26	06 52	02 23	03 16	04 09	05 02
20	05 39	06 07	06 31	02 16	03 05	03 55	04 45
N 10	05 23	05 49	06 12	02 11	02 57	03 43	04 31
0	05 06	05 32	05 55	02 06	02 48	03 32	04 17
S 10	04 47	05 14	05 37	02 01	02 40	03 21	04 04
20	04 24	04 54	05 18	01 55	02 31	03 09	03 49
30	03 55	04 29	04 56	01 49	02 21	02 56	03 33
35	03 37	04 13	04 43	01 46	02 16	02 48	03 23
40	03 13	03 55	04 28	01 42	02 09	02 39	03 12
45	02 43	03 32	04 10	01 37	02 02	02 29	03 00
S 50	01 57	03 03	03 47	01 32	01 53	02 17	02 44
52	01 29	02 47	03 36	01 29	01 49	02 11	02 37
54	00 42	02 29	03 24	01 26	01 44	02 05	02 29
56	////	02 07	03 10	01 23	01 39	01 58	02 20
58	////	01 37	02 53	01 20	01 34	01 50	02 10
S 60	////	00 46	02 32	01 16	01 28	01 41	01 59

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 21	Moonset 22	Moonset 23	Moonset 24
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	12 59	15 31	12 27	12 07	11 36	▬
N 70	▬	14 02	15 51	12 41	12 30	12 16	11 51
68	▬	14 38	16 07	12 51	12 48	12 44	12 40
66	13 22	15 03	16 20	13 00	13 02	13 05	13 11
64	14 05	15 23	16 31	13 08	13 14	13 22	13 34
62	14 33	15 39	16 41	13 15	13 24	13 36	13 52
60	14 55	15 53	16 49	13 20	13 32	13 48	14 08
N 58	15 12	16 04	16 57	13 25	13 40	13 58	14 21
56	15 27	16 15	17 04	13 30	13 47	14 07	14 32
54	15 40	16 24	17 10	13 34	13 53	14 15	14 42
52	15 51	16 32	17 16	13 38	13 58	14 22	14 51
50	16 01	16 39	17 21	13 41	14 03	14 29	14 59
45	16 22	16 55	17 33	13 48	14 14	14 43	15 16
N 40	16 38	17 09	17 43	13 54	14 23	14 54	15 29
35	16 53	17 21	17 53	14 00	14 31	15 04	15 41
30	17 05	17 31	18 01	14 04	14 37	15 13	15 52
20	17 26	17 50	18 18	14 12	14 49	15 28	16 09
N 10	17 45	18 08	18 34	14 19	14 59	15 41	16 25
0	18 02	18 25	18 51	14 26	15 09	15 54	16 39
S 10	18 20	18 43	19 10	14 33	15 19	16 06	16 54
20	18 39	19 04	19 33	14 40	15 29	16 19	17 10
30	19 01	19 29	20 02	14 48	15 41	16 34	17 28
35	19 14	19 44	20 21	14 53	15 48	16 43	17 38
40	19 29	20 02	20 44	14 58	15 56	16 53	17 50
45	19 47	20 25	21 15	15 05	16 05	17 05	18 04
S 50	20 10	20 55	22 00	15 12	16 16	17 20	18 22
52	20 21	21 10	22 28	15 16	16 22	17 27	18 30
54	20 33	21 28	23 16	15 20	16 27	17 34	18 39
56	20 47	21 50	////	15 24	16 34	17 43	18 49
58	21 04	22 20	////	15 29	16 41	17 52	19 01
S 60	21 25	23 11	////	15 34	16 49	18 03	19 15

Day	SUN Eqn. of Time 00ʰ	SUN Eqn. of Time 12ʰ	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
21	02 08	01 53	11 58	08 16	20 37	25	
22	01 38	01 23	11 59	08 59	21 21	26	◑
23	01 08	00 53	11 59	09 43	22 05	27	

G.M.T.	ARIES	VENUS −4.3		MARS +1.0		JUPITER −1.4		SATURN +0.9		STARS		
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	Name	S.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′		° ′	° ′
24 00	92 26.0	142 15.9	S18 30.5	268 12.0	N 0 35.5	239 27.9	S12 02.9	252 08.8	S 5 58.2	Acamar	315 36.3	S40 22.9
01	107 28.4	157 17.8	29.9	283 13.4	35.1	254 30.0	03.0	267 11.1	58.2	Achernar	335 44.4	S57 20.1
02	122 30.9	172 19.6	29.2	298 14.8	34.7	269 32.1	03.2	282 13.4	58.3	Acrux	173 36.3	S62 59.6
03	137 33.3	187 21.5	·· 28.6	313 16.3	·· 34.3	284 34.1	·· 03.3	297 15.7	·· 58.3	Adhara	255 31.0	S28 56.8
04	152 35.8	202 23.3	28.0	328 17.7	33.9	299 36.2	03.4	312 18.0	58.4	Aldebaran	291 16.7	N16 28.4
05	167 38.3	217 25.2	27.3	343 19.1	33.5	314 38.3	03.5	327 20.3	58.4			
06	182 40.7	232 27.0	S18 26.7	358 20.6	N 0 33.1	329 40.4	S12 03.7	342 22.6	S 5 58.5	Alioth	166 41.8	N56 03.3
07	197 43.2	247 28.9	26.0	13 22.0	32.7	344 42.4	03.8	357 24.9	58.5	Alkaid	153 18.0	N49 24.1
T 08	212 45.7	262 30.8	25.4	28 23.5	32.3	359 44.5	03.9	12 27.2	58.6	Al Na'ir	28 14.1	S47 03.2
H 09	227 48.1	277 32.6	·· 24.8	43 24.9	·· 31.9	14 46.6	·· 04.1	27 29.6	·· 58.6	Alnilam	276 10.4	S 1 12.8
U 10	242 50.6	292 34.5	24.1	58 26.3	31.5	29 48.7	04.2	42 31.9	58.7	Alphard	218 19.5	S 8 34.7
R 11	257 53.1	307 36.4	23.5	73 27.8	31.1	44 50.8	04.3	57 34.2	58.7			
S 12	272 55.5	322 38.3	S18 22.8	88 29.2	N 0 30.7	59 52.8	S12 04.4	72 36.5	S 5 58.8	Alphecca	126 31.7	N26 46.5
D 13	287 58.0	337 40.2	22.2	103 30.7	30.3	74 54.9	04.6	87 38.8	58.8	Alpheratz	358 08.4	N28 59.5
A 14	303 00.4	352 42.1	21.6	118 32.1	29.9	89 57.0	04.7	102 41.1	58.9	Altair	62 32.0	N 8 49.2
Y 15	318 02.9	7 44.0	·· 20.9	133 33.5	·· 29.5	104 59.1	·· 04.8	117 43.4	·· 58.9	Ankaa	353 39.3	S42 24.6
16	333 05.4	22 45.9	20.3	148 35.0	29.1	120 01.1	05.0	132 45.7	59.0	Antares	112 56.1	S26 23.4
17	348 07.8	37 47.8	19.7	163 36.4	28.7	135 03.2	05.1	147 48.1	59.0			
18	3 10.3	52 49.7	S18 19.0	178 37.9	N 0 28.3	150 05.3	S12 05.2	162 50.4	S 5 59.1	Arcturus	146 17.9	N19 16.6
19	18 12.8	67 51.6	18.4	193 39.3	27.9	165 07.4	05.3	177 52.7	59.1	Atria	108 20.1	S68 59.6
20	33 15.2	82 53.5	17.7	208 40.8	27.4	180 09.5	05.5	192 55.0	59.2	Avior	234 27.3	S59 26.9
21	48 17.7	97 55.4	·· 17.1	223 42.2	·· 27.0	195 11.5	·· 05.6	207 57.3	·· 59.2	Bellatrix	278 57.5	N 6 20.0
22	63 20.2	112 57.3	16.5	238 43.6	26.6	210 13.6	05.7	222 59.6	59.3	Betelgeuse	271 27.0	N 7 24.2
23	78 22.6	127 59.3	15.8	253 45.1	26.2	225 15.7	05.8	238 01.9	59.3			
25 00	93 25.1	143 01.2	S18 15.2	268 46.5	N 0 25.8	240 17.8	S12 06.0	253 04.3	S 5 59.4	Canopus	264 06.3	S52 41.2
01	108 27.6	158 03.1	14.6	283 48.0	25.4	255 19.9	06.1	268 06.6	59.4	Capella	281 09.5	N45 58.8
02	123 30.0	173 05.1	13.9	298 49.4	25.0	270 21.9	06.2	283 08.9	59.5	Deneb	49 48.3	N45 13.1
03	138 32.5	188 07.0	·· 13.3	313 50.9	·· 24.6	285 24.0	·· 06.4	298 11.2	·· 59.5	Denebola	182 58.1	N14 40.4
04	153 34.9	203 08.9	12.7	328 52.3	24.2	300 26.1	06.5	313 13.5	59.6	Diphda	349 19.9	S18 05.4
05	168 37.4	218 10.9	12.0	343 53.8	23.8	315 28.2	06.6	328 15.8	59.6			
06	183 39.9	233 12.9	S18 11.4	358 55.2	N 0 23.4	330 30.3	S12 06.7	343 18.1	S 5 59.7	Dubhe	194 20.8	N61 50.7
07	198 42.3	248 14.8	10.8	13 56.7	23.0	345 32.3	06.9	358 20.5	59.7	Elnath	278 42.6	N28 35.5
08	213 44.8	263 16.8	10.1	28 58.1	22.6	0 34.4	07.0	13 22.8	59.8	Eltanin	90 57.9	N51 29.5
F 09	228 47.3	278 18.7	·· 09.5	43 59.6	·· 22.2	15 36.5	·· 07.1	28 25.1	·· 59.8	Enif	34 10.9	N 9 47.5
R 10	243 49.7	293 20.7	08.9	59 01.0	21.8	30 38.6	07.2	43 27.4	59.9	Fomalhaut	15 50.6	S29 43.3
I 11	258 52.2	308 22.7	08.2	74 02.5	21.4	45 40.7	07.4	58 29.7	5 59.9			
D 12	273 54.7	323 24.7	S18 07.6	89 03.9	N 0 21.0	60 42.8	S12 07.5	73 32.0	S 6 00.0	Gacrux	172 27.8	S57 00.3
A 13	288 57.1	338 26.6	07.0	104 05.4	20.6	75 44.8	07.6	88 34.3	00.0	Gienah	176 17.1	S17 26.3
Y 14	303 59.6	353 28.6	06.3	119 06.8	20.2	90 46.9	07.7	103 36.7	00.0	Hadar	149 22.4	S60 16.8
15	319 02.1	8 30.6	·· 05.7	134 08.3	·· 19.8	105 49.0	·· 07.9	118 39.0	·· 00.1	Hamal	328 27.8	N23 22.7
16	334 04.5	23 32.6	05.1	149 09.7	19.4	120 51.1	08.0	133 41.3	00.1	Kaus Aust.	84 16.1	S34 23.6
17	349 07.0	38 34.6	04.4	164 11.2	19.0	135 53.2	08.1	148 43.6	00.2			
18	4 09.4	53 36.6	S18 03.8	179 12.6	N 0 18.6	150 55.2	S12 08.2	163 45.9	S 6 00.2	Kochab	137 19.8	N74 13.6
19	19 11.9	68 38.6	03.2	194 14.1	18.2	165 57.3	08.4	178 48.2	00.3	Markab	14 02.4	N15 06.5
20	34 14.4	83 40.6	02.6	209 15.5	17.8	180 59.4	08.5	193 50.6	00.3	Menkar	314 40.0	N 4 01.1
21	49 16.8	98 42.6	·· 01.9	224 17.0	·· 17.4	196 01.5	·· 08.6	208 52.9	·· 00.4	Menkent	148 36.2	S36 16.6
22	64 19.3	113 44.7	01.3	239 18.4	17.0	211 03.6	08.7	223 55.2	00.4	Miaplacidus	221 44.1	S69 38.3
23	79 21.8	128 46.7	00.7	254 19.9	16.6	226 05.7	08.9	238 57.5	00.5			
26 00	94 24.2	143 48.7	S18 00.0	269 21.3	N 0 16.2	241 07.7	S12 09.0	253 59.8	S 6 00.5	Mirfak	309 14.5	N49 47.9
01	109 26.7	158 50.7	17 59.4	284 22.8	15.8	256 09.8	09.1	269 02.1	00.6	Nunki	76 28.5	S26 19.2
02	124 29.2	173 52.8	58.8	299 24.2	15.4	271 11.9	09.2	284 04.5	00.6	Peacock	53 57.5	S56 47.8
03	139 31.6	188 54.8	·· 58.2	314 25.7	·· 15.0	286 14.0	·· 09.4	299 06.8	·· 00.7	Pollux	243 56.7	N28 04.2
04	154 34.1	203 56.8	57.5	329 27.1	14.6	301 16.1	09.5	314 09.1	00.7	Procyon	245 24.6	N 5 16.3
05	169 36.6	218 58.9	56.9	344 28.6	14.2	316 18.2	09.6	329 11.4	00.8			
06	184 39.0	234 00.9	S17 56.3	359 30.1	N 0 13.8	331 20.3	S12 09.7	344 13.7	S 6 00.8	Rasalhague	96 29.1	N12 34.4
07	199 41.5	249 03.0	55.7	14 31.5	13.4	346 22.3	09.9	359 16.1	00.9	Regulus	208 08.9	N12 03.3
S 08	214 43.9	264 05.1	55.0	29 33.0	13.0	1 24.4	10.0	14 18.4	00.9	Rigel	281 34.8	S 8 13.4
A 09	229 46.4	279 07.1	·· 54.4	44 34.4	·· 12.7	16 26.5	·· 10.1	29 20.7	·· 01.0	Rigil Kent.	140 25.1	S60 45.3
T 10	244 48.9	294 09.2	53.8	59 35.9	12.3	31 28.6	10.2	44 23.0	01.0	Sabik	102 40.5	S15 42.1
U 11	259 51.3	309 11.3	53.2	74 37.3	11.9	46 30.7	10.4	59 25.3	01.0			
R 12	274 53.8	324 13.3	S17 52.5	89 38.8	N 0 11.5	61 32.8	S12 10.5	74 27.7	S 6 01.1	Schedar	350 08.0	N56 26.5
D 13	289 56.3	339 15.4	51.9	104 40.3	11.1	76 34.9	10.6	89 30.0	01.1	Shaula	96 55.0	S37 05.4
A 14	304 58.7	354 17.5	51.3	119 41.7	10.7	91 36.9	10.7	104 32.3	01.2	Sirius	258 54.6	S16 41.5
Y 15	320 01.2	9 19.6	·· 50.7	134 43.2	·· 10.3	106 39.0	·· 10.9	119 34.6	·· 01.2	Spica	158 56.7	S11 03.9
16	335 03.7	24 21.7	50.0	149 44.6	09.9	121 41.1	11.0	134 36.9	01.3	Suhail	223 09.8	S43 21.4
17	350 06.1	39 23.8	49.4	164 46.1	09.5	136 43.2	11.1	149 39.2	01.3			
18	5 08.6	54 25.9	S17 48.8	179 47.6	N 0 09.1	151 45.3	S12 11.2	164 41.6	S 6 01.4	Vega	80 55.7	N38 46.0
19	20 11.0	69 28.0	48.2	194 49.0	08.7	166 47.4	11.4	179 43.9	01.4	Zuben'ubi	137 32.3	S15 57.9
20	35 13.5	84 30.1	47.6	209 50.5	08.3	181 49.5	11.5	194 46.2	01.5			
21	50 16.0	99 32.2	·· 46.9	224 51.9	·· 07.9	196 51.6	·· 11.6	209 48.5	·· 01.5		S.H.A.	Mer. Pass.
22	65 18.4	114 34.3	46.3	239 53.4	07.5	211 53.6	11.7	224 50.9	01.6		° ′	h m
23	80 20.9	129 36.4	45.7	254 54.9	07.1	226 55.7	11.8	239 53.2	01.6	Venus	49 36.1	14 26
	h m									Mars	175 21.4	6 04
Mer Pass.	17 43.4	v 2.0	d 0.6	v 1.4	d 0.4	v 2.1	d 0.1	v 2.3	d 0.0	Jupiter	146 52.7	7 58
										Saturn	159 39.2	7 07

G.M.T.	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
24 00	180 09.4	S23 25.4	207 48.5	13.4	S17 30.6	6.9	54.0
01	195 09.0	25.4	222 20.9	13.2	17 37.5	6.7	54.0
02	210 08.7	25.4	236 53.1	13.3	17 44.2	6.7	54.0
03	225 08.4	·· 25.3	251 25.4	13.2	17 50.9	6.6	54.0
04	240 08.1	25.3	265 57.6	13.1	17 57.5	6.5	54.0
05	255 07.8	25.2	280 29.7	13.1	18 04.0	6.4	54.0
06	270 07.5	S23 25.2	295 01.8	13.1	S18 10.4	6.4	54.0
07	285 07.2	25.1	309 33.9	13.0	18 16.8	6.3	54.0
T 08	300 06.9	25.1	324 05.9	13.0	18 23.1	6.2	54.0
H 09	315 06.6	·· 25.0	338 37.9	13.0	18 29.3	6.1	54.0
U 10	330 06.2	25.0	353 09.9	12.9	18 35.4	6.1	54.0
R 11	345 05.9	24.9	7 41.8	12.9	18 41.5	5.9	54.0
S 12	0 05.6	S23 24.9	22 13.7	12.8	S18 47.4	5.9	54.0
D 13	15 05.3	24.8	36 45.5	12.8	18 53.3	5.8	54.0
A 14	30 05.0	24.8	51 17.3	12.7	18 59.1	5.7	54.0
Y 15	45 04.7	·· 24.7	65 49.0	12.7	19 04.8	5.6	54.0
16	60 04.4	24.7	80 20.7	12.7	19 10.4	5.6	54.0
17	75 04.1	24.6	94 52.4	12.6	19 16.0	5.4	54.0
18	90 03.7	S23 24.6	109 24.0	12.6	S19 21.4	5.4	54.0
19	105 03.4	24.5	123 55.6	12.6	19 26.8	5.3	54.0
20	120 03.1	24.5	138 27.2	12.5	19 32.1	5.2	54.0
21	135 02.8	·· 24.4	152 58.7	12.5	19 37.3	5.1	54.0
22	150 02.5	24.4	167 30.2	12.4	19 42.4	5.0	54.0
23	165 02.2	24.3	182 01.6	12.4	19 47.4	5.0	54.0
25 00	180 01.9	S23 24.2	196 33.0	12.3	S19 52.4	4.8	54.0
01	195 01.6	24.2	211 04.3	12.4	19 57.2	4.8	54.0
02	210 01.3	24.1	225 35.7	12.2	20 02.0	4.7	54.0
03	225 00.9	·· 24.0	240 06.9	12.3	20 06.7	4.5	54.0
04	240 00.6	24.0	254 38.2	12.2	20 11.2	4.5	54.0
05	255 00.3	23.9	269 09.4	12.1	20 15.7	4.4	54.0
06	270 00.0	S23 23.9	283 40.5	12.2	S20 20.1	4.3	54.0
07	284 59.7	23.8	298 11.7	12.1	20 24.4	4.2	54.0
08	299 59.4	23.7	312 42.8	12.0	20 28.6	4.2	54.1
F 09	314 59.1	·· 23.7	327 13.8	12.1	20 32.8	4.0	54.1
R 10	329 58.8	23.6	341 44.9	11.9	20 36.8	3.9	54.1
I 11	344 58.5	23.5	356 15.8	12.0	20 40.7	3.9	54.1
D 12	359 58.1	S23 23.5	10 46.8	11.9	S20 44.6	3.7	54.1
A 13	14 57.8	23.4	25 17.7	11.9	20 48.3	3.7	54.1
Y 14	29 57.5	23.3	39 48.6	11.9	20 52.0	3.5	54.1
15	44 57.2	·· 23.2	54 19.5	11.8	20 55.5	3.5	54.1
16	59 56.9	23.2	68 50.3	11.8	20 59.0	3.3	54.1
17	74 56.6	23.1	83 21.1	11.7	21 02.3	3.3	54.1
18	89 56.3	S23 23.0	97 51.8	11.7	S21 05.6	3.2	54.1
19	104 56.0	22.9	112 22.5	11.7	21 08.8	3.1	54.1
20	119 55.7	22.9	126 53.2	11.7	21 11.9	2.9	54.1
21	134 55.3	·· 22.8	141 23.9	11.6	21 14.8	2.9	54.1
22	149 55.0	22.7	155 54.5	11.6	21 17.7	2.8	54.1
23	164 54.7	22.6	170 25.1	11.6	21 20.5	2.7	54.2
26 00	179 54.4	S23 22.6	184 55.7	11.5	S21 23.2	2.5	54.2
01	194 54.1	22.5	199 26.2	11.6	21 25.7	2.5	54.2
02	209 53.8	22.4	213 56.8	11.4	21 28.2	2.4	54.2
03	224 53.5	·· 22.3	228 27.2	11.5	21 30.6	2.3	54.2
04	239 53.2	22.2	242 57.7	11.4	21 32.9	2.1	54.2
05	254 52.9	22.2	257 28.1	11.4	21 35.0	2.1	54.2
06	269 52.5	S23 22.1	271 58.5	11.4	S21 37.1	2.0	54.2
07	284 52.2	22.0	286 28.9	11.4	21 39.1	1.9	54.2
S 08	299 51.9	21.9	300 59.3	11.3	21 41.0	1.7	54.2
A 09	314 51.6	·· 21.8	315 29.6	11.3	21 42.7	1.7	54.2
T 10	329 51.3	21.7	329 59.9	11.3	21 44.4	1.5	54.2
U 11	344 51.0	21.6	344 30.2	11.3	21 45.9	1.5	54.3
R 12	359 50.7	S23 21.6	359 00.5	11.2	S21 47.4	1.4	54.3
D 13	14 50.4	21.5	13 30.7	11.3	21 48.8	1.2	54.3
A 14	29 50.1	21.4	28 01.0	11.2	21 50.0	1.2	54.3
Y 15	44 49.8	·· 21.3	42 31.2	11.1	21 51.2	1.0	54.3
16	59 49.4	21.2	57 01.3	11.2	21 52.2	0.9	54.3
17	74 49.1	21.1	71 31.5	11.2	21 53.1	0.9	54.3
18	89 48.8	S23 21.0	86 01.7	11.1	S21 54.0	0.7	54.3
19	104 48.5	20.9	100 31.8	11.1	21 54.7	0.6	54.3
20	119 48.2	20.8	115 01.9	11.1	21 55.3	0.6	54.3
21	134 47.9	·· 20.7	129 32.0	11.1	21 55.9	0.4	54.3
22	149 47.6	20.6	144 02.1	11.0	21 56.3	0.3	54.4
23	164 47.3	20.5	158 32.1	11.1	21 56.6	0.2	54.4
	S.D. 16.3	d 0.1	S.D. 14.7		14.7		14.8

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 24	Moonrise 25	Moonrise 26	Moonrise 27
°	h m	h m	h m	h m	h m	h m	h m
N 72	08 27	10 57	▬	▬	▬	▬	▬
N 70	08 07	09 55	▬	▬	▬	▬	▬
68	07 51	09 20	▬	08 07	09 49	11 37	12 34
66	07 38	08 55	10 35	07 37	09 02	10 17	11 10
64	07 27	08 35	09 53	07 14	08 32	09 40	10 32
62	07 17	08 19	09 25	06 56	08 09	09 14	10 06
60	07 09	08 06	09 03	06 41	07 51	08 53	09 45
N 58	07 01	07 54	08 46	06 29	07 36	08 36	09 28
56	06 55	07 44	08 31	06 18	07 23	08 22	09 13
54	06 49	07 35	08 19	06 08	07 12	08 10	09 01
52	06 43	07 27	08 08	06 00	07 02	07 59	08 50
50	06 38	07 19	07 58	05 52	06 53	07 49	08 40
45	06 26	07 03	07 37	05 36	06 34	07 29	08 20
N 40	06 15	06 50	07 20	05 23	06 19	07 13	08 03
35	06 06	06 38	07 06	05 12	06 06	06 59	07 49
30	05 57	06 27	06 54	05 02	05 55	06 47	07 37
20	05 41	06 08	06 32	04 45	05 36	06 27	07 17
N 10	05 25	05 51	06 14	04 31	05 19	06 09	06 58
0	05 08	05 34	05 56	04 17	05 04	05 52	06 42
S 10	04 49	05 16	05 39	04 04	04 48	05 36	06 25
20	04 26	04 55	05 20	03 49	04 32	05 18	06 07
30	03 57	04 30	04 58	03 33	04 13	04 58	05 46
35	03 38	04 15	04 45	03 23	04 02	04 46	05 34
40	03 15	03 57	04 30	03 12	03 50	04 32	05 20
45	02 44	03 34	04 12	03 00	03 35	04 16	05 04
S 50	01 59	03 04	03 49	02 44	03 17	03 56	04 43
52	01 31	02 49	03 38	02 37	03 09	03 47	04 34
54	00 44	02 31	03 26	02 29	02 59	03 37	04 23
56	////	02 09	03 12	02 20	02 49	03 25	04 10
58	////	01 39	02 55	02 10	02 36	03 11	03 56
S 60	////	00 49	02 34	01 59	02 22	02 55	03 39

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 24	Moonset 25	Moonset 26	Moonset 27
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	13 03	15 33	▬	▬	▬	▬
N 70	▬	14 05	15 53	11 51	▬	▬	▬
68	▬	14 40	16 09	12 40	12 35	12 29	13 15
66	13 25	15 05	16 22	13 11	13 23	13 49	14 39
64	14 07	15 25	16 33	13 34	13 54	14 26	15 17
62	14 35	15 41	16 43	13 52	14 17	14 53	15 43
60	14 57	15 55	16 51	14 08	14 35	15 13	16 04
N 58	15 14	16 06	16 59	14 21	14 51	15 30	16 21
56	15 29	16 16	17 06	14 32	15 04	15 44	16 35
54	15 42	16 26	17 12	14 42	15 15	15 57	16 47
52	15 53	16 34	17 17	14 51	15 25	16 08	16 58
50	16 03	16 41	17 23	14 59	15 35	16 17	17 08
45	16 23	16 57	17 34	15 16	15 54	16 38	17 28
N 40	16 40	17 11	17 45	15 29	16 09	16 54	17 45
35	16 54	17 23	17 54	15 41	16 23	17 08	17 59
30	17 07	17 33	18 03	15 52	16 34	17 20	18 11
20	17 28	17 52	18 19	16 09	16 54	17 41	18 31
N 10	17 46	18 09	18 36	16 25	17 11	17 59	18 49
0	18 04	18 26	18 53	16 39	17 27	18 16	19 06
S 10	18 21	18 45	19 12	16 54	17 43	18 33	19 22
20	18 40	19 05	19 34	17 10	18 00	18 51	19 40
30	19 02	19 30	20 03	17 28	18 20	19 12	20 00
35	19 15	19 45	20 22	17 38	18 32	19 24	20 12
40	19 30	20 03	20 45	17 50	18 45	19 38	20 26
45	19 48	20 26	21 16	18 04	19 01	19 54	20 42
S 50	20 11	20 56	22 01	18 22	19 20	20 14	21 02
52	20 22	21 11	22 29	18 30	19 30	20 24	21 11
54	20 34	21 29	23 15	18 39	19 40	20 35	21 22
56	20 48	21 51	////	18 49	19 52	20 47	21 34
58	21 05	22 21	////	19 01	20 05	21 01	21 48
S 60	21 26	23 11	////	19 15	20 21	21 18	22 04

Day	SUN Eqn. of Time 00ʰ	SUN Eqn. of Time 12ʰ	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
24	00 38	00 23	12 00	10 28	22 52	28	
25	00 08	00 07	12 00	11 15	23 40	29	●
26	00 22	00 37	12 01	12 04	24 29	00	

G.M.T.	ARIES	VENUS −4.3		MARS +1.0		JUPITER −1.4		SATURN +0.9		STARS		
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	Name	S.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′		° ′	° ′
27 00	95 23.4	144 38.5	S17 45.1	269 56.3	N 0 06.7	241 57.8	S12 12.0	254 55.5	S 6 01.7	Acamar	315 36.3	S40 22.9
01	110 25.8	159 40.7	44.5	284 57.8	06.3	256 59.9	12.1	269 57.8	01.7	Achernar	335 44.4	S57 20.1
02	125 28.3	174 42.8	43.8	299 59.3	05.9	272 02.0	12.2	285 00.1	01.7	Acrux	173 36.3	S62 59.6
03	140 30.8	189 44.9	·· 43.2	315 00.7	·· 05.5	287 04.1	·· 12.3	300 02.5	·· 01.8	Adhara	255 31.0	S28 56.8
04	155 33.2	204 47.1	42.6	330 02.2	05.2	302 06.2	12.5	315 04.8	01.8	Aldebaran	291 16.7	N16 28.4
05	170 35.7	219 49.2	42.0	345 03.6	04.8	317 08.3	12.6	330 07.1	01.9			
06	185 38.2	234 51.4	S17 41.4	0 05.1	N 0 04.4	332 10.3	S12 12.7	345 09.4	S 6 01.9	Alioth	166 41.8	N56 03.3
07	200 40.6	249 53.5	40.8	15 06.6	04.0	347 12.4	12.8	0 11.7	02.0	Alkaid	153 18.0	N49 24.0
08	215 43.1	264 55.7	40.1	30 08.0	03.6	2 14.5	13.0	15 14.1	02.0	Al Na'ir	28 14.1	S47 03.2
S 09	230 45.5	279 57.8	·· 39.5	45 09.5	·· 03.2	17 16.6	·· 13.1	30 16.4	·· 02.1	Alnilam	276 10.4	S 1 12.9
U 10	245 48.0	295 00.0	38.9	60 11.0	02.8	32 18.7	13.2	45 18.7	02.1	Alphard	218 19.5	S 8 34.7
N 11	260 50.5	310 02.2	38.3	75 12.4	02.4	47 20.8	13.3	60 21.0	02.2			
U 12	275 52.9	325 04.3	S17 37.7	90 13.9	N 0 02.0	62 22.9	S12 13.4	75 23.4	S 6 02.2	Alphecca	126 31.6	N26 46.5
A 13	290 55.4	340 06.5	37.1	105 15.4	01.6	77 25.0	13.6	90 25.7	02.2	Alpheratz	358 08.4	N28 59.5
Y 14	305 57.9	355 08.7	36.4	120 16.9	01.2	92 27.1	13.7	105 28.0	02.3	Altair	62 32.0	N 8 49.2
15	321 00.3	10 10.9	·· 35.8	135 18.3	·· 00.8	107 29.2	·· 13.8	120 30.3	·· 02.3	Ankaa	353 39.3	S42 24.6
16	336 02.8	25 13.1	35.2	150 19.8	00.4	122 31.2	13.9	135 32.6	02.4	Antares	112 56.1	S26 23.4
17	351 05.3	40 15.3	34.6	165 21.3	N 0 00.1	137 33.3	14.1	150 35.0	02.4			
18	6 07.7	55 17.5	S17 34.0	180 22.7	S 0 00.3	152 35.4	S12 14.2	165 37.3	S 6 02.5	Arcturus	146 17.8	N19 16.6
19	21 10.2	70 19.7	33.4	195 24.2	00.7	167 37.5	14.3	180 39.6	02.5	Atria	108 20.1	S68 59.6
20	36 12.7	85 21.9	32.8	210 25.7	01.1	182 39.6	14.4	195 41.9	02.6	Avior	234 27.3	S59 26.9
21	51 15.1	100 24.1	·· 32.2	225 27.1	·· 01.5	197 41.7	·· 14.5	210 44.3	·· 02.6	Bellatrix	278 57.5	N 6 20.0
22	66 17.6	115 26.3	31.5	240 28.6	01.9	212 43.8	14.7	225 46.6	02.7	Betelgeuse	271 27.0	N 7 24.2
23	81 20.0	130 28.5	30.9	255 30.1	02.3	227 45.9	14.8	240 48.9	02.7			
28 00	96 22.5	145 30.7	S17 30.3	270 31.6	S 0 02.7	242 48.0	S12 14.9	255 51.2	S 6 02.7	Canopus	264 06.2	S52 41.2
01	111 25.0	160 33.0	29.7	285 33.0	03.1	257 50.1	15.0	270 53.6	02.8	Capella	281 09.5	N45 58.8
02	126 27.4	175 35.2	29.1	300 34.5	03.4	272 52.2	15.1	285 55.9	02.8	Deneb	49 48.3	N45 13.0
03	141 29.9	190 37.4	·· 28.5	315 36.0	·· 03.8	287 54.3	·· 15.3	300 58.2	·· 02.9	Denebola	182 58.1	N14 40.4
04	156 32.4	205 39.7	27.9	330 37.5	04.2	302 56.4	15.4	316 00.5	02.9	Diphda	349 19.9	S18 05.4
05	171 34.8	220 41.9	27.3	345 38.9	04.6	317 58.4	15.5	331 02.9	03.0			
06	186 37.3	235 44.2	S17 26.7	0 40.4	S 0 05.0	333 00.5	S12 15.6	346 05.2	S 6 03.0	Dubhe	194 20.8	N61 50.7
07	201 39.8	250 46.4	26.1	15 41.9	05.4	348 02.6	15.8	1 07.5	03.0	Elnath	278 42.6	N28 35.5
08	216 42.2	265 48.7	25.5	30 43.4	05.8	3 04.7	15.9	16 09.8	03.1	Eltanin	90 57.9	N51 29.5
M 09	231 44.7	280 50.9	·· 24.9	45 44.8	·· 06.2	18 06.8	·· 16.0	31 12.2	·· 03.1	Enif	34 10.9	N 9 47.5
O 10	246 47.2	295 53.2	24.2	60 46.3	06.6	33 08.9	16.1	46 14.5	03.2	Fomalhaut	15 50.6	S29 43.3
N 11	261 49.6	310 55.5	23.6	75 47.8	06.9	48 11.0	16.2	61 16.8	03.2			
D 12	276 52.1	325 57.7	S17 23.0	90 49.3	S 0 07.3	63 13.1	S12 16.4	76 19.1	S 6 03.3	Gacrux	172 27.8	S57 00.4
A 13	291 54.5	341 00.0	22.4	105 50.7	07.7	78 15.2	16.5	91 21.5	03.3	Gienah	176 17.0	S17 26.3
Y 14	306 57.0	356 02.3	21.8	120 52.2	08.1	93 17.3	16.6	106 23.8	03.4	Hadar	149 22.4	S60 16.8
15	321 59.5	11 04.6	·· 21.2	135 53.7	·· 08.5	108 19.4	·· 16.7	121 26.1	·· 03.4	Hamal	328 27.8	N23 22.7
16	337 01.9	26 06.9	20.6	150 55.2	08.9	123 21.5	16.8	136 28.4	03.4	Kaus Aust.	84 16.1	S34 23.6
17	352 04.4	41 09.2	20.0	165 56.7	09.3	138 23.6	17.0	151 30.8	03.5			
18	7 06.9	56 11.5	S17 19.4	180 58.1	S 0 09.6	153 25.7	S12 17.1	166 33.1	S 6 03.5	Kochab	137 19.8	N74 13.6
19	22 09.3	71 13.8	18.8	195 59.6	10.0	168 27.8	17.2	181 35.4	03.6	Markab	14 02.4	N15 06.5
20	37 11.8	86 16.1	18.2	211 01.1	10.4	183 29.9	17.3	196 37.8	03.6	Menkar	314 40.0	N 4 01.1
21	52 14.3	101 18.4	·· 17.6	226 02.6	·· 10.8	198 32.0	·· 17.4	211 40.1	·· 03.7	Menkent	148 36.2	S36 16.6
22	67 16.7	116 20.7	17.0	241 04.1	11.2	213 34.1	17.6	226 42.4	03.7	Miaplacidus	221 44.0	S69 38.3
23	82 19.2	131 23.0	16.4	256 05.5	11.6	228 36.2	17.7	241 44.7	03.7			
29 00	97 21.6	146 25.4	S17 15.8	271 07.0	S 0 12.0	243 38.3	S12 17.8	256 47.1	S 6 03.8	Mirfak	309 14.5	N49 47.9
01	112 24.1	161 27.7	15.2	286 08.5	12.3	258 40.4	17.9	271 49.4	03.8	Nunki	76 28.5	S26 19.2
02	127 26.6	176 30.0	14.6	301 10.0	12.7	273 42.4	18.0	286 51.7	03.9	Peacock	53 57.5	S56 47.8
03	142 29.0	191 32.4	·· 14.0	316 11.5	·· 13.1	288 44.5	·· 18.2	301 54.0	·· 03.9	Pollux	243 56.7	N28 04.2
04	157 31.5	206 34.7	13.4	331 13.0	13.5	303 46.6	18.3	316 56.4	04.0	Procyon	245 24.5	N 5 16.3
05	172 34.0	221 37.0	12.8	346 14.4	13.9	318 48.7	18.4	331 58.7	04.0			
06	187 36.4	236 39.4	S17 12.2	1 15.9	S 0 14.3	333 50.8	S12 18.5	347 01.0	S 6 04.0	Rasalhague	96 29.1	N12 34.4
07	202 38.9	251 41.7	11.6	16 17.4	14.6	348 52.9	18.6	2 03.4	04.1	Regulus	208 08.9	N12 03.3
08	217 41.4	266 44.1	11.0	31 18.9	15.0	3 55.0	18.8	17 05.7	04.1	Rigel	281 34.8	S 8 13.4
T 09	232 43.8	281 46.5	·· 10.4	46 20.4	·· 15.4	18 57.1	·· 18.9	32 08.0	·· 04.2	Rigil Kent.	140 25.0	S60 45.3
U 10	247 46.3	296 48.8	09.8	61 21.9	15.8	33 59.2	19.0	47 10.4	04.2	Sabik	102 40.5	S15 42.1
E 11	262 48.8	311 51.2	09.2	76 23.3	16.2	49 01.3	19.1	62 12.7	04.3			
S 12	277 51.2	326 53.6	S17 08.7	91 24.8	S 0 16.6	64 03.4	S12 19.2	77 15.0	S 6 04.3	Schedar	350 08.0	N56 26.5
D 13	292 53.7	341 56.0	08.1	106 26.3	16.9	79 05.5	19.3	92 17.3	04.3	Shaula	96 55.0	S37 05.4
A 14	307 56.1	356 58.3	07.5	121 27.8	17.3	94 07.6	19.5	107 19.7	04.4	Sirius	258 54.6	S16 41.5
Y 15	322 58.6	12 00.7	·· 06.9	136 29.3	·· 17.7	109 09.7	·· 19.6	122 22.0	·· 04.4	Spica	158 56.7	S11 03.9
16	338 01.1	27 03.1	06.3	151 30.8	18.1	124 11.8	19.7	137 24.3	04.5	Suhail	223 09.8	S43 21.4
17	353 03.5	42 05.5	05.7	166 32.3	18.5	139 13.9	19.8	152 26.7	04.5			
18	8 06.0	57 07.9	S17 05.1	181 33.8	S 0 18.8	154 16.0	S12 19.9	167 29.0	S 6 04.6	Vega	80 55.7	N38 46.0
19	23 08.5	72 10.3	04.5	196 35.3	19.2	169 18.1	20.1	182 31.3	04.6	Zuben'ubi	137 32.3	S15 57.9
20	38 10.9	87 12.7	03.9	211 36.7	19.6	184 20.2	20.2	197 33.7	04.6			
21	53 13.4	102 15.2	·· 03.3	226 38.2	·· 20.0	199 22.3	·· 20.3	212 36.0	·· 04.7		S.H.A.	Mer. Pass.
22	68 15.9	117 17.6	02.7	241 39.7	20.4	214 24.4	20.4	227 38.3	04.7		° ′	h m
23	83 18.3	132 20.0	02.2	256 41.2	20.7	229 26.5	20.5	242 40.6	04.8	Venus	49 08.2	14 16
	h m									Mars	174 09.1	5 57
Mer. Pass.	17 31.6	v 2.3	d 0.6	v 1.5	d 0.4	v 2.1	d 0.1	v 2.3	d 0.0	Jupiter	146 25.5	7 48
										Saturn	159 28.7	6 56

G.M.T.	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
27 00	179 47.0	S23 20.4	173 02.2	11.0	S21 56.8	0.1	54.4
01	194 46.7	20.3	187 32.2	11.1	21 56.9	0.0	54.4
02	209 46.3	20.2	202 02.3	11.0	21 56.9	0.1	54.4
03	224 46.0	·· 20.1	216 32.3	11.0	21 56.8	0.3	54.4
04	239 45.7	20.0	231 02.3	11.0	21 56.5	0.3	54.4
05	254 45.4	19.9	245 32.3	11.0	21 56.2	0.4	54.4
06	269 45.1	S23 19.8	260 02.3	10.9	S21 55.8	0.6	54.4
07	284 44.8	19.7	274 32.2	11.0	21 55.2	0.6	54.5
08	299 44.5	19.6	289 02.2	10.9	21 54.6	0.8	54.5
S 09	314 44.2	·· 19.5	303 32.1	11.0	21 53.8	0.8	54.5
U 10	329 43.9	19.4	318 02.1	10.9	21 53.0	1.0	54.5
N 11	344 43.6	19.3	332 32.0	11.0	21 52.0	1.0	54.5
D 12	359 43.3	S23 19.2	347 02.0	10.9	S21 51.0	1.2	54.5
A 13	14 42.9	19.1	1 31.9	10.9	21 49.8	1.3	54.5
Y 14	29 42.6	19.0	16 01.8	11.0	21 48.5	1.4	54.5
15	44 42.3	·· 18.8	30 31.8	10.9	21 47.1	1.5	54.6
16	59 42.0	18.7	45 01.7	10.9	21 45.6	1.6	54.6
17	74 41.7	18.6	59 31.6	10.9	21 44.0	1.7	54.6
18	89 41.4	S23 18.5	74 01.5	11.0	S21 42.3	1.8	54.6
19	104 41.1	18.4	88 31.5	10.9	21 40.5	2.0	54.6
20	119 40.8	18.3	103 01.4	10.9	21 38.5	2.0	54.6
21	134 40.5	·· 18.2	117 31.3	10.9	21 36.5	2.1	54.6
22	149 40.2	18.0	132 01.2	10.9	21 34.4	2.3	54.6
23	164 39.9	17.9	146 31.1	11.0	21 32.1	2.3	54.7
28 00	179 39.6	S23 17.8	161 01.1	10.9	S21 29.8	2.5	54.7
01	194 39.3	17.7	175 31.0	10.9	21 27.3	2.5	54.7
02	209 38.9	17.6	190 00.9	11.0	21 24.8	2.7	54.7
03	224 38.6	·· 17.5	204 30.9	10.9	21 22.1	2.8	54.7
04	239 38.3	17.3	219 00.8	11.0	21 19.3	2.8	54.7
05	254 38.0	17.2	233 30.8	10.9	21 16.5	3.0	54.7
06	269 37.7	S23 17.1	248 00.7	11.0	S21 13.5	3.1	54.8
07	284 37.4	17.0	262 30.7	10.9	21 10.4	3.2	54.8
08	299 37.1	16.8	277 00.6	11.0	21 07.2	3.3	54.8
M 09	314 36.8	·· 16.7	291 30.6	11.0	21 03.9	3.4	54.8
O 10	329 36.5	16.6	306 00.6	11.0	21 00.5	3.5	54.8
N 11	344 36.2	16.5	320 30.6	11.0	20 57.0	3.6	54.8
D 12	359 35.9	S23 16.3	335 00.6	11.0	S20 53.4	3.7	54.8
A 13	14 35.6	16.2	349 30.6	11.1	20 49.7	3.8	54.9
Y 14	29 35.3	16.1	4 00.7	11.0	20 45.9	4.0	54.9
15	44 35.0	·· 15.9	18 30.7	11.0	20 41.9	4.0	54.9
16	59 34.6	15.8	33 00.7	11.1	20 37.9	4.1	54.9
17	74 34.3	15.7	47 30.8	11.1	20 33.8	4.2	54.9
18	89 34.0	S23 15.5	62 00.9	11.1	S20 29.6	4.4	54.9
19	104 33.7	15.4	76 31.0	11.1	20 25.2	4.4	55.0
20	119 33.4	15.3	91 01.1	11.1	20 20.8	4.5	55.0
21	134 33.1	·· 15.1	105 31.2	11.1	20 16.3	4.7	55.0
22	149 32.8	15.0	120 01.3	11.2	20 11.6	4.7	55.0
23	164 32.5	14.9	134 31.5	11.2	20 06.9	4.8	55.0
29 00	179 32.2	S23 14.7	149 01.7	11.1	S20 02.1	5.0	55.0
01	194 31.9	14.6	163 31.8	11.2	19 57.1	5.0	55.1
02	209 31.6	14.5	178 02.0	11.3	19 52.1	5.1	55.1
03	224 31.3	·· 14.3	192 32.3	11.2	19 47.0	5.3	55.1
04	239 31.0	14.2	207 02.5	11.2	19 41.7	5.3	55.1
05	254 30.7	14.0	221 32.7	11.3	19 36.4	5.4	55.1
06	269 30.4	S23 13.9	236 03.0	11.3	S19 31.0	5.6	55.1
07	284 30.1	13.8	250 33.3	11.3	19 25.4	5.6	55.2
08	299 29.8	13.6	265 03.6	11.3	19 19.8	5.7	55.2
T 09	314 29.4	·· 13.5	279 33.9	11.4	19 14.1	5.8	55.2
U 10	329 29.1	13.3	294 04.3	11.4	19 08.3	5.9	55.2
E 11	344 28.8	13.2	308 34.7	11.3	19 02.4	6.1	55.2
S 12	359 28.5	S23 13.0	323 05.0	11.4	S18 56.3	6.1	55.2
D 13	14 28.2	12.9	337 35.4	11.5	18 50.2	6.2	55.3
A 14	29 27.9	12.7	352 05.9	11.4	18 44.0	6.3	55.3
Y 15	44 27.6	·· 12.6	6 36.3	11.5	18 37.7	6.3	55.3
16	59 27.3	12.4	21 06.8	11.5	18 31.4	6.5	55.3
17	74 27.0	12.3	35 37.3	11.5	18 24.9	6.6	55.3
18	89 26.7	S23 12.1	50 07.8	11.5	S18 18.3	6.7	55.4
19	104 26.4	12.0	64 38.3	11.6	18 11.6	6.7	55.4
20	119 26.1	11.8	79 08.9	11.6	18 04.9	6.9	55.4
21	134 25.8	·· 11.7	93 39.5	11.6	17 58.0	6.9	55.4
22	149 25.5	11.5	108 10.1	11.6	17 51.1	7.1	55.4
23	164 25.2	11.4	122 40.7	11.6	17 44.0	7.1	55.5
	S.D. 16.3	d 0.1	S.D. 14.9		14.9		15.1

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 27	Moonrise 28	Moonrise 29	Moonrise 30
°	h m	h m	h m	h m	h m	h m	h m
N 72	08 27	10 53	▬	▬	▬	▬	13 25
N 70	08 07	09 54	▬	▬	▬	13 11	12 46
68	07 51	09 20	▬	12 34	12 27	12 22	12 18
66	07 38	08 55	10 34	11 10	11 38	11 51	11 57
64	07 27	08 36	09 53	10 32	11 07	11 28	11 41
62	07 18	08 20	09 25	10 06	10 43	11 09	11 27
60	07 10	08 06	09 04	09 45	10 24	10 53	11 15
N 58	07 02	07 55	08 46	09 28	10 09	10 40	11 05
56	06 55	07 45	08 32	09 13	09 56	10 29	10 56
54	06 49	07 35	08 19	09 01	09 44	10 19	10 48
52	06 44	07 27	08 08	08 50	09 34	10 10	10 41
50	06 38	07 20	07 58	08 40	09 25	10 02	10 34
45	06 27	07 04	07 38	08 20	09 05	09 45	10 20
N 40	06 17	06 51	07 21	08 03	08 50	09 31	10 09
35	06 07	06 39	07 07	07 49	08 36	09 19	09 59
30	05 59	06 28	06 55	07 37	08 25	09 09	09 50
20	05 42	06 10	06 34	07 17	08 05	08 51	09 35
N 10	05 26	05 52	06 15	06 58	07 48	08 36	09 22
0	05 09	05 35	05 58	06 42	07 31	08 21	09 10
S 10	04 50	05 17	05 40	06 25	07 15	08 06	08 57
20	04 28	04 57	05 21	06 07	06 58	07 51	08 44
30	03 59	04 32	05 00	05 46	06 38	07 33	08 29
35	03 40	04 17	04 47	05 34	06 26	07 22	08 20
40	03 17	03 59	04 32	05 20	06 13	07 10	08 10
45	02 47	03 36	04 14	05 04	05 57	06 56	07 58
S 50	02 02	03 07	03 51	04 43	05 38	06 38	07 44
52	01 34	02 52	03 41	04 34	05 28	06 30	07 37
54	00 50	02 34	03 28	04 23	05 18	06 21	07 29
56	////	02 12	03 14	04 10	05 06	06 10	07 21
58	////	01 43	02 58	03 56	04 52	05 58	07 11
S 60	////	00 54	02 37	03 39	04 36	05 45	07 00

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 27	Moonset 28	Moonset 29	Moonset 30
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	13 10	15 37	▬	▬	▬	17 33
N 70	▬	14 09	15 56	▬	▬	16 05	18 11
68	▬	14 44	16 12	13 15	15 06	16 53	18 38
66	13 30	15 08	16 25	14 39	15 55	17 24	18 58
64	14 11	15 28	16 36	15 17	16 26	17 47	19 13
62	14 38	15 44	16 45	15 43	16 49	18 05	19 27
60	15 00	15 57	16 54	16 04	17 07	18 20	19 38
N 58	15 17	16 09	17 01	16 21	17 22	18 32	19 47
56	15 32	16 19	17 08	16 35	17 35	18 43	19 56
54	15 44	16 28	17 14	16 47	17 47	18 53	20 03
52	15 55	16 36	17 20	16 58	17 57	19 01	20 10
50	16 05	16 43	17 25	17 08	18 06	19 09	20 16
45	16 25	16 59	17 36	17 28	18 24	19 25	20 29
N 40	16 42	17 13	17 47	17 45	18 40	19 38	20 39
35	16 56	17 24	17 56	17 59	18 53	19 50	20 48
30	17 09	17 35	18 05	18 11	19 04	19 59	20 56
20	17 30	17 54	18 21	18 31	19 23	20 16	21 10
N 10	17 48	18 11	18 37	18 49	19 40	20 31	21 22
0	18 05	18 28	18 54	19 06	19 55	20 44	21 33
S 10	18 23	18 46	19 13	19 22	20 11	20 58	21 44
20	18 42	19 06	19 35	19 40	20 27	21 12	21 55
30	19 04	19 31	20 04	20 00	20 46	21 29	22 08
35	19 16	19 46	20 23	20 12	20 57	21 38	22 16
40	19 31	20 04	20 46	20 26	21 10	21 49	22 25
45	19 49	20 27	21 16	20 42	21 25	22 02	22 35
S 50	20 12	20 56	22 01	21 02	21 43	22 17	22 47
52	20 22	21 11	22 28	21 11	21 51	22 24	22 52
54	20 35	21 29	23 12	21 22	22 01	22 32	22 58
56	20 49	21 51	////	21 34	22 11	22 41	23 05
58	21 05	22 20	////	21 48	22 24	22 51	23 13
S 60	21 25	23 07	////	22 04	22 38	23 03	23 21

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
27	00 52	01 06	12 01	12 54	00 29	01	
28	01 21	01 36	12 02	13 43	01 19	02	●
29	01 51	02 05	12 02	14 33	02 08	03	

G.M.T.	ARIES	VENUS −4.2		MARS +0.9		JUPITER −1.4		SATURN +0.9		STARS		
	G.H.A.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	G.H.A.	Dec.	Name	S.H.A.	Dec.
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′		° ′	° ′
30 00	98 20.8	147 22.4	S17 01.6	271 42.7	S 0 21.1	244 28.6	S12 20.6	257 43.0	S 6 04.8	Acamar	315 36.3	S40 22.9
01	113 23.3	162 24.9	01.0	286 44.2	21.5	259 30.7	20.8	272 45.3	04.8	Achernar	335 44.4	S57 20.1
02	128 25.7	177 27.3	17 00.4	301 45.7	21.9	274 32.8	20.9	287 47.6	04.9	Acrux	173 36.2	S62 59.6
03	143 28.2	192 29.7	16 59.8	316 47.2	22.3	289 34.9	21.0	302 50.0	04.9	Adhara	255 31.0	S28 56.9
04	158 30.6	207 32.2	59.2	331 48.7	22.6	304 37.0	21.1	317 52.3	05.0	Aldebaran	291 16.7	N16 28.4
05	173 33.1	222 34.6	58.6	346 50.2	23.0	319 39.1	21.2	332 54.6	05.0			
06	188 35.6	237 37.1	S16 58.1	1 51.7	S 0 23.4	334 41.2	S12 21.3	347 57.0	S 6 05.1	Alioth	166 41.8	N56 03.3
07	203 38.0	252 39.6	57.5	16 53.2	23.8	349 43.3	21.5	2 59.3	05.1	Alkaid	153 17.9	N49 24.0
W 08	218 40.5	267 42.0	56.9	31 54.7	24.2	4 45.4	21.6	18 01.6	05.1	Al Na'ir	28 14.1	S47 03.2
E 09	233 43.0	282 44.5	56.3	46 56.2	24.5	19 47.5	21.7	33 04.0	05.2	Alnilam	276 10.4	S 1 12.9
D 10	248 45.4	297 47.0	55.7	61 57.7	24.9	34 49.6	21.8	48 06.3	05.2	Alphard	218 19.4	S 8 34.8
N 11	263 47.9	312 49.4	55.1	76 59.1	25.3	49 51.8	21.9	63 08.6	05.3			
E 12	278 50.4	327 51.9	S16 54.6	92 00.6	S 0 25.7	64 53.9	S12 22.0	78 11.0	S 6 05.3	Alphecca	126 31.6	N26 46.5
S 13	293 52.8	342 54.4	54.0	107 02.1	26.0	79 56.0	22.2	93 13.3	05.3	Alpheratz	358 08.4	N28 59.5
D 14	308 55.3	357 56.9	53.4	122 03.6	26.4	94 58.1	22.3	108 15.6	05.4	Altair	62 32.0	N 8 49.2
A 15	323 57.7	12 59.4	52.8	137 05.1	26.8	110 00.2	22.4	123 18.0	05.4	Ankaa	353 39.4	S42 24.6
Y 16	339 00.2	28 01.9	52.2	152 06.6	27.2	125 02.3	22.5	138 20.3	05.5	Antares	112 56.1	S26 23.4
17	354 02.7	43 04.4	51.7	167 08.1	27.6	140 04.4	22.6	153 22.6	05.5			
18	9 05.1	58 06.9	S16 51.1	182 09.6	S 0 27.9	155 06.5	S12 22.7	168 25.0	S 6 05.5	Arcturus	146 17.8	N19 16.5
19	24 07.6	73 09.4	50.5	197 11.1	28.3	170 08.6	22.9	183 27.3	05.6	Atria	108 20.1	S68 59.5
20	39 10.1	88 11.9	49.9	212 12.6	28.7	185 10.7	23.0	198 29.6	05.6	Avior	234 27.2	S59 27.0
21	54 12.5	103 14.4	49.3	227 14.1	29.1	200 12.8	23.1	213 32.0	05.7	Bellatrix	278 57.5	N 6 20.0
22	69 15.0	118 17.0	48.8	242 15.6	29.4	215 14.9	23.2	228 34.3	05.7	Betelgeuse	271 27.0	N 7 24.2
23	84 17.5	133 19.5	48.2	257 17.1	29.8	230 17.0	23.3	243 36.6	05.7			
31 00	99 19.9	148 22.0	S16 47.6	272 18.6	S 0 30.2	245 19.1	S12 23.4	258 39.0	S 6 05.8	Canopus	264 06.2	S52 41.2
01	114 22.4	163 24.6	47.0	287 20.1	30.6	260 21.2	23.6	273 41.3	05.8	Capella	281 09.5	N45 58.8
02	129 24.9	178 27.1	46.5	302 21.6	30.9	275 23.3	23.7	288 43.7	05.9	Deneb	49 48.3	N45 13.0
03	144 27.3	193 29.6	45.9	317 23.2	31.3	290 25.4	23.8	303 46.0	05.9	Denebola	182 58.1	N14 40.4
04	159 29.8	208 32.2	45.3	332 24.7	31.7	305 27.5	23.9	318 48.3	05.9	Diphda	349 20.0	S18 05.4
05	174 32.2	223 34.8	44.7	347 26.2	32.1	320 29.6	24.0	333 50.7	06.0			
06	189 34.7	238 37.3	S16 44.2	2 27.7	S 0 32.4	335 31.7	S12 24.1	348 53.0	S 6 06.0	Dubhe	194 20.7	N61 50.7
07	204 37.2	253 39.9	43.6	17 29.2	32.8	350 33.9	24.3	3 55.3	06.1	Elnath	278 42.6	N28 35.5
T 08	219 39.6	268 42.4	43.0	32 30.7	33.2	5 36.0	24.4	18 57.7	06.1	Eltanin	90 57.9	N51 29.4
H 09	234 42.1	283 45.0	42.5	47 32.2	33.6	20 38.1	24.5	34 00.0	06.1	Enif	34 10.9	N 9 47.5
U 10	249 44.6	298 47.6	41.9	62 33.7	33.9	35 40.2	24.6	49 02.3	06.2	Fomalhaut	15 50.6	S29 43.3
R 11	264 47.0	313 50.2	41.3	77 35.2	34.3	50 42.3	24.7	64 04.7	06.2			
S 12	279 49.5	328 52.8	S16 40.8	92 36.7	S 0 34.7	65 44.4	S12 24.8	79 07.0	S 6 06.3	Gacrux	172 27.8	S57 00.4
D 13	294 52.0	343 55.4	40.2	107 38.2	35.0	80 46.5	24.9	94 09.4	06.3	Gienah	176 17.0	S17 26.3
A 14	309 54.4	358 57.9	39.6	122 39.7	35.4	95 48.6	25.1	109 11.7	06.3	Hadar	149 22.4	S60 16.8
Y 15	324 56.9	14 00.5	39.1	137 41.2	35.8	110 50.7	25.2	124 14.0	06.4	Hamal	328 27.8	N23 22.7
16	339 59.4	29 03.2	38.5	152 42.7	36.2	125 52.8	25.3	139 16.4	06.4	Kaus Aust.	84 16.1	S34 23.6
17	355 01.8	44 05.8	37.9	167 44.2	36.5	140 54.9	25.4	154 18.7	06.5			
18	10 04.3	59 08.4	S16 37.4	182 45.7	S 0 36.9	155 57.0	S12 25.5	169 21.0	S 6 06.5	Kochab	137 19.7	N74 13.6
19	25 06.7	74 11.0	36.8	197 47.3	37.3	170 59.2	25.6	184 23.4	06.5	Markab	14 02.4	N15 06.5
20	40 09.2	89 13.6	36.2	212 48.8	37.6	186 01.3	25.7	199 25.7	06.6	Menkar	314 40.0	N 4 01.1
21	55 11.7	104 16.2	35.7	227 50.3	38.0	201 03.4	25.9	214 28.1	06.6	Menkent	148 36.1	S36 16.6
22	70 14.1	119 18.9	35.1	242 51.8	38.4	216 05.5	26.0	229 30.4	06.6	Miaplacidus	221 44.0	S69 38.3
23	85 16.6	134 21.5	34.5	257 53.3	38.8	231 07.6	26.1	244 32.7	06.7			
1 00	100 19.1	149 24.1	S16 34.0	272 54.8	S 0 39.1	246 09.7	S12 26.2	259 35.1	S 6 06.7	Mirfak	309 14.5	N49 48.0
01	115 21.5	164 26.8	33.4	287 56.3	39.5	261 11.8	26.3	274 37.4	06.8	Nunki	76 28.4	S26 19.2
02	130 24.0	179 29.4	32.9	302 57.8	39.9	276 13.9	26.4	289 39.7	06.8	Peacock	53 57.5	S56 47.8
03	145 26.5	194 32.1	32.3	317 59.4	40.2	291 16.0	26.5	304 42.1	06.8	Pollux	243 56.7	N28 04.2
04	160 28.9	209 34.7	31.7	333 00.9	40.6	306 18.1	26.7	319 44.4	06.9	Procyon	245 24.5	N 5 16.3
05	175 31.4	224 37.4	31.2	348 02.4	41.0	321 20.3	26.8	334 46.8	06.9			
06	190 33.8	239 40.1	S16 30.6	3 03.9	S 0 41.3	336 22.4	S12 26.9	349 49.1	S 6 07.0	Rasalhague	96 29.1	N12 34.4
07	205 36.3	254 42.7	30.1	18 05.4	41.7	351 24.5	27.0	4 51.4	07.0	Regulus	208 08.8	N12 03.3
08	220 38.8	269 45.4	29.5	33 06.9	42.1	6 26.6	27.1	19 53.8	07.0	Rigel	281 34.8	S 8 13.4
F 09	235 41.2	284 48.1	29.0	48 08.4	42.4	21 28.7	27.2	34 56.1	07.1	Rigil Kent.	140 25.0	S60 45.3
R 10	250 43.7	299 50.8	28.4	63 10.0	42.8	36 30.8	27.3	49 58.5	07.1	Sabik	102 40.4	S15 42.1
I 11	265 46.2	314 53.5	27.9	78 11.5	43.2	51 32.9	27.4	65 00.8	07.1			
D 12	280 48.6	329 56.2	S16 27.3	93 13.0	S 0 43.6	66 35.0	S12 27.6	80 03.1	S 6 07.2	Schedar	350 08.0	N56 26.5
A 13	295 51.1	344 58.9	26.7	108 14.5	43.9	81 37.2	27.7	95 05.5	07.2	Shaula	96 55.0	S37 05.4
Y 14	310 53.6	0 01.6	26.2	123 16.0	44.3	96 39.3	27.8	110 07.8	07.3	Sirius	258 54.6	S16 41.5
15	325 56.0	15 04.3	25.6	138 17.5	44.7	111 41.4	27.9	125 10.2	07.3	Spica	158 56.7	S11 03.9
16	340 58.5	30 07.0	25.1	153 19.1	45.0	126 43.5	28.0	140 12.5	07.3	Suhail	223 09.8	S43 21.4
17	356 01.0	45 09.7	24.5	168 20.6	45.4	141 45.6	28.1	155 14.8	07.4			
18	11 03.4	60 12.4	S16 24.0	183 22.1	S 0 45.8	156 47.7	S12 28.2	170 17.2	S 6 07.4	Vega	80 55.7	N38 46.0
19	26 05.9	75 15.1	23.4	198 23.6	46.1	171 49.8	28.3	185 19.5	07.4	Zuben'ubi	137 32.3	S15 57.9
20	41 08.3	90 17.9	22.9	213 25.1	46.5	186 51.9	28.5	200 21.9	07.5			
21	56 10.8	105 20.6	22.3	228 26.7	46.9	201 54.1	28.6	215 24.2	07.5		S.H.A.	Mer. Pass.
22	71 13.3	120 23.3	21.8	243 28.2	47.2	216 56.2	28.7	230 26.6	07.6	Venus	° ′ 49 02.1	h m 14 04
23	86 15.7	135 26.1	21.2	258 29.7	47.6	231 58.3	28.8	245 28.9	07.6	Mars	172 58.7	5 50
	h m									Jupiter	145 59.2	7 38
Mer. Pass.	17 19.8	v 2.6	d 0.6	v 1.5	d 0.4	v 2.1	d 0.1	v 2.3	d 0.0	Saturn	159 19.1	6 44

G.M.T.	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
30 00	179 24.9	S23 11.2	137 11.3	11.7	S17 36.9	7.2	55.5
01	194 24.6	11.0	151 42.0	11.7	17 29.7	7.3	55.5
02	209 24.3	10.9	166 12.7	11.7	17 22.4	7.4	55.5
03	224 24.0	·· 10.7	180 43.4	11.7	17 15.0	7.4	55.5
04	239 23.7	10.6	195 14.1	11.8	17 07.6	7.6	55.6
05	254 23.4	10.4	209 44.9	11.8	17 00.0	7.7	55.6
06	269 23.1	S23 10.2	224 15.7	11.8	S16 52.3	7.7	55.6
07	284 22.8	10.1	238 46.5	11.8	16 44.6	7.8	55.6
W 08	299 22.5	09.9	253 17.3	11.8	16 36.8	7.9	55.6
E 09	314 22.2	·· 09.7	267 48.1	11.9	16 28.9	8.0	55.7
D 10	329 21.9	09.6	282 19.0	11.9	16 20.9	8.1	55.7
N 11	344 21.6	09.4	296 49.9	11.9	16 12.8	8.1	55.7
E 12	359 21.3	S23 09.3	311 20.8	11.9	S16 04.7	8.3	55.7
S 13	14 21.0	09.1	325 51.7	12.0	15 56.4	8.3	55.7
D 14	29 20.6	08.9	340 22.7	12.0	15 48.1	8.4	55.8
A 15	44 20.3	·· 08.7	354 53.7	12.0	15 39.7	8.5	55.8
Y 16	59 20.0	08.6	9 24.7	12.0	15 31.2	8.5	55.8
17	74 19.7	08.4	23 55.7	12.0	15 22.7	8.7	55.8
18	89 19.4	S23 08.2	38 26.7	12.1	S15 14.0	8.7	55.9
19	104 19.1	08.1	52 57.8	12.1	15 05.3	8.8	55.9
20	119 18.8	07.9	67 28.9	12.1	14 56.5	8.9	55.9
21	134 18.5	·· 07.7	82 00.0	12.1	14 47.6	8.9	55.9
22	149 18.2	07.5	96 31.1	12.1	14 38.7	9.1	55.9
23	164 17.9	07.4	111 02.2	12.2	14 29.6	9.1	56.0
31 00	179 17.6	S23 07.2	125 33.4	12.2	S14 20.5	9.1	56.0
01	194 17.3	07.0	140 04.6	12.2	14 11.4	9.3	56.0
02	209 17.0	06.8	154 35.8	12.2	14 02.1	9.3	56.0
03	224 16.7	·· 06.7	169 07.0	12.2	13 52.8	9.4	56.1
04	239 16.4	06.5	183 38.2	12.3	13 43.4	9.5	56.1
05	254 16.1	06.3	198 09.5	12.3	13 33.9	9.5	56.1
06	269 15.8	S23 06.1	212 40.8	12.3	S13 24.4	9.7	56.1
07	284 15.5	05.9	227 12.1	12.3	13 14.7	9.7	56.2
T 08	299 15.2	05.8	241 43.4	12.3	13 05.0	9.7	56.2
H 09	314 14.9	·· 05.6	256 14.7	12.3	12 55.3	9.8	56.2
U 10	329 14.6	05.4	270 46.0	12.4	12 45.5	9.9	56.2
R 11	344 14.3	05.2	285 17.4	12.4	12 35.6	10.0	56.3
S 12	359 14.0	S23 05.0	299 48.8	12.4	S12 25.6	10.0	56.3
D 13	14 13.7	04.8	314 20.2	12.4	12 15.6	10.1	56.3
A 14	29 13.4	04.6	328 51.6	12.4	12 05.5	10.2	56.3
Y 15	44 13.1	·· 04.5	343 23.0	12.4	11 55.3	10.2	56.3
16	59 12.8	04.3	357 54.4	12.5	11 45.1	10.3	56.4
17	74 12.5	04.1	12 25.9	12.4	11 34.8	10.3	56.4
18	89 12.2	S23 03.9	26 57.3	12.5	S11 24.5	10.5	56.4
19	104 12.0	03.7	41 28.8	12.5	11 14.0	10.4	56.5
20	119 11.7	03.5	56 00.3	12.5	11 03.6	10.6	56.5
21	134 11.4	·· 03.3	70 31.8	12.5	10 53.0	10.6	56.5
22	149 11.1	03.1	85 03.3	12.5	10 42.4	10.6	56.5
23	164 10.8	02.9	99 34.8	12.5	10 31.8	10.8	56.6
1 00	179 10.5	S23 02.7	114 06.3	12.5	S10 21.0	10.7	56.6
01	194 10.2	02.5	128 37.8	12.6	10 10.3	10.9	56.6
02	209 09.9	02.3	143 09.4	12.5	9 59.4	10.9	56.6
03	224 09.6	·· 02.1	157 40.9	12.6	9 48.5	10.9	56.7
04	239 09.3	01.9	172 12.5	12.5	9 37.6	11.0	56.7
05	254 09.0	01.7	186 44.0	12.6	9 26.6	11.1	56.7
06	269 08.7	S23 01.5	201 15.6	12.6	S 9 15.5	11.1	56.7
07	284 08.4	01.3	215 47.2	12.5	9 04.4	11.1	56.8
08	299 08.1	01.1	230 18.7	12.6	8 53.3	11.3	56.8
F 09	314 07.8	·· 00.9	244 50.3	12.6	8 42.0	11.2	56.8
R 10	329 07.5	00.7	259 21.9	12.6	8 30.8	11.3	56.8
I 11	344 07.2	00.5	273 53.5	12.6	8 19.5	11.4	56.9
D 12	359 06.9	S23 00.3	288 25.1	12.5	S 8 08.1	11.4	56.9
A 13	14 06.6	23 00.1	302 56.6	12.6	7 56.7	11.5	56.9
Y 14	29 06.3	22 59.9	317 28.2	12.6	7 45.2	11.5	57.0
15	44 06.0	·· 59.7	331 59.8	12.6	7 33.7	11.6	57.0
16	59 05.7	59.5	346 31.4	12.6	7 22.1	11.6	57.0
17	74 05.4	59.3	1 03.0	12.5	7 10.5	11.6	57.0
18	89 05.1	S22 59.1	15 34.5	12.6	S 6 58.9	11.7	57.1
19	104 04.8	58.9	30 06.1	12.6	6 47.2	11.8	57.1
20	119 04.5	58.6	44 37.7	12.6	6 35.4	11.8	57.1
21	134 04.3	·· 58.4	59 09.3	12.5	6 23.6	11.8	57.2
22	149 04.0	58.2	73 40.8	12.6	6 11.8	11.9	57.2
23	164 03.7	58.0	88 12.4	12.5	5 59.9	11.9	57.2
	S.D. 16.3	d 0.2	S.D. 15.2		15.3		15.5

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 30	Moonrise 31	Moonrise 1	Moonrise 2
°	h m	h m	h m	h m	h m	h m	h m
N 72	08 25	10 46	▬	13 25	12 53	12 32	12 15
N 70	08 06	09 51	▬	12 46	12 31	12 20	12 11
68	07 50	09 18	▬	12 18	12 14	12 11	12 07
66	07 38	08 54	10 30	11 57	12 01	12 03	12 04
64	07 27	08 35	09 51	11 41	11 49	11 56	12 01
62	07 18	08 19	09 24	11 27	11 40	11 50	11 58
60	07 10	08 06	09 03	11 15	11 31	11 45	11 56
N 58	07 02	07 55	08 46	11 05	11 24	11 40	11 54
56	06 56	07 45	08 32	10 56	11 17	11 36	11 53
54	06 50	07 36	08 19	10 48	11 11	11 32	11 51
52	06 44	07 28	08 08	10 41	11 06	11 29	11 50
50	06 39	07 20	07 59	10 34	11 01	11 26	11 49
45	06 27	07 05	07 38	10 20	10 51	11 19	11 46
N 40	06 17	06 51	07 22	10 09	10 42	11 14	11 44
35	06 08	06 40	07 08	09 59	10 35	11 09	11 42
30	06 00	06 29	06 56	09 50	10 28	11 05	11 40
20	05 43	06 11	06 35	09 35	10 17	10 57	11 37
N 10	05 27	05 54	06 17	09 22	10 07	10 51	11 34
0	05 11	05 37	05 59	09 10	09 57	10 44	11 32
S 10	04 52	05 19	05 42	08 57	09 48	10 38	11 29
20	04 30	04 59	05 23	08 44	09 38	10 32	11 26
30	04 01	04 34	05 02	08 29	09 26	10 24	11 23
35	03 43	04 19	04 49	08 20	09 19	10 20	11 21
40	03 20	04 01	04 34	08 10	09 12	10 15	11 19
45	02 50	03 39	04 16	07 58	09 03	10 09	11 17
S 50	02 05	03 10	03 54	07 44	08 52	10 02	11 14
52	01 39	02 55	03 43	07 37	08 47	09 59	11 13
54	00 57	02 38	03 31	07 29	08 41	09 56	11 12
56	////	02 16	03 17	07 21	08 35	09 52	11 10
58	////	01 47	03 01	07 11	08 28	09 47	11 08
S 60	////	01 02	02 41	07 00	08 20	09 43	11 07

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 30	Moonset 31	Moonset 1	Moonset 2
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	13 20	15 41	17 33	19 45	21 44	23 41
N 70	▬	14 15	16 01	18 11	20 05	21 54	23 42
68	▬	14 48	16 16	18 38	20 20	22 02	23 44
66	13 36	15 13	16 29	18 58	20 33	22 08	23 45
64	14 16	15 32	16 39	19 13	20 43	22 13	23 46
62	14 43	15 47	16 49	19 27	20 52	22 18	23 46
60	15 03	16 00	16 57	19 38	20 59	22 22	23 47
N 58	15 20	16 12	17 04	19 47	21 06	22 26	23 48
56	15 35	16 22	17 11	19 56	21 11	22 29	23 48
54	15 47	16 31	17 17	20 03	21 16	22 32	23 49
52	15 58	16 39	17 22	20 10	21 21	22 34	23 49
50	16 08	16 46	17 27	20 16	21 25	22 36	23 49
45	16 28	17 02	17 39	20 29	21 34	22 41	23 50
N 40	16 44	17 15	17 49	20 39	21 42	22 46	23 51
35	16 58	17 26	17 58	20 48	21 48	22 49	23 51
30	17 11	17 37	18 07	20 56	21 54	22 52	23 52
20	17 31	17 55	18 23	21 10	22 04	22 58	23 53
N 10	17 50	18 12	18 39	21 22	22 12	23 02	23 54
0	18 07	18 29	18 55	21 33	22 20	23 07	23 54
S 10	18 24	18 47	19 14	21 44	22 28	23 11	23 55
20	18 43	19 07	19 36	21 55	22 36	23 16	23 55
30	19 04	19 32	20 05	22 08	22 45	23 21	23 56
35	19 17	19 47	20 23	22 16	22 51	23 24	23 57
40	19 32	20 05	20 46	22 25	22 57	23 27	23 57
45	19 50	20 27	21 16	22 35	23 04	23 31	23 58
S 50	20 12	20 56	22 00	22 47	23 12	23 36	23 58
52	20 22	21 11	22 26	22 52	23 16	23 38	23 58
54	20 34	21 28	23 07	22 58	23 20	23 40	23 59
56	20 48	21 49	////	23 05	23 25	23 43	23 59
58	21 04	22 17	////	23 13	23 30	23 45	23 59
S 60	21 24	23 02	////	23 21	23 36	23 48	24 00

Day	SUN Eqn. of Time 00ʰ	SUN Eqn. of Time 12ʰ	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
30	02 20	02 34	12 03	15 21	02 57	04	
31	02 49	03 03	12 03	16 09	03 45	05	◑
1	03 18	03 32	12 04	16 56	04 32	06	

EXPLANATION

PRINCIPLE AND ARRANGEMENT

1. *Object.* The object of this Almanac is to provide, in a convenient form, the data required for the practice of astronomical navigation at sea.

2. *Principle.* The main contents of the Almanac consist of data from which the *Greenwich Hour Angle* (G.H.A.) and the *Declination* (Dec.) of all the bodies used for navigation can be obtained for any instant of *Greenwich Mean Time* (G.M.T.). The *Local Hour Angle* (L.H.A.) can then be obtained by means of the formula:

$$\text{L.H.A.} = \text{G.H.A.} \begin{matrix} - \text{ west} \\ + \text{ east} \end{matrix} \text{ longitude}$$

The remaining data consist of: times of rising and setting of the Sun and Moon, and times of twilight; miscellaneous calendarial and planning data and auxiliary tables, including a list of Standard Times; corrections to be applied to observed altitude.

For the Sun, Moon, and planets the G.H.A. and Dec. are tabulated directly for each hour of G.M.T. throughout the year. For the stars the *Sidereal Hour Angle* (S.H.A.) is given, and the G.H.A. is obtained from:

$$\text{G.H.A. Star} = \text{G.H.A. Aries} + \text{S.H.A. Star}$$

The S.H.A. and Dec. of the stars change slowly and may be regarded as constant over periods of several days. G.H.A. Aries, or the Greenwich Hour Angle of the first point of Aries (the Vernal Equinox), is tabulated for each hour. Permanent tables give the appropriate increments and corrections to the tabulated hourly values of G.H.A. and Dec. for the minutes and seconds of G.M.T.

The six-volume series of *Sight Reduction Tables for Marine Navigation* (published in U.S.A. as Pub. No. 229 and in U.K. as N.P. 401) has been designed for the solution of the navigational triangle and is intended for use with *The Nautical Almanac.*

The tabular accuracy is $0'{\cdot}1$ throughout. The time argument on the daily pages of this Almanac is 12^h + the Greenwich Hour Angle of the mean sun and is here denoted by G.M.T., although it is also known as universal time (UT, or UT1). This scale may differ from the broadcast time signals (UTC) by an amount which, if ignored, will introduce an error of up to $0'{\cdot}2$ in longitude determined from astronomical observations. (The difference arises because the time argument depends on the variable rate of rotation of the Earth while the broadcast time signals are now based on an atomic time-scale.) Step adjustments of exactly one second are made to the time signals as required (normally at 24^h on December 31 and June 30) so that the difference between the time signals and G.M.T., as used in this Almanac, may not exceed $0^s{\cdot}9$. Those who require to reduce observations to a precision of better than 1^s must therefore obtain the correction to the time signals from coding in the signal, or from other sources. The correction may be applied to each of the times of observation; alternatively, the longitude, when determined from astronomical observations, may be corrected by the corresponding amount shown in the following table:

Correction to time signals	Correction to longitude
$-0^s{\cdot}9$ to $-0^s{\cdot}7$	$0'{\cdot}2$ to east
$-0^s{\cdot}6$ to $-0^s{\cdot}3$	$0'{\cdot}1$ to east
$-0^s{\cdot}2$ to $+0^s{\cdot}2$	no correction
$+0^s{\cdot}3$ to $+0^s{\cdot}6$	$0'{\cdot}1$ to west
$+0^s{\cdot}7$ to $+0^s{\cdot}9$	$0'{\cdot}2$ to west

3. *Lay-out.* The ephemeral data for three days are presented on an opening of two pages: the left-hand page contains the data for the planets and stars; the right-hand page contains the data for the Sun and Moon, together with times of twilight, sunrise, sunset, moonrise and moonset.

The remaining contents are arranged as follows: for ease of reference the altitude-correction tables are given on pages A2, A3, A4, xxxiv and xxxv; calendar, Moon's phases, eclipses, and planet notes (i.e. data of general interest) precede the main tabulations; the other data follow the main tabulations and are arranged, as far as possible, in order of importance or frequency of use backwards from page xxxv.

MAIN DATA

4. *Daily pages.* The daily pages give the G.H.A. of Aries, the G.H.A. and Dec. of the Sun, Moon, and the four navigational planets, for each hour of G.M.T. For the Moon, values of v and d are also tabulated for each hour to facilitate the correction of G.H.A. and Dec. to intermediate times; v and d for the Sun and planets change so slowly that they are given, at the foot of the appropriate columns, once only on the page; v is zero for Aries and negligible for the Sun, and is omitted. The S.H.A. and Dec. of the 57 selected stars, arranged in alphabetical order of proper name, are also given.

5. *Stars.* The S.H.A. and Dec. of 173 stars, including the 57 selected stars, are tabulated for each month on pages 268-273; no interpolation is required and the data can be used in precisely the same way as those for the selected stars on the daily pages. The stars are arranged in order of S.H.A.

The list of 173 includes all stars down to magnitude 3·0, together with a few fainter ones to fill the larger gaps. The 57 selected stars have been chosen from amongst these on account of brightness and distribution in the sky; they will suffice for the majority of observations.

The 57 selected stars are known by their proper names, but they are also numbered in descending order of S.H.A. In the list of 173 stars, the constellation names are always given on the left-hand page; on the facing page proper names are given where well-known names exist. Numbers for the selected stars are given in both columns.

An index to the selected stars, containing lists in both alphabetical and numerical order, is given on page xxxiii and is also reprinted on the bookmark.

6. *Increments and corrections.* These tables, printed on tinted paper (pages ii-xxxi) at the back of the Almanac, provide the increments and corrections for minutes and seconds to be applied to the hourly values of G.H.A. and Dec. They consist of sixty tables, one for each minute, separated into two parts: increments to G.H.A. for Sun and planets, Aries, and Moon for every minute and second; and, for each minute, corrections to be applied to G.H.A. and Dec. corresponding to the values of v and d given on the daily pages.

The increments are based on the following adopted hourly rates of increase of the G.H.A.: Sun and planets, 15° precisely; Aries, 15° 02′·46; Moon, 14° 19′·0. The values of v on the daily pages are the excesses of the actual hourly motions over the adopted values; they are generally positive, except for Venus. The tabulated hourly values of the Sun's G.H.A. have been adjusted to reduce to a minimum the error caused by treating v as negligible. The values of d on the daily pages are the hourly differences of the Dec. For the Moon, the true values of v and d are given for each hour; otherwise mean values are given for the three days on the page.

7. *Method of entry.* The G.M.T. of an observation is expressed as a day and hour, followed by a number of minutes and seconds. The tabular values of G.H.A. and Dec., and, where necessary, the corresponding values of v and d, are taken directly from the daily pages for the day and hour of G.M.T.; this hour is always *before* the time of observation. S.H.A. and Dec. of the selected stars are also taken from the daily pages.

The table of Increments and Corrections for the minute of G.M.T. is then selected. For the G.H.A., the increment for minutes and seconds is taken from the appropriate column opposite the seconds of G.M.T.; the v-correction is taken from the second part of the same table opposite the value of v as given on the daily pages. Both increment and v-correction are to be added to the G.H.A., except for Venus when v is prefixed by a minus sign and the v-correction is to be subtracted. For the Dec. there is no increment, but a d-correction is applied in the same way as the v-correction; d is given without sign on the daily pages and the sign of the correction is to be supplied by inspection of the Dec. column. In many cases the correction may be applied mentally.

8. *Examples.* (a) Sun and Moon. Required the G.H.A. and Dec. of the Sun and Moon on 1981 January 22 at G.M.T. $15^h\,47^m\,13^s$.

		SUN				MOON					
		G.H.A.		Dec.		d	G.H.A.		v	Dec.		d
		°	′	°	′	′	°	′	′	°	′	′
Daily page, Jan. 22^d 15^h		42	04·7	S.19	35·9	0·6	193	38·8	11·8	N.12	57·4	8·8
Increments for	$47^m\,13^s$	11	48·3				11	16.0				
v or d corrections for	47^m				−0·5			+9·3			−7·0	
Sum for	Jan. 22^d 15^h 47^m 13^s	53	53·0	S.19	35·4		205	04·1		N.12	50·4	

(b) Planets. Required the L.H.A. and Dec. of (i) Venus on 1981 January 22 at G.M.T. $12^h\,57^m\,28^s$ in longitude W. 107° 12′; (ii) Jupiter on 1981 January 22 at G.M.T. $03^h\,48^m\,51^s$ in longitude E. 27° 45′.

		VENUS						JUPITER					
		G.H.A.		v	Dec.		d		G.H.A.		v	Dec.		d
		°	′	′	°	′	′		°	′	′	°	′	′
Daily page, Jan. 22^d	(12^h)	16	30·1	−0·9	S.22	45·7	0·2	(03^h)	336	17·5	2·5	S.2	49·2	0·0
Increments (planets)	$(57^m\,28^s)$	14	22·0					$(48^m\,51^s)$	12	12·8				
v or d corrections	(57^m)		−0·9			−0·2		(48^m)		+2·0			0·0	
Sum = G.H.A. and Dec.		30	51·2		S.22	45·5			348	32·3		S.2	49·2	
Longitude	(west)	−107	12·0					(east)	+ 27	45·0				
Multiples of 360°		+360							−360					
L.H.A. planet		283	39·2						16	17·3				

(c) Stars. Required the G.H.A. and Dec. of (i) *Aldebaran* on 1981 January 22 at G.M.T. $15^h\,55^m\,13^s$; (ii) *Vega* on 1981 January 22 at G.M.T. $16^h\,02^m\,45^s$.

		Aldebaran				*Vega*			
		G.H.A.		Dec.		G.H.A.		Dec.	
		°	′	°	′	°	′	°	′
Daily page (S.H.A. and Dec.)		291	17·5	N.16	28·2	80	56·1	N.38	45·9
Daily page (G.H.A. Aries)	(15^h)	346	52·3			(16^h) 1	54·8		
Increments (Aries)	$(55^m\,13^s)$	13	50·5			$(02^m\,45^s)$ 0	41·4		
Sum = G.H.A. star		652	00·3			83	32·3		
Multiples of 360°		−360							
G.H.A. star		292	00·3			83	32·3		

9. *Polaris (Pole Star) tables.* The tables on pages 274-276 provide means by which the latitude can be deduced from an observed altitude of *Polaris*, and they also give its azimuth; their use is explained and illustrated on those pages. They are based on the following formula:

$$\text{Latitude} - Ho = -p\cos h + \tfrac{1}{2}p\sin p\sin^2 h\tan(\text{latitude})$$

where Ho = Apparent altitude (corrected for refraction)

p = polar distance of *Polaris* = 90° − Dec.

h = local hour angle of *Polaris* = L.H.A. Aries + S.H.A.

a_0, which is a function of L.H.A. Aries only, is the value of both terms of the above formula calculated for mean values of the S.H.A. (326° 42′) and Dec. (N.89° 10′·8) of *Polaris*, for a mean latitude of 50°, and adjusted by the addition of a constant (58′·8). a_1, which is a function of

L.H.A. Aries and latitude, is the excess of the value of the second term over its mean value for latitude 50°, increased by a constant (0′·6) to make it always positive. a_2, which is a function of L.H.A. Aries and date, is the correction to the first term for the variation of *Polaris* from its adopted mean position; it is increased by a constant (0′·6) to make it positive. The sum of the added constants is 1°, so that:

$$\text{Latitude} = \text{Apparent altitude (corrected for refraction)} - 1^\circ + a_0 + a_1 + a_2$$

RISING AND SETTING PHENOMENA

10. *General.* On the right-hand daily pages are given the times of sunrise and sunset, of the beginning and end of civil and nautical twilights, and of moonrise and moonset for a range of latitudes from N. 72° to S. 60°. These times, which are given to the nearest minute, are strictly the G.M.T. of the phenomena on the Greenwich meridian; they are given for every day for moonrise and moonset, but only for the middle day of the three on each page for the solar phenomena.

They are approximately the Local Mean Times (L.M.T.) of the corresponding phenomena on other meridians; they can be formally interpolated if desired. The G.M.T. of a phenomenon is obtained from the L.M.T. by:

$$\text{G.M.T.} = \text{L.M.T.} \overset{+\ \text{west}}{-\ \text{east}} \text{longitude}$$

in which the longitude must first be converted to time by the table on page i or otherwise.

Interpolation for latitude can be done mentally or with the aid of Table I on page xxxii.

The following symbols are used to indicate the conditions under which, in high latitudes, some of the phenomena do not occur:

□ Sun or Moon remains continuously above the horizon;

■ Sun or Moon remains continuously below the horizon;

//// twilight lasts all night.

Basis of the tabulations. At sunrise and sunset 16′ is allowed for semi-diameter and 34′ for horizontal refraction, so that at the times given the Sun's upper limb is on the visible horizon; all times refer to phenomena as seen from sea level with a clear horizon.

At the times given for the beginning and end of twilight, the Sun's zenith distance is 96° for civil, and 102° for nautical twilight. The degree of illumination at the times given for civil twilight (in good conditions and in the absence of other illumination) is such that the brightest stars are visible and the horizon is clearly defined. At the times given for nautical twilight the horizon is in general not visible, and it is too dark for observation with a marine sextant.

Times corresponding to other depressions of the Sun may be obtained by interpolation or, for depressions of more than 12°, less reliably, by extrapolation; times so obtained will be subject to considerable uncertainty near extreme conditions.

At moonrise and moonset allowance is made for semi-diameter, parallax, and refraction (34′), so that at the times given the Moon's upper limb is on the visible horizon as seen from sea level.

11. *Sunrise, sunset, twilight.* The tabulated times may be regarded, without serious error, as the L.M.T. of the phenomena on any of the three days on the page and in any longitude. Precise times may normally be obtained by interpolating the tabular values for latitude and to the correct day and longitude, the latter being expressed as a fraction of a day by dividing it by 360°, positive for west and negative for east longitudes. In the extreme conditions near □, ■ or //// interpolation may not be possible in one direction, but accurate times are of little value in these circumstances.

Examples. Required the G.M.T. of (a) the beginning of morning twilights and sunrise on 1981 January 22 for latitude S. 48° 55′, longitude E. 75° 18′; (b) sunset and the end of evening twilights on 1981 January 24 for latitude N. 67° 10′, longitude W. 168° 05′.

	(a)	Twilight Nautical	Civil	Sunrise	(b)	Sunset	Twilight Civil	Nautical
From p. 25		d h m	d h m	d h m		d h m	d h m	d h m
L.M.T. for Lat.	S.45°	22 03 25	22 04 09	22 04 44	N.66°	24 14 57	24 16 08	24 17 15
Corr. to (p. xxxii, Table I)	S.48° 55′	−27	−20	−16	N.67° 10′	−17	−9	−6
Long. (p. i)	E.75° 18′	−5 01	−5 01	−5 01	W.168° 05′	+11 12	+11 12	+11 12
G.M.T.		21 21 57	21 22 48	21 23 27		25 01 52	25 03 11	25 04 21

The L.M.T. are strictly for January 23 (middle date on page) and 0° longitude; for more precise times it is necessary to interpolate, but rounding errors may accumulate to about 2^m:

(a) to January 22^d − 75°/360° = Jan. 21^d·8, i.e. $\frac{4}{5}$ (1·2) = 0·4 backwards towards the data for the same latitude interpolated similarly from page 23; the corrections are −2^m to nautical twilight, −2^m to civil twilight and −2^m to sunrise.

(b) to January 24^d + 168°/360° = Jan. 24^d·5, i.e. $\frac{1}{2}$ (1·5) = 0·5 forwards towards the data for the same latitude interpolated similarly from page 27; the corrections are +8^m to sunset, +5^m to civil twilight, and +4^m to nautical twilight.

12. *Moonrise, moonset.* Precise times of moonrise and moonset are rarely needed; a glance at the tables will generally give sufficient indication of whether the Moon is available for observation and of the hours of rising and setting. If needed, precise times may be obtained as follows. Interpolate for latitude, using Table I on page xxxii, on the day wanted and also on the preceding day in east longitudes or the following day in west longitudes, take the difference between these times and interpolate for longitude by applying to the time for the day wanted the correction from Table II on page xxxii, so that the resulting time is between the two times used. In extreme conditions near □ or ■ interpolation for latitude or longitude may be possible only in one direction; accurate times are of little value in these circumstances.

To facilitate this interpolation the times of moonrise and moonset are given for four days on each page; where no phenomenon occurs during a particular day (as happens once a month) the time of the phenomenon on the following day, increased by 24^h, is given; extra care must be taken when interpolating between two values, when one of those values exceeds 24^h. In practice it suffices to use the daily difference between the times for the nearest tabular latitude, and generally, to enter Table II with the nearest tabular arguments as in the example below.

Examples. Required the G.M.T. of moonrise and moonset in latitude S.47° 10′, longitudes E.124° 00′ and W.78° 31′ on 1981 January 23.

	Longitude E.124° 00′ Moonrise	Moonset	Longitude W.78° 31′ Moonrise	Moonset
	d h m	d h m	d h m	d h m
L.M.T. for Lat. S.45°	23 21 37	23 07 55	23 21 37	23 07 55
Lat. correction (p. xxxii, Table I)	+02	−04	+02	−04
Long. correction (p. xxxii, Table II)	−10	−23	+07	+16
Correct L.M.T.	23 21 29	23 07 28	23 21 46	23 08 07
Longitude (p. i)	−8 16	−8 16	+5 14	+5 14
G.M.T.	23 13 13	22 23 12	24 03 00	23 13 21

ALTITUDE CORRECTION TABLES

13. *General.* In general two corrections are given for application to altitudes observed with a marine sextant; additional corrections are required for Venus and Mars and also for very low altitudes.

Tables of the correction for dip of the horizon, due to height of eye above sea level, are given on pages A2 and xxxiv. Strictly this correction should be applied first and subtracted from the sextant altitude to give apparent altitude, which is the correct argument for the other tables.

Separate tables are given of the second correction for the Sun, for stars and planets (on pages A2 and A3), and for the Moon (on pages xxxiv and xxxv). For the Sun, values are given for both lower and upper limbs, for two periods of the year. The star tables are used for the planets, but additional corrections (page A2) are required for Venus and Mars. The Moon tables are in two parts: the main correction is a function of apparent altitude only and is tabulated for the lower limb (30′ must be subtracted to obtain the correction for the upper limb); the other, which is given for both lower and upper limbs, depends also on the horizontal parallax, which has to be taken from the daily pages.

An additional correction, given on page A4, is required for the change in the refraction, due to variations of pressure and temperature from the adopted standard conditions; it may generally be ignored for altitudes greater than 10°, except possibly in extreme conditions. The correction tables for the Sun, stars, and planets are in two parts; only those for altitudes greater than 10° are reprinted on the bookmark.

14. *Critical tables.* Some of the altitude correction tables are arranged as critical tables. In these an interval of apparent altitude (or height of eye) corresponds to a single value of the correction; no interpolation is required. At a "critical" entry the upper of the two possible values of the correction is to be taken. For example, in the table of dip, a correction of −4′·1 corresponds to all values of the height of eye from 5·3 to 5·5 metres (17·5 to 18·3 feet) inclusive.

15. *Examples.* The following examples illustrate the use of the altitude correction tables; the sextant altitudes given are assumed to be taken on 1981 January 22 with a marine sextant at height 5·4 metres (18 feet), temperature −3°C. and pressure 982 mb., the Moon sights being taken at about 10^h G.M.T.

	SUN lower limb	SUN upper limb	MOON lower limb	MOON upper limb	VENUS	*Polaris*
	° ′	° ′	° ′	° ′	° ′	° ′
Sextant altitude	21 19·7	3 20·2	33 27·6	26 06·7	4 32·6	49 36·5
Dip, height 5·4 metres (18 feet)	−4·1	−4·1	−4·1	−4·1	−4·1	−4·1
Main correction	+13·8	−29·6	+57·4	+60·5	−10·8	−0·8
−30′ for upper limb (Moon)	—	—	—	−30·0	—	—
L, U correction for Moon	—	—	+3·5	+2·8	—	—
Additional correction for Venus	—	—	—	—	+0·1	—
Additional refraction correction	−0·1	−0·3	0·0	−0·1	−0·3	0·0
Corrected sextant altitude	21 29·3	2 46·2	34 24·4	26 35·8	4 17·5	49 31·6

The main corrections have been taken out with apparent altitude (sextant altitude corrected for dip) as argument, interpolating where possible. These refinements are rarely necessary.

16. *Basis of the corrections.* The table for the dip of the sea horizon is based on the formula:

$$\text{Correction for dip} = -1'\cdot76\sqrt{(\text{height of eye in metres})} = -0'\cdot97\sqrt{(\text{height of eye in feet})}$$

The mean refraction, given explicitly in the correction table for the stars and planets and incorporated into those for the Sun and Moon, is based on Garfinkel's theory and is for a temperature of 10°C. (50°F.) and a pressure of 1010 mb. (29·83 inches). The additional corrections for variations of temperature and pressure from these adopted means are also based on Garfinkel's theory; there is no significant difference between the various theories to the accuracy given.

The correction table for the Sun includes the effects of semi-diameter and parallax, as well as the mean refraction; no correction for irradiation is included.

The additional corrections for Venus and Mars allow for parallax and phase, and are given by $p \cos H - k \cos\theta$, where H is the altitude, θ the angle at the planet between the vertical and the Sun: p and k are, for Venus, for 1981:

	Jan. 1	Sept. 30	Nov. 21	Dec. 15	Dec. 30	Dec. 31
	′	′	′	′	′	′
p	0·1	0·2	0·3	0·4	0·5	
k	0·0	0·1	0·2	0·3	0·4	

The corrections given on page A2, and on the bookmark, are mean values applicable, in the case of Venus, only when the Sun is below the horizon. For daylight observations of Venus the observed values of H and θ should be used to calculate the correction directly; the term $-k \cos \theta$ is positive when the Sun is lower than Venus, zero when they have the same altitude, and negative when the Sun is higher.

In the case of the Moon the correction table includes the effects of semi-diameter, parallax and augmentation as well as the mean refraction; no correction for irradiation is included.

17. *Bubble sextant observations.* When observing with a bubble sextant no correction is necessary for dip, semi-diameter, or augmentation. For the stars and planets the corrections given may be used unchanged, and they should also be used for the Sun; for the Moon it is easiest to take the mean of the corrections for lower and upper limbs and subtract 15′ from the altitude; the correction for dip must not be applied.

AUXILIARY AND PLANNING DATA

18. *Sun and Moon.* On the daily pages are given: the semi-diameters and the times of meridian passage of both Sun and Moon over the Greenwich meridian; the equation of time; the horizontal parallax and the age of the Moon, together with a symbol indicating the phase. For the Moon, the semi-diameters for each of the three days are given, in order, at the foot of the column; for the Sun a single value is sufficient. The equation of time is given, without sign, for 00^h and 12^h G.M.T. on each day. To obtain apparent time, apply the equation of time to mean time with a *positive* sign when G.H.A. Sun at 00^h G.M.T. *exceeds* $180°$, or at 12^h *exceeds* $0°$, corresponding to a meridian passage of the Sun *before* 12^h G.M.T.; *otherwise* apply with a *negative* sign.

The times of the phases of the Moon are given in G.M.T. on page 4.

19. *Planets.* The magnitudes of the planets are given immediately following their names in the headings on the daily pages; also given, for the middle day of the three on the page, are their S.H.A. at 00^h G.M.T. and their times of meridian passage.

The planet notes and diagram on pages 8 and 9 provide descriptive information as to the suitability of the planets for observation during the year, and of their positions and movements.

20. *Stars.* The time of meridian passage of the first point of Aries over the Greenwich meridian is given on the daily pages, for the middle day of the three on the page, to $0^m \cdot 1$. The interval between successive meridian passages is $23^h\ 56^m \cdot 1$ (24^h less $3^m \cdot 9$) so that times for intermediate days and other meridians can readily be derived. If a precise time is required it may be obtained by finding the G.M.T. at which L.H.A. Aries is zero.

The meridian passage of a star occurs when its L.H.A. is zero, that is when L.H.A. Aries + S.H.A. = $360°$. An approximate time can be obtained from the planet diagram on page 9.

The star charts on pages 266 and 267 are intended to assist identification. They show the relative positions of the stars in the sky as seen from the Earth and include all 173 stars used in the Almanac, together with a few others to complete the main constellation configurations. The local meridian at any time may be located on the chart by means of its S.H.A. which is $360°$ – L.H.A. Aries, or west longitude – G.H.A. Aries.

21. *Star globe.* To set a star globe on which is printed a scale of L.H.A. Aries, first set the globe for latitude and then rotate about the polar axis until the scale under the edge of the meridian circle reads L.H.A. Aries.

To mark the positions of the Sun, Moon, and planets on the star globe, take the difference G.H.A. Aries – G.H.A. body and use this along the L.H.A. Aries scale, in conjunction with the declination, to plot the position. G.H.A. Aries – G.H.A. body is most conveniently found by taking the difference when the G.H.A. of the body is small (less than $15°$), which happens once a day.

22. *Calendar.* On page 4 are given lists of ecclesiastical festivals, and of the principal anniversaries and holidays in the United Kingdom and the United States of America. The calendar on page 5 includes the day of the year as well as the day of the week.

Brief particulars are given, at the foot of page 5, of the solar and lunar eclipses occurring during the year; the times given are in G.M.T. The principal features of the more important solar eclipses are shown on the maps on pages 6 and 7.

23. *Standard times.* The lists on pages 262–265 give the standard times used in most countries. In general no attempt is made to give details of the beginning and end of summer time, since they are liable to frequent changes at short notice.

The Date or Calendar Line is an arbitrary line, on either side of which the date differs by one day; when crossing this line on a westerly course, the date must be advanced one day; when crossing it on an easterly course, the date must be put back one day. The line is a modification of the line of the 180th meridian, and is drawn so as to include, as far as possible, islands of any one group, etc., on the same side of the line. It may be traced by starting at the South Pole and joining up to the following positions:

Lat.	S. 51°·0	S. 45°·0	S. 15°·0	S. 5°·0	N. 48°·0	N. 53°·0	N. 65°·5
Long.	180°·0	W. 172°·5	W. 172°·5	180°·0	180°·0	E. 170°·0	W. 169°·0

thence through the middle of the Diomede Islands to Lat. N.68°·0, Long. W.169°·0, passing east of Ostrov Vrangelya (Wrangel Island) to Lat. N.75°·0, Long. 180°·0, and thence to the North Pole.

ACCURACY

24. *Main data.* The quantities tabulated in this Almanac are generally correct to the nearest 0′·1; the exception is the Sun's G.H.A. which is deliberately adjusted by up to 0′·15 to reduce the error due to ignoring the v-correction. The G.H.A. and Dec. at intermediate times cannot be obtained to this precision, since at least two quantities must be added; moreover, the v- and d-corrections are based on mean values of v and d and are taken from tables for the whole minute only. The largest error that can occur in the G.H.A. or Dec. of any body other than the Sun or Moon is less than 0′·2; it may reach 0′·25 for the G.H.A. of the Sun and 0′·3 for that of the Moon.

In practice it may be expected that only one third of the values of G.H.A. and Dec. taken out will have errors larger than 0′·05 and less than one-tenth will have errors larger than 0′·1.

25. *Altitude corrections.* The errors in the altitude corrections are nominally of the same order as those in G.H.A. and Dec., as they result from the addition of several quantities each correctly rounded off to 0′·1. But the actual values of the dip and of the refraction at low altitudes may, in extreme atmospheric conditions, differ considerably from the mean values used in the tables.

USE OF THIS ALMANAC IN 1982

This Almanac may be used for the Sun and stars in 1982 in the following manner.

For the Sun, take out the G.H.A. and Dec. for the same date but for a time $5^h\ 48^m\ 00^s$ *earlier* than the G.M.T. of observation; add 87° 00′ to the G.H.A. so obtained. The error, mainly due to planetary perturbations of the Earth, is unlikely to exceed 0′·4.

For the stars, calculate the G.H.A. and Dec. for the same date and the same time, but *subtract* 15′·1 from the G.H.A. so found. The error, due to incomplete correction for precession and nutation, is unlikely to exceed 0′·4. If preferred, the same result can be obtained by using a time $5^h\ 48^m\ 00^s$ earlier than the G.M.T. of observation (as for the Sun) and adding 86° 59′·2 to the G.H.A. (or adding 87° as for the Sun and subtracting 0′·8, for precession, from the S.H.A. of the star).

The Almanac cannot be so used for the Moon or planets.

LIST I—PLACES FAST ON G.M.T. (mainly those EAST OF GREENWICH)

The times given below should be *added* to G.M.T. to give Standard Time.
subtracted from Standard Time to give G.M.T.

	h	m
Admiralty Islands	10	
Afghanistan	04	30
Albania*	01	
Algeria*	01	
Amirante Islands	04	
Andaman Islands	05	30
Angola	01	
Annobon Island‡	01	
Arabian Emirates, Federation of	04	
Australia		
Australian Capital Territory*	10	
New South Wales[1]*	10	
Northern Territory	09	30
Queensland	10	
South Australia*	09	30
Tasmania*	10	
Victoria*	10	
Western Australia	08	
Austria	01	
Balearic Islands*	01	
Bangladesh	06	
Belgium*	01	
Benin (Dahomey)	01	
Botswana, Republic of	02	
Brunei	08	
Bulgaria	02	
Burma	06	30
Burundi	02	
Cambodia (Democratic Kampuchea)	07	
Cameroun Republic	01	
Caroline Islands, east of long. E. 160°	12	
west of long. E. 150°	10	
Truk, Ponape	11	
Central African Empire	01	
Chad	01	
Chagos Archipelago‡	06	
Chatham Islands‡	12	45
China[2]	08	
Christmas Island, Indian Ocean	07	
Cocos Keeling Islands	06	30
Comoro Islands (Comoros)	03	
Congo Republic	01	
Corsica‡*	01	
Crete*	02	
Cyprus, Ercan*	02	
Larnaca	02	
Czechoslovakia	01	
Denmark	01	
Djibouti	03	
Egypt (United Arab Republic)	02	
Equatorial Guinea, Republic of	01	
Estonia	03	
Ethiopia	03	
Fernando Póo‡	01	
Fiji	12	
Finland	02	
France*	01	
Friendly Islands	13	
Gabon	01	
Germany, East	01	
West[3]	01	
Gibraltar‡	01	
Gilbert Islands	12	
Greece*	02	
Guam*	10	
Holland (The Netherlands)*	01	
Hong Kong	08	
Hungary	01	
India	05	30
Indonesia, Republic of		
Bali, Bangka, Billiton, Java, Lombok, Madura, Sumatra	07	
Borneo, Celebes, Flores, Sumba, Sumbawa, Timor	08	
Aru, Kei, Moluccas, Tanimbar, Irian Jaya	09	
Iran‡*	04	
Iraq	03	
Israel	02	
Italy*	01	
Japan	09	
Jordan*	02	
Kamchatka Peninsula	12	
Kenya	03	
Korea, North	09	
Republic of (South)	09	
Kuril Islands	11	
Kuwait	03	
Laccadive Islands	05	30
Ladrone Islands	10	
Laos	07	
Latvia	03	
Lebanon*	02	

* Summer time may be kept in these countries.
‡ The legal time may differ from that given here.
[1] Except Broken Hill Area which keeps 09h 30m.
[2] All the coast, but some areas may keep summer time.
[3] Including West Berlin.

LIST I—(*continued*)

	h	m
Lesotho	02	
Libya‡	02	
Liechtenstein	01	
Lord Howe Island	10	
Luxembourg*	01	
Macao	08	
Madagascar, Democratic Republic of	03	
Malawi	02	
Malaysia		
Malaya	07	30
Sabah, Sarawak	08	
Maldives, Republic of The	05	
Malta*	01	
Manchuria	09	
Mariana Islands	10	
Marshall Islands[1]	12	
Mauritius	04	
Monaco*	01	
Mozambique	02	
Namibia (South West Africa)	02	
Nauru	11	30
Netherlands, The*	01	
New Caledonia*	11	
New Hebrides	11	
New Zealand*	12	
Nicobar Islands	05	30
Niger	01	
Nigeria, Republic of	01	
Norfolk Island	11	30
Norway	01	
Novaya Zemlya	05	
Ocean Island	11	30
Okinawa	09	
Oman	04	
Pakistan	05	
Papua New Guinea	10	
Pescadores Islands	08	
Philippine Republic	08	
Poland*	01	
Réunion	04	
Rhodesia	02	
Romania	02	
Rwanda	02	
Ryukyu Islands	09	
Sakhalin	11	
Santa Cruz Islands	11	
Sardinia*	01	
Saudi Arabia	03	
Schouten Islands	09	
Seychelles	04	
Sicily*	01	
Singapore	07	30
Socotra	03	
Solomon Islands	11	
Somalia Republic	03	
South Africa, Republic of	02	
Southern Yemen	03	
South West Africa (Namibia)	02	
Spain*	01	
Spanish Morocco*	01	
Spitsbergen (Svalbard)	01	
Sri Lanka	05	30
Sudan, Republic of	02	
Swaziland	02	
Sweden	01	
Switzerland	01	
Syria* (Syrian Arab Republic)	02	
Taiwan	08	
Tanzania	03	
Thailand	07	
Tonga Islands	13	
Truk	11	
Tunisia	01	
Turkey*	02	
Tuvalu Islands	12	
Uganda	03	
Union of Soviet Socialist Republics[2]		
west of long. E. 40°	03	
long. E. 40° to E. 52° 30′	04	
long. E. 52° 30′ to E. 67° 30′	05	
long. E. 67° 30′ to E. 82° 30′	06	
long. E. 82° 30′ to E. 97° 30′	07	
long. E. 97° 30′ to E. 112° 30′	08	
long. E. 112° 30′ to E. 127° 30′	09	
long. E. 127° 30′ to E. 142° 30′	10	
long. E. 142° 30′ to E. 157° 30′	11	
long. E. 157° 30′ to E. 172° 30′	12	
east of long. E. 172° 30′	13	
Vietnam, Northern	07	
Southern‡	07	
Wrangell Island	13	
Yugoslavia	01	
Zaire		
Kinshasa, Mbandaka	01	
Haut-Zaire, Kivu, Kasai, Shaba	02	
Zambia, Republic of	02	

* Summer time may be kept in these countries.
‡ The legal time may differ from that given here.
[1] Except the islands of Kwajalein and Eniwetok which keep a time 24^h slow on that of the rest of the islands.
[2] The boundaries between the zones are irregular; the longitudes given are approximate only.

LIST II—PLACES NORMALLY KEEPING G.M.T.

Ascension Island	Great Britain[1]	Irish Republic*	Morocco	Senegal
Canary Islands*	Guinea Bissau	Ivory Coast	Portugal*	Sierra Leone
Channel Islands[1]	Guinea Republic	Liberia	Principe	Tangier
Faeroes, The	Iceland	Madeira	Rio de Oro‡	Togo Republic
Gambia	Ifni	Mali	St. Helena	Tristan da Cunha
Ghana	Ireland, Northern[1]	Mauritania (Dakhla)	São Tomé	Upper Volta

* Summer time may be kept in these countries.
‡ The legal time may differ from that given here.
[1] Summer time, one hour in advance of G.M.T., is kept from March 22^{d} 02^{h} to October 25^{d} 02^{h} G.M.T.

LIST III—PLACES SLOW ON G.M.T. (WEST OF GREENWICH)

The times given below should be *subtracted* from G.M.T. to give Standard Time.
added to Standard Time to give G.M.T.

	h	m
Argentina‡	03	
Austral Islands[1]	10	
Azores	01	
Bahamas*	05	
Barbados*	04	
Belize	06	
Bermuda*	04	
Bolivia	04	
Brazil, eastern[2]	03	
Territory of Acre	05	
western	04	
British Antarctic Territory[3]	03	
Canada		
Alberta*	07	
British Columbia*	08	
Labrador*	04	
Manitoba*	06	
New Brunswick*	04	
Newfoundland*	03	30
Northwest Territories*		
east of long. W. 68°	04	
long. W. 68° to W. 85°	05	
long. W. 85° to W. 102°	06	
west of long. W. 102°	07	
Nova Scotia*	04	
Ontario*, east of long. W. 90°	05	
west of long. W. 90°	06	
Prince Edward Island*	04	
Quebec*, east of long. W. 63°	04	
west of long. W. 63°	05	
Saskatchewan*		
east of long. W. 106°	06	
west of long. W. 106°	07	
Yukon	08	

	h	m
Cape Verde Islands‡	01	
Cayman Islands	05	
Chile*	04	
Christmas Island, Pacific Ocean	10	
Colombia	05	
Cook Islands, except Niue	10	30
Costa Rica	06	
Cuba*	05	
Curaçao Island	04	
Dominican Republic‡	04	
Easter Island (I. de Pascua)*	07	
Ecuador	05	
Falkland Islands[4]	04	
Fanning Island	10	
Fernando de Noronha Island	02	
French Guiana‡	03	
Galápagos Islands	06	
Greenland, Scoresby Sound[5]	02	
Angmagssalik and west coast	03	
Thule area	04	
Grenada	04	
Guadeloupe	04	
Guatemala	06	
Guiana, French‡	03	
Guyana, Republic of‡	03	
Haiti	05	
Honduras	06	
Jamaica*	05	
Jan Mayen Island	01	
Johnston Island	10	

* Summer time may be kept in these countries.
‡ The legal time may differ from that given here.
[1] This is the legal standard time, but local mean time is generally used.
[2] Including all the coast and Brasilia.
[3] Except South Georgia which keeps 02^{h}.
[4] Except Port Stanley which keeps 03^{h}‡.
[5] Scoresby Sound may keep 03^{h} in summer.

LIST III—(*continued*)

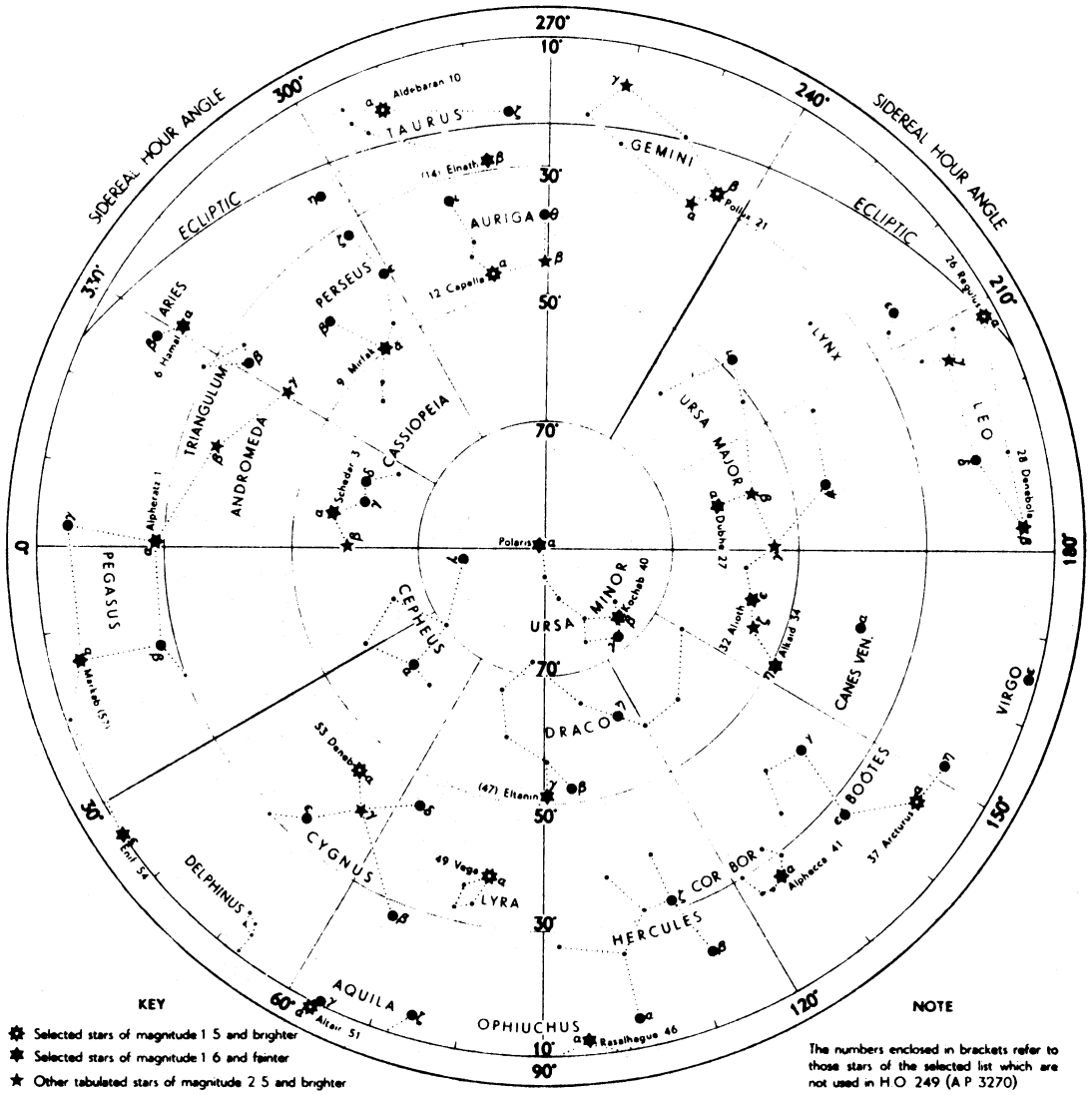
	h	m
Juan Fernandez Islands	04	
Leeward Islands	04	
Low Archipelago	10	
Marquesas Islands[1]	09	30
Martinique	04	
Mexico‡*[2]	06	
Midway Islands	11	
Miquelon	03	
Nicaragua‡	06	
Niue Island	11	
Panama Canal Zone	05	
Panama, Republic of	05	
Paraguay*	04	
Peru	05	
Puerto Rico	04	
Rarotonga	10	30
St. Pierre and Miquelon*	04	
Salvador, El	06	
Samoa	11	
Society Islands[1]	10	
South Georgia	02	
Surinam	03	30
Tobago	04	
Trindade Island, South Atlantic	02	
Trinidad	04	
Tuamotu Archipelago[1]	10	
Tubuai Islands[1]	10	
Turks and Caicos Islands*	05	
United States of America		
Alabama[3]	06	
Alaska[3], east of long. W. 137°	08	
long. W. 137° to W. 141°	09	
long. W. 141° to W. 161°	10	
long. W. 161° to W. 172° 30′	11	
Aleutian Islands	11	
Arizona	07	
Arkansas[3]	06	
California[3]	08	
Colorado[3]	07	
Connecticut[3]	05	
Delaware[3]	05	
District of Columbia[3]	05	
Florida[3, 4]	05	

	h
United States of America (*continued*)	
Georgia[3]	05
Hawaii	10
Idaho[3, 4]	07
Illinois[3]	06
Indiana[4]	05
Iowa[3]	06
Kansas[3, 4]	06
Kentucky[3, 4]	05
Louisiana[3]	06
Maine[3]	05
Maryland[3]	05
Massachusetts[3]	05
Michigan[3, 4]	05
Minnesota[3]	06
Mississippi[3]	06
Missouri[3]	06
Montana[3]	07
Nebraska[3, 4]	06
Nevada[3]	08
New Hampshire[3]	05
New Jersey[3]	05
New Mexico[3]	07
New York[3]	05
North Carolina[3]	05
North Dakota[3, 4]	06
Ohio[3]	05
Oklahoma[3]	06
Oregon[3, 4]	08
Pennsylvania[3]	05
Rhode Island[3]	05
South Carolina[3]	05
South Dakota[3], eastern part	06
western part	07
Tennessee[3, 4]	06
Texas[3, 4]	06
Utah[3]	07
Vermont[3]	05
Virginia[3]	05
Washington, D.C.[3]	05
Washington[3]	08
West Virginia[3]	05
Wisconsin[3]	06
Wyoming[3]	07
Uruguay	03
Venezuela‡	04
Virgin Islands	04
Windward Islands	04

* Summer time may be kept in these countries.
‡ The legal time may differ from that given here.
[1] This is the legal standard time, but local mean time is generally used.
[2] Except the states of Sonora, Sinaloa, Nayarit, and the Southern District of Lower California which keep 07^h, and the Northern District of Lower California which keeps 08^h.
[3] Summer (daylight-saving) time, one hour fast on the time given, is kept in these states from the last Sunday in April to the last Sunday in October, changing at $02^h\ 00^m$ local clock time.
[4] This applies to the greater portion of the state.

STAR CHARTS

NORTHERN STARS



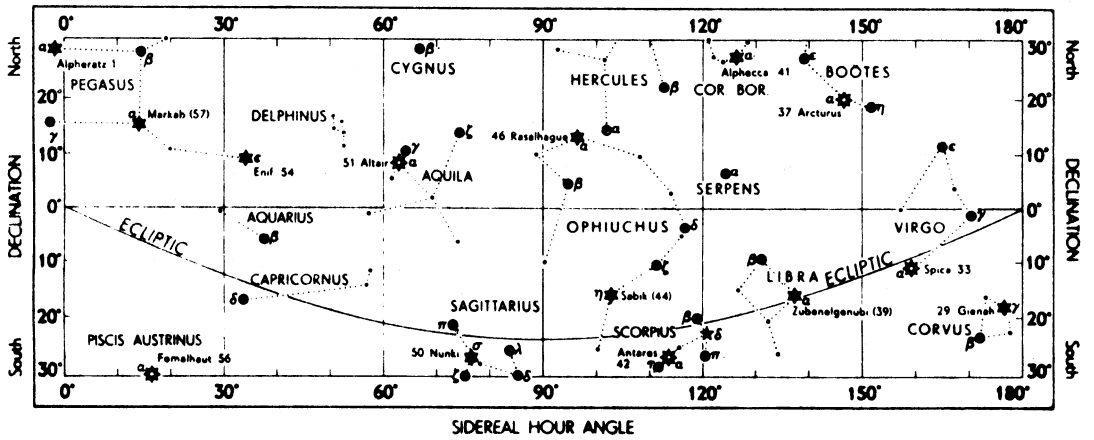
KEY

- Selected stars of magnitude 1·5 and brighter
- Selected stars of magnitude 1·6 and fainter
- ★ Other tabulated stars of magnitude 2·5 and brighter
- ● Other tabulated stars of magnitude 2·6 and fainter
- · Untabulated stars

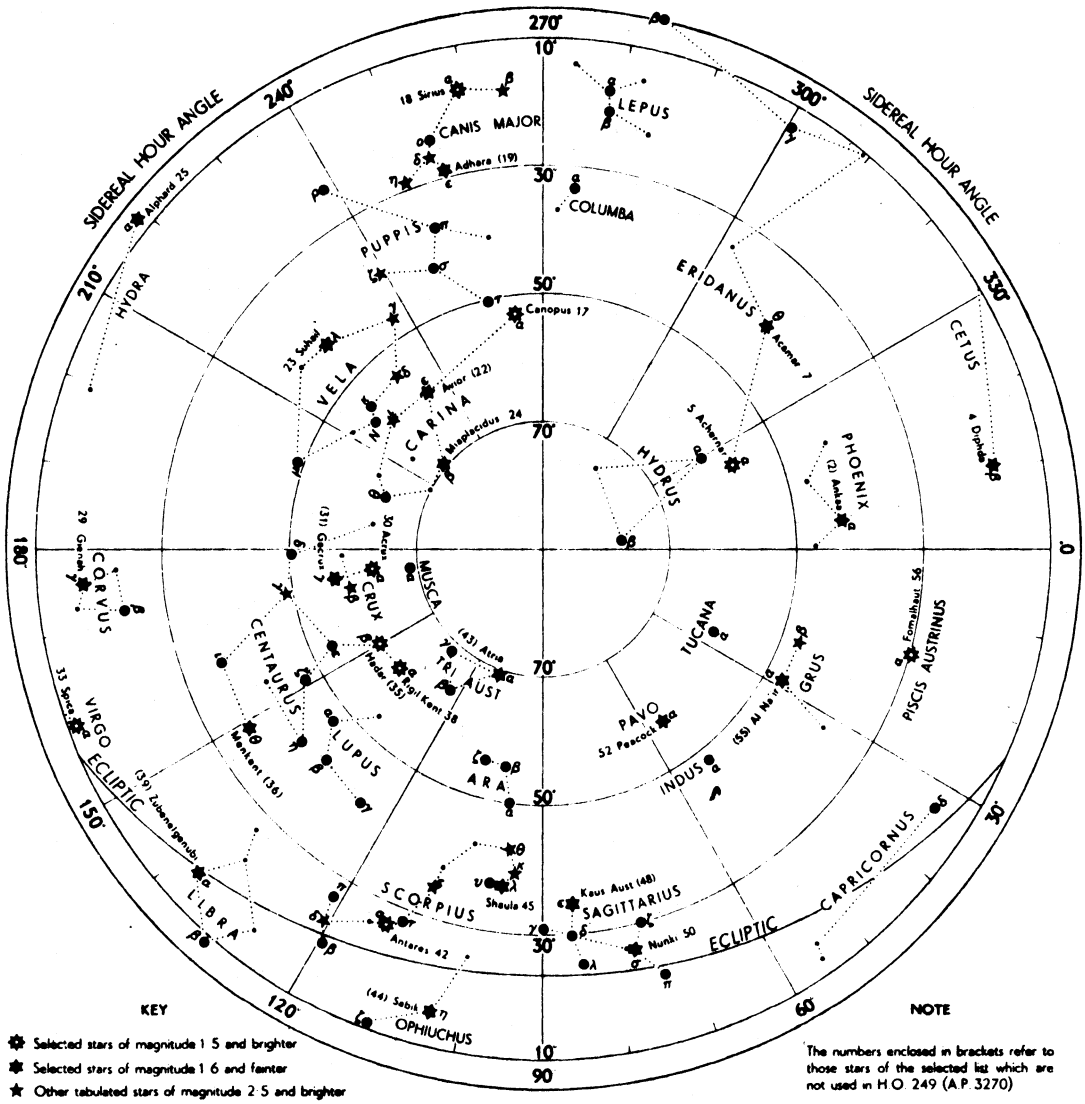
NOTE

The numbers enclosed in brackets refer to those stars of the selected list which are not used in H.O. 249 (A.P. 3270).

EQUATORIAL STARS (S.H.A. 0° to 180°)



SOUTHERN STARS



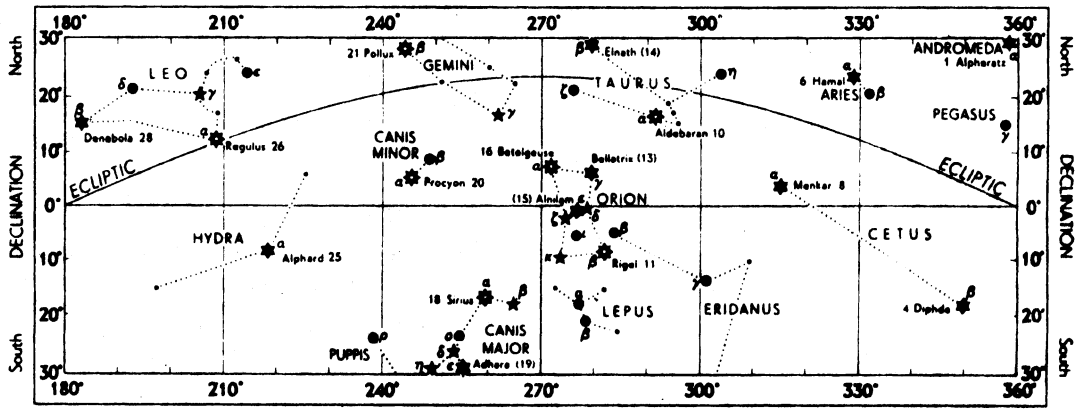
KEY

- Selected stars of magnitude 1·5 and brighter
- Selected stars of magnitude 1·6 and fainter
- Other tabulated stars of magnitude 2·5 and brighter
- Other tabulated stars of magnitude 2·6 and fainter
- Untabulated stars

NOTE

The numbers enclosed in brackets refer to those stars of the selected list which are not used in H.O. 249 (A.P. 3270)

EQUATORIAL STARS (S.H.A. 180° to 360°)



Mag.	Name and Number		S.H.A. JAN.	FEB.	MAR.	APR.	MAY	JUNE	Dec.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
			° ′	′	′	′	′	′	°	′	′	′	′	′	′
3·4	γ Cephei		5 22·1	22·6	22·8	22·5	22·0	21·2	N. 77	31·8	31·7	31·5	31·4	31·3	31·3
2·6	α Pegasi	57	14 03·1	03·2	03·2	03·0	02·9	02·6	N. 15	06·1	06·1	06·0	06·0	06·1	06·1
2·6	β Pegasi		14 17·6	17·6	17·6	17·5	17·3	17·0	N. 27	58·8	58·7	58·6	58·6	58·6	58·7
1·3	α Piscis Aust.	56	15 51·4	51·5	51·4	51·3	51·1	50·8	S. 29	43·6	43·6	43·5	43·4	43·3	43·2
2·2	β Gruis		19 37·6	37·6	37·5	37·3	37·1	36·8	S. 46	59·3	59·2	59·1	59·0	58·8	58·8
2·9	α Tucanæ		25 42·7	42·7	42·6	42·4	42·0	41·6	S. 60	21·5	21·4	21·2	21·1	21·0	20·9
2·2	α Gruis	55	28 15·1	15·1	15·0	14·7	14·5	14·1	S. 47	03·4	03·3	03·2	03·1	03·0	02·9
3·0	δ Capricorni		33 30·6	30·6	30·5	30·3	30·1	29·8	S. 16	12·9	12·9	12·9	12·8	12·8	12·7
2·5	ε Pegasi	54	34 11·6	11·6	11·5	11·4	11·2	10·9	N. 9	47·2	47·2	47·1	47·1	47·2	47·3
3·1	β Aquarii		37 22·1	22·1	21·9	21·8	21·6	21·3	S. 5	39·4	39·4	39·4	39·4	39·3	39·2
2·6	α Cephei		40 28·7	28·7	28·6	28·3	27·9	27·5	N. 62	30·4	30·3	30·1	30·0	30·0	30·1
2·6	ε Cygni		48 38·8	38·8	38·7	38·4	38·2	38·0	N. 33	54·0	53·8	53·7	53·7	53·7	53·9
1·3	α Cygni	53	49 48·8	48·7	48·6	48·3	48·0	47·8	N. 45	12·8	12·6	12·5	12·5	12·5	12·6
3·2	α Indi		50 57·2	57·1	56·9	56·6	56·3	56·0	S. 47	21·6	21·5	21·4	21·3	21·3	21·3
2·1	α Pavonis	52	53 58·7	58·5	58·3	57·9	57·5	57·2	S. 56	47·9	47·8	47·7	47·6	47·5	47·5
2·3	γ Cygni		54 37·3	37·2	37·1	36·9	36·6	36·4	N. 40	11·8	11·6	11·5	11·5	11·5	11·7
0·9	α Aquilæ	51	62 32·7	32·5	32·4	32·2	32·0	31·8	N. 8	49·1	49·0	48·9	48·9	49·0	49·1
2·8	γ Aquilæ		63 40·1	40·0	39·9	39·7	39·5	39·3	N. 10	34·0	33·9	33·9	33·9	33·9	34·0
3·0	δ Cygni		63 54·8	54·7	54·5	54·3	54·0	53·8	N. 45	05·1	04·9	04·8	04·8	04·9	05·0
3·2	β Cygni		67 31·2	31·1	30·9	30·7	30·4	30·2	N. 27	55·2	55·0	55·0	55·0	55·0	55·2
3·0	π Sagittarii		72 51·1	50·9	50·7	50·5	50·2	50·0	S. 21	03·3	03·3	03·2	03·2	03·2	03·2
3·0	ζ Aquilæ		73 52·4	52·3	52·1	51·9	51·7	51·5	N. 13	50·1	50·0	49·9	49·9	50·0	50·1
2·7	ζ Sagittarii		74 39·6	39·4	39·2	38·9	38·7	38·5	S. 29	54·5	54·4	54·4	54·4	54·4	54·4
2·1	σ Sagittarii	50	76 29·3	29·1	28·9	28·6	28·4	28·2	S. 26	19·2	19·2	19·2	19·2	19·2	19·1
0·1	α Lyræ	49	80 56·1	55·9	55·7	55·5	55·2	55·1	N. 38	45·9	45·8	45·7	45·7	45·8	46·0
2·9	λ Sagittarii		83 18·6	18·4	18·2	17·9	17·7	17·5	S. 25	25·9	25·9	25·9	25·9	25·9	25·9
2·0	ε Sagittarii	48	84 16·9	16·7	16·5	16·2	16·0	15·8	S. 34	23·6	23·6	23·5	23·5	23·5	23·6
2·8	δ Sagittarii		85 03·9	03·7	03·5	03·2	03·0	02·8	S. 29	50·1	50·1	50·1	50·1	50·1	50·1
3·1	γ Sagittarii		88 51·8	51·6	51·3	51·1	50·8	50·7	S. 30	25·4	25·4	25·4	25·4	25·4	25·4
2·4	γ Draconis	47	90 58·1	57·9	57·6	57·3	57·1	57·0	N. 51	29·4	29·3	29·2	29·2	29·3	29·5
2·9	β Ophiuchi		94 22·5	22·3	22·1	21·9	21·7	21·6	N. 4	34·5	34·4	34·4	34·4	34·5	34·5
2·5	κ Scorpii		94 43·0	42·8	42·5	42·2	42·0	41·8	S. 39	01·1	01·1	01·1	01·1	01·2	01·2
2·0	θ Scorpii		96 01·3	01·1	00·8	00·5	00·3	00·1	S. 42	59·0	59·0	59·0	59·0	59·1	59·1
2·1	α Ophiuchi	46	96 29·7	29·5	29·3	29·1	28·9	28·8	N. 12	34·4	34·3	34·3	34·3	34·4	34·5
1·7	λ Scorpii	45	96 55·8	55·6	55·3	55·0	54·8	54·7	S. 37	05·3	05·3	05·3	05·3	05·4	05·4
3·0	α Aræ		97 25·1	24·8	24·5	24·2	23·9	23·7	S. 49	51·5	51·5	51·5	51·5	51·6	51·7
3·0	β Draconis		97 30·6	30·3	30·0	29·7	29·5	29·4	N. 52	18·8	18·7	18·7	18·7	18·8	19·0
2·8	υ Scorpii		97 38·5	38·3	38·0	37·7	37·5	37·4	S. 37	16·7	16·7	16·7	16·7	16·8	16·8
2·8	β Aræ		99 05·0	04·6	04·3	03·9	03·6	03·4	S. 55	30·6	30·5	30·5	30·6	30·7	30·7
Var.‡	α Herculis		101 33·7	33·5	33·3	33·1	32·9	32·9	N. 14	24·7	24·6	24·5	24·6	24·6	24·7
2·6	η Ophiuchi	44	102 41·2	40·9	40·7	40·5	40·3	40·2	S. 15	42·0	42·1	42·1	42·1	42·1	42·1
3·1	ζ Aræ		105 45·0	44·7	44·3	44·0	43·7	43·5	S. 55	57·4	57·4	57·4	57·5	57·6	57·7
2·4	ε Scorpii		107 46·5	46·3	46·0	45·8	45·6	45·5	S. 34	15·4	15·4	15·4	15·5	15·5	15·6
1·9	α Triang. Aust.	43	108 21·3	20·8	20·2	19·7	19·3	19·1	S. 68	59·4	59·3	59·4	59·4	59·5	59·7
3·0	ζ Herculis		109 51·9	51·7	51·4	51·2	51·1	51·0	N. 31	38·2	38·0	38·0	38·1	38·2	38·3
2·7	ζ Ophiuchi		110 58·8	58·5	58·3	58·1	58·0	57·9	S. 10	31·7	31·7	31·8	31·8	31·8	31·7
2·9	τ Scorpii		111 20·0	19·7	19·5	19·3	19·1	19·0	S. 28	10·5	10·5	10·5	10·6	10·6	10·6
2·8	β Herculis		112 39·4	39·2	38·9	38·7	38·6	38·5	N. 21	31·8	31·7	31·7	31·7	31·8	31·9
1·2	α Scorpii	42	112 56·8	56·6	56·4	56·1	56·0	55·9	S. 26	23·3	23·3	23·4	23·4	23·4	23·4
2·9	η Draconis		114 04·7	04·3	03·9	03·6	03·4	03·4	N. 61	33·3	33·2	33·2	33·3	33·4	33·6
3·0	δ Ophiuchi		116 40·2	39·9	39·7	39·5	39·4	39·3	S. 3	38·7	38·8	38·8	38·8	38·8	38·7
2·8	β Scorpii		118 55·4	55·2	55·0	54·8	54·6	54·6	S. 19	45·1	45·2	45·2	45·2	45·3	45·3
2·5	δ Scorpii		120 12·3	12·0	11·8	11·6	11·5	11·4	S. 22	33·9	34·0	34·0	34·1	34·1	34·1
3·0	π Scorpii		120 34·9	34·6	34·4	34·2	34·1	34·0	S. 26	03·4	03·5	03·5	03·6	03·6	03·6
3·0	β Trianguli Aust.		121 38·8	38·3	37·9	37·5	37·3	37·2	S. 63	22·1	22·1	22·1	22·2	22·4	22·5
2·8	α Serpentis		124 10·4	10·2	10·0	09·8	09·7	09·6	N. 6	29·1	29·0	29·0	29·0	29·1	29·1
2·3	α Coronæ Bor.	41	126 32·1	31·9	31·7	31·5	31·4	31·4	N. 26	46·6	46·5	46·5	46·6	46·7	46·8
3·0	γ Lupi		126 32·3	32·0	31·8	31·6	31·4	31·4	S. 41	06·0	06·0	06·1	06·2	06·2	06·3

‡3·0—3·7

Mag.	Name and Number		S.H.A. JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	Dec. JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
			° ′	′	′	′	′	′	° ′	′	′	′	′	′
3·4	γ Cephei		5 20·4	19·9	19·7	19·8	20·3	20·9	N. 77 31·4	31·5	31·7	31·9	32·1	32·1
2·6	*Markab*	57	14 02·4	02·2	02·2	02·2	02·3	02·4	N. 15 06·3	06·4	06·5	06·5	06·5	06·5
2·6	*Scheat*		14 16·8	16·6	16·6	16·6	16·7	16·8	N. 27 58·8	58·9	59·1	59·1	59·2	59·2
1·3	*Fomalhaut*	56	15 50·6	50·4	50·3	50·3	50·4	50·5	S. 29 43·1	43·1	43·2	43·2	43·3	43·3
2·2	β Gruis		19 36·5	36·3	36·2	36·3	36·4	36·6	S. 46 58·7	58·8	58·9	59·0	59·1	59·1
2·9	α Tucanæ		25 41·2	41·0	40·9	41·0	41·3	41·5	S. 60 21·0	21·0	21·2	21·3	21·3	21·3
2·2	*Al Na'ir*	55	28 13·9	13·7	13·6	13·7	13·9	14·0	S. 47 02·9	03·0	03·1	03·2	03·2	03·2
3·0	δ Capricorni		33 29·6	29·5	29·5	29·6	29·7	29·8	S. 16 12·6	12·6	12·6	12·6	12·7	12·7
2·5	*Enif*	54	34 10·7	10·6	10·6	10·7	10·8	10·9	N. 9 47·4	47·5	47·5	47·6	47·6	47·5
3·1	β Aquarii		37 21·1	21·0	21·0	21·1	21·2	21·3	S. 5 39·1	39·1	39·1	39·1	39·1	39·1
2·6	*Alderamin*		40 27·3	27·2	27·3	27·6	27·9	28·2	N. 62 30·3	30·5	30·6	30·8	30·8	30·8
2·6	ε Cygni		48 37·8	37·8	37·8	38·0	38·1	38·2	N. 33 54·0	54·2	54·3	54·3	54·3	54·3
1·3	*Deneb*	53	49 47·6	47·6	47·7	47·9	48·1	48·2	N. 45 12·8	13·0	13·1	13·2	13·2	13·1
3·2	α Indi		50 55·8	55·7	55·7	55·9	56·1	56·2	S. 47 21·3	21·4	21·5	21·5	21·5	21·5
2·1	*Peacock*	52	53 56·9	56·8	56·9	57·1	57·4	57·5	S. 56 47·6	47·7	47·8	47·9	47·9	47·8
2·3	γ Cygni		54 36·2	36·2	36·3	36·5	36·7	36·8	N. 40 11·8	12·0	12·1	12·2	12·1	12·1
0·9	*Altair*	51	62 31·6	31·6	31·7	31·8	31·9	32·0	N. 8 49·2	49·3	49·3	49·3	49·3	49·3
2·8	γ Aquilæ		63 39·1	39·1	39·2	39·3	39·4	39·5	N. 10 34·1	34·2	34·3	34·3	34·2	34·2
3·0	δ Cygni		63 53·7	53·7	53·8	54·0	54·2	54·4	N. 45 05·2	05·3	05·4	05·5	05·4	05·3
3·2	*Albireo*		67 30·1	30·1	30·3	30·4	30·6	30·6	N. 27 55·3	55·4	55·5	55·5	55·5	55·4
3·0	π Sagittarii		72 49·9	49·9	50·0	50·1	50·2	50·3	S. 21 03·1	03·2	03·2	03·2	03·2	03·2
3·0	ζ Aquilæ		73 51·4	51·4	51·6	51·7	51·8	51·8	N. 13 50·2	50·3	50·4	50·4	50·3	50·2
2·7	ζ Sagittarii		74 38·3	38·3	38·4	38·6	38·7	38·7	S. 29 54·4	54·4	54·4	54·5	54·5	54·4
2·1	*Nunki*	50	76 28·1	28·1	28·2	28·3	28·5	28·5	S. 26 19·2	19·2	19·2	19·2	19·2	19·2
0·1	*Vega*	49	80 55·0	55·1	55·3	55·5	55·6	55·7	N. 38 46·1	46·2	46·3	46·3	46·2	46·1
2·9	λ Sagittarii		83 17·5	17·5	17·6	17·7	17·8	17·8	S. 25 25·9	25·9	25·9	25·9	25·9	25·9
2·0	*Kaus Australis*	48	84 15·7	15·7	15·9	16·0	16·1	16·1	S. 34 23·6	23·6	23·7	23·7	23·7	23·6
2·8	δ Sagittarii		85 02·7	02·8	02·9	03·0	03·1	03·1	S. 29 50·2	50·2	50·2	50·2	50·2	50·2
3·1	γ Sagittarii		88 50·6	50·6	50·8	50·9	51·0	51·0	S. 30 25·5	25·5	25·5	25·5	25·5	25·5
2·4	*Eltanin*	47	90 57·0	57·1	57·4	57·6	57·8	57·9	N. 51 29·7	29·8	29·8	29·8	29·7	29·5
2·9	β Ophiuchi		94 21·5	21·6	21·7	21·8	21·9	21·9	N. 4 34·6	34·7	34·7	34·7	34·6	34·5
2·5	κ Scorpii		94 41·8	41·8	42·0	42·2	42·2	42·2	S. 39 01·3	01·3	01·3	01·3	01·3	01·2
2·0	θ Scorpii		96 00·0	00·1	00·3	00·5	00·5	00·5	S. 42 59·2	59·3	59·3	59·3	59·2	59·2
2·1	*Rasalhague*	46	96 28·8	28·8	28·9	29·1	29·2	29·1	N. 12 34·5	34·6	34·6	34·6	34·5	34·4
1·7	*Shaula*	45	96 54·6	54·7	54·8	55·0	55·1	55·0	S. 37 05·4	05·5	05·5	05·5	05·5	05·4
3·0	α Aræ		97 23·7	23·8	24·0	24·2	24·3	24·2	S. 49 51·8	51·8	51·9	51·8	51·8	51·7
3·0	β Draconis		97 29·4	29·6	29·9	30·1	30·3	30·3	N. 52 19·1	19·2	19·3	19·2	19·1	18·9
2·8	υ Scorpii		97 37·3	37·4	37·5	37·7	37·8	37·7	S. 37 16·9	16·9	17·0	16·9	16·9	16·9
2·8	β Aræ		99 03·4	03·5	03·7	04·0	04·1	04·0	S. 55 30·8	30·9	30·9	30·9	30·8	30·7
Var.‡	α Herculis		101 32·8	32·9	33·0	33·2	33·3	33·2	N. 14 24·8	24·9	24·9	24·9	24·8	24·7
2·6	*Sabik*	44	102 40·2	40·3	40·4	40·5	40·6	40·5	S. 15 42·1	42·1	42·1	42·1	42·1	42·1
3·1	ζ Aræ		105 43·5	43·7	43·9	44·1	44·2	44·1	S. 55 57·8	57·8	57·9	57·8	57·7	57·6
2·4	ε Scorpii		107 45·5	45·6	45·7	45·9	45·9	45·8	S. 34 15·6	15·6	15·6	15·6	15·6	15·5
1·9	*Atria*	43	108 19·2	19·4	19·8	20·2	20·4	20·2	S. 68 59·8	59·9	59·9	59·8	59·7	59·6
3·0	ζ Herculis		109 51·0	51·2	51·3	51·5	51·6	51·5	N. 31 38·4	38·5	38·5	38·4	38·3	38·2
2·7	ζ Ophiuchi		110 57·9	58·0	58·1	58·2	58·2	58·2	S. 10 31·7	31·7	31·7	31·7	31·7	31·8
2·9	τ Scorpii		111 19·0	19·1	19·2	19·4	19·4	19·3	S. 28 10·7	10·7	10·7	10·7	10·6	10·6
2·8	β Herculis		112 38·6	38·7	38·8	38·9	39·0	38·9	N. 21 32·0	32·0	32·1	32·0	31·9	31·8
1·2	*Antares*	42	112 55·9	56·0	56·1	56·2	56·3	56·2	S. 26 23·5	23·5	23·5	23·4	23·4	23·4
2·9	η Draconis		114 03·6	03·9	04·2	04·5	04·7	04·7	N. 61 33·7	33·8	33·8	33·7	33·5	33·3
3·0	δ Ophiuchi		116 39·4	39·4	39·6	39·7	39·7	39·6	S. 3 38·7	38·7	38·7	38·7	38·7	38·8
2·8	β Scorpii		118 54·6	54·7	54·8	54·9	54·9	54·8	S. 19 45·3	45·3	45·2	45·2	45·2	45·2
2·5	*Dschubba*		120 11·4	11·5	11·7	11·8	11·8	11·7	S. 22 34·1	34·1	34·1	34·1	34·1	34·1
3·0	π Scorpii		120 34·0	34·1	34·3	34·4	34·4	34·3	S. 26 03·7	03·7	03·6	03·6	03·6	03·6
3·0	β Trianguli Aust.		121 37·3	37·5	37·8	38·1	38·1	37·9	S. 63 22·6	22·6	22·6	22·5	22·4	22·3
2·8	α Serpentis		124 09·7	09·8	09·9	10·0	10·0	09·9	N. 6 29·2	29·2	29·2	29·2	29·1	29·0
2·3	*Alphecca*	41	126 31·4	31·6	31·7	31·8	31·8	31·7	N. 26 46·9	46·9	46·9	46·8	46·7	46·5
3·0	γ Lupi		126 31·4	31·6	31·7	31·8	31·8	31·7	S. 41 06·4	06·4	06·3	06·3	06·2	06·2

‡ 3·0—3·7

Mag.	Name and Number		S.H.A.							Dec.						
				JAN.	FEB.	MAR.	APR.	MAY	JUNE		JAN.	FEB.	MAR.	APR.	MAY	JUNE
			°	′	′	′	′	′	′	°	′	′	′	′	′	′
3·1	γ Ursæ Minoris		129	49·5	48·9	48·4	48·0	47·9	48·1	N. 71	53·9	53·9	53·9	54·0	54·2	54·3
3·1	γ Trianguli Aust.		130	43·8	43·2	42·7	42·3	42·1	42·1	S. 68	36·2	36·3	36·4	36·5	36·6	36·8
2·7	β Libræ		130	60·6	60·3	60·1	60·0	59·9	59·9	S. 9	18·7	18·8	18·8	18·9	18·8	18·8
2·8	β Lupi		135	41·1	40·8	40·5	40·3	40·2	40·2	S. 43	03·2	03·3	03·4	03·5	03·6	03·6
2·2	β Ursæ Minoris	40	137	19·5	18·8	18·3	17·9	17·9	18·1	N. 74	13·8	13·7	13·8	13·9	14·1	14·2
2·9	α Libræ	39	137	32·9	32·7	32·5	32·3	32·2	32·2	S. 15	57·7	57·7	57·8	57·8	57·9	57·9
2·6	ε Bootis		138	58·0	57·7	57·5	57·3	57·3	57·3	N. 27	09·1	09·1	09·1	09·1	09·2	09·3
2·9	α Lupi		139	50·4	50·1	49·8	49·6	49·5	49·5	S. 47	18·1	18·2	18·3	18·4	18·5	18·6
0·1	α Centauri	38	140	25·7	25·3	24·9	24·7	24·6	24·7	S. 60	45·0	45·1	45·2	45·3	45·5	45·6
2·6	η Centauri		141	25·8	25·5	25·3	25·1	25·0	25·1	S. 42	04·2	04·3	04·4	04·5	04·6	04·7
3·0	γ Bootis		142	10·6	10·3	10·1	10·0	09·9	10·0	N. 38	23·3	23·3	23·3	23·4	23·5	23·6
0·2	α Bootis	37	146	18·3	18·1	17·9	17·8	17·8	17·8	N. 19	16·8	16·7	16·7	16·8	16·8	16·9
2·3	θ Centauri	36	148	36·8	36·5	36·3	36·2	36·1	36·2	S. 36	16·4	16·5	16·6	16·7	16·7	16·8
0·9	β Centauri	35	149	23·1	22·7	22·4	22·2	22·1	22·2	S. 60	16·5	16·6	16·8	16·9	17·1	17·2
3·1	ζ Centauri		151	24·9	24·6	24·4	24·3	24·2	24·3	S. 47	11·4	11·5	11·6	11·8	11·9	11·9
2·8	η Bootis		151	33·5	33·3	33·1	33·0	33·0	33·0	N. 18	29·5	29·4	29·4	29·5	29·5	29·6
1·9	η Ursæ Majoris	34	153	18·4	18·1	17·8	17·7	17·7	17·8	N. 49	24·3	24·3	24·3	24·4	24·6	24·7
2·6	ε Centauri		155	20·0	19·6	19·4	19·2	19·2	19·3	S. 53	21·9	22·0	22·1	22·3	22·4	22·5
1·2	α Virginis	33	158	57·3	57·1	56·9	56·8	56·8	56·9	S. 11	03·6	03·7	03·8	03·8	03·9	03·8
2·2	ζ Ursæ Majoris		159	12·8	12·5	12·2	12·1	12·2	12·3	N. 55	01·2	01·2	01·3	01·4	01·6	01·7
2·9	ι Centauri		160	07·2	07·0	06·8	06·7	06·7	06·8	S. 36	36·5	36·6	36·7	36·8	36·9	37·0
3·0	ε Virginis		164	41·7	41·5	41·3	41·3	41·3	41·3	N. 11	03·6	03·6	03·5	03·6	03·6	03·7
2·9	α Canum Venat.		166	13·1	12·8	12·6	12·6	12·6	12·7	N. 38	25·1	25·1	25·1	25·2	25·3	25·4
1·7	ε Ursæ Majoris	32	166	42·3	41·9	41·7	41·6	41·7	41·9	N. 56	03·5	03·6	03·6	03·8	03·9	04·0
1·5	β Crucis		168	20·8	20·5	20·3	20·2	20·3	20·5	S. 59	34·8	34·9	35·0	35·2	35·3	35·4
2·9	γ Virginis		169	49·7	49·4	49·3	49·3	49·3	49·4	S. 1	20·7	20·8	20·8	20·8	20·8	20·8
2·4	γ Centauri		169	53·0	52·7	52·6	52·5	52·6	52·7	S. 48	51·0	51·2	51·3	51·5	51·6	51·6
2·9	α Muscæ		170	59·1	58·7	58·4	58·4	58·5	58·8	S. 69	01·5	01·6	01·8	02·0	02·1	02·2
2·8	β Corvi		171	39·2	39·0	38·9	38·9	38·9	39·0	S. 23	17·3	17·5	17·6	17·6	17·7	17·7
1·6	γ Crucis	31	172	28·3	28·0	27·8	27·8	27·9	28·0	S. 57	00·1	00·2	00·4	00·6	00·7	00·7
1·1	α Crucis	30	173	36·7	36·4	36·2	36·1	36·3	36·5	S. 62	59·3	59·4	59·6	59·8	59·9	60·0
2·8	γ Corvi	29	176	17·6	17·4	17·3	17·3	17·3	17·4	S. 17	26·1	26·2	26·3	26·3	26·4	26·4
2·9	δ Centauri		178	09·3	09·1	08·9	08·9	09·0	09·2	S. 50	36·7	36·9	37·0	37·2	37·3	37·3
2·5	γ Ursæ Majoris		181	47·5	47·2	47·1	47·1	47·2	47·4	N. 53	47·8	47·8	47·9	48·1	48·2	48·2
2·2	β Leonis	28	182	58·7	58·5	58·4	58·4	58·4	58·5	N. 14	40·6	40·6	40·6	40·6	40·7	40·7
2·6	δ Leonis		191	43·5	43·3	43·3	43·3	43·4	43·5	N. 20	37·6	37·5	37·6	37·6	37·7	37·7
3·2	ψ Ursæ Majoris		192	51·0	50·8	50·7	50·8	50·9	51·0	N. 44	35·9	36·0	36·0	36·1	36·2	36·3
2·0	α Ursæ Majoris	27	194	21·5	21·2	21·1	21·2	21·4	21·7	N. 61	51·0	51·1	51·2	51·3	51·4	51·4
2·4	β Ursæ Majoris		194	49·4	49·2	49·1	49·2	49·3	49·6	N. 56	28·9	28·9	29·0	29·2	29·2	29·3
2·8	μ Velorum		198	30·4	30·3	30·2	30·3	30·5	30·7	S. 49	19·0	19·2	19·3	19·4	19·5	19·5
3·0	θ Carinæ		199	25·2	25·0	25·0	25·2	25·5	25·8	S. 64	17·4	17·6	17·8	18·0	18·0	18·1
2·3	γ Leonis		205	16·0	15·9	15·9	15·9	16·0	16·1	N. 19	56·2	56·2	56·2	56·2	56·3	56·3
1·3	α Leonis	26	208	09·5	09·4	09·4	09·4	09·5	09·6	N. 12	03·5	03·5	03·5	03·5	03·6	03·6
3·1	ε Leonis		213	48·3	48·2	48·2	48·3	48·4	48·5	N. 23	51·6	51·6	51·6	51·7	51·7	51·7
3·0	*N* Velorum		217	19·8	19·7	19·8	20·0	20·3	20·5	S. 56	56·9	57·1	57·3	57·4	57·4	57·4
2·2	α Hydræ	25	218	20·0	20·0	20·0	20·0	20·1	20·2	20·3	S. 8	34·6	34·7	34·7	34·8	34·7
2·6	κ Velorum		219	36·6	36·5	36·6	36·8	37·1	37·3	S. 54	55·7	55·9	56·0	56·1	56·1	56·1
2·2	ι Carinæ		220	50·6	50·6	50·7	50·9	51·2	51·5	S. 59	11·6	11·8	12·0	12·1	12·1	12·1
1·8	β Carinæ	24	221	44·0	43·9	44·1	44·5	45·0	45·4	S. 69	38·2	38·4	38·6	38·7	38·7	38·7
2·2	λ Velorum	23	223	10·2	10·1	10·2	10·4	10·5	10·7	S. 43	21·3	21·5	21·6	21·7	21·7	21·6
3·1	ι Ursæ Majoris		225	31·1	31·0	31·1	31·3	31·4	31·6	N. 48	06·9	06·9	07·0	07·1	07·1	07·1
2·0	δ Velorum		228	56·7	56·7	56·9	57·1	57·4	57·6	S. 54	38·3	38·5	38·6	38·7	38·7	38·6
1·7	ε Carinæ	22	234	27·4	27·5	27·6	27·9	28·2	28·5	S. 59	26·9	27·1	27·2	27·3	27·3	27·2
1·9	γ Velorum		237	45·3	45·4	45·5	45·7	45·9	46·1	S. 47	16·9	17·0	17·1	17·2	17·2	17·1
2·9	ρ Puppis		238	18·7	18·7	18·8	18·9	19·1	19·2	S. 24	15·0	15·1	15·2	15·2	15·2	15·1
2·3	ζ Puppis		239	15·9	15·9	16·0	16·2	16·4	16·5	S. 39	57·0	57·2	57·3	57·3	57·3	57·2
1·2	β Geminorum	21	243	57·5	57·5	57·6	57·7	57·8	57·9	N. 28	04·3	04·3	04·3	04·4	04·4	04·3
0·5	α Canis Minoris	20	245	25·2	25·2	25·3	25·4	25·5	25·6	N. 5	16·3	16·3	16·3	16·3	16·3	16·4

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				JULY	AUG.	SEPT.	OCT.	NOV.	DEC.		JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
			°	′	′	′	′	′	′	°	′	′	′	′	′	′
3·1	γ Ursæ Minoris		129	48·4	48·9	49·5	49·8	50·0	49·9	N. 71	54·4	54·4	54·4	54·2	54·0	53·8
3·1	γ Trianguli Aust.		130	42·3	42·6	43·0	43·3	43·3	43·0	S. 68	36·9	36·9	36·9	36·8	36·6	36·5
2·7	β Libræ		130	59·9	60·0	60·1	60·2	60·2	60·0	S. 9	18·8	18·8	18·8	18·8	18·8	18·9
2·8	β Lupi		135	40·3	40·4	40·6	40·7	40·7	40·5	S. 43	03·7	03·7	03·6	03·5	03·5	03·4
2·2	*Kochab*	40	137	18·6	19·2	19·7	20·1	20·2	20·0	N. 74	14·3	14·3	14·2	14·1	13·9	13·7
2·9	*Zubenelgenubi*	39	137	32·3	32·4	32·5	32·6	32·5	32·4	S. 15	57·9	57·8	57·8	57·8	57·8	57·8
2·6	ε Bootis		138	57·4	57·5	57·6	57·7	57·7	57·6	N. 27	09·4	09·4	09·4	09·3	09·2	09·0
2·9	α Lupi		139	49·6	49·8	50·0	50·1	50·0	49·8	S. 47	18·6	18·6	18·6	18·5	18·4	18·4
0·1	*Rigil Kent.*	38	140	24·9	25·1	25·4	25·5	25·5	25·2	S. 60	45·6	45·6	45·6	45·5	45·3	45·3
2·6	η Centauri		141	25·1	25·3	25·5	25·5	25·5	25·3	S. 42	04·7	04·7	04·6	04·5	04·5	04·5
3·0	γ Bootis		142	10·1	10·2	10·4	10·5	10·4	10·3	N. 38	23·7	23·7	23·6	23·5	23·4	23·2
0·2	*Arcturus*	37	146	17·9	18·0	18·1	18·1	18·1	17·9	N. 19	17·0	17·0	16·9	16·9	16·7	16·6
2·3	*Menkent*	36	148	36·3	36·4	36·5	36·6	36·5	36·3	S. 36	16·8	16·8	16·7	16·7	16·6	16·6
0·9	*Hadar*	35	149	22·4	22·7	22·9	23·0	22·9	22·6	S. 60	17·2	17·2	17·1	17·0	16·9	16·8
3·1	ζ Centauri		151	24·4	24·6	24·7	24·8	24·7	24·4	S. 47	12·0	11·9	11·9	11·8	11·7	11·7
2·8	η Bootis		151	33·1	33·2	33·3	33·3	33·3	33·1	N. 18	29·7	29·7	29·6	29·6	29·4	29·3
1·9	*Alkaid*	34	153	18·0	18·2	18·3	18·4	18·3	18·1	N. 49	24·7	24·7	24·6	24·5	24·3	24·1
2·6	ε Centauri		155	19·5	19·7	19·9	19·9	19·8	19·5	S. 53	22·5	22·5	22·4	22·3	22·2	22·1
1·2	*Spica*	33	158	56·9	57·0	57·1	57·1	57·0	56·8	S. 11	03·8	03·8	03·8	03·7	03·8	03·8
2·2	*Mizar*		159	12·5	12·7	12·9	12·9	12·8	12·6	N. 55	01·7	01·7	01·6	01·4	01·2	01·0
2·9	ι Centauri		160	06·9	07·0	07·1	07·1	07·0	06·7	S. 36	37·0	36·9	36·8	36·8	36·7	36·7
3·0	ε Virginis		164	41·4	41·5	41·6	41·5	41·4	41·2	N. 11	03·7	03·7	03·7	03·6	03·5	03·4
2·9	*Cor Caroli*		166	12·8	13·0	13·0	13·0	12·9	12·7	N. 38	25·4	25·4	25·3	25·2	25·0	24·9
1·7	*Alioth*	32	166	42·1	42·3	42·4	42·4	42·3	42·0	N. 56	04·0	03·9	03·8	03·7	03·5	03·3
1·5	*Mimosa*		168	20·7	20·9	21·1	21·1	20·9	20·5	S. 59	35·4	35·4	35·2	35·1	35·0	35·0
2·9	γ Virginis		169	49·4	49·5	49·6	49·5	49·4	49·2	S. 1	20·7	20·7	20·7	20·7	20·8	20·9
2·4	*Muhlifain*		169	52·9	53·0	53·1	53·1	52·9	52·6	S. 48	51·6	51·5	51·4	51·3	51·3	51·3
2·9	α Muscæ		170	59·2	59·5	59·8	59·7	59·4	59·0	S. 69	02·2	02·1	02·0	01·9	01·8	01·7
2·8	β Corvi		171	39·1	39·1	39·2	39·2	39·0	38·8	S. 23	17·7	17·6	17·5	17·5	17·5	17·6
1·6	*Gacrux*	31	172	28·2	28·4	28·6	28·5	28·3	28·0	S. 57	00·7	00·7	00·5	00·4	00·3	00·3
1·1	*Acrux*	30	173	36·8	37·0	37·2	37·1	36·9	36·5	S. 62	60·0	59·9	59·8	59·6	59·5	59·5
2·8	*Gienah*	29	176	17·5	17·6	17·6	17·6	17·4	17·2	S. 17	26·3	26·3	26·2	26·2	26·2	26·3
2·9	δ Centauri		178	09·3	09·5	09·6	09·5	09·3	09·0	S. 50	37·3	37·2	37·1	37·0	36·9	36·9
2·5	*Phecda*		181	47·6	47·7	47·8	47·7	47·4	47·1	N. 53	48·2	48·1	48·0	47·8	47·7	47·5
2·2	*Denebola*	28	182	58·6	58·7	58·7	58·6	58·4	58·2	N. 14	40·7	40·7	40·7	40·6	40·5	40·4
2·6	δ Leonis		191	43·5	43·6	43·6	43·5	43·3	43·0	N. 20	37·7	37·7	37·6	37·6	37·5	37·3
3·2	ψ Ursæ Majoris		192	51·1	51·2	51·2	51·1	50·8	50·5	N. 44	36·2	36·2	36·0	35·9	35·8	35·7
2·0	*Dubhe*	27	194	21·9	22·0	21·9	21·8	21·4	21·0	N. 61	51·4	51·3	51·1	50·9	50·8	50·7
2·4	*Merak*		194	49·7	49·8	49·8	49·6	49·3	48·9	N. 56	29·2	29·1	29·0	28·8	28·7	28·6
2·8	μ Velorum		198	30·8	30·9	30·9	30·8	30·5	30·2	S. 49	19·4	19·3	19·2	19·1	19·1	19·1
3·0	θ Carinæ		199	26·1	26·2	26·2	26·0	25·7	25·2	S. 64	18·0	17·9	17·7	17·6	17·5	17·6
2·3	*Algeiba*		205	16·2	16·2	16·1	16·0	15·7	15·5	N. 19	56·3	56·3	56·2	56·2	56·1	56·0
1·3	*Regulus*	26	208	09·7	09·7	09·6	09·4	09·2	09·0	N. 12	03·6	03·6	03·6	03·5	03·5	03·4
3·1	ε Leonis		213	48·5	48·5	48·4	48·2	48·0	47·7	N. 23	51·7	51·7	51·7	51·6	51·5	51·4
3·0	*N* Velorum		217	20·6	20·7	20·6	20·3	20·0	19·7	S. 56	57·3	57·1	57·0	56·9	56·9	57·0
2·2	*Alphard*	25	218	20·3	20·3	20·2	20·0	19·8	19·5	S. 8	34·6	34·6	34·5	34·5	34·6	34·7
2·6	κ Velorum		219	37·4	37·4	37·3	37·1	36·8	36·4	S. 54	56·0	55·8	55·7	55·6	55·6	55·7
2·2	ι Carinæ		220	51·6	51·7	51·6	51·3	50·9	50·6	S. 59	11·9	11·8	11·6	11·6	11·6	11·7
1·8	*Miaplacidus*	24	221	45·7	45·7	45·6	45·2	44·7	44·2	S. 69	38·6	38·4	38·3	38·2	38·2	38·3
2·2	*Suhail*	23	223	10·8	10·8	10·6	10·4	10·2	09·9	S. 43	21·5	21·4	21·2	21·2	21·2	21·3
3·1	ι Ursæ Majoris		225	31·6	31·5	31·3	31·1	30·7	30·4	N. 48	07·0	06·9	06·8	06·7	06·7	06·6
2·0	δ Velorum		228	57·7	57·7	57·5	57·2	56·9	56·6	S. 54	38·5	38·3	38·2	38·1	38·2	38·3
1·7	*Avior*	22	234	28·6	28·6	28·4	28·1	27·7	27·4	S. 59	27·1	26·9	26·7	26·7	26·7	26·9
1·9	γ Velorum		237	46·1	46·1	45·9	45·6	45·3	45·1	S. 47	16·9	16·8	16·7	16·6	16·7	16·8
2·9	ρ Puppis		238	19·2	19·1	18·9	18·7	18·5	18·3	S. 24	15·0	14·9	14·8	14·8	14·9	15·0
2·3	ζ Puppis		239	16·5	16·5	16·3	16·1	15·8	15·5	S. 39	57·1	56·9	56·8	56·8	56·8	57·0
1·2	*Pollux*	21	243	57·9	57·7	57·5	57·3	57·0	56·8	N. 28	04·3	04·3	04·3	04·2	04·2	04·2
0·5	*Procyon*	20	245	25·5	25·4	25·2	25·0	24·8	24·6	N. 5	16·4	16·4	16·5	16·4	16·4	16·3

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				JAN.	FEB.	MAR.	APR.	MAY	JUNE		JAN.	FEB.	MAR.	APR.	MAY	JUNE
			°	′	′	′	′	′	′	°	′	′	′	′	′	′
1·6	α Geminorum		246	39·0	39·0	39·1	39·2	39·4	39·4	N. 31	55·7	55·8	55·8	55·9	55·9	55·8
3·3	σ Puppis		247	50·2	50·2	50·4	50·6	50·8	50·9	S. 43	15·9	16·0	16·1	16·1	16·1	16·0
3·1	β Canis Minoris		248	28·0	28·0	28·1	28·2	28·3	28·4	N. 8	19·6	19·6	19·5	19·6	19·6	19·6
2·4	η Canis Majoris		249	09·6	09·6	09·7	09·9	10·0	10·1	S. 29	16·1	16·2	16·3	16·3	16·2	16·1
2·7	π Puppis		250	52·6	52·6	52·8	53·0	53·1	53·2	S. 37	03·9	04·0	04·1	04·1	04·1	04·0
2·0	δ Canis Majoris		253	05·5	05·5	05·6	05·8	05·9	06·0	S. 26	21·9	22·0	22·1	22·1	22·0	21·9
3·1	ο Canis Majoris		254	26·3	26·3	26·4	26·6	26·7	26·8	S. 23	48·4	48·6	48·6	48·6	48·6	48·5
1·6	ε Canis Majoris	19	255	31·6	31·6	31·7	31·9	32·0	32·1	S. 28	56·9	57·0	57·1	57·1	57·0	56·9
2·8	τ Puppis		257	37·6	37·7	37·9	38·1	38·4	38·5	S. 50	35·7	35·8	35·9	35·9	35·8	35·7
−1·6	α Canis Majoris	18	258	55·2	55·2	55·3	55·5	55·6	55·6	S. 16	41·6	41·7	41·7	41·7	41·6	41·5
1·9	γ Geminorum		260	50·6	50·7	50·8	50·9	51·0	51·0	N. 16	24·9	24·9	24·9	24·9	24·9	24·9
−0·9	α Carinæ	17	264	06·6	06·7	06·9	07·2	07·4	07·5	S. 52	41·3	41·4	41·5	41·5	41·4	41·3
2·0	β Canis Majoris		264	31·9	31·9	32·0	32·2	32·3	32·3	S. 17	56·9	57·0	57·1	57·0	57·0	56·9
2·7	θ Aurigæ		270	23·4	23·5	23·7	23·8	23·9	23·9	N. 37	12·7	12·7	12·7	12·7	12·7	12·7
2·1	β Aurigæ		270	27·8	27·9	28·0	28·2	28·3	28·3	N. 44	56·8	56·8	56·9	56·8	56·8	56·7
Var.‡	α Orionis	16	271	27·7	27·8	27·9	28·0	28·1	28·1	N. 7	24·1	24·1	24·1	24·1	24·1	24·2
2·2	κ Orionis		273	17·0	17·1	17·2	17·4	17·4	17·4	S. 9	40·7	40·8	40·8	40·8	40·7	40·6
1·9	ζ Orionis		275	02·9	02·9	03·1	03·2	03·3	03·2	S. 1	57·3	57·3	57·3	57·3	57·3	57·2
2·8	α Columbæ		275	15·4	15·5	15·6	15·8	15·9	15·9	S. 34	05·3	05·4	05·4	05·4	05·3	05·1
3·0	ζ Tauri		275	52·2	52·3	52·4	52·6	52·6	52·6	N. 21	07·8	07·8	07·8	07·8	07·8	07·8
1·8	ε Orionis	15	276	11·1	11·2	11·3	11·5	11·5	11·5	S. 1	13·0	13·0	13·0	13·0	13·0	12·9
2·9	ι Orionis		276	22·3	22·4	22·5	22·6	22·7	22·7	S. 5	55·5	55·5	55·5	55·5	55·5	55·4
2·7	α Leporis		277	01·5	01·6	01·7	01·8	01·9	01·9	S. 17	50·3	50·4	50·4	50·4	50·3	50·2
2·5	δ Orionis		277	14·4	14·4	14·5	14·7	14·7	14·7	S. 0	18·9	18·9	19·0	18·9	18·9	18·8
3·0	β Leporis		278	08·4	08·5	08·6	08·8	08·8	08·8	S. 20	46·7	46·7	46·8	46·7	46·6	46·5
1·8	β Tauri	14	278	43·5	43·6	43·7	43·9	43·9	43·9	N. 28	35·5	35·5	35·5	35·5	35·5	35·4
1·7	γ Orionis	13	278	58·2	58·3	58·4	58·5	58·6	58·6	N. 6	19·9	19·8	19·8	19·8	19·9	19·9
0·2	α Aurigæ	12	281	10·6	10·7	10·8	11·0	11·1	11·1	N. 45	58·8	58·8	58·8	58·8	58·8	58·7
0·3	β Orionis	11	281	35·5	35·6	35·7	35·9	35·9	35·9	S. 8	13·6	13·6	13·6	13·6	13·5	13·5
2·9	β Eridani		283	16·2	16·3	16·4	16·5	16·6	16·5	S. 5	06·8	06·8	06·9	06·8	06·8	06·7
2·9	ι Aurigæ		286	03·6	03·7	03·8	03·9	04·0	03·9	N. 33	08·2	08·2	08·2	08·2	08·1	08·1
1·1	α Tauri	10	291	17·5	17·6	17·7	17·8	17·9	17·8	N. 16	28·2	28·2	28·2	28·2	28·2	28·2
3·2	γ Eridani		300	42·8	42·9	43·1	43·2	43·2	43·1	S. 13	34·0	34·0	34·0	33·9	33·9	33·7
3·0	ε Persei		300	51·3	51·4	51·6	51·7	51·7	51·6	N. 39	57·4	57·4	57·4	57·3	57·3	57·2
2·9	ζ Persei		301	45·9	46·0	46·2	46·3	46·3	46·2	N. 31	49·7	49·7	49·6	49·6	49·6	49·5
3·0	η Tauri		303	24·7	24·8	24·9	25·0	25·0	24·9	N. 24	02·8	02·8	02·7	02·7	02·7	02·7
1·9	α Persei	9	309	15·5	15·7	15·9	16·0	16·0	15·8	N. 49	47·7	47·8	47·7	47·6	47·5	47·5
Var.§	β Persei		313	16·1	16·2	16·4	16·5	16·4	16·2	N. 40	53·0	53·0	53·0	52·9	52·9	52·8
2·8	α Ceti	8	314	40·8	40·9	41·0	41·0	41·0	40·9	N. 4	00·8	00·8	00·8	00·8	00·8	00·9
3·1	θ Eridani	7	315	36·9	37·1	37·3	37·4	37·3	37·2	S. 40	23·2	23·2	23·2	23·0	22·9	22·7
2·1	α Ursæ Minoris		326	42·6	53·3	61·9	66·2	63·7	56·1	N. 89	10·9	10·9	10·8	10·7	10·5	10·4
3·1	β Trianguli		327	53·9	54·1	54·2	54·2	54·1	53·9	N. 34	53·9	53·9	53·8	53·8	53·7	53·7
2·2	α Arietis	6	328	28·6	28·7	28·8	28·8	28·8	28·6	N. 23	22·4	22·3	22·3	22·2	22·2	22·3
2·2	γ Andromedæ		329	19·1	19·3	19·4	19·5	19·4	19·2	N. 42	14·4	14·4	14·3	14·2	14·2	14·2
3·0	α Hydri		330	27·6	27·9	28·1	28·2	28·2	27·9	S. 61	40·2	40·1	40·0	39·8	39·7	39·5
2·7	β Arietis		331	36·3	36·4	36·5	36·5	36·4	36·2	N. 20	42·9	42·9	42·8	42·8	42·8	42·8
0·6	α Eridani	5	335	45·1	45·4	45·5	45·6	45·5	45·2	S. 57	20·4	20·4	20·2	20·1	19·9	19·7
2·8	δ Cassiopeiæ		338	51·6	51·9	52·1	52·1	51·9	51·6	N. 60	08·4	08·3	08·2	08·1	08·0	08·0
2·4	β Andromedæ		342	50·2	50·3	50·4	50·4	50·3	50·0	N. 35	31·3	31·2	31·1	31·1	31·0	31·0
Var.‖	γ Cassiopeiæ		346	06·9	07·1	07·3	07·2	07·0	06·7	N. 60	37·0	37·0	36·8	36·7	36·6	36·6
2·2	β Ceti	4	349	20·7	20·8	20·9	20·8	20·7	20·5	S. 18	05·7	05·7	05·6	05·6	05·4	05·3
2·5	α Cassiopeiæ	3	350	08·9	09·1	09·2	09·1	08·9	08·6	N. 56	26·2	26·1	26·0	25·8	25·8	25·8
2·4	α Phœnicis	2	353	40·2	40·3	40·3	40·3	40·1	39·9	S. 42	24·9	24·8	24·7	24·6	24·4	24·3
2·9	β Hydri		353	49·4	50·0	50·2	50·1	49·7	48·9	S. 77	22·1	22·0	21·8	21·6	21·4	21·3
2·9	γ Pegasi		356	56·4	56·5	56·5	56·5	56·3	56·1	N. 15	04·6	04·6	04·5	04·5	04·6	04·6
2·4	β Cassiopeiæ		357	57·9	58·1	58·2	58·1	57·8	57·5	N. 59	02·9	02·8	02·6	02·5	02·4	02·5
2·2	α Andromedæ	1	358	09·2	09·3	09·3	09·3	09·1	08·9	N. 28	59·2	59·1	59·0	59·0	59·0	59·0

‡ 0·1—1·2 § 2·3—3·5 ‖ Irregular variable; 1978 mag. 2·7

Mag.	Name and Number		S.H.A.							Dec.						
				JULY	AUG.	SEPT.	OCT.	NOV.	DEC.		JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
			°	′	′	′	′	′	′	°	′	′	′	′	′	′
1·6	*Castor*		246	39·4	39·2	39·0	38·8	38·5	38·2	N. 31	55·8	55·8	55·7	55·7	55·7	55·6
3·3	σ Puppis		247	50·9	50·8	50·6	50·3	50·1	49·9	S. 43	15·8	15·7	15·6	15·5	15·6	15·8
3·1	β Canis Minoris		248	28·3	28·2	28·0	27·8	27·6	27·4	N. 8	19·7	19·7	19·7	19·7	19·6	19·6
2·4	η Canis Majoris		249	10·1	10·0	09·8	09·6	09·3	09·1	S. 29	16·0	15·9	15·8	15·8	15·8	16·0
2·7	π Puppis		250	53·2	53·1	52·9	52·7	52·4	52·2	S. 37	03·8	03·7	03·6	03·6	03·7	03·8
2·0	*Wezen*		253	05·9	05·8	05·6	05·4	05·2	05·0	S. 26	21·8	21·7	21·6	21·6	21·7	21·8
3·1	ο Canis Majoris		254	26·7	26·6	26·4	26·2	26·0	25·8	S. 23	48·3	48·2	48·1	48·1	48·2	48·3
1·6	*Adhara*	19	255	32·0	31·9	31·7	31·5	31·3	31·1	S. 28	56·8	56·6	56·6	56·6	56·6	56·8
2·8	τ Puppis		257	38·4	38·3	38·0	37·8	37·5	37·3	S. 50	35·5	35·4	35·3	35·3	35·4	35·5
−1·6	*Sirius*	18	258	55·5	55·4	55·2	55·0	54·8	54·6	S. 16	41·4	41·3	41·3	41·3	41·4	41·5
1·9	*Alhena*		260	50·9	50·8	50·5	50·3	50·1	49·9	N. 16	24·9	24·9	25·0	24·9	24·9	24·9
−0·9	*Canopus*	17	264	07·5	07·3	07·0	06·7	06·4	06·3	S. 52	41·1	40·9	40·8	40·9	41·0	41·1
2·0	*Mirzam*		264	32·2	32·1	31·9	31·7	31·5	31·3	S. 17	56·8	56·7	56·6	56·6	56·7	56·8
2·7	θ Aurigæ		270	23·8	23·5	23·3	23·0	22·7	22·6	N. 37	12·6	12·6	12·6	12·6	12·6	12·7
2·1	*Menkalinan*		270	28·2	27·9	27·6	27·3	27·0	26·8	N. 44	56·7	56·6	56·6	56·6	56·7	56·7
Var.‡	*Betelgeuse*	16	271	28·0	27·8	27·6	27·4	27·2	27·0	N. 7	24·2	24·3	24·3	24·3	24·3	24·2
2·2	κ Orionis		273	17·3	17·1	16·9	16·7	16·5	16·4	S. 9	40·5	40·5	40·4	40·4	40·5	40·6
1·9	*Alnitak*		275	03·1	02·9	02·7	02·5	02·3	02·2	S. 1	57·1	57·1	57·0	57·0	57·1	57·1
2·8	*Phact*		275	15·8	15·6	15·4	15·2	15·0	14·9	S. 34	05·0	04·8	04·8	04·8	04·9	05·1
3·0	ζ Tauri		275	52·5	52·3	52·0	51·8	51·6	51·4	N. 21	07·8	07·9	07·9	07·9	07 9	07·9
1·8	*Alnilam*	15	276	11·4	11·2	11·0	10·8	10·6	10·5	S. 1	12·8	12·7	12·7	12·7	12·8	12·8
2·9	ι Orionis		276	22·6	22·4	22·2	22·0	21·8	21·7	S. 5	55·3	55·2	55·2	55·2	55·2	55·3
2·7	α Leporis		277	01·8	01·6	01·4	01·2	01·0	00·9	S. 17	50·1	50·0	49·9	49·9	50·0	50·1
2·5	δ Orionis		277	14·6	14·4	14·2	14·0	13·8	13·7	S. 0	18·8	18·7	18·6	18·6	18·7	18·8
3·0	β Leporis		278	08·7	08·5	08·3	08·1	07·9	07·8	S. 20	46·4	46·3	46·2	46·3	46·3	46·5
1·8	*Elnath*	14	278	43·7	43·5	43·3	43·0	42·8	42·7	N. 28	35·4	35·5	35·5	35·5	35·5	35·5
1·7	*Bellatrix*	13	278	58·4	58·2	58·0	57·8	57·6	57·5	N. 6	20·0	20·0	20·1	20·1	20·0	20·0
0·2	*Capella*	12	281	10·9	10·6	10·3	10·0	09·7	09·5	N. 45	58·6	58·6	58·6	58·7	58·7	58·8
0·3	*Rigel*	11	281	35·8	35·6	35·3	35·1	35·0	34·9	S. 8	13·4	13·3	13·2	13·2	13·3	13·4
2·9	β Eridani		283	16·4	16·2	16·0	15·8	15·6	15·5	S. 5	06·6	06·5	06·5	06·5	06·5	06·6
2·9	ι Aurigæ		286	03·8	03·5	03·2	03·0	02·8	02·7	N. 33	08·1	08·1	08·2	08·2	08·2	08·3
1·1	*Aldebaran*	10	291	17·6	17·4	17·2	16·9	16·8	16·7	N. 16	28·3	28·3	28·4	28·4	28·4	28·4
3·2	γ Eridani		300	42·9	42·7	42·5	42·3	42·2	42·1	S. 13	33·6	33·5	33·5	33·5	33·6	33·7
3·0	ε Persei		300	51·4	51·1	50·8	50·6	50·4	50·3	N. 39	57·2	57·3	57·3	57·4	57·5	57·5
2·9	ζ Persei		301	46·0	45·7	45·4	45·2	45·1	45·0	N. 31	49·6	49·6	49·7	49·7	49·8	49·8
3·0	*Alcyone*		303	24·7	24·4	24·2	24·0	23·9	23·8	N. 24	02·7	02·8	02·9	02·9	03·0	03·0
1·9	*Mirfak*	9	309	15·5	15·2	14·9	14·6	14·5	14·4	N. 49	47·5	47·5	47·6	47·7	47·8	47·9
Var.§	*Algol*		313	16·0	15·7	15·4	15·2	15·1	15·1	N. 40	52·8	52·9	53·0	53·1	53·2	53·2
2·8	*Menkar*	8	314	40·7	40·4	40·2	40·1	40·0	40·0	N. 4	01·0	01·1	01·1	01·1	01·1	01·1
3·1	*Acamar*	7	315	37·0	36·7	36·5	36·3	36·2	36·2	S. 40	22·6	22·5	22·5	22·6	22·7	22·8
2·1	*Polaris*		326	45·3	33·9	24·3	18·4	17·5	22·5	N. 89	10·4	10·4	10·6	10·7	10·9	11·1
3·1	β Trianguli		327	53·7	53·4	53·2	53·1	53·0	53·0	N. 34	53·8	53·9	54·0	54·1	54·1	54·2
2·2	*Hamal*	6	328	28·3	28·1	27·9	27·8	27·7	27·7	N. 23	22·3	22·4	22·5	22·6	22·6	22·7
2·2	*Almak*		329	18·9	18·6	18·4	18·2	18·1	18·2	N. 42	14·2	14·3	14·4	14·5	14·6	14·7
3·0	α Hydri		330	27·5	27·1	26·8	26·6	26·6	26·8	S. 61	39·4	39·3	39·4	39·5	39·7	39·8
2·7	*Sheratan*		331	36·0	35·8	35·6	35·5	35·4	35·4	N. 20	42·9	43·0	43·1	43·2	43·2	43·2
0·6	*Achernar*	5	335	44·9	44·5	44·2	44·1	44·1	44·3	S. 57	19·6	19·6	19·7	19·8	19·9	20·1
2·8	*Ruchbah*		338	51·2	50·8	50·5	50·4	50·4	50·5	N. 60	08·0	08·1	08·3	08·4	08·6	08·7
2·4	*Mirach*		342	49·7	49·5	49·3	49·2	49·2	49·3	N. 35	31·1	31·2	31·4	31·5	31·5	31·6
Var.‖	γ Cassiopeiæ		346	06·3	05·9	05·7	05·6	05·6	05·8	N. 60	36·6	36·8	36·9	37·1	37·2	37·3
2·2	*Diphda*	4	349	20·2	20·0	19·9	19·8	19·8	19·9	S. 18	05·2	05·2	05·2	05·2	05·3	05·3
2·5	*Schedar*	3	350	08·2	07·9	07·7	07·7	07·7	07·9	N. 56	25·8	26·0	26·1	26·3	26·4	26·5
2·4	*Ankaa*	2	353	39·6	39·3	39·1	39·1	39·2	39·3	S. 42	24·2	24·2	24·3	24·4	24·5	24·6
2·9	β Hydri		353	48·1	47·4	46·9	46·9	47·2	47·8	S. 77	21·3	21·3	21·4	21·6	21·7	21·8
2·9	*Algenib*		356	55·8	55·6	55·5	55·5	55·5	55·6	N. 15	04·7	04·8	04·9	05·0	05·0	05·0
2·4	*Caph*		357	57·1	56·8	56·6	56·6	56·7	56·9	N. 59	02·5	02·7	02·9	03·0	03·1	03·2
2·2	*Alpheratz*	1	358	08·6	08·4	08·3	08·2	08·3	08·4	N. 28	59·1	59·2	59·4	59·5	59·5	59·5

‡ 0·1—1·2 § 2·3—3·5 ‖ Irregular variable; 1978 mag. 2·7

POLARIS (POLE STAR) TABLES,

FOR DETERMINING LATITUDE FROM SEXTANT ALTITUDE AND FOR AZIMUTH

L.H.A. ARIES	0°– 9°	10°– 19°	20°– 29°	30°– 39°	40°– 49°	50°– 59°	60°– 69°	70°– 79°	80°– 89°	90°– 99°	100°– 109°	110°– 119°
	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	0 17·8	0 13·7	0 10·9	0 09·7	0 09·9	0 11·7	0 14·9	0 19·5	0 25·3	0 32·1	0 39·7	0 47·9
1	17·3	13·3	10·7	09·6	10·1	12·0	15·3	20·0	25·9	32·8	40·5	48·7
2	16·9	13·0	10·6	09·6	10·2	12·2	15·7	20·6	26·6	33·5	41·3	49·6
3	16·4	12·7	10·4	09·6	10·3	12·5	16·2	21·1	27·2	34·3	42·1	50·4
4	16·0	12·4	10·3	09·6	10·5	12·8	16·6	21·7	27·9	35·0	42·9	51·3
5	0 15·6	0 12·1	0 10·1	0 09·6	0 10·6	0 13·1	0 17·1	0 22·3	0 28·6	0 35·8	0 43·7	0 52·1
6	15·2	11·9	10·0	09·7	10·8	13·5	17·5	22·8	29·3	36·6	44·6	53·0
7	14·8	11·6	09·9	09·7	11·0	13·8	18·0	23·4	29·9	37·3	45·4	53·8
8	14·4	11·4	09·8	09·8	11·2	14·2	18·5	24·0	30·6	38·1	46·2	54·7
9	14·0	11·2	09·7	09·8	11·5	14·5	19·0	24·7	31·4	38·9	47·0	55·5
10	0 13·7	0 10·9	0 09·7	0 09·9	0 11·7	0 14·9	0 19·5	0 25·3	0 32·1	0 39·7	0 47·9	0 56·4

Lat.	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1
°	′	′	′	′	′	′	′	′	′	′	′	′
0	0·5	0·6	0·6	0·6	0·6	0·5	0·5	0·4	0·3	0·3	0·2	0·2
10	·5	·6	·6	·6	·6	·6	·5	·4	·4	·3	·3	·2
20	·5	·6	·6	·6	·6	·6	·5	·5	·4	·4	·3	·3
30	·6	·6	·6	·6	·6	·6	·5	·5	·5	·4	·4	·4
40	0·6	0·6	0·6	0·6	0·6	0·6	0·6	0·5	0·5	0·5	0·5	0·5
45	·6	·6	·6	·6	·6	·6	·6	·6	·6	·5	·5	·5
50	·6	·6	·6	·6	·6	·6	·6	·6	·6	·6	·6	·6
55	·6	·6	·6	·6	·6	·6	·6	·6	·7	·7	·7	·7
60	·6	·6	·6	·6	·6	·6	·7	·7	·7	·7	·8	·8
62	0·7	0·6	0·6	0·6	0·6	0·6	0·7	0·7	0·7	0·8	0·8	0·8
64	·7	·6	·6	·6	·6	·6	·7	·7	·8	·8	·9	0·9
66	·7	·6	·6	·6	·6	·7	·7	·8	·8	0·9	0·9	1·0
68	0·7	0·6	0·6	0·6	0·6	0·7	0·7	0·8	0·9	1·0	1·0	1·0

Month	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2
	′	′	′	′	′	′	′	′	′	′	′	′
Jan.	0·7	0·7	0·7	0·7	0·7	0·7	0·7	0·7	0·7	0·6	0·6	0·6
Feb.	·6	·6	·7	·7	·7	·7	·8	·8	·8	·8	·8	·8
Mar.	·5	·5	·6	·6	·7	·7	·8	·8	·8	·9	·9	·9
Apr.	0·3	0·4	0·4	0·5	0·5	0·6	0·7	0·7	0·8	0·8	0·9	0·9
May	·2	·2	·3	·3	·4	·5	·5	·6	·7	·7	·8	·9
June	·2	·2	·2	·2	·3	·3	·4	·5	·5	·6	·7	·7
July	0·2	0·2	0·2	0·2	0·2	0·2	0·3	0·3	0·4	0·4	0·5	0·6
Aug.	·3	·3	·3	·2	·2	·2	·2	·3	·3	·3	·4	·4
Sept.	·5	·5	·4	·4	·3	·3	·3	·3	·3	·3	·3	·3
Oct.	0·7	0·6	0·6	0·5	0·5	0·4	0·4	0·3	0·3	0·3	0·3	0·3
Nov.	0·9	0·8	·8	·7	·6	·6	·5	·5	·4	·3	·3	·3
Dec.	1·0	1·0	0·9	0·9	0·8	0·8	0·7	0·6	0·6	0·5	0·4	0·4

Lat.	AZIMUTH											
°	°	°	°	°	°	°	°	°	°	°	°	°
0	0·4	0·3	0·1	0·0	359·8	359·7	359·6	359·5	359·4	359·3	359·2	359·2
20	0·4	0·3	0·1	0·0	359·8	359·7	359·5	359·4	359·3	359·2	359·2	359·1
40	0·5	0·3	0·2	0·0	359·8	359·6	359·4	359·3	359·2	359·1	359·0	358·9
50	0·6	0·4	0·2	0·0	359·7	359·5	359·3	359·1	359·0	358·9	358·8	358·7
55	0·7	0·5	0·2	0·0	359·7	359·5	359·2	359·0	358·9	358·7	358·6	358·6
60	0·8	0·5	0·2	0·0	359·7	359·4	359·1	358·9	358·7	358·5	358·4	358·4
65	0·9	0·6	0·3	359·9	359·6	359·3	359·0	358·7	358·4	358·3	358·1	358·1

Latitude = Apparent altitude (corrected for refraction) − 1° + a_0 + a_1 + a_2

The table is entered with L.H.A. Aries to determine the column to be used; each column refers to a range of 10°. a_0 is taken, with mental interpolation, from the upper table with the units of L.H.A. Aries in degrees as argument; a_1, a_2 are taken, without interpolation, from the second and third tables with arguments latitude and month respectively. a_0, a_1, a_2 are always positive. The final table gives the azimuth of *Polaris*.

POLARIS (POLE STAR) TABLES, 1981

FOR DETERMINING LATITUDE FROM SEXTANT ALTITUDE AND FOR AZIMUTH

L.H.A. ARIES	120°– 129°	130°– 139°	140°– 149°	150°– 159°	160°– 169°	170°– 179°	180°– 189°	190°– 199°	200°– 209°	210°– 219°	220°– 229°	230°– 239°
	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	0 56·4	1 05·0	1 13·3	1 21·2	1 28·5	1 34·8	1 40·0	1 44·1	1 46·7	1 47·9	1 47·7	1 46·0
1	57·2	05·8	14·1	22·0	29·1	35·4	40·5	44·4	46·9	48·0	47·6	45·7
2	58·1	06·7	15·0	22·7	29·8	35·9	41·0	44·7	47·1	48·0	47·4	45·4
3	59·0	07·5	15·8	23·5	30·5	36·5	41·4	45·0	47·2	48·0	47·3	45·2
4	0 59·8	08·3	16·6	24·2	31·1	37·0	41·8	45·3	47·4	48·0	47·2	44·9
5	1 00·7	1 09·2	1 17·4	1 25·0	1 31·8	1 37·6	1 42·2	1 45·6	1 47·5	1 48·0	1 47·0	1 44·6
6	01·5	10·0	18·1	25·7	32·4	38·1	42·6	45·8	47·6	47·9	46·8	44·3
7	02·4	10·8	18·9	26·4	33·0	38·6	43·0	46·1	47·7	47·9	46·6	43·9
8	03·2	11·7	19·7	27·1	33·6	39·1	43·4	46·3	47·8	47·8	46·4	43·6
9	04·1	12·5	20·5	27·8	34·2	39·6	43·7	46·5	47·9	47·8	46·2	43·2
10	1 05·0	1 13·3	1 21·2	1 28·5	1 34·8	1 40·0	1 44·1	1 46·7	1 47·9	1 47·7	1 46·0	1 42·8
Lat.	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1
°	′	′	′	′	′	′	′	′	′	′	′	′
0	0·2	0·2	0·2	0·3	0·4	0·4	0·5	0·6	0·6	0·6	0·6	0·5
10	·2	·3	·3	·3	·4	·5	·5	·6	·6	·6	·6	·6
20	·3	·3	·3	·4	·4	·5	·5	·6	·6	·6	·6	·6
30	·4	·4	·4	·4	·5	·5	·6	·6	·6	·6	·6	·6
40	0·5	0·5	0·5	0·5	0·5	0·6	0·6	0·6	0·6	0·6	0·6	0·6
45	·5	·5	·5	·6	·6	·6	·6	·6	·6	·6	·6	·6
50	·6	·6	·6	·6	·6	·6	·6	·6	·6	·6	·6	·6
55	·7	·7	·7	·7	·6	·6	·6	·6	·6	·6	·6	·6
60	·8	·8	·8	·7	·7	·7	·6	·6	·6	·6	·6	·6
62	0·8	0·8	0·8	0·8	0·7	0·7	0·7	0·6	0·6	0·6	0·6	0·6
64	0·9	0·9	·9	·8	·8	·7	·7	·6	·6	·6	·6	·6
66	1·0	1·0	0·9	·9	·8	·7	·7	·6	·6	·6	·6	·7
68	1·1	1·0	1·0	0·9	0·9	0·8	0·7	0·6	0·6	0·6	0·6	0·7
Month	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2
	′	′	′	′	′	′	′	′	′	′	′	′
Jan.	0·6	0·6	0·6	0·6	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·5
Feb.	·8	·7	·7	·7	·7	·6	·6	·6	·5	·5	·5	·5
Mar.	·9	0·9	0·9	0·8	·8	·8	·7	·7	·6	·6	·5	·5
Apr.	0·9	1·0	1·0	1·0	0·9	0·9	0·9	0·8	0·8	0·7	0·7	0·6
May	·9	1·0	1·0	1·0	1·0	1·0	1·0	1·0	0·9	0·9	·8	·7
June	·8	0·9	0·9	1·0	1·0	1·0	1·0	1·0	1·0	1·0	0·9	0·9
July	0·7	0·7	0·8	0·9	0·9	0·9	1·0	1·0	1·0	1·0	1·0	1·0
Aug.	·5	·6	·6	·7	·7	·8	0·9	0·9	0·9	1·0	1·0	1·0
Sept.	·4	·4	·5	·5	·6	·6	·7	·7	·8	0·8	0·9	0·9
Oct.	0·3	0·3	0·3	0·3	0·4	0·4	0·5	0·6	0·6	0·7	0·7	0·8
Nov.	·2	·2	·2	·2	·3	·3	·3	·4	·4	·5	·6	·6
Dec.	0·3	0·3	0·2	0·2	0·2	0·2	0·2	0·2	0·3	0·3	0·4	0·4

Lat.	AZIMUTH											
°	°	°	°	°	°	°	°	°	°	°	°	°
0	359·2	359·2	359·2	359·3	359·4	359·5	359·6	359·7	359·9	0·0	0·2	0·3
20	359·1	359·1	359·2	359·3	359·4	359·5	359·6	359·7	359·9	0·0	0·2	0·3
40	358·9	359·0	359·0	359·1	359·2	359·3	359·5	359·7	359·8	0·0	0·2	0·4
50	358·7	358·8	358·8	358·9	359·1	359·2	359·4	359·6	359·8	0·0	0·3	0·5
55	358·6	358·6	358·7	358·8	358·9	359·1	359·3	359·6	359·8	0·0	0·3	0·5
60	358·4	358·4	358·5	358·6	358·8	359·0	359·2	359·5	359·8	0·0	0·3	0·6
65	358·1	358·1	358·2	358·4	358·6	358·8	359·1	359·4	359·7	0·1	0·4	0·7

ILLUSTRATION

On 1981 April 21 at G.M.T. $23^h\ 18^m\ 56^s$ in longitude W. 37° 14′ the apparent altitude (corrected for refraction), *Ho*, of

From the daily pages:	° ′
G.H.A. Aries (23^h)	194 55·4
Increment ($18^m\ 56^s$)	4 44·8
Longitude (west)	−37 14

	° ′
Ho	49 31·6
a_0 (argument 162° 26′)	1 30·1
a_1 (lat. 50° approx.)	0·6
a_2 (April)	0·9

POLARIS (POLE STAR) TABLES,

FOR DETERMINING LATITUDE FROM SEXTANT ALTITUDE AND FOR AZIMUTH

L.H.A. ARIES	240°– 249°	250°– 259°	260°– 269°	270°– 279°	280°– 289°	290°– 299°	300°– 309°	310°– 319°	320°– 329°	330°– 339°	340°– 349°	350°– 359°
	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	1 42·8	1 38·4	1 32·8	1 26·1	1 18·6	1 10·5	1 02·1	0 53·5	0 45·0	0 37·0	0 29·7	0 23·2
1	42·5	37·9	32·1	25·4	17·8	09·7	01·2	52·6	44·2	36·3	29·0	22·6
2	42·1	37·4	31·5	24·7	17·0	08·8	1 00·3	51·8	43·4	35·5	28·3	22·0
3	41·6	36·8	30·9	23·9	16·2	08·0	0 59·5	50·9	42·6	34·7	27·6	21·5
4	41·2	36·3	30·2	23·2	15·4	07·2	58·6	50·1	41·8	34·0	27·0	20·9
5	1 40·8	1 35·7	1 29·6	1 22·5	1 14·6	1 06·3	0 57·8	0 49·2	0 41·0	0 33·3	0 26·3	0 20·4
6	40·3	35·2	28·9	21·7	13·8	05·5	56·9	48·4	40·2	32·5	25·7	19·8
7	39·9	34·6	28·2	20·9	13·0	04·6	56·0	47·5	39·4	31·8	25·0	19·3
8	39·4	34·0	27·5	20·2	12·2	03·8	55·2	46·7	38·6	31·1	24·4	18·8
9	38·9	33·4	26·8	19·4	11·3	02·9	54·3	45·9	37·8	30·4	23·8	18·3
10	1 38·4	1 32·8	1 26·1	1 18·6	1 10·5	1 02·1	0 53·5	0 45·0	0 37·0	0 29·7	0 23·2	0 17·8
Lat.	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1
°	′	′	′	′	′	′	′	′	′	′	′	′
0	0·5	0·4	0·3	0·3	0·2	0·2	0·2	0·2	0·2	0·3	0·4	0·4
10	·5	·4	·4	·3	·3	·2	·2	·3	·3	·3	·4	·5
20	·5	·5	·4	·4	·3	·3	·3	·3	·3	·4	·4	·5
30	·5	·5	·5	·4	·4	·4	·4	·4	·4	·4	·5	·5
40	0·6	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·6
45	·6	·6	·6	·5	·5	·5	·5	·5	·5	·6	·6	·6
50	·6	·6	·6	·6	·6	·6	·6	·6	·6	·6	·6	·6
55	·6	·6	·7	·7	·7	·7	·7	·7	·7	·7	·6	·6
60	·7	·7	·7	·7	·8	·8	·8	·8	·8	·7	·7	·7
62	0·7	0·7	0·7	0·8	0·8	0·8	0·8	0·8	0·8	0·8	0·7	0·7
64	·7	·7	·8	·8	·9	0·9	0·9	0·9	·9	·8	·8	·7
66	·7	·8	·8	0·9	0·9	1·0	1·0	1·0	0·9	·9	·8	·7
68	0·7	0·8	0·9	1·0	1·0	1·0	1·1	1·0	1·0	0·9	0·9	0·8
Month	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2
	′	′	′	′	′	′	′	′	′	′	′	′
Jan.	0·5	0·5	0·5	0·6	0·6	0·6	0·6	0·6	0·6	0·6	0·7	0·7
Feb.	·4	·4	·4	·4	·4	·4	·4	·5	·5	·5	·5	·6
Mar.	·4	·4	·4	·3	·3	·3	·3	·3	·3	·4	·4	·4
Apr.	0·5	0·5	0·4	0·4	0·3	0·3	0·3	0·2	0·2	0·2	0·3	0·3
May	·7	·6	·5	·5	·4	·3	·3	·2	·2	·2	·2	·2
June	·8	·7	·7	·6	·5	·5	·4	·3	·3	·2	·2	·2
July	0·9	0·9	0·8	0·8	0·7	0·6	0·5	0·5	0·4	0·3	0·3	0·3
Aug.	1·0	·9	·9	·9	·8	·8	·7	·6	·6	·5	·5	·4
Sept.	0·9	·9	·9	·9	·9	·9	·8	·8	·7	·7	·6	·6
Oct.	0·8	0·9	0·9	0·9	0·9	0·9	0·9	0·9	0·9	0·9	0·8	0·8
Nov.	·7	·7	·8	·9	·9	·9	1·0	1·0	1·0	1·0	0·9	0·9
Dec.	0·5	0·6	0·6	0·7	0·8	0·8	0·9	0·9	1·0	1·0	1·0	1·0
Lat.	AZIMUTH											
°	°	°	°	°	°	°	°	°	°	°	°	°
0	0·4	0·5	0·6	0·7	0·8	0·8	0·8	0·8	0·8	0·7	0·6	0·5
20	0·5	0·6	0·7	0·8	0·8	0·9	0·9	0·9	0·8	0·7	0·7	0·5
40	0·6	0·7	0·8	0·9	1·0	1·1	1·1	1·1	1·0	0·9	0·8	0·7
50	0·7	0·8	1·0	1·1	1·2	1·3	1·3	1·3	1·2	1·1	1·0	0·8
55	0·7	0·9	1·1	1·2	1·3	1·4	1·4	1·4	1·3	1·2	1·1	0·9
60	0·8	1·1	1·3	1·4	1·5	1·6	1·6	1·6	1·5	1·4	1·2	1·0
65	1·0	1·3	1·5	1·7	1·8	1·9	1·9	1·9	1·8	1·7	1·5	1·2

Latitude = Apparent altitude (corrected for refraction) − 1° + a_0 + a_1 + a_2

The table is entered with L.H.A. Aries to determine the column to be used; each column refers to a range of 10°. a_0 is taken, with mental interpolation, from the upper table with the units of L.H.A. Aries in degrees as argument; a_1, a_2 are taken, without interpolation, from the second and third tables with arguments latitude and month respectively. a_0, a_1, a_2 are always positive. The final table gives the azimuth of *Polaris*.

CONVERSION OF ARC TO TIME

0°–59°		60°–119°		120°–179°		180°–239°		240°–299°		300°–359°			0′·00	0′·25	0′·50	0′·75
°	h m	°	h m	°	h m	°	h m	°	h m	°	h m	′	m s	m s	m s	m s
0	0 00	60	4 00	120	8 00	180	12 00	240	16 00	300	20 00	0	0 00	0 01	0 02	0 03
1	0 04	61	4 04	121	8 04	181	12 04	241	16 04	301	20 04	1	0 04	0 05	0 06	0 07
2	0 08	62	4 08	122	8 08	182	12 08	242	16 08	302	20 08	2	0 08	0 09	0 10	0 11
3	0 12	63	4 12	123	8 12	183	12 12	243	16 12	303	20 12	3	0 12	0 13	0 14	0 15
4	0 16	64	4 16	124	8 16	184	12 16	244	16 16	304	20 16	4	0 16	0 17	0 18	0 19
5	0 20	65	4 20	125	8 20	185	12 20	245	16 20	305	20 20	5	0 20	0 21	0 22	0 23
6	0 24	66	4 24	126	8 24	186	12 24	246	16 24	306	20 24	6	0 24	0 25	0 26	0 27
7	0 28	67	4 28	127	8 28	187	12 28	247	16 28	307	20 28	7	0 28	0 29	0 30	0 31
8	0 32	68	4 32	128	8 32	188	12 32	248	16 32	308	20 32	8	0 32	0 33	0 34	0 35
9	0 36	69	4 36	129	8 36	189	12 36	249	16 36	309	20 36	9	0 36	0 37	0 38	0 39
10	0 40	70	4 40	130	8 40	190	12 40	250	16 40	310	20 40	10	0 40	0 41	0 42	0 43
11	0 44	71	4 44	131	8 44	191	12 44	251	16 44	311	20 44	11	0 44	0 45	0 46	0 47
12	0 48	72	4 48	132	8 48	192	12 48	252	16 48	312	20 48	12	0 48	0 49	0 50	0 51
13	0 52	73	4 52	133	8 52	193	12 52	253	16 52	313	20 52	13	0 52	0 53	0 54	0 55
14	0 56	74	4 56	134	8 56	194	12 56	254	16 56	314	20 56	14	0 56	0 57	0 58	0 59
15	1 00	75	5 00	135	9 00	195	13 00	255	17 00	315	21 00	15	1 00	1 01	1 02	1 03
16	1 04	76	5 04	136	9 04	196	13 04	256	17 04	316	21 04	16	1 04	1 05	1 06	1 07
17	1 08	77	5 08	137	9 08	197	13 08	257	17 08	317	21 08	17	1 08	1 09	1 10	1 11
18	1 12	78	5 12	138	9 12	198	13 12	258	17 12	318	21 12	18	1 12	1 13	1 14	1 15
19	1 16	79	5 16	139	9 16	199	13 16	259	17 16	319	21 16	19	1 16	1 17	1 18	1 19
20	1 20	80	5 20	140	9 20	200	13 20	260	17 20	320	21 20	20	1 20	1 21	1 22	1 23
21	1 24	81	5 24	141	9 24	201	13 24	261	17 24	321	21 24	21	1 24	1 25	1 26	1 27
22	1 28	82	5 28	142	9 28	202	13 28	262	17 28	322	21 28	22	1 28	1 29	1 30	1 31
23	1 32	83	5 32	143	9 32	203	13 32	263	17 32	323	21 32	23	1 32	1 33	1 34	1 35
24	1 36	84	5 36	144	9 36	204	13 36	264	17 36	324	21 36	24	1 36	1 37	1 38	1 39
25	1 40	85	5 40	145	9 40	205	13 40	265	17 40	325	21 40	25	1 40	1 41	1 42	1 43
26	1 44	86	5 44	146	9 44	206	13 44	266	17 44	326	21 44	26	1 44	1 45	1 46	1 47
27	1 48	87	5 48	147	9 48	207	13 48	267	17 48	327	21 48	27	1 48	1 49	1 50	1 51
28	1 52	88	5 52	148	9 52	208	13 52	268	17 52	328	21 52	28	1 52	1 53	1 54	1 55
29	1 56	89	5 56	149	9 56	209	13 56	269	17 56	329	21 56	29	1 56	1 57	1 58	1 59
30	2 00	90	6 00	150	10 00	210	14 00	270	18 00	330	22 00	30	2 00	2 01	2 02	2 03
31	2 04	91	6 04	151	10 04	211	14 04	271	18 04	331	22 04	31	2 04	2 05	2 06	2 07
32	2 08	92	6 08	152	10 08	212	14 08	272	18 08	332	22 08	32	2 08	2 09	2 10	2 11
33	2 12	93	6 12	153	10 12	213	14 12	273	18 12	333	22 12	33	2 12	2 13	2 14	2 15
34	2 16	94	6 16	154	10 16	214	14 16	274	18 16	334	22 16	34	2 16	2 17	2 18	2 19
35	2 20	95	6 20	155	10 20	215	14 20	275	18 20	335	22 20	35	2 20	2 21	2 22	2 23
36	2 24	96	6 24	156	10 24	216	14 24	276	18 24	336	22 24	36	2 24	2 25	2 26	2 27
37	2 28	97	6 28	157	10 28	217	14 28	277	18 28	337	22 28	37	2 28	2 29	2 30	2 31
38	2 32	98	6 32	158	10 32	218	14 32	278	18 32	338	22 32	38	2 32	2 33	2 34	2 35
39	2 36	99	6 36	159	10 36	219	14 36	279	18 36	339	22 36	39	2 36	2 37	2 38	2 39
40	2 40	100	6 40	160	10 40	220	14 40	280	18 40	340	22 40	40	2 40	2 41	2 42	2 43
41	2 44	101	6 44	161	10 44	221	14 44	281	18 44	341	22 44	41	2 44	2 45	2 46	2 47
42	2 48	102	6 48	162	10 48	222	14 48	282	18 48	342	22 48	42	2 48	2 49	2 50	2 51
43	2 52	103	6 52	163	10 52	223	14 52	283	18 52	343	22 52	43	2 52	2 53	2 54	2 55
44	2 56	104	6 56	164	10 56	224	14 56	284	18 56	344	22 56	44	2 56	2 57	2 58	2 59
45	3 00	105	7 00	165	11 00	225	15 00	285	19 00	345	23 00	45	3 00	3 01	3 02	3 03
46	3 04	106	7 04	166	11 04	226	15 04	286	19 04	346	23 04	46	3 04	3 05	3 06	3 07
47	3 08	107	7 08	167	11 08	227	15 08	287	19 08	347	23 08	47	3 08	3 09	3 10	3 11
48	3 12	108	7 12	168	11 12	228	15 12	288	19 12	348	23 12	48	3 12	3 13	3 14	3 15
49	3 16	109	7 16	169	11 16	229	15 16	289	19 16	349	23 16	49	3 16	3 17	3 18	3 19
50	3 20	110	7 20	170	11 20	230	15 20	290	19 20	350	23 20	50	3 20	3 21	3 22	3 23
51	3 24	111	7 24	171	11 24	231	15 24	291	19 24	351	23 24	51	3 24	3 25	3 26	3 27
52	3 28	112	7 28	172	11 28	232	15 28	292	19 28	352	23 28	52	3 28	3 29	3 30	3 31
53	3 32	113	7 32	173	11 32	233	15 32	293	19 32	353	23 32	53	3 32	3 33	3 34	3 35
54	3 36	114	7 36	174	11 36	234	15 36	294	19 36	354	23 36	54	3 36	3 37	3 38	3 39
55	3 40	115	7 40	175	11 40	235	15 40	295	19 40	355	23 40	55	3 40	3 41	3 42	3 43
56	3 44	116	7 44	176	11 44	236	15 44	296	19 44	356	23 44	56	3 44	3 45	3 46	3 47
57	3 48	117	7 48	177	11 48	237	15 48	297	19 48	357	23 48	57	3 48	3 49	3 50	3 51
58	3 52	118	7 52	178	11 52	238	15 52	298	19 52	358	23 52	58	3 52	3 53	3 54	3 55
59	3 56	119	7 56	179	11 56	239	15 56	299	19 56	359	23 56	59	3 56	3 57	3 58	3 59

The above table is for converting expressions in arc to their equivalent in time ; its main use in this Almanac is for the conversion of longitude for application to L.M.T. (*added* if *west*, *subtracted* if *east*) to give G.M.T. or vice versa, particularly in the case of sunrise, sunset, etc.

0m s	SUN PLANETS ° ′	ARIES ° ′	MOON ° ′	v or d ′	Corrn ′	v or d ′	Corrn ′	v or d ′	Corrn ′
00	0 00·0	0 00·0	0 00·0	0·0	0·0	6·0	0·1	12·0	0·1
01	0 00·3	0 00·3	0 00·2	0·1	0·0	6·1	0·1	12·1	0·1
02	0 00·5	0 00·5	0 00·5	0·2	0·0	6·2	0·1	12·2	0·1
03	0 00·8	0 00·8	0 00·7	0·3	0·0	6·3	0·1	12·3	0·1
04	0 01·0	0 01·0	0 01·0	0·4	0·0	6·4	0·1	12·4	0·1
05	0 01·3	0 01·3	0 01·2	0·5	0·0	6·5	0·1	12·5	0·1
06	0 01·5	0 01·5	0 01·4	0·6	0·0	6·6	0·1	12·6	0·1
07	0 01·8	0 01·8	0 01·7	0·7	0·0	6·7	0·1	12·7	0·1
08	0 02·0	0 02·0	0 01·9	0·8	0·0	6·8	0·1	12·8	0·1
09	0 02·3	0 02·3	0 02·1	0·9	0·0	6·9	0·1	12·9	0·1
10	0 02·5	0 02·5	0 02·4	1·0	0·0	7·0	0·1	13·0	0·1
11	0 02·8	0 02·8	0 02·6	1·1	0·0	7·1	0·1	13·1	0·1
12	0 03·0	0 03·0	0 02·9	1·2	0·0	7·2	0·1	13·2	0·1
13	0 03·3	0 03·3	0 03·1	1·3	0·0	7·3	0·1	13·3	0·1
14	0 03·5	0 03·5	0 03·3	1·4	0·0	7·4	0·1	13·4	0·1
15	0 03·8	0 03·8	0 03·6	1·5	0·0	7·5	0·1	13·5	0·1
16	0 04·0	0 04·0	0 03·8	1·6	0·0	7·6	0·1	13·6	0·1
17	0 04·3	0 04·3	0 04·1	1·7	0·0	7·7	0·1	13·7	0·1
18	0 04·5	0 04·5	0 04·3	1·8	0·0	7·8	0·1	13·8	0·1
19	0 04·8	0 04·8	0 04·5	1·9	0·0	7·9	0·1	13·9	0·1
20	0 05·0	0 05·0	0 04·8	2·0	0·0	8·0	0·1	14·0	0·1
21	0 05·3	0 05·3	0 05·0	2·1	0·0	8·1	0·1	14·1	0·1
22	0 05·5	0 05·5	0 05·2	2·2	0·0	8·2	0·1	14·2	0·1
23	0 05·8	0 05·8	0 05·5	2·3	0·0	8·3	0·1	14·3	0·1
24	0 06·0	0 06·0	0 05·7	2·4	0·0	8·4	0·1	14·4	0·1
25	0 06·3	0 06·3	0 06·0	2·5	0·0	8·5	0·1	14·5	0·1
26	0 06·5	0 06·5	0 06·2	2·6	0·0	8·6	0·1	14·6	0·1
27	0 06·8	0 06·8	0 06·4	2·7	0·0	8·7	0·1	14·7	0·1
28	0 07·0	0 07·0	0 06·7	2·8	0·0	8·8	0·1	14·8	0·1
29	0 07·3	0 07·3	0 06·9	2·9	0·0	8·9	0·1	14·9	0·1
30	0 07·5	0 07·5	0 07·2	3·0	0·0	9·0	0·1	15·0	0·1
31	0 07·8	0 07·8	0 07·4	3·1	0·0	9·1	0·1	15·1	0·1
32	0 08·0	0 08·0	0 07·6	3·2	0·0	9·2	0·1	15·2	0·1
33	0 08·3	0 08·3	0 07·9	3·3	0·0	9·3	0·1	15·3	0·1
34	0 08·5	0 08·5	0 08·1	3·4	0·0	9·4	0·1	15·4	0·1
35	0 08·8	0 08·8	0 08·4	3·5	0·0	9·5	0·1	15·5	0·1
36	0 09·0	0 09·0	0 08·6	3·6	0·0	9·6	0·1	15·6	0·1
37	0 09·3	0 09·3	0 08·8	3·7	0·0	9·7	0·1	15·7	0·1
38	0 09·5	0 09·5	0 09·1	3·8	0·0	9·8	0·1	15·8	0·1
39	0 09·8	0 09·8	0 09·3	3·9	0·0	9·9	0·1	15·9	0·1
40	0 10·0	0 10·0	0 09·5	4·0	0·0	10·0	0·1	16·0	0·1
41	0 10·3	0 10·3	0 09·8	4·1	0·0	10·1	0·1	16·1	0·1
42	0 10·5	0 10·5	0 10·0	4·2	0·0	10·2	0·1	16·2	0·1
43	0 10·8	0 10·8	0 10·3	4·3	0·0	10·3	0·1	16·3	0·1
44	0 11·0	0 11·0	0 10·5	4·4	0·0	10·4	0·1	16·4	0·1
45	0 11·3	0 11·3	0 10·7	4·5	0·0	10·5	0·1	16·5	0·1
46	0 11·5	0 11·5	0 11·0	4·6	0·0	10·6	0·1	16·6	0·1
47	0 11·8	0 11·8	0 11·2	4·7	0·0	10·7	0·1	16·7	0·1
48	0 12·0	0 12·0	0 11·5	4·8	0·0	10·8	0·1	16·8	0·1
49	0 12·3	0 12·3	0 11·7	4·9	0·0	10·9	0·1	16·9	0·1
50	0 12·5	0 12·5	0 11·9	5·0	0·0	11·0	0·1	17·0	0·1
51	0 12·8	0 12·8	0 12·2	5·1	0·0	11·1	0·1	17·1	0·1
52	0 13·0	0 13·0	0 12·4	5·2	0·0	11·2	0·1	17·2	0·1
53	0 13·3	0 13·3	0 12·6	5·3	0·0	11·3	0·1	17·3	0·1
54	0 13·5	0 13·5	0 12·9	5·4	0·0	11·4	0·1	17·4	0·1
55	0 13·8	0 13·8	0 13·1	5·5	0·0	11·5	0·1	17·5	0·1
56	0 14·0	0 14·0	0 13·4	5·6	0·0	11·6	0·1	17·6	0·1
57	0 14·3	0 14·3	0 13·6	5·7	0·0	11·7	0·1	17·7	0·1
58	0 14·5	0 14·5	0 13·8	5·8	0·0	11·8	0·1	17·8	0·1
59	0 14·8	0 14·8	0 14·1	5·9	0·0	11·9	0·1	17·9	0·1
60	0 15·0	0 15·0	0 14·3	6·0	0·1	12·0	0·1	18·0	0·2

1m s	SUN PLANETS ° ′	ARIES ° ′	MOON ° ′	v or d ′	Corrn ′	v or d ′	Corrn ′	v or d ′	Corrn ′
00	0 15·0	0 15·0	0 14·3	0·0	0·0	6·0	0·2	12·0	0·3
01	0 15·3	0 15·3	0 14·6	0·1	0·0	6·1	0·2	12·1	0·3
02	0 15·5	0 15·5	0 14·8	0·2	0·0	6·2	0·2	12·2	0·3
03	0 15·8	0 15·8	0 15·0	0·3	0·0	6·3	0·2	12·3	0·3
04	0 16·0	0 16·0	0 15·3	0·4	0·0	6·4	0·2	12·4	0·3
05	0 16·3	0 16·3	0 15·5	0·5	0·0	6·5	0·2	12·5	0·3
06	0 16·5	0 16·5	0 15·7	0·6	0·0	6·6	0·2	12·6	0·3
07	0 16·8	0 16·8	0 16·0	0·7	0·0	6·7	0·2	12·7	0·3
08	0 17·0	0 17·0	0 16·2	0·8	0·0	6·8	0·2	12·8	0·3
09	0 17·3	0 17·3	0 16·5	0·9	0·0	6·9	0·2	12·9	0·3
10	0 17·5	0 17·5	0 16·7	1·0	0·0	7·0	0·2	13·0	0·3
11	0 17·8	0 17·8	0 16·9	1·1	0·0	7·1	0·2	13·1	0·3
12	0 18·0	0 18·0	0 17·2	1·2	0·0	7·2	0·2	13·2	0·3
13	0 18·3	0 18·3	0 17·4	1·3	0·0	7·3	0·2	13·3	0·3
14	0 18·5	0 18·6	0 17·7	1·4	0·0	7·4	0·2	13·4	0·3
15	0 18·8	0 18·8	0 17·9	1·5	0·0	7·5	0·2	13·5	0·3
16	0 19·0	0 19·1	0 18·1	1·6	0·0	7·6	0·2	13·6	0·3
17	0 19·3	0 19·3	0 18·4	1·7	0·0	7·7	0·2	13·7	0·3
18	0 19·5	0 19·6	0 18·6	1·8	0·0	7·8	0·2	13·8	0·3
19	0 19·8	0 19·8	0 18·9	1·9	0·0	7·9	0·2	13·9	0·3
20	0 20·0	0 20·1	0 19·1	2·0	0·1	8·0	0·2	14·0	0·4
21	0 20·3	0 20·3	0 19·3	2·1	0·1	8·1	0·2	14·1	0·4
22	0 20·5	0 20·6	0 19·6	2·2	0·1	8·2	0·2	14·2	0·4
23	0 20·8	0 20·8	0 19·8	2·3	0·1	8·3	0·2	14·3	0·4
24	0 21·0	0 21·1	0 20·0	2·4	0·1	8·4	0·2	14·4	0·4
25	0 21·3	0 21·3	0 20·3	2·5	0·1	8·5	0·2	14·5	0·4
26	0 21·5	0 21·6	0 20·5	2·6	0·1	8·6	0·2	14·6	0·4
27	0 21·8	0 21·8	0 20·8	2·7	0·1	8·7	0·2	14·7	0·4
28	0 22·0	0 22·1	0 21·0	2·8	0·1	8·8	0·2	14·8	0·4
29	0 22·3	0 22·3	0 21·2	2·9	0·1	8·9	0·2	14·9	0·4
30	0 22·5	0 22·6	0 21·5	3·0	0·1	9·0	0·2	15·0	0·4
31	0 22·8	0 22·8	0 21·7	3·1	0·1	9·1	0·2	15·1	0·4
32	0 23·0	0 23·1	0 22·0	3·2	0·1	9·2	0·2	15·2	0·4
33	0 23·3	0 23·3	0 22·2	3·3	0·1	9·3	0·2	15·3	0·4
34	0 23·5	0 23·6	0 22·4	3·4	0·1	9·4	0·2	15·4	0·4
35	0 23·8	0 23·8	0 22·7	3·5	0·1	9·5	0·2	15·5	0·4
36	0 24·0	0 24·1	0 22·9	3·6	0·1	9·6	0·2	15·6	0·4
37	0 24·3	0 24·3	0 23·1	3·7	0·1	9·7	0·2	15·7	0·4
38	0 24·5	0 24·6	0 23·4	3·8	0·1	9·8	0·2	15·8	0·4
39	0 24·8	0 24·8	0 23·6	3·9	0·1	9·9	0·2	15·9	0·4
40	0 25·0	0 25·1	0 23·9	4·0	0·1	10·0	0·3	16·0	0·4
41	0 25·3	0 25·3	0 24·1	4·1	0·1	10·1	0·3	16·1	0·4
42	0 25·5	0 25·6	0 24·3	4·2	0·1	10·2	0·3	16·2	0·4
43	0 25·8	0 25·8	0 24·6	4·3	0·1	10·3	0·3	16·3	0·4
44	0 26·0	0 26·1	0 24·8	4·4	0·1	10·4	0·3	16·4	0·4
45	0 26·3	0 26·3	0 25·1	4·5	0·1	10·5	0·3	16·5	0·4
46	0 26·5	0 26·6	0 25·3	4·6	0·1	10·6	0·3	16·6	0·4
47	0 26·8	0 26·8	0 25·5	4·7	0·1	10·7	0·3	16·7	0·4
48	0 27·0	0 27·1	0 25·8	4·8	0·1	10·8	0·3	16·8	0·4
49	0 27·3	0 27·3	0 26·0	4·9	0·1	10·9	0·3	16·9	0·4
50	0 27·5	0 27·6	0 26·2	5·0	0·1	11·0	0·3	17·0	0·4
51	0 27·8	0 27·8	0 26·5	5·1	0·1	11·1	0·3	17·1	0·4
52	0 28·0	0 28·1	0 26·7	5·2	0·1	11·2	0·3	17·2	0·4
53	0 28·3	0 28·3	0 27·0	5·3	0·1	11·3	0·3	17·3	0·4
54	0 28·5	0 28·6	0 27·2	5·4	0·1	11·4	0·3	17·4	0·4
55	0 28·8	0 28·8	0 27·4	5·5	0·1	11·5	0·3	17·5	0·4
56	0 29·0	0 29·1	0 27·7	5·6	0·1	11·6	0·3	17·6	0·4
57	0 29·3	0 29·3	0 27·9	5·7	0·1	11·7	0·3	17·7	0·4
58	0 29·5	0 29·6	0 28·2	5·8	0·1	11·8	0·3	17·8	0·4
59	0 29·8	0 29·8	0 28·4	5·9	0·1	11·9	0·3	17·9	0·4
60	0 30·0	0 30·1	0 28·6	6·0	0·2	12·0	0·3	18·0	0·5

2m s	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
	° ′	° ′	° ′	′	′	′	′	′	′
00	0 30·0	0 30·1	0 28·6	0·0	0·0	6·0	0·3	12·0	0·5
01	0 30·3	0 30·3	0 28·9	0·1	0·0	6·1	0·3	12·1	0·5
02	0 30·5	0 30·6	0 29·1	0·2	0·0	6·2	0·3	12·2	0·5
03	0 30·8	0 30·8	0 29·3	0·3	0·0	6·3	0·3	12·3	0·5
04	0 31·0	0 31·1	0 29·6	0·4	0·0	6·4	0·3	12·4	0·5
05	0 31·3	0 31·3	0 29·8	0·5	0·0	6·5	0·3	12·5	0·5
06	0 31·5	0 31·6	0 30·1	0·6	0·0	6·6	0·3	12·6	0·5
07	0 31·8	0 31·8	0 30·3	0·7	0·0	6·7	0·3	12·7	0·5
08	0 32·0	0 32·1	0 30·5	0·8	0·0	6·8	0·3	12·8	0·5
09	0 32·3	0 32·3	0 30·8	0·9	0·0	6·9	0·3	12·9	0·5
10	0 32·5	0 32·6	0 31·0	1·0	0·0	7·0	0·3	13·0	0·5
11	0 32·8	0 32·8	0 31·3	1·1	0·0	7·1	0·3	13·1	0·5
12	0 33·0	0 33·1	0 31·5	1·2	0·1	7·2	0·3	13·2	0·6
13	0 33·3	0 33·3	0 31·7	1·3	0·1	7·3	0·3	13·3	0·6
14	0 33·5	0 33·6	0 32·0	1·4	0·1	7·4	0·3	13·4	0·6
15	0 33·8	0 33·8	0 32·2	1·5	0·1	7·5	0·3	13·5	0·6
16	0 34·0	0 34·1	0 32·5	1·6	0·1	7·6	0·3	13·6	0·6
17	0 34·3	0 34·3	0 32·7	1·7	0·1	7·7	0·3	13·7	0·6
18	0 34·5	0 34·6	0 32·9	1·8	0·1	7·8	0·3	13·8	0·6
19	0 34·8	0 34·8	0 33·2	1·9	0·1	7·9	0·3	13·9	0·6
20	0 35·0	0 35·1	0 33·4	2·0	0·1	8·0	0·3	14·0	0·6
21	0 35·3	0 35·3	0 33·6	2·1	0·1	8·1	0·3	14·1	0·6
22	0 35·5	0 35·6	0 33·9	2·2	0·1	8·2	0·3	14·2	0·6
23	0 35·8	0 35·8	0 34·1	2·3	0·1	8·3	0·3	14·3	0·6
24	0 36·0	0 36·1	0 34·4	2·4	0·1	8·4	0·4	14·4	0·6
25	0 36·3	0 36·3	0 34·6	2·5	0·1	8·5	0·4	14·5	0·6
26	0 36·5	0 36·6	0 34·8	2·6	0·1	8·6	0·4	14·6	0·6
27	0 36·8	0 36·9	0 35·1	2·7	0·1	8·7	0·4	14·7	0·6
28	0 37·0	0 37·1	0 35·3	2·8	0·1	8·8	0·4	14·8	0·6
29	0 37·3	0 37·4	0 35·6	2·9	0·1	8·9	0·4	14·9	0·6
30	0 37·5	0 37·6	0 35·8	3·0	0·1	9·0	0·4	15·0	0·6
31	0 37·8	0 37·9	0 36·0	3·1	0·1	9·1	0·4	15·1	0·6
32	0 38·0	0 38·1	0 36·3	3·2	0·1	9·2	0·4	15·2	0·6
33	0 38·3	0 38·4	0 36·5	3·3	0·1	9·3	0·4	15·3	0·6
34	0 38·5	0 38·6	0 36·7	3·4	0·1	9·4	0·4	15·4	0·6
35	0 38·8	0 38·9	0 37·0	3·5	0·1	9·5	0·4	15·5	0·6
36	0 39·0	0 39·1	0 37·2	3·6	0·2	9·6	0·4	15·6	0·7
37	0 39·3	0 39·4	0 37·5	3·7	0·2	9·7	0·4	15·7	0·7
38	0 39·5	0 39·6	0 37·7	3·8	0·2	9·8	0·4	15·8	0·7
39	0 39·8	0 39·9	0 37·9	3·9	0·2	9·9	0·4	15·9	0·7
40	0 40·0	0 40·1	0 38·2	4·0	0·2	10·0	0·4	16·0	0·7
41	0 40·3	0 40·4	0 38·4	4·1	0·2	10·1	0·4	16·1	0·7
42	0 40·5	0 40·6	0 38·7	4·2	0·2	10·2	0·4	16·2	0·7
43	0 40·8	0 40·9	0 38·9	4·3	0·2	10·3	0·4	16·3	0·7
44	0 41·0	0 41·1	0 39·1	4·4	0·2	10·4	0·4	16·4	0·7
45	0 41·3	0 41·4	0 39·4	4·5	0·2	10·5	0·4	16·5	0·7
46	0 41·5	0 41·6	0 39·6	4·6	0·2	10·6	0·4	16·6	0·7
47	0 41·8	0 41·9	0 39·8	4·7	0·2	10·7	0·4	16·7	0·7
48	0 42·0	0 42·1	0 40·1	4·8	0·2	10·8	0·5	16·8	0·7
49	0 42·3	0 42·4	0 40·3	4·9	0·2	10·9	0·5	16·9	0·7
50	0 42·5	0 42·6	0 40·6	5·0	0·2	11·0	0·5	17·0	0·7
51	0 42·8	0 42·9	0 40·8	5·1	0·2	11·1	0·5	17·1	0·7
52	0 43·0	0 43·1	0 41·0	5·2	0·2	11·2	0·5	17·2	0·7
53	0 43·3	0 43·4	0 41·3	5·3	0·2	11·3	0·5	17·3	0·7
54	0 43·5	0 43·6	0 41·5	5·4	0·2	11·4	0·5	17·4	0·7
55	0 43·8	0 43·9	0 41·8	5·5	0·2	11·5	0·5	17·5	0·7
56	0 44·0	0 44·1	0 42·0	5·6	0·2	11·6	0·5	17·6	0·7
57	0 44·3	0 44·4	0 42·2	5·7	0·2	11·7	0·5	17·7	0·7
58	0 44·5	0 44·6	0 42·5	5·8	0·2	11·8	0·5	17·8	0·7
59	0 44·8	0 44·9	0 42·7	5·9	0·2	11·9	0·5	17·9	0·7
60	0 45·0	0 45·1	0 43·0	6·0	0·3	12·0	0·5	18·0	0·8

3m s	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
	° ′	° ′	° ′	′	′	′	′	′	′
00	0 45·0	0 45·1	0 43·0	0·0	0·0	6·0	0·4	12·0	0·7
01	0 45·3	0 45·4	0 43·2	0·1	0·0	6·1	0·4	12·1	0·7
02	0 45·5	0 45·6	0 43·4	0·2	0·0	6·2	0·4	12·2	0·7
03	0 45·8	0 45·9	0 43·7	0·3	0·0	6·3	0·4	12·3	0·7
04	0 46·0	0 46·1	0 43·9	0·4	0·0	6·4	0·4	12·4	0·7
05	0 46·3	0 46·4	0 44·1	0·5	0·0	6·5	0·4	12·5	0·7
06	0 46·5	0 46·6	0 44·4	0·6	0·0	6·6	0·4	12·6	0·7
07	0 46·8	0 46·9	0 44·6	0·7	0·0	6·7	0·4	12·7	0·7
08	0 47·0	0 47·1	0 44·9	0·8	0·0	6·8	0·4	12·8	0·7
09	0 47·3	0 47·4	0 45·1	0·9	0·1	6·9	0·4	12·9	0·8
10	0 47·5	0 47·6	0 45·3	1·0	0·1	7·0	0·4	13·0	0·8
11	0 47·8	0 47·9	0 45·6	1·1	0·1	7·1	0·4	13·1	0·8
12	0 48·0	0 48·1	0 45·8	1·2	0·1	7·2	0·4	13·2	0·8
13	0 48·3	0 48·4	0 46·1	1·3	0·1	7·3	0·4	13·3	0·8
14	0 48·5	0 48·6	0 46·3	1·4	0·1	7·4	0·4	13·4	0·8
15	0 48·8	0 48·9	0 46·5	1·5	0·1	7·5	0·4	13·5	0·8
16	0 49·0	0 49·1	0 46·8	1·6	0·1	7·6	0·4	13·6	0·8
17	0 49·3	0 49·4	0 47·0	1·7	0·1	7·7	0·4	13·7	0·8
18	0 49·5	0 49·6	0 47·2	1·8	0·1	7·8	0·5	13·8	0·8
19	0 49·8	0 49·9	0 47·5	1·9	0·1	7·9	0·5	13·9	0·8
20	0 50·0	0 50·1	0 47·7	2·0	0·1	8·0	0·5	14·0	0·8
21	0 50·3	0 50·4	0 48·0	2·1	0·1	8·1	0·5	14·1	0·8
22	0 50·5	0 50·6	0 48·2	2·2	0·1	8·2	0·5	14·2	0·8
23	0 50·8	0 50·9	0 48·4	2·3	0·1	8·3	0·5	14·3	0·8
24	0 51·0	0 51·1	0 48·7	2·4	0·1	8·4	0·5	14·4	0·8
25	0 51·3	0 51·4	0 48·9	2·5	0·1	8·5	0·5	14·5	0·8
26	0 51·5	0 51·6	0 49·2	2·6	0·2	8·6	0·5	14·6	0·9
27	0 51·8	0 51·9	0 49·4	2·7	0·2	8·7	0·5	14·7	0·9
28	0 52·0	0 52·1	0 49·6	2·8	0·2	8·8	0·5	14·8	0·9
29	0 52·3	0 52·4	0 49·9	2·9	0·2	8·9	0·5	14·9	0·9
30	0 52·5	0 52·6	0 50·1	3·0	0·2	9·0	0·5	15·0	0·9
31	0 52·8	0 52·9	0 50·3	3·1	0·2	9·1	0·5	15·1	0·9
32	0 53·0	0 53·1	0 50·6	3·2	0·2	9·2	0·5	15·2	0·9
33	0 53·3	0 53·4	0 50·8	3·3	0·2	9·3	0·5	15·3	0·9
34	0 53·5	0 53·6	0 51·1	3·4	0·2	9·4	0·5	15·4	0·9
35	0 53·8	0 53·9	0 51·3	3·5	0·2	9·5	0·6	15·5	0·9
36	0 54·0	0 54·1	0 51·5	3·6	0·2	9·6	0·6	15·6	0·9
37	0 54·3	0 54·4	0 51·8	3·7	0·2	9·7	0·6	15·7	0·9
38	0 54·5	0 54·6	0 52·0	3·8	0·2	9·8	0·6	15·8	0·9
39	0 54·8	0 54·9	0 52·3	3·9	0·2	9·9	0·6	15·9	0·9
40	0 55·0	0 55·2	0 52·5	4·0	0·2	10·0	0·6	16·0	0·9
41	0 55·3	0 55·4	0 52·7	4·1	0·2	10·1	0·6	16·1	0·9
42	0 55·5	0 55·7	0 53·0	4·2	0·2	10·2	0·6	16·2	0·9
43	0 55·8	0 55·9	0 53·2	4·3	0·3	10·3	0·6	16·3	1·0
44	0 56·0	0 56·2	0 53·4	4·4	0·3	10·4	0·6	16·4	1·0
45	0 56·3	0 56·4	0 53·7	4·5	0·3	10·5	0·6	16·5	1·0
46	0 56·5	0 56·7	0 53·9	4·6	0·3	10·6	0·6	16·6	1·0
47	0 56·8	0 56·9	0 54·2	4·7	0·3	10·7	0·6	16·7	1·0
48	0 57·0	0 57·2	0 54·4	4·8	0·3	10·8	0·6	16·8	1·0
49	0 57·3	0 57·4	0 54·6	4·9	0·3	10·9	0·6	16·9	1·0
50	0 57·5	0 57·7	0 54·9	5·0	0·3	11·0	0·6	17·0	1·0
51	0 57·8	0 57·9	0 55·1	5·1	0·3	11·1	0·6	17·1	1·0
52	0 58·0	0 58·2	0 55·4	5·2	0·3	11·2	0·7	17·2	1·0
53	0 58·3	0 58·4	0 55·6	5·3	0·3	11·3	0·7	17·3	1·0
54	0 58·5	0 58·7	0 55·8	5·4	0·3	11·4	0·7	17·4	1·0
55	0 58·8	0 58·9	0 56·1	5·5	0·3	11·5	0·7	17·5	1·0
56	0 59·0	0 59·2	0 56·3	5·6	0·3	11·6	0·7	17·6	1·0
57	0 59·3	0 59·4	0 56·6	5·7	0·3	11·7	0·7	17·7	1·0
58	0 59·5	0 59·7	0 56·8	5·8	0·3	11·8	0·7	17·8	1·0
59	0 59·8	0 59·9	0 57·0	5·9	0·3	11·9	0·7	17·9	1·0
60	1 00·0	1 00·2	0 57·3	6·0	0·4	12·0	0·7	18·0	1·1

4m s	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
	° ′	° ′	° ′	′	′	′	′	′	′
00	1 00·0	1 00·2	0 57·3	0·0	0·0	6·0	0·5	12·0	0·9
01	1 00·3	1 00·4	0 57·5	0·1	0·0	6·1	0·5	12·1	0·9
02	1 00·5	1 00·7	0 57·7	0·2	0·0	6·2	0·5	12·2	0·9
03	1 00·8	1 00·9	0 58·0	0·3	0·0	6·3	0·5	12·3	0·9
04	1 01·0	1 01·2	0 58·2	0·4	0·0	6·4	0·5	12·4	0·9
05	1 01·3	1 01·4	0 58·5	0·5	0·0	6·5	0·5	12·5	0·9
06	1 01·5	1 01·7	0 58·7	0·6	0·0	6·6	0·5	12·6	0·9
07	1 01·8	1 01·9	0 58·9	0·7	0·1	6·7	0·5	12·7	1·0
08	1 02·0	1 02·2	0 59·2	0·8	0·1	6·8	0·5	12·8	1·0
09	1 02·3	1 02·4	0 59·4	0·9	0·1	6·9	0·5	12·9	1·0
10	1 02·5	1 02·7	0 59·7	1·0	0·1	7·0	0·5	13·0	1·0
11	1 02·8	1 02·9	0 59·9	1·1	0·1	7·1	0·5	13·1	1·0
12	1 03·0	1 03·2	1 00·1	1·2	0·1	7·2	0·5	13·2	1·0
13	1 03·3	1 03·4	1 00·4	1·3	0·1	7·3	0·5	13·3	1·0
14	1 03·5	1 03·7	1 00·6	1·4	0·1	7·4	0·6	13·4	1·0
15	1 03·8	1 03·9	1 00·8	1·5	0·1	7·5	0·6	13·5	1·0
16	1 04·0	1 04·2	1 01·1	1·6	0·1	7·6	0·6	13·6	1·0
17	1 04·3	1 04·4	1 01·3	1·7	0·1	7·7	0·6	13·7	1·0
18	1 04·5	1 04·7	1 01·6	1·8	0·1	7·8	0·6	13·8	1·0
19	1 04·8	1 04·9	1 01·8	1·9	0·1	7·9	0·6	13·9	1·0
20	1 05·0	1 05·2	1 02·0	2·0	0·2	8·0	0·6	14·0	1·1
21	1 05·3	1 05·4	1 02·3	2·1	0·2	8·1	0·6	14·1	1·1
22	1 05·5	1 05·7	1 02·5	2·2	0·2	8·2	0·6	14·2	1·1
23	1 05·8	1 05·9	1 02·8	2·3	0·2	8·3	0·6	14·3	1·1
24	1 06·0	1 06·2	1 03·0	2·4	0·2	8·4	0·6	14·4	1·1
25	1 06·3	1 06·4	1 03·2	2·5	0·2	8·5	0·6	14·5	1·1
26	1 06·5	1 06·7	1 03·5	2·6	0·2	8·6	0·6	14·6	1·1
27	1 06·8	1 06·9	1 03·7	2·7	0·2	8·7	0·7	14·7	1·1
28	1 07·0	1 07·2	1 03·9	2·8	0·2	8·8	0·7	14·8	1·1
29	1 07·3	1 07·4	1 04·2	2·9	0·2	8·9	0·7	14·9	1·1
30	1 07·5	1 07·7	1 04·4	3·0	0·2	9·0	0·7	15·0	1·1
31	1 07·8	1 07·9	1 04·7	3·1	0·2	9·1	0·7	15·1	1·1
32	1 08·0	1 08·2	1 04·9	3·2	0·2	9·2	0·7	15·2	1·1
33	1 08·3	1 08·4	1 05·1	3·3	0·2	9·3	0·7	15·3	1·1
34	1 08·5	1 08·7	1 05·4	3·4	0·3	9·4	0·7	15·4	1·2
35	1 08·8	1 08·9	1 05·6	3·5	0·3	9·5	0·7	15·5	1·2
36	1 09·0	1 09·2	1 05·9	3·6	0·3	9·6	0·7	15·6	1·2
37	1 09·3	1 09·4	1 06·1	3·7	0·3	9·7	0·7	15·7	1·2
38	1 09·5	1 09·7	1 06·3	3·8	0·3	9·8	0·7	15·8	1·2
39	1 09·8	1 09·9	1 06·6	3·9	0·3	9·9	0·7	15·9	1·2
40	1 10·0	1 10·2	1 06·8	4·0	0·3	10·0	0·8	16·0	1·2
41	1 10·3	1 10·4	1 07·0	4·1	0·3	10·1	0·8	16·1	1·2
42	1 10·5	1 10·7	1 07·3	4·2	0·3	10·2	0·8	16·2	1·2
43	1 10·8	1 10·9	1 07·5	4·3	0·3	10·3	0·8	16·3	1·2
44	1 11·0	1 11·2	1 07·8	4·4	0·3	10·4	0·8	16·4	1·2
45	1 11·3	1 11·4	1 08·0	4·5	0·3	10·5	0·8	16·5	1·2
46	1 11·5	1 11·7	1 08·2	4·6	0·3	10·6	0·8	16·6	1·2
47	1 11·8	1 11·9	1 08·5	4·7	0·4	10·7	0·8	16·7	1·3
48	1 12·0	1 12·2	1 08·7	4·8	0·4	10·8	0·8	16·8	1·3
49	1 12·3	1 12·4	1 09·0	4·9	0·4	10·9	0·8	16·9	1·3
50	1 12·5	1 12·7	1 09·2	5·0	0·4	11·0	0·8	17·0	1·3
51	1 12·8	1 12·9	1 09·4	5·1	0·4	11·1	0·8	17·1	1·3
52	1 13·0	1 13·2	1 09·7	5·2	0·4	11·2	0·8	17·2	1·3
53	1 13·3	1 13·5	1 09·9	5·3	0·4	11·3	0·8	17·3	1·3
54	1 13·5	1 13·7	1 10·2	5·4	0·4	11·4	0·9	17·4	1·3
55	1 13·8	1 14·0	1 10·4	5·5	0·4	11·5	0·9	17·5	1·3
56	1 14·0	1 14·2	1 10·6	5·6	0·4	11·6	0·9	17·6	1·3
57	1 14·3	1 14·5	1 10·9	5·7	0·4	11·7	0·9	17·7	1·3
58	1 14·5	1 14·7	1 11·1	5·8	0·4	11·8	0·9	17·8	1·3
59	1 14·8	1 15·0	1 11·3	5·9	0·4	11·9	0·9	17·9	1·3
60	1 15·0	1 15·2	1 11·6	6·0	0·5	12·0	0·9	18·0	1·4

5m s	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
	° ′	° ′	° ′	′	′	′	′	′	′
00	1 15·0	1 15·2	1 11·6	0·0	0·0	6·0	0·6	12·0	1·1
01	1 15·3	1 15·5	1 11·8	0·1	0·0	6·1	0·6	12·1	1·1
02	1 15·5	1 15·7	1 12·1	0·2	0·0	6·2	0·6	12·2	1·1
03	1 15·8	1 16·0	1 12·3	0·3	0·0	6·3	0·6	12·3	1·1
04	1 16·0	1 16·2	1 12·5	0·4	0·0	6·4	0·6	12·4	1·1
05	1 16·3	1 16·5	1 12·8	0·5	0·0	6·5	0·6	12·5	1·1
06	1 16·5	1 16·7	1 13·0	0·6	0·1	6·6	0·6	12·6	1·2
07	1 16·8	1 17·0	1 13·3	0·7	0·1	6·7	0·6	12·7	1·2
08	1 17·0	1 17·2	1 13·5	0·8	0·1	6·8	0·6	12·8	1·2
09	1 17·3	1 17·5	1 13·7	0·9	0·1	6·9	0·6	12·9	1·2
10	1 17·5	1 17·7	1 14·0	1·0	0·1	7·0	0·6	13·0	1·2
11	1 17·8	1 18·0	1 14·2	1·1	0·1	7·1	0·7	13·1	1·2
12	1 18·0	1 18·2	1 14·4	1·2	0·1	7·2	0·7	13·2	1·2
13	1 18·3	1 18·5	1 14·7	1·3	0·1	7·3	0·7	13·3	1·2
14	1 18·5	1 18·7	1 14·9	1·4	0·1	7·4	0·7	13·4	1·2
15	1 18·8	1 19·0	1 15·2	1·5	0·1	7·5	0·7	13·5	1·2
16	1 19·0	1 19·2	1 15·4	1·6	0·1	7·6	0·7	13·6	1·2
17	1 19·3	1 19·5	1 15·6	1·7	0·2	7·7	0·7	13·7	1·3
18	1 19·5	1 19·7	1 15·9	1·8	0·2	7·8	0·7	13·8	1·3
19	1 19·8	1 20·0	1 16·1	1·9	0·2	7·9	0·7	13·9	1·3
20	1 20·0	1 20·2	1 16·4	2·0	0·2	8·0	0·7	14·0	1·3
21	1 20·3	1 20·5	1 16·6	2·1	0·2	8·1	0·7	14·1	1·3
22	1 20·5	1 20·7	1 16·8	2·2	0·2	8·2	0·8	14·2	1·3
23	1 20·8	1 21·0	1 17·1	2·3	0·2	8·3	0·8	14·3	1·3
24	1 21·0	1 21·2	1 17·3	2·4	0·2	8·4	0·8	14·4	1·3
25	1 21·3	1 21·5	1 17·5	2·5	0·2	8·5	0·8	14·5	1·3
26	1 21·5	1 21·7	1 17·8	2·6	0·2	8·6	0·8	14·6	1·3
27	1 21·8	1 22·0	1 18·0	2·7	0·2	8·7	0·8	14·7	1·3
28	1 22·0	1 22·2	1 18·3	2·8	0·3	8·8	0·8	14·8	1·4
29	1 22·3	1 22·5	1 18·5	2·9	0·3	8·9	0·8	14·9	1·4
30	1 22·5	1 22·7	1 18·7	3·0	0·3	9·0	0·8	15·0	1·4
31	1 22·8	1 23·0	1 19·0	3·1	0·3	9·1	0·8	15·1	1·4
32	1 23·0	1 23·2	1 19·2	3·2	0·3	9·2	0·8	15·2	1·4
33	1 23·3	1 23·5	1 19·5	3·3	0·3	9·3	0·9	15·3	1·4
34	1 23·5	1 23·7	1 19·7	3·4	0·3	9·4	0·9	15·4	1·4
35	1 23·8	1 24·0	1 19·9	3·5	0·3	9·5	0·9	15·5	1·4
36	1 24·0	1 24·2	1 20·2	3·6	0·3	9·6	0·9	15·6	1·4
37	1 24·3	1 24·5	1 20·4	3·7	0·3	9·7	0·9	15·7	1·4
38	1 24·5	1 24·7	1 20·7	3·8	0·3	9·8	0·9	15·8	1·4
39	1 24·8	1 25·0	1 20·9	3·9	0·4	9·9	0·9	15·9	1·5
40	1 25·0	1 25·2	1 21·1	4·0	0·4	10·0	0·9	16·0	1·5
41	1 25·3	1 25·5	1 21·4	4·1	0·4	10·1	0·9	16·1	1·5
42	1 25·5	1 25·7	1 21·6	4·2	0·4	10·2	0·9	16·2	1·5
43	1 25·8	1 26·0	1 21·8	4·3	0·4	10·3	0·9	16·3	1·5
44	1 26·0	1 26·2	1 22·1	4·4	0·4	10·4	1·0	16·4	1·5
45	1 26·3	1 26·5	1 22·3	4·5	0·4	10·5	1·0	16·5	1·5
46	1 26·5	1 26·7	1 22·6	4·6	0·4	10·6	1·0	16·6	1·5
47	1 26·8	1 27·0	1 22·8	4·7	0·4	10·7	1·0	16·7	1·5
48	1 27·0	1 27·2	1 23·0	4·8	0·4	10·8	1·0	16·8	1·5
49	1 27·3	1 27·5	1 23·3	4·9	0·4	10·9	1·0	16·9	1·5
50	1 27·5	1 27·7	1 23·5	5·0	0·5	11·0	1·0	17·0	1·6
51	1 27·8	1 28·0	1 23·8	5·1	0·5	11·1	1·0	17·1	1·6
52	1 28·0	1 28·2	1 24·0	5·2	0·5	11·2	1·0	17·2	1·6
53	1 28·3	1 28·5	1 24·2	5·3	0·5	11·3	1·0	17·3	1·6
54	1 28·5	1 28·7	1 24·5	5·4	0·5	11·4	1·0	17·4	1·6
55	1 28·8	1 29·0	1 24·7	5·5	0·5	11·5	1·1	17·5	1·6
56	1 29·0	1 29·2	1 24·9	5·6	0·5	11·6	1·1	17·6	1·6
57	1 29·3	1 29·5	1 25·2	5·7	0·5	11·7	1·1	17·7	1·6
58	1 29·5	1 29·7	1 25·4	5·8	0·5	11·8	1·1	17·8	1·6
59	1 29·8	1 30·0	1 25·7	5·9	0·5	11·9	1·1	17·9	1·6
60	1 30·0	1 30·2	1 25·9	6·0	0·6	12·0	1·1	18·0	1·7

m 6 s	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
	° ′	° ′	° ′	′	′	′	′	′	′
00	1 30·0	1 30·2	1 25·9	0·0	0·0	6·0	0·7	12·0	1·3
01	1 30·3	1 30·5	1 26·1	0·1	0·0	6·1	0·7	12·1	1·3
02	1 30·5	1 30·7	1 26·4	0·2	0·0	6·2	0·7	12·2	1·3
03	1 30·8	1 31·0	1 26·6	0·3	0·0	6·3	0·7	12·3	1·3
04	1 31·0	1 31·2	1 26·9	0·4	0·0	6·4	0·7	12·4	1·3
05	1 31·3	1 31·5	1 27·1	0·5	0·1	6·5	0·7	12·5	1·4
06	1 31·5	1 31·8	1 27·3	0·6	0·1	6·6	0·7	12·6	1·4
07	1 31·8	1 32·0	1 27·6	0·7	0·1	6·7	0·7	12·7	1·4
08	1 32·0	1 32·3	1 27·8	0·8	0·1	6·8	0·7	12·8	1·4
09	1 32·3	1 32·5	1 28·0	0·9	0·1	6·9	0·7	12·9	1·4
10	1 32·5	1 32·8	1 28·3	1·0	0·1	7·0	0·8	13·0	1·4
11	1 32·8	1 33·0	1 28·5	1·1	0·1	7·1	0·8	13·1	1·4
12	1 33·0	1 33·3	1 28·8	1·2	0·1	7·2	0·8	13·2	1·4
13	1 33·3	1 33·5	1 29·0	1·3	0·1	7·3	0·8	13·3	1·4
14	1 33·5	1 33·8	1 29·2	1·4	0·2	7·4	0·8	13·4	1·5
15	1 33·8	1 34·0	1 29·5	1·5	0·2	7·5	0·8	13·5	1·5
16	1 34·0	1 34·3	1 29·7	1·6	0·2	7·6	0·8	13·6	1·5
17	1 34·3	1 34·5	1 30·0	1·7	0·2	7·7	0·8	13·7	1·5
18	1 34·5	1 34·8	1 30·2	1·8	0·2	7·8	0·8	13·8	1·5
19	1 34·8	1 35·0	1 30·4	1·9	0·2	7·9	0·9	13·9	1·5
20	1 35·0	1 35·3	1 30·7	2·0	0·2	8·0	0·9	14·0	1·5
21	1 35·3	1 35·5	1 30·9	2·1	0·2	8·1	0·9	14·1	1·5
22	1 35·5	1 35·8	1 31·1	2·2	0·2	8·2	0·9	14·2	1·5
23	1 35·8	1 36·0	1 31·4	2·3	0·2	8·3	0·9	14·3	1·5
24	1 36·0	1 36·3	1 31·6	2·4	0·3	8·4	0·9	14·4	1·6
25	1 36·3	1 36·5	1 31·9	2·5	0·3	8·5	0·9	14·5	1·6
26	1 36·5	1 36·8	1 32·1	2·6	0·3	8·6	0·9	14·6	1·6
27	1 36·8	1 37·0	1 32·3	2·7	0·3	8·7	0·9	14·7	1·6
28	1 37·0	1 37·3	1 32·6	2·8	0·3	8·8	1·0	14·8	1·6
29	1 37·3	1 37·5	1 32·8	2·9	0·3	8·9	1·0	14·9	1·6
30	1 37·5	1 37·8	1 33·1	3·0	0·3	9·0	1·0	15·0	1·6
31	1 37·8	1 38·0	1 33·3	3·1	0·3	9·1	1·0	15·1	1·6
32	1 38·0	1 38·3	1 33·5	3·2	0·3	9·2	1·0	15·2	1·6
33	1 38·3	1 38·5	1 33·8	3·3	0·4	9·3	1·0	15·3	1·7
34	1 38·5	1 38·8	1 34·0	3·4	0·4	9·4	1·0	15·4	1·7
35	1 38·8	1 39·0	1 34·3	3·5	0·4	9·5	1·0	15·5	1·7
36	1 39·0	1 39·3	1 34·5	3·6	0·4	9·6	1·0	15·6	1·7
37	1 39·3	1 39·5	1 34·7	3·7	0·4	9·7	1·1	15·7	1·7
38	1 39·5	1 39·8	1 35·0	3·8	0·4	9·8	1·1	15·8	1·7
39	1 39·8	1 40·0	1 35·2	3·9	0·4	9·9	1·1	15·9	1·7
40	1 40·0	1 40·3	1 35·4	4·0	0·4	10·0	1·1	16·0	1·7
41	1 40·3	1 40·5	1 35·7	4·1	0·4	10·1	1·1	16·1	1·7
42	1 40·5	1 40·8	1 35·9	4·2	0·5	10·2	1·1	16·2	1·8
43	1 40·8	1 41·0	1 36·2	4·3	0·5	10·3	1·1	16·3	1·8
44	1 41·0	1 41·3	1 36·4	4·4	0·5	10·4	1·1	16·4	1·8
45	1 41·3	1 41·5	1 36·6	4·5	0·5	10·5	1·1	16·5	1·8
46	1 41·5	1 41·8	1 36·9	4·6	0·5	10·6	1·1	16·6	1·8
47	1 41·8	1 42·0	1 37·1	4·7	0·5	10·7	1·2	16·7	1·8
48	1 42·0	1 42·3	1 37·4	4·8	0·5	10·8	1·2	16·8	1·8
49	1 42·3	1 42·5	1 37·6	4·9	0·5	10·9	1·2	16·9	1·8
50	1 42·5	1 42·8	1 37·8	5·0	0·5	11·0	1·2	17·0	1·8
51	1 42·8	1 43·0	1 38·1	5·1	0·6	11·1	1·2	17·1	1·9
52	1 43·0	1 43·3	1 38·3	5·2	0·6	11·2	1·2	17·2	1·9
53	1 43·3	1 43·5	1 38·5	5·3	0·6	11·3	1·2	17·3	1·9
54	1 43·5	1 43·8	1 38·8	5·4	0·6	11·4	1·2	17·4	1·9
55	1 43·8	1 44·0	1 39·0	5·5	0·6	11·5	1·2	17·5	1·9
56	1 44·0	1 44·3	1 39·3	5·6	0·6	11·6	1·3	17·6	1·9
57	1 44·3	1 44·5	1 39·5	5·7	0·6	11·7	1·3	17·7	1·9
58	1 44·5	1 44·8	1 39·7	5·8	0·6	11·8	1·3	17·8	1·9
59	1 44·8	1 45·0	1 40·0	5·9	0·6	11·9	1·3	17·9	1·9
60	1 45·0	1 45·3	1 40·2	6·0	0·7	12·0	1·3	18·0	2·0

m 7 s	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
	° ′	° ′	° ′	′	′	′	′	′	′
00	1 45·0	1 45·3	1 40·2	0·0	0·0	6·0	0·8	12·0	1·5
01	1 45·3	1 45·5	1 40·5	0·1	0·0	6·1	0·8	12·1	1·5
02	1 45·5	1 45·8	1 40·7	0·2	0·0	6·2	0·8	12·2	1·5
03	1 45·8	1 46·0	1 40·9	0·3	0·0	6·3	0·8	12·3	1·5
04	1 46·0	1 46·3	1 41·2	0·4	0·1	6·4	0·8	12·4	1·6
05	1 46·3	1 46·5	1 41·4	0·5	0·1	6·5	0·8	12·5	1·6
06	1 46·5	1 46·8	1 41·6	0·6	0·1	6·6	0·8	12·6	1·6
07	1 46·8	1 47·0	1 41·9	0·7	0·1	6·7	0·8	12·7	1·6
08	1 47·0	1 47·3	1 42·1	0·8	0·1	6·8	0·9	12·8	1·6
09	1 47·3	1 47·5	1 42·4	0·9	0·1	6·9	0·9	12·9	1·6
10	1 47·5	1 47·8	1 42·6	1·0	0·1	7·0	0·9	13·0	1·6
11	1 47·8	1 48·0	1 42·8	1·1	0·1	7·1	0·9	13·1	1·6
12	1 48·0	1 48·3	1 43·1	1·2	0·2	7·2	0·9	13·2	1·7
13	1 48·3	1 48·5	1 43·3	1·3	0·2	7·3	0·9	13·3	1·7
14	1 48·5	1 48·8	1 43·6	1·4	0·2	7·4	0·9	13·4	1·7
15	1 48·8	1 49·0	1 43·8	1·5	0·2	7·5	0·9	13·5	1·7
16	1 49·0	1 49·3	1 44·0	1·6	0·2	7·6	1·0	13·6	1·7
17	1 49·3	1 49·5	1 44·3	1·7	0·2	7·7	1·0	13·7	1·7
18	1 49·5	1 49·8	1 44·5	1·8	0·2	7·8	1·0	13·8	1·7
19	1 49·8	1 50·1	1 44·8	1·9	0·2	7·9	1·0	13·9	1·7
20	1 50·0	1 50·3	1 45·0	2·0	0·3	8·0	1·0	14·0	1·8
21	1 50·3	1 50·6	1 45·2	2·1	0·3	8·1	1·0	14·1	1·8
22	1 50·5	1 50·8	1 45·5	2·2	0·3	8·2	1·0	14·2	1·8
23	1 50·8	1 51·1	1 45·7	2·3	0·3	8·3	1·0	14·3	1·8
24	1 51·0	1 51·3	1 45·9	2·4	0·3	8·4	1·1	14·4	1·8
25	1 51·3	1 51·6	1 46·2	2·5	0·3	8·5	1·1	14·5	1·8
26	1 51·5	1 51·8	1 46·4	2·6	0·3	8·6	1·1	14·6	1·8
27	1 51·8	1 52·1	1 46·7	2·7	0·3	8·7	1·1	14·7	1·8
28	1 52·0	1 52·3	1 46·9	2·8	0·4	8·8	1·1	14·8	1·9
29	1 52·3	1 52·6	1 47·1	2·9	0·4	8·9	1·1	14·9	1·9
30	1 52·5	1 52·8	1 47·4	3·0	0·4	9·0	1·1	15·0	1·9
31	1 52·8	1 53·1	1 47·6	3·1	0·4	9·1	1·1	15·1	1·9
32	1 53·0	1 53·3	1 47·9	3·2	0·4	9·2	1·2	15·2	1·9
33	1 53·3	1 53·6	1 48·1	3·3	0·4	9·3	1·2	15·3	1·9
34	1 53·5	1 53·8	1 48·3	3·4	0·4	9·4	1·2	15·4	1·9
35	1 53·8	1 54·1	1 48·6	3·5	0·4	9·5	1·2	15·5	1·9
36	1 54·0	1 54·3	1 48·8	3·6	0·5	9·6	1·2	15·6	2·0
37	1 54·3	1 54·6	1 49·0	3·7	0·5	9·7	1·2	15·7	2·0
38	1 54·5	1 54·8	1 49·3	3·8	0·5	9·8	1·2	15·8	2·0
39	1 54·8	1 55·1	1 49·5	3·9	0·5	9·9	1·2	15·9	2·0
40	1 55·0	1 55·3	1 49·8	4·0	0·5	10·0	1·3	16·0	2·0
41	1 55·3	1 55·6	1 50·0	4·1	0·5	10·1	1·3	16·1	2·0
42	1 55·5	1 55·8	1 50·2	4·2	0·5	10·2	1·3	16·2	2·0
43	1 55·8	1 56·1	1 50·5	4·3	0·5	10·3	1·3	16·3	2·0
44	1 56·0	1 56·3	1 50·7	4·4	0·6	10·4	1·3	16·4	2·1
45	1 56·3	1 56·6	1 51·0	4·5	0·6	10·5	1·3	16·5	2·1
46	1 56·5	1 56·8	1 51·2	4·6	0·6	10·6	1·3	16·6	2·1
47	1 56·8	1 57·1	1 51·4	4·7	0·6	10·7	1·3	16·7	2·1
48	1 57·0	1 57·3	1 51·7	4·8	0·6	10·8	1·4	16·8	2·1
49	1 57·3	1 57·6	1 51·9	4·9	0·6	10·9	1·4	16·9	2·1
50	1 57·5	1 57·8	1 52·1	5·0	0·6	11·0	1·4	17·0	2·1
51	1 57·8	1 58·1	1 52·4	5·1	0·6	11·1	1·4	17·1	2·1
52	1 58·0	1 58·3	1 52·6	5·2	0·7	11·2	1·4	17·2	2·2
53	1 58·3	1 58·6	1 52·9	5·3	0·7	11·3	1·4	17·3	2·2
54	1 58·5	1 58·8	1 53·1	5·4	0·7	11·4	1·4	17·4	2·2
55	1 58·8	1 59·1	1 53·3	5·5	0·7	11·5	1·4	17·5	2·2
56	1 59·0	1 59·3	1 53·6	5·6	0·7	11·6	1·5	17·6	2·2
57	1 59·3	1 59·6	1 53·8	5·7	0·7	11·7	1·5	17·7	2·2
58	1 59·5	1 59·8	1 54·1	5·8	0·7	11·8	1·5	17·8	2·2
59	1 59·8	2 00·1	1 54·3	5·9	0·7	11·9	1·5	17·9	2·2
60	2 00·0	2 00·3	1 54·5	6·0	0·8	12·0	1·5	18·0	2·3

m 8	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	2 00·0	2 00·3	1 54·5	0·0	0·0	6·0	0·9	12·0	1·7
01	2 00·3	2 00·6	1 54·8	0·1	0·0	6·1	0·9	12·1	1·7
02	2 00·5	2 00·8	1 55·0	0·2	0·0	6·2	0·9	12·2	1·7
03	2 00·8	2 01·1	1 55·2	0·3	0·0	6·3	0·9	12·3	1·7
04	2 01·0	2 01·3	1 55·5	0·4	0·1	6·4	0·9	12·4	1·8
05	2 01·3	2 01·6	1 55·7	0·5	0·1	6·5	0·9	12·5	1·8
06	2 01·5	2 01·8	1 56·0	0·6	0·1	6·6	0·9	12·6	1·8
07	2 01·8	2 02·1	1 56·2	0·7	0·1	6·7	0·9	12·7	1·8
08	2 02·0	2 02·3	1 56·4	0·8	0·1	6·8	1·0	12·8	1·8
09	2 02·3	2 02·6	1 56·7	0·9	0·1	6·9	1·0	12·9	1·8
10	2 02·5	2 02·8	1 56·9	1·0	0·1	7·0	1·0	13·0	1·8
11	2 02·8	2 03·1	1 57·2	1·1	0·2	7·1	1·0	13·1	1·9
12	2 03·0	2 03·3	1 57·4	1·2	0·2	7·2	1·0	13·2	1·9
13	2 03·3	2 03·6	1 57·6	1·3	0·2	7·3	1·0	13·3	1·9
14	2 03·5	2 03·8	1 57·9	1·4	0·2	7·4	1·0	13·4	1·9
15	2 03·8	2 04·1	1 58·1	1·5	0·2	7·5	1·1	13·5	1·9
16	2 04·0	2 04·3	1 58·4	1·6	0·2	7·6	1·1	13·6	1·9
17	2 04·3	2 04·6	1 58·6	1·7	0·2	7·7	1·1	13·7	1·9
18	2 04·5	2 04·8	1 58·8	1·8	0·3	7·8	1·1	13·8	2·0
19	2 04·8	2 05·1	1 59·1	1·9	0·3	7·9	1·1	13·9	2·0
20	2 05·0	2 05·3	1 59·3	2·0	0·3	8·0	1·1	14·0	2·0
21	2 05·3	2 05·6	1 59·5	2·1	0·3	8·1	1·1	14·1	2·0
22	2 05·5	2 05·8	1 59·8	2·2	0·3	8·2	1·2	14·2	2·0
23	2 05·8	2 06·1	2 00·0	2·3	0·3	8·3	1·2	14·3	2·0
24	2 06·0	2 06·3	2 00·3	2·4	0·3	8·4	1·2	14·4	2·0
25	2 06·3	2 06·6	2 00·5	2·5	0·4	8·5	1·2	14·5	2·1
26	2 06·5	2 06·8	2 00·7	2·6	0·4	8·6	1·2	14·6	2·1
27	2 06·8	2 07·1	2 01·0	2·7	0·4	8·7	1·2	14·7	2·1
28	2 07·0	2 07·3	2 01·2	2·8	0·4	8·8	1·2	14·8	2·1
29	2 07·3	2 07·6	2 01·5	2·9	0·4	8·9	1·3	14·9	2·1
30	2 07·5	2 07·8	2 01·7	3·0	0·4	9·0	1·3	15·0	2·1
31	2 07·8	2 08·1	2 01·9	3·1	0·4	9·1	1·3	15·1	2·1
32	2 08·0	2 08·4	2 02·2	3·2	0·5	9·2	1·3	15·2	2·2
33	2 08·3	2 08·6	2 02·4	3·3	0·5	9·3	1·3	15·3	2·2
34	2 08·5	2 08·9	2 02·6	3·4	0·5	9·4	1·3	15·4	2·2
35	2 08·8	2 09·1	2 02·9	3·5	0·5	9·5	1·3	15·5	2·2
36	2 09·0	2 09·4	2 03·1	3·6	0·5	9·6	1·4	15·6	2·2
37	2 09·3	2 09·6	2 03·4	3·7	0·5	9·7	1·4	15·7	2·2
38	2 09·5	2 09·9	2 03·6	3·8	0·5	9·8	1·4	15·8	2·2
39	2 09·8	2 10·1	2 03·8	3·9	0·6	9·9	1·4	15·9	2·3
40	2 10·0	2 10·4	2 04·1	4·0	0·6	10·0	1·4	16·0	2·3
41	2 10·3	2 10·6	2 04·3	4·1	0·6	10·1	1·4	16·1	2·3
42	2 10·5	2 10·9	2 04·6	4·2	0·6	10·2	1·4	16·2	2·3
43	2 10·8	2 11·1	2 04·8	4·3	0·6	10·3	1·5	16·3	2·3
44	2 11·0	2 11·4	2 05·0	4·4	0·6	10·4	1·5	16·4	2·3
45	2 11·3	2 11·6	2 05·3	4·5	0·6	10·5	1·5	16·5	2·3
46	2 11·5	2 11·9	2 05·5	4·6	0·7	10·6	1·5	16·6	2·4
47	2 11·8	2 12·1	2 05·7	4·7	0·7	10·7	1·5	16·7	2·4
48	2 12·0	2 12·4	2 06·0	4·8	0·7	10·8	1·5	16·8	2·4
49	2 12·3	2 12·6	2 06·2	4·9	0·7	10·9	1·5	16·9	2·4
50	2 12·5	2 12·9	2 06·5	5·0	0·7	11·0	1·6	17·0	2·4
51	2 12·8	2 13·1	2 06·7	5·1	0·7	11·1	1·6	17·1	2·4
52	2 13·0	2 13·4	2 06·9	5·2	0·7	11·2	1·6	17·2	2·4
53	2 13·3	2 13·6	2 07·2	5·3	0·8	11·3	1·6	17·3	2·5
54	2 13·5	2 13·9	2 07·4	5·4	0·8	11·4	1·6	17·4	2·5
55	2 13·8	2 14·1	2 07·7	5·5	0·8	11·5	1·6	17·5	2·5
56	2 14·0	2 14·4	2 07·9	5·6	0·8	11·6	1·6	17·6	2·5
57	2 14·3	2 14·6	2 08·1	5·7	0·8	11·7	1·7	17·7	2·5
58	2 14·5	2 14·9	2 08·4	5·8	0·8	11·8	1·7	17·8	2·5
59	2 14·8	2 15·1	2 08·6	5·9	0·8	11·9	1·7	17·9	2·5
60	2 15·0	2 15·4	2 08·9	6·0	0·9	12·0	1·7	18·0	2·6

m 9	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	2 15·0	2 15·4	2 08·9	0·0	0·0	6·0	1·0	12·0	1·9
01	2 15·3	2 15·6	2 09·1	0·1	0·0	6·1	1·0	12·1	1·9
02	2 15·5	2 15·9	2 09·3	0·2	0·0	6·2	1·0	12·2	1·9
03	2 15·8	2 16·1	2 09·6	0·3	0·0	6·3	1·0	12·3	1·9
04	2 16·0	2 16·4	2 09·8	0·4	0·1	6·4	1·0	12·4	2·0
05	2 16·3	2 16·6	2 10·0	0·5	0·1	6·5	1·0	12·5	2·0
06	2 16·5	2 16·9	2 10·3	0·6	0·1	6·6	1·0	12·6	2·0
07	2 16·8	2 17·1	2 10·5	0·7	0·1	6·7	1·1	12·7	2·0
08	2 17·0	2 17·4	2 10·8	0·8	0·1	6·8	1·1	12·8	2·0
09	2 17·3	2 17·6	2 11·0	0·9	0·1	6·9	1·1	12·9	2·0
10	2 17·5	2 17·9	2 11·2	1·0	0·2	7·0	1·1	13·0	2·1
11	2 17·8	2 18·1	2 11·5	1·1	0·2	7·1	1·1	13·1	2·1
12	2 18·0	2 18·4	2 11·7	1·2	0·2	7·2	1·1	13·2	2·1
13	2 18·3	2 18·6	2 12·0	1·3	0·2	7·3	1·2	13·3	2·1
14	2 18·5	2 18·9	2 12·2	1·4	0·2	7·4	1·2	13·4	2·1
15	2 18·8	2 19·1	2 12·4	1·5	0·2	7·5	1·2	13·5	2·1
16	2 19·0	2 19·4	2 12·7	1·6	0·3	7·6	1·2	13·6	2·2
17	2 19·3	2 19·6	2 12·9	1·7	0·3	7·7	1·2	13·7	2·2
18	2 19·5	2 19·9	2 13·1	1·8	0·3	7·8	1·2	13·8	2·2
19	2 19·8	2 20·1	2 13·4	1·9	0·3	7·9	1·3	13·9	2·2
20	2 20·0	2 20·4	2 13·6	2·0	0·3	8·0	1·3	14·0	2·2
21	2 20·3	2 20·6	2 13·9	2·1	0·3	8·1	1·3	14·1	2·2
22	2 20·5	2 20·9	2 14·1	2·2	0·3	8·2	1·3	14·2	2·2
23	2 20·8	2 21·1	2 14·3	2·3	0·4	8·3	1·3	14·3	2·3
24	2 21·0	2 21·4	2 14·6	2·4	0·4	8·4	1·3	14·4	2·3
25	2 21·3	2 21·6	2 14·8	2·5	0·4	8·5	1·3	14·5	2·3
26	2 21·5	2 21·9	2 15·1	2·6	0·4	8·6	1·4	14·6	2·3
27	2 21·8	2 22·1	2 15·3	2·7	0·4	8·7	1·4	14·7	2·3
28	2 22·0	2 22·4	2 15·5	2·8	0·4	8·8	1·4	14·8	2·3
29	2 22·3	2 22·6	2 15·8	2·9	0·5	8·9	1·4	14·9	2·4
30	2 22·5	2 22·9	2 16·0	3·0	0·5	9·0	1·4	15·0	2·4
31	2 22·8	2 23·1	2 16·2	3·1	0·5	9·1	1·4	15·1	2·4
32	2 23·0	2 23·4	2 16·5	3·2	0·5	9·2	1·5	15·2	2·4
33	2 23·3	2 23·6	2 16·7	3·3	0·5	9·3	1·5	15·3	2·4
34	2 23·5	2 23·9	2 17·0	3·4	0·5	9·4	1·5	15·4	2·4
35	2 23·8	2 24·1	2 17·2	3·5	0·6	9·5	1·5	15·5	2·5
36	2 24·0	2 24·4	2 17·4	3·6	0·6	9·6	1·5	15·6	2·5
37	2 24·3	2 24·6	2 17·7	3·7	0·6	9·7	1·5	15·7	2·5
38	2 24·5	2 24·9	2 17·9	3·8	0·6	9·8	1·6	15·8	2·5
39	2 24·8	2 25·1	2 18·2	3·9	0·6	9·9	1·6	15·9	2·5
40	2 25·0	2 25·4	2 18·4	4·0	0·6	10·0	1·6	16·0	2·5
41	2 25·3	2 25·6	2 18·6	4·1	0·6	10·1	1·6	16·1	2·5
42	2 25·5	2 25·9	2 18·9	4·2	0·7	10·2	1·6	16·2	2·6
43	2 25·8	2 26·1	2 19·1	4·3	0·7	10·3	1·6	16·3	2·6
44	2 26·0	2 26·4	2 19·3	4·4	0·7	10·4	1·6	16·4	2·6
45	2 26·3	2 26·7	2 19·6	4·5	0·7	10·5	1·7	16·5	2·6
46	2 26·5	2 26·9	2 19·8	4·6	0·7	10·6	1·7	16·6	2·6
47	2 26·8	2 27·2	2 20·1	4·7	0·7	10·7	1·7	16·7	2·6
48	2 27·0	2 27·4	2 20·3	4·8	0·8	10·8	1·7	16·8	2·7
49	2 27·3	2 27·7	2 20·5	4·9	0·8	10·9	1·7	16·9	2·7
50	2 27·5	2 27·9	2 20·8	5·0	0·8	11·0	1·7	17·0	2·7
51	2 27·8	2 28·2	2 21·0	5·1	0·8	11·1	1·8	17·1	2·7
52	2 28·0	2 28·4	2 21·3	5·2	0·8	11·2	1·8	17·2	2·7
53	2 28·3	2 28·7	2 21·5	5·3	0·8	11·3	1·8	17·3	2·7
54	2 28·5	2 28·9	2 21·7	5·4	0·9	11·4	1·8	17·4	2·8
55	2 28·8	2 29·2	2 22·0	5·5	0·9	11·5	1·8	17·5	2·8
56	2 29·0	2 29·4	2 22·2	5·6	0·9	11·6	1·8	17·6	2·8
57	2 29·3	2 29·7	2 22·5	5·7	0·9	11·7	1·9	17·7	2·8
58	2 29·5	2 29·9	2 22·7	5·8	0·9	11·8	1·9	17·8	2·8
59	2 29·8	2 30·2	2 22·9	5·9	0·9	11·9	1·9	17·9	2·8
60	2 30·0	2 30·4	2 23·2	6·0	1·0	12·0	1·9	18·0	2·9

10m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	2 30·0	2 30·4	2 23·2	0·0	0·0	6·0	1·1	12·0	2·1
01	2 30·3	2 30·7	2 23·4	0·1	0·0	6·1	1·1	12·1	2·1
02	2 30·5	2 30·9	2 23·6	0·2	0·0	6·2	1·1	12·2	2·1
03	2 30·8	2 31·2	2 23·9	0·3	0·1	6·3	1·1	12·3	2·2
04	2 31·0	2 31·4	2 24·1	0·4	0·1	6·4	1·1	12·4	2·2
05	2 31·3	2 31·7	2 24·4	0·5	0·1	6·5	1·1	12·5	2·2
06	2 31·5	2 31·9	2 24·6	0·6	0·1	6·6	1·2	12·6	2·2
07	2 31·8	2 32·2	2 24·8	0·7	0·1	6·7	1·2	12·7	2·2
08	2 32·0	2 32·4	2 25·1	0·8	0·1	6·8	1·2	12·8	2·2
09	2 32·3	2 32·7	2 25·3	0·9	0·2	6·9	1·2	12·9	2·3
10	2 32·5	2 32·9	2 25·6	1·0	0·2	7·0	1·2	13·0	2·3
11	2 32·8	2 33·2	2 25·8	1·1	0·2	7·1	1·2	13·1	2·3
12	2 33·0	2 33·4	2 26·0	1·2	0·2	7·2	1·3	13·2	2·3
13	2 33·3	2 33·7	2 26·3	1·3	0·2	7·3	1·3	13·3	2·3
14	2 33·5	2 33·9	2 26·5	1·4	0·2	7·4	1·3	13·4	2·3
15	2 33·8	2 34·2	2 26·7	1·5	0·3	7·5	1·3	13·5	2·4
16	2 34·0	2 34·4	2 27·0	1·6	0·3	7·6	1·3	13·6	2·4
17	2 34·3	2 34·7	2 27·2	1·7	0·3	7·7	1·3	13·7	2·4
18	2 34·5	2 34·9	2 27·5	1·8	0·3	7·8	1·4	13·8	2·4
19	2 34·8	2 35·2	2 27·7	1·9	0·3	7·9	1·4	13·9	2·4
20	2 35·0	2 35·4	2 27·9	2·0	0·4	8·0	1·4	14·0	2·5
21	2 35·3	2 35·7	2 28·2	2·1	0·4	8·1	1·4	14·1	2·5
22	2 35·5	2 35·9	2 28·4	2·2	0·4	8·2	1·4	14·2	2·5
23	2 35·8	2 36·2	2 28·7	2·3	0·4	8·3	1·5	14·3	2·5
24	2 36·0	2 36·4	2 28·9	2·4	0·4	8·4	1·5	14·4	2·5
25	2 36·3	2 36·7	2 29·1	2·5	0·4	8·5	1·5	14·5	2·5
26	2 36·5	2 36·9	2 29·4	2·6	0·5	8·6	1·5	14·6	2·6
27	2 36·8	2 37·2	2 29·6	2·7	0·5	8·7	1·5	14·7	2·6
28	2 37·0	2 37·4	2 29·8	2·8	0·5	8·8	1·5	14·8	2·6
29	2 37·3	2 37·7	2 30·1	2·9	0·5	8·9	1·6	14·9	2·6
30	2 37·5	2 37·9	2 30·3	3·0	0·5	9·0	1·6	15·0	2·6
31	2 37·8	2 38·2	2 30·6	3·1	0·5	9·1	1·6	15·1	2·6
32	2 38·0	2 38·4	2 30·8	3·2	0·6	9·2	1·6	15·2	2·7
33	2 38·3	2 38·7	2 31·0	3·3	0·6	9·3	1·6	15·3	2·7
34	2 38·5	2 38·9	2 31·3	3·4	0·6	9·4	1·6	15·4	2·7
35	2 38·8	2 39·2	2 31·5	3·5	0·6	9·5	1·7	15·5	2·7
36	2 39·0	2 39·4	2 31·8	3·6	0·6	9·6	1·7	15·6	2·7
37	2 39·3	2 39·7	2 32·0	3·7	0·6	9·7	1·7	15·7	2·7
38	2 39·5	2 39·9	2 32·2	3·8	0·7	9·8	1·7	15·8	2·8
39	2 39·8	2 40·2	2 32·5	3·9	0·7	9·9	1·7	15·9	2·8
40	2 40·0	2 40·4	2 32·7	4·0	0·7	10·0	1·8	16·0	2·8
41	2 40·3	2 40·7	2 32·9	4·1	0·7	10·1	1·8	16·1	2·8
42	2 40·5	2 40·9	2 33·2	4·2	0·7	10·2	1·8	16·2	2·8
43	2 40·8	2 41·2	2 33·4	4·3	0·8	10·3	1·8	16·3	2·9
44	2 41·0	2 41·4	2 33·7	4·4	0·8	10·4	1·8	16·4	2·9
45	2 41·3	2 41·7	2 33·9	4·5	0·8	10·5	1·8	16·5	2·9
46	2 41·5	2 41·9	2 34·1	4·6	0·8	10·6	1·9	16·6	2·9
47	2 41·8	2 42·2	2 34·4	4·7	0·8	10·7	1·9	16·7	2·9
48	2 42·0	2 42·4	2 34·6	4·8	0·8	10·8	1·9	16·8	2·9
49	2 42·3	2 42·7	2 34·9	4·9	0·9	10·9	1·9	16·9	3·0
50	2 42·5	2 42·9	2 35·1	5·0	0·9	11·0	1·9	17·0	3·0
51	2 42·8	2 43·2	2 35·3	5·1	0·9	11·1	1·9	17·1	3·0
52	2 43·0	2 43·4	2 35·6	5·2	0·9	11·2	2·0	17·2	3·0
53	2 43·3	2 43·7	2 35·8	5·3	0·9	11·3	2·0	17·3	3·0
54	2 43·5	2 43·9	2 36·1	5·4	0·9	11·4	2·0	17·4	3·0
55	2 43·8	2 44·2	2 36·3	5·5	1·0	11·5	2·0	17·5	3·1
56	2 44·0	2 44·4	2 36·5	5·6	1·0	11·6	2·0	17·6	3·1
57	2 44·3	2 44·7	2 36·8	5·7	1·0	11·7	2·0	17·7	3·1
58	2 44·5	2 45·0	2 37·0	5·8	1·0	11·8	2·1	17·8	3·1
59	2 44·8	2 45·2	2 37·2	5·9	1·0	11·9	2·1	17·9	3·1
60	2 45·0	2 45·5	2 37·5	6·0	1·1	12·0	2·1	18·0	3·2

11m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	2 45·0	2 45·5	2 37·5	0·0	0·0	6·0	1·2	12·0	2·3
01	2 45·3	2 45·7	2 37·7	0·1	0·0	6·1	1·2	12·1	2·3
02	2 45·5	2 46·0	2 38·0	0·2	0·0	6·2	1·2	12·2	2·3
03	2 45·8	2 46·2	2 38·2	0·3	0·1	6·3	1·2	12·3	2·4
04	2 46·0	2 46·5	2 38·4	0·4	0·1	6·4	1·2	12·4	2·4
05	2 46·3	2 46·7	2 38·7	0·5	0·1	6·5	1·2	12·5	2·4
06	2 46·5	2 47·0	2 38·9	0·6	0·1	6·6	1·3	12·6	2·4
07	2 46·8	2 47·2	2 39·2	0·7	0·1	6·7	1·3	12·7	2·4
08	2 47·0	2 47·5	2 39·4	0·8	0·2	6·8	1·3	12·8	2·5
09	2 47·3	2 47·7	2 39·6	0·9	0·2	6·9	1·3	12·9	2·5
10	2 47·5	2 48·0	2 39·9	1·0	0·2	7·0	1·3	13·0	2·5
11	2 47·8	2 48·2	2 40·1	1·1	0·2	7·1	1·4	13·1	2·5
12	2 48·0	2 48·5	2 40·3	1·2	0·2	7·2	1·4	13·2	2·5
13	2 48·3	2 48·7	2 40·6	1·3	0·2	7·3	1·4	13·3	2·5
14	2 48·5	2 49·0	2 40·8	1·4	0·3	7·4	1·4	13·4	2·6
15	2 48·8	2 49·2	2 41·1	1·5	0·3	7·5	1·4	13·5	2·6
16	2 49·0	2 49·5	2 41·3	1·6	0·3	7·6	1·5	13·6	2·6
17	2 49·3	2 49·7	2 41·5	1·7	0·3	7·7	1·5	13·7	2·6
18	2 49·5	2 50·0	2 41·8	1·8	0·3	7·8	1·5	13·8	2·6
19	2 49·8	2 50·2	2 42·0	1·9	0·4	7·9	1·5	13·9	2·7
20	2 50·0	2 50·5	2 42·3	2·0	0·4	8·0	1·5	14·0	2·7
21	2 50·3	2 50·7	2 42·5	2·1	0·4	8·1	1·6	14·1	2·7
22	2 50·5	2 51·0	2 42·7	2·2	0·4	8·2	1·6	14·2	2·7
23	2 50·8	2 51·2	2 43·0	2·3	0·4	8·3	1·6	14·3	2·7
24	2 51·0	2 51·5	2 43·2	2·4	0·5	8·4	1·6	14·4	2·8
25	2 51·3	2 51·7	2 43·4	2·5	0·5	8·5	1·6	14·5	2·8
26	2 51·5	2 52·0	2 43·7	2·6	0·5	8·6	1·6	14·6	2·8
27	2 51·8	2 52·2	2 43·9	2·7	0·5	8·7	1·7	14·7	2·8
28	2 52·0	2 52·5	2 44·2	2·8	0·5	8·8	1·7	14·8	2·8
29	2 52·3	2 52·7	2 44·4	2·9	0·6	8·9	1·7	14·9	2·9
30	2 52·5	2 53·0	2 44·6	3·0	0·6	9·0	1·7	15·0	2·9
31	2 52·8	2 53·2	2 44·9	3·1	0·6	9·1	1·7	15·1	2·9
32	2 53·0	2 53·5	2 45·1	3·2	0·6	9·2	1·8	15·2	2·9
33	2 53·3	2 53·7	2 45·4	3·3	0·6	9·3	1·8	15·3	2·9
34	2 53·5	2 54·0	2 45·6	3·4	0·7	9·4	1·8	15·4	3·0
35	2 53·8	2 54·2	2 45·8	3·5	0·7	9·5	1·8	15·5	3·0
36	2 54·0	2 54·5	2 46·1	3·6	0·7	9·6	1·8	15·6	3·0
37	2 54·3	2 54·7	2 46·3	3·7	0·7	9·7	1·9	15·7	3·0
38	2 54·5	2 55·0	2 46·6	3·8	0·7	9·8	1·9	15·8	3·0
39	2 54·8	2 55·2	2 46·8	3·9	0·7	9·9	1·9	15·9	3·0
40	2 55·0	2 55·5	2 47·0	4·0	0·8	10·0	1·9	16·0	3·1
41	2 55·3	2 55·7	2 47·3	4·1	0·8	10·1	1·9	16·1	3·1
42	2 55·5	2 56·0	2 47·5	4·2	0·8	10·2	2·0	16·2	3·1
43	2 55·8	2 56·2	2 47·7	4·3	0·8	10·3	2·0	16·3	3·1
44	2 56·0	2 56·5	2 48·0	4·4	0·8	10·4	2·0	16·4	3·1
45	2 56·3	2 56·7	2 48·2	4·5	0·9	10·5	2·0	16·5	3·2
46	2 56·5	2 57·0	2 48·5	4·6	0·9	10·6	2·0	16·6	3·2
47	2 56·8	2 57·2	2 48·7	4·7	0·9	10·7	2·1	16·7	3·2
48	2 57·0	2 57·5	2 48·9	4·8	0·9	10·8	2·1	16·8	3·2
49	2 57·3	2 57·7	2 49·2	4·9	0·9	10·9	2·1	16·9	3·2
50	2 57·5	2 58·0	2 49·4	5·0	1·0	11·0	2·1	17·0	3·3
51	2 57·8	2 58·2	2 49·7	5·1	1·0	11·1	2·1	17·1	3·3
52	2 58·0	2 58·5	2 49·9	5·2	1·0	11·2	2·1	17·2	3·3
53	2 58·3	2 58·7	2 50·1	5·3	1·0	11·3	2·2	17·3	3·3
54	2 58·5	2 59·0	2 50·4	5·4	1·0	11·4	2·2	17·4	3·3
55	2 58·8	2 59·2	2 50·6	5·5	1·1	11·5	2·2	17·5	3·4
56	2 59·0	2 59·5	2 50·8	5·6	1·1	11·6	2·2	17·6	3·4
57	2 59·3	2 59·7	2 51·1	5·7	1·1	11·7	2·2	17·7	3·4
58	2 59·5	3 00·0	2 51·3	5·8	1·1	11·8	2·3	17·8	3·4
59	2 59·8	3 00·2	2 51·6	5·9	1·1	11·9	2·3	17·9	3·4
60	3 00·0	3 00·5	2 51·8	6·0	1·2	12·0	2·3	18·0	3·5

12m s	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
	° ′	° ′	° ′	′	′	′	′	′	′
00	3 00·0	3 00·5	2 51·8	0·0	0·0	6·0	1·3	12·0	2·5
01	3 00·3	3 00·7	2 52·0	0·1	0·0	6·1	1·3	12·1	2·5
02	3 00·5	3 01·0	2 52·3	0·2	0·0	6·2	1·3	12·2	2·5
03	3 00·8	3 01·2	2 52·5	0·3	0·1	6·3	1·3	12·3	2·6
04	3 01·0	3 01·5	2 52·8	0·4	0·1	6·4	1·3	12·4	2·6
05	3 01·3	3 01·7	2 53·0	0·5	0·1	6·5	1·4	12·5	2·6
06	3 01·5	3 02·0	2 53·2	0·6	0·1	6·6	1·4	12·6	2·6
07	3 01·8	3 02·2	2 53·5	0·7	0·1	6·7	1·4	12·7	2·6
08	3 02·0	3 02·5	2 53·7	0·8	0·2	6·8	1·4	12·8	2·7
09	3 02·3	3 02·7	2 53·9	0·9	0·2	6·9	1·4	12·9	2·7
10	3 02·5	3 03·0	2 54·2	1·0	0·2	7·0	1·5	13·0	2·7
11	3 02·8	3 03·3	2 54·4	1·1	0·2	7·1	1·5	13·1	2·7
12	3 03·0	3 03·5	2 54·7	1·2	0·3	7·2	1·5	13·2	2·8
13	3 03·3	3 03·8	2 54·9	1·3	0·3	7·3	1·5	13·3	2·8
14	3 03·5	3 04·0	2 55·1	1·4	0·3	7·4	1·5	13·4	2·8
15	3 03·8	3 04·3	2 55·4	1·5	0·3	7·5	1·6	13·5	2·8
16	3 04·0	3 04·5	2 55·6	1·6	0·3	7·6	1·6	13·6	2·8
17	3 04·3	3 04·8	2 55·9	1·7	0·4	7·7	1·6	13·7	2·9
18	3 04·5	3 05·0	2 56·1	1·8	0·4	7·8	1·6	13·8	2·9
19	3 04·8	3 05·3	2 56·3	1·9	0·4	7·9	1·6	13·9	2·9
20	3 05·0	3 05·5	2 56·6	2·0	0·4	8·0	1·7	14·0	2·9
21	3 05·3	3 05·8	2 56·8	2·1	0·4	8·1	1·7	14·1	2·9
22	3 05·5	3 06·0	2 57·0	2·2	0·5	8·2	1·7	14·2	3·0
23	3 05·8	3 06·3	2 57·3	2·3	0·5	8·3	1·7	14·3	3·0
24	3 06·0	3 06·5	2 57·5	2·4	0·5	8·4	1·8	14·4	3·0
25	3 06·3	3 06·8	2 57·8	2·5	0·5	8·5	1·8	14·5	3·0
26	3 06·5	3 07·0	2 58·0	2·6	0·5	8·6	1·8	14·6	3·0
27	3 06·8	3 07·3	2 58·2	2·7	0·6	8·7	1·8	14·7	3·1
28	3 07·0	3 07·5	2 58·5	2·8	0·6	8·8	1·8	14·8	3·1
29	3 07·3	3 07·8	2 58·7	2·9	0·6	8·9	1·9	14·9	3·1
30	3 07·5	3 08·0	2 59·0	3·0	0·6	9·0	1·9	15·0	3·1
31	3 07·8	3 08·3	2 59·2	3·1	0·6	9·1	1·9	15·1	3·1
32	3 08·0	3 08·5	2 59·4	3·2	0·7	9·2	1·9	15·2	3·2
33	3 08·3	3 08·8	2 59·7	3·3	0·7	9·3	1·9	15·3	3·2
34	3 08·5	3 09·0	2 59·9	3·4	0·7	9·4	2·0	15·4	3·2
35	3 08·8	3 09·3	3 00·2	3·5	0·7	9·5	2·0	15·5	3·2
36	3 09·0	3 09·5	3 00·4	3·6	0·8	9·6	2·0	15·6	3·3
37	3 09·3	3 09·8	3 00·6	3·7	0·8	9·7	2·0	15·7	3·3
38	3 09·5	3 10·0	3 00·9	3·8	0·8	9·8	2·0	15·8	3·3
39	3 09·8	3 10·3	3 01·1	3·9	0·8	9·9	2·1	15·9	3·3
40	3 10·0	3 10·5	3 01·3	4·0	0·8	10·0	2·1	16·0	3·3
41	3 10·3	3 10·8	3 01·6	4·1	0·9	10·1	2·1	16·1	3·4
42	3 10·5	3 11·0	3 01·8	4·2	0·9	10·2	2·1	16·2	3·4
43	3 10·8	3 11·3	3 02·1	4·3	0·9	10·3	2·1	16·3	3·4
44	3 11·0	3 11·5	3 02·3	4·4	0·9	10·4	2·2	16·4	3·4
45	3 11·3	3 11·8	3 02·5	4·5	0·9	10·5	2·2	16·5	3·4
46	3 11·5	3 12·0	3 02·8	4·6	1·0	10·6	2·2	16·6	3·5
47	3 11·8	3 12·3	3 03·0	4·7	1·0	10·7	2·2	16·7	3·5
48	3 12·0	3 12·5	3 03·3	4·8	1·0	10·8	2·3	16·8	3·5
49	3 12·3	3 12·8	3 03·5	4·9	1·0	10·9	2·3	16·9	3·5
50	3 12·5	3 13·0	3 03·7	5·0	1·0	11·0	2·3	17·0	3·5
51	3 12·8	3 13·3	3 04·0	5·1	1·1	11·1	2·3	17·1	3·6
52	3 13·0	3 13·5	3 04·2	5·2	1·1	11·2	2·3	17·2	3·6
53	3 13·3	3 13·8	3 04·4	5·3	1·1	11·3	2·4	17·3	3·6
54	3 13·5	3 14·0	3 04·7	5·4	1·1	11·4	2·4	17·4	3·6
55	3 13·8	3 14·3	3 04·9	5·5	1·1	11·5	2·4	17·5	3·6
56	3 14·0	3 14·5	3 05·2	5·6	1·2	11·6	2·4	17·6	3·7
57	3 14·3	3 14·8	3 05·4	5·7	1·2	11·7	2·4	17·7	3·7
58	3 14·5	3 15·0	3 05·6	5·8	1·2	11·8	2·5	17·8	3·7
59	3 14·8	3 15·3	3 05·9	5·9	1·2	11·9	2·5	17·9	3·7
60	3 15·0	3 15·5	3 06·1	6·0	1·3	12·0	2·5	18·0	3·8

13m s	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
	° ′	° ′	° ′	′	′	′	′	′	′
00	3 15·0	3 15·5	3 06·1	0·0	0·0	6·0	1·4	12·0	2·7
01	3 15·3	3 15·8	3 06·4	0·1	0·0	6·1	1·4	12·1	2·7
02	3 15·5	3 16·0	3 06·6	0·2	0·0	6·2	1·4	12·2	2·7
03	3 15·8	3 16·3	3 06·8	0·3	0·1	6·3	1·4	12·3	2·8
04	3 16·0	3 16·5	3 07·1	0·4	0·1	6·4	1·4	12·4	2·8
05	3 16·3	3 16·8	3 07·3	0·5	0·1	6·5	1·5	12·5	2·8
06	3 16·5	3 17·0	3 07·5	0·6	0·1	6·6	1·5	12·6	2·8
07	3 16·8	3 17·3	3 07·8	0·7	0·2	6·7	1·5	12·7	2·9
08	3 17·0	3 17·5	3 08·0	0·8	0·2	6·8	1·5	12·8	2·9
09	3 17·3	3 17·8	3 08·3	0·9	0·2	6·9	1·6	12·9	2·9
10	3 17·5	3 18·0	3 08·5	1·0	0·2	7·0	1·6	13·0	2·9
11	3 17·8	3 18·3	3 08·7	1·1	0·2	7·1	1·6	13·1	2·9
12	3 18·0	3 18·5	3 09·0	1·2	0·3	7·2	1·6	13·2	3·0
13	3 18·3	3 18·8	3 09·2	1·3	0·3	7·3	1·6	13·3	3·0
14	3 18·5	3 19·0	3 09·5	1·4	0·3	7·4	1·7	13·4	3·0
15	3 18·8	3 19·3	3 09·7	1·5	0·3	7·5	1·7	13·5	3·0
16	3 19·0	3 19·5	3 09·9	1·6	0·4	7·6	1·7	13·6	3·1
17	3 19·3	3 19·8	3 10·2	1·7	0·4	7·7	1·7	13·7	3·1
18	3 19·5	3 20·0	3 10·4	1·8	0·4	7·8	1·8	13·8	3·1
19	3 19·8	3 20·3	3 10·7	1·9	0·4	7·9	1·8	13·9	3·1
20	3 20·0	3 20·5	3 10·9	2·0	0·5	8·0	1·8	14·0	3·2
21	3 20·3	3 20·8	3 11·1	2·1	0·5	8·1	1·8	14·1	3·2
22	3 20·5	3 21·0	3 11·4	2·2	0·5	8·2	1·8	14·2	3·2
23	3 20·8	3 21·3	3 11·6	2·3	0·5	8·3	1·9	14·3	3·2
24	3 21·0	3 21·6	3 11·8	2·4	0·5	8·4	1·9	14·4	3·2
25	3 21·3	3 21·8	3 12·1	2·5	0·6	8·5	1·9	14·5	3·3
26	3 21·5	3 22·1	3 12·3	2·6	0·6	8·6	1·9	14·6	3·3
27	3 21·8	3 22·3	3 12·6	2·7	0·6	8·7	2·0	14·7	3·3
28	3 22·0	3 22·6	3 12·8	2·8	0·6	8·8	2·0	14·8	3·3
29	3 22·3	3 22·8	3 13·0	2·9	0·7	8·9	2·0	14·9	3·4
30	3 22·5	3 23·1	3 13·3	3·0	0·7	9·0	2·0	15·0	3·4
31	3 22·8	3 23·3	3 13·5	3·1	0·7	9·1	2·0	15·1	3·4
32	3 23·0	3 23·6	3 13·8	3·2	0·7	9·2	2·1	15·2	3·4
33	3 23·3	3 23·8	3 14·0	3·3	0·7	9·3	2·1	15·3	3·4
34	3 23·5	3 24·1	3 14·2	3·4	0·8	9·4	2·1	15·4	3·5
35	3 23·8	3 24·3	3 14·5	3·5	0·8	9·5	2·1	15·5	3·5
36	3 24·0	3 24·6	3 14·7	3·6	0·8	9·6	2·2	15·6	3·5
37	3 24·3	3 24·8	3 14·9	3·7	0·8	9·7	2·2	15·7	3·5
38	3 24·5	3 25·1	3 15·2	3·8	0·9	9·8	2·2	15·8	3·6
39	3 24·8	3 25·3	3 15·4	3·9	0·9	9·9	2·2	15·9	3·6
40	3 25·0	3 25·6	3 15·7	4·0	0·9	10·0	2·3	16·0	3·6
41	3 25·3	3 25·8	3 15·9	4·1	0·9	10·1	2·3	16·1	3·6
42	3 25·5	3 26·1	3 16·1	4·2	0·9	10·2	2·3	16·2	3·6
43	3 25·8	3 26·3	3 16·4	4·3	1·0	10·3	2·3	16·3	3·7
44	3 26·0	3 26·6	3 16·6	4·4	1·0	10·4	2·3	16·4	3·7
45	3 26·3	3 26·8	3 16·9	4·5	1·0	10·5	2·4	16·5	3·7
46	3 26·5	3 27·1	3 17·1	4·6	1·0	10·6	2·4	16·6	3·7
47	3 26·8	3 27·3	3 17·3	4·7	1·1	10·7	2·4	16·7	3·8
48	3 27·0	3 27·6	3 17·6	4·8	1·1	10·8	2·4	16·8	3·8
49	3 27·3	3 27·8	3 17·8	4·9	1·1	10·9	2·5	16·9	3·8
50	3 27·5	3 28·1	3 18·0	5·0	1·1	11·0	2·5	17·0	3·8
51	3 27·8	3 28·3	3 18·3	5·1	1·1	11·1	2·5	17·1	3·8
52	3 28·0	3 28·6	3 18·5	5·2	1·2	11·2	2·5	17·2	3·9
53	3 28·3	3 28·8	3 18·8	5·3	1·2	11·3	2·5	17·3	3·9
54	3 28·5	3 29·1	3 19·0	5·4	1·2	11·4	2·6	17·4	3·9
55	3 28·8	3 29·3	3 19·2	5·5	1·2	11·5	2·6	17·5	3·9
56	3 29·0	3 29·6	3 19·5	5·6	1·3	11·6	2·6	17·6	4·0
57	3 29·3	3 29·8	3 19·7	5·7	1·3	11·7	2·6	17·7	4·0
58	3 29·5	3 30·1	3 20·0	5·8	1·3	11·8	2·7	17·8	4·0
59	3 29·8	3 30·3	3 20·2	5·9	1·3	11·9	2·7	17·9	4·0
60	3 30·0	3 30·6	3 20·4	6·0	1·4	12·0	2·7	18·0	4·1

14m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	3 30·0	3 30·6	3 20·4	0·0	0·0	6·0	1·5	12·0	2·9
01	3 30·3	3 30·8	3 20·7	0·1	0·0	6·1	1·5	12·1	2·9
02	3 30·5	3 31·1	3 20·9	0·2	0·0	6·2	1·5	12·2	2·9
03	3 30·8	3 31·3	3 21·1	0·3	0·1	6·3	1·5	12·3	3·0
04	3 31·0	3 31·6	3 21·4	0·4	0·1	6·4	1·5	12·4	3·0
05	3 31·3	3 31·8	3 21·6	0·5	0·1	6·5	1·6	12·5	3·0
06	3 31·5	3 32·1	3 21·9	0·6	0·1	6·6	1·6	12·6	3·0
07	3 31·8	3 32·3	3 22·1	0·7	0·2	6·7	1·6	12·7	3·1
08	3 32·0	3 32·6	3 22·3	0·8	0·2	6·8	1·6	12·8	3·1
09	3 32·3	3 32·8	3 22·6	0·9	0·2	6·9	1·7	12·9	3·1
10	3 32·5	3 33·1	3 22·8	1·0	0·2	7·0	1·7	13·0	3·1
11	3 32·8	3 33·3	3 23·1	1·1	0·3	7·1	1·7	13·1	3·2
12	3 33·0	3 33·6	3 23·3	1·2	0·3	7·2	1·7	13·2	3·2
13	3 33·3	3 33·8	3 23·5	1·3	0·3	7·3	1·8	13·3	3·2
14	3 33·5	3 34·1	3 23·8	1·4	0·3	7·4	1·8	13·4	3·2
15	3 33·8	3 34·3	3 24·0	1·5	0·4	7·5	1·8	13·5	3·3
16	3 34·0	3 34·6	3 24·3	1·6	0·4	7·6	1·8	13·6	3·3
17	3 34·3	3 34·8	3 24·5	1·7	0·4	7·7	1·9	13·7	3·3
18	3 34·5	3 35·1	3 24·7	1·8	0·4	7·8	1·9	13·8	3·3
19	3 34·8	3 35·3	3 25·0	1·9	0·5	7·9	1·9	13·9	3·4
20	3 35·0	3 35·6	3 25·2	2·0	0·5	8·0	1·9	14·0	3·4
21	3 35·3	3 35·8	3 25·4	2·1	0·5	8·1	2·0	14·1	3·4
22	3 35·5	3 36·1	3 25·7	2·2	0·5	8·2	2·0	14·2	3·4
23	3 35·8	3 36·3	3 25·9	2·3	0·6	8·3	2·0	14·3	3·5
24	3 36·0	3 36·6	3 26·2	2·4	0·6	8·4	2·0	14·4	3·5
25	3 36·3	3 36·8	3 26·4	2·5	0·6	8·5	2·1	14·5	3·5
26	3 36·5	3 37·1	3 26·6	2·6	0·6	8·6	2·1	14·6	3·5
27	3 36·8	3 37·3	3 26·9	2·7	0·7	8·7	2·1	14·7	3·6
28	3 37·0	3 37·6	3 27·1	2·8	0·7	8·8	2·1	14·8	3·6
29	3 37·3	3 37·8	3 27·4	2·9	0·7	8·9	2·2	14·9	3·6
30	3 37·5	3 38·1	3 27·6	3·0	0·7	9·0	2·2	15·0	3·6
31	3 37·8	3 38·3	3 27·8	3·1	0·7	9·1	2·2	15·1	3·6
32	3 38·0	3 38·6	3 28·1	3·2	0·8	9·2	2·2	15·2	3·7
33	3 38·3	3 38·8	3 28·3	3·3	0·8	9·3	2·2	15·3	3·7
34	3 38·5	3 39·1	3 28·5	3·4	0·8	9·4	2·3	15·4	3·7
35	3 38·8	3 39·3	3 28·8	3·5	0·8	9·5	2·3	15·5	3·7
36	3 39·0	3 39·6	3 29·0	3·6	0·9	9·6	2·3	15·6	3·8
37	3 39·3	3 39·9	3 29·3	3·7	0·9	9·7	2·3	15·7	3·8
38	3 39·5	3 40·1	3 29·5	3·8	0·9	9·8	2·4	15·8	3·8
39	3 39·8	3 40·4	3 29·7	3·9	0·9	9·9	2·4	15·9	3·8
40	3 40·0	3 40·6	3 30·0	4·0	1·0	10·0	2·4	16·0	3·9
41	3 40·3	3 40·9	3 30·2	4·1	1·0	10·1	2·4	16·1	3·9
42	3 40·5	3 41·1	3 30·5	4·2	1·0	10·2	2·5	16·2	3·9
43	3 40·8	3 41·4	3 30·7	4·3	1·0	10·3	2·5	16·3	3·9
44	3 41·0	3 41·6	3 30·9	4·4	1·1	10·4	2·5	16·4	4·0
45	3 41·3	3 41·9	3 31·2	4·5	1·1	10·5	2·5	16·5	4·0
46	3 41·5	3 42·1	3 31·4	4·6	1·1	10·6	2·6	16·6	4·0
47	3 41·8	3 42·4	3 31·6	4·7	1·1	10·7	2·6	16·7	4·0
48	3 42·0	3 42·6	3 31·9	4·8	1·2	10·8	2·6	16·8	4·1
49	3 42·3	3 42·9	3 32·1	4·9	1·2	10·9	2·6	16·9	4·1
50	3 42·5	3 43·1	3 32·4	5·0	1·2	11·0	2·7	17·0	4·1
51	3 42·8	3 43·4	3 32·6	5·1	1·2	11·1	2·7	17·1	4·1
52	3 43·0	3 43·6	3 32·8	5·2	1·3	11·2	2·7	17·2	4·2
53	3 43·3	3 43·9	3 33·1	5·3	1·3	11·3	2·7	17·3	4·2
54	3 43·5	3 44·1	3 33·3	5·4	1·3	11·4	2·8	17·4	4·2
55	3 43·8	3 44·4	3 33·6	5·5	1·3	11·5	2·8	17·5	4·2
56	3 44·0	3 44·6	3 33·8	5·6	1·4	11·6	2·8	17·6	4·3
57	3 44·3	3 44·9	3 34·0	5·7	1·4	11·7	2·8	17·7	4·3
58	3 44·5	3 45·1	3 34·3	5·8	1·4	11·8	2·9	17·8	4·3
59	3 44·8	3 45·4	3 34·5	5·9	1·4	11·9	2·9	17·9	4·3
60	3 45·0	3 45·6	3 34·8	6·0	1·5	12·0	2·9	18·0	4·4

15m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	3 45·0	3 45·6	3 34·8	0·0	0·0	6·0	1·6	12·0	3·1
01	3 45·3	3 45·9	3 35·0	0·1	0·0	6·1	1·6	12·1	3·1
02	3 45·5	3 46·1	3 35·2	0·2	0·1	6·2	1·6	12·2	3·2
03	3 45·8	3 46·4	3 35·5	0·3	0·1	6·3	1·6	12·3	3·2
04	3 46·0	3 46·6	3 35·7	0·4	0·1	6·4	1·7	12·4	3·2
05	3 46·3	3 46·9	3 35·9	0·5	0·1	6·5	1·7	12·5	3·2
06	3 46·5	3 47·1	3 36·2	0·6	0·2	6·6	1·7	12·6	3·3
07	3 46·8	3 47·4	3 36·4	0·7	0·2	6·7	1·7	12·7	3·3
08	3 47·0	3 47·6	3 36·7	0·8	0·2	6·8	1·8	12·8	3·3
09	3 47·3	3 47·9	3 36·9	0·9	0·2	6·9	1·8	12·9	3·3
10	3 47·5	3 48·1	3 37·1	1·0	0·3	7·0	1·8	13·0	3·4
11	3 47·8	3 48·4	3 37·4	1·1	0·3	7·1	1·8	13·1	3·4
12	3 48·0	3 48·6	3 37·6	1·2	0·3	7·2	1·9	13·2	3·4
13	3 48·3	3 48·9	3 37·9	1·3	0·3	7·3	1·9	13·3	3·4
14	3 48·5	3 49·1	3 38·1	1·4	0·4	7·4	1·9	13·4	3·5
15	3 48·8	3 49·4	3 38·3	1·5	0·4	7·5	1·9	13·5	3·5
16	3 49·0	3 49·6	3 38·6	1·6	0·4	7·6	2·0	13·6	3·5
17	3 49·3	3 49·9	3 38·8	1·7	0·4	7·7	2·0	13·7	3·5
18	3 49·5	3 50·1	3 39·0	1·8	0·5	7·8	2·0	13·8	3·6
19	3 49·8	3 50·4	3 39·3	1·9	0·5	7·9	2·0	13·9	3·6
20	3 50·0	3 50·6	3 39·5	2·0	0·5	8·0	2·1	14·0	3·6
21	3 50·3	3 50·9	3 39·8	2·1	0·5	8·1	2·1	14·1	3·6
22	3 50·5	3 51·1	3 40·0	2·2	0·6	8·2	2·1	14·2	3·7
23	3 50·8	3 51·4	3 40·2	2·3	0·6	8·3	2·1	14·3	3·7
24	3 51·0	3 51·6	3 40·5	2·4	0·6	8·4	2·2	14·4	3·7
25	3 51·3	3 51·9	3 40·7	2·5	0·6	8·5	2·2	14·5	3·7
26	3 51·5	3 52·1	3 41·0	2·6	0·7	8·6	2·2	14·6	3·8
27	3 51·8	3 52·4	3 41·2	2·7	0·7	8·7	2·2	14·7	3·8
28	3 52·0	3 52·6	3 41·4	2·8	0·7	8·8	2·3	14·8	3·8
29	3 52·3	3 52·9	3 41·7	2·9	0·7	8·9	2·3	14·9	3·8
30	3 52·5	3 53·1	3 41·9	3·0	0·8	9·0	2·3	15·0	3·9
31	3 52·8	3 53·4	3 42·1	3·1	0·8	9·1	2·4	15·1	3·9
32	3 53·0	3 53·6	3 42·4	3·2	0·8	9·2	2·4	15·2	3·9
33	3 53·3	3 53·9	3 42·6	3·3	0·9	9·3	2·4	15·3	4·0
34	3 53·5	3 54·1	3 42·9	3·4	0·9	9·4	2·4	15·4	4·0
35	3 53·8	3 54·4	3 43·1	3·5	0·9	9·5	2·5	15·5	4·0
36	3 54·0	3 54·6	3 43·3	3·6	0·9	9·6	2·5	15·6	4·0
37	3 54·3	3 54·9	3 43·6	3·7	1·0	9·7	2·5	15·7	4·1
38	3 54·5	3 55·1	3 43·8	3·8	1·0	9·8	2·5	15·8	4·1
39	3 54·8	3 55·4	3 44·1	3·9	1·0	9·9	2·6	15·9	4·1
40	3 55·0	3 55·6	3 44·3	4·0	1·0	10·0	2·6	16·0	4·1
41	3 55·3	3 55·9	3 44·5	4·1	1·1	10·1	2·6	16·1	4·2
42	3 55·5	3 56·1	3 44·8	4·2	1·1	10·2	2·6	16·2	4·2
43	3 55·8	3 56·4	3 45·0	4·3	1·1	10·3	2·7	16·3	4·2
44	3 56·0	3 56·6	3 45·2	4·4	1·1	10·4	2·7	16·4	4·2
45	3 56·3	3 56·9	3 45·5	4·5	1·2	10·5	2·7	16·5	4·3
46	3 56·5	3 57·1	3 45·7	4·6	1·2	10·6	2·7	16·6	4·3
47	3 56·8	3 57·4	3 46·0	4·7	1·2	10·7	2·8	16·7	4·3
48	3 57·0	3 57·6	3 46·2	4·8	1·2	10·8	2·8	16·8	4·3
49	3 57·3	3 57·9	3 46·4	4·9	1·3	10·9	2·8	16·9	4·4
50	3 57·5	3 58·2	3 46·7	5·0	1·3	11·0	2·8	17·0	4·4
51	3 57·8	3 58·4	3 46·9	5·1	1·3	11·1	2·9	17·1	4·4
52	3 58·0	3 58·7	3 47·2	5·2	1·3	11·2	2·9	17·2	4·4
53	3 58·3	3 58·9	3 47·4	5·3	1·4	11·3	2·9	17·3	4·5
54	3 58·5	3 59·2	3 47·6	5·4	1·4	11·4	2·9	17·4	4·5
55	3 58·8	3 59·4	3 47·9	5·5	1·4	11·5	3·0	17·5	4·5
56	3 59·0	3 59·7	3 48·1	5·6	1·4	11·6	3·0	17·6	4·5
57	3 59·3	3 59·9	3 48·4	5·7	1·5	11·7	3·0	17·7	4·6
58	3 59·5	4 00·2	3 48·6	5·8	1·5	11·8	3·0	17·8	4·6
59	3 59·8	4 00·4	3 48·8	5·9	1·5	11·9	3·1	17·9	4·6
60	4 00·0	4 00·7	3 49·1	6·0	1·6	12·0	3·1	18·0	4·7

16m s	SUN PLANETS	ARIES	MOON	v or d	Corr^n	v or d	Corr^n	v or d	Corr^n
	° ′	° ′	° ′	′	′	′	′	′	′
00	4 00·0	4 00·7	3 49·1	0·0	0·0	6·0	1·7	12·0	3·3
01	4 00·3	4 00·9	3 49·3	0·1	0·0	6·1	1·7	12·1	3·3
02	4 00·5	4 01·2	3 49·5	0·2	0·1	6·2	1·7	12·2	3·4
03	4 00·8	4 01·4	3 49·8	0·3	0·1	6·3	1·7	12·3	3·4
04	4 01·0	4 01·7	3 50·0	0·4	0·1	6·4	1·8	12·4	3·4
05	4 01·3	4 01·9	3 50·3	0·5	0·1	6·5	1·8	12·5	3·4
06	4 01·5	4 02·2	3 50·5	0·6	0·2	6·6	1·8	12·6	3·5
07	4 01·8	4 02·4	3 50·7	0·7	0·2	6·7	1·8	12·7	3·5
08	4 02·0	4 02·7	3 51·0	0·8	0·2	6·8	1·9	12·8	3·5
09	4 02·3	4 02·9	3 51·2	0·9	0·2	6·9	1·9	12·9	3·5
10	4 02·5	4 03·2	3 51·5	1·0	0·3	7·0	1·9	13·0	3·6
11	4 02·8	4 03·4	3 51·7	1·1	0·3	7·1	2·0	13·1	3·6
12	4 03·0	4 03·7	3 51·9	1·2	0·3	7·2	2·0	13·2	3·6
13	4 03·3	4 03·9	3 52·2	1·3	0·4	7·3	2·0	13·3	3·7
14	4 03·5	4 04·2	3 52·4	1·4	0·4	7·4	2·0	13·4	3·7
15	4 03·8	4 04·4	3 52·6	1·5	0·4	7·5	2·1	13·5	3·7
16	4 04·0	4 04·7	3 52·9	1·6	0·4	7·6	2·1	13·6	3·7
17	4 04·3	4 04·9	3 53·1	1·7	0·5	7·7	2·1	13·7	3·8
18	4 04·5	4 05·2	3 53·4	1·8	0·5	7·8	2·1	13·8	3·8
19	4 04·8	4 05·4	3 53·6	1·9	0·5	7·9	2·2	13·9	3·8
20	4 05·0	4 05·7	3 53·8	2·0	0·6	8·0	2·2	14·0	3·9
21	4 05·3	4 05·9	3 54·1	2·1	0·6	8·1	2·2	14·1	3·9
22	4 05·5	4 06·2	3 54·3	2·2	0·6	8·2	2·3	14·2	3·9
23	4 05·8	4 06·4	3 54·6	2·3	0·6	8·3	2·3	14·3	3·9
24	4 06·0	4 06·7	3 54·8	2·4	0·7	8·4	2·3	14·4	4·0
25	4 06·3	4 06·9	3 55·0	2·5	0·7	8·5	2·3	14·5	4·0
26	4 06·5	4 07·2	3 55·3	2·6	0·7	8·6	2·4	14·6	4·0
27	4 06·8	4 07·4	3 55·5	2·7	0·7	8·7	2·4	14·7	4·0
28	4 07·0	4 07·7	3 55·7	2·8	0·8	8·8	2·4	14·8	4·1
29	4 07·3	4 07·9	3 56·0	2·9	0·8	8·9	2·4	14·9	4·1
30	4 07·5	4 08·2	3 56·2	3·0	0·8	9·0	2·5	15·0	4·1
31	4 07·8	4 08·4	3 56·5	3·1	0·9	9·1	2·5	15·1	4·2
32	4 08·0	4 08·7	3 56·7	3·2	0·9	9·2	2·5	15·2	4·2
33	4 08·3	4 08·9	3 56·9	3·3	0·9	9·3	2·6	15·3	4·2
34	4 08·5	4 09·2	3 57·2	3·4	0·9	9·4	2·6	15·4	4·2
35	4 08·8	4 09·4	3 57·4	3·5	1·0	9·5	2·6	15·5	4·3
36	4 09·0	4 09·7	3 57·7	3·6	1·0	9·6	2·6	15·6	4·3
37	4 09·3	4 09·9	3 57·9	3·7	1·0	9·7	2·7	15·7	4·3
38	4 09·5	4 10·2	3 58·1	3·8	1·0	9·8	2·7	15·8	4·3
39	4 09·8	4 10·4	3 58·4	3·9	1·1	9·9	2·7	15·9	4·4
40	4 10·0	4 10·7	3 58·6	4·0	1·1	10·0	2·8	16·0	4·4
41	4 10·3	4 10·9	3 58·8	4·1	1·1	10·1	2·8	16·1	4·4
42	4 10·5	4 11·2	3 59·1	4·2	1·2	10·2	2·8	16·2	4·5
43	4 10·8	4 11·4	3 59·3	4·3	1·2	10·3	2·8	16·3	4·5
44	4 11·0	4 11·7	3 59·6	4·4	1·2	10·4	2·9	16·4	4·5
45	4 11·3	4 11·9	3 59·8	4·5	1·2	10·5	2·9	16·5	4·5
46	4 11·5	4 12·2	4 00·0	4·6	1·3	10·6	2·9	16·6	4·6
47	4 11·8	4 12·4	4 00·3	4·7	1·3	10·7	2·9	16·7	4·6
48	4 12·0	4 12·7	4 00·5	4·8	1·3	10·8	3·0	16·8	4·6
49	4 12·3	4 12·9	4 00·8	4·9	1·3	10·9	3·0	16·9	4·6
50	4 12·5	4 13·2	4 01·0	5·0	1·4	11·0	3·0	17·0	4·7
51	4 12·8	4 13·4	4 01·2	5·1	1·4	11·1	3·1	17·1	4·7
52	4 13·0	4 13·7	4 01·5	5·2	1·4	11·2	3·1	17·2	4·7
53	4 13·3	4 13·9	4 01·7	5·3	1·5	11·3	3·1	17·3	4·8
54	4 13·5	4 14·2	4 02·0	5·4	1·5	11·4	3·1	17·4	4·8
55	4 13·8	4 14·4	4 02·2	5·5	1·5	11·5	3·2	17·5	4·8
56	4 14·0	4 14·7	4 02·4	5·6	1·5	11·6	3·2	17·6	4·8
57	4 14·3	4 14·9	4 02·7	5·7	1·6	11·7	3·2	17·7	4·9
58	4 14·5	4 15·2	4 02·9	5·8	1·6	11·8	3·2	17·8	4·9
59	4 14·8	4 15·4	4 03·1	5·9	1·6	11·9	3·3	17·9	4·9
60	4 15·0	4 15·7	4 03·4	6·0	1·7	12·0	3·3	18·0	5·0

17m s	SUN PLANETS	ARIES	MOON	v or d	Corr^n	v or d	Corr^n	v or d	Corr^n
	° ′	° ′	° ′	′	′	′	′	′	′
00	4 15·0	4 15·7	4 03·4	0·0	0·0	6·0	1·8	12·0	3·5
01	4 15·3	4 15·9	4 03·6	0·1	0·0	6·1	1·8	12·1	3·5
02	4 15·5	4 16·2	4 03·9	0·2	0·1	6·2	1·8	12·2	3·6
03	4 15·8	4 16·5	4 04·1	0·3	0·1	6·3	1·8	12·3	3·6
04	4 16·0	4 16·7	4 04·3	0·4	0·1	6·4	1·9	12·4	3·6
05	4 16·3	4 17·0	4 04·6	0·5	0·1	6·5	1·9	12·5	3·6
06	4 16·5	4 17·2	4 04·8	0·6	0·2	6·6	1·9	12·6	3·7
07	4 16·8	4 17·5	4 05·1	0·7	0·2	6·7	2·0	12·7	3·7
08	4 17·0	4 17·7	4 05·3	0·8	0·2	6·8	2·0	12·8	3·7
09	4 17·3	4 18·0	4 05·5	0·9	0·3	6·9	2·0	12·9	3·8
10	4 17·5	4 18·2	4 05·8	1·0	0·3	7·0	2·0	13·0	3·8
11	4 17·8	4 18·5	4 06·0	1·1	0·3	7·1	2·1	13·1	3·8
12	4 18·0	4 18·7	4 06·2	1·2	0·4	7·2	2·1	13·2	3·9
13	4 18·3	4 19·0	4 06·5	1·3	0·4	7·3	2·1	13·3	3·9
14	4 18·5	4 19·2	4 06·7	1·4	0·4	7·4	2·2	13·4	3·9
15	4 18·8	4 19·5	4 07·0	1·5	0·4	7·5	2·2	13·5	3·9
16	4 19·0	4 19·7	4 07·2	1·6	0·5	7·6	2·2	13·6	4·0
17	4 19·3	4 20·0	4 07·4	1·7	0·5	7·7	2·2	13·7	4·0
18	4 19·5	4 20·2	4 07·7	1·8	0·5	7·8	2·3	13·8	4·0
19	4 19·8	4 20·5	4 07·9	1·9	0·6	7·9	2·3	13·9	4·1
20	4 20·0	4 20·7	4 08·2	2·0	0·6	8·0	2·3	14·0	4·1
21	4 20·3	4 21·0	4 08·4	2·1	0·6	8·1	2·4	14·1	4·1
22	4 20·5	4 21·2	4 08·6	2·2	0·6	8·2	2·4	14·2	4·1
23	4 20·8	4 21·5	4 08·9	2·3	0·7	8·3	2·4	14·3	4·2
24	4 21·0	4 21·7	4 09·1	2·4	0·7	8·4	2·5	14·4	4·2
25	4 21·3	4 22·0	4 09·3	2·5	0·7	8·5	2·5	14·5	4·2
26	4 21·5	4 22·2	4 09·6	2·6	0·8	8·6	2·5	14·6	4·3
27	4 21·8	4 22·5	4 09·8	2·7	0·8	8·7	2·5	14·7	4·3
28	4 22·0	4 22·7	4 10·1	2·8	0·8	8·8	2·6	14·8	4·3
29	4 22·3	4 23·0	4 10·3	2·9	0·8	8·9	2·6	14·9	4·3
30	4 22·5	4 23·2	4 10·5	3·0	0·9	9·0	2·6	15·0	4·4
31	4 22·8	4 23·5	4 10·8	3·1	0·9	9·1	2·7	15·1	4·4
32	4 23·0	4 23·7	4 11·0	3·2	0·9	9·2	2·7	15·2	4·4
33	4 23·3	4 24·0	4 11·3	3·3	1·0	9·3	2·7	15·3	4·5
34	4 23·5	4 24·2	4 11·5	3·4	1·0	9·4	2·7	15·4	4·5
35	4 23·8	4 24·5	4 11·7	3·5	1·0	9·5	2·8	15·5	4·5
36	4 24·0	4 24·7	4 12·0	3·6	1·1	9·6	2·8	15·6	4·6
37	4 24·3	4 25·0	4 12·2	3·7	1·1	9·7	2·8	15·7	4·6
38	4 24·5	4 25·2	4 12·5	3·8	1·1	9·8	2·9	15·8	4·6
39	4 24·8	4 25·5	4 12·7	3·9	1·1	9·9	2·9	15·9	4·6
40	4 25·0	4 25·7	4 12·9	4·0	1·2	10·0	2·9	16·0	4·7
41	4 25·3	4 26·0	4 13·2	4·1	1·2	10·1	2·9	16·1	4·7
42	4 25·5	4 26·2	4 13·4	4·2	1·2	10·2	3·0	16·2	4·7
43	4 25·8	4 26·5	4 13·6	4·3	1·3	10·3	3·0	16·3	4·8
44	4 26·0	4 26·7	4 13·9	4·4	1·3	10·4	3·0	16·4	4·8
45	4 26·3	4 27·0	4 14·1	4·5	1·3	10·5	3·1	16·5	4·8
46	4 26·5	4 27·2	4 14·4	4·6	1·3	10·6	3·1	16·6	4·8
47	4 26·8	4 27·5	4 14·6	4·7	1·4	10·7	3·1	16·7	4·9
48	4 27·0	4 27·7	4 14·8	4·8	1·4	10·8	3·2	16·8	4·9
49	4 27·3	4 28·0	4 15·1	4·9	1·4	10·9	3·2	16·9	4·9
50	4 27·5	4 28·2	4 15·3	5·0	1·5	11·0	3·2	17·0	5·0
51	4 27·8	4 28·5	4 15·6	5·1	1·5	11·1	3·2	17·1	5·0
52	4 28·0	4 28·7	4 15·8	5·2	1·5	11·2	3·3	17·2	5·0
53	4 28·3	4 29·0	4 16·0	5·3	1·5	11·3	3·3	17·3	5·0
54	4 28·5	4 29·2	4 16·3	5·4	1·6	11·4	3·3	17·4	5·1
55	4 28·8	4 29·5	4 16·5	5·5	1·6	11·5	3·4	17·5	5·1
56	4 29·0	4 29·7	4 16·7	5·6	1·6	11·6	3·4	17·6	5·1
57	4 29·3	4 30·0	4 17·0	5·7	1·7	11·7	3·4	17·7	5·2
58	4 29·5	4 30·2	4 17·2	5·8	1·7	11·8	3·4	17·8	5·2
59	4 29·8	4 30·5	4 17·5	5·9	1·7	11·9	3·5	17·9	5·2
60	4 30·0	4 30·7	4 17·7	6·0	1·8	12·0	3·5	18·0	5·3

18m s	SUN PLANETS ° ′	ARIES ° ′	MOON ° ′	v or d ′	Corrn ′	v or d ′	Corrn ′	v or d ′	Corrn ′
00	4 30·0	4 30·7	4 17·7	0·0	0·0	6·0	1·9	12·0	3·7
01	4 30·3	4 31·0	4 17·9	0·1	0·0	6·1	1·9	12·1	3·7
02	4 30·5	4 31·2	4 18·2	0·2	0·1	6·2	1·9	12·2	3·8
03	4 30·8	4 31·5	4 18·4	0·3	0·1	6·3	1·9	12·3	3·8
04	4 31·0	4 31·7	4 18·7	0·4	0·1	6·4	2·0	12·4	3·8
05	4 31·3	4 32·0	4 18·9	0·5	0·2	6·5	2·0	12·5	3·9
06	4 31·5	4 32·2	4 19·1	0·6	0·2	6·6	2·0	12·6	3·9
07	4 31·8	4 32·5	4 19·4	0·7	0·2	6·7	2·1	12·7	3·9
08	4 32·0	4 32·7	4 19·6	0·8	0·2	6·8	2·1	12·8	3·9
09	4 32·3	4 33·0	4 19·8	0·9	0·3	6·9	2·1	12·9	4·0
10	4 32·5	4 33·2	4 20·1	1·0	0·3	7·0	2·2	13·0	4·0
11	4 32·8	4 33·5	4 20·3	1·1	0·3	7·1	2·2	13·1	4·0
12	4 33·0	4 33·7	4 20·6	1·2	0·4	7·2	2·2	13·2	4·1
13	4 33·3	4 34·0	4 20·8	1·3	0·4	7·3	2·3	13·3	4·1
14	4 33·5	4 34·2	4 21·0	1·4	0·4	7·4	2·3	13·4	4·1
15	4 33·8	4 34·5	4 21·3	1·5	0·5	7·5	2·3	13·5	4·2
16	4 34·0	4 34·8	4 21·5	1·6	0·5	7·6	2·3	13·6	4·2
17	4 34·3	4 35·0	4 21·8	1·7	0·5	7·7	2·4	13·7	4·2
18	4 34·5	4 35·3	4 22·0	1·8	0·6	7·8	2·4	13·8	4·3
19	4 34·8	4 35·5	4 22·2	1·9	0·6	7·9	2·4	13·9	4·3
20	4 35·0	4 35·8	4 22·5	2·0	0·6	8·0	2·5	14·0	4·3
21	4 35·3	4 36·0	4 22·7	2·1	0·6	8·1	2·5	14·1	4·3
22	4 35·5	4 36·3	4 22·9	2·2	0·7	8·2	2·5	14·2	4·4
23	4 35·8	4 36·5	4 23·2	2·3	0·7	8·3	2·6	14·3	4·4
24	4 36·0	4 36·8	4 23·4	2·4	0·7	8·4	2·6	14·4	4·4
25	4 36·3	4 37·0	4 23·7	2·5	0·8	8·5	2·6	14·5	4·5
26	4 36·5	4 37·3	4 23·9	2·6	0·8	8·6	2·7	14·6	4·5
27	4 36·8	4 37·5	4 24·1	2·7	0·8	8·7	2·7	14·7	4·5
28	4 37·0	4 37·8	4 24·4	2·8	0·9	8·8	2·7	14·8	4·6
29	4 37·3	4 38·0	4 24·6	2·9	0·9	8·9	2·7	14·9	4·6
30	4 37·5	4 38·3	4 24·9	3·0	0·9	9·0	2·8	15·0	4·6
31	4 37·8	4 38·5	4 25·1	3·1	1·0	9·1	2·8	15·1	4·7
32	4 38·0	4 38·8	4 25·3	3·2	1·0	9·2	2·8	15·2	4·7
33	4 38·3	4 39·0	4 25·6	3·3	1·0	9·3	2·9	15·3	4·7
34	4 38·5	4 39·3	4 25·8	3·4	1·0	9·4	2·9	15·4	4·7
35	4 38·8	4 39·5	4 26·1	3·5	1·1	9·5	2·9	15·5	4·8
36	4 39·0	4 39·8	4 26·3	3·6	1·1	9·6	3·0	15·6	4·8
37	4 39·3	4 40·0	4 26·5	3·7	1·1	9·7	3·0	15·7	4·8
38	4 39·5	4 40·3	4 26·8	3·8	1·2	9·8	3·0	15·8	4·9
39	4 39·8	4 40·5	4 27·0	3·9	1·2	9·9	3·1	15·9	4·9
40	4 40·0	4 40·8	4 27·2	4·0	1·2	10·0	3·1	16·0	4·9
41	4 40·3	4 41·0	4 27·5	4·1	1·3	10·1	3·1	16·1	5·0
42	4 40·5	4 41·3	4 27·7	4·2	1·3	10·2	3·1	16·2	5·0
43	4 40·8	4 41·5	4 28·0	4·3	1·3	10·3	3·2	16·3	5·0
44	4 41·0	4 41·8	4 28·2	4·4	1·4	10·4	3·2	16·4	5·1
45	4 41·3	4 42·0	4 28·4	4·5	1·4	10·5	3·2	16·5	5·1
46	4 41·5	4 42·3	4 28·7	4·6	1·4	10·6	3·3	16·6	5·1
47	4 41·8	4 42·5	4 28·9	4·7	1·4	10·7	3·3	16·7	5·1
48	4 42·0	4 42·8	4 29·2	4·8	1·5	10·8	3·3	16·8	5·2
49	4 42·3	4 43·0	4 29·4	4·9	1·5	10·9	3·4	16·9	5·2
50	4 42·5	4 43·3	4 29·6	5·0	1·5	11·0	3·4	17·0	5·2
51	4 42·8	4 43·5	4 29·9	5·1	1·6	11·1	3·4	17·1	5·3
52	4 43·0	4 43·8	4 30·1	5·2	1·6	11·2	3·5	17·2	5·3
53	4 43·3	4 44·0	4 30·3	5·3	1·6	11·3	3·5	17·3	5·3
54	4 43·5	4 44·3	4 30·6	5·4	1·7	11·4	3·5	17·4	5·4
55	4 43·8	4 44·5	4 30·8	5·5	1·7	11·5	3·5	17·5	5·4
56	4 44·0	4 44·8	4 31·1	5·6	1·7	11·6	3·6	17·6	5·4
57	4 44·3	4 45·0	4 31·3	5·7	1·8	11·7	3·6	17·7	5·5
58	4 44·5	4 45·3	4 31·5	5·8	1·8	11·8	3·6	17·8	5·5
59	4 44·8	4 45·5	4 31·8	5·9	1·8	11·9	3·7	17·9	5·5
60	4 45·0	4 45·8	4 32·0	6·0	1·9	12·0	3·7	18·0	5·6

19m s	SUN PLANETS ° ′	ARIES ° ′	MOON ° ′	v or d ′	Corrn ′	v or d ′	Corrn ′	v or d ′	Corrn ′
00	4 45·0	4 45·8	4 32·0	0·0	0·0	6·0	2·0	12·0	3·9
01	4 45·3	4 46·0	4 32·3	0·1	0·0	6·1	2·0	12·1	3·9
02	4 45·5	4 46·3	4 32·5	0·2	0·1	6·2	2·0	12·2	4·0
03	4 45·8	4 46·5	4 32·7	0·3	0·1	6·3	2·0	12·3	4·0
04	4 46·0	4 46·8	4 33·0	0·4	0·1	6·4	2·1	12·4	4·0
05	4 46·3	4 47·0	4 33·2	0·5	0·2	6·5	2·1	12·5	4·1
06	4 46·5	4 47·3	4 33·4	0·6	0·2	6·6	2·1	12·6	4·1
07	4 46·8	4 47·5	4 33·7	0·7	0·2	6·7	2·2	12·7	4·1
08	4 47·0	4 47·8	4 33·9	0·8	0·3	6·8	2·2	12·8	4·2
09	4 47·3	4 48·0	4 34·2	0·9	0·3	6·9	2·2	12·9	4·2
10	4 47·5	4 48·3	4 34·4	1·0	0·3	7·0	2·3	13·0	4·2
11	4 47·8	4 48·5	4 34·6	1·1	0·4	7·1	2·3	13·1	4·3
12	4 48·0	4 48·8	4 34·9	1·2	0·4	7·2	2·3	13·2	4·3
13	4 48·3	4 49·0	4 35·1	1·3	0·4	7·3	2·4	13·3	4·3
14	4 48·5	4 49·3	4 35·4	1·4	0·5	7·4	2·4	13·4	4·4
15	4 48·8	4 49·5	4 35·6	1·5	0·5	7·5	2·4	13·5	4·4
16	4 49·0	4 49·8	4 35·8	1·6	0·5	7·6	2·5	13·6	4·4
17	4 49·3	4 50·0	4 36·1	1·7	0·6	7·7	2·5	13·7	4·5
18	4 49·5	4 50·3	4 36·3	1·8	0·6	7·8	2·5	13·8	4·5
19	4 49·8	4 50·5	4 36·6	1·9	0·6	7·9	2·6	13·9	4·5
20	4 50·0	4 50·8	4 36·8	2·0	0·7	8·0	2·6	14·0	4·6
21	4 50·3	4 51·0	4 37·0	2·1	0·7	8·1	2·6	14·1	4·6
22	4 50·5	4 51·3	4 37·3	2·2	0·7	8·2	2·7	14·2	4·6
23	4 50·8	4 51·5	4 37·5	2·3	0·7	8·3	2·7	14·3	4·6
24	4 51·0	4 51·8	4 37·7	2·4	0·8	8·4	2·7	14·4	4·7
25	4 51·3	4 52·0	4 38·0	2·5	0·8	8·5	2·8	14·5	4·7
26	4 51·5	4 52·3	4 38·2	2·6	0·8	8·6	2·8	14·6	4·7
27	4 51·8	4 52·5	4 38·5	2·7	0·9	8·7	2·8	14·7	4·8
28	4 52·0	4 52·8	4 38·7	2·8	0·9	8·8	2·9	14·8	4·8
29	4 52·3	4 53·1	4 38·9	2·9	0·9	8·9	2·9	14·9	4·8
30	4 52·5	4 53·3	4 39·2	3·0	1·0	9·0	2·9	15·0	4·9
31	4 52·8	4 53·6	4 39·4	3·1	1·0	9·1	3·0	15·1	4·9
32	4 53·0	4 53·8	4 39·7	3·2	1·0	9·2	3·0	15·2	4·9
33	4 53·3	4 54·1	4 39·9	3·3	1·1	9·3	3·0	15·3	5·0
34	4 53·5	4 54·3	4 40·1	3·4	1·1	9·4	3·1	15·4	5·0
35	4 53·8	4 54·6	4 40·4	3·5	1·1	9·5	3·1	15·5	5·0
36	4 54·0	4 54·8	4 40·6	3·6	1·2	9·6	3·1	15·6	5·1
37	4 54·3	4 55·1	4 40·8	3·7	1·2	9·7	3·2	15·7	5·1
38	4 54·5	4 55·3	4 41·1	3·8	1·2	9·8	3·2	15·8	5·1
39	4 54·8	4 55·6	4 41·3	3·9	1·3	9·9	3·2	15·9	5·2
40	4 55·0	4 55·8	4 41·6	4·0	1·3	10·0	3·3	16·0	5·2
41	4 55·3	4 56·1	4 41·8	4·1	1·3	10·1	3·3	16·1	5·2
42	4 55·5	4 56·3	4 42·0	4·2	1·4	10·2	3·3	16·2	5·3
43	4 55·8	4 56·6	4 42·3	4·3	1·4	10·3	3·3	16·3	5·3
44	4 56·0	4 56·8	4 42·5	4·4	1·4	10·4	3·4	16·4	5·3
45	4 56·3	4 57·1	4 42·8	4·5	1·5	10·5	3·4	16·5	5·4
46	4 56·5	4 57·3	4 43·0	4·6	1·5	10·6	3·4	16·6	5·4
47	4 56·8	4 57·6	4 43·2	4·7	1·5	10·7	3·5	16·7	5·4
48	4 57·0	4 57·8	4 43·5	4·8	1·6	10·8	3·5	16·8	5·5
49	4 57·3	4 58·1	4 43·7	4·9	1·6	10·9	3·5	16·9	5·5
50	4 57·5	4 58·3	4 43·9	5·0	1·6	11·0	3·6	17·0	5·5
51	4 57·8	4 58·6	4 44·2	5·1	1·7	11·1	3·6	17·1	5·6
52	4 58·0	4 58·8	4 44·4	5·2	1·7	11·2	3·6	17·2	5·6
53	4 58·3	4 59·1	4 44·7	5·3	1·7	11·3	3·7	17·3	5·6
54	4 58·5	4 59·3	4 44·9	5·4	1·8	11·4	3·7	17·4	5·7
55	4 58·8	4 59·6	4 45·1	5·5	1·8	11·5	3·7	17·5	5·7
56	4 59·0	4 59·8	4 45·4	5·6	1·8	11·6	3·8	17·6	5·7
57	4 59·3	5 00·1	4 45·6	5·7	1·9	11·7	3·8	17·7	5·8
58	4 59·5	5 00·3	4 45·9	5·8	1·9	11·8	3·8	17·8	5·8
59	4 59·8	5 00·6	4 46·1	5·9	1·9	11·9	3·9	17·9	5·8
60	5 00·0	5 00·8	4 46·3	6·0	2·0	12·0	3·9	18·0	5·9

20m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	5 00·0	5 00·8	4 46·3	0·0	0·0	6·0	2·1	12·0	4·1
01	5 00·3	5 01·1	4 46·6	0·1	0·0	6·1	2·1	12·1	4·1
02	5 00·5	5 01·3	4 46·8	0·2	0·1	6·2	2·1	12·2	4·2
03	5 00·8	5 01·6	4 47·0	0·3	0·1	6·3	2·2	12·3	4·2
04	5 01·0	5 01·8	4 47·3	0·4	0·1	6·4	2·2	12·4	4·2
05	5 01·3	5 02·1	4 47·5	0·5	0·2	6·5	2·2	12·5	4·3
06	5 01·5	5 02·3	4 47·8	0·6	0·2	6·6	2·3	12·6	4·3
07	5 01·8	5 02·6	4 48·0	0·7	0·2	6·7	2·3	12·7	4·3
08	5 02·0	5 02·8	4 48·2	0·8	0·3	6·8	2·3	12·8	4·4
09	5 02·3	5 03·1	4 48·5	0·9	0·3	6·9	2·4	12·9	4·4
10	5 02·5	5 03·3	4 48·7	1·0	0·3	7·0	2·4	13·0	4·4
11	5 02·8	5 03·6	4 49·0	1·1	0·4	7·1	2·4	13·1	4·5
12	5 03·0	5 03·8	4 49·2	1·2	0·4	7·2	2·5	13·2	4·5
13	5 03·3	5 04·1	4 49·4	1·3	0·4	7·3	2·5	13·3	4·5
14	5 03·5	5 04·3	4 49·7	1·4	0·5	7·4	2·5	13·4	4·6
15	5 03·8	5 04·6	4 49·9	1·5	0·5	7·5	2·6	13·5	4·6
16	5 04·0	5 04·8	4 50·2	1·6	0·5	7·6	2·6	13·6	4·6
17	5 04·3	5 05·1	4 50·4	1·7	0·6	7·7	2·6	13·7	4·7
18	5 04·5	5 05·3	4 50·6	1·8	0·6	7·8	2·7	13·8	4·7
19	5 04·8	5 05·6	4 50·9	1·9	0·6	7·9	2·7	13·9	4·7
20	5 05·0	5 05·8	4 51·1	2·0	0·7	8·0	2·7	14·0	4·8
21	5 05·3	5 06·1	4 51·3	2·1	0·7	8·1	2·8	14·1	4·8
22	5 05·5	5 06·3	4 51·6	2·2	0·8	8·2	2·8	14·2	4·9
23	5 05·8	5 06·6	4 51·8	2·3	0·8	8·3	2·8	14·3	4·9
24	5 06·0	5 06·8	4 52·1	2·4	0·8	8·4	2·9	14·4	4·9
25	5 06·3	5 07·1	4 52·3	2·5	0·9	8·5	2·9	14·5	5·0
26	5 06·5	5 07·3	4 52·5	2·6	0·9	8·6	2·9	14·6	5·0
27	5 06·8	5 07·6	4 52·8	2·7	0·9	8·7	3·0	14·7	5·0
28	5 07·0	5 07·8	4 53·0	2·8	1·0	8·8	3·0	14·8	5·1
29	5 07·3	5 08·1	4 53·3	2·9	1·0	8·9	3·0	14·9	5·1
30	5 07·5	5 08·3	4 53·5	3·0	1·0	9·0	3·1	15·0	5·1
31	5 07·8	5 08·6	4 53·7	3·1	1·1	9·1	3·1	15·1	5·2
32	5 08·0	5 08·8	4 54·0	3·2	1·1	9·2	3·1	15·2	5·2
33	5 08·3	5 09·1	4 54·2	3·3	1·1	9·3	3·2	15·3	5·2
34	5 08·5	5 09·3	4 54·4	3·4	1·2	9·4	3·2	15·4	5·3
35	5 08·8	5 09·6	4 54·7	3·5	1·2	9·5	3·2	15·5	5·3
36	5 09·0	5 09·8	4 54·9	3·6	1·2	9·6	3·3	15·6	5·3
37	5 09·3	5 10·1	4 55·2	3·7	1·3	9·7	3·3	15·7	5·4
38	5 09·5	5 10·3	4 55·4	3·8	1·3	9·8	3·3	15·8	5·4
39	5 09·8	5 10·6	4 55·6	3·9	1·3	9·9	3·4	15·9	5·4
40	5 10·0	5 10·8	4 55·9	4·0	1·4	10·0	3·4	16·0	5·5
41	5 10·3	5 11·1	4 56·1	4·1	1·4	10·1	3·5	16·1	5·5
42	5 10·5	5 11·4	4 56·4	4·2	1·4	10·2	3·5	16·2	5·5
43	5 10·8	5 11·6	4 56·6	4·3	1·5	10·3	3·5	16·3	5·6
44	5 11·0	5 11·9	4 56·8	4·4	1·5	10·4	3·6	16·4	5·6
45	5 11·3	5 12·1	4 57·1	4·5	1·5	10·5	3·6	16·5	5·6
46	5 11·5	5 12·4	4 57·3	4·6	1·6	10·6	3·6	16·6	5·7
47	5 11·8	5 12·6	4 57·5	4·7	1·6	10·7	3·7	16·7	5·7
48	5 12·0	5 12·9	4 57·8	4·8	1·6	10·8	3·7	16·8	5·7
49	5 12·3	5 13·1	4 58·0	4·9	1·7	10·9	3·7	16·9	5·8
50	5 12·5	5 13·4	4 58·3	5·0	1·7	11·0	3·8	17·0	5·8
51	5 12·8	5 13·6	4 58·5	5·1	1·7	11·1	3·8	17·1	5·8
52	5 13·0	5 13·9	4 58·7	5·2	1·8	11·2	3·8	17·2	5·9
53	5 13·3	5 14·1	4 59·0	5·3	1·8	11·3	3·9	17·3	5·9
54	5 13·5	5 14·4	4 59·2	5·4	1·8	11·4	3·9	17·4	5·9
55	5 13·8	5 14·6	4 59·5	5·5	1·9	11·5	3·9	17·5	6·0
56	5 14·0	5 14·9	4 59·7	5·6	1·9	11·6	4·0	17·6	6·0
57	5 14·3	5 15·1	4 59·9	5·7	1·9	11·7	4·0	17·7	6·0
58	5 14·5	5 15·4	5 00·2	5·8	2·0	11·8	4·0	17·8	6·1
59	5 14·8	5 15·6	5 00·4	5·9	2·0	11·9	4·1	17·9	6·1
60	5 15·0	5 15·9	5 00·7	6·0	2·1	12·0	4·1	18·0	6·2

21m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	5 15·0	5 15·9	5 00·7	0·0	0·0	6·0	2·2	12·0	4·3
01	5 15·3	5 16·1	5 00·9	0·1	0·0	6·1	2·2	12·1	4·3
02	5 15·5	5 16·4	5 01·1	0·2	0·1	6·2	2·2	12·2	4·4
03	5 15·8	5 16·6	5 01·4	0·3	0·1	6·3	2·3	12·3	4·4
04	5 16·0	5 16·9	5 01·6	0·4	0·1	6·4	2·3	12·4	4·4
05	5 16·3	5 17·1	5 01·8	0·5	0·2	6·5	2·3	12·5	4·5
06	5 16·5	5 17·4	5 02·1	0·6	0·2	6·6	2·4	12·6	4·5
07	5 16·8	5 17·6	5 02·3	0·7	0·3	6·7	2·4	12·7	4·6
08	5 17·0	5 17·9	5 02·6	0·8	0·3	6·8	2·4	12·8	4·6
09	5 17·3	5 18·1	5 02·8	0·9	0·3	6·9	2·5	12·9	4·6
10	5 17·5	5 18·4	5 03·0	1·0	0·4	7·0	2·5	13·0	4·7
11	5 17·8	5 18·6	5 03·3	1·1	0·4	7·1	2·5	13·1	4·7
12	5 18·0	5 18·9	5 03·5	1·2	0·4	7·2	2·6	13·2	4·7
13	5 18·3	5 19·1	5 03·8	1·3	0·5	7·3	2·6	13·3	4·8
14	5 18·5	5 19·4	5 04·0	1·4	0·5	7·4	2·7	13·4	4·8
15	5 18·8	5 19·6	5 04·2	1·5	0·5	7·5	2·7	13·5	4·8
16	5 19·0	5 19·9	5 04·5	1·6	0·6	7·6	2·7	13·6	4·9
17	5 19·3	5 20·1	5 04·7	1·7	0·6	7·7	2·8	13·7	4·9
18	5 19·5	5 20·4	5 04·9	1·8	0·6	7·8	2·8	13·8	4·9
19	5 19·8	5 20·6	5 05·2	1·9	0·7	7·9	2·8	13·9	5·0
20	5 20·0	5 20·9	5 05·4	2·0	0·7	8·0	2·9	14·0	5·0
21	5 20·3	5 21·1	5 05·7	2·1	0·8	8·1	2·9	14·1	5·1
22	5 20·5	5 21·4	5 05·9	2·2	0·8	8·2	2·9	14·2	5·1
23	5 20·8	5 21·6	5 06·1	2·3	0·8	8·3	3·0	14·3	5·1
24	5 21·0	5 21·9	5 06·4	2·4	0·9	8·4	3·0	14·4	5·2
25	5 21·3	5 22·1	5 06·6	2·5	0·9	8·5	3·0	14·5	5·2
26	5 21·5	5 22·4	5 06·9	2·6	0·9	8·6	3·1	14·6	5·2
27	5 21·8	5 22·6	5 07·1	2·7	1·0	8·7	3·1	14·7	5·3
28	5 22·0	5 22·9	5 07·3	2·8	1·0	8·8	3·2	14·8	5·3
29	5 22·3	5 23·1	5 07·6	2·9	1·0	8·9	3·2	14·9	5·3
30	5 22·5	5 23·4	5 07·8	3·0	1·1	9·0	3·2	15·0	5·4
31	5 22·8	5 23·6	5 08·0	3·1	1·1	9·1	3·3	15·1	5·4
32	5 23·0	5 23·9	5 08·3	3·2	1·1	9·2	3·3	15·2	5·4
33	5 23·3	5 24·1	5 08·5	3·3	1·2	9·3	3·3	15·3	5·5
34	5 23·5	5 24·4	5 08·8	3·4	1·2	9·4	3·4	15·4	5·5
35	5 23·8	5 24·6	5 09·0	3·5	1·3	9·5	3·4	15·5	5·6
36	5 24·0	5 24·9	5 09·2	3·6	1·3	9·6	3·4	15·6	5·6
37	5 24·3	5 25·1	5 09·5	3·7	1·3	9·7	3·5	15·7	5·6
38	5 24·5	5 25·4	5 09·7	3·8	1·4	9·8	3·5	15·8	5·7
39	5 24·8	5 25·6	5 10·0	3·9	1·4	9·9	3·5	15·9	5·7
40	5 25·0	5 25·9	5 10·2	4·0	1·4	10·0	3·6	16·0	5·7
41	5 25·3	5 26·1	5 10·4	4·1	1·5	10·1	3·6	16·1	5·8
42	5 25·5	5 26·4	5 10·7	4·2	1·5	10·2	3·7	16·2	5·8
43	5 25·8	5 26·6	5 10·9	4·3	1·5	10·3	3·7	16·3	5·8
44	5 26·0	5 26·9	5 11·1	4·4	1·6	10·4	3·7	16·4	5·9
45	5 26·3	5 27·1	5 11·4	4·5	1·6	10·5	3·8	16·5	5·9
46	5 26·5	5 27·4	5 11·6	4·6	1·6	10·6	3·8	16·6	5·9
47	5 26·8	5 27·6	5 11·9	4·7	1·7	10·7	3·8	16·7	6·0
48	5 27·0	5 27·9	5 12·1	4·8	1·7	10·8	3·9	16·8	6·0
49	5 27·3	5 28·1	5 12·3	4·9	1·8	10·9	3·9	16·9	6·1
50	5 27·5	5 28·4	5 12·6	5·0	1·8	11·0	3·9	17·0	6·1
51	5 27·8	5 28·6	5 12·8	5·1	1·8	11·1	4·0	17·1	6·1
52	5 28·0	5 28·9	5 13·1	5·2	1·9	11·2	4·0	17·2	6·2
53	5 28·3	5 29·1	5 13·3	5·3	1·9	11·3	4·0	17·3	6·2
54	5 28·5	5 29·4	5 13·5	5·4	1·9	11·4	4·1	17·4	6·2
55	5 28·8	5 29·7	5 13·8	5·5	2·0	11·5	4·1	17·5	6·3
56	5 29·0	5 29·9	5 14·0	5·6	2·0	11·6	4·2	17·6	6·3
57	5 29·3	5 30·2	5 14·3	5·7	2·0	11·7	4·2	17·7	6·3
58	5 29·5	5 30·4	5 14·5	5·8	2·1	11·8	4·2	17·8	6·4
59	5 29·8	5 30·7	5 14·7	5·9	2·1	11·9	4·3	17·9	6·4
60	5 30·0	5 30·9	5 15·0	6·0	2·2	12·0	4·3	18·0	6·5

22m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	5 30·0	5 30·9	5 15·0	0·0	0·0	6·0	2·3	12·0	4·5
01	5 30·3	5 31·2	5 15·2	0·1	0·0	6·1	2·3	12·1	4·5
02	5 30·5	5 31·4	5 15·4	0·2	0·1	6·2	2·3	12·2	4·6
03	5 30·8	5 31·7	5 15·7	0·3	0·1	6·3	2·4	12·3	4·6
04	5 31·0	5 31·9	5 15·9	0·4	0·2	6·4	2·4	12·4	4·7
05	5 31·3	5 32·2	5 16·2	0·5	0·2	6·5	2·4	12·5	4·7
06	5 31·5	5 32·4	5 16·4	0·6	0·2	6·6	2·5	12·6	4·7
07	5 31·8	5 32·7	5 16·6	0·7	0·3	6·7	2·5	12·7	4·8
08	5 32·0	5 32·9	5 16·9	0·8	0·3	6·8	2·6	12·8	4·8
09	5 32·3	5 33·2	5 17·1	0·9	0·3	6·9	2·6	12·9	4·8
10	5 32·5	5 33·4	5 17·4	1·0	0·4	7·0	2·6	13·0	4·9
11	5 32·8	5 33·7	5 17·6	1·1	0·4	7·1	2·7	13·1	4·9
12	5 33·0	5 33·9	5 17·8	1·2	0·5	7·2	2·7	13·2	5·0
13	5 33·3	5 34·2	5 18·1	1·3	0·5	7·3	2·7	13·3	5·0
14	5 33·5	5 34·4	5 18·3	1·4	0·5	7·4	2·8	13·4	5·0
15	5 33·8	5 34·7	5 18·5	1·5	0·6	7·5	2·8	13·5	5·1
16	5 34·0	5 34·9	5 18·8	1·6	0·6	7·6	2·9	13·6	5·1
17	5 34·3	5 35·2	5 19·0	1·7	0·6	7·7	2·9	13·7	5·1
18	5 34·5	5 35·4	5 19·3	1·8	0·7	7·8	2·9	13·8	5·2
19	5 34·8	5 35·7	5 19·5	1·9	0·7	7·9	3·0	13·9	5·2
20	5 35·0	5 35·9	5 19·7	2·0	0·8	8·0	3·0	14·0	5·3
21	5 35·3	5 36·2	5 20·0	2·1	0·8	8·1	3·0	14·1	5·3
22	5 35·5	5 36·4	5 20·2	2·2	0·8	8·2	3·1	14·2	5·3
23	5 35·8	5 36·7	5 20·5	2·3	0·9	8·3	3·1	14·3	5·4
24	5 36·0	5 36·9	5 20·7	2·4	0·9	8·4	3·2	14·4	5·4
25	5 36·3	5 37·2	5 20·9	2·5	0·9	8·5	3·2	14·5	5·4
26	5 36·5	5 37·4	5 21·2	2·6	1·0	8·6	3·2	14·6	5·5
27	5 36·8	5 37·7	5 21·4	2·7	1·0	8·7	3·3	14·7	5·5
28	5 37·0	5 37·9	5 21·6	2·8	1·1	8·8	3·3	14·8	5·6
29	5 37·3	5 38·2	5 21·9	2·9	1·1	8·9	3·3	14·9	5·6
30	5 37·5	5 38·4	5 22·1	3·0	1·1	9·0	3·4	15·0	5·6
31	5 37·8	5 38·7	5 22·4	3·1	1·2	9·1	3·4	15·1	5·7
32	5 38·0	5 38·9	5 22·6	3·2	1·2	9·2	3·5	15·2	5·7
33	5 38·3	5 39·2	5 22·8	3·3	1·2	9·3	3·5	15·3	5·7
34	5 38·5	5 39·4	5 23·1	3·4	1·3	9·4	3·5	15·4	5·8
35	5 38·8	5 39·7	5 23·3	3·5	1·3	9·5	3·6	15·5	5·8
36	5 39·0	5 39·9	5 23·6	3·6	1·4	9·6	3·6	15·6	5·9
37	5 39·3	5 40·2	5 23·8	3·7	1·4	9·7	3·6	15·7	5·9
38	5 39·5	5 40·4	5 24·0	3·8	1·4	9·8	3·7	15·8	5·9
39	5 39·8	5 40·7	5 24·3	3·9	1·5	9·9	3·7	15·9	6·0
40	5 40·0	5 40·9	5 24·5	4·0	1·5	10·0	3·8	16·0	6·0
41	5 40·3	5 41·2	5 24·7	4·1	1·5	10·1	3·8	16·1	6·0
42	5 40·5	5 41·4	5 25·0	4·2	1·6	10·2	3·8	16·2	6·1
43	5 40·8	5 41·7	5 25·2	4·3	1·6	10·3	3·9	16·3	6·1
44	5 41·0	5 41·9	5 25·5	4·4	1·7	10·4	3·9	16·4	6·2
45	5 41·3	5 42·2	5 25·7	4·5	1·7	10·5	3·9	16·5	6·2
46	5 41·5	5 42·4	5 25·9	4·6	1·7	10·6	4·0	16·6	6·2
47	5 41·8	5 42·7	5 26·2	4·7	1·8	10·7	4·0	16·7	6·3
48	5 42·0	5 42·9	5 26·4	4·8	1·8	10·8	4·1	16·8	6·3
49	5 42·3	5 43·2	5 26·7	4·9	1·8	10·9	4·1	16·9	6·3
50	5 42·5	5 43·4	5 26·9	5·0	1·9	11·0	4·1	17·0	6·4
51	5 42·8	5 43·7	5 27·1	5·1	1·9	11·1	4·2	17·1	6·4
52	5 43·0	5 43·9	5 27·4	5·2	2·0	11·2	4·2	17·2	6·5
53	5 43·3	5 44·2	5 27·6	5·3	2·0	11·3	4·2	17·3	6·5
54	5 43·5	5 44·4	5 27·9	5·4	2·0	11·4	4·3	17·4	6·5
55	5 43·8	5 44·7	5 28·1	5·5	2·1	11·5	4·3	17·5	6·6
56	5 44·0	5 44·9	5 28·3	5·6	2·1	11·6	4·4	17·6	6·6
57	5 44·3	5 45·2	5 28·6	5·7	2·1	11·7	4·4	17·7	6·6
58	5 44·5	5 45·4	5 28·8	5·8	2·2	11·8	4·4	17·8	6·7
59	5 44·8	5 45·7	5 29·0	5·9	2·2	11·9	4·5	17·9	6·7
60	5 45·0	5 45·9	5 29·3	6·0	2·3	12·0	4·5	18·0	6·8

23m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	5 45·0	5 45·9	5 29·3	0·0	0·0	6·0	2·4	12·0	4·7
01	5 45·3	5 46·2	5 29·5	0·1	0·0	6·1	2·4	12·1	4·7
02	5 45·5	5 46·4	5 29·8	0·2	0·1	6·2	2·4	12·2	4·8
03	5 45·8	5 46·7	5 30·0	0·3	0·1	6·3	2·5	12·3	4·8
04	5 46·0	5 46·9	5 30·2	0·4	0·2	6·4	2·5	12·4	4·9
05	5 46·3	5 47·2	5 30·5	0·5	0·2	6·5	2·5	12·5	4·9
06	5 46·5	5 47·4	5 30·7	0·6	0·2	6·6	2·6	12·6	4·9
07	5 46·8	5 47·7	5 31·0	0·7	0·3	6·7	2·6	12·7	5·0
08	5 47·0	5 48·0	5 31·2	0·8	0·3	6·8	2·7	12·8	5·0
09	5 47·3	5 48·2	5 31·4	0·9	0·4	6·9	2·7	12·9	5·1
10	5 47·5	5 48·5	5 31·7	1·0	0·4	7·0	2·7	13·0	5·1
11	5 47·8	5 48·7	5 31·9	1·1	0·4	7·1	2·8	13·1	5·1
12	5 48·0	5 49·0	5 32·1	1·2	0·5	7·2	2·8	13·2	5·2
13	5 48·3	5 49·2	5 32·4	1·3	0·5	7·3	2·9	13·3	5·2
14	5 48·5	5 49·5	5 32·6	1·4	0·5	7·4	2·9	13·4	5·2
15	5 48·8	5 49·7	5 32·9	1·5	0·6	7·5	2·9	13·5	5·3
16	5 49·0	5 50·0	5 33·1	1·6	0·6	7·6	3·0	13·6	5·3
17	5 49·3	5 50·2	5 33·3	1·7	0·7	7·7	3·0	13·7	5·4
18	5 49·5	5 50·5	5 33·6	1·8	0·7	7·8	3·1	13·8	5·4
19	5 49·8	5 50·7	5 33·8	1·9	0·7	7·9	3·1	13·9	5·4
20	5 50·0	5 51·0	5 34·1	2·0	0·8	8·0	3·1	14·0	5·5
21	5 50·3	5 51·2	5 34·3	2·1	0·8	8·1	3·2	14·1	5·5
22	5 50·5	5 51·5	5 34·5	2·2	0·9	8·2	3·2	14·2	5·6
23	5 50·8	5 51·7	5 34·8	2·3	0·9	8·3	3·3	14·3	5·6
24	5 51·0	5 52·0	5 35·0	2·4	0·9	8·4	3·3	14·4	5·6
25	5 51·3	5 52·2	5 35·2	2·5	1·0	8·5	3·3	14·5	5·7
26	5 51·5	5 52·5	5 35·5	2·6	1·0	8·6	3·4	14·6	5·7
27	5 51·8	5 52·7	5 35·7	2·7	1·1	8·7	3·4	14·7	5·8
28	5 52·0	5 53·0	5 36·0	2·8	1·1	8·8	3·4	14·8	5·8
29	5 52·3	5 53·2	5 36·2	2·9	1·1	8·9	3·5	14·9	5·8
30	5 52·5	5 53·5	5 36·4	3·0	1·2	9·0	3·5	15·0	5·9
31	5 52·8	5 53·7	5 36·7	3·1	1·2	9·1	3·6	15·1	5·9
32	5 53·0	5 54·0	5 36·9	3·2	1·3	9·2	3·6	15·2	6·0
33	5 53·3	5 54·2	5 37·2	3·3	1·3	9·3	3·6	15·3	6·0
34	5 53·5	5 54·5	5 37·4	3·4	1·3	9·4	3·7	15·4	6·0
35	5 53·8	5 54·7	5 37·6	3·5	1·4	9·5	3·7	15·5	6·1
36	5 54·0	5 55·0	5 37·9	3·6	1·4	9·6	3·8	15·6	6·1
37	5 54·3	5 55·2	5 38·1	3·7	1·4	9·7	3·8	15·7	6·1
38	5 54·5	5 55·5	5 38·4	3·8	1·5	9·8	3·8	15·8	6·2
39	5 54·8	5 55·7	5 38·6	3·9	1·5	9·9	3·9	15·9	6·2
40	5 55·0	5 56·0	5 38·8	4·0	1·6	10·0	3·9	16·0	6·3
41	5 55·3	5 56·2	5 39·1	4·1	1·6	10·1	4·0	16·1	6·3
42	5 55·5	5 56·5	5 39·3	4·2	1·6	10·2	4·0	16·2	6·3
43	5 55·8	5 56·7	5 39·5	4·3	1·7	10·3	4·0	16·3	6·4
44	5 56·0	5 57·0	5 39·8	4·4	1·7	10·4	4·1	16·4	6·4
45	5 56·3	5 57·2	5 40·0	4·5	1·8	10·5	4·1	16·5	6·5
46	5 56·5	5 57·5	5 40·3	4·6	1·8	10·6	4·2	16·6	6·5
47	5 56·8	5 57·7	5 40·5	4·7	1·8	10·7	4·2	16·7	6·5
48	5 57·0	5 58·0	5 40·7	4·8	1·9	10·8	4·2	16·8	6·6
49	5 57·3	5 58·2	5 41·0	4·9	1·9	10·9	4·3	16·9	6·6
50	5 57·5	5 58·5	5 41·2	5·0	2·0	11·0	4·3	17·0	6·7
51	5 57·8	5 58·7	5 41·5	5·1	2·0	11·1	4·3	17·1	6·7
52	5 58·0	5 59·0	5 41·7	5·2	2·0	11·2	4·4	17·2	6·7
53	5 58·3	5 59·2	5 41·9	5·3	2·1	11·3	4·4	17·3	6·8
54	5 58·5	5 59·5	5 42·2	5·4	2·1	11·4	4·5	17·4	6·8
55	5 58·8	5 59·7	5 42·4	5·5	2·2	11·5	4·5	17·5	6·9
56	5 59·0	6 00·0	5 42·6	5·6	2·2	11·6	4·5	17·6	6·9
57	5 59·3	6 00·2	5 42·9	5·7	2·2	11·7	4·6	17·7	6·9
58	5 59·5	6 00·5	5 43·1	5·8	2·3	11·8	4·6	17·8	7·0
59	5 59·8	6 00·7	5 43·4	5·9	2·3	11·9	4·7	17·9	7·0
60	6 00·0	6 01·0	5 43·6	6·0	2·4	12·0	4·7	18·0	7·1

24m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	6 00·0	6 01·0	5 43·6	0·0	0·0	6·0	2·5	12·0	4·9
01	6 00·3	6 01·2	5 43·8	0·1	0·0	6·1	2·5	12·1	4·9
02	6 00·5	6 01·5	5 44·1	0·2	0·1	6·2	2·5	12·2	5·0
03	6 00·8	6 01·7	5 44·3	0·3	0·1	6·3	2·6	12·3	5·0
04	6 01·0	6 02·0	5 44·6	0·4	0·2	6·4	2·6	12·4	5·1
05	6 01·3	6 02·2	5 44·8	0·5	0·2	6·5	2·7	12·5	5·1
06	6 01·5	6 02·5	5 45·0	0·6	0·2	6·6	2·7	12·6	5·1
07	6 01·8	6 02·7	5 45·3	0·7	0·3	6·7	2·7	12·7	5·2
08	6 02·0	6 03·0	5 45·5	0·8	0·3	6·8	2·8	12·8	5·2
09	6 02·3	6 03·2	5 45·7	0·9	0·4	6·9	2·8	12·9	5·3
10	6 02·5	6 03·5	5 46·0	1·0	0·4	7·0	2·9	13·0	5·3
11	6 02·8	6 03·7	5 46·2	1·1	0·4	7·1	2·9	13·1	5·3
12	6 03·0	6 04·0	5 46·5	1·2	0·5	7·2	2·9	13·2	5·4
13	6 03·3	6 04·2	5 46·7	1·3	0·5	7·3	3·0	13·3	5·4
14	6 03·5	6 04·5	5 46·9	1·4	0·6	7·4	3·0	13·4	5·5
15	6 03·8	6 04·7	5 47·2	1·5	0·6	7·5	3·1	13·5	5·5
16	6 04·0	6 05·0	5 47·4	1·6	0·7	7·6	3·1	13·6	5·6
17	6 04·3	6 05·2	5 47·7	1·7	0·7	7·7	3·1	13·7	5·6
18	6 04·5	6 05·5	5 47·9	1·8	0·7	7·8	3·2	13·8	5·6
19	6 04·8	6 05·7	5 48·1	1·9	0·8	7·9	3·2	13·9	5·7
20	6 05·0	6 06·0	5 48·4	2·0	0·8	8·0	3·3	14·0	5·7
21	6 05·3	6 06·3	5 48·6	2·1	0·9	8·1	3·3	14·1	5·8
22	6 05·5	6 06·5	5 48·8	2·2	0·9	8·2	3·3	14·2	5·8
23	6 05·8	6 06·8	5 49·1	2·3	0·9	8·3	3·4	14·3	5·8
24	6 06·0	6 07·0	5 49·3	2·4	1·0	8·4	3·4	14·4	5·9
25	6 06·3	6 07·3	5 49·6	2·5	1·0	8·5	3·5	14·5	5·9
26	6 06·5	6 07·5	5 49·8	2·6	1·1	8·6	3·5	14·6	6·0
27	6 06·8	6 07·8	5 50·0	2·7	1·1	8·7	3·6	14·7	6·0
28	6 07·0	6 08·0	5 50·3	2·8	1·1	8·8	3·6	14·8	6·0
29	6 07·3	6 08·3	5 50·5	2·9	1·2	8·9	3·6	14·9	6·1
30	6 07·5	6 08·5	5 50·8	3·0	1·2	9·0	3·7	15·0	6·1
31	6 07·8	6 08·8	5 51·0	3·1	1·3	9·1	3·7	15·1	6·2
32	6 08·0	6 09·0	5 51·2	3·2	1·3	9·2	3·8	15·2	6·2
33	6 08·3	6 09·3	5 51·5	3·3	1·3	9·3	3·8	15·3	6·2
34	6 08·5	6 09·5	5 51·7	3·4	1·4	9·4	3·8	15·4	6·3
35	6 08·8	6 09·8	5 52·0	3·5	1·4	9·5	3·9	15·5	6·3
36	6 09·0	6 10·0	5 52·2	3·6	1·5	9·6	3·9	15·6	6·4
37	6 09·3	6 10·3	5 52·4	3·7	1·5	9·7	4·0	15·7	6·4
38	6 09·5	6 10·5	5 52·7	3·8	1·6	9·8	4·0	15·8	6·5
39	6 09·8	6 10·8	5 52·9	3·9	1·6	9·9	4·0	15·9	6·5
40	6 10·0	6 11·0	5 53·1	4·0	1·6	10·0	4·1	16·0	6·5
41	6 10·3	6 11·3	5 53·4	4·1	1·7	10·1	4·1	16·1	6·6
42	6 10·5	6 11·5	5 53·6	4·2	1·7	10·2	4·2	16·2	6·6
43	6 10·8	6 11·8	5 53·9	4·3	1·8	10·3	4·2	16·3	6·7
44	6 11·0	6 12·0	5 54·1	4·4	1·8	10·4	4·2	16·4	6·7
45	6 11·3	6 12·3	5 54·3	4·5	1·8	10·5	4·3	16·5	6·7
46	6 11·5	6 12·5	5 54·6	4·6	1·9	10·6	4·3	16·6	6·8
47	6 11·8	6 12·8	5 54·8	4·7	1·9	10·7	4·4	16·7	6·8
48	6 12·0	6 13·0	5 55·1	4·8	2·0	10·8	4·4	16·8	6·9
49	6 12·3	6 13·3	5 55·3	4·9	2·0	10·9	4·5	16·9	6·9
50	6 12·5	6 13·5	5 55·5	5·0	2·0	11·0	4·5	17·0	6·9
51	6 12·8	6 13·8	5 55·8	5·1	2·1	11·1	4·5	17·1	7·0
52	6 13·0	6 14·0	5 56·0	5·2	2·1	11·2	4·6	17·2	7·0
53	6 13·3	6 14·3	5 56·2	5·3	2·2	11·3	4·6	17·3	7·1
54	6 13·5	6 14·5	5 56·5	5·4	2·2	11·4	4·7	17·4	7·1
55	6 13·8	6 14·8	5 56·7	5·5	2·2	11·5	4·7	17·5	7·1
56	6 14·0	6 15·0	5 57·0	5·6	2·3	11·6	4·7	17·6	7·2
57	6 14·3	6 15·3	5 57·2	5·7	2·3	11·7	4·8	17·7	7·2
58	6 14·5	6 15·5	5 57·4	5·8	2·4	11·8	4·8	17·8	7·3
59	6 14·8	6 15·8	5 57·7	5·9	2·4	11·9	4·9	17·9	7·3
60	6 15·0	6 16·0	5 57·9	6·0	2·5	12·0	4·9	18·0	7·4

25m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	6 15·0	6 16·0	5 57·9	0·0	0·0	6·0	2·6	12·0	5·1
01	6 15·3	6 16·3	5 58·2	0·1	0·0	6·1	2·6	12·1	5·1
02	6 15·5	6 16·5	5 58·4	0·2	0·1	6·2	2·6	12·2	5·2
03	6 15·8	6 16·8	5 58·6	0·3	0·1	6·3	2·7	12·3	5·2
04	6 16·0	6 17·0	5 58·9	0·4	0·2	6·4	2·7	12·4	5·3
05	6 16·3	6 17·3	5 59·1	0·5	0·2	6·5	2·8	12·5	5·3
06	6 16·5	6 17·5	5 59·3	0·6	0·3	6·6	2·8	12·6	5·4
07	6 16·8	6 17·8	5 59·6	0·7	0·3	6·7	2·8	12·7	5·4
08	6 17·0	6 18·0	5 59·8	0·8	0·3	6·8	2·9	12·8	5·4
09	6 17·3	6 18·3	6 00·1	0·9	0·4	6·9	2·9	12·9	5·5
10	6 17·5	6 18·5	6 00·3	1·0	0·4	7·0	3·0	13·0	5·5
11	6 17·8	6 18·8	6 00·5	1·1	0·5	7·1	3·0	13·1	5·6
12	6 18·0	6 19·0	6 00·8	1·2	0·5	7·2	3·1	13·2	5·6
13	6 18·3	6 19·3	6 01·0	1·3	0·6	7·3	3·1	13·3	5·7
14	6 18·5	6 19·5	6 01·3	1·4	0·6	7·4	3·1	13·4	5·7
15	6 18·8	6 19·8	6 01·5	1·5	0·6	7·5	3·2	13·5	5·7
16	6 19·0	6 20·0	6 01·7	1·6	0·7	7·6	3·2	13·6	5·8
17	6 19·3	6 20·3	6 02·0	1·7	0·7	7·7	3·3	13·7	5·8
18	6 19·5	6 20·5	6 02·2	1·8	0·8	7·8	3·3	13·8	5·9
19	6 19·8	6 20·8	6 02·5	1·9	0·8	7·9	3·4	13·9	5·9
20	6 20·0	6 21·0	6 02·7	2·0	0·9	8·0	3·4	14·0	6·0
21	6 20·3	6 21·3	6 02·9	2·1	0·9	8·1	3·4	14·1	6·0
22	6 20·5	6 21·5	6 03·2	2·2	0·9	8·2	3·5	14·2	6·0
23	6 20·8	6 21·8	6 03·4	2·3	1·0	8·3	3·5	14·3	6·1
24	6 21·0	6 22·0	6 03·6	2·4	1·0	8·4	3·6	14·4	6·1
25	6 21·3	6 22·3	6 03·9	2·5	1·1	8·5	3·6	14·5	6·2
26	6 21·5	6 22·5	6 04·1	2·6	1·1	8·6	3·7	14·6	6·2
27	6 21·8	6 22·8	6 04·4	2·7	1·1	8·7	3·7	14·7	6·2
28	6 22·0	6 23·0	6 04·6	2·8	1·2	8·8	3·7	14·8	6·3
29	6 22·3	6 23·3	6 04·8	2·9	1·2	8·9	3·8	14·9	6·3
30	6 22·5	6 23·5	6 05·1	3·0	1·3	9·0	3·8	15·0	6·4
31	6 22·8	6 23·8	6 05·3	3·1	1·3	9·1	3·9	15·1	6·4
32	6 23·0	6 24·0	6 05·6	3·2	1·4	9·2	3·9	15·2	6·5
33	6 23·3	6 24·3	6 05·8	3·3	1·4	9·3	4·0	15·3	6·5
34	6 23·5	6 24·5	6 06·0	3·4	1·4	9·4	4·0	15·4	6·5
35	6 23·8	6 24·8	6 06·3	3·5	1·5	9·5	4·0	15·5	6·6
36	6 24·0	6 25·1	6 06·5	3·6	1·5	9·6	4·1	15·6	6·6
37	6 24·3	6 25·3	6 06·7	3·7	1·6	9·7	4·1	15·7	6·7
38	6 24·5	6 25·6	6 07·0	3·8	1·6	9·8	4·2	15·8	6·7
39	6 24·8	6 25·8	6 07·2	3·9	1·7	9·9	4·2	15·9	6·8
40	6 25·0	6 26·1	6 07·5	4·0	1·7	10·0	4·3	16·0	6·8
41	6 25·3	6 26·3	6 07·7	4·1	1·7	10·1	4·3	16·1	6·8
42	6 25·5	6 26·6	6 07·9	4·2	1·8	10·2	4·3	16·2	6·9
43	6 25·8	6 26·8	6 08·2	4·3	1·8	10·3	4·4	16·3	6·9
44	6 26·0	6 27·1	6 08·4	4·4	1·9	10·4	4·4	16·4	7·0
45	6 26·3	6 27·3	6 08·7	4·5	1·9	10·5	4·5	16·5	7·0
46	6 26·5	6 27·6	6 08·9	4·6	2·0	10·6	4·5	16·6	7·1
47	6 26·8	6 27·8	6 09·1	4·7	2·0	10·7	4·5	16·7	7·1
48	6 27·0	6 28·1	6 09·4	4·8	2·0	10·8	4·6	16·8	7·1
49	6 27·3	6 28·3	6 09·6	4·9	2·1	10·9	4·6	16·9	7·2
50	6 27·5	6 28·6	6 09·8	5·0	2·1	11·0	4·7	17·0	7·2
51	6 27·8	6 28·8	6 10·1	5·1	2·2	11·1	4·7	17·1	7·3
52	6 28·0	6 29·1	6 10·3	5·2	2·2	11·2	4·8	17·2	7·3
53	6 28·3	6 29·3	6 10·6	5·3	2·3	11·3	4·8	17·3	7·4
54	6 28·5	6 29·6	6 10·8	5·4	2·3	11·4	4·8	17·4	7·4
55	6 28·8	6 29·8	6 11·0	5·5	2·3	11·5	4·9	17·5	7·4
56	6 29·0	6 30·1	6 11·3	5·6	2·4	11·6	4·9	17·6	7·5
57	6 29·3	6 30·3	6 11·5	5·7	2·4	11·7	5·0	17·7	7·5
58	6 29·5	6 30·6	6 11·8	5·8	2·5	11·8	5·0	17·8	7·6
59	6 29·8	6 30·8	6 12·0	5·9	2·5	11·9	5·1	17·9	7·6
60	6 30·0	6 31·1	6 12·2	6·0	2·6	12·0	5·1	18·0	7·7

26m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	6 30·0	6 31·1	6 12·2	0·0	0·0	6·0	2·7	12·0	5·3
01	6 30·3	6 31·3	6 12·5	0·1	0·0	6·1	2·7	12·1	5·3
02	6 30·5	6 31·6	6 12·7	0·2	0·1	6·2	2·7	12·2	5·4
03	6 30·8	6 31·8	6 12·9	0·3	0·1	6·3	2·8	12·3	5·4
04	6 31·0	6 32·1	6 13·2	0·4	0·2	6·4	2·8	12·4	5·5
05	6 31·3	6 32·3	6 13·4	0·5	0·2	6·5	2·9	12·5	5·5
06	6 31·5	6 32·6	6 13·7	0·6	0·3	6·6	2·9	12·6	5·6
07	6 31·8	6 32·8	6 13·9	0·7	0·3	6·7	3·0	12·7	5·6
08	6 32·0	6 33·1	6 14·1	0·8	0·4	6·8	3·0	12·8	5·7
09	6 32·3	6 33·3	6 14·4	0·9	0·4	6·9	3·0	12·9	5·7
10	6 32·5	6 33·6	6 14·6	1·0	0·4	7·0	3·1	13·0	5·7
11	6 32·8	6 33·8	6 14·9	1·1	0·5	7·1	3·1	13·1	5·8
12	6 33·0	6 34·1	6 15·1	1·2	0·5	7·2	3·2	13·2	5·8
13	6 33·3	6 34·3	6 15·3	1·3	0·6	7·3	3·2	13·3	5·9
14	6 33·5	6 34·6	6 15·6	1·4	0·6	7·4	3·3	13·4	5·9
15	6 33·8	6 34·8	6 15·8	1·5	0·7	7·5	3·3	13·5	6·0
16	6 34·0	6 35·1	6 16·1	1·6	0·7	7·6	3·4	13·6	6·0
17	6 34·3	6 35·3	6 16·3	1·7	0·8	7·7	3·4	13·7	6·1
18	6 34·5	6 35·6	6 16·5	1·8	0·8	7·8	3·4	13·8	6·1
19	6 34·8	6 35·8	6 16·8	1·9	0·8	7·9	3·5	13·9	6·1
20	6 35·0	6 36·1	6 17·0	2·0	0·9	8·0	3·5	14·0	6·2
21	6 35·3	6 36·3	6 17·2	2·1	0·9	8·1	3·6	14·1	6·2
22	6 35·5	6 36·6	6 17·5	2·2	1·0	8·2	3·6	14·2	6·3
23	6 35·8	6 36·8	6 17·7	2·3	1·0	8·3	3·7	14·3	6·3
24	6 36·0	6 37·1	6 18·0	2·4	1·1	8·4	3·7	14·4	6·4
25	6 36·3	6 37·3	6 18·2	2·5	1·1	8·5	3·8	14·5	6·4
26	6 36·5	6 37·6	6 18·4	2·6	1·1	8·6	3·8	14·6	6·4
27	6 36·8	6 37·8	6 18·7	2·7	1·2	8·7	3·8	14·7	6·5
28	6 37·0	6 38·1	6 18·9	2·8	1·2	8·8	3·9	14·8	6·5
29	6 37·3	6 38·3	6 19·2	2·9	1·3	8·9	3·9	14·9	6·6
30	6 37·5	6 38·6	6 19·4	3·0	1·3	9·0	4·0	15·0	6·6
31	6 37·8	6 38·8	6 19·6	3·1	1·4	9·1	4·0	15·1	6·7
32	6 38·0	6 39·1	6 19·9	3·2	1·4	9·2	4·1	15·2	6·7
33	6 38·3	6 39·3	6 20·1	3·3	1·5	9·3	4·1	15·3	6·8
34	6 38·5	6 39·6	6 20·3	3·4	1·5	9·4	4·2	15·4	6·8
35	6 38·8	6 39·8	6 20·6	3·5	1·5	9·5	4·2	15·5	6·8
36	6 39·0	6 40·1	6 20·8	3·6	1·6	9·6	4·2	15·6	6·9
37	6 39·3	6 40·3	6 21·1	3·7	1·6	9·7	4·3	15·7	6·9
38	6 39·5	6 40·6	6 21·3	3·8	1·7	9·8	4·3	15·8	7·0
39	6 39·8	6 40·8	6 21·5	3·9	1·7	9·9	4·4	15·9	7·0
40	6 40·0	6 41·1	6 21·8	4·0	1·8	10·0	4·4	16·0	7·1
41	6 40·3	6 41·3	6 22·0	4·1	1·8	10·1	4·5	16·1	7·1
42	6 40·5	6 41·6	6 22·3	4·2	1·9	10·2	4·5	16·2	7·2
43	6 40·8	6 41·8	6 22·5	4·3	1·9	10·3	4·5	16·3	7·2
44	6 41·0	6 42·1	6 22·7	4·4	1·9	10·4	4·6	16·4	7·2
45	6 41·3	6 42·3	6 23·0	4·5	2·0	10·5	4·6	16·5	7·3
46	6 41·5	6 42·6	6 23·2	4·6	2·0	10·6	4·7	16·6	7·3
47	6 41·8	6 42·8	6 23·4	4·7	2·1	10·7	4·7	16·7	7·4
48	6 42·0	6 43·1	6 23·7	4·8	2·1	10·8	4·8	16·8	7·4
49	6 42·3	6 43·4	6 23·9	4·9	2·2	10·9	4·8	16·9	7·5
50	6 42·5	6 43·6	6 24·2	5·0	2·2	11·0	4·9	17·0	7·5
51	6 42·8	6 43·9	6 24·4	5·1	2·3	11·1	4·9	17·1	7·6
52	6 43·0	6 44·1	6 24·6	5·2	2·3	11·2	4·9	17·2	7·6
53	6 43·3	6 44·4	6 24·9	5·3	2·3	11·3	5·0	17·3	7·6
54	6 43·5	6 44·6	6 25·1	5·4	2·4	11·4	5·0	17·4	7·7
55	6 43·8	6 44·9	6 25·4	5·5	2·4	11·5	5·1	17·5	7·7
56	6 44·0	6 45·1	6 25·6	5·6	2·5	11·6	5·1	17·6	7·8
57	6 44·3	6 45·4	6 25·8	5·7	2·5	11·7	5·2	17·7	7·8
58	6 44·5	6 45·6	6 26·1	5·8	2·6	11·8	5·2	17·8	7·9
59	6 44·8	6 45·9	6 26·3	5·9	2·6	11·9	5·3	17·9	7·9
60	6 45·0	6 46·1	6 26·6	6·0	2·7	12·0	5·3	18·0	8·0

27m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	6 45·0	6 46·1	6 26·6	0·0	0·0	6·0	2·8	12·0	5·5
01	6 45·3	6 46·4	6 26·8	0·1	0·0	6·1	2·8	12·1	5·5
02	6 45·5	6 46·6	6 27·0	0·2	0·1	6·2	2·8	12·2	5·6
03	6 45·8	6 46·9	6 27·3	0·3	0·1	6·3	2·9	12·3	5·6
04	6 46·0	6 47·1	6 27·5	0·4	0·2	6·4	2·9	12·4	5·7
05	6 46·3	6 47·4	6 27·7	0·5	0·2	6·5	3·0	12·5	5·7
06	6 46·5	6 47·6	6 28·0	0·6	0·3	6·6	3·0	12·6	5·8
07	6 46·8	6 47·9	6 28·2	0·7	0·3	6·7	3·1	12·7	5·8
08	6 47·0	6 48·1	6 28·5	0·8	0·4	6·8	3·1	12·8	5·9
09	6 47·3	6 48·4	6 28·7	0·9	0·4	6·9	3·2	12·9	5·9
10	6 47·5	6 48·6	6 28·9	1·0	0·5	7·0	3·2	13·0	6·0
11	6 47·8	6 48·9	6 29·2	1·1	0·5	7·1	3·3	13·1	6·0
12	6 48·0	6 49·1	6 29·4	1·2	0·6	7·2	3·3	13·2	6·1
13	6 48·3	6 49·4	6 29·7	1·3	0·6	7·3	3·3	13·3	6·1
14	6 48·5	6 49·6	6 29·9	1·4	0·6	7·4	3·4	13·4	6·1
15	6 48·8	6 49·9	6 30·1	1·5	0·7	7·5	3·4	13·5	6·2
16	6 49·0	6 50·1	6 30·4	1·6	0·7	7·6	3·5	13·6	6·2
17	6 49·3	6 50·4	6 30·6	1·7	0·8	7·7	3·5	13·7	6·3
18	6 49·5	6 50·6	6 30·8	1·8	0·8	7·8	3·6	13·8	6·3
19	6 49·8	6 50·9	6 31·1	1·9	0·9	7·9	3·6	13·9	6·4
20	6 50·0	6 51·1	6 31·3	2·0	0·9	8·0	3·7	14·0	6·4
21	6 50·3	6 51·4	6 31·6	2·1	1·0	8·1	3·7	14·1	6·5
22	6 50·5	6 51·6	6 31·8	2·2	1·0	8·2	3·8	14·2	6·5
23	6 50·8	6 51·9	6 32·0	2·3	1·1	8·3	3·8	14·3	6·6
24	6 51·0	6 52·1	6 32·3	2·4	1·1	8·4	3·9	14·4	6·6
25	6 51·3	6 52·4	6 32·5	2·5	1·1	8·5	3·9	14·5	6·6
26	6 51·5	6 52·6	6 32·8	2·6	1·2	8·6	3·9	14·6	6·7
27	6 51·8	6 52·9	6 33·0	2·7	1·2	8·7	4·0	14·7	6·7
28	6 52·0	6 53·1	6 33·2	2·8	1·3	8·8	4·0	14·8	6·8
29	6 52·3	6 53·4	6 33·5	2·9	1·3	8·9	4·1	14·9	6·8
30	6 52·5	6 53·6	6 33·7	3·0	1·4	9·0	4·1	15·0	6·9
31	6 52·8	6 53·9	6 33·9	3·1	1·4	9·1	4·2	15·1	6·9
32	6 53·0	6 54·1	6 34·2	3·2	1·5	9·2	4·2	15·2	7·0
33	6 53·3	6 54·4	6 34·4	3·3	1·5	9·3	4·3	15·3	7·0
34	6 53·5	6 54·6	6 34·7	3·4	1·6	9·4	4·3	15·4	7·1
35	6 53·8	6 54·9	6 34·9	3·5	1·6	9·5	4·4	15·5	7·1
36	6 54·0	6 55·1	6 35·1	3·6	1·7	9·6	4·4	15·6	7·2
37	6 54·3	6 55·4	6 35·4	3·7	1·7	9·7	4·4	15·7	7·2
38	6 54·5	6 55·6	6 35·6	3·8	1·7	9·8	4·5	15·8	7·2
39	6 54·8	6 55·9	6 35·9	3·9	1·8	9·9	4·5	15·9	7·3
40	6 55·0	6 56·1	6 36·1	4·0	1·8	10·0	4·6	16·0	7·3
41	6 55·3	6 56·4	6 36·3	4·1	1·9	10·1	4·6	16·1	7·4
42	6 55·5	6 56·6	6 36·6	4·2	1·9	10·2	4·7	16·2	7·4
43	6 55·8	6 56·9	6 36·8	4·3	2·0	10·3	4·7	16·3	7·5
44	6 56·0	6 57·1	6 37·0	4·4	2·0	10·4	4·8	16·4	7·5
45	6 56·3	6 57·4	6 37·3	4·5	2·1	10·5	4·8	16·5	7·6
46	6 56·5	6 57·6	6 37·5	4·6	2·1	10·6	4·9	16·6	7·6
47	6 56·8	6 57·9	6 37·8	4·7	2·2	10·7	4·9	16·7	7·7
48	6 57·0	6 58·1	6 38·0	4·8	2·2	10·8	5·0	16·8	7·7
49	6 57·3	6 58·4	6 38·2	4·9	2·2	10·9	5·0	16·9	7·7
50	6 57·5	6 58·6	6 38·5	5·0	2·3	11·0	5·0	17·0	7·8
51	6 57·8	6 58·9	6 38·7	5·1	2·3	11·1	5·1	17·1	7·8
52	6 58·0	6 59·1	6 39·0	5·2	2·4	11·2	5·1	17·2	7·9
53	6 58·3	6 59·4	6 39·2	5·3	2·4	11·3	5·2	17·3	7·9
54	6 58·5	6 59·6	6 39·4	5·4	2·5	11·4	5·2	17·4	8·0
55	6 58·8	6 59·9	6 39·7	5·5	2·5	11·5	5·3	17·5	8·0
56	6 59·0	7 00·1	6 39·9	5·6	2·6	11·6	5·3	17·6	8·1
57	6 59·3	7 00·4	6 40·2	5·7	2·6	11·7	5·4	17·7	8·1
58	6 59·5	7 00·6	6 40·4	5·8	2·7	11·8	5·4	17·8	8·2
59	6 59·8	7 00·9	6 40·6	5·9	2·7	11·9	5·5	17·9	8·2
60	7 00·0	7 01·1	6 40·9	6·0	2·8	12·0	5·5	18·0	8·3

28m s	SUN PLANETS ° ′	ARIES ° ′	MOON ° ′	v or d ′	Corrn ′	v or d ′	Corrn ′	v or d ′	Corrn ′
00	7 00·0	7 01·1	6 40·9	0·0	0·0	6·0	2·9	12·0	5·7
01	7 00·3	7 01·4	6 41·1	0·1	0·0	6·1	2·9	12·1	5·7
02	7 00·5	7 01·7	6 41·3	0·2	0·1	6·2	2·9	12·2	5·8
03	7 00·8	7 01·9	6 41·6	0·3	0·1	6·3	3·0	12·3	5·8
04	7 01·0	7 02·2	6 41·8	0·4	0·2	6·4	3·0	12·4	5·9
05	7 01·3	7 02·4	6 42·1	0·5	0·2	6·5	3·1	12·5	5·9
06	7 01·5	7 02·7	6 42·3	0·6	0·3	6·6	3·1	12·6	6·0
07	7 01·8	7 02·9	6 42·5	0·7	0·3	6·7	3·2	12·7	6·0
08	7 02·0	7 03·2	6 42·8	0·8	0·4	6·8	3·2	12·8	6·1
09	7 02·3	7 03·4	6 43·0	0·9	0·4	6·9	3·3	12·9	6·1
10	7 02·5	7 03·7	6 43·3	1·0	0·5	7·0	3·3	13·0	6·2
11	7 02·8	7 03·9	6 43·5	1·1	0·5	7·1	3·4	13·1	6·2
12	7 03·0	7 04·2	6 43·7	1·2	0·6	7·2	3·4	13·2	6·3
13	7 03·3	7 04·4	6 44·0	1·3	0·6	7·3	3·5	13·3	6·3
14	7 03·5	7 04·7	6 44·2	1·4	0·7	7·4	3·5	13·4	6·4
15	7 03·8	7 04·9	6 44·4	1·5	0·7	7·5	3·6	13·5	6·4
16	7 04·0	7 05·2	6 44·7	1·6	0·8	7·6	3·6	13·6	6·5
17	7 04·3	7 05·4	6 44·9	1·7	0·8	7·7	3·7	13·7	6·5
18	7 04·5	7 05·7	6 45·2	1·8	0·9	7·8	3·7	13·8	6·6
19	7 04·8	7 05·9	6 45·4	1·9	0·9	7·9	3·8	13·9	6·6
20	7 05·0	7 06·2	6 45·6	2·0	1·0	8·0	3·8	14·0	6·7
21	7 05·3	7 06·4	6 45·9	2·1	1·0	8·1	3·8	14·1	6·7
22	7 05·5	7 06·7	6 46·1	2·2	1·0	8·2	3·9	14·2	6·7
23	7 05·8	7 06·9	6 46·4	2·3	1·1	8·3	3·9	14·3	6·8
24	7 06·0	7 07·2	6 46·6	2·4	1·1	8·4	4·0	14·4	6·8
25	7 06·3	7 07·4	6 46·8	2·5	1·2	8·5	4·0	14·5	6·9
26	7 06·5	7 07·7	6 47·1	2·6	1·2	8·6	4·1	14·6	6·9
27	7 06·8	7 07·9	6 47·3	2·7	1·3	8·7	4·1	14·7	7·0
28	7 07·0	7 08·2	6 47·5	2·8	1·3	8·8	4·2	14·8	7·0
29	7 07·3	7 08·4	6 47·8	2·9	1·4	8·9	4·2	14·9	7·1
30	7 07·5	7 08·7	6 48·0	3·0	1·4	9·0	4·3	15·0	7·1
31	7 07·8	7 08·9	6 48·3	3·1	1·5	9·1	4·3	15·1	7·2
32	7 08·0	7 09·2	6 48·5	3·2	1·5	9·2	4·4	15·2	7·2
33	7 08·3	7 09·4	6 48·7	3·3	1·6	9·3	4·4	15·3	7·3
34	7 08·5	7 09·7	6 49·0	3·4	1·6	9·4	4·5	15·4	7·3
35	7 08·8	7 09·9	6 49·2	3·5	1·7	9·5	4·5	15·5	7·4
36	7 09·0	7 10·2	6 49·5	3·6	1·7	9·6	4·6	15·6	7·4
37	7 09·3	7 10·4	6 49·7	3·7	1·8	9·7	4·6	15·7	7·5
38	7 09·5	7 10·7	6 49·9	3·8	1·8	9·8	4·7	15·8	7·5
39	7 09·8	7 10·9	6 50·2	3·9	1·9	9·9	4·7	15·9	7·6
40	7 10·0	7 11·2	6 50·4	4·0	1·9	10·0	4·8	16·0	7·6
41	7 10·3	7 11·4	6 50·6	4·1	1·9	10·1	4·8	16·1	7·6
42	7 10·5	7 11·7	6 50·9	4·2	2·0	10·2	4·8	16·2	7·7
43	7 10·8	7 11·9	6 51·1	4·3	2·0	10·3	4·9	16·3	7·7
44	7 11·0	7 12·2	6 51·4	4·4	2·1	10·4	4·9	16·4	7·8
45	7 11·3	7 12·4	6 51·6	4·5	2·1	10·5	5·0	16·5	7·8
46	7 11·5	7 12·7	6 51·8	4·6	2·2	10·6	5·0	16·6	7·9
47	7 11·8	7 12·9	6 52·1	4·7	2·2	10·7	5·1	16·7	7·9
48	7 12·0	7 13·2	6 52·3	4·8	2·3	10·8	5·1	16·8	8·0
49	7 12·3	7 13·4	6 52·6	4·9	2·3	10·9	5·2	16·9	8·0
50	7 12·5	7 13·7	6 52·8	5·0	2·4	11·0	5·2	17·0	8·1
51	7 12·8	7 13·9	6 53·0	5·1	2·4	11·1	5·3	17·1	8·1
52	7 13·0	7 14·2	6 53·3	5·2	2·5	11·2	5·3	17·2	8·2
53	7 13·3	7 14·4	6 53·5	5·3	2·5	11·3	5·4	17·3	8·2
54	7 13·5	7 14·7	6 53·8	5·4	2·6	11·4	5·4	17·4	8·3
55	7 13·8	7 14·9	6 54·0	5·5	2·6	11·5	5·5	17·5	8·3
56	7 14·0	7 15·2	6 54·2	5·6	2·7	11·6	5·5	17·6	8·4
57	7 14·3	7 15·4	6 54·5	5·7	2·7	11·7	5·6	17·7	8·4
58	7 14·5	7 15·7	6 54·7	5·8	2·8	11·8	5·6	17·8	8·5
59	7 14·8	7 15·9	6 54·9	5·9	2·8	11·9	5·7	17·9	8·5
60	7 15·0	7 16·2	6 55·2	6·0	2·9	12·0	5·7	18·0	8·6

29m s	SUN PLANETS ° ′	ARIES ° ′	MOON ° ′	v or d ′	Corrn ′	v or d ′	Corrn ′	v or d ′	Corrn ′
00	7 15·0	7 16·2	6 55·2	0·0	0·0	6·0	3·0	12·0	5·9
01	7 15·3	7 16·4	6 55·4	0·1	0·0	6·1	3·0	12·1	5·9
02	7 15·5	7 16·7	6 55·7	0·2	0·1	6·2	3·0	12·2	6·0
03	7 15·8	7 16·9	6 55·9	0·3	0·1	6·3	3·1	12·3	6·0
04	7 16·0	7 17·2	6 56·1	0·4	0·2	6·4	3·1	12·4	6·1
05	7 16·3	7 17·4	6 56·4	0·5	0·2	6·5	3·2	12·5	6·1
06	7 16·5	7 17·7	6 56·6	0·6	0·3	6·6	3·2	12·6	6·2
07	7 16·8	7 17·9	6 56·9	0·7	0·3	6·7	3·3	12·7	6·2
08	7 17·0	7 18·2	6 57·1	0·8	0·4	6·8	3·3	12·8	6·3
09	7 17·3	7 18·4	6 57·3	0·9	0·4	6·9	3·4	12·9	6·3
10	7 17·5	7 18·7	6 57·6	1·0	0·5	7·0	3·4	13·0	6·4
11	7 17·8	7 18·9	6 57·8	1·1	0·5	7·1	3·5	13·1	6·4
12	7 18·0	7 19·2	6 58·0	1·2	0·6	7·2	3·5	13·2	6·5
13	7 18·3	7 19·4	6 58·3	1·3	0·6	7·3	3·6	13·3	6·5
14	7 18·5	7 19·7	6 58·5	1·4	0·7	7·4	3·6	13·4	6·6
15	7 18·8	7 20·0	6 58·8	1·5	0·7	7·5	3·7	13·5	6·6
16	7 19·0	7 20·2	6 59·0	1·6	0·8	7·6	3·7	13·6	6·7
17	7 19·3	7 20·5	6 59·2	1·7	0·8	7·7	3·8	13·7	6·7
18	7 19·5	7 20·7	6 59·5	1·8	0·9	7·8	3·8	13·8	6·8
19	7 19·8	7 21·0	6 59·7	1·9	0·9	7·9	3·9	13·9	6·8
20	7 20·0	7 21·2	7 00·0	2·0	1·0	8·0	3·9	14·0	6·9
21	7 20·3	7 21·5	7 00·2	2·1	1·0	8·1	4·0	14·1	6·9
22	7 20·5	7 21·7	7 00·4	2·2	1·1	8·2	4·0	14·2	7·0
23	7 20·8	7 22·0	7 00·7	2·3	1·1	8·3	4·1	14·3	7·0
24	7 21·0	7 22·2	7 00·9	2·4	1·2	8·4	4·1	14·4	7·1
25	7 21·3	7 22·5	7 01·1	2·5	1·2	8·5	4·2	14·5	7·1
26	7 21·5	7 22·7	7 01·4	2·6	1·3	8·6	4·2	14·6	7·2
27	7 21·8	7 23·0	7 01·6	2·7	1·3	8·7	4·3	14·7	7·2
28	7 22·0	7 23·2	7 01·9	2·8	1·4	8·8	4·3	14·8	7·3
29	7 22·3	7 23·5	7 02·1	2·9	1·4	8·9	4·4	14·9	7·3
30	7 22·5	7 23·7	7 02·3	3·0	1·5	9·0	4·4	15·0	7·4
31	7 22·8	7 24·0	7 02·6	3·1	1·5	9·1	4·5	15·1	7·4
32	7 23·0	7 24·2	7 02·8	3·2	1·6	9·2	4·5	15·2	7·5
33	7 23·3	7 24·5	7 03·1	3·3	1·6	9·3	4·6	15·3	7·5
34	7 23·5	7 24·7	7 03·3	3·4	1·7	9·4	4·6	15·4	7·6
35	7 23·8	7 25·0	7 03·5	3·5	1·7	9·5	4·7	15·5	7·6
36	7 24·0	7 25·2	7 03·8	3·6	1·8	9·6	4·7	15·6	7·7
37	7 24·3	7 25·5	7 04·0	3·7	1·8	9·7	4·8	15·7	7·7
38	7 24·5	7 25·7	7 04·3	3·8	1·9	9·8	4·8	15·8	7·8
39	7 24·8	7 26·0	7 04·5	3·9	1·9	9·9	4·9	15·9	7·8
40	7 25·0	7 26·2	7 04·7	4·0	2·0	10·0	4·9	16·0	7·9
41	7 25·3	7 26·5	7 05·0	4·1	2·0	10·1	5·0	16·1	7·9
42	7 25·5	7 26·7	7 05·2	4·2	2·1	10·2	5·0	16·2	8·0
43	7 25·8	7 27·0	7 05·4	4·3	2·1	10·3	5·1	16·3	8·0
44	7 26·0	7 27·2	7 05·7	4·4	2·2	10·4	5·1	16·4	8·1
45	7 26·3	7 27·5	7 05·9	4·5	2·2	10·5	5·2	16·5	8·1
46	7 26·5	7 27·7	7 06·2	4·6	2·3	10·6	5·2	16·6	8·2
47	7 26·8	7 28·0	7 06·4	4·7	2·3	10·7	5·3	16·7	8·2
48	7 27·0	7 28·2	7 06·6	4·8	2·4	10·8	5·3	16·8	8·3
49	7 27·3	7 28·5	7 06·9	4·9	2·4	10·9	5·4	16·9	8·3
50	7 27·5	7 28·7	7 07·1	5·0	2·5	11·0	5·4	17·0	8·4
51	7 27·8	7 29·0	7 07·4	5·1	2·5	11·1	5·5	17·1	8·4
52	7 28·0	7 29·2	7 07·6	5·2	2·6	11·2	5·5	17·2	8·5
53	7 28·3	7 29·5	7 07·8	5·3	2·6	11·3	5·6	17·3	8·5
54	7 28·5	7 29·7	7 08·1	5·4	2·7	11·4	5·6	17·4	8·6
55	7 28·8	7 30·0	7 08·3	5·5	2·7	11·5	5·7	17·5	8·6
56	7 29·0	7 30·2	7 08·5	5·6	2·8	11·6	5·7	17·6	8·7
57	7 29·3	7 30·5	7 08·8	5·7	2·8	11·7	5·8	17·7	8·7
58	7 29·5	7 30·7	7 09·0	5·8	2·9	11·8	5·8	17·8	8·8
59	7 29·8	7 31·0	7 09·3	5·9	2·9	11·9	5·9	17·9	8·8
60	7 30·0	7 31·2	7 09·5	6·0	3·0	12·0	5·9	18·0	8·9

30m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	7 30·0	7 31·2	7 09·5	0·0	0·0	6·0	3·1	12·0	6·1
01	7 30·3	7 31·5	7 09·7	0·1	0·1	6·1	3·1	12·1	6·2
02	7 30·5	7 31·7	7 10·0	0·2	0·1	6·2	3·2	12·2	6·2
03	7 30·8	7 32·0	7 10·2	0·3	0·2	6·3	3·2	12·3	6·3
04	7 31·0	7 32·2	7 10·5	0·4	0·2	6·4	3·3	12·4	6·3
05	7 31·3	7 32·5	7 10·7	0·5	0·3	6·5	3·3	12·5	6·4
06	7 31·5	7 32·7	7 10·9	0·6	0·3	6·6	3·4	12·6	6·4
07	7 31·8	7 33·0	7 11·2	0·7	0·4	6·7	3·4	12·7	6·5
08	7 32·0	7 33·2	7 11·4	0·8	0·4	6·8	3·5	12·8	6·5
09	7 32·3	7 33·5	7 11·6	0·9	0·5	6·9	3·5	12·9	6·6
10	7 32·5	7 33·7	7 11·9	1·0	0·5	7·0	3·6	13·0	6·6
11	7 32·8	7 34·0	7 12·1	1·1	0·6	7·1	3·6	13·1	6·7
12	7 33·0	7 34·2	7 12·4	1·2	0·6	7·2	3·7	13·2	6·7
13	7 33·3	7 34·5	7 12·6	1·3	0·7	7·3	3·7	13·3	6·8
14	7 33·5	7 34·7	7 12·8	1·4	0·7	7·4	3·8	13·4	6·8
15	7 33·8	7 35·0	7 13·1	1·5	0·8	7·5	3·8	13·5	6·9
16	7 34·0	7 35·2	7 13·3	1·6	0·8	7·6	3·9	13·6	6·9
17	7 34·3	7 35·5	7 13·6	1·7	0·9	7·7	3·9	13·7	7·0
18	7 34·5	7 35·7	7 13·8	1·8	0·9	7·8	4·0	13·8	7·0
19	7 34·8	7 36·0	7 14·0	1·9	1·0	7·9	4·0	13·9	7·1
20	7 35·0	7 36·2	7 14·3	2·0	1·0	8·0	4·1	14·0	7·1
21	7 35·3	7 36·5	7 14·5	2·1	1·1	8·1	4·1	14·1	7·2
22	7 35·5	7 36·7	7 14·7	2·2	1·1	8·2	4·2	14·2	7·2
23	7 35·8	7 37·0	7 15·0	2·3	1·2	8·3	4·2	14·3	7·3
24	7 36·0	7 37·2	7 15·2	2·4	1·2	8·4	4·3	14·4	7·3
25	7 36·3	7 37·5	7 15·5	2·5	1·3	8·5	4·3	14·5	7·4
26	7 36·5	7 37·7	7 15·7	2·6	1·3	8·6	4·4	14·6	7·4
27	7 36·8	7 38·0	7 15·9	2·7	1·4	8·7	4·4	14·7	7·5
28	7 37·0	7 38·3	7 16·2	2·8	1·4	8·8	4·5	14·8	7·5
29	7 37·3	7 38·5	7 16·4	2·9	1·5	8·9	4·5	14·9	7·6
30	7 37·5	7 38·8	7 16·7	3·0	1·5	9·0	4·6	15·0	7·6
31	7 37·8	7 39·0	7 16·9	3·1	1·6	9·1	4·6	15·1	7·7
32	7 38·0	7 39·3	7 17·1	3·2	1·6	9·2	4·7	15·2	7·7
33	7 38·3	7 39·5	7 17·4	3·3	1·7	9·3	4·7	15·3	7·8
34	7 38·5	7 39·8	7 17·6	3·4	1·7	9·4	4·8	15·4	7·8
35	7 38·8	7 40·0	7 17·9	3·5	1·8	9·5	4·8	15·5	7·9
36	7 39·0	7 40·3	7 18·1	3·6	1·8	9·6	4·9	15·6	7·9
37	7 39·3	7 40·5	7 18·3	3·7	1·9	9·7	4·9	15·7	8·0
38	7 39·5	7 40·8	7 18·6	3·8	1·9	9·8	5·0	15·8	8·0
39	7 39·8	7 41·0	7 18·8	3·9	2·0	9·9	5·0	15·9	8·1
40	7 40·0	7 41·3	7 19·0	4·0	2·0	10·0	5·1	16·0	8·1
41	7 40·3	7 41·5	7 19·3	4·1	2·1	10·1	5·1	16·1	8·2
42	7 40·5	7 41·8	7 19·5	4·2	2·1	10·2	5·2	16·2	8·2
43	7 40·8	7 42·0	7 19·8	4·3	2·2	10·3	5·2	16·3	8·3
44	7 41·0	7 42·3	7 20·0	4·4	2·2	10·4	5·3	16·4	8·3
45	7 41·3	7 42·5	7 20·2	4·5	2·3	10·5	5·3	16·5	8·4
46	7 41·5	7 42·8	7 20·5	4·6	2·3	10·6	5·4	16·6	8·4
47	7 41·8	7 43·0	7 20·7	4·7	2·4	10·7	5·4	16·7	8·5
48	7 42·0	7 43·3	7 21·0	4·8	2·4	10·8	5·5	16·8	8·5
49	7 42·3	7 43·5	7 21·2	4·9	2·5	10·9	5·5	16·9	8·6
50	7 42·5	7 43·8	7 21·4	5·0	2·5	11·0	5·6	17·0	8·6
51	7 42·8	7 44·0	7 21·7	5·1	2·6	11·1	5·6	17·1	8·7
52	7 43·0	7 44·3	7 21·9	5·2	2·6	11·2	5·7	17·2	8·7
53	7 43·3	7 44·5	7 22·1	5·3	2·7	11·3	5·7	17·3	8·8
54	7 43·5	7 44·8	7 22·4	5·4	2·7	11·4	5·8	17·4	8·8
55	7 43·8	7 45·0	7 22·6	5·5	2·8	11·5	5·8	17·5	8·9
56	7 44·0	7 45·3	7 22·9	5·6	2·8	11·6	5·9	17·6	8·9
57	7 44·3	7 45·5	7 23·1	5·7	2·9	11·7	5·9	17·7	9·0
58	7 44·5	7 45·8	7 23·3	5·8	2·9	11·8	6·0	17·8	9·0
59	7 44·8	7 46·0	7 23·6	5·9	3·0	11·9	6·0	17·9	9·1
60	7 45·0	7 46·3	7 23·8	6·0	3·1	12·0	6·1	18·0	9·2

31m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	7 45·0	7 46·3	7 23·8	0·0	0·0	6·0	3·2	12·0	6·3
01	7 45·3	7 46·5	7 24·1	0·1	0·1	6·1	3·2	12·1	6·4
02	7 45·5	7 46·8	7 24·3	0·2	0·1	6·2	3·3	12·2	6·4
03	7 45·8	7 47·0	7 24·5	0·3	0·2	6·3	3·3	12·3	6·5
04	7 46·0	7 47·3	7 24·8	0·4	0·2	6·4	3·4	12·4	6·5
05	7 46·3	7 47·5	7 25·0	0·5	0·3	6·5	3·4	12·5	6·6
06	7 46·5	7 47·8	7 25·2	0·6	0·3	6·6	3·5	12·6	6·6
07	7 46·8	7 48·0	7 25·5	0·7	0·4	6·7	3·5	12·7	6·7
08	7 47·0	7 48·3	7 25·7	0·8	0·4	6·8	3·6	12·8	6·7
09	7 47·3	7 48·5	7 26·0	0·9	0·5	6·9	3·6	12·9	6·8
10	7 47·5	7 48·8	7 26·2	1·0	0·5	7·0	3·7	13·0	6·8
11	7 47·8	7 49·0	7 26·4	1·1	0·6	7·1	3·7	13·1	6·9
12	7 48·0	7 49·3	7 26·7	1·2	0·6	7·2	3·8	13·2	6·9
13	7 48·3	7 49·5	7 26·9	1·3	0·7	7·3	3·8	13·3	7·0
14	7 48·5	7 49·8	7 27·2	1·4	0·7	7·4	3·9	13·4	7·0
15	7 48·8	7 50·0	7 27·4	1·5	0·8	7·5	3·9	13·5	7·1
16	7 49·0	7 50·3	7 27·6	1·6	0·8	7·6	4·0	13·6	7·1
17	7 49·3	7 50·5	7 27·9	1·7	0·9	7·7	4·0	13·7	7·2
18	7 49·5	7 50·8	7 28·1	1·8	0·9	7·8	4·1	13·8	7·2
19	7 49·8	7 51·0	7 28·4	1·9	1·0	7·9	4·1	13·9	7·3
20	7 50·0	7 51·3	7 28·6	2·0	1·1	8·0	4·2	14·0	7·4
21	7 50·3	7 51·5	7 28·8	2·1	1·1	8·1	4·3	14·1	7·4
22	7 50·5	7 51·8	7 29·1	2·2	1·2	8·2	4·3	14·2	7·5
23	7 50·8	7 52·0	7 29·3	2·3	1·2	8·3	4·4	14·3	7·5
24	7 51·0	7 52·3	7 29·5	2·4	1·3	8·4	4·4	14·4	7·6
25	7 51·3	7 52·5	7 29·8	2·5	1·3	8·5	4·5	14·5	7·6
26	7 51·5	7 52·8	7 30·0	2·6	1·4	8·6	4·5	14·6	7·7
27	7 51·8	7 53·0	7 30·3	2·7	1·4	8·7	4·6	14·7	7·7
28	7 52·0	7 53·3	7 30·5	2·8	1·5	8·8	4·6	14·8	7·8
29	7 52·3	7 53·5	7 30·7	2·9	1·5	8·9	4·7	14·9	7·8
30	7 52·5	7 53·8	7 31·0	3·0	1·6	9·0	4·7	15·0	7·9
31	7 52·8	7 54·0	7 31·2	3·1	1·6	9·1	4·8	15·1	7·9
32	7 53·0	7 54·3	7 31·5	3·2	1·7	9·2	4·8	15·2	8·0
33	7 53·3	7 54·5	7 31·7	3·3	1·7	9·3	4·9	15·3	8·0
34	7 53·5	7 54·8	7 31·9	3·4	1·8	9·4	4·9	15·4	8·1
35	7 53·8	7 55·0	7 32·2	3·5	1·8	9·5	5·0	15·5	8·1
36	7 54·0	7 55·3	7 32·4	3·6	1·9	9·6	5·0	15·6	8·2
37	7 54·3	7 55·5	7 32·6	3·7	1·9	9·7	5·1	15·7	8·2
38	7 54·5	7 55·8	7 32·9	3·8	2·0	9·8	5·1	15·8	8·3
39	7 54·8	7 56·0	7 33·1	3·9	2·0	9·9	5·2	15·9	8·3
40	7 55·0	7 56·3	7 33·4	4·0	2·1	10·0	5·3	16·0	8·4
41	7 55·3	7 56·6	7 33·6	4·1	2·2	10·1	5·3	16·1	8·5
42	7 55·5	7 56·8	7 33·8	4·2	2·2	10·2	5·4	16·2	8·5
43	7 55·8	7 57·1	7 34·1	4·3	2·3	10·3	5·4	16·3	8·6
44	7 56·0	7 57·3	7 34·3	4·4	2·3	10·4	5·5	16·4	8·6
45	7 56·3	7 57·6	7 34·6	4·5	2·4	10·5	5·5	16·5	8·7
46	7 56·5	7 57·8	7 34·8	4·6	2·4	10·6	5·6	16·6	8·7
47	7 56·8	7 58·1	7 35·0	4·7	2·5	10·7	5·6	16·7	8·8
48	7 57·0	7 58·3	7 35·3	4·8	2·5	10·8	5·7	16·8	8·8
49	7 57·3	7 58·6	7 35·5	4·9	2·6	10·9	5·7	16·9	8·9
50	7 57·5	7 58·8	7 35·7	5·0	2·6	11·0	5·8	17·0	8·9
51	7 57·8	7 59·1	7 36·0	5·1	2·7	11·1	5·8	17·1	9·0
52	7 58·0	7 59·3	7 36·2	5·2	2·7	11·2	5·9	17·2	9·0
53	7 58·3	7 59·6	7 36·5	5·3	2·8	11·3	5·9	17·3	9·1
54	7 58·5	7 59·8	7 36·7	5·4	2·8	11·4	6·0	17·4	9·1
55	7 58·8	8 00·1	7 36·9	5·5	2·9	11·5	6·0	17·5	9·2
56	7 59·0	8 00·3	7 37·2	5·6	2·9	11·6	6·1	17·6	9·2
57	7 59·3	8 00·6	7 37·4	5·7	3·0	11·7	6·1	17·7	9·3
58	7 59·5	8 00·8	7 37·7	5·8	3·0	11·8	6·2	17·8	9·3
59	7 59·8	8 01·1	7 37·9	5·9	3·1	11·9	6·2	17·9	9·4
60	8 00·0	8 01·3	7 38·1	6·0	3·2	12·0	6·3	18·0	9·5

32m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	8 00·0	8 01·3	7 38·1	0·0	0·0	6·0	3·3	12·0	6·5
01	8 00·3	8 01·6	7 38·4	0·1	0·1	6·1	3·3	12·1	6·6
02	8 00·5	8 01·8	7 38·6	0·2	0·1	6·2	3·4	12·2	6·6
03	8 00·8	8 02·1	7 38·8	0·3	0·2	6·3	3·4	12·3	6·7
04	8 01·0	8 02·3	7 39·1	0·4	0·2	6·4	3·5	12·4	6·7
05	8 01·3	8 02·6	7 39·3	0·5	0·3	6·5	3·5	12·5	6·8
06	8 01·5	8 02·8	7 39·6	0·6	0·3	6·6	3·6	12·6	6·8
07	8 01·8	8 03·1	7 39·8	0·7	0·4	6·7	3·6	12·7	6·9
08	8 02·0	8 03·3	7 40·0	0·8	0·4	6·8	3·7	12·8	6·9
09	8 02·3	8 03·6	7 40·3	0·9	0·5	6·9	3·7	12·9	7·0
10	8 02·5	8 03·8	7 40·5	1·0	0·5	7·0	3·8	13·0	7·0
11	8 02·8	8 04·1	7 40·8	1·1	0·6	7·1	3·8	13·1	7·1
12	8 03·0	8 04·3	7 41·0	1·2	0·7	7·2	3·9	13·2	7·2
13	8 03·3	8 04·6	7 41·2	1·3	0·7	7·3	4·0	13·3	7·2
14	8 03·5	8 04·8	7 41·5	1·4	0·8	7·4	4·0	13·4	7·3
15	8 03·8	8 05·1	7 41·7	1·5	0·8	7·5	4·1	13·5	7·3
16	8 04·0	8 05·3	7 42·0	1·6	0·9	7·6	4·1	13·6	7·4
17	8 04·3	8 05·6	7 42·2	1·7	0·9	7·7	4·2	13·7	7·4
18	8 04·5	8 05·8	7 42·4	1·8	1·0	7·8	4·2	13·8	7·5
19	8 04·8	8 06·1	7 42·7	1·9	1·0	7·9	4·3	13·9	7·5
20	8 05·0	8 06·3	7 42·9	2·0	1·1	8·0	4·3	14·0	7·6
21	8 05·3	8 06·6	7 43·1	2·1	1·1	8·1	4·4	14·1	7·6
22	8 05·5	8 06·8	7 43·4	2·2	1·2	8·2	4·4	14·2	7·7
23	8 05·8	8 07·1	7 43·6	2·3	1·2	8·3	4·5	14·3	7·7
24	8 06·0	8 07·3	7 43·9	2·4	1·3	8·4	4·6	14·4	7·8
25	8 06·3	8 07·6	7 44·1	2·5	1·4	8·5	4·6	14·5	7·9
26	8 06·5	8 07·8	7 44·3	2·6	1·4	8·6	4·7	14·6	7·9
27	8 06·8	8 08·1	7 44·6	2·7	1·5	8·7	4·7	14·7	8·0
28	8 07·0	8 08·3	7 44·8	2·8	1·5	8·8	4·8	14·8	8·0
29	8 07·3	8 08·6	7 45·1	2·9	1·6	8·9	4·8	14·9	8·1
30	8 07·5	8 08·8	7 45·3	3·0	1·6	9·0	4·9	15·0	8·1
31	8 07·8	8 09·1	7 45·5	3·1	1·7	9·1	4·9	15·1	8·2
32	8 08·0	8 09·3	7 45·8	3·2	1·7	9·2	5·0	15·2	8·2
33	8 08·3	8 09·6	7 46·0	3·3	1·8	9·3	5·0	15·3	8·3
34	8 08·5	8 09·8	7 46·2	3·4	1·8	9·4	5·1	15·4	8·3
35	8 08·8	8 10·1	7 46·5	3·5	1·9	9·5	5·1	15·5	8·4
36	8 09·0	8 10·3	7 46·7	3·6	2·0	9·6	5·2	15·6	8·5
37	8 09·3	8 10·6	7 47·0	3·7	2·0	9·7	5·3	15·7	8·5
38	8 09·5	8 10·8	7 47·2	3·8	2·1	9·8	5·3	15·8	8·6
39	8 09·8	8 11·1	7 47·4	3·9	2·1	9·9	5·4	15·9	8·6
40	8 10·0	8 11·3	7 47·7	4·0	2·2	10·0	5·4	16·0	8·7
41	8 10·3	8 11·6	7 47·9	4·1	2·2	10·1	5·5	16·1	8·7
42	8 10·5	8 11·8	7 48·2	4·2	2·3	10·2	5·5	16·2	8·8
43	8 10·8	8 12·1	7 48·4	4·3	2·3	10·3	5·6	16·3	8·8
44	8 11·0	8 12·3	7 48·6	4·4	2·4	10·4	5·6	16·4	8·9
45	8 11·3	8 12·6	7 48·9	4·5	2·4	10·5	5·7	16·5	8·9
46	8 11·5	8 12·8	7 49·1	4·6	2·5	10·6	5·7	16·6	9·0
47	8 11·8	8 13·1	7 49·3	4·7	2·5	10·7	5·8	16·7	9·0
48	8 12·0	8 13·3	7 49·6	4·8	2·6	10·8	5·9	16·8	9·1
49	8 12·3	8 13·6	7 49·8	4·9	2·7	10·9	5·9	16·9	9·2
50	8 12·5	8 13·8	7 50·1	5·0	2·7	11·0	6·0	17·0	9·2
51	8 12·8	8 14·1	7 50·3	5·1	2·8	11·1	6·0	17·1	9·3
52	8 13·0	8 14·3	7 50·5	5·2	2·8	11·2	6·1	17·2	9·3
53	8 13·3	8 14·6	7 50·8	5·3	2·9	11·3	6·1	17·3	9·4
54	8 13·5	8 14·9	7 51·0	5·4	2·9	11·4	6·2	17·4	9·4
55	8 13·8	8 15·1	7 51·3	5·5	3·0	11·5	6·2	17·5	9·5
56	8 14·0	8 15·4	7 51·5	5·6	3·0	11·6	6·3	17·6	9·5
57	8 14·3	8 15·6	7 51·7	5·7	3·1	11·7	6·3	17·7	9·6
58	8 14·5	8 15·9	7 52·0	5·8	3·1	11·8	6·4	17·8	9·6
59	8 14·8	8 16·1	7 52·2	5·9	3·2	11·9	6·4	17·9	9·7
60	8 15·0	8 16·4	7 52·5	6·0	3·3	12·0	6·5	18·0	9·8

33m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	8 15·0	8 16·4	7 52·5	0·0	0·0	6·0	3·4	12·0	6·7
01	8 15·3	8 16·6	7 52·7	0·1	0·1	6·1	3·4	12·1	6·8
02	8 15·5	8 16·9	7 52·9	0·2	0·1	6·2	3·5	12·2	6·8
03	8 15·8	8 17·1	7 53·2	0·3	0·2	6·3	3·5	12·3	6·9
04	8 16·0	8 17·4	7 53·4	0·4	0·2	6·4	3·6	12·4	6·9
05	8 16·3	8 17·6	7 53·6	0·5	0·3	6·5	3·6	12·5	7·0
06	8 16·5	8 17·9	7 53·9	0·6	0·3	6·6	3·7	12·6	7·0
07	8 16·8	8 18·1	7 54·1	0·7	0·4	6·7	3·7	12·7	7·1
08	8 17·0	8 18·4	7 54·4	0·8	0·4	6·8	3·8	12·8	7·1
09	8 17·3	8 18·6	7 54·6	0·9	0·5	6·9	3·9	12·9	7·2
10	8 17·5	8 18·9	7 54·8	1·0	0·6	7·0	3·9	13·0	7·3
11	8 17·8	8 19·1	7 55·1	1·1	0·6	7·1	4·0	13·1	7·3
12	8 18·0	8 19·4	7 55·3	1·2	0·7	7·2	4·0	13·2	7·4
13	8 18·3	8 19·6	7 55·6	1·3	0·7	7·3	4·1	13·3	7·4
14	8 18·5	8 19·9	7 55·8	1·4	0·8	7·4	4·1	13·4	7·5
15	8 18·8	8 20·1	7 56·0	1·5	0·8	7·5	4·2	13·5	7·5
16	8 19·0	8 20·4	7 56·3	1·6	0·9	7·6	4·2	13·6	7·6
17	8 19·3	8 20·6	7 56·5	1·7	0·9	7·7	4·3	13·7	7·6
18	8 19·5	8 20·9	7 56·7	1·8	1·0	7·8	4·4	13·8	7·7
19	8 19·8	8 21·1	7 57·0	1·9	1·1	7·9	4·4	13·9	7·8
20	8 20·0	8 21·4	7 57·2	2·0	1·1	8·0	4·5	14·0	7·8
21	8 20·3	8 21·6	7 57·5	2·1	1·2	8·1	4·5	14·1	7·9
22	8 20·5	8 21·9	7 57·7	2·2	1·2	8·2	4·6	14·2	7·9
23	8 20·8	8 22·1	7 57·9	2·3	1·3	8·3	4·6	14·3	8·0
24	8 21·0	8 22·4	7 58·2	2·4	1·3	8·4	4·7	14·4	8·0
25	8 21·3	8 22·6	7 58·4	2·5	1·4	8·5	4·7	14·5	8·1
26	8 21·5	8 22·9	7 58·7	2·6	1·5	8·6	4·8	14·6	8·2
27	8 21·8	8 23·1	7 58·9	2·7	1·5	8·7	4·9	14·7	8·2
28	8 22·0	8 23·4	7 59·1	2·8	1·6	8·8	4·9	14·8	8·3
29	8 22·3	8 23·6	7 59·4	2·9	1·6	8·9	5·0	14·9	8·3
30	8 22·5	8 23·9	7 59·6	3·0	1·7	9·0	5·0	15·0	8·4
31	8 22·8	8 24·1	7 59·8	3·1	1·7	9·1	5·1	15·1	8·4
32	8 23·0	8 24·4	8 00·1	3·2	1·8	9·2	5·1	15·2	8·5
33	8 23·3	8 24·6	8 00·3	3·3	1·8	9·3	5·2	15·3	8·5
34	8 23·5	8 24·9	8 00·6	3·4	1·9	9·4	5·2	15·4	8·6
35	8 23·8	8 25·1	8 00·8	3·5	2·0	9·5	5·3	15·5	8·7
36	8 24·0	8 25·4	8 01·0	3·6	2·0	9·6	5·4	15·6	8·7
37	8 24·3	8 25·6	8 01·3	3·7	2·1	9·7	5·4	15·7	8·8
38	8 24·5	8 25·9	8 01·5	3·8	2·1	9·8	5·5	15·8	8·8
39	8 24·8	8 26·1	8 01·8	3·9	2·2	9·9	5·5	15·9	8·9
40	8 25·0	8 26·4	8 02·0	4·0	2·2	10·0	5·6	16·0	8·9
41	8 25·3	8 26·6	8 02·2	4·1	2·3	10·1	5·6	16·1	9·0
42	8 25·5	8 26·9	8 02·5	4·2	2·3	10·2	5·7	16·2	9·0
43	8 25·8	8 27·1	8 02·7	4·3	2·4	10·3	5·8	16·3	9·1
44	8 26·0	8 27·4	8 02·9	4·4	2·5	10·4	5·8	16·4	9·2
45	8 26·3	8 27·6	8 03·2	4·5	2·5	10·5	5·9	16·5	9·2
46	8 26·5	8 27·9	8 03·4	4·6	2·6	10·6	5·9	16·6	9·3
47	8 26·8	8 28·1	8 03·7	4·7	2·6	10·7	6·0	16·7	9·3
48	8 27·0	8 28·4	8 03·9	4·8	2·7	10·8	6·0	16·8	9·4
49	8 27·3	8 28·6	8 04·1	4·9	2·7	10·9	6·1	16·9	9·4
50	8 27·5	8 28·9	8 04·4	5·0	2·8	11·0	6·1	17·0	9·5
51	8 27·8	8 29·1	8 04·6	5·1	2·8	11·1	6·2	17·1	9·5
52	8 28·0	8 29·4	8 04·9	5·2	2·9	11·2	6·3	17·2	9·6
53	8 28·3	8 29·6	8 05·1	5·3	3·0	11·3	6·3	17·3	9·7
54	8 28·5	8 29·9	8 05·3	5·4	3·0	11·4	6·4	17·4	9·7
55	8 28·8	8 30·1	8 05·6	5·5	3·1	11·5	6·4	17·5	9·8
56	8 29·0	8 30·4	8 05·8	5·6	3·1	11·6	6·5	17·6	9·8
57	8 29·3	8 30·6	8 06·1	5·7	3·2	11·7	6·5	17·7	9·9
58	8 29·5	8 30·9	8 06·3	5·8	3·2	11·8	6·6	17·8	9·9
59	8 29·8	8 31·1	8 06·5	5·9	3·3	11·9	6·6	17·9	10·0
60	8 30·0	8 31·4	8 06·8	6·0	3·4	12·0	6·7	18·0	10·1

34m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	8 30·0	8 31·4	8 06·8	0·0	0·0	6·0	3·5	12·0	6·9
01	8 30·3	8 31·6	8 07·0	0·1	0·1	6·1	3·5	12·1	7·0
02	8 30·5	8 31·9	8 07·2	0·2	0·1	6·2	3·6	12·2	7·0
03	8 30·8	8 32·1	8 07·5	0·3	0·2	6·3	3·6	12·3	7·1
04	8 31·0	8 32·4	8 07·7	0·4	0·2	6·4	3·7	12·4	7·1
05	8 31·3	8 32·6	8 08·0	0·5	0·3	6·5	3·7	12·5	7·2
06	8 31·5	8 32·9	8 08·2	0·6	0·3	6·6	3·8	12·6	7·2
07	8 31·8	8 33·2	8 08·4	0·7	0·4	6·7	3·9	12·7	7·3
08	8 32·0	8 33·4	8 08·7	0·8	0·5	6·8	3·9	12·8	7·4
09	8 32·3	8 33·7	8 08·9	0·9	0·5	6·9	4·0	12·9	7·4
10	8 32·5	8 33·9	8 09·2	1·0	0·6	7·0	4·0	13·0	7·5
11	8 32·8	8 34·2	8 09·4	1·1	0·6	7·1	4·1	13·1	7·5
12	8 33·0	8 34·4	8 09·6	1·2	0·7	7·2	4·1	13·2	7·6
13	8 33·3	8 34·7	8 09·9	1·3	0·7	7·3	4·2	13·3	7·6
14	8 33·5	8 34·9	8 10·1	1·4	0·8	7·4	4·3	13·4	7·7
15	8 33·8	8 35·2	8 10·3	1·5	0·9	7·5	4·3	13·5	7·8
16	8 34·0	8 35·4	8 10·6	1·6	0·9	7·6	4·4	13·6	7·8
17	8 34·3	8 35·7	8 10·8	1·7	1·0	7·7	4·4	13·7	7·9
18	8 34·5	8 35·9	8 11·1	1·8	1·0	7·8	4·5	13·8	7·9
19	8 34·8	8 36·2	8 11·3	1·9	1·1	7·9	4·5	13·9	8·0
20	8 35·0	8 36·4	8 11·5	2·0	1·2	8·0	4·6	14·0	8·1
21	8 35·3	8 36·7	8 11·8	2·1	1·2	8·1	4·7	14·1	8·1
22	8 35·5	8 36·9	8 12·0	2·2	1·3	8·2	4·7	14·2	8·2
23	8 35·8	8 37·2	8 12·3	2·3	1·3	8·3	4·8	14·3	8·2
24	8 36·0	8 37·4	8 12·5	2·4	1·4	8·4	4·8	14·4	8·3
25	8 36·3	8 37·7	8 12·7	2·5	1·4	8·5	4·9	14·5	8·3
26	8 36·5	8 37·9	8 13·0	2·6	1·5	8·6	4·9	14·6	8·4
27	8 36·8	8 38·2	8 13·2	2·7	1·6	8·7	5·0	14·7	8·5
28	8 37·0	8 38·4	8 13·4	2·8	1·6	8·8	5·1	14·8	8·5
29	8 37·3	8 38·7	8 13·7	2·9	1·7	8·9	5·1	14·9	8·6
30	8 37·5	8 38·9	8 13·9	3·0	1·7	9·0	5·2	15·0	8·6
31	8 37·8	8 39·2	8 14·2	3·1	1·8	9·1	5·2	15·1	8·7
32	8 38·0	8 39·4	8 14·4	3·2	1·8	9·2	5·3	15·2	8·7
33	8 38·3	8 39·7	8 14·6	3·3	1·9	9·3	5·3	15·3	8·8
34	8 38·5	8 39·9	8 14·9	3·4	2·0	9·4	5·4	15·4	8·9
35	8 38·8	8 40·2	8 15·1	3·5	2·0	9·5	5·5	15·5	8·9
36	8 39·0	8 40·4	8 15·4	3·6	2·1	9·6	5·5	15·6	9·0
37	8 39·3	8 40·7	8 15·6	3·7	2·1	9·7	5·6	15·7	9·0
38	8 39·5	8 40·9	8 15·8	3·8	2·2	9·8	5·6	15·8	9·1
39	8 39·8	8 41·2	8 16·1	3·9	2·2	9·9	5·7	15·9	9·1
40	8 40·0	8 41·4	8 16·3	4·0	2·3	10·0	5·8	16·0	9·2
41	8 40·3	8 41·7	8 16·5	4·1	2·4	10·1	5·8	16·1	9·3
42	8 40·5	8 41·9	8 16·8	4·2	2·4	10·2	5·9	16·2	9·3
43	8 40·8	8 42·2	8 17·0	4·3	2·5	10·3	5·9	16·3	9·4
44	8 41·0	8 42·4	8 17·3	4·4	2·5	10·4	6·0	16·4	9·4
45	8 41·3	8 42·7	8 17·5	4·5	2·6	10·5	6·0	16·5	9·5
46	8 41·5	8 42·9	8 17·7	4·6	2·6	10·6	6·1	16·6	9·5
47	8 41·8	8 43·2	8 18·0	4·7	2·7	10·7	6·2	16·7	9·6
48	8 42·0	8 43·4	8 18·2	4·8	2·8	10·8	6·2	16·8	9·7
49	8 42·3	8 43·7	8 18·5	4·9	2·8	10·9	6·3	16·9	9·7
50	8 42·5	8 43·9	8 18·7	5·0	2·9	11·0	6·3	17·0	9·8
51	8 42·8	8 44·2	8 18·9	5·1	2·9	11·1	6·4	17·1	9·8
52	8 43·0	8 44·4	8 19·2	5·2	3·0	11·2	6·4	17·2	9·9
53	8 43·3	8 44·7	8 19·4	5·3	3·0	11·3	6·5	17·3	9·9
54	8 43·5	8 44·9	8 19·7	5·4	3·1	11·4	6·6	17·4	10·0
55	8 43·8	8 45·2	8 19·9	5·5	3·2	11·5	6·6	17·5	10·1
56	8 44·0	8 45·4	8 20·1	5·6	3·2	11·6	6·7	17·6	10·1
57	8 44·3	8 45·7	8 20·4	5·7	3·3	11·7	6·7	17·7	10·2
58	8 44·5	8 45·9	8 20·6	5·8	3·3	11·8	6·8	17·8	10·2
59	8 44·8	8 46·2	8 20·8	5·9	3·4	11·9	6·8	17·9	10·3
60	8 45·0	8 46·4	8 21·1	6·0	3·5	12·0	6·9	18·0	10·4

35m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	8 45·0	8 46·4	8 21·1	0·0	0·0	6·0	3·6	12·0	7·1
01	8 45·3	8 46·7	8 21·3	0·1	0·1	6·1	3·6	12·1	7·2
02	8 45·5	8 46·9	8 21·6	0·2	0·1	6·2	3·7	12·2	7·2
03	8 45·8	8 47·2	8 21·8	0·3	0·2	6·3	3·7	12·3	7·3
04	8 46·0	8 47·4	8 22·0	0·4	0·2	6·4	3·8	12·4	7·3
05	8 46·3	8 47·7	8 22·3	0·5	0·3	6·5	3·8	12·5	7·4
06	8 46·5	8 47·9	8 22·5	0·6	0·4	6·6	3·9	12·6	7·5
07	8 46·8	8 48·2	8 22·8	0·7	0·4	6·7	4·0	12·7	7·5
08	8 47·0	8 48·4	8 23·0	0·8	0·5	6·8	4·0	12·8	7·6
09	8 47·3	8 48·7	8 23·2	0·9	0·5	6·9	4·1	12·9	7·6
10	8 47·5	8 48·9	8 23·5	1·0	0·6	7·0	4·1	13·0	7·7
11	8 47·8	8 49·2	8 23·7	1·1	0·7	7·1	4·2	13·1	7·8
12	8 48·0	8 49·4	8 23·9	1·2	0·7	7·2	4·3	13·2	7·8
13	8 48·3	8 49·7	8 24·2	1·3	0·8	7·3	4·3	13·3	7·9
14	8 48·5	8 49·9	8 24·4	1·4	0·8	7·4	4·4	13·4	7·9
15	8 48·8	8 50·2	8 24·7	1·5	0·9	7·5	4·4	13·5	8·0
16	8 49·0	8 50·4	8 24·9	1·6	0·9	7·6	4·5	13·6	8·0
17	8 49·3	8 50·7	8 25·1	1·7	1·0	7·7	4·6	13·7	8·1
18	8 49·5	8 50·9	8 25·4	1·8	1·1	7·8	4·6	13·8	8·2
19	8 49·8	8 51·2	8 25·6	1·9	1·1	7·9	4·7	13·9	8·2
20	8 50·0	8 51·5	8 25·9	2·0	1·2	8·0	4·7	14·0	8·3
21	8 50·3	8 51·7	8 26·1	2·1	1·2	8·1	4·8	14·1	8·3
22	8 50·5	8 52·0	8 26·3	2·2	1·3	8·2	4·9	14·2	8·4
23	8 50·8	8 52·2	8 26·6	2·3	1·4	8·3	4·9	14·3	8·5
24	8 51·0	8 52·5	8 26·8	2·4	1·4	8·4	5·0	14·4	8·5
25	8 51·3	8 52·7	8 27·0	2·5	1·5	8·5	5·0	14·5	8·6
26	8 51·5	8 53·0	8 27·3	2·6	1·5	8·6	5·1	14·6	8·6
27	8 51·8	8 53·2	8 27·5	2·7	1·6	8·7	5·1	14·7	8·7
28	8 52·0	8 53·5	8 27·8	2·8	1·7	8·8	5·2	14·8	8·8
29	8 52·3	8 53·7	8 28·0	2·9	1·7	8·9	5·3	14·9	8·8
30	8 52·5	8 54·0	8 28·2	3·0	1·8	9·0	5·3	15·0	8·9
31	8 52·8	8 54·2	8 28·5	3·1	1·8	9·1	5·4	15·1	8·9
32	8 53·0	8 54·5	8 28·7	3·2	1·9	9·2	5·4	15·2	9·0
33	8 53·3	8 54·7	8 29·0	3·3	2·0	9·3	5·5	15·3	9·1
34	8 53·5	8 55·0	8 29·2	3·4	2·0	9·4	5·6	15·4	9·1
35	8 53·8	8 55·2	8 29·4	3·5	2·1	9·5	5·6	15·5	9·2
36	8 54·0	8 55·5	8 29·7	3·6	2·1	9·6	5·7	15·6	9·2
37	8 54·3	8 55·7	8 29·9	3·7	2·2	9·7	5·7	15·7	9·3
38	8 54·5	8 56·0	8 30·2	3·8	2·2	9·8	5·8	15·8	9·3
39	8 54·8	8 56·2	8 30·4	3·9	2·3	9·9	5·9	15·9	9·4
40	8 55·0	8 56·5	8 30·6	4·0	2·4	10·0	5·9	16·0	9·5
41	8 55·3	8 56·7	8 30·9	4·1	2·4	10·1	6·0	16·1	9·5
42	8 55·5	8 57·0	8 31·1	4·2	2·5	10·2	6·0	16·2	9·6
43	8 55·8	8 57·2	8 31·3	4·3	2·5	10·3	6·1	16·3	9·6
44	8 56·0	8 57·5	8 31·6	4·4	2·6	10·4	6·2	16·4	9·7
45	8 56·3	8 57·7	8 31·8	4·5	2·7	10·5	6·2	16·5	9·8
46	8 56·5	8 58·0	8 32·1	4·6	2·7	10·6	6·3	16·6	9·8
47	8 56·8	8 58·2	8 32·3	4·7	2·8	10·7	6·3	16·7	9·9
48	8 57·0	8 58·5	8 32·5	4·8	2·8	10·8	6·4	16·8	9·9
49	8 57·3	8 58·7	8 32·8	4·9	2·9	10·9	6·4	16·9	10·0
50	8 57·5	8 59·0	8 33·0	5·0	3·0	11·0	6·5	17·0	10·1
51	8 57·8	8 59·2	8 33·3	5·1	3·0	11·1	6·6	17·1	10·1
52	8 58·0	8 59·5	8 33·5	5·2	3·1	11·2	6·6	17·2	10·2
53	8 58·3	8 59·7	8 33·7	5·3	3·1	11·3	6·7	17·3	10·2
54	8 58·5	9 00·0	8 34·0	5·4	3·2	11·4	6·7	17·4	10·3
55	8 58·8	9 00·2	8 34·2	5·5	3·3	11·5	6·8	17·5	10·4
56	8 59·0	9 00·5	8 34·4	5·6	3·3	11·6	6·9	17·6	10·4
57	8 59·3	9 00·7	8 34·7	5·7	3·4	11·7	6·9	17·7	10·5
58	8 59·5	9 01·0	8 34·9	5·8	3·4	11·8	7·0	17·8	10·5
59	8 59·8	9 01·2	8 35·2	5·9	3·5	11·9	7·0	17·9	10·6
60	9 00·0	9 01·5	8 35·4	6·0	3·6	12·0	7·1	18·0	10·7

36m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	9 00·0	9 01·5	8 35·4	0·0	0·0	6·0	3·7	12·0	7·3
01	9 00·3	9 01·7	8 35·6	0·1	0·1	6·1	3·7	12·1	7·4
02	9 00·5	9 02·0	8 35·9	0·2	0·1	6·2	3·8	12·2	7·4
03	9 00·8	9 02·2	8 36·1	0·3	0·2	6·3	3·8	12·3	7·5
04	9 01·0	9 02·5	8 36·4	0·4	0·2	6·4	3·9	12·4	7·5
05	9 01·3	9 02·7	8 36·6	0·5	0·3	6·5	4·0	12·5	7·6
06	9 01·5	9 03·0	8 36·8	0·6	0·4	6·6	4·0	12·6	7·7
07	9 01·8	9 03·2	8 37·1	0·7	0·4	6·7	4·1	12·7	7·7
08	9 02·0	9 03·5	8 37·3	0·8	0·5	6·8	4·1	12·8	7·8
09	9 02·3	9 03·7	8 37·5	0·9	0·5	6·9	4·2	12·9	7·8
10	9 02·5	9 04·0	8 37·8	1·0	0·6	7·0	4·3	13·0	7·9
11	9 02·8	9 04·2	8 38·0	1·1	0·7	7·1	4·3	13·1	8·0
12	9 03·0	9 04·5	8 38·3	1·2	0·7	7·2	4·4	13·2	8·0
13	9 03·3	9 04·7	8 38·5	1·3	0·8	7·3	4·4	13·3	8·1
14	9 03·5	9 05·0	8 38·7	1·4	0·9	7·4	4·5	13·4	8·2
15	9 03·8	9 05·2	8 39·0	1·5	0·9	7·5	4·6	13·5	8·2
16	9 04·0	9 05·5	8 39·2	1·6	1·0	7·6	4·6	13·6	8·3
17	9 04·3	9 05·7	8 39·5	1·7	1·0	7·7	4·7	13·7	8·3
18	9 04·5	9 06·0	8 39·7	1·8	1·1	7·8	4·7	13·8	8·4
19	9 04·8	9 06·2	8 39·9	1·9	1·2	7·9	4·8	13·9	8·5
20	9 05·0	9 06·5	8 40·2	2·0	1·2	8·0	4·9	14·0	8·5
21	9 05·3	9 06·7	8 40·4	2·1	1·3	8·1	4·9	14·1	8·6
22	9 05·5	9 07·0	8 40·6	2·2	1·3	8·2	5·0	14·2	8·6
23	9 05·8	9 07·2	8 40·9	2·3	1·4	8·3	5·0	14·3	8·7
24	9 06·0	9 07·5	8 41·1	2·4	1·5	8·4	5·1	14·4	8·8
25	9 06·3	9 07·7	8 41·4	2·5	1·5	8·5	5·2	14·5	8·8
26	9 06·5	9 08·0	8 41·6	2·6	1·6	8·6	5·2	14·6	8·9
27	9 06·8	9 08·2	8 41·8	2·7	1·6	8·7	5·3	14·7	8·9
28	9 07·0	9 08·5	8 42·1	2·8	1·7	8·8	5·4	14·8	9·0
29	9 07·3	9 08·7	8 42·3	2·9	1·8	8·9	5·4	14·9	9·1
30	9 07·5	9 09·0	8 42·6	3·0	1·8	9·0	5·5	15·0	9·1
31	9 07·8	9 09·2	8 42·8	3·1	1·9	9·1	5·5	15·1	9·2
32	9 08·0	9 09·5	8 43·0	3·2	1·9	9·2	5·6	15·2	9·2
33	9 08·3	9 09·8	8 43·3	3·3	2·0	9·3	5·7	15·3	9·3
34	9 08·5	9 10·0	8 43·5	3·4	2·1	9·4	5·7	15·4	9·4
35	9 08·8	9 10·3	8 43·8	3·5	2·1	9·5	5·8	15·5	9·4
36	9 09·0	9 10·5	8 44·0	3·6	2·2	9·6	5·8	15·6	9·5
37	9 09·3	9 10·8	8 44·2	3·7	2·3	9·7	5·9	15·7	9·6
38	9 09·5	9 11·0	8 44·5	3·8	2·3	9·8	6·0	15·8	9·6
39	9 09·8	9 11·3	8 44·7	3·9	2·4	9·9	6·0	15·9	9·7
40	9 10·0	9 11·5	8 44·9	4·0	2·4	10·0	6·1	16·0	9·7
41	9 10·3	9 11·8	8 45·2	4·1	2·5	10·1	6·1	16·1	9·8
42	9 10·5	9 12·0	8 45·4	4·2	2·6	10·2	6·2	16·2	9·9
43	9 10·8	9 12·3	8 45·7	4·3	2·6	10·3	6·3	16·3	9·9
44	9 11·0	9 12·5	8 45·9	4·4	2·7	10·4	6·3	16·4	10·0
45	9 11·3	9 12·8	8 46·1	4·5	2·7	10·5	6·4	16·5	10·0
46	9 11·5	9 13·0	8 46·4	4·6	2·8	10·6	6·4	16·6	10·1
47	9 11·8	9 13·3	8 46·6	4·7	2·9	10·7	6·5	16·7	10·2
48	9 12·0	9 13·5	8 46·9	4·8	2·9	10·8	6·6	16·8	10·2
49	9 12·3	9 13·8	8 47·1	4·9	3·0	10·9	6·6	16·9	10·3
50	9 12·5	9 14·0	8 47·3	5·0	3·0	11·0	6·7	17·0	10·3
51	9 12·8	9 14·3	8 47·6	5·1	3·1	11·1	6·8	17·1	10·4
52	9 13·0	9 14·5	8 47·8	5·2	3·2	11·2	6·8	17·2	10·5
53	9 13·3	9 14·8	8 48·0	5·3	3·2	11·3	6·9	17·3	10·5
54	9 13·5	9 15·0	8 48·3	5·4	3·3	11·4	6·9	17·4	10·6
55	9 13·8	9 15·3	8 48·5	5·5	3·3	11·5	7·0	17·5	10·6
56	9 14·0	9 15·5	8 48·8	5·6	3·4	11·6	7·1	17·6	10·7
57	9 14·3	9 15·8	8 49·0	5·7	3·5	11·7	7·1	17·7	10·8
58	9 14·5	9 16·0	8 49·2	5·8	3·5	11·8	7·2	17·8	10·8
59	9 14·8	9 16·3	8 49·5	5·9	3·6	11·9	7·2	17·9	10·9
60	9 15·0	9 16·5	8 49·7	6·0	3·7	12·0	7·3	18·0	11·0

37m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	9 15·0	9 16·5	8 49·7	0·0	0·0	6·0	3·8	12·0	7·5
01	9 15·3	9 16·8	8 50·0	0·1	0·1	6·1	3·8	12·1	7·6
02	9 15·5	9 17·0	8 50·2	0·2	0·1	6·2	3·9	12·2	7·6
03	9 15·8	9 17·3	8 50·4	0·3	0·2	6·3	3·9	12·3	7·7
04	9 16·0	9 17·5	8 50·7	0·4	0·3	6·4	4·0	12·4	7·8
05	9 16·3	9 17·8	8 50·9	0·5	0·3	6·5	4·1	12·5	7·8
06	9 16·5	9 18·0	8 51·1	0·6	0·4	6·6	4·1	12·6	7·9
07	9 16·8	9 18·3	8 51·4	0·7	0·4	6·7	4·2	12·7	7·9
08	9 17·0	9 18·5	8 51·6	0·8	0·5	6·8	4·3	12·8	8·0
09	9 17·3	9 18·8	8 51·9	0·9	0·6	6·9	4·3	12·9	8·1
10	9 17·5	9 19·0	8 52·1	1·0	0·6	7·0	4·4	13·0	8·1
11	9 17·8	9 19·3	8 52·3	1·1	0·7	7·1	4·4	13·1	8·2
12	9 18·0	9 19·5	8 52·6	1·2	0·8	7·2	4·5	13·2	8·3
13	9 18·3	9 19·8	8 52·8	1·3	0·8	7·3	4·6	13·3	8·3
14	9 18·5	9 20·0	8 53·1	1·4	0·9	7·4	4·6	13·4	8·4
15	9 18·8	9 20·3	8 53·3	1·5	0·9	7·5	4·7	13·5	8·4
16	9 19·0	9 20·5	8 53·5	1·6	1·0	7·6	4·8	13·6	8·5
17	9 19·3	9 20·8	8 53·8	1·7	1·1	7·7	4·8	13·7	8·6
18	9 19·5	9 21·0	8 54·0	1·8	1·1	7·8	4·9	13·8	8·6
19	9 19·8	9 21·3	8 54·3	1·9	1·2	7·9	4·9	13·9	8·7
20	9 20·0	9 21·5	8 54·5	2·0	1·3	8·0	5·0	14·0	8·8
21	9 20·3	9 21·8	8 54·7	2·1	1·3	8·1	5·1	14·1	8·8
22	9 20·5	9 22·0	8 55·0	2·2	1·4	8·2	5·1	14·2	8·9
23	9 20·8	9 22·3	8 55·2	2·3	1·4	8·3	5·2	14·3	8·9
24	9 21·0	9 22·5	8 55·4	2·4	1·5	8·4	5·3	14·4	9·0
25	9 21·3	9 22·8	8 55·7	2·5	1·6	8·5	5·3	14·5	9·1
26	9 21·5	9 23·0	8 55·9	2·6	1·6	8·6	5·4	14·6	9·1
27	9 21·8	9 23·3	8 56·2	2·7	1·7	8·7	5·4	14·7	9·2
28	9 22·0	9 23·5	8 56·4	2·8	1·8	8·8	5·5	14·8	9·3
29	9 22·3	9 23·8	8 56·6	2·9	1·8	8·9	5·6	14·9	9·3
30	9 22·5	9 24·0	8 56·9	3·0	1·9	9·0	5·6	15·0	9·4
31	9 22·8	9 24·3	8 57·1	3·1	1·9	9·1	5·7	15·1	9·4
32	9 23·0	9 24·5	8 57·4	3·2	2·0	9·2	5·8	15·2	9·5
33	9 23·3	9 24·8	8 57·6	3·3	2·1	9·3	5·8	15·3	9·6
34	9 23·5	9 25·0	8 57·8	3·4	2·1	9·4	5·9	15·4	9·6
35	9 23·8	9 25·3	8 58·1	3·5	2·2	9·5	5·9	15·5	9·7
36	9 24·0	9 25·5	8 58·3	3·6	2·3	9·6	6·0	15·6	9·8
37	9 24·3	9 25·8	8 58·5	3·7	2·3	9·7	6·1	15·7	9·8
38	9 24·5	9 26·0	8 58·8	3·8	2·4	9·8	6·1	15·8	9·9
39	9 24·8	9 26·3	8 59·0	3·9	2·4	9·9	6·2	15·9	9·9
40	9 25·0	9 26·5	8 59·3	4·0	2·5	10·0	6·3	16·0	10·0
41	9 25·3	9 26·8	8 59·5	4·1	2·6	10·1	6·3	16·1	10·1
42	9 25·5	9 27·0	8 59·7	4·2	2·6	10·2	6·4	16·2	10·1
43	9 25·8	9 27·3	9 00·0	4·3	2·7	10·3	6·4	16·3	10·2
44	9 26·0	9 27·5	9 00·2	4·4	2·8	10·4	6·5	16·4	10·3
45	9 26·3	9 27·8	9 00·5	4·5	2·8	10·5	6·6	16·5	10·3
46	9 26·5	9 28·1	9 00·7	4·6	2·9	10·6	6·6	16·6	10·4
47	9 26·8	9 28·3	9 00·9	4·7	2·9	10·7	6·7	16·7	10·4
48	9 27·0	9 28·6	9 01·2	4·8	3·0	10·8	6·8	16·8	10·5
49	9 27·3	9 28·8	9 01·4	4·9	3·1	10·9	6·8	16·9	10·6
50	9 27·5	9 29·1	9 01·6	5·0	3·1	11·0	6·9	17·0	10·6
51	9 27·8	9 29·3	9 01·9	5·1	3·2	11·1	6·9	17·1	10·7
52	9 28·0	9 29·6	9 02·1	5·2	3·3	11·2	7·0	17·2	10·8
53	9 28·3	9 29·8	9 02·4	5·3	3·3	11·3	7·1	17·3	10·8
54	9 28·5	9 30·1	9 02·6	5·4	3·4	11·4	7·1	17·4	10·9
55	9 28·8	9 30·3	9 02·8	5·5	3·4	11·5	7·2	17·5	10·9
56	9 29·0	9 30·6	9 03·1	5·6	3·5	11·6	7·3	17·6	11·0
57	9 29·3	9 30·8	9 03·3	5·7	3·6	11·7	7·3	17·7	11·1
58	9 29·5	9 31·1	9 03·6	5·8	3·6	11·8	7·4	17·8	11·1
59	9 29·8	9 31·3	9 03·8	5·9	3·7	11·9	7·4	17·9	11·2
60	9 30·0	9 31·6	9 04·0	6·0	3·8	12·0	7·5	18·0	11·3

38m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	9 30·0	9 31·6	9 04·0	0·0	0·0	6·0	3·9	12·0	7·7
01	9 30·3	9 31·8	9 04·3	0·1	0·1	6·1	3·9	12·1	7·8
02	9 30·5	9 32·1	9 04·5	0·2	0·1	6·2	4·0	12·2	7·8
03	9 30·8	9 32·3	9 04·7	0·3	0·2	6·3	4·0	12·3	7·9
04	9 31·0	9 32·6	9 05·0	0·4	0·3	6·4	4·1	12·4	8·0
05	9 31·3	9 32·8	9 05·2	0·5	0·3	6·5	4·2	12·5	8·0
06	9 31·5	9 33·1	9 05·5	0·6	0·4	6·6	4·2	12·6	8·1
07	9 31·8	9 33·3	9 05·7	0·7	0·4	6·7	4·3	12·7	8·1
08	9 32·0	9 33·6	9 05·9	0·8	0·5	6·8	4·4	12·8	8·2
09	9 32·3	9 33·8	9 06·2	0·9	0·6	6·9	4·4	12·9	8·3
10	9 32·5	9 34·1	9 06·4	1·0	0·6	7·0	4·5	13·0	8·3
11	9 32·8	9 34·3	9 06·7	1·1	0·7	7·1	4·6	13·1	8·4
12	9 33·0	9 34·6	9 06·9	1·2	0·8	7·2	4·6	13·2	8·5
13	9 33·3	9 34·8	9 07·1	1·3	0·8	7·3	4·7	13·3	8·5
14	9 33·5	9 35·1	9 07·4	1·4	0·9	7·4	4·7	13·4	8·6
15	9 33·8	9 35·3	9 07·6	1·5	1·0	7·5	4·8	13·5	8·7
16	9 34·0	9 35·6	9 07·9	1·6	1·0	7·6	4·9	13·6	8·7
17	9 34·3	9 35·8	9 08·1	1·7	1·1	7·7	4·9	13·7	8·8
18	9 34·5	9 36·1	9 08·3	1·8	1·2	7·8	5·0	13·8	8·9
19	9 34·8	9 36·3	9 08·6	1·9	1·2	7·9	5·1	13·9	8·9
20	9 35·0	9 36·6	9 08·8	2·0	1·3	8·0	5·1	14·0	9·0
21	9 35·3	9 36·8	9 09·0	2·1	1·3	8·1	5·2	14·1	9·0
22	9 35·5	9 37·1	9 09·3	2·2	1·4	8·2	5·3	14·2	9·1
23	9 35·8	9 37·3	9 09·5	2·3	1·5	8·3	5·3	14·3	9·2
24	9 36·0	9 37·6	9 09·8	2·4	1·5	8·4	5·4	14·4	9·2
25	9 36·3	9 37·8	9 10·0	2·5	1·6	8·5	5·5	14·5	9·3
26	9 36·5	9 38·1	9 10·2	2·6	1·7	8·6	5·5	14·6	9·4
27	9 36·8	9 38·3	9 10·5	2·7	1·7	8·7	5·6	14·7	9·4
28	9 37·0	9 38·6	9 10·7	2·8	1·8	8·8	5·6	14·8	9·5
29	9 37·3	9 38·8	9 11·0	2·9	1·9	8·9	5·7	14·9	9·6
30	9 37·5	9 39·1	9 11·2	3·0	1·9	9·0	5·8	15·0	9·6
31	9 37·8	9 39·3	9 11·4	3·1	2·0	9·1	5·8	15·1	9·7
32	9 38·0	9 39·6	9 11·7	3·2	2·1	9·2	5·9	15·2	9·8
33	9 38·3	9 39·8	9 11·9	3·3	2·1	9·3	6·0	15·3	9·8
34	9 38·5	9 40·1	9 12·1	3·4	2·2	9·4	6·0	15·4	9·9
35	9 38·8	9 40·3	9 12·4	3·5	2·2	9·5	6·1	15·5	9·9
36	9 39·0	9 40·6	9 12·6	3·6	2·3	9·6	6·2	15·6	10·0
37	9 39·3	9 40·8	9 12·9	3·7	2·4	9·7	6·2	15·7	10·1
38	9 39·5	9 41·1	9 13·1	3·8	2·4	9·8	6·3	15·8	10·1
39	9 39·8	9 41·3	9 13·3	3·9	2·5	9·9	6·4	15·9	10·2
40	9 40·0	9 41·6	9 13·6	4·0	2·6	10·0	6·4	16·0	10·3
41	9 40·3	9 41·8	9 13·8	4·1	2·6	10·1	6·5	16·1	10·3
42	9 40·5	9 42·1	9 14·1	4·2	2·7	10·2	6·5	16·2	10·4
43	9 40·8	9 42·3	9 14·3	4·3	2·8	10·3	6·6	16·3	10·5
44	9 41·0	9 42·6	9 14·5	4·4	2·8	10·4	6·7	16·4	10·5
45	9 41·3	9 42·8	9 14·8	4·5	2·9	10·5	6·7	16·5	10·6
46	9 41·5	9 43·1	9 15·0	4·6	3·0	10·6	6·8	16·6	10·7
47	9 41·8	9 43·3	9 15·2	4·7	3·0	10·7	6·9	16·7	10·7
48	9 42·0	9 43·6	9 15·5	4·8	3·1	10·8	6·9	16·8	10·8
49	9 42·3	9 43·8	9 15·7	4·9	3·1	10·9	7·0	16·9	10·8
50	9 42·5	9 44·1	9 16·0	5·0	3·2	11·0	7·1	17·0	10·9
51	9 42·8	9 44·3	9 16·2	5·1	3·3	11·1	7·1	17·1	11·0
52	9 43·0	9 44·6	9 16·4	5·2	3·3	11·2	7·2	17·2	11·0
53	9 43·3	9 44·8	9 16·7	5·3	3·4	11·3	7·3	17·3	11·1
54	9 43·5	9 45·1	9 16·9	5·4	3·5	11·4	7·3	17·4	11·2
55	9 43·8	9 45·3	9 17·2	5·5	3·5	11·5	7·4	17·5	11·2
56	9 44·0	9 45·6	9 17·4	5·6	3·6	11·6	7·4	17·6	11·3
57	9 44·3	9 45·8	9 17·6	5·7	3·7	11·7	7·5	17·7	11·4
58	9 44·5	9 46·1	9 17·9	5·8	3·7	11·8	7·6	17·8	11·4
59	9 44·8	9 46·4	9 18·1	5·9	3·8	11·9	7·6	17·9	11·5
60	9 45·0	9 46·6	9 18·4	6·0	3·9	12·0	7·7	18·0	11·6

39m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	9 45·0	9 46·6	9 18·4	0·0	0·0	6·0	4·0	12·0	7·9
01	9 45·3	9 46·9	9 18·6	0·1	0·1	6·1	4·0	12·1	8·0
02	9 45·5	9 47·1	9 18·8	0·2	0·1	6·2	4·1	12·2	8·0
03	9 45·8	9 47·4	9 19·1	0·3	0·2	6·3	4·1	12·3	8·1
04	9 46·0	9 47·6	9 19·3	0·4	0·3	6·4	4·2	12·4	8·2
05	9 46·3	9 47·9	9 19·5	0·5	0·3	6·5	4·3	12·5	8·2
06	9 46·5	9 48·1	9 19·8	0·6	0·4	6·6	4·3	12·6	8·3
07	9 46·8	9 48·4	9 20·0	0·7	0·5	6·7	4·4	12·7	8·4
08	9 47·0	9 48·6	9 20·3	0·8	0·5	6·8	4·5	12·8	8·4
09	9 47·3	9 48·9	9 20·5	0·9	0·6	6·9	4·5	12·9	8·5
10	9 47·5	9 49·1	9 20·7	1·0	0·7	7·0	4·6	13·0	8·6
11	9 47·8	9 49·4	9 21·0	1·1	0·7	7·1	4·7	13·1	8·6
12	9 48·0	9 49·6	9 21·2	1·2	0·8	7·2	4·7	13·2	8·7
13	9 48·3	9 49·9	9 21·5	1·3	0·9	7·3	4·8	13·3	8·8
14	9 48·5	9 50·1	9 21·7	1·4	0·9	7·4	4·9	13·4	8·8
15	9 48·8	9 50·4	9 21·9	1·5	1·0	7·5	4·9	13·5	8·9
16	9 49·0	9 50·6	9 22·2	1·6	1·1	7·6	5·0	13·6	9·0
17	9 49·3	9 50·9	9 22·4	1·7	1·1	7·7	5·1	13·7	9·0
18	9 49·5	9 51·1	9 22·6	1·8	1·2	7·8	5·1	13·8	9·1
19	9 49·8	9 51·4	9 22·9	1·9	1·3	7·9	5·2	13·9	9·2
20	9 50·0	9 51·6	9 23·1	2·0	1·3	8·0	5·3	14·0	9·2
21	9 50·3	9 51·9	9 23·4	2·1	1·4	8·1	5·3	14·1	9·3
22	9 50·5	9 52·1	9 23·6	2·2	1·4	8·2	5·4	14·2	9·3
23	9 50·8	9 52·4	9 23·8	2·3	1·5	8·3	5·5	14·3	9·4
24	9 51·0	9 52·6	9 24·1	2·4	1·6	8·4	5·5	14·4	9·5
25	9 51·3	9 52·9	9 24·3	2·5	1·6	8·5	5·6	14·5	9·5
26	9 51·5	9 53·1	9 24·6	2·6	1·7	8·6	5·7	14·6	9·6
27	9 51·8	9 53·4	9 24·8	2·7	1·8	8·7	5·7	14·7	9·7
28	9 52·0	9 53·6	9 25·0	2·8	1·8	8·8	5·8	14·8	9·7
29	9 52·3	9 53·9	9 25·3	2·9	1·9	8·9	5·9	14·9	9·8
30	9 52·5	9 54·1	9 25·5	3·0	2·0	9·0	5·9	15·0	9·9
31	9 52·8	9 54·4	9 25·7	3·1	2·0	9·1	6·0	15·1	9·9
32	9 53·0	9 54·6	9 26·0	3·2	2·1	9·2	6·1	15·2	10·0
33	9 53·3	9 54·9	9 26·2	3·3	2·2	9·3	6·1	15·3	10·1
34	9 53·5	9 55·1	9 26·5	3·4	2·2	9·4	6·2	15·4	10·1
35	9 53·8	9 55·4	9 26·7	3·5	2·3	9·5	6·3	15·5	10·2
36	9 54·0	9 55·6	9 26·9	3·6	2·4	9·6	6·3	15·6	10·3
37	9 54·3	9 55·9	9 27·2	3·7	2·4	9·7	6·4	15·7	10·3
38	9 54·5	9 56·1	9 27·4	3·8	2·5	9·8	6·5	15·8	10·4
39	9 54·8	9 56·4	9 27·7	3·9	2·6	9·9	6·5	15·9	10·5
40	9 55·0	9 56·6	9 27·9	4·0	2·6	10·0	6·6	16·0	10·5
41	9 55·3	9 56·9	9 28·1	4·1	2·7	10·1	6·6	16·1	10·6
42	9 55·5	9 57·1	9 28·4	4·2	2·8	10·2	6·7	16·2	10·7
43	9 55·8	9 57·4	9 28·6	4·3	2·8	10·3	6·8	16·3	10·7
44	9 56·0	9 57·6	9 28·8	4·4	2·9	10·4	6·8	16·4	10·8
45	9 56·3	9 57·9	9 29·1	4·5	3·0	10·5	6·9	16·5	10·9
46	9 56·5	9 58·1	9 29·3	4·6	3·0	10·6	7·0	16·6	10·9
47	9 56·8	9 58·4	9 29·6	4·7	3·1	10·7	7·0	16·7	11·0
48	9 57·0	9 58·6	9 29·8	4·8	3·2	10·8	7·1	16·8	11·1
49	9 57·3	9 58·9	9 30·0	4·9	3·2	10·9	7·2	16·9	11·1
50	9 57·5	9 59·1	9 30·3	5·0	3·3	11·0	7·2	17·0	11·2
51	9 57·8	9 59·4	9 30·5	5·1	3·4	11·1	7·3	17·1	11·3
52	9 58·0	9 59·6	9 30·8	5·2	3·4	11·2	7·4	17·2	11·3
53	9 58·3	9 59·9	9 31·0	5·3	3·5	11·3	7·4	17·3	11·4
54	9 58·5	10 00·1	9 31·2	5·4	3·6	11·4	7·5	17·4	11·5
55	9 58·8	10 00·4	9 31·5	5·5	3·6	11·5	7·6	17·5	11·5
56	9 59·0	10 00·6	9 31·7	5·6	3·7	11·6	7·6	17·6	11·6
57	9 59·3	10 00·9	9 32·0	5·7	3·8	11·7	7·7	17·7	11·7
58	9 59·5	10 01·1	9 32·2	5·8	3·8	11·8	7·8	17·8	11·7
59	9 59·8	10 01·4	9 32·4	5·9	3·9	11·9	7·8	17·9	11·8
60	10 00·0	10 01·6	9 32·7	6·0	4·0	12·0	7·9	18·0	11·9

40m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	10 00·0	10 01·6	9 32·7	0·0	0·0	6·0	4·1	12·0	8·1
01	10 00·3	10 01·9	9 32·9	0·1	0·1	6·1	4·1	12·1	8·2
02	10 00·5	10 02·1	9 33·1	0·2	0·1	6·2	4·2	12·2	8·2
03	10 00·8	10 02·4	9 33·4	0·3	0·2	6·3	4·3	12·3	8·3
04	10 01·0	10 02·6	9 33·6	0·4	0·3	6·4	4·3	12·4	8·4
05	10 01·3	10 02·9	9 33·9	0·5	0·3	6·5	4·4	12·5	8·4
06	10 01·5	10 03·1	9 34·1	0·6	0·4	6·6	4·5	12·6	8·5
07	10 01·8	10 03·4	9 34·3	0·7	0·5	6·7	4·5	12·7	8·6
08	10 02·0	10 03·6	9 34·6	0·8	0·5	6·8	4·6	12·8	8·6
09	10 02·3	10 03·9	9 34·8	0·9	0·6	6·9	4·7	12·9	8·7
10	10 02·5	10 04·1	9 35·1	1·0	0·7	7·0	4·7	13·0	8·8
11	10 02·8	10 04·4	9 35·3	1·1	0·7	7·1	4·8	13·1	8·8
12	10 03·0	10 04·7	9 35·5	1·2	0·8	7·2	4·9	13·2	8·9
13	10 03·3	10 04·9	9 35·8	1·3	0·9	7·3	4·9	13·3	9·0
14	10 03·5	10 05·2	9 36·0	1·4	0·9	7·4	5·0	13·4	9·0
15	10 03·8	10 05·4	9 36·2	1·5	1·0	7·5	5·1	13·5	9·1
16	10 04·0	10 05·7	9 36·5	1·6	1·1	7·6	5·1	13·6	9·2
17	10 04·3	10 05·9	9 36·7	1·7	1·1	7·7	5·2	13·7	9·2
18	10 04·5	10 06·2	9 37·0	1·8	1·2	7·8	5·3	13·8	9·3
19	10 04·8	10 06·4	9 37·2	1·9	1·3	7·9	5·3	13·9	9·4
20	10 05·0	10 06·7	9 37·4	2·0	1·4	8·0	5·4	14·0	9·5
21	10 05·3	10 06·9	9 37·7	2·1	1·4	8·1	5·5	14·1	9·5
22	10 05·5	10 07·2	9 37·9	2·2	1·5	8·2	5·5	14·2	9·6
23	10 05·8	10 07·4	9 38·2	2·3	1·6	8·3	5·6	14·3	9·7
24	10 06·0	10 07·7	9 38·4	2·4	1·6	8·4	5·7	14·4	9·7
25	10 06·3	10 07·9	9 38·6	2·5	1·7	8·5	5·7	14·5	9·8
26	10 06·5	10 08·2	9 38·9	2·6	1·8	8·6	5·8	14·6	9·9
27	10 06·8	10 08·4	9 39·1	2·7	1·8	8·7	5·9	14·7	9·9
28	10 07·0	10 08·7	9 39·3	2·8	1·9	8·8	5·9	14·8	10·0
29	10 07·3	10 08·9	9 39·6	2·9	2·0	8·9	6·0	14·9	10·1
30	10 07·5	10 09·2	9 39·8	3·0	2·0	9·0	6·1	15·0	10·1
31	10 07·8	10 09·4	9 40·1	3·1	2·1	9·1	6·1	15·1	10·2
32	10 08·0	10 09·7	9 40·3	3·2	2·2	9·2	6·2	15·2	10·3
33	10 08·3	10 09·9	9 40·5	3·3	2·2	9·3	6·3	15·3	10·3
34	10 08·5	10 10·2	9 40·8	3·4	2·3	9·4	6·3	15·4	10·4
35	10 08·8	10 10·4	9 41·0	3·5	2·4	9·5	6·4	15·5	10·5
36	10 09·0	10 10·7	9 41·3	3·6	2·4	9·6	6·5	15·6	10·5
37	10 09·3	10 10·9	9 41·5	3·7	2·5	9·7	6·5	15·7	10·6
38	10 09·5	10 11·2	9 41·7	3·8	2·6	9·8	6·6	15·8	10·7
39	10 09·8	10 11·4	9 42·0	3·9	2·6	9·9	6·7	15·9	10·7
40	10 10·0	10 11·7	9 42·2	4·0	2·7	10·0	6·8	16·0	10·8
41	10 10·3	10 11·9	9 42·4	4·1	2·8	10·1	6·8	16·1	10·9
42	10 10·5	10 12·2	9 42·7	4·2	2·8	10·2	6·9	16·2	10·9
43	10 10·8	10 12·4	9 42·9	4·3	2·9	10·3	7·0	16·3	11·0
44	10 11·0	10 12·7	9 43·2	4·4	3·0	10·4	7·0	16·4	11·1
45	10 11·3	10 12·9	9 43·4	4·5	3·0	10·5	7·1	16·5	11·1
46	10 11·5	10 13·2	9 43·6	4·6	3·1	10·6	7·2	16·6	11·2
47	10 11·8	10 13·4	9 43·9	4·7	3·2	10·7	7·2	16·7	11·3
48	10 12·0	10 13·7	9 44·1	4·8	3·2	10·8	7·3	16·8	11·3
49	10 12·3	10 13·9	9 44·4	4·9	3·3	10·9	7·4	16·9	11·4
50	10 12·5	10 14·2	9 44·6	5·0	3·4	11·0	7·4	17·0	11·5
51	10 12·8	10 14·4	9 44·8	5·1	3·4	11·1	7·5	17·1	11·5
52	10 13·0	10 14·7	9 45·1	5·2	3·5	11·2	7·6	17·2	11·6
53	10 13·3	10 14·9	9 45·3	5·3	3·6	11·3	7·6	17·3	11·7
54	10 13·5	10 15·2	9 45·6	5·4	3·6	11·4	7·7	17·4	11·7
55	10 13·8	10 15·4	9 45·8	5·5	3·7	11·5	7·8	17·5	11·8
56	10 14·0	10 15·7	9 46·0	5·6	3·8	11·6	7·8	17·6	11·9
57	10 14·3	10 15·9	9 46·3	5·7	3·8	11·7	7·9	17·7	11·9
58	10 14·5	10 16·2	9 46·5	5·8	3·9	11·8	8·0	17·8	12·0
59	10 14·8	10 16·4	9 46·7	5·9	4·0	11·9	8·0	17·9	12·1
60	10 15·0	10 16·7	9 47·0	6·0	4·1	12·0	8·1	18·0	12·2

41m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	10 15·0	10 16·7	9 47·0	0·0	0·0	6·0	4·2	12·0	8·3
01	10 15·3	10 16·9	9 47·2	0·1	0·1	6·1	4·2	12·1	8·4
02	10 15·5	10 17·2	9 47·5	0·2	0·1	6·2	4·3	12·2	8·4
03	10 15·8	10 17·4	9 47·7	0·3	0·2	6·3	4·4	12·3	8·5
04	10 16·0	10 17·7	9 47·9	0·4	0·3	6·4	4·4	12·4	8·6
05	10 16·3	10 17·9	9 48·2	0·5	0·3	6·5	4·5	12·5	8·6
06	10 16·5	10 18·2	9 48·4	0·6	0·4	6·6	4·6	12·6	8·7
07	10 16·8	10 18·4	9 48·7	0·7	0·5	6·7	4·6	12·7	8·8
08	10 17·0	10 18·7	9 48·9	0·8	0·6	6·8	4·7	12·8	8·9
09	10 17·3	10 18·9	9 49·1	0·9	0·6	6·9	4·8	12·9	8·9
10	10 17·5	10 19·2	9 49·4	1·0	0·7	7·0	4·8	13·0	9·0
11	10 17·8	10 19·4	9 49·6	1·1	0·8	7·1	4·9	13·1	9·1
12	10 18·0	10 19·7	9 49·8	1·2	0·8	7·2	5·0	13·2	9·1
13	10 18·3	10 19·9	9 50·1	1·3	0·9	7·3	5·0	13·3	9·2
14	10 18·5	10 20·2	9 50·3	1·4	1·0	7·4	5·1	13·4	9·3
15	10 18·8	10 20·4	9 50·6	1·5	1·0	7·5	5·2	13·5	9·3
16	10 19·0	10 20·7	9 50·8	1·6	1·1	7·6	5·3	13·6	9·4
17	10 19·3	10 20·9	9 51·0	1·7	1·2	7·7	5·3	13·7	9·5
18	10 19·5	10 21·2	9 51·3	1·8	1·2	7·8	5·4	13·8	9·5
19	10 19·8	10 21·4	9 51·5	1·9	1·3	7·9	5·5	13·9	9·6
20	10 20·0	10 21·7	9 51·8	2·0	1·4	8·0	5·5	14·0	9·7
21	10 20·3	10 21·9	9 52·0	2·1	1·5	8·1	5·6	14·1	9·8
22	10 20·5	10 22·2	9 52·2	2·2	1·5	8·2	5·7	14·2	9·8
23	10 20·8	10 22·4	9 52·5	2·3	1·6	8·3	5·7	14·3	9·9
24	10 21·0	10 22·7	9 52·7	2·4	1·7	8·4	5·8	14·4	10·0
25	10 21·3	10 23·0	9 52·9	2·5	1·7	8·5	5·9	14·5	10·0
26	10 21·5	10 23·2	9 53·2	2·6	1·8	8·6	5·9	14·6	10·1
27	10 21·8	10 23·5	9 53·4	2·7	1·9	8·7	6·0	14·7	10·2
28	10 22·0	10 23·7	9 53·7	2·8	1·9	8·8	6·1	14·8	10·2
29	10 22·3	10 24·0	9 53·9	2·9	2·0	8·9	6·2	14·9	10·3
30	10 22·5	10 24·2	9 54·1	3·0	2·1	9·0	6·2	15·0	10·4
31	10 22·8	10 24·5	9 54·4	3·1	2·1	9·1	6·3	15·1	10·4
32	10 23·0	10 24·7	9 54·6	3·2	2·2	9·2	6·4	15·2	10·5
33	10 23·3	10 25·0	9 54·9	3·3	2·3	9·3	6·4	15·3	10·6
34	10 23·5	10 25·2	9 55·1	3·4	2·4	9·4	6·5	15·4	10·7
35	10 23·8	10 25·5	9 55·3	3·5	2·4	9·5	6·6	15·5	10·7
36	10 24·0	10 25·7	9 55·6	3·6	2·5	9·6	6·6	15·6	10·8
37	10 24·3	10 26·0	9 55·8	3·7	2·6	9·7	6·7	15·7	10·9
38	10 24·5	10 26·2	9 56·1	3·8	2·6	9·8	6·8	15·8	10·9
39	10 24·8	10 26·5	9 56·3	3·9	2·7	9·9	6·8	15·9	11·0
40	10 25·0	10 26·7	9 56·5	4·0	2·8	10·0	6·9	16·0	11·1
41	10 25·3	10 27·0	9 56·8	4·1	2·8	10·1	7·0	16·1	11·1
42	10 25·5	10 27·2	9 57·0	4·2	2·9	10·2	7·1	16·2	11·2
43	10 25·8	10 27·5	9 57·2	4·3	3·0	10·3	7·1	16·3	11·3
44	10 26·0	10 27·7	9 57·5	4·4	3·0	10·4	7·2	16·4	11·3
45	10 26·3	10 28·0	9 57·7	4·5	3·1	10·5	7·3	16·5	11·4
46	10 26·5	10 28·2	9 58·0	4·6	3·2	10·6	7·3	16·6	11·5
47	10 26·8	10 28·5	9 58·2	4·7	3·3	10·7	7·4	16·7	11·6
48	10 27·0	10 28·7	9 58·4	4·8	3·3	10·8	7·5	16·8	11·6
49	10 27·3	10 29·0	9 58·7	4·9	3·4	10·9	7·5	16·9	11·7
50	10 27·5	10 29·2	9 58·9	5·0	3·5	11·0	7·6	17·0	11·8
51	10 27·8	10 29·5	9 59·2	5·1	3·5	11·1	7·7	17·1	11·8
52	10 28·0	10 29·7	9 59·4	5·2	3·6	11·2	7·7	17·2	11·9
53	10 28·3	10 30·0	9 59·6	5·3	3·7	11·3	7·8	17·3	12·0
54	10 28·5	10 30·2	9 59·9	5·4	3·7	11·4	7·9	17·4	12·0
55	10 28·8	10 30·5	10 00·1	5·5	3·8	11·5	8·0	17·5	12·1
56	10 29·0	10 30·7	10 00·3	5·6	3·9	11·6	8·0	17·6	12·2
57	10 29·3	10 31·0	10 00·6	5·7	3·9	11·7	8·1	17·7	12·2
58	10 29·5	10 31·2	10 00·8	5·8	4·0	11·8	8·2	17·8	12·3
59	10 29·8	10 31·5	10 01·1	5·9	4·1	11·9	8·2	17·9	12·4
60	10 30·0	10 31·7	10 01·3	6·0	4·2	12·0	8·3	18·0	12·5

42m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	10 30·0	10 31·7	10 01·3	0·0	0·0	6·0	4·3	12·0	8·5
01	10 30·3	10 32·0	10 01·5	0·1	0·1	6·1	4·3	12·1	8·6
02	10 30·5	10 32·2	10 01·8	0·2	0·1	6·2	4·4	12·2	8·6
03	10 30·8	10 32·5	10 02·0	0·3	0·2	6·3	4·5	12·3	8·7
04	10 31·0	10 32·7	10 02·3	0·4	0·3	6·4	4·5	12·4	8·8
05	10 31·3	10 33·0	10 02·5	0·5	0·4	6·5	4·6	12·5	8·9
06	10 31·5	10 33·2	10 02·7	0·6	0·4	6·6	4·7	12·6	8·9
07	10 31·8	10 33·5	10 03·0	0·7	0·5	6·7	4·7	12·7	9·0
08	10 32·0	10 33·7	10 03·2	0·8	0·6	6·8	4·8	12·8	9·1
09	10 32·3	10 34·0	10 03·4	0·9	0·6	6·9	4·9	12·9	9·1
10	10 32·5	10 34·2	10 03·7	1·0	0·7	7·0	5·0	13·0	9·2
11	10 32·8	10 34·5	10 03·9	1·1	0·8	7·1	5·0	13·1	9·3
12	10 33·0	10 34·7	10 04·2	1·2	0·9	7·2	5·1	13·2	9·4
13	10 33·3	10 35·0	10 04·4	1·3	0·9	7·3	5·2	13·3	9·4
14	10 33·5	10 35·2	10 04·6	1·4	1·0	7·4	5·2	13·4	9·5
15	10 33·8	10 35·5	10 04·9	1·5	1·1	7·5	5·3	13·5	9·6
16	10 34·0	10 35·7	10 05·1	1·6	1·1	7·6	5·4	13·6	9·6
17	10 34·3	10 36·0	10 05·4	1·7	1·2	7·7	5·5	13·7	9·7
18	10 34·5	10 36·2	10 05·6	1·8	1·3	7·8	5·5	13·8	9·8
19	10 34·8	10 36·5	10 05·8	1·9	1·3	7·9	5·6	13·9	9·8
20	10 35·0	10 36·7	10 06·1	2·0	1·4	8·0	5·7	14·0	9·9
21	10 35·3	10 37·0	10 06·3	2·1	1·5	8·1	5·7	14·1	10·0
22	10 35·5	10 37·2	10 06·5	2·2	1·6	8·2	5·8	14·2	10·1
23	10 35·8	10 37·5	10 06·8	2·3	1·6	8·3	5·9	14·3	10·1
24	10 36·0	10 37·7	10 07·0	2·4	1·7	8·4	6·0	14·4	10·2
25	10 36·3	10 38·0	10 07·3	2·5	1·8	8·5	6·0	14·5	10·3
26	10 36·5	10 38·2	10 07·5	2·6	1·8	8·6	6·1	14·6	10·3
27	10 36·8	10 38·5	10 07·7	2·7	1·9	8·7	6·2	14·7	10·4
28	10 37·0	10 38·7	10 08·0	2·8	2·0	8·8	6·2	14·8	10·5
29	10 37·3	10 39·0	10 08·2	2·9	2·1	8·9	6·3	14·9	10·6
30	10 37·5	10 39·2	10 08·5	3·0	2·1	9·0	6·4	15·0	10·6
31	10 37·8	10 39·5	10 08·7	3·1	2·2	9·1	6·4	15·1	10·7
32	10 38·0	10 39·7	10 08·9	3·2	2·3	9·2	6·5	15·2	10·8
33	10 38·3	10 40·0	10 09·2	3·3	2·3	9·3	6·6	15·3	10·8
34	10 38·5	10 40·2	10 09·4	3·4	2·4	9·4	6·7	15·4	10·9
35	10 38·8	10 40·5	10 09·7	3·5	2·5	9·5	6·7	15·5	11·0
36	10 39·0	10 40·7	10 09·9	3·6	2·6	9·6	6·8	15·6	11·1
37	10 39·3	10 41·0	10 10·1	3·7	2·6	9·7	6·9	15·7	11·1
38	10 39·5	10 41·3	10 10·4	3·8	2·7	9·8	6·9	15·8	11·2
39	10 39·8	10 41·5	10 10·6	3·9	2·8	9·9	7·0	15·9	11·3
40	10 40·0	10 41·8	10 10·8	4·0	2·8	10·0	7·1	16·0	11·3
41	10 40·3	10 42·0	10 11·1	4·1	2·9	10·1	7·2	16·1	11·4
42	10 40·5	10 42·3	10 11·3	4·2	3·0	10·2	7·2	16·2	11·5
43	10 40·8	10 42·5	10 11·6	4·3	3·0	10·3	7·3	16·3	11·5
44	10 41·0	10 42·8	10 11·8	4·4	3·1	10·4	7·4	16·4	11·6
45	10 41·3	10 43·0	10 12·0	4·5	3·2	10·5	7·4	16·5	11·7
46	10 41·5	10 43·3	10 12·3	4·6	3·3	10·6	7·5	16·6	11·8
47	10 41·8	10 43·5	10 12·5	4·7	3·3	10·7	7·6	16·7	11·8
48	10 42·0	10 43·8	10 12·8	4·8	3·4	10·8	7·7	16·8	11·9
49	10 42·3	10 44·0	10 13·0	4·9	3·5	10·9	7·7	16·9	12·0
50	10 42·5	10 44·3	10 13·2	5·0	3·5	11·0	7·8	17·0	12·0
51	10 42·8	10 44·5	10 13·5	5·1	3·6	11·1	7·9	17·1	12·1
52	10 43·0	10 44·8	10 13·7	5·2	3·7	11·2	7·9	17·2	12·2
53	10 43·3	10 45·0	10 13·9	5·3	3·8	11·3	8·0	17·3	12·3
54	10 43·5	10 45·3	10 14·2	5·4	3·8	11·4	8·1	17·4	12·3
55	10 43·8	10 45·5	10 14·4	5·5	3·9	11·5	8·1	17·5	12·4
56	10 44·0	10 45·8	10 14·7	5·6	4·0	11·6	8·2	17·6	12·5
57	10 44·3	10 46·0	10 14·9	5·7	4·0	11·7	8·3	17·7	12·5
58	10 44·5	10 46·3	10 15·1	5·8	4·1	11·8	8·4	17·8	12·6
59	10 44·8	10 46·5	10 15·4	5·9	4·2	11·9	8·4	17·9	12·7
60	10 45·0	10 46·8	10 15·6	6·0	4·3	12·0	8·5	18·0	12·8

43m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	10 45·0	10 46·8	10 15·6	0·0	0·0	6·0	4·4	12·0	8·7
01	10 45·3	10 47·0	10 15·9	0·1	0·1	6·1	4·4	12·1	8·8
02	10 45·5	10 47·3	10 16·1	0·2	0·1	6·2	4·5	12·2	8·8
03	10 45·8	10 47·5	10 16·3	0·3	0·2	6·3	4·6	12·3	8·9
04	10 46·0	10 47·8	10 16·6	0·4	0·3	6·4	4·6	12·4	9·0
05	10 46·3	10 48·0	10 16·8	0·5	0·4	6·5	4·7	12·5	9·1
06	10 46·5	10 48·3	10 17·0	0·6	0·4	6·6	4·8	12·6	9·1
07	10 46·8	10 48·5	10 17·3	0·7	0·5	6·7	4·9	12·7	9·2
08	10 47·0	10 48·8	10 17·5	0·8	0·6	6·8	4·9	12·8	9·3
09	10 47·3	10 49·0	10 17·8	0·9	0·7	6·9	5·0	12·9	9·4
10	10 47·5	10 49·3	10 18·0	1·0	0·7	7·0	5·1	13·0	9·4
11	10 47·8	10 49·5	10 18·2	1·1	0·8	7·1	5·1	13·1	9·5
12	10 48·0	10 49·8	10 18·5	1·2	0·9	7·2	5·2	13·2	9·6
13	10 48·3	10 50·0	10 18·7	1·3	0·9	7·3	5·3	13·3	9·6
14	10 48·5	10 50·3	10 19·0	1·4	1·0	7·4	5·4	13·4	9·7
15	10 48·8	10 50·5	10 19·2	1·5	1·1	7·5	5·4	13·5	9·8
16	10 49·0	10 50·8	10 19·4	1·6	1·2	7·6	5·5	13·6	9·9
17	10 49·3	10 51·0	10 19·7	1·7	1·2	7·7	5·6	13·7	9·9
18	10 49·5	10 51·3	10 19·9	1·8	1·3	7·8	5·7	13·8	10·0
19	10 49·8	10 51·5	10 20·2	1·9	1·4	7·9	5·7	13·9	10·1
20	10 50·0	10 51·8	10 20·4	2·0	1·5	8·0	5·8	14·0	10·2
21	10 50·3	10 52·0	10 20·6	2·1	1·5	8·1	5·9	14·1	10·2
22	10 50·5	10 52·3	10 20·9	2·2	1·6	8·2	5·9	14·2	10·3
23	10 50·8	10 52·5	10 21·1	2·3	1·7	8·3	6·0	14·3	10·4
24	10 51·0	10 52·8	10 21·3	2·4	1·7	8·4	6·1	14·4	10·4
25	10 51·3	10 53·0	10 21·6	2·5	1·8	8·5	6·2	14·5	10·5
26	10 51·5	10 53·3	10 21·8	2·6	1·9	8·6	6·2	14·6	10·6
27	10 51·8	10 53·5	10 22·1	2·7	2·0	8·7	6·3	14·7	10·7
28	10 52·0	10 53·8	10 22·3	2·8	2·0	8·8	6·4	14·8	10·7
29	10 52·3	10 54·0	10 22·5	2·9	2·1	8·9	6·5	14·9	10·8
30	10 52·5	10 54·3	10 22·8	3·0	2·2	9·0	6·5	15·0	10·9
31	10 52·8	10 54·5	10 23·0	3·1	2·2	9·1	6·6	15·1	10·9
32	10 53·0	10 54·8	10 23·3	3·2	2·3	9·2	6·7	15·2	11·0
33	10 53·3	10 55·0	10 23·5	3·3	2·4	9·3	6·7	15·3	11·1
34	10 53·5	10 55·3	10 23·7	3·4	2·5	9·4	6·8	15·4	11·2
35	10 53·8	10 55·5	10 24·0	3·5	2·5	9·5	6·9	15·5	11·2
36	10 54·0	10 55·8	10 24·2	3·6	2·6	9·6	7·0	15·6	11·3
37	10 54·3	10 56·0	10 24·4	3·7	2·7	9·7	7·0	15·7	11·4
38	10 54·5	10 56·3	10 24·7	3·8	2·8	9·8	7·1	15·8	11·5
39	10 54·8	10 56·5	10 24·9	3·9	2·8	9·9	7·2	15·9	11·5
40	10 55·0	10 56·8	10 25·2	4·0	2·9	10·0	7·3	16·0	11·6
41	10 55·3	10 57·0	10 25·4	4·1	3·0	10·1	7·3	16·1	11·7
42	10 55·5	10 57·3	10 25·6	4·2	3·0	10·2	7·4	16·2	11·7
43	10 55·8	10 57·5	10 25·9	4·3	3·1	10·3	7·5	16·3	11·8
44	10 56·0	10 57·8	10 26·1	4·4	3·2	10·4	7·5	16·4	11·9
45	10 56·3	10 58·0	10 26·4	4·5	3·3	10·5	7·6	16·5	12·0
46	10 56·5	10 58·3	10 26·6	4·6	3·3	10·6	7·7	16·6	12·0
47	10 56·8	10 58·5	10 26·8	4·7	3·4	10·7	7·8	16·7	12·1
48	10 57·0	10 58·8	10 27·1	4·8	3·5	10·8	7·8	16·8	12·2
49	10 57·3	10 59·0	10 27·3	4·9	3·6	10·9	7·9	16·9	12·3
50	10 57·5	10 59·3	10 27·5	5·0	3·6	11·0	8·0	17·0	12·3
51	10 57·8	10 59·6	10 27·8	5·1	3·7	11·1	8·0	17·1	12·4
52	10 58·0	10 59·8	10 28·0	5·2	3·8	11·2	8·1	17·2	12·5
53	10 58·3	11 00·1	10 28·3	5·3	3·8	11·3	8·2	17·3	12·5
54	10 58·5	11 00·3	10 28·5	5·4	3·9	11·4	8·3	17·4	12·6
55	10 58·8	11 00·6	10 28·7	5·5	4·0	11·5	8·3	17·5	12·7
56	10 59·0	11 00·8	10 29·0	5·6	4·1	11·6	8·4	17·6	12·8
57	10 59·3	11 01·1	10 29·2	5·7	4·1	11·7	8·5	17·7	12·8
58	10 59·5	11 01·3	10 29·5	5·8	4·2	11·8	8·6	17·8	12·9
59	10 59·8	11 01·6	10 29·7	5·9	4·3	11·9	8·6	17·9	13·0
60	11 00·0	11 01·8	10 29·9	6·0	4·4	12·0	8·7	18·0	13·1

44m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	11 00·0	11 01·8	10 29·9	0·0	0·0	6·0	4·5	12·0	8·9
01	11 00·3	11 02·1	10 30·2	0·1	0·1	6·1	4·5	12·1	9·0
02	11 00·5	11 02·3	10 30·4	0·2	0·1	6·2	4·6	12·2	9·0
03	11 00·8	11 02·6	10 30·6	0·3	0·2	6·3	4·7	12·3	9·1
04	11 01·0	11 02·8	10 30·9	0·4	0·3	6·4	4·7	12·4	9·2
05	11 01·3	11 03·1	10 31·1	0·5	0·4	6·5	4·8	12·5	9·3
06	11 01·5	11 03·3	10 31·4	0·6	0·4	6·6	4·9	12·6	9·3
07	11 01·8	11 03·6	10 31·6	0·7	0·5	6·7	5·0	12·7	9·4
08	11 02·0	11 03·8	10 31·8	0·8	0·6	6·8	5·0	12·8	9·5
09	11 02·3	11 04·1	10 32·1	0·9	0·7	6·9	5·1	12·9	9·6
10	11 02·5	11 04·3	10 32·3	1·0	0·7	7·0	5·2	13·0	9·6
11	11 02·8	11 04·6	10 32·6	1·1	0·8	7·1	5·3	13·1	9·7
12	11 03·0	11 04·8	10 32·8	1·2	0·9	7·2	5·3	13·2	9·8
13	11 03·3	11 05·1	10 33·0	1·3	1·0	7·3	5·4	13·3	9·9
14	11 03·5	11 05·3	10 33·3	1·4	1·0	7·4	5·5	13·4	9·9
15	11 03·8	11 05·6	10 33·5	1·5	1·1	7·5	5·6	13·5	10·0
16	11 04·0	11 05·8	10 33·8	1·6	1·2	7·6	5·6	13·6	10·1
17	11 04·3	11 06·1	10 34·0	1·7	1·3	7·7	5·7	13·7	10·2
18	11 04·5	11 06·3	10 34·2	1·8	1·3	7·8	5·8	13·8	10·2
19	11 04·8	11 06·6	10 34·5	1·9	1·4	7·9	5·9	13·9	10·3
20	11 05·0	11 06·8	10 34·7	2·0	1·5	8·0	5·9	14·0	10·4
21	11 05·3	11 07·1	10 34·9	2·1	1·6	8·1	6·0	14·1	10·5
22	11 05·5	11 07·3	10 35·2	2·2	1·6	8·2	6·1	14·2	10·5
23	11 05·8	11 07·6	10 35·4	2·3	1·7	8·3	6·2	14·3	10·6
24	11 06·0	11 07·8	10 35·7	2·4	1·8	8·4	6·2	14·4	10·7
25	11 06·3	11 08·1	10 35·9	2·5	1·9	8·5	6·3	14·5	10·8
26	11 06·5	11 08·3	10 36·1	2·6	1·9	8·6	6·4	14·6	10·8
27	11 06·8	11 08·6	10 36·4	2·7	2·0	8·7	6·5	14·7	10·9
28	11 07·0	11 08·8	10 36·6	2·8	2·1	8·8	6·5	14·8	11·0
29	11 07·3	11 09·1	10 36·9	2·9	2·2	8·9	6·6	14·9	11·1
30	11 07·5	11 09·3	10 37·1	3·0	2·2	9·0	6·7	15·0	11·1
31	11 07·8	11 09·6	10 37·3	3·1	2·3	9·1	6·7	15·1	11·2
32	11 08·0	11 09·8	10 37·6	3·2	2·4	9·2	6·8	15·2	11·3
33	11 08·3	11 10·1	10 37·8	3·3	2·4	9·3	6·9	15·3	11·3
34	11 08·5	11 10·3	10 38·0	3·4	2·5	9·4	7·0	15·4	11·4
35	11 08·8	11 10·6	10 38·3	3·5	2·6	9·5	7·0	15·5	11·5
36	11 09·0	11 10·8	10 38·5	3·6	2·7	9·6	7·1	15·6	11·6
37	11 09·3	11 11·1	10 38·8	3·7	2·7	9·7	7·2	15·7	11·6
38	11 09·5	11 11·3	10 39·0	3·8	2·8	9·8	7·3	15·8	11·7
39	11 09·8	11 11·6	10 39·2	3·9	2·9	9·9	7·3	15·9	11·8
40	11 10·0	11 11·8	10 39·5	4·0	3·0	10·0	7·4	16·0	11·9
41	11 10·3	11 12·1	10 39·7	4·1	3·0	10·1	7·5	16·1	11·9
42	11 10·5	11 12·3	10 40·0	4·2	3·1	10·2	7·6	16·2	12·0
43	11 10·8	11 12·6	10 40·2	4·3	3·2	10·3	7·6	16·3	12·1
44	11 11·0	11 12·8	10 40·4	4·4	3·3	10·4	7·7	16·4	12·2
45	11 11·3	11 13·1	10 40·7	4·5	3·3	10·5	7·8	16·5	12·2
46	11 11·5	11 13·3	10 40·9	4·6	3·4	10·6	7·9	16·6	12·3
47	11 11·8	11 13·6	10 41·1	4·7	3·5	10·7	7·9	16·7	12·4
48	11 12·0	11 13·8	10 41·4	4·8	3·6	10·8	8·0	16·8	12·5
49	11 12·3	11 14·1	10 41·6	4·9	3·6	10·9	8·1	16·9	12·5
50	11 12·5	11 14·3	10 41·9	5·0	3·7	11·0	8·2	17·0	12·6
51	11 12·8	11 14·6	10 42·1	5·1	3·8	11·1	8·2	17·1	12·7
52	11 13·0	11 14·8	10 42·3	5·2	3·9	11·2	8·3	17·2	12·8
53	11 13·3	11 15·1	10 42·6	5·3	3·9	11·3	8·4	17·3	12·8
54	11 13·5	11 15·3	10 42·8	5·4	4·0	11·4	8·5	17·4	12·9
55	11 13·8	11 15·6	10 43·1	5·5	4·1	11·5	8·5	17·5	13·0
56	11 14·0	11 15·8	10 43·3	5·6	4·2	11·6	8·6	17·6	13·1
57	11 14·3	11 16·1	10 43·5	5·7	4·2	11·7	8·7	17·7	13·1
58	11 14·5	11 16·3	10 43·8	5·8	4·3	11·8	8·8	17·8	13·2
59	11 14·8	11 16·6	10 44·0	5·9	4·4	11·9	8·8	17·9	13·3
60	11 15·0	11 16·8	10 44·3	6·0	4·5	12·0	8·9	18·0	13·4

45m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	11 15·0	11 16·8	10 44·3	0·0	0·0	6·0	4·6	12·0	9·1
01	11 15·3	11 17·1	10 44·5	0·1	0·1	6·1	4·6	12·1	9·2
02	11 15·5	11 17·3	10 44·7	0·2	0·2	6·2	4·7	12·2	9·3
03	11 15·8	11 17·6	10 45·0	0·3	0·2	6·3	4·8	12·3	9·3
04	11 16·0	11 17·9	10 45·2	0·4	0·3	6·4	4·9	12·4	9·4
05	11 16·3	11 18·1	10 45·4	0·5	0·4	6·5	4·9	12·5	9·5
06	11 16·5	11 18·4	10 45·7	0·6	0·5	6·6	5·0	12·6	9·6
07	11 16·8	11 18·6	10 45·9	0·7	0·5	6·7	5·1	12·7	9·6
08	11 17·0	11 18·9	10 46·2	0·8	0·6	6·8	5·2	12·8	9·7
09	11 17·3	11 19·1	10 46·4	0·9	0·7	6·9	5·2	12·9	9·8
10	11 17·5	11 19·4	10 46·6	1·0	0·8	7·0	5·3	13·0	9·9
11	11 17·8	11 19·6	10 46·9	1·1	0·8	7·1	5·4	13·1	9·9
12	11 18·0	11 19·9	10 47·1	1·2	0·9	7·2	5·5	13·2	10·0
13	11 18·3	11 20·1	10 47·4	1·3	1·0	7·3	5·5	13·3	10·1
14	11 18·5	11 20·4	10 47·6	1·4	1·1	7·4	5·6	13·4	10·2
15	11 18·8	11 20·6	10 47·8	1·5	1·1	7·5	5·7	13·5	10·2
16	11 19·0	11 20·9	10 48·1	1·6	1·2	7·6	5·8	13·6	10·3
17	11 19·3	11 21·1	10 48·3	1·7	1·3	7·7	5·8	13·7	10·4
18	11 19·5	11 21·4	10 48·5	1·8	1·4	7·8	5·9	13·8	10·5
19	11 19·8	11 21·6	10 48·8	1·9	1·4	7·9	6·0	13·9	10·5
20	11 20·0	11 21·9	10 49·0	2·0	1·5	8·0	6·1	14·0	10·6
21	11 20·3	11 22·1	10 49·3	2·1	1·6	8·1	6·1	14·1	10·7
22	11 20·5	11 22·4	10 49·5	2·2	1·7	8·2	6·2	14·2	10·8
23	11 20·8	11 22·6	10 49·7	2·3	1·7	8·3	6·3	14·3	10·8
24	11 21·0	11 22·9	10 50·0	2·4	1·8	8·4	6·4	14·4	10·9
25	11 21·3	11 23·1	10 50·2	2·5	1·9	8·5	6·4	14·5	11·0
26	11 21·5	11 23·4	10 50·5	2·6	2·0	8·6	6·5	14·6	11·1
27	11 21·8	11 23·6	10 50·7	2·7	2·0	8·7	6·6	14·7	11·1
28	11 22·0	11 23·9	10 50·9	2·8	2·1	8·8	6·7	14·8	11·2
29	11 22·3	11 24·1	10 51·2	2·9	2·2	8·9	6·7	14·9	11·3
30	11 22·5	11 24·4	10 51·4	3·0	2·3	9·0	6·8	15·0	11·4
31	11 22·8	11 24·6	10 51·6	3·1	2·4	9·1	6·9	15·1	11·5
32	11 23·0	11 24·9	10 51·9	3·2	2·4	9·2	7·0	15·2	11·5
33	11 23·3	11 25·1	10 52·1	3·3	2·5	9·3	7·1	15·3	11·6
34	11 23·5	11 25·4	10 52·4	3·4	2·6	9·4	7·1	15·4	11·7
35	11 23·8	11 25·6	10 52·6	3·5	2·7	9·5	7·2	15·5	11·8
36	11 24·0	11 25·9	10 52·8	3·6	2·7	9·6	7·3	15·6	11·8
37	11 24·3	11 26·1	10 53·1	3·7	2·8	9·7	7·4	15·7	11·9
38	11 24·5	11 26·4	10 53·3	3·8	2·9	9·8	7·4	15·8	12·0
39	11 24·8	11 26·6	10 53·6	3·9	3·0	9·9	7·5	15·9	12·1
40	11 25·0	11 26·9	10 53·8	4·0	3·0	10·0	7·6	16·0	12·1
41	11 25·3	11 27·1	10 54·0	4·1	3·1	10·1	7·7	16·1	12·2
42	11 25·5	11 27·4	10 54·3	4·2	3·2	10·2	7·7	16·2	12·3
43	11 25·8	11 27·6	10 54·5	4·3	3·3	10·3	7·8	16·3	12·4
44	11 26·0	11 27·9	10 54·7	4·4	3·3	10·4	7·9	16·4	12·4
45	11 26·3	11 28·1	10 55·0	4·5	3·4	10·5	8·0	16·5	12·5
46	11 26·5	11 28·4	10 55·2	4·6	3·5	10·6	8·0	16·6	12·6
47	11 26·8	11 28·6	10 55·5	4·7	3·6	10·7	8·1	16·7	12·7
48	11 27·0	11 28·9	10 55·7	4·8	3·6	10·8	8·2	16·8	12·7
49	11 27·3	11 29·1	10 55·9	4·9	3·7	10·9	8·3	16·9	12·8
50	11 27·5	11 29·4	10 56·2	5·0	3·8	11·0	8·3	17·0	12·9
51	11 27·8	11 29·6	10 56·4	5·1	3·9	11·1	8·4	17·1	13·0
52	11 28·0	11 29·9	10 56·7	5·2	3·9	11·2	8·5	17·2	13·0
53	11 28·3	11 30·1	10 56·9	5·3	4·0	11·3	8·6	17·3	13·1
54	11 28·5	11 30·4	10 57·1	5·4	4·1	11·4	8·6	17·4	13·2
55	11 28·8	11 30·6	10 57·4	5·5	4·2	11·5	8·7	17·5	13·3
56	11 29·0	11 30·9	10 57·6	5·6	4·2	11·6	8·8	17·6	13·3
57	11 29·3	11 31·1	10 57·9	5·7	4·3	11·7	8·9	17·7	13·4
58	11 29·5	11 31·4	10 58·1	5·8	4·4	11·8	8·9	17·8	13·5
59	11 29·8	11 31·6	10 58·3	5·9	4·5	11·9	9·0	17·9	13·6
60	11 30·0	11 31·9	10 58·6	6·0	4·6	12·0	9·1	18·0	13·7

46m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	11 30·0	11 31·9	10 58·6	0·0	0·0	6·0	4·7	12·0	9·3
01	11 30·3	11 32·1	10 58·8	0·1	0·1	6·1	4·7	12·1	9·4
02	11 30·5	11 32·4	10 59·0	0·2	0·2	6·2	4·8	12·2	9·5
03	11 30·8	11 32·6	10 59·3	0·3	0·2	6·3	4·9	12·3	9·5
04	11 31·0	11 32·9	10 59·5	0·4	0·3	6·4	5·0	12·4	9·6
05	11 31·3	11 33·1	10 59·8	0·5	0·4	6·5	5·0	12·5	9·7
06	11 31·5	11 33·4	11 00·0	0·6	0·5	6·6	5·1	12·6	9·8
07	11 31·8	11 33·6	11 00·2	0·7	0·5	6·7	5·2	12·7	9·8
08	11 32·0	11 33·9	11 00·5	0·8	0·6	6·8	5·3	12·8	9·9
09	11 32·3	11 34·1	11 00·7	0·9	0·7	6·9	5·3	12·9	10·0
10	11 32·5	11 34·4	11 01·0	1·0	0·8	7·0	5·4	13·0	10·1
11	11 32·8	11 34·6	11 01·2	1·1	0·9	7·1	5·5	13·1	10·2
12	11 33·0	11 34·9	11 01·4	1·2	0·9	7·2	5·6	13·2	10·2
13	11 33·3	11 35·1	11 01·7	1·3	1·0	7·3	5·7	13·3	10·3
14	11 33·5	11 35·4	11 01·9	1·4	1·1	7·4	5·7	13·4	10·4
15	11 33·8	11 35·6	11 02·1	1·5	1·2	7·5	5·8	13·5	10·5
16	11 34·0	11 35·9	11 02·4	1·6	1·2	7·6	5·9	13·6	10·5
17	11 34·3	11 36·2	11 02·6	1·7	1·3	7·7	6·0	13·7	10·6
18	11 34·5	11 36·4	11 02·9	1·8	1·4	7·8	6·0	13·8	10·7
19	11 34·8	11 36·7	11 03·1	1·9	1·5	7·9	6·1	13·9	10·8
20	11 35·0	11 36·9	11 03·3	2·0	1·6	8·0	6·2	14·0	10·9
21	11 35·3	11 37·2	11 03·6	2·1	1·6	8·1	6·3	14·1	10·9
22	11 35·5	11 37·4	11 03·8	2·2	1·7	8·2	6·4	14·2	11·0
23	11 35·8	11 37·7	11 04·1	2·3	1·8	8·3	6·4	14·3	11·1
24	11 36·0	11 37·9	11 04·3	2·4	1·9	8·4	6·5	14·4	11·2
25	11 36·3	11 38·2	11 04·5	2·5	1·9	8·5	6·6	14·5	11·2
26	11 36·5	11 38·4	11 04·8	2·6	2·0	8·6	6·7	14·6	11·3
27	11 36·8	11 38·7	11 05·0	2·7	2·1	8·7	6·7	14·7	11·4
28	11 37·0	11 38·9	11 05·2	2·8	2·2	8·8	6·8	14·8	11·5
29	11 37·3	11 39·2	11 05·5	2·9	2·2	8·9	6·9	14·9	11·5
30	11 37·5	11 39·4	11 05·7	3·0	2·3	9·0	7·0	15·0	11·6
31	11 37·8	11 39·7	11 06·0	3·1	2·4	9·1	7·1	15·1	11·7
32	11 38·0	11 39·9	11 06·2	3·2	2·5	9·2	7·1	15·2	11·8
33	11 38·3	11 40·2	11 06·4	3·3	2·6	9·3	7·2	15·3	11·9
34	11 38·5	11 40·4	11 06·7	3·4	2·6	9·4	7·3	15·4	11·9
35	11 38·8	11 40·7	11 06·9	3·5	2·7	9·5	7·4	15·5	12·0
36	11 39·0	11 40·9	11 07·2	3·6	2·8	9·6	7·4	15·6	12·1
37	11 39·3	11 41·2	11 07·4	3·7	2·9	9·7	7·5	15·7	12·2
38	11 39·5	11 41·4	11 07·6	3·8	2·9	9·8	7·6	15·8	12·2
39	11 39·8	11 41·7	11 07·9	3·9	3·0	9·9	7·7	15·9	12·3
40	11 40·0	11 41·9	11 08·1	4·0	3·1	10·0	7·8	16·0	12·4
41	11 40·3	11 42·2	11 08·3	4·1	3·2	10·1	7·8	16·1	12·5
42	11 40·5	11 42·4	11 08·6	4·2	3·3	10·2	7·9	16·2	12·6
43	11 40·8	11 42·7	11 08·8	4·3	3·3	10·3	8·0	16·3	12·6
44	11 41·0	11 42·9	11 09·1	4·4	3·4	10·4	8·1	16·4	12·7
45	11 41·3	11 43·2	11 09·3	4·5	3·5	10·5	8·1	16·5	12·8
46	11 41·5	11 43·4	11 09·5	4·6	3·6	10·6	8·2	16·6	12·9
47	11 41·8	11 43·7	11 09·8	4·7	3·6	10·7	8·3	16·7	12·9
48	11 42·0	11 43·9	11 10·0	4·8	3·7	10·8	8·4	16·8	13·0
49	11 42·3	11 44·2	11 10·3	4·9	3·8	10·9	8·4	16·9	13·1
50	11 42·5	11 44·4	11 10·5	5·0	3·9	11·0	8·5	17·0	13·2
51	11 42·8	11 44·7	11 10·7	5·1	4·0	11·1	8·6	17·1	13·3
52	11 43·0	11 44·9	11 11·0	5·2	4·0	11·2	8·7	17·2	13·3
53	11 43·3	11 45·2	11 11·2	5·3	4·1	11·3	8·8	17·3	13·4
54	11 43·5	11 45·4	11 11·5	5·4	4·2	11·4	8·8	17·4	13·5
55	11 43·8	11 45·7	11 11·7	5·5	4·3	11·5	8·9	17·5	13·6
56	11 44·0	11 45·9	11 11·9	5·6	4·3	11·6	9·0	17·6	13·6
57	11 44·3	11 46·2	11 12·2	5·7	4·4	11·7	9·1	17·7	13·7
58	11 44·5	11 46·4	11 12·4	5·8	4·5	11·8	9·1	17·8	13·8
59	11 44·8	11 46·7	11 12·6	5·9	4·6	11·9	9·2	17·9	13·9
60	11 45·0	11 46·9	11 12·9	6·0	4·7	12·0	9·3	18·0	14·0

47m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	11 45·0	11 46·9	11 12·9	0·0	0·0	6·0	4·8	12·0	9·5
01	11 45·3	11 47·2	11 13·1	0·1	0·1	6·1	4·8	12·1	9·6
02	11 45·5	11 47·4	11 13·4	0·2	0·2	6·2	4·9	12·2	9·7
03	11 45·8	11 47·7	11 13·6	0·3	0·2	6·3	5·0	12·3	9·7
04	11 46·0	11 47·9	11 13·8	0·4	0·3	6·4	5·1	12·4	9·8
05	11 46·3	11 48·2	11 14·1	0·5	0·4	6·5	5·1	12·5	9·9
06	11 46·5	11 48·4	11 14·3	0·6	0·5	6·6	5·2	12·6	10·0
07	11 46·8	11 48·7	11 14·6	0·7	0·6	6·7	5·3	12·7	10·1
08	11 47·0	11 48·9	11 14·8	0·8	0·6	6·8	5·4	12·8	10·1
09	11 47·3	11 49·2	11 15·0	0·9	0·7	6·9	5·5	12·9	10·2
10	11 47·5	11 49·4	11 15·3	1·0	0·8	7·0	5·5	13·0	10·3
11	11 47·8	11 49·7	11 15·5	1·1	0·9	7·1	5·6	13·1	10·4
12	11 48·0	11 49·9	11 15·7	1·2	1·0	7·2	5·7	13·2	10·5
13	11 48·3	11 50·2	11 16·0	1·3	1·0	7·3	5·8	13·3	10·5
14	11 48·5	11 50·4	11 16·2	1·4	1·1	7·4	5·9	13·4	10·6
15	11 48·8	11 50·7	11 16·5	1·5	1·2	7·5	5·9	13·5	10·7
16	11 49·0	11 50·9	11 16·7	1·6	1·3	7·6	6·0	13·6	10·8
17	11 49·3	11 51·2	11 16·9	1·7	1·3	7·7	6·1	13·7	10·8
18	11 49·5	11 51·4	11 17·2	1·8	1·4	7·8	6·2	13·8	10·9
19	11 49·8	11 51·7	11 17·4	1·9	1·5	7·9	6·3	13·9	11·0
20	11 50·0	11 51·9	11 17·7	2·0	1·6	8·0	6·3	14·0	11·1
21	11 50·3	11 52·2	11 17·9	2·1	1·7	8·1	6·4	14·1	11·2
22	11 50·5	11 52·4	11 18·1	2·2	1·7	8·2	6·5	14·2	11·2
23	11 50·8	11 52·7	11 18·4	2·3	1·8	8·3	6·6	14·3	11·3
24	11 51·0	11 52·9	11 18·6	2·4	1·9	8·4	6·7	14·4	11·4
25	11 51·3	11 53·2	11 18·8	2·5	2·0	8·5	6·7	14·5	11·5
26	11 51·5	11 53·4	11 19·1	2·6	2·1	8·6	6·8	14·6	11·6
27	11 51·8	11 53·7	11 19·3	2·7	2·1	8·7	6·9	14·7	11·6
28	11 52·0	11 53·9	11 19·6	2·8	2·2	8·8	7·0	14·8	11·7
29	11 52·3	11 54·2	11 19·8	2·9	2·3	8·9	7·0	14·9	11·8
30	11 52·5	11 54·5	11 20·0	3·0	2·4	9·0	7·1	15·0	11·9
31	11 52·8	11 54·7	11 20·3	3·1	2·5	9·1	7·2	15·1	12·0
32	11 53·0	11 55·0	11 20·5	3·2	2·5	9·2	7·3	15·2	12·0
33	11 53·3	11 55·2	11 20·8	3·3	2·6	9·3	7·4	15·3	12·1
34	11 53·5	11 55·5	11 21·0	3·4	2·7	9·4	7·4	15·4	12·2
35	11 53·8	11 55·7	11 21·2	3·5	2·8	9·5	7·5	15·5	12·3
36	11 54·0	11 56·0	11 21·5	3·6	2·9	9·6	7·6	15·6	12·4
37	11 54·3	11 56·2	11 21·7	3·7	2·9	9·7	7·7	15·7	12·4
38	11 54·5	11 56·5	11 22·0	3·8	3·0	9·8	7·8	15·8	12·5
39	11 54·8	11 56·7	11 22·2	3·9	3·1	9·9	7·8	15·9	12·6
40	11 55·0	11 57·0	11 22·4	4·0	3·2	10·0	7·9	16·0	12·7
41	11 55·3	11 57·2	11 22·7	4·1	3·2	10·1	8·0	16·1	12·7
42	11 55·5	11 57·5	11 22·9	4·2	3·3	10·2	8·1	16·2	12·8
43	11 55·8	11 57·7	11 23·1	4·3	3·4	10·3	8·2	16·3	12·9
44	11 56·0	11 58·0	11 23·4	4·4	3·5	10·4	8·2	16·4	13·0
45	11 56·3	11 58·2	11 23·6	4·5	3·6	10·5	8·3	16·5	13·1
46	11 56·5	11 58·5	11 23·9	4·6	3·6	10·6	8·4	16·6	13·1
47	11 56·8	11 58·7	11 24·1	4·7	3·7	10·7	8·5	16·7	13·2
48	11 57·0	11 59·0	11 24·3	4·8	3·8	10·8	8·6	16·8	13·3
49	11 57·3	11 59·2	11 24·6	4·9	3·9	10·9	8·6	16·9	13·4
50	11 57·5	11 59·5	11 24·8	5·0	4·0	11·0	8·7	17·0	13·5
51	11 57·8	11 59·7	11 25·1	5·1	4·0	11·1	8·8	17·1	13·5
52	11 58·0	12 00·0	11 25·3	5·2	4·1	11·2	8·9	17·2	13·6
53	11 58·3	12 00·2	11 25·5	5·3	4·2	11·3	8·9	17·3	13·7
54	11 58·5	12 00·5	11 25·8	5·4	4·3	11·4	9·0	17·4	13·8
55	11 58·8	12 00·7	11 26·0	5·5	4·4	11·5	9·1	17·5	13·9
56	11 59·0	12 01·0	11 26·2	5·6	4·4	11·6	9·2	17·6	13·9
57	11 59·3	12 01·2	11 26·5	5·7	4·5	11·7	9·3	17·7	14·0
58	11 59·5	12 01·5	11 26·7	5·8	4·6	11·8	9·3	17·8	14·1
59	11 59·8	12 01·7	11 27·0	5·9	4·7	11·9	9·4	17·9	14·2
60	12 00·0	12 02·0	11 27·2	6·0	4·8	12·0	9·5	18·0	14·3

m 48	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	12 00·0	12 02·0	11 27·2	0·0	0·0	6·0	4·9	12·0	9·7
01	12 00·3	12 02·2	11 27·4	0·1	0·1	6·1	4·9	12·1	9·8
02	12 00·5	12 02·5	11 27·7	0·2	0·2	6·2	5·0	12·2	9·9
03	12 00·8	12 02·7	11 27·9	0·3	0·2	6·3	5·1	12·3	9·9
04	12 01·0	12 03·0	11 28·2	0·4	0·3	6·4	5·2	12·4	10·0
05	12 01·3	12 03·2	11 28·4	0·5	0·4	6·5	5·3	12·5	10·1
06	12 01·5	12 03·5	11 28·6	0·6	0·5	6·6	5·3	12·6	10·2
07	12 01·8	12 03·7	11 28·9	0·7	0·6	6·7	5·4	12·7	10·3
08	12 02·0	12 04·0	11 29·1	0·8	0·6	6·8	5·5	12·8	10·3
09	12 02·3	12 04·2	11 29·3	0·9	0·7	6·9	5·6	12·9	10·4
10	12 02·5	12 04·5	11 29·6	1·0	0·8	7·0	5·7	13·0	10·5
11	12 02·8	12 04·7	11 29·8	1·1	0·9	7·1	5·7	13·1	10·6
12	12 03·0	12 05·0	11 30·1	1·2	1·0	7·2	5·8	13·2	10·7
13	12 03·3	12 05·2	11 30·3	1·3	1·1	7·3	5·9	13·3	10·8
14	12 03·5	12 05·5	11 30·5	1·4	1·1	7·4	6·0	13·4	10·8
15	12 03·8	12 05·7	11 30·8	1·5	1·2	7·5	6·1	13·5	10·9
16	12 04·0	12 06·0	11 31·0	1·6	1·3	7·6	6·1	13·6	11·0
17	12 04·3	12 06·2	11 31·3	1·7	1·4	7·7	6·2	13·7	11·1
18	12 04·5	12 06·5	11 31·5	1·8	1·5	7·8	6·3	13·8	11·2
19	12 04·8	12 06·7	11 31·7	1·9	1·5	7·9	6·4	13·9	11·2
20	12 05·0	12 07·0	11 32·0	2·0	1·6	8·0	6·5	14·0	11·3
21	12 05·3	12 07·2	11 32·2	2·1	1·7	8·1	6·5	14·1	11·4
22	12 05·5	12 07·5	11 32·4	2·2	1·8	8·2	6·6	14·2	11·5
23	12 05·8	12 07·7	11 32·7	2·3	1·9	8·3	6·7	14·3	11·6
24	12 06·0	12 08·0	11 32·9	2·4	1·9	8·4	6·8	14·4	11·6
25	12 06·3	12 08·2	11 33·2	2·5	2·0	8·5	6·9	14·5	11·7
26	12 06·5	12 08·5	11 33·4	2·6	2·1	8·6	7·0	14·6	11·8
27	12 06·8	12 08·7	11 33·6	2·7	2·2	8·7	7·0	14·7	11·9
28	12 07·0	12 09·0	11 33·9	2·8	2·3	8·8	7·1	14·8	12·0
29	12 07·3	12 09·2	11 34·1	2·9	2·3	8·9	7·2	14·9	12·0
30	12 07·5	12 09·5	11 34·4	3·0	2·4	9·0	7·3	15·0	12·1
31	12 07·8	12 09·7	11 34·6	3·1	2·5	9·1	7·4	15·1	12·2
32	12 08·0	12 10·0	11 34·8	3·2	2·6	9·2	7·4	15·2	12·3
33	12 08·3	12 10·2	11 35·1	3·3	2·7	9·3	7·5	15·3	12·4
34	12 08·5	12 10·5	11 35·3	3·4	2·7	9·4	7·6	15·4	12·4
35	12 08·8	12 10·7	11 35·6	3·5	2·8	9·5	7·7	15·5	12·5
36	12 09·0	12 11·0	11 35·8	3·6	2·9	9·6	7·8	15·6	12·6
37	12 09·3	12 11·2	11 36·0	3·7	3·0	9·7	7·8	15·7	12·7
38	12 09·5	12 11·5	11 36·3	3·8	3·1	9·8	7·9	15·8	12·8
39	12 09·8	12 11·7	11 36·5	3·9	3·2	9·9	8·0	15·9	12·9
40	12 10·0	12 12·0	11 36·7	4·0	3·2	10·0	8·1	16·0	12·9
41	12 10·3	12 12·2	11 37·0	4·1	3·3	10·1	8·2	16·1	13·0
42	12 10·5	12 12·5	11 37·2	4·2	3·4	10·2	8·2	16·2	13·1
43	12 10·8	12 12·8	11 37·5	4·3	3·5	10·3	8·3	16·3	13·2
44	12 11·0	12 13·0	11 37·7	4·4	3·6	10·4	8·4	16·4	13·3
45	12 11·3	12 13·3	11 37·9	4·5	3·6	10·5	8·5	16·5	13·3
46	12 11·5	12 13·5	11 38·2	4·6	3·7	10·6	8·6	16·6	13·4
47	12 11·8	12 13·8	11 38·4	4·7	3·8	10·7	8·6	16·7	13·5
48	12 12·0	12 14·0	11 38·7	4·8	3·9	10·8	8·7	16·8	13·6
49	12 12·3	12 14·3	11 38·9	4·9	4·0	10·9	8·8	16·9	13·7
50	12 12·5	12 14·5	11 39·1	5·0	4·0	11·0	8·9	17·0	13·7
51	12 12·8	12 14·8	11 39·4	5·1	4·1	11·1	9·0	17·1	13·8
52	12 13·0	12 15·0	11 39·6	5·2	4·2	11·2	9·1	17·2	13·9
53	12 13·3	12 15·3	11 39·8	5·3	4·3	11·3	9·1	17·3	14·0
54	12 13·5	12 15·5	11 40·1	5·4	4·4	11·4	9·2	17·4	14·1
55	12 13·8	12 15·8	11 40·3	5·5	4·4	11·5	9·3	17·5	14·1
56	12 14·0	12 16·0	11 40·6	5·6	4·5	11·6	9·4	17·6	14·2
57	12 14·3	12 16·3	11 40·8	5·7	4·6	11·7	9·5	17·7	14·3
58	12 14·5	12 16·5	11 41·0	5·8	4·7	11·8	9·5	17·8	14·4
59	12 14·8	12 16·8	11 41·3	5·9	4·8	11·9	9·6	17·9	14·5
60	12 15·0	12 17·0	11 41·5	6·0	4·9	12·0	9·7	18·0	14·6

m 49	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	12 15·0	12 17·0	11 41·5	0·0	0·0	6·0	5·0	12·0	9·9
01	12 15·3	12 17·3	11 41·8	0·1	0·1	6·1	5·0	12·1	10·0
02	12 15·5	12 17·5	11 42·0	0·2	0·2	6·2	5·1	12·2	10·1
03	12 15·8	12 17·8	11 42·2	0·3	0·2	6·3	5·2	12·3	10·1
04	12 16·0	12 18·0	11 42·5	0·4	0·3	6·4	5·3	12·4	10·2
05	12 16·3	12 18·3	11 42·7	0·5	0·4	6·5	5·4	12·5	10·3
06	12 16·5	12 18·5	11 42·9	0·6	0·5	6·6	5·4	12·6	10·4
07	12 16·8	12 18·8	11 43·2	0·7	0·6	6·7	5·5	12·7	10·5
08	12 17·0	12 19·0	11 43·4	0·8	0·7	6·8	5·6	12·8	10·6
09	12 17·3	12 19·3	11 43·7	0·9	0·7	6·9	5·7	12·9	10·6
10	12 17·5	12 19·5	11 43·9	1·0	0·8	7·0	5·8	13·0	10·7
11	12 17·8	12 19·8	11 44·1	1·1	0·9	7·1	5·9	13·1	10·8
12	12 18·0	12 20·0	11 44·4	1·2	1·0	7·2	5·9	13·2	10·9
13	12 18·3	12 20·3	11 44·6	1·3	1·1	7·3	6·0	13·3	11·0
14	12 18·5	12 20·5	11 44·9	1·4	1·2	7·4	6·1	13·4	11·1
15	12 18·8	12 20·8	11 45·1	1·5	1·2	7·5	6·2	13·5	11·1
16	12 19·0	12 21·0	11 45·3	1·6	1·3	7·6	6·3	13·6	11·2
17	12 19·3	12 21·3	11 45·6	1·7	1·4	7·7	6·4	13·7	11·3
18	12 19·5	12 21·5	11 45·8	1·8	1·5	7·8	6·4	13·8	11·4
19	12 19·8	12 21·8	11 46·1	1·9	1·6	7·9	6·5	13·9	11·5
20	12 20·0	12 22·0	11 46·3	2·0	1·7	8·0	6·6	14·0	11·6
21	12 20·3	12 22·3	11 46·5	2·1	1·7	8·1	6·7	14·1	11·6
22	12 20·5	12 22·5	11 46·8	2·2	1·8	8·2	6·8	14·2	11·7
23	12 20·8	12 22·8	11 47·0	2·3	1·9	8·3	6·8	14·3	11·8
24	12 21·0	12 23·0	11 47·2	2·4	2·0	8·4	6·9	14·4	11·9
25	12 21·3	12 23·3	11 47·5	2·5	2·1	8·5	7·0	14·5	12·0
26	12 21·5	12 23·5	11 47·7	2·6	2·1	8·6	7·1	14·6	12·0
27	12 21·8	12 23·8	11 48·0	2·7	2·2	8·7	7·2	14·7	12·1
28	12 22·0	12 24·0	11 48·2	2·8	2·3	8·8	7·3	14·8	12·2
29	12 22·3	12 24·3	11 48·4	2·9	2·4	8·9	7·3	14·9	12·3
30	12 22·5	12 24·5	11 48·7	3·0	2·5	9·0	7·4	15·0	12·4
31	12 22·8	12 24·8	11 48·9	3·1	2·6	9·1	7·5	15·1	12·5
32	12 23·0	12 25·0	11 49·2	3·2	2·6	9·2	7·6	15·2	12·5
33	12 23·3	12 25·3	11 49·4	3·3	2·7	9·3	7·7	15·3	12·6
34	12 23·5	12 25·5	11 49·6	3·4	2·8	9·4	7·8	15·4	12·7
35	12 23·8	12 25·8	11 49·9	3·5	2·9	9·5	7·8	15·5	12·8
36	12 24·0	12 26·0	11 50·1	3·6	3·0	9·6	7·9	15·6	12·9
37	12 24·3	12 26·3	11 50·3	3·7	3·1	9·7	8·0	15·7	13·0
38	12 24·5	12 26·5	11 50·6	3·8	3·1	9·8	8·1	15·8	13·0
39	12 24·8	12 26·8	11 50·8	3·9	3·2	9·9	8·2	15·9	13·1
40	12 25·0	12 27·0	11 51·1	4·0	3·3	10·0	8·3	16·0	13·2
41	12 25·3	12 27·3	11 51·3	4·1	3·4	10·1	8·3	16·1	13·3
42	12 25·5	12 27·5	11 51·5	4·2	3·5	10·2	8·4	16·2	13·4
43	12 25·8	12 27·8	11 51·8	4·3	3·5	10·3	8·5	16·3	13·4
44	12 26·0	12 28·0	11 52·0	4·4	3·6	10·4	8·6	16·4	13·5
45	12 26·3	12 28·3	11 52·3	4·5	3·7	10·5	8·7	16·5	13·6
46	12 26·5	12 28·5	11 52·5	4·6	3·8	10·6	8·7	16·6	13·7
47	12 26·8	12 28·8	11 52·7	4·7	3·9	10·7	8·8	16·7	13·8
48	12 27·0	12 29·0	11 53·0	4·8	4·0	10·8	8·9	16·8	13·9
49	12 27·3	12 29·3	11 53·2	4·9	4·0	10·9	9·0	16·9	13·9
50	12 27·5	12 29·5	11 53·4	5·0	4·1	11·0	9·1	17·0	14·0
51	12 27·8	12 29·8	11 53·7	5·1	4·2	11·1	9·2	17·1	14·1
52	12 28·0	12 30·0	11 53·9	5·2	4·3	11·2	9·2	17·2	14·2
53	12 28·3	12 30·3	11 54·2	5·3	4·4	11·3	9·3	17·3	14·3
54	12 28·5	12 30·5	11 54·4	5·4	4·5	11·4	9·4	17·4	14·4
55	12 28·8	12 30·8	11 54·6	5·5	4·5	11·5	9·5	17·5	14·4
56	12 29·0	12 31·1	11 54·9	5·6	4·6	11·6	9·6	17·6	14·5
57	12 29·3	12 31·3	11 55·1	5·7	4·7	11·7	9·7	17·7	14·6
58	12 29·5	12 31·6	11 55·4	5·8	4·8	11·8	9·7	17·8	14·7
59	12 29·8	12 31·8	11 55·6	5·9	4·9	11·9	9·8	17·9	14·8
60	12 30·0	12 32·1	11 55·8	6·0	5·0	12·0	9·9	18·0	14·9

50m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	12 30·0	12 32·1	11 55·8	0·0	0·0	6·0	5·1	12·0	10·1
01	12 30·3	12 32·3	11 56·1	0·1	0·1	6·1	5·1	12·1	10·2
02	12 30·5	12 32·6	11 56·3	0·2	0·2	6·2	5·2	12·2	10·3
03	12 30·8	12 32·8	11 56·5	0·3	0·3	6·3	5·3	12·3	10·4
04	12 31·0	12 33·1	11 56·8	0·4	0·3	6·4	5·4	12·4	10·4
05	12 31·3	12 33·3	11 57·0	0·5	0·4	6·5	5·5	12·5	10·5
06	12 31·5	12 33·6	11 57·3	0·6	0·5	6·6	5·6	12·6	10·6
07	12 31·8	12 33·8	11 57·5	0·7	0·6	6·7	5·6	12·7	10·7
08	12 32·0	12 34·1	11 57·7	0·8	0·7	6·8	5·7	12·8	10·8
09	12 32·3	12 34·3	11 58·0	0·9	0·8	6·9	5·8	12·9	10·9
10	12 32·5	12 34·6	11 58·2	1·0	0·8	7·0	5·9	13·0	10·9
11	12 32·8	12 34·8	11 58·5	1·1	0·9	7·1	6·0	13·1	11·0
12	12 33·0	12 35·1	11 58·7	1·2	1·0	7·2	6·1	13·2	11·1
13	12 33·3	12 35·3	11 58·9	1·3	1·1	7·3	6·1	13·3	11·2
14	12 33·5	12 35·6	11 59·2	1·4	1·2	7·4	6·2	13·4	11·3
15	12 33·8	12 35·8	11 59·4	1·5	1·3	7·5	6·3	13·5	11·4
16	12 34·0	12 36·1	11 59·7	1·6	1·3	7·6	6·4	13·6	11·4
17	12 34·3	12 36·3	11 59·9	1·7	1·4	7·7	6·5	13·7	11·5
18	12 34·5	12 36·6	12 00·1	1·8	1·5	7·8	6·6	13·8	11·6
19	12 34·8	12 36·8	12 00·4	1·9	1·6	7·9	6·6	13·9	11·7
20	12 35·0	12 37·1	12 00·6	2·0	1·7	8·0	6·7	14·0	11·8
21	12 35·3	12 37·3	12 00·8	2·1	1·8	8·1	6·8	14·1	11·9
22	12 35·5	12 37·6	12 01·1	2·2	1·9	8·2	6·9	14·2	12·0
23	12 35·8	12 37·8	12 01·3	2·3	1·9	8·3	7·0	14·3	12·0
24	12 36·0	12 38·1	12 01·6	2·4	2·0	8·4	7·1	14·4	12·1
25	12 36·3	12 38·3	12 01·8	2·5	2·1	8·5	7·2	14·5	12·2
26	12 36·5	12 38·6	12 02·0	2·6	2·2	8·6	7·2	14·6	12·3
27	12 36·8	12 38·8	12 02·3	2·7	2·3	8·7	7·3	14·7	12·4
28	12 37·0	12 39·1	12 02·5	2·8	2·4	8·8	7·4	14·8	12·5
29	12 37·3	12 39·3	12 02·8	2·9	2·4	8·9	7·5	14·9	12·5
30	12 37·5	12 39·6	12 03·0	3·0	2·5	9·0	7·6	15·0	12·6
31	12 37·8	12 39·8	12 03·2	3·1	2·6	9·1	7·7	15·1	12·7
32	12 38·0	12 40·1	12 03·5	3·2	2·7	9·2	7·7	15·2	12·8
33	12 38·3	12 40·3	12 03·7	3·3	2·8	9·3	7·8	15·3	12·9
34	12 38·5	12 40·6	12 03·9	3·4	2·9	9·4	7·9	15·4	13·0
35	12 38·8	12 40·8	12 04·2	3·5	2·9	9·5	8·0	15·5	13·0
36	12 39·0	12 41·1	12 04·4	3·6	3·0	9·6	8·1	15·6	13·1
37	12 39·3	12 41·3	12 04·7	3·7	3·1	9·7	8·2	15·7	13·2
38	12 39·5	12 41·6	12 04·9	3·8	3·2	9·8	8·2	15·8	13·3
39	12 39·8	12 41·8	12 05·1	3·9	3·3	9·9	8·3	15·9	13·4
40	12 40·0	12 42·1	12 05·4	4·0	3·4	10·0	8·4	16·0	13·5
41	12 40·3	12 42·3	12 05·6	4·1	3·5	10·1	8·5	16·1	13·6
42	12 40·5	12 42·6	12 05·9	4·2	3·5	10·2	8·6	16·2	13·6
43	12 40·8	12 42·8	12 06·1	4·3	3·6	10·3	8·7	16·3	13·7
44	12 41·0	12 43·1	12 06·3	4·4	3·7	10·4	8·8	16·4	13·8
45	12 41·3	12 43·3	12 06·6	4·5	3·8	10·5	8·8	16·5	13·9
46	12 41·5	12 43·6	12 06·8	4·6	3·9	10·6	8·9	16·6	14·0
47	12 41·8	12 43·8	12 07·0	4·7	4·0	10·7	9·0	16·7	14·1
48	12 42·0	12 44·1	12 07·3	4·8	4·0	10·8	9·1	16·8	14·1
49	12 42·3	12 44·3	12 07·5	4·9	4·1	10·9	9·2	16·9	14·2
50	12 42·5	12 44·6	12 07·8	5·0	4·2	11·0	9·3	17·0	14·3
51	12 42·8	12 44·8	12 08·0	5·1	4·3	11·1	9·3	17·1	14·4
52	12 43·0	12 45·1	12 08·2	5·2	4·4	11·2	9·4	17·2	14·5
53	12 43·3	12 45·3	12 08·5	5·3	4·5	11·3	9·5	17·3	14·6
54	12 43·5	12 45·6	12 08·7	5·4	4·5	11·4	9·6	17·4	14·6
55	12 43·8	12 45·8	12 09·0	5·5	4·6	11·5	9·7	17·5	14·7
56	12 44·0	12 46·1	12 09·2	5·6	4·7	11·6	9·8	17·6	14·8
57	12 44·3	12 46·3	12 09·4	5·7	4·8	11·7	9·8	17·7	14·9
58	12 44·5	12 46·6	12 09·7	5·8	4·9	11·8	9·9	17·8	15·0
59	12 44·8	12 46·8	12 09·9	5·9	5·0	11·9	10·0	17·9	15·1
60	12 45·0	12 47·1	12 10·2	6·0	5·1	12·0	10·1	18·0	15·2

51m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	12 45·0	12 47·1	12 10·2	0·0	0·0	6·0	5·2	12·0	10·3
01	12 45·3	12 47·3	12 10·4	0·1	0·1	6·1	5·2	12·1	10·4
02	12 45·5	12 47·6	12 10·6	0·2	0·2	6·2	5·3	12·2	10·5
03	12 45·8	12 47·8	12 10·9	0·3	0·3	6·3	5·4	12·3	10·6
04	12 46·0	12 48·1	12 11·1	0·4	0·3	6·4	5·5	12·4	10·6
05	12 46·3	12 48·3	12 11·3	0·5	0·4	6·5	5·6	12·5	10·7
06	12 46·5	12 48·6	12 11·6	0·6	0·5	6·6	5·7	12·6	10·8
07	12 46·8	12 48·8	12 11·8	0·7	0·6	6·7	5·8	12·7	10·9
08	12 47·0	12 49·1	12 12·1	0·8	0·7	6·8	5·8	12·8	11·0
09	12 47·3	12 49·4	12 12·3	0·9	0·8	6·9	5·9	12·9	11·1
10	12 47·5	12 49·6	12 12·5	1·0	0·9	7·0	6·0	13·0	11·2
11	12 47·8	12 49·9	12 12·8	1·1	0·9	7·1	6·1	13·1	11·2
12	12 48·0	12 50·1	12 13·0	1·2	1·0	7·2	6·2	13·2	11·3
13	12 48·3	12 50·4	12 13·3	1·3	1·1	7·3	6·3	13·3	11·4
14	12 48·5	12 50·6	12 13·5	1·4	1·2	7·4	6·4	13·4	11·5
15	12 48·8	12 50·9	12 13·7	1·5	1·3	7·5	6·4	13·5	11·6
16	12 49·0	12 51·1	12 14·0	1·6	1·4	7·6	6·5	13·6	11·7
17	12 49·3	12 51·4	12 14·2	1·7	1·5	7·7	6·6	13·7	11·8
18	12 49·5	12 51·6	12 14·4	1·8	1·5	7·8	6·7	13·8	11·8
19	12 49·8	12 51·9	12 14·7	1·9	1·6	7·9	6·8	13·9	11·9
20	12 50·0	12 52·1	12 14·9	2·0	1·7	8·0	6·9	14·0	12·0
21	12 50·3	12 52·4	12 15·2	2·1	1·8	8·1	7·0	14·1	12·1
22	12 50·5	12 52·6	12 15·4	2·2	1·9	8·2	7·0	14·2	12·2
23	12 50·8	12 52·9	12 15·6	2·3	2·0	8·3	7·1	14·3	12·3
24	12 51·0	12 53·1	12 15·9	2·4	2·1	8·4	7·2	14·4	12·4
25	12 51·3	12 53·4	12 16·1	2·5	2·1	8·5	7·3	14·5	12·4
26	12 51·5	12 53·6	12 16·4	2·6	2·2	8·6	7·4	14·6	12·5
27	12 51·8	12 53·9	12 16·6	2·7	2·3	8·7	7·5	14·7	12·6
28	12 52·0	12 54·1	12 16·8	2·8	2·4	8·8	7·6	14·8	12·7
29	12 52·3	12 54·4	12 17·1	2·9	2·5	8·9	7·6	14·9	12·8
30	12 52·5	12 54·6	12 17·3	3·0	2·6	9·0	7·7	15·0	12·9
31	12 52·8	12 54·9	12 17·5	3·1	2·7	9·1	7·8	15·1	13·0
32	12 53·0	12 55·1	12 17·8	3·2	2·7	9·2	7·9	15·2	13·0
33	12 53·3	12 55·4	12 18·0	3·3	2·8	9·3	8·0	15·3	13·1
34	12 53·5	12 55·6	12 18·3	3·4	2·9	9·4	8·1	15·4	13·2
35	12 53·8	12 55·9	12 18·5	3·5	3·0	9·5	8·2	15·5	13·3
36	12 54·0	12 56·1	12 18·7	3·6	3·1	9·6	8·2	15·6	13·4
37	12 54·3	12 56·4	12 19·0	3·7	3·2	9·7	8·3	15·7	13·5
38	12 54·5	12 56·6	12 19·2	3·8	3·3	9·8	8·4	15·8	13·6
39	12 54·8	12 56·9	12 19·5	3·9	3·3	9·9	8·5	15·9	13·6
40	12 55·0	12 57·1	12 19·7	4·0	3·4	10·0	8·6	16·0	13·7
41	12 55·3	12 57·4	12 19·9	4·1	3·5	10·1	8·7	16·1	13·8
42	12 55·5	12 57·6	12 20·2	4·2	3·6	10·2	8·8	16·2	13·9
43	12 55·8	12 57·9	12 20·4	4·3	3·7	10·3	8·8	16·3	14·0
44	12 56·0	12 58·1	12 20·6	4·4	3·8	10·4	8·9	16·4	14·1
45	12 56·3	12 58·4	12 20·9	4·5	3·9	10·5	9·0	16·5	14·2
46	12 56·5	12 58·6	12 21·1	4·6	3·9	10·6	9·1	16·6	14·2
47	12 56·8	12 58·9	12 21·4	4·7	4·0	10·7	9·2	16·7	14·3
48	12 57·0	12 59·1	12 21·6	4·8	4·1	10·8	9·3	16·8	14·4
49	12 57·3	12 59·4	12 21·8	4·9	4·2	10·9	9·4	16·9	14·5
50	12 57·5	12 59·6	12 22·1	5·0	4·3	11·0	9·4	17·0	14·6
51	12 57·8	12 59·9	12 22·3	5·1	4·4	11·1	9·5	17·1	14·7
52	12 58·0	13 00·1	12 22·6	5·2	4·5	11·2	9·6	17·2	14·8
53	12 58·3	13 00·4	12 22·8	5·3	4·5	11·3	9·7	17·3	14·8
54	12 58·5	13 00·6	12 23·0	5·4	4·6	11·4	9·8	17·4	14·9
55	12 58·8	13 00·9	12 23·3	5·5	4·7	11·5	9·9	17·5	15·0
56	12 59·0	13 01·1	12 23·5	5·6	4·8	11·6	10·0	17·6	15·1
57	12 59·3	13 01·4	12 23·8	5·7	4·9	11·7	10·0	17·7	15·2
58	12 59·5	13 01·6	12 24·0	5·8	5·0	11·8	10·1	17·8	15·3
59	12 59·8	13 01·9	12 24·2	5·9	5·1	11·9	10·2	17·9	15·4
60	13 00·0	13 02·1	12 24·5	6·0	5·2	12·0	10·3	18·0	15·5

52m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	13 00·0	13 02·1	12 24·5	0·0	0·0	6·0	5·3	12·0	10·5
01	13 00·3	13 02·4	12 24·7	0·1	0·1	6·1	5·3	12·1	10·6
02	13 00·5	13 02·6	12 24·9	0·2	0·2	6·2	5·4	12·2	10·7
03	13 00·8	13 02·9	12 25·2	0·3	0·3	6·3	5·5	12·3	10·8
04	13 01·0	13 03·1	12 25·4	0·4	0·4	6·4	5·6	12·4	10·9
05	13 01·3	13 03·4	12 25·7	0·5	0·4	6·5	5·7	12·5	10·9
06	13 01·5	13 03·6	12 25·9	0·6	0·5	6·6	5·8	12·6	11·0
07	13 01·8	13 03·9	12 26·1	0·7	0·6	6·7	5·9	12·7	11·1
08	13 02·0	13 04·1	12 26·4	0·8	0·7	6·8	6·0	12·8	11·2
09	13 02·3	13 04·4	12 26·6	0·9	0·8	6·9	6·0	12·9	11·3
10	13 02·5	13 04·6	12 26·9	1·0	0·9	7·0	6·1	13·0	11·4
11	13 02·8	13 04·9	12 27·1	1·1	1·0	7·1	6·2	13·1	11·5
12	13 03·0	13 05·1	12 27·3	1·2	1·1	7·2	6·3	13·2	11·6
13	13 03·3	13 05·4	12 27·6	1·3	1·1	7·3	6·4	13·3	11·6
14	13 03·5	13 05·6	12 27·8	1·4	1·2	7·4	6·5	13·4	11·7
15	13 03·8	13 05·9	12 28·0	1·5	1·3	7·5	6·6	13·5	11·8
16	13 04·0	13 06·1	12 28·3	1·6	1·4	7·6	6·7	13·6	11·9
17	13 04·3	13 06·4	12 28·5	1·7	1·5	7·7	6·7	13·7	12·0
18	13 04·5	13 06·6	12 28·8	1·8	1·6	7·8	6·8	13·8	12·1
19	13 04·8	13 06·9	12 29·0	1·9	1·7	7·9	6·9	13·9	12·2
20	13 05·0	13 07·1	12 29·2	2·0	1·8	8·0	7·0	14·0	12·3
21	13 05·3	13 07·4	12 29·5	2·1	1·8	8·1	7·1	14·1	12·3
22	13 05·5	13 07·7	12 29·7	2·2	1·9	8·2	7·2	14·2	12·4
23	13 05·8	13 07·9	12 30·0	2·3	2·0	8·3	7·3	14·3	12·5
24	13 06·0	13 08·2	12 30·2	2·4	2·1	8·4	7·4	14·4	12·6
25	13 06·3	13 08·4	12 30·4	2·5	2·2	8·5	7·4	14·5	12·7
26	13 06·5	13 08·7	12 30·7	2·6	2·3	8·6	7·5	14·6	12·8
27	13 06·8	13 08·9	12 30·9	2·7	2·4	8·7	7·6	14·7	12·9
28	13 07·0	13 09·2	12 31·1	2·8	2·5	8·8	7·7	14·8	13·0
29	13 07·3	13 09·4	12 31·4	2·9	2·5	8·9	7·8	14·9	13·0
30	13 07·5	13 09·7	12 31·6	3·0	2·6	9·0	7·9	15·0	13·1
31	13 07·8	13 09·9	12 31·9	3·1	2·7	9·1	8·0	15·1	13·2
32	13 08·0	13 10·2	12 32·1	3·2	2·8	9·2	8·1	15·2	13·3
33	13 08·3	13 10·4	12 32·3	3·3	2·9	9·3	8·1	15·3	13·4
34	13 08·5	13 10·7	12 32·6	3·4	3·0	9·4	8·2	15·4	13·5
35	13 08·8	13 10·9	12 32·8	3·5	3·1	9·5	8·3	15·5	13·6
36	13 09·0	13 11·2	12 33·1	3·6	3·2	9·6	8·4	15·6	13·7
37	13 09·3	13 11·4	12 33·3	3·7	3·2	9·7	8·5	15·7	13·7
38	13 09·5	13 11·7	12 33·5	3·8	3·3	9·8	8·6	15·8	13·8
39	13 09·8	13 11·9	12 33·8	3·9	3·4	9·9	8·7	15·9	13·9
40	13 10·0	13 12·2	12 34·0	4·0	3·5	10·0	8·8	16·0	14·0
41	13 10·3	13 12·4	12 34·2	4·1	3·6	10·1	8·8	16·1	14·1
42	13 10·5	13 12·7	12 34·5	4·2	3·7	10·2	8·9	16·2	14·2
43	13 10·8	13 12·9	12 34·7	4·3	3·8	10·3	9·0	16·3	14·3
44	13 11·0	13 13·2	12 35·0	4·4	3·9	10·4	9·1	16·4	14·4
45	13 11·3	13 13·4	12 35·2	4·5	3·9	10·5	9·2	16·5	14·4
46	13 11·5	13 13·7	12 35·4	4·6	4·0	10·6	9·3	16·6	14·5
47	13 11·8	13 13·9	12 35·7	4·7	4·1	10·7	9·4	16·7	14·6
48	13 12·0	13 14·2	12 35·9	4·8	4·2	10·8	9·5	16·8	14·7
49	13 12·3	13 14·4	12 36·2	4·9	4·3	10·9	9·5	16·9	14·8
50	13 12·5	13 14·7	12 36·4	5·0	4·4	11·0	9·6	17·0	14·9
51	13 12·8	13 14·9	12 36·6	5·1	4·5	11·1	9·7	17·1	15·0
52	13 13·0	13 15·2	12 36·9	5·2	4·6	11·2	9·8	17·2	15·1
53	13 13·3	13 15·4	12 37·1	5·3	4·6	11·3	9·9	17·3	15·1
54	13 13·5	13 15·7	12 37·4	5·4	4·7	11·4	10·0	17·4	15·2
55	13 13·8	13 15·9	12 37·6	5·5	4·8	11·5	10·1	17·5	15·3
56	13 14·0	13 16·2	12 37·8	5·6	4·9	11·6	10·2	17·6	15·4
57	13 14·3	13 16·4	12 38·1	5·7	5·0	11·7	10·2	17·7	15·5
58	13 14·5	13 16·7	12 38·3	5·8	5·1	11·8	10·3	17·8	15·6
59	13 14·8	13 16·9	12 38·5	5·9	5·2	11·9	10·4	17·9	15·7
60	13 15·0	13 17·2	12 38·8	6·0	5·3	12·0	10·5	18·0	15·8

53m	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
s	° ′	° ′	° ′	′	′	′	′	′	′
00	13 15·0	13 17·2	12 38·8	0·0	0·0	6·0	5·4	12·0	10·7
01	13 15·3	13 17·4	12 39·0	0·1	0·1	6·1	5·4	12·1	10·8
02	13 15·5	13 17·7	12 39·3	0·2	0·2	6·2	5·5	12·2	10·9
03	13 15·8	13 17·9	12 39·5	0·3	0·3	6·3	5·6	12·3	11·0
04	13 16·0	13 18·2	12 39·7	0·4	0·4	6·4	5·7	12·4	11·1
05	13 16·3	13 18·4	12 40·0	0·5	0·4	6·5	5·8	12·5	11·1
06	13 16·5	13 18·7	12 40·2	0·6	0·5	6·6	5·9	12·6	11·2
07	13 16·8	13 18·9	12 40·5	0·7	0·6	6·7	6·0	12·7	11·3
08	13 17·0	13 19·2	12 40·7	0·8	0·7	6·8	6·1	12·8	11·4
09	13 17·3	13 19·4	12 40·9	0·9	0·8	6·9	6·2	12·9	11·5
10	13 17·5	13 19·7	12 41·2	1·0	0·9	7·0	6·2	13·0	11·6
11	13 17·8	13 19·9	12 41·4	1·1	1·0	7·1	6·3	13·1	11·7
12	13 18·0	13 20·2	12 41·6	1·2	1·1	7·2	6·4	13·2	11·8
13	13 18·3	13 20·4	12 41·9	1·3	1·2	7·3	6·5	13·3	11·9
14	13 18·5	13 20·7	12 42·1	1·4	1·2	7·4	6·6	13·4	11·9
15	13 18·8	13 20·9	12 42·4	1·5	1·3	7·5	6·7	13·5	12·0
16	13 19·0	13 21·2	12 42·6	1·6	1·4	7·6	6·8	13·6	12·1
17	13 19·3	13 21·4	12 42·8	1·7	1·5	7·7	6·9	13·7	12·2
18	13 19·5	13 21·7	12 43·1	1·8	1·6	7·8	7·0	13·8	12·3
19	13 19·8	13 21·9	12 43·3	1·9	1·7	7·9	7·0	13·9	12·4
20	13 20·0	13 22·2	12 43·6	2·0	1·8	8·0	7·1	14·0	12·5
21	13 20·3	13 22·4	12 43·8	2·1	1·9	8·1	7·2	14·1	12·6
22	13 20·5	13 22·7	12 44·0	2·2	2·0	8·2	7·3	14·2	12·7
23	13 20·8	13 22·9	12 44·3	2·3	2·1	8·3	7·4	14·3	12·8
24	13 21·0	13 23·2	12 44·5	2·4	2·1	8·4	7·5	14·4	12·8
25	13 21·3	13 23·4	12 44·7	2·5	2·2	8·5	7·6	14·5	12·9
26	13 21·5	13 23·7	12 45·0	2·6	2·3	8·6	7·7	14·6	13·0
27	13 21·8	13 23·9	12 45·2	2·7	2·4	8·7	7·8	14·7	13·1
28	13 22·0	13 24·2	12 45·5	2·8	2·5	8·8	7·8	14·8	13·2
29	13 22·3	13 24·4	12 45·7	2·9	2·6	8·9	7·9	14·9	13·3
30	13 22·5	13 24·7	12 45·9	3·0	2·7	9·0	8·0	15·0	13·4
31	13 22·8	13 24·9	12 46·2	3·1	2·8	9·1	8·1	15·1	13·5
32	13 23·0	13 25·2	12 46·4	3·2	2·9	9·2	8·2	15·2	13·6
33	13 23·3	13 25·4	12 46·7	3·3	2·9	9·3	8·3	15·3	13·6
34	13 23·5	13 25·7	12 46·9	3·4	3·0	9·4	8·4	15·4	13·7
35	13 23·8	13 26·0	12 47·1	3·5	3·1	9·5	8·5	15·5	13·8
36	13 24·0	13 26·2	12 47·4	3·6	3·2	9·6	8·6	15·6	13·9
37	13 24·3	13 26·5	12 47·6	3·7	3·3	9·7	8·6	15·7	14·0
38	13 24·5	13 26·7	12 47·9	3·8	3·4	9·8	8·7	15·8	14·1
39	13 24·8	13 27·0	12 48·1	3·9	3·5	9·9	8·8	15·9	14·2
40	13 25·0	13 27·2	12 48·3	4·0	3·6	10·0	8·9	16·0	14·3
41	13 25·3	13 27·5	12 48·6	4·1	3·7	10·1	9·0	16·1	14·4
42	13 25·5	13 27·7	12 48·8	4·2	3·7	10·2	9·1	16·2	14·4
43	13 25·8	13 28·0	12 49·0	4·3	3·8	10·3	9·2	16·3	14·5
44	13 26·0	13 28·2	12 49·3	4·4	3·9	10·4	9·3	16·4	14·6
45	13 26·3	13 28·5	12 49·5	4·5	4·0	10·5	9·4	16·5	14·7
46	13 26·5	13 28·7	12 49·8	4·6	4·1	10·6	9·5	16·6	14·8
47	13 26·8	13 29·0	12 50·0	4·7	4·2	10·7	9·5	16·7	14·9
48	13 27·0	13 29·2	12 50·2	4·8	4·3	10·8	9·6	16·8	15·0
49	13 27·3	13 29·5	12 50·5	4·9	4·4	10·9	9·7	16·9	15·1
50	13 27·5	13 29·7	12 50·7	5·0	4·5	11·0	9·8	17·0	15·2
51	13 27·8	13 30·0	12 51·0	5·1	4·5	11·1	9·9	17·1	15·2
52	13 28·0	13 30·2	12 51·2	5·2	4·6	11·2	10·0	17·2	15·3
53	13 28·3	13 30·5	12 51·4	5·3	4·7	11·3	10·1	17·3	15·4
54	13 28·5	13 30·7	12 51·7	5·4	4·8	11·4	10·2	17·4	15·5
55	13 28·8	13 31·0	12 51·9	5·5	4·9	11·5	10·3	17·5	15·6
56	13 29·0	13 31·2	12 52·1	5·6	5·0	11·6	10·3	17·6	15·7
57	13 29·3	13 31·5	12 52·4	5·7	5·1	11·7	10·4	17·7	15·8
58	13 29·5	13 31·7	12 52·6	5·8	5·2	11·8	10·5	17·8	15·9
59	13 29·8	13 32·0	12 52·9	5·9	5·3	11·9	10·6	17·9	16·0
60	13 30·0	13 32·2	12 53·1	6·0	5·4	12·0	10·7	18·0	16·1

54m s	SUN PLANETS ° ′	ARIES ° ′	MOON ° ′	v or d ′	Corrn ′	v or d ′	Corrn ′	v or d ′	Corrn ′
00	13 30·0	13 32·2	12 53·1	0·0	0·0	6·0	5·5	12·0	10·9
01	13 30·3	13 32·5	12 53·3	0·1	0·1	6·1	5·5	12·1	11·0
02	13 30·5	13 32·7	12 53·6	0·2	0·2	6·2	5·6	12·2	11·1
03	13 30·8	13 33·0	12 53·8	0·3	0·3	6·3	5·7	12·3	11·2
04	13 31·0	13 33·2	12 54·1	0·4	0·4	6·4	5·8	12·4	11·3
05	13 31·3	13 33·5	12 54·3	0·5	0·5	6·5	5·9	12·5	11·4
06	13 31·5	13 33·7	12 54·5	0·6	0·5	6·6	6·0	12·6	11·4
07	13 31·8	13 34·0	12 54·8	0·7	0·6	6·7	6·1	12·7	11·5
08	13 32·0	13 34·2	12 55·0	0·8	0·7	6·8	6·2	12·8	11·6
09	13 32·3	13 34·5	12 55·2	0·9	0·8	6·9	6·3	12·9	11·7
10	13 32·5	13 34·7	12 55·5	1·0	0·9	7·0	6·4	13·0	11·8
11	13 32·8	13 35·0	12 55·7	1·1	1·0	7·1	6·4	13·1	11·9
12	13 33·0	13 35·2	12 56·0	1·2	1·1	7·2	6·5	13·2	12·0
13	13 33·3	13 35·5	12 56·2	1·3	1·2	7·3	6·6	13·3	12·1
14	13 33·5	13 35·7	12 56·4	1·4	1·3	7·4	6·7	13·4	12·2
15	13 33·8	13 36·0	12 56·7	1·5	1·4	7·5	6·8	13·5	12·3
16	13 34·0	13 36·2	12 56·9	1·6	1·5	7·6	6·9	13·6	12·4
17	13 34·3	13 36·5	12 57·2	1·7	1·5	7·7	7·0	13·7	12·4
18	13 34·5	13 36·7	12 57·4	1·8	1·6	7·8	7·1	13·8	12·5
19	13 34·8	13 37·0	12 57·6	1·9	1·7	7·9	7·2	13·9	12·6
20	13 35·0	13 37·2	12 57·9	2·0	1·8	8·0	7·3	14·0	12·7
21	13 35·3	13 37·5	12 58·1	2·1	1·9	8·1	7·4	14·1	12·8
22	13 35·5	13 37·7	12 58·3	2·2	2·0	8·2	7·4	14·2	12·9
23	13 35·8	13 38·0	12 58·6	2·3	2·1	8·3	7·5	14·3	13·0
24	13 36·0	13 38·2	12 58·8	2·4	2·2	8·4	7·6	14·4	13·1
25	13 36·3	13 38·5	12 59·1	2·5	2·3	8·5	7·7	14·5	13·2
26	13 36·5	13 38·7	12 59·3	2·6	2·4	8·6	7·8	14·6	13·3
27	13 36·8	13 39·0	12 59·5	2·7	2·5	8·7	7·9	14·7	13·4
28	13 37·0	13 39·2	12 59·8	2·8	2·5	8·8	8·0	14·8	13·4
29	13 37·3	13 39·5	13 00·0	2·9	2·6	8·9	8·1	14·9	13·5
30	13 37·5	13 39·7	13 00·3	3·0	2·7	9·0	8·2	15·0	13·6
31	13 37·8	13 40·0	13 00·5	3·1	2·8	9·1	8·3	15·1	13·7
32	13 38·0	13 40·2	13 00·7	3·2	2·9	9·2	8·4	15·2	13·8
33	13 38·3	13 40·5	13 01·0	3·3	3·0	9·3	8·4	15·3	13·9
34	13 38·5	13 40·7	13 01·2	3·4	3·1	9·4	8·5	15·4	14·0
35	13 38·8	13 41·0	13 01·5	3·5	3·2	9·5	8·6	15·5	14·1
36	13 39·0	13 41·2	13 01·7	3·6	3·3	9·6	8·7	15·6	14·2
37	13 39·3	13 41·5	13 01·9	3·7	3·4	9·7	8·8	15·7	14·3
38	13 39·5	13 41·7	13 02·2	3·8	3·5	9·8	8·9	15·8	14·4
39	13 39·8	13 42·0	13 02·4	3·9	3·5	9·9	9·0	15·9	14·4
40	13 40·0	13 42·2	13 02·6	4·0	3·6	10·0	9·1	16·0	14·5
41	13 40·3	13 42·5	13 02·9	4·1	3·7	10·1	9·2	16·1	14·6
42	13 40·5	13 42·7	13 03·1	4·2	3·8	10·2	9·3	16·2	14·7
43	13 40·8	13 43·0	13 03·4	4·3	3·9	10·3	9·4	16·3	14·8
44	13 41·0	13 43·2	13 03·6	4·4	4·0	10·4	9·4	16·4	14·9
45	13 41·3	13 43·5	13 03·8	4·5	4·1	10·5	9·5	16·5	15·0
46	13 41·5	13 43·7	13 04·1	4·6	4·2	10·6	9·6	16·6	15·1
47	13 41·8	13 44·0	13 04·3	4·7	4·3	10·7	9·7	16·7	15·2
48	13 42·0	13 44·3	13 04·6	4·8	4·4	10·8	9·8	16·8	15·3
49	13 42·3	13 44·5	13 04·8	4·9	4·5	10·9	9·9	16·9	15·4
50	13 42·5	13 44·8	13 05·0	5·0	4·5	11·0	10·0	17·0	15·4
51	13 42·8	13 45·0	13 05·3	5·1	4·6	11·1	10·1	17·1	15·5
52	13 43·0	13 45·3	13 05·5	5·2	4·7	11·2	10·2	17·2	15·6
53	13 43·3	13 45·5	13 05·7	5·3	4·8	11·3	10·3	17·3	15·7
54	13 43·5	13 45·8	13 06·0	5·4	4·9	11·4	10·4	17·4	15·8
55	13 43·8	13 46·0	13 06·2	5·5	5·0	11·5	10·4	17·5	15·9
56	13 44·0	13 46·3	13 06·5	5·6	5·1	11·6	10·5	17·6	16·0
57	13 44·3	13 46·5	13 06·7	5·7	5·2	11·7	10·6	17·7	16·1
58	13 44·5	13 46·8	13 06·9	5·8	5·3	11·8	10·7	17·8	16·2
59	13 44·8	13 47·0	13 07·2	5·9	5·4	11·9	10·8	17·9	16·3
60	13 45·0	13 47·3	13 07·4	6·0	5·5	12·0	10·9	18·0	16·4

55m s	SUN PLANETS ° ′	ARIES ° ′	MOON ° ′	v or d ′	Corrn ′	v or d ′	Corrn ′	v or d ′	Corrn ′
00	13 45·0	13 47·3	13 07·4	0·0	0·0	6·0	5·6	12·0	11·1
01	13 45·3	13 47·5	13 07·7	0·1	0·1	6·1	5·6	12·1	11·2
02	13 45·5	13 47·8	13 07·9	0·2	0·2	6·2	5·7	12·2	11·3
03	13 45·8	13 48·0	13 08·1	0·3	0·3	6·3	5·8	12·3	11·4
04	13 46·0	13 48·3	13 08·4	0·4	0·4	6·4	5·9	12·4	11·5
05	13 46·3	13 48·5	13 08·6	0·5	0·5	6·5	6·0	12·5	11·6
06	13 46·5	13 48·8	13 08·8	0·6	0·6	6·6	6·1	12·6	11·7
07	13 46·8	13 49·0	13 09·1	0·7	0·6	6·7	6·2	12·7	11·7
08	13 47·0	13 49·3	13 09·3	0·8	0·7	6·8	6·3	12·8	11·8
09	13 47·3	13 49·5	13 09·6	0·9	0·8	6·9	6·4	12·9	11·9
10	13 47·5	13 49·8	13 09·8	1·0	0·9	7·0	6·5	13·0	12·0
11	13 47·8	13 50·0	13 10·0	1·1	1·0	7·1	6·6	13·1	12·1
12	13 48·0	13 50·3	13 10·3	1·2	1·1	7·2	6·7	13·2	12·2
13	13 48·3	13 50·5	13 10·5	1·3	1·2	7·3	6·8	13·3	12·3
14	13 48·5	13 50·8	13 10·8	1·4	1·3	7·4	6·8	13·4	12·4
15	13 48·8	13 51·0	13 11·0	1·5	1·4	7·5	6·9	13·5	12·5
16	13 49·0	13 51·3	13 11·2	1·6	1·5	7·6	7·0	13·6	12·6
17	13 49·3	13 51·5	13 11·5	1·7	1·6	7·7	7·1	13·7	12·7
18	13 49·5	13 51·8	13 11·7	1·8	1·7	7·8	7·2	13·8	12·8
19	13 49·8	13 52·0	13 12·0	1·9	1·8	7·9	7·3	13·9	12·9
20	13 50·0	13 52·3	13 12·2	2·0	1·9	8·0	7·4	14·0	13·0
21	13 50·3	13 52·5	13 12·4	2·1	1·9	8·1	7·5	14·1	13·0
22	13 50·5	13 52·8	13 12·7	2·2	2·0	8·2	7·6	14·2	13·1
23	13 50·8	13 53·0	13 12·9	2·3	2·1	8·3	7·7	14·3	13·2
24	13 51·0	13 53·3	13 13·1	2·4	2·2	8·4	7·8	14·4	13·3
25	13 51·3	13 53·5	13 13·4	2·5	2·3	8·5	7·9	14·5	13·4
26	13 51·5	13 53·8	13 13·6	2·6	2·4	8·6	8·0	14·6	13·5
27	13 51·8	13 54·0	13 13·9	2·7	2·5	8·7	8·0	14·7	13·6
28	13 52·0	13 54·3	13 14·1	2·8	2·6	8·8	8·1	14·8	13·7
29	13 52·3	13 54·5	13 14·3	2·9	2·7	8·9	8·2	14·9	13·8
30	13 52·5	13 54·8	13 14·6	3·0	2·8	9·0	8·3	15·0	13·9
31	13 52·8	13 55·0	13 14·8	3·1	2·9	9·1	8·4	15·1	14·0
32	13 53·0	13 55·3	13 15·1	3·2	3·0	9·2	8·5	15·2	14·1
33	13 53·3	13 55·5	13 15·3	3·3	3·1	9·3	8·6	15·3	14·2
34	13 53·5	13 55·8	13 15·5	3·4	3·1	9·4	8·7	15·4	14·2
35	13 53·8	13 56·0	13 15·8	3·5	3·2	9·5	8·8	15·5	14·3
36	13 54·0	13 56·3	13 16·0	3·6	3·3	9·6	8·9	15·6	14·4
37	13 54·3	13 56·5	13 16·2	3·7	3·4	9·7	9·0	15·7	14·5
38	13 54·5	13 56·8	13 16·5	3·8	3·5	9·8	9·1	15·8	14·6
39	13 54·8	13 57·0	13 16·7	3·9	3·6	9·9	9·2	15·9	14·7
40	13 55·0	13 57·3	13 17·0	4·0	3·7	10·0	9·3	16·0	14·8
41	13 55·3	13 57·5	13 17·2	4·1	3·8	10·1	9·3	16·1	14·9
42	13 55·5	13 57·8	13 17·4	4·2	3·9	10·2	9·4	16·2	15·0
43	13 55·8	13 58·0	13 17·7	4·3	4·0	10·3	9·5	16·3	15·1
44	13 56·0	13 58·3	13 17·9	4·4	4·1	10·4	9·6	16·4	15·2
45	13 56·3	13 58·5	13 18·2	4·5	4·2	10·5	9·7	16·5	15·3
46	13 56·5	13 58·8	13 18·4	4·6	4·3	10·6	9·8	16·6	15·4
47	13 56·8	13 59·0	13 18·6	4·7	4·3	10·7	9·9	16·7	15·4
48	13 57·0	13 59·3	13 18·9	4·8	4·4	10·8	10·0	16·8	15·5
49	13 57·3	13 59·5	13 19·1	4·9	4·5	10·9	10·1	16·9	15·6
50	13 57·5	13 59·8	13 19·3	5·0	4·6	11·0	10·2	17·0	15·7
51	13 57·8	14 00·0	13 19·6	5·1	4·7	11·1	10·3	17·1	15·8
52	13 58·0	14 00·3	13 19·8	5·2	4·8	11·2	10·4	17·2	15·9
53	13 58·3	14 00·5	13 20·1	5·3	4·9	11·3	10·5	17·3	16·0
54	13 58·5	14 00·8	13 20·3	5·4	5·0	11·4	10·5	17·4	16·1
55	13 58·8	14 01·0	13 20·5	5·5	5·1	11·5	10·6	17·5	16·2
56	13 59·0	14 01·3	13 20·8	5·6	5·2	11·6	10·7	17·6	16·3
57	13 59·3	14 01·5	13 21·0	5·7	5·3	11·7	10·8	17·7	16·4
58	13 59·5	14 01·8	13 21·3	5·8	5·4	11·8	10·9	17·8	16·5
59	13 59·8	14 02·0	13 21·5	5·9	5·5	11·9	11·0	17·9	16·6
60	14 00·0	14 02·3	13 21·7	6·0	5·6	12·0	11·1	18·0	16·7

56m	SUN PLANETS	ARIES	MOON	v or d	Corr^n	v or d	Corr^n	v or d	Corr^n
s	° ′	° ′	° ′	′	′	′	′	′	′
00	14 00·0	14 02·3	13 21·7	0·0	0·0	6·0	5·7	12·0	11·3
01	14 00·3	14 02·6	13 22·0	0·1	0·1	6·1	5·7	12·1	11·4
02	14 00·5	14 02·8	13 22·2	0·2	0·2	6·2	5·8	12·2	11·5
03	14 00·8	14 03·1	13 22·4	0·3	0·3	6·3	5·9	12·3	11·6
04	14 01·0	14 03·3	13 22·7	0·4	0·4	6·4	6·0	12·4	11·7
05	14 01·3	14 03·6	13 22·9	0·5	0·5	6·5	6·1	12·5	11·8
06	14 01·5	14 03·8	13 23·2	0·6	0·6	6·6	6·2	12·6	11·9
07	14 01·8	14 04·1	13 23·4	0·7	0·7	6·7	6·3	12·7	12·0
08	14 02·0	14 04·3	13 23·6	0·8	0·8	6·8	6·4	12·8	12·1
09	14 02·3	14 04·6	13 23·9	0·9	0·8	6·9	6·5	12·9	12·1
10	14 02·5	14 04·8	13 24·1	1·0	0·9	7·0	6·6	13·0	12·2
11	14 02·8	14 05·1	13 24·4	1·1	1·0	7·1	6·7	13·1	12·3
12	14 03·0	14 05·3	13 24·6	1·2	1·1	7·2	6·8	13·2	12·4
13	14 03·3	14 05·6	13 24·8	1·3	1·2	7·3	6·9	13·3	12·5
14	14 03·5	14 05·8	13 25·1	1·4	1·3	7·4	7·0	13·4	12·6
15	14 03·8	14 06·1	13 25·3	1·5	1·4	7·5	7·1	13·5	12·7
16	14 04·0	14 06·3	13 25·6	1·6	1·5	7·6	7·2	13·6	12·8
17	14 04·3	14 06·6	13 25·8	1·7	1·6	7·7	7·3	13·7	12·9
18	14 04·5	14 06·8	13 26·0	1·8	1·7	7·8	7·3	13·8	13·0
19	14 04·8	14 07·1	13 26·3	1·9	1·8	7·9	7·4	13·9	13·1
20	14 05·0	14 07·3	13 26·5	2·0	1·9	8·0	7·5	14·0	13·2
21	14 05·3	14 07·6	13 26·7	2·1	2·0	8·1	7·6	14·1	13·3
22	14 05·5	14 07·8	13 27·0	2·2	2·1	8·2	7·7	14·2	13·4
23	14 05·8	14 08·1	13 27·2	2·3	2·2	8·3	7·8	14·3	13·5
24	14 06·0	14 08·3	13 27·5	2·4	2·3	8·4	7·9	14·4	13·6
25	14 06·3	14 08·6	13 27·7	2·5	2·4	8·5	8·0	14·5	13·7
26	14 06·5	14 08·8	13 27·9	2·6	2·4	8·6	8·1	14·6	13·7
27	14 06·8	14 09·1	13 28·2	2·7	2·5	8·7	8·2	14·7	13·8
28	14 07·0	14 09·3	13 28·4	2·8	2·6	8·8	8·3	14·8	13·9
29	14 07·3	14 09·6	13 28·7	2·9	2·7	8·9	8·4	14·9	14·0
30	14 07·5	14 09·8	13 28·9	3·0	2·8	9·0	8·5	15·0	14·1
31	14 07·8	14 10·1	13 29·1	3·1	2·9	9·1	8·6	15·1	14·2
32	14 08·0	14 10·3	13 29·4	3·2	3·0	9·2	8·7	15·2	14·3
33	14 08·3	14 10·6	13 29·6	3·3	3·1	9·3	8·8	15·3	14·4
34	14 08·5	14 10·8	13 29·8	3·4	3·2	9·4	8·9	15·4	14·5
35	14 08·8	14 11·1	13 30·1	3·5	3·3	9·5	8·9	15·5	14·6
36	14 09·0	14 11·3	13 30·3	3·6	3·4	9·6	9·0	15·6	14·7
37	14 09·3	14 11·6	13 30·6	3·7	3·5	9·7	9·1	15·7	14·8
38	14 09·5	14 11·8	13 30·8	3·8	3·6	9·8	9·2	15·8	14·9
39	14 09·8	14 12·1	13 31·0	3·9	3·7	9·9	9·3	15·9	15·0
40	14 10·0	14 12·3	13 31·3	4·0	3·8	10·0	9·4	16·0	15·1
41	14 10·3	14 12·6	13 31·5	4·1	3·9	10·1	9·5	16·1	15·2
42	14 10·5	14 12·8	13 31·8	4·2	4·0	10·2	9·6	16·2	15·3
43	14 10·8	14 13·1	13 32·0	4·3	4·0	10·3	9·7	16·3	15·3
44	14 11·0	14 13·3	13 32·2	4·4	4·1	10·4	9·8	16·4	15·4
45	14 11·3	14 13·6	13 32·5	4·5	4·2	10·5	9·9	16·5	15·5
46	14 11·5	14 13·8	13 32·7	4·6	4·3	10·6	10·0	16·6	15·6
47	14 11·8	14 14·1	13 32·9	4·7	4·4	10·7	10·1	16·7	15·7
48	14 12·0	14 14·3	13 33·2	4·8	4·5	10·8	10·2	16·8	15·8
49	14 12·3	14 14·6	13 33·4	4·9	4·6	10·9	10·3	16·9	15·9
50	14 12·5	14 14·8	13 33·7	5·0	4·7	11·0	10·4	17·0	16·0
51	14 12·8	14 15·1	13 33·9	5·1	4·8	11·1	10·5	17·1	16·1
52	14 13·0	14 15·3	13 34·1	5·2	4·9	11·2	10·5	17·2	16·2
53	14 13·3	14 15·6	13 34·4	5·3	5·0	11·3	10·6	17·3	16·3
54	14 13·5	14 15·8	13 34·6	5·4	5·1	11·4	10·7	17·4	16·4
55	14 13·8	14 16·1	13 34·9	5·5	5·2	11·5	10·8	17·5	16·5
56	14 14·0	14 16·3	13 35·1	5·6	5·3	11·6	10·9	17·6	16·6
57	14 14·3	14 16·6	13 35·3	5·7	5·4	11·7	11·0	17·7	16·7
58	14 14·5	14 16·8	13 35·6	5·8	5·5	11·8	11·1	17·8	16·8
59	14 14·8	14 17·1	13 35·8	5·9	5·6	11·9	11·2	17·9	16·9
60	14 15·0	14 17·3	13 36·1	6·0	5·7	12·0	11·3	18·0	17·0

57m	SUN PLANETS	ARIES	MOON	v or d	Corr^n	v or d	Corr^n	v or d	Corr^n
s	° ′	° ′	° ′	′	′	′	′	′	′
00	14 15·0	14 17·3	13 36·1	0·0	0·0	6·0	5·8	12·0	11·5
01	14 15·3	14 17·6	13 36·3	0·1	0·1	6·1	5·8	12·1	11·6
02	14 15·5	14 17·8	13 36·5	0·2	0·2	6·2	5·9	12·2	11·7
03	14 15·8	14 18·1	13 36·8	0·3	0·3	6·3	6·0	12·3	11·8
04	14 16·0	14 18·3	13 37·0	0·4	0·4	6·4	6·1	12·4	11·9
05	14 16·3	14 18·6	13 37·2	0·5	0·5	6·5	6·2	12·5	12·0
06	14 16·5	14 18·8	13 37·5	0·6	0·6	6·6	6·3	12·6	12·1
07	14 16·8	14 19·1	13 37·7	0·7	0·7	6·7	6·4	12·7	12·2
08	14 17·0	14 19·3	13 38·0	0·8	0·8	6·8	6·5	12·8	12·3
09	14 17·3	14 19·6	13 38·2	0·9	0·9	6·9	6·6	12·9	12·4
10	14 17·5	14 19·8	13 38·4	1·0	1·0	7·0	6·7	13·0	12·5
11	14 17·8	14 20·1	13 38·7	1·1	1·1	7·1	6·8	13·1	12·6
12	14 18·0	14 20·3	13 38·9	1·2	1·2	7·2	6·9	13·2	12·7
13	14 18·3	14 20·6	13 39·2	1·3	1·2	7·3	7·0	13·3	12·7
14	14 18·5	14 20·9	13 39·4	1·4	1·3	7·4	7·1	13·4	12·8
15	14 18·8	14 21·1	13 39·6	1·5	1·4	7·5	7·2	13·5	12·9
16	14 19·0	14 21·4	13 39·9	1·6	1·5	7·6	7·3	13·6	13·0
17	14 19·3	14 21·6	13 40·1	1·7	1·6	7·7	7·4	13·7	13·1
18	14 19·5	14 21·9	13 40·3	1·8	1·7	7·8	7·5	13·8	13·2
19	14 19·8	14 22·1	13 40·6	1·9	1·8	7·9	7·6	13·9	13·3
20	14 20·0	14 22·4	13 40·8	2·0	1·9	8·0	7·7	14·0	13·4
21	14 20·3	14 22·6	13 41·1	2·1	2·0	8·1	7·8	14·1	13·5
22	14 20·5	14 22·9	13 41·3	2·2	2·1	8·2	7·9	14·2	13·6
23	14 20·8	14 23·1	13 41·5	2·3	2·2	8·3	8·0	14·3	13·7
24	14 21·0	14 23·4	13 41·8	2·4	2·3	8·4	8·1	14·4	13·8
25	14 21·3	14 23·6	13 42·0	2·5	2·4	8·5	8·1	14·5	13·9
26	14 21·5	14 23·9	13 42·3	2·6	2·5	8·6	8·2	14·6	14·0
27	14 21·8	14 24·1	13 42·5	2·7	2·6	8·7	8·3	14·7	14·1
28	14 22·0	14 24·4	13 42·7	2·8	2·7	8·8	8·4	14·8	14·2
29	14 22·3	14 24·6	13 43·0	2·9	2·8	8·9	8·5	14·9	14·3
30	14 22·5	14 24·9	13 43·2	3·0	2·9	9·0	8·6	15·0	14·4
31	14 22·8	14 25·1	13 43·4	3·1	3·0	9·1	8·7	15·1	14·5
32	14 23·0	14 25·4	13 43·7	3·2	3·1	9·2	8·8	15·2	14·6
33	14 23·3	14 25·6	13 43·9	3·3	3·2	9·3	8·9	15·3	14·7
34	14 23·5	14 25·9	13 44·2	3·4	3·3	9·4	9·0	15·4	14·8
35	14 23·8	14 26·1	13 44·4	3·5	3·4	9·5	9·1	15·5	14·9
36	14 24·0	14 26·4	13 44·6	3·6	3·5	9·6	9·2	15·6	15·0
37	14 24·3	14 26·6	13 44·9	3·7	3·5	9·7	9·3	15·7	15·0
38	14 24·5	14 26·9	13 45·1	3·8	3·6	9·8	9·4	15·8	15·1
39	14 24·8	14 27·1	13 45·4	3·9	3·7	9·9	9·5	15·9	15·2
40	14 25·0	14 27·4	13 45·6	4·0	3·8	10·0	9·6	16·0	15·3
41	14 25·3	14 27·6	13 45·8	4·1	3·9	10·1	9·7	16·1	15·4
42	14 25·5	14 27·9	13 46·1	4·2	4·0	10·2	9·8	16·2	15·5
43	14 25·8	14 28·1	13 46·3	4·3	4·1	10·3	9·9	16·3	15·6
44	14 26·0	14 28·4	13 46·5	4·4	4·2	10·4	10·0	16·4	15·7
45	14 26·3	14 28·6	13 46·8	4·5	4·3	10·5	10·1	16·5	15·8
46	14 26·5	14 28·9	13 47·0	4·6	4·4	10·6	10·2	16·6	15·9
47	14 26·8	14 29·1	13 47·3	4·7	4·5	10·7	10·3	16·7	16·0
48	14 27·0	14 29·4	13 47·5	4·8	4·6	10·8	10·4	16·8	16·1
49	14 27·3	14 29·6	13 47·7	4·9	4·7	10·9	10·4	16·9	16·2
50	14 27·5	14 29·9	13 48·0	5·0	4·8	11·0	10·5	17·0	16·3
51	14 27·8	14 30·1	13 48·2	5·1	4·9	11·1	10·6	17·1	16·4
52	14 28·0	14 30·4	13 48·5	5·2	5·0	11·2	10·7	17·2	16·5
53	14 28·3	14 30·6	13 48·7	5·3	5·1	11·3	10·8	17·3	16·6
54	14 28·5	14 30·9	13 48·9	5·4	5·2	11·4	10·9	17·4	16·7
55	14 28·8	14 31·1	13 49·2	5·5	5·3	11·5	11·0	17·5	16·8
56	14 29·0	14 31·4	13 49·4	5·6	5·4	11·6	11·1	17·6	16·9
57	14 29·3	14 31·6	13 49·7	5·7	5·5	11·7	11·2	17·7	17·0
58	14 29·5	14 31·9	13 49·9	5·8	5·6	11·8	11·3	17·8	17·1
59	14 29·8	14 32·1	13 50·1	5·9	5·7	11·9	11·4	17·9	17·2
60	14 30·0	14 32·4	13 50·4	6·0	5·8	12·0	11·5	18·0	17·3

58m s	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
	° ′	° ′	° ′	′	′	′	′	′	′
00	14 30·0	14 32·4	13 50·4	0·0	0·0	6·0	5·9	12·0	11·7
01	14 30·3	14 32·6	13 50·6	0·1	0·1	6·1	5·9	12·1	11·8
02	14 30·5	14 32·9	13 50·8	0·2	0·2	6·2	6·0	12·2	11·9
03	14 30·8	14 33·1	13 51·1	0·3	0·3	6·3	6·1	12·3	12·0
04	14 31·0	14 33·4	13 51·3	0·4	0·4	6·4	6·2	12·4	12·1
05	14 31·3	14 33·6	13 51·6	0·5	0·5	6·5	6·3	12·5	12·2
06	14 31·5	14 33·9	13 51·8	0·6	0·6	6·6	6·4	12·6	12·3
07	14 31·8	14 34·1	13 52·0	0·7	0·7	6·7	6·5	12·7	12·4
08	14 32·0	14 34·4	13 52·3	0·8	0·8	6·8	6·6	12·8	12·5
09	14 32·3	14 34·6	13 52·5	0·9	0·9	6·9	6·7	12·9	12·6
10	14 32·5	14 34·9	13 52·8	1·0	1·0	7·0	6·8	13·0	12·7
11	14 32·8	14 35·1	13 53·0	1·1	1·1	7·1	6·9	13·1	12·8
12	14 33·0	14 35·4	13 53·2	1·2	1·2	7·2	7·0	13·2	12·9
13	14 33·3	14 35·6	13 53·5	1·3	1·3	7·3	7·1	13·3	13·0
14	14 33·5	14 35·9	13 53·7	1·4	1·4	7·4	7·2	13·4	13·1
15	14 33·8	14 36·1	13 53·9	1·5	1·5	7·5	7·3	13·5	13·2
16	14 34·0	14 36·4	13 54·2	1·6	1·6	7·6	7·4	13·6	13·3
17	14 34·3	14 36·6	13 54·4	1·7	1·7	7·7	7·5	13·7	13·4
18	14 34·5	14 36·9	13 54·7	1·8	1·8	7·8	7·6	13·8	13·5
19	14 34·8	14 37·1	13 54·9	1·9	1·9	7·9	7·7	13·9	13·6
20	14 35·0	14 37·4	13 55·1	2·0	2·0	8·0	7·8	14·0	13·7
21	14 35·3	14 37·6	13 55·4	2·1	2·0	8·1	7·9	14·1	13·7
22	14 35·5	14 37·9	13 55·6	2·2	2·1	8·2	8·0	14·2	13·8
23	14 35·8	14 38·1	13 55·9	2·3	2·2	8·3	8·1	14·3	13·9
24	14 36·0	14 38·4	13 56·1	2·4	2·3	8·4	8·2	14·4	14·0
25	14 36·3	14 38·6	13 56·3	2·5	2·4	8·5	8·3	14·5	14·1
26	14 36·5	14 38·9	13 56·6	2·6	2·5	8·6	8·4	14·6	14·2
27	14 36·8	14 39·2	13 56·8	2·7	2·6	8·7	8·5	14·7	14·3
28	14 37·0	14 39·4	13 57·0	2·8	2·7	8·8	8·6	14·8	14·4
29	14 37·3	14 39·7	13 57·3	2·9	2·8	8·9	8·7	14·9	14·5
30	14 37·5	14 39·9	13 57·5	3·0	2·9	9·0	8·8	15·0	14·6
31	14 37·8	14 40·2	13 57·8	3·1	3·0	9·1	8·9	15·1	14·7
32	14 38·0	14 40·4	13 58·0	3·2	3·1	9·2	9·0	15·2	14·8
33	14 38·3	14 40·7	13 58·2	3·3	3·2	9·3	9·1	15·3	14·9
34	14 38·5	14 40·9	13 58·5	3·4	3·3	9·4	9·2	15·4	15·0
35	14 38·8	14 41·2	13 58·7	3·5	3·4	9·5	9·3	15·5	15·1
36	14 39·0	14 41·4	13 59·0	3·6	3·5	9·6	9·4	15·6	15·2
37	14 39·3	14 41·7	13 59·2	3·7	3·6	9·7	9·5	15·7	15·3
38	14 39·5	14 41·9	13 59·4	3·8	3·7	9·8	9·6	15·8	15·4
39	14 39·8	14 42·2	13 59·7	3·9	3·8	9·9	9·7	15·9	15·5
40	14 40·0	14 42·4	13 59·9	4·0	3·9	10·0	9·8	16·0	15·6
41	14 40·3	14 42·7	14 00·1	4·1	4·0	10·1	9·8	16·1	15·7
42	14 40·5	14 42·9	14 00·4	4·2	4·1	10·2	9·9	16·2	15·8
43	14 40·8	14 43·2	14 00·6	4·3	4·2	10·3	10·0	16·3	15·9
44	14 41·0	14 43·4	14 00·9	4·4	4·3	10·4	10·1	16·4	16·0
45	14 41·3	14 43·7	14 01·1	4·5	4·4	10·5	10·2	16·5	16·1
46	14 41·5	14 43·9	14 01·3	4·6	4·5	10·6	10·3	16·6	16·2
47	14 41·8	14 44·2	14 01·6	4·7	4·6	10·7	10·4	16·7	16·3
48	14 42·0	14 44·4	14 01·8	4·8	4·7	10·8	10·5	16·8	16·4
49	14 42·3	14 44·7	14 02·1	4·9	4·8	10·9	10·6	16·9	16·5
50	14 42·5	14 44·9	14 02·3	5·0	4·9	11·0	10·7	17·0	16·6
51	14 42·8	14 45·2	14 02·5	5·1	5·0	11·1	10·8	17·1	16·7
52	14 43·0	14 45·4	14 02·8	5·2	5·1	11·2	10·9	17·2	16·8
53	14 43·3	14 45·7	14 03·0	5·3	5·2	11·3	11·0	17·3	16·9
54	14 43·5	14 45·9	14 03·3	5·4	5·3	11·4	11·1	17·4	17·0
55	14 43·8	14 46·2	14 03·5	5·5	5·4	11·5	11·2	17·5	17·1
56	14 44·0	14 46·4	14 03·7	5·6	5·5	11·6	11·3	17·6	17·2
57	14 44·3	14 46·7	14 04·0	5·7	5·6	11·7	11·4	17·7	17·3
58	14 44·5	14 46·9	14 04·2	5·8	5·7	11·8	11·5	17·8	17·4
59	14 44·8	14 47·2	14 04·4	5·9	5·8	11·9	11·6	17·9	17·5
60	14 45·0	14 47·4	14 04·7	6·0	5·9	12·0	11·7	18·0	17·6

59m s	SUN PLANETS	ARIES	MOON	v or d	Corrn	v or d	Corrn	v or d	Corrn
	° ′	° ′	° ′	′	′	′	′	′	′
00	14 45·0	14 47·4	14 04·7	0·0	0·0	6·0	6·0	12·0	11·9
01	14 45·3	14 47·7	14 04·9	0·1	0·1	6·1	6·0	12·1	12·0
02	14 45·5	14 47·9	14 05·2	0·2	0·2	6·2	6·1	12·2	12·1
03	14 45·8	14 48·2	14 05·4	0·3	0·3	6·3	6·2	12·3	12·2
04	14 46·0	14 48·4	14 05·6	0·4	0·4	6·4	6·3	12·4	12·3
05	14 46·3	14 48·7	14 05·9	0·5	0·5	6·5	6·4	12·5	12·4
06	14 46·5	14 48·9	14 06·1	0·6	0·6	6·6	6·5	12·6	12·5
07	14 46·8	14 49·2	14 06·4	0·7	0·7	6·7	6·6	12·7	12·6
08	14 47·0	14 49·4	14 06·6	0·8	0·8	6·8	6·7	12·8	12·7
09	14 47·3	14 49·7	14 06·8	0·9	0·9	6·9	6·8	12·9	12·8
10	14 47·5	14 49·9	14 07·1	1·0	1·0	7·0	6·9	13·0	12·9
11	14 47·8	14 50·2	14 07·3	1·1	1·1	7·1	7·0	13·1	13·0
12	14 48·0	14 50·4	14 07·5	1·2	1·2	7·2	7·1	13·2	13·1
13	14 48·3	14 50·7	14 07·8	1·3	1·3	7·3	7·2	13·3	13·2
14	14 48·5	14 50·9	14 08·0	1·4	1·4	7·4	7·3	13·4	13·3
15	14 48·8	14 51·2	14 08·3	1·5	1·5	7·5	7·4	13·5	13·4
16	14 49·0	14 51·4	14 08·5	1·6	1·6	7·6	7·5	13·6	13·5
17	14 49·3	14 51·7	14 08·7	1·7	1·7	7·7	7·6	13·7	13·6
18	14 49·5	14 51·9	14 09·0	1·8	1·8	7·8	7·7	13·8	13·7
19	14 49·8	14 52·2	14 09·2	1·9	1·9	7·9	7·8	13·9	13·8
20	14 50·0	14 52·4	14 09·5	2·0	2·0	8·0	7·9	14·0	13·9
21	14 50·3	14 52·7	14 09·7	2·1	2·1	8·1	8·0	14·1	14·0
22	14 50·5	14 52·9	14 09·9	2·2	2·2	8·2	8·1	14·2	14·1
23	14 50·8	14 53·2	14 10·2	2·3	2·3	8·3	8·2	14·3	14·2
24	14 51·0	14 53·4	14 10·4	2·4	2·4	8·4	8·3	14·4	14·3
25	14 51·3	14 53·7	14 10·6	2·5	2·5	8·5	8·4	14·5	14·4
26	14 51·5	14 53·9	14 10·9	2·6	2·6	8·6	8·5	14·6	14·5
27	14 51·8	14 54·2	14 11·1	2·7	2·7	8·7	8·6	14·7	14·6
28	14 52·0	14 54·4	14 11·4	2·8	2·8	8·8	8·7	14·8	14·7
29	14 52·3	14 54·7	14 11·6	2·9	2·9	8·9	8·8	14·9	14·8
30	14 52·5	14 54·9	14 11·8	3·0	3·0	9·0	8·9	15·0	14·9
31	14 52·8	14 55·2	14 12·1	3·1	3·1	9·1	9·0	15·1	15·0
32	14 53·0	14 55·4	14 12·3	3·2	3·2	9·2	9·1	15·2	15·1
33	14 53·3	14 55·7	14 12·6	3·3	3·3	9·3	9·2	15·3	15·2
34	14 53·5	14 55·9	14 12·8	3·4	3·4	9·4	9·3	15·4	15·3
35	14 53·8	14 56·2	14 13·0	3·5	3·5	9·5	9·4	15·5	15·4
36	14 54·0	14 56·4	14 13·3	3·6	3·6	9·6	9·5	15·6	15·5
37	14 54·3	14 56·7	14 13·5	3·7	3·7	9·7	9·6	15·7	15·6
38	14 54·5	14 56·9	14 13·8	3·8	3·8	9·8	9·7	15·8	15·7
39	14 54·8	14 57·2	14 14·0	3·9	3·9	9·9	9·8	15·9	15·8
40	14 55·0	14 57·5	14 14·2	4·0	4·0	10·0	9·9	16·0	15·9
41	14 55·3	14 57·7	14 14·5	4·1	4·1	10·1	10·0	16·1	16·0
42	14 55·5	14 58·0	14 14·7	4·2	4·2	10·2	10·1	16·2	16·1
43	14 55·8	14 58·2	14 14·9	4·3	4·3	10·3	10·2	16·3	16·2
44	14 56·0	14 58·5	14 15·2	4·4	4·4	10·4	10·3	16·4	16·3
45	14 56·3	14 58·7	14 15·4	4·5	4·5	10·5	10·4	16·5	16·4
46	14 56·5	14 59·0	14 15·7	4·6	4·6	10·6	10·5	16·6	16·5
47	14 56·8	14 59·2	14 15·9	4·7	4·7	10·7	10·6	16·7	16·6
48	14 57·0	14 59·5	14 16·1	4·8	4·8	10·8	10·7	16·8	16·7
49	14 57·3	14 59·7	14 16·4	4·9	4·9	10·9	10·8	16·9	16·8
50	14 57·5	15 00·0	14 16·6	5·0	5·0	11·0	10·9	17·0	16·9
51	14 57·8	15 00·2	14 16·9	5·1	5·1	11·1	11·0	17·1	17·0
52	14 58·0	15 00·5	14 17·1	5·2	5·2	11·2	11·1	17·2	17·1
53	14 58·3	15 00·7	14 17·3	5·3	5·3	11·3	11·2	17·3	17·2
54	14 58·5	15 01·0	14 17·6	5·4	5·4	11·4	11·3	17·4	17·3
55	14 58·8	15 01·2	14 17·8	5·5	5·5	11·5	11·4	17·5	17·4
56	14 59·0	15 01·5	14 18·0	5·6	5·6	11·6	11·5	17·6	17·5
57	14 59·3	15 01·7	14 18·3	5·7	5·7	11·7	11·6	17·7	17·6
58	14 59·5	15 02·0	14 18·5	5·8	5·8	11·8	11·7	17·8	17·7
59	14 59·8	15 02·2	14 18·8	5·9	5·9	11·9	11·8	17·9	17·8
60	15 00·0	15 02·5	14 19·0	6·0	6·0	12·0	11·9	18·0	17·9

TABLES FOR INTERPOLATING SUNRISE, MOONRISE, ETC.

TABLE I—FOR LATITUDE

Tabular Interval			Difference between the times for consecutive latitudes															
10°	5°	2°	5m	10m	15m	20m	25m	30m	35m	40m	45m	50m	55m	60m	1h 05m	1h 10m	1h 15m	1h 20m
° ′	° ′	° ′	m	m	m	m	m	m	m	m	m	m	m	m	h m	h m	h m	h m
0 30	0 15	0 06	0	0	1	1	1	1	1	2	2	2	2	2	0 02	0 02	0 02	0 02
1 00	0 30	0 12	0	1	1	2	2	3	3	3	4	4	4	5	05	05	05	05
1 30	0 45	0 18	1	1	2	3	3	4	4	5	5	6	7	7	07	07	07	07
2 00	1 00	0 24	1	2	3	4	5	5	6	7	7	8	9	10	10	10	10	10
2 30	1 15	0 30	1	2	4	5	6	7	8	9	9	10	11	12	12	13	13	13
3 00	1 30	0 36	1	3	4	6	7	8	9	10	11	12	13	14	0 15	0 15	0 16	0 16
3 30	1 45	0 42	2	3	5	7	8	10	11	12	13	14	16	17	18	18	19	19
4 00	2 00	0 48	2	4	6	8	9	11	13	14	15	16	18	19	20	21	22	22
4 30	2 15	0 54	2	4	7	9	11	13	15	16	18	19	21	22	23	24	25	26
5 00	2 30	1 00	2	5	7	10	12	14	16	18	20	22	23	25	26	27	28	29
5 30	2 45	1 06	3	5	8	11	13	16	18	20	22	24	26	28	0 29	0 30	0 31	0 32
6 00	3 00	1 12	3	6	9	12	14	17	20	22	24	26	29	31	32	33	34	36
6 30	3 15	1 18	3	6	10	13	16	19	22	24	26	29	31	34	36	37	38	40
7 00	3 30	1 24	3	7	10	14	17	20	23	26	29	31	34	37	39	41	42	44
7 30	3 45	1 30	4	7	11	15	18	22	25	28	31	34	37	40	43	44	46	48
8 00	4 00	1 36	4	8	12	16	20	23	27	30	34	37	41	44	0 47	0 48	0 51	0 53
8 30	4 15	1 42	4	8	13	17	21	25	29	33	36	40	44	48	0 51	0 53	0 56	0 58
9 00	4 30	1 48	4	9	13	18	22	27	31	35	39	43	47	52	0 55	0 58	1 01	1 04
9 30	4 45	1 54	5	9	14	19	24	28	33	38	42	47	51	56	1 00	1 04	1 08	1 12
10 00	5 00	2 00	5	10	15	20	25	30	35	40	45	50	55	60	1 05	1 10	1 15	1 20

Table I is for interpolating the L.M.T. of sunrise, twilight, moonrise, etc., for latitude. It is to be entered, in the appropriate column on the left, with the difference between true latitude and the nearest tabular latitude which is *less* than the true latitude; and with the argument at the top which is the nearest value of the difference between the times for the tabular latitude and the next higher one; the correction so obtained is applied to the time for the tabular latitude; the sign of the correction can be seen by inspection. It is to be noted that the interpolation is not linear, so that when using this table it is essential to take out the tabular phenomenon for the latitude *less* than the true latitude.

TABLE II—FOR LONGITUDE

Long. East or West	Difference between the times for given date and preceding date (for east longitude) or for given date and following date (for west longitude)																	
	10m	20m	30m	40m	50m	60m	1h + 10m	1h + 20m	1h + 30m	1h + 40m	1h + 50m	1h + 60m	2h 10m	2h 20m	2h 30m	2h 40m	2h 50m	3h 00m
°	m	m	m	m	m	m	m	m	m	m	m	m	h m	h m	h m	h m	h m	h m
0	0	0	0	0	0	0	0	0	0	0	0	0	0 00	0 00	0 00	0 00	0 00	0 00
10	0	1	1	1	1	2	2	2	2	3	3	3	04	04	04	04	05	05
20	1	1	2	2	3	3	4	4	5	6	6	7	07	08	08	09	09	10
30	1	2	2	3	4	5	6	7	7	8	9	10	11	12	12	13	14	15
40	1	2	3	4	6	7	8	9	10	11	12	13	14	16	17	18	19	20
50	1	3	4	6	7	8	10	11	12	14	15	17	0 18	0 19	0 21	0 22	0 24	0 25
60	2	3	5	7	8	10	12	13	15	17	18	20	22	23	25	27	28	30
70	2	4	6	8	10	12	14	16	17	19	21	23	25	27	29	31	33	35
80	2	4	7	9	11	13	16	18	20	22	24	27	29	31	33	36	38	40
90	2	5	7	10	12	15	17	20	22	25	27	30	32	35	37	40	42	45
100	3	6	8	11	14	17	19	22	25	28	31	33	0 36	0 39	0 42	0 44	0 47	0 50
110	3	6	9	12	15	18	21	24	27	31	34	37	40	43	46	49	0 52	0 55
120	3	7	10	13	17	20	23	27	30	33	37	40	43	47	50	53	0 57	1 00
130	4	7	11	14	18	22	25	29	32	36	40	43	47	51	54	0 58	1 01	1 05
140	4	8	12	16	19	23	27	31	35	39	43	47	51	54	0 58	1 02	1 06	1 10
150	4	8	13	17	21	25	29	33	38	42	46	50	0 54	0 58	1 03	1 07	1 11	1 15
160	4	9	13	18	22	27	31	36	40	44	49	53	0 58	1 02	1 07	1 11	1 16	1 20
170	5	9	14	19	24	28	33	38	42	47	52	57	1 01	1 06	1 11	1 16	1 20	1 25
180	5	10	15	20	25	30	35	40	45	50	55	60	1 05	1 10	1 15	1 20	1 25	1 30

Table II is for interpolating the L.M.T. of moonrise, moonset and the Moon's meridian passage for longitude. It is entered with longitude and with the difference between the times for the given date and for the preceding date (in east longitudes) or following date (in west longitudes). The correction is normally *added* for west longitudes and *subtracted* for east longitudes, but if, as occasionally happens, the times become earlier each day instead of later, the signs of the corrections must be reversed.

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INDEX TO SELECTED STARS,

Name	No.	Mag.	S.H.A.	Dec.
			°	°
Acamar	7	3·1	316	S. 40
Achernar	5	0·6	336	S. 57
Acrux	30	1·1	174	S. 63
Adhara	19	1·6	256	S. 29
Aldebaran	10	1·1	291	N. 16
Alioth	32	1·7	167	N. 56
Alkaid	34	1·9	153	N. 49
Al Na'ir	55	2·2	28	S. 47
Alnilam	15	1·8	276	S. 1
Alphard	25	2·2	218	S. 9
Alphecca	41	2·3	127	N. 27
Alpheratz	1	2·2	358	N. 29
Altair	51	0·9	63	N. 9
Ankaa	2	2·4	354	S. 42
Antares	42	1·2	113	S. 26
Arcturus	37	0·2	146	N. 19
Atria	43	1·9	108	S. 69
Avior	22	1·7	234	S. 59
Bellatrix	13	1·7	279	N. 6
Betelgeuse	16	Var.*	271	N. 7
Canopus	17	−0·9	264	S. 53
Capella	12	0·2	281	N. 46
Deneb	53	1·3	50	N. 45
Denebola	28	2·2	183	N. 15
Diphda	4	2·2	349	S. 18
Dubhe	27	2·0	194	N. 62
Elnath	14	1·8	279	N. 29
Eltanin	47	2·4	91	N. 51
Enif	54	2·5	34	N. 10
Fomalhaut	56	1·3	16	S. 30
Gacrux	31	1·6	172	S. 57
Gienah	29	2·8	176	S. 17
Hadar	35	0·9	149	S. 60
Hamal	6	2·2	328	N. 23
Kaus Australis	48	2·0	84	S. 34
Kochab	40	2·2	137	N. 74
Markab	57	2·6	14	N. 15
Menkar	8	2·8	315	N. 4
Menkent	36	2·3	149	S. 36
Miaplacidus	24	1·8	222	S. 70
Mirfak	9	1·9	309	N. 50
Nunki	50	2·1	76	S. 26
Peacock	52	2·1	54	S. 57
Pollux	21	1·2	244	N. 28
Procyon	20	0·5	245	N. 5
Rasalhague	46	2·1	96	N. 13
Regulus	26	1·3	208	N. 12
Rigel	11	0·3	282	S. 8
Rigil Kentaurus	38	0·1	140	S. 61
Sabik	44	2·6	103	S. 16
Schedar	3	2·5	350	N. 56
Shaula	45	1·7	97	S. 37
Sirius	18	−1·6	259	S. 17
Spica	33	1·2	159	S. 11
Suhail	23	2·2	223	S. 43
Vega	49	0·1	81	N. 39
Zubenelgenubi	39	2·9	138	S. 16

No.	Name	Mag.	S.H.A.	Dec.
			°	°
1	*Alpheratz*	2·2	358	N. 29
2	*Ankaa*	2·4	354	S. 42
3	*Schedar*	2·5	350	N. 56
4	*Diphda*	2·2	349	S. 18
5	*Achernar*	0·6	336	S. 57
6	*Hamal*	2·2	328	N. 23
7	*Acamar*	3·1	316	S. 40
8	*Menkar*	2·8	315	N. 4
9	*Mirfak*	1·9	309	N. 50
10	*Aldebaran*	1·1	291	N. 16
11	*Rigel*	0·3	282	S. 8
12	*Capella*	0·2	281	N. 46
13	*Bellatrix*	1·7	279	N. 6
14	*Elnath*	1·8	279	N. 29
15	*Alnilam*	1·8	276	S. 1
16	*Betelgeuse*	Var.*	271	N. 7
17	*Canopus*	−0·9	264	S. 53
18	*Sirius*	−1·6	259	S. 17
19	*Adhara*	1·6	256	S. 29
20	*Procyon*	0·5	245	N. 5
21	*Pollux*	1·2	244	N. 28
22	*Avior*	1·7	234	S. 59
23	*Suhail*	2·2	223	S. 43
24	*Miaplacidus*	1·8	222	S. 70
25	*Alphard*	2·2	218	S. 9
26	*Regulus*	1·3	208	N. 12
27	*Dubhe*	2·0	194	N. 62
28	*Denebola*	2·2	183	N. 15
29	*Gienah*	2·8	176	S. 17
30	*Acrux*	1·1	174	S. 63
31	*Gacrux*	1·6	172	S. 57
32	*Alioth*	1·7	167	N. 56
33	*Spica*	1·2	159	S. 11
34	*Alkaid*	1·9	153	N. 49
35	*Hadar*	0·9	149	S. 60
36	*Menkent*	2·3	149	S. 36
37	*Arcturus*	0·2	146	N. 19
38	*Rigil Kentaurus*	0·1	140	S. 61
39	*Zubenelgenubi*	2·9	138	S. 16
40	*Kochab*	2·2	137	N. 74
41	*Alphecca*	2·3	127	N. 27
42	*Antares*	1·2	113	S. 26
43	*Atria*	1·9	108	S. 69
44	*Sabik*	2·6	103	S. 16
45	*Shaula*	1·7	97	S. 37
46	*Rasalhague*	2·1	96	N. 13
47	*Eltanin*	2·4	91	N. 51
48	*Kaus Australis*	2·0	84	S. 34
49	*Vega*	0·1	81	N. 39
50	*Nunki*	2·1	76	S. 26
51	*Altair*	0·9	63	N. 9
52	*Peacock*	2·1	54	S. 57
53	*Deneb*	1·3	50	N. 45
54	*Enif*	2·5	34	N. 10
55	*Al Na'ir*	2·2	28	S. 47
56	*Fomalhaut*	1·3	16	S. 30
57	*Markab*	2·6	14	N. 15

* 0·1—1·2

ALTITUDE CORRECTION TABLES 0°–35°—MOON

App. Alt.	0°–4° Corrⁿ	5°–9° Corrⁿ	10°–14° Corrⁿ	15°–19° Corrⁿ	20°–24° Corrⁿ	25°–29° Corrⁿ	30°–34° Corrⁿ	App. Alt.
′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	′
00	0 33·8	5 58·2	10 62·1	15 62·8	20 62·2	25 60·8	30 58·9	00
10	35·9	58·5	62·2	62·8	62·1	60·8	58·8	10
20	37·8	58·7	62·2	62·8	62·1	60·7	58·8	20
30	39·6	58·9	62·3	62·8	62·1	60·7	58·7	30
40	41·2	59·1	62·3	62·8	62·0	60·6	58·6	40
50	42·6	59·3	62·4	62·7	62·0	60·6	58·5	50
00	1 44·0	6 59·5	11 62·4	16 62·7	21 62·0	26 60·5	31 58·5	00
10	45·2	59·7	62·4	62·7	61·9	60·4	58·4	10
20	46·3	59·9	62·5	62·7	61·9	60·4	58·3	20
30	47·3	60·0	62·5	62·7	61·9	60·3	58·2	30
40	48·3	60·2	62·5	62·7	61·8	60·3	58·2	40
50	49·2	60·3	62·6	62·7	61·8	60·2	58·1	50
00	2 50·0	7 60·5	12 62·6	17 62·7	22 61·7	27 60·1	32 58·0	00
10	50·8	60·6	62·6	62·6	61·7	60·1	57·9	10
20	51·4	60·7	62·6	62·6	61·6	60·0	57·8	20
30	52·1	60·9	62·7	62·6	61·6	59·9	57·8	30
40	52·7	61·0	62·7	62·6	61·5	59·9	57·7	40
50	53·3	61·1	62·7	62·6	61·5	59·8	57·6	50
00	3 53·8	8 61·2	13 62·7	18 62·5	23 61·5	28 59·7	33 57·5	00
10	54·3	61·3	62·7	62·5	61·4	59·7	57·4	10
20	54·8	61·4	62·7	62·5	61·4	59·6	57·4	20
30	55·2	61·5	62·8	62·5	61·3	59·6	57·3	30
40	55·6	61·6	62·8	62·4	61·3	59·5	57·2	40
50	56·0	61·6	62·8	62·4	61·2	59·4	57·1	50
00	4 56·4	9 61·7	14 62·8	19 62·4	24 61·2	29 59·3	34 57·0	00
10	56·7	61·8	62·8	62·3	61·1	59·3	56·9	10
20	57·1	61·9	62·8	62·3	61·1	59·2	56·9	20
30	57·4	61·9	62·8	62·3	61·0	59·1	56·8	30
40	57·7	62·0	62·8	62·2	60·9	59·1	56·7	40
50	57·9	62·1	62·8	62·2	60·9	59·0	56·6	50

H.P.	L	U	L	U	L	U	L	U	L	U	L	U	L	U	H.P.
′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
54·0	0·3	0·9	0·3	0·9	0·4	1·0	0·5	1·1	0·6	1·2	0·7	1·3	0·9	1·5	54·0
54·3	0·7	1·1	0·7	1·2	0·7	1·2	0·8	1·3	0·9	1·4	1·1	1·5	1·2	1·7	54·3
54·6	1·1	1·4	1·1	1·4	1·1	1·4	1·2	1·5	1·3	1·6	1·4	1·7	1·5	1·8	54·6
54·9	1·4	1·6	1·5	1·6	1·5	1·6	1·6	1·7	1·6	1·8	1·8	1·9	1·9	2·0	54·9
55·2	1·8	1·8	1·8	1·8	1·9	1·9	1·9	1·9	2·0	2·0	2·1	2·1	2·2	2·2	55·2
55·5	2·2	2·0	2·2	2·0	2·3	2·1	2·3	2·1	2·4	2·2	2·4	2·3	2·5	2·4	55·5
55·8	2·6	2·2	2·6	2·2	2·6	2·3	2·7	2·3	2·7	2·4	2·8	2·4	2·9	2·5	55·8
56·1	3·0	2·4	3·0	2·5	3·0	2·5	3·0	2·5	3·1	2·6	3·1	2·6	3·2	2·7	56·1
56·4	3·4	2·7	3·4	2·7	3·4	2·7	3·4	2·7	3·4	2·8	3·5	2·8	3·5	2·9	56·4
56·7	3·7	2·9	3·7	2·9	3·8	2·9	3·8	2·9	3·8	3·0	3·8	3·0	3·9	3·0	56·7
57·0	4·1	3·1	4·1	3·1	4·1	3·1	4·1	3·1	4·2	3·1	4·2	3·2	4·2	3·2	57·0
57·3	4·5	3·3	4·5	3·3	4·5	3·3	4·5	3·3	4·5	3·3	4·5	3·4	4·6	3·4	57·3
57·6	4·9	3·5	4·9	3·5	4·9	3·5	4·9	3·5	4·9	3·5	4·9	3·5	4·9	3·6	57·6
57·9	5·3	3·8	5·3	3·8	5·2	3·8	5·2	3·7	5·2	3·7	5·2	3·7	5·2	3·7	57·9
58·2	5·6	4·0	5·6	4·0	5·6	4·0	5·6	4·0	5·6	3·9	5·6	3·9	5·6	3·9	58·2
58·5	6·0	4·2	6·0	4·2	6·0	4·2	6·0	4·2	6·0	4·1	5·9	4·1	5·9	4·1	58·5
58·8	6·4	4·4	6	4·4	6·4	4·4	6·3	4·4	6·3	4·3	6·3	4·3	6·2	4·2	58·8
59·1	6·8	4·6	6·8	4·6	6·7	4·6	6·7	4·6	6·7	4·5	6·6	4·5	6·6	4·4	59·1
59·4	7·2	4·8	7·1	4·8	7·1	4·8	7·1	4·8	7·0	4·7	7·0	4·7	6·9	4·6	59·4
59·7	7·5	5·1	7·5	5·0	7·5	5·0	7·5	5·0	7·4	4·9	7·3	4·8	7·2	4·7	59·7
60·0	7·9	5·3	7·9	5·3	7·9	5·2	7·8	5·2	7·8	5·1	7·7	5·0	7·6	4·9	60·0
60·3	8·3	5·5	8·3	5·5	8·2	5·4	8·2	5·4	8·1	5·3	8·0	5·2	7·9	5·1	60·3
60·6	8·7	5·7	8·7	5·7	8·6	5·7	8·6	5·6	8·5	5·5	8·4	5·4	8·2	5·3	60·6
60·9	9·1	5·9	9·0	5·9	9·0	5·9	8·9	5·8	8·8	5·7	8·7	5·6	8·6	5·4	60·9
61·2	9·5	6·2	9·4	6·1	9·4	6·1	9·3	6·0	9·2	5·9	9·1	5·8	8·9	5·6	61·2
61·5	9·8	6·4	9·8	6·3	9·7	6·3	9·7	6·2	9·5	6·1	9·4	5·9	9·2	5·8	61·5

DIP

Ht. of Eye	Corrⁿ	Ht. of Eye	Ht. of Eye	Corrⁿ	Ht. of Eye
m		ft.	m		ft.
2·4	2·8	8·0	9·5	5·5	31·5
2·6	2·9	8·6	9·9	5·6	32·7
2·8	3·0	9·2	10·3	5·7	33·9
3·0	3·1	9·8	10·6	5·8	35·1
3·2	3·2	10·5	11·0	5·9	36·3
3·4	3·3	11·2	11·4	6·0	37·6
3·6	3·4	11·9	11·8	6·1	38·9
3·8	3·5	12·6	12·2	6·2	40·1
4·0	3·6	13·3	12·6	6·3	41·5
4·3	3·7	14·1	13·0	6·4	42·8
4·5	3·8	14·9	13·4	6·5	44·2
4·7	3·9	15·7	13·8	6·6	45·5
5·0	4·0	16·5	14·2	6·7	46·9
5·2	4·1	17·4	14·7	6·8	48·4
5·5	4·2	18·3	15·1	6·9	49·8
5·8	4·3	19·1	15·5	7·0	51·3
6·1	4·4	20·1	16·0	7·1	52·8
6·3	4·5	21·0	16·5	7·2	54·3
6·6	4·6	22·0	16·9	7·3	55·8
6·9	4·7	22·9	17·4	7·4	57·4
7·2	4·8	23·9	17·9	7·5	58·9
7·5	4·9	24·9	18·4	7·6	60·5
7·9	5·0	26·0	18·8	7·7	62·1
8·2	5·1	27·1	19·3	7·8	63·8
8·5	5·2	28·1	19·8	7·9	65·4
8·8	5·3	29·2	20·4	8·0	67·1
9·2	5·4	30·4	20·9	8·1	68·8
9·5		31·5	21·4		70·5

MOON CORRECTION TABLE

The correction is in two parts; the first correction is taken from the upper part of the table with argument apparent altitude, and the second from the lower part, with argument H.P., in the same column as that from which the first correction was taken. Separate corrections are given in the lower part for lower (L) and upper (U) limbs. All corrections are to be **added** to apparent altitude, *but 30′ is to be subtracted from the altitude of the upper limb.*

For corrections for pressure and temperature see page A4.

For bubble sextant observations ignore dip, take the **mean** of upper and lower limb corrections and subtract **15′** from the altitude.

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