

NAUTICAL ALMANAC

UT	SUN		MOON					Lat.	Twilight			Sunrise	Moonrise						
									Naut.	Civil			1	2	3	4			
	GHA	Dec	GHA	v	Dec	d	HP		h m	h m	h m		h m	h m	h m	h m			
d h	o ,	o ,	o ,	,	o ,	,	,	N 72	03 54	05 16	06 23	18 25	18 05	17 45	17 22				
1 00	182 33.2	S 3 07.7	16 38.8	15.6	S 8	18.3	11.4	54.2	N 70	04 06	05 19	06 20	18 18	18 05	17 51	17 36			
01	197 33.4	08.6	31 13.4	15.6	8	06.9	11.4	54.2	68	04 15	05 21	06 16	18 13	18 05	17 56	17 48			
02	212 33.6	09.6	45 48.0	15.6	7	55.5	11.5	54.2	66	04 22	05 23	06 14	18 08	18 05	18 01	17 57			
03	227 33.8	.	10.6	60 22.6	15.7	7	44.0	11.5	54.2	64	04 28	05 24	06 11	18 04	18 05	18 05	18 06		
04	242 34.0	11.5	74 57.3	15.6	7	32.5	11.5	54.2	62	04 33	05 25	06 10	18 01	18 05	18 08	18 13			
05	257 34.2	12.5	89 31.9	15.7	7	21.0	11.6	54.2	60	04 38	05 26	06 08	17 58	18 05	18 11	18 19			
06	272 34.4	S 3 13.5	104 06.6	15.7	S 7	09.4	11.6	54.3	N 58	04 41	05 27	06 06	17 55	18 05	18 14	18 24			
07	287 34.6	14.5	118 41.3	15.7	6	57.8	11.6	54.3	56	04 44	05 28	06 05	17 53	18 05	18 16	18 29			
08	302 34.8	15.4	133 16.0	15.7	6	46.2	11.7	54.3	54	04 47	05 28	06 04	17 51	18 05	18 18	18 33			
M 09	317 35.0	.	16.4	147 50.7	15.7	6	34.5	11.7	54.3	52	04 50	05 29	06 02	17 49	18 05	18 20	18 37		
O 10	332 35.2	17.4	162 25.4	15.8	6	22.8	11.7	54.3	50	04 52	05 29	06 01	17 47	18 05	18 22	18 41			
N 11	347 35.4	18.3	177 00.2	15.7	6	11.1	11.7	54.3	45	04 56	05 30	05 59	17 43	18 05	18 26	18 49			
D 12	2 35.6	S 3 19.3	191 34.9	15.8	S 5	59.4	11.8	54.3	N 40	04 59	05 30	05 57	17 40	18 05	18 29	18 56			
A 13	17 35.8	20.3	206 09.7	15.8	5	47.6	11.8	54.3	35	05 01	05 30	05 55	17 37	18 05	18 32	19 01			
Y 14	32 36.0	21.2	220 44.5	15.7	5	35.8	11.9	54.3	30	05 02	05 30	05 54	17 35	18 05	18 35	19 06			
15	47 36.2	.	22.2	235 19.2	15.8	5	23.9	11.8	54.3	20	05 04	05 29	05 51	17 30	18 05	18 39	19 15		
16	62 36.4	23.2	249 54.0	15.8	5	12.1	11.9	54.3	N 10	05 03	05 28	05 49	17 27	18 05	18 43	19 23			
17	77 36.6	24.1	264 28.8	15.8	5	0.02	11.9	54.4	0	05 01	05 25	05 46	17 23	18 05	18 47	19 30			
18	92 36.8	S 3 25.1	279 03.6	15.8	S 4	48.3	12.0	54.4	S 10	04 58	05 22	05 43	17 20	18 05	18 50	19 38			
19	107 37.0	26.1	293 38.4	15.8	4	36.3	11.9	54.4	20	04 53	05 19	05 41	17 16	18 05	18 54	19 46			
20	122 37.2	27.0	308 13.2	15.8	4	24.4	12.0	54.4	30	04 45	05 13	05 37	17 11	18 05	18 59	19 55			
21	137 37.4	.	322 48.0	15.8	4	12.4	12.0	54.4	35	04 40	05 10	05 35	17 09	18 05	19 02	20 00			
22	152 37.6	29.0	337 22.8	15.8	4	0.04	12.0	54.4	40	04 34	05 06	05 33	17 06	18 05	19 05	20 06			
23	167 37.8	30.0	351 57.6	15.8	3	48.4	12.1	54.4	45	04 26	05 01	05 30	17 03	18 05	19 08	20 13			
2 00	182 38.0	S 3 30.9	6 32.4	15.8	S 3	36.3	12.0	54.4	S 50	04 15	04 54	05 27	16 59	18 05	19 13	20 22			
01	197 38.2	31.9	21 07.2	15.8	3	24.3	12.1	54.4	52	04 10	04 51	05 25	16 57	18 05	19 15	20 25			
02	212 38.4	32.9	35 42.0	15.9	3	12.2	12.1	54.5	54	04 05	04 48	05 24	16 55	18 05	19 17	20 30			
03	227 38.6	.	33.8	50 16.9	15.8	3 00.1	12.1	54.5	56	03 59	04 44	05 22	16 53	18 05	19 19	20 35			
04	242 38.8	34.8	64 51.7	15.8	2	48.0	12.1	54.5	58	03 51	04 40	05 20	16 50	18 05	19 22	20 40			
05	257 39.0	35.8	79 26.5	15.8	2	35.9	12.2	54.5	S 60	03 43	04 35	05 18	16 47	18 06	19 25	20 46			
T 08	302 39.6	38.7	123 10.9	15.8	1	59.4	12.2	54.5	Lat.			Sunset			Moonset				
U 09	317 39.8	.	39.6	137 45.7	15.8	1	47.2	12.2	54.5	Civil			Naut.			1	2	3	4
E 11	347 40.2	41.6	152 20.5	15.7	1	35.0	12.2	54.5	N 72	17 13	18 20	19 41	03 20	05 10	06 58	08 51			
S 12	2 40.4	S 3 42.5	181 30.0	15.8	S 1	10.5	12.2	54.6	N 70	17 17	18 18	19 30	03 32	05 13	06 55	08 39			
D 13	17 40.6	43.5	196 04.8	15.7	0	58.3	12.3	54.6	68	17 20	18 16	19 21	03 41	05 16	06 52	08 29			
A 14	32 40.8	44.5	210 39.5	15.8	0	46.0	12.2	54.6	66	17 23	18 14	19 14	03 49	05 19	06 49	08 21			
Y 15	47 41.0	.	225 14.3	15.7	0	33.8	12.3	54.6	64	17 26	18 13	19 08	03 56	05 21	06 47	08 14			
16	62 41.2	46.4	239 49.0	15.7	0	21.5	12.2	54.6	62	17 28	18 12	19 03	04 02	05 23	06 45	08 08			
17	77 41.4	47.4	254 23.7	15.7	S 0	09.3	12.3	54.6	60	17 30	18 11	18 59	04 07	05 25	06 43	08 03			
18	92 41.6	S 3 48.3	268 58.4	15.7	N 0	03.0	12.3	54.6	N 58	17 31	18 10	18 56	04 11	05 26	06 42	07 59			
19	107 41.8	49.3	283 33.1	15.7	0	15.3	12.3	54.7	56	17 33	18 10	18 53	04 15	05 27	06 41	07 55			
20	122 42.0	50.3	298 07.8	15.7	0	27.6	12.3	54.7	54	17 34	18 09	18 50	04 18	05 29	06 39	07 52			
21	137 42.2	.	312 42.5	15.6	0	39.9	12.3	54.7	52	17 35	18 09	18 48	04 22	05 30	06 38	07 48			
22	152 42.4	52.2	327 17.1	15.6	0	52.2	12.3	54.7	50	17 36	18 08	18 46	04 24	05 31	06 37	07 45			
23	167 42.6	53.2	341 51.7	15.7	1	04.5	12.3	54.7	45	17 39	18 08	18 42	04 30	05 33	06 35	07 39			
3 00	182 42.8	S 3 54.1	356 26.4	15.6	N 1	16.8	12.3	54.7	N 40	17 41	18 08	18 39	04 36	05 34	06 34	07 34			
01	197 43.0	55.1	11 01.0	15.5	1	29.1	12.3	54.7	35	17 43	18 08	18 37	04 40	05 36	06 32	07 30			
02	212 43.2	56.1	25 35.5	15.6	1	41.4	12.3	54.8	30	17 44	18 08	18 36	04 44	05 37	06 31	07 26			
03	227 43.4	.	57.0	40 10.1	15.5	1	53.7	12.3	54.8	20	17 47	18 09	18 35	04 50	05 39	06 29	07 19		
04	242 43.6	58.0	54 44.6	15.5	2	06.0	12.3	54.8	N 10	17 50	18 11	18 35	04 56	05 41	06 27	07 13			
05	257 43.8	59.0	69 19.1	15.5	2	18.3	12.3	54.8	0	17 53	18 13	18 37	05 02	05 43	06 25	07 07			
W 07	272 44.0	S 3 59.9	83 53.6	15.5	N 2	30.6	12.3	54.8	S 10	17 55	18 16	18 41	05 07	05 45	06 23	07 02			
E 08	302 44.4	01.9	98 28.1	15.5	2	42.9	12.3	54.8	20	17 58	18 20	18 46	05 13	05 47	06 21	06 56			
D 09	317 44.6	.	02.8	127 37.0	15.4	3	07.5	12.3	54.9	30	18 02	18 26	18 54	05 19	05 49	06 19	06 49		
N 10	332 44.8	03.8	142 11.4	15.4	3	19.8	12.3	54.9	35	18 04	18 29	18 59	05 23	05 50	06 17	06 45			
N 11	347 45.0	04.8	156 45.8	15.3	3	32.1	12.2	54.9	40	18 06	18 34	19 06	05 27	05 51	06 16	06 41			
E 12	2 45.1	S 4 05.7	171 20.1	15.3	N 3	44.3	12.3	54.9	45	18 09	18 39	19 14	05 31	05 53	06 14	06 36			
S 13	17 45.3	06.7	185 54.4	15.3	3	56.6	12.3	54.9	S 50	18 13	18 45	19 25	05 37	05 55	06 12	06 30			
D 14	32 45.5	07.6	200 28.7	15.3	4	08.9	12.2	54.9	52	18 14	18 48	19 30	05 40	05 56	06 11	06 27			
A 15	47 45.7	.	08.6	215 03.0	15.2	4	21.1	12.2	54.9	54	18 16	18 52	19 35	05 43	05 56	06 10	06 24		
Y 16	62 45.9	09.6	229 37.2	15.2	4	33													

2001 JULY 9, 10, 11 (MON., TUES., WED.)

137

UT	SUN		MOON					Lat.	Twilight		Sunrise	Moonrise			
						Naut.	Civil		9	10		11	12		
	GHA	Dec	GHA	v	Dec	d	HP		h m	h m		h m	h m	h m	h m
	d h	o ' / o '	o ' / o '	o ' / o '	o ' / o '	o ' / o '	o ' / o '	N 72 °	h m	h m	h m	h m	h m	h m	h m
9 00	178 42.9	N22 22.5	319 17.8	13.7	S17 11.3	8.2	54.1	N 70 °	h m	h m	h m	01 29	00 39	{ 00 13 } { 23 50 }	23 31
01	193 42.8	22.2	333 50.5	13.8	17 03.1	8.4	54.1	68	h m	h m	h m	00 37	{ 00 13 } { 23 50 }	23 43	23 31
02	208 42.7	21.9	348 23.3	13.8	16 54.7	8.4	54.1	66	h m	h m	h m	{ 00 04 } { 23 50 }	23 45	23 38	23 31
03	223 42.7	.	2 56.1	13.9	16 46.3	8.5	54.1	64	h m	h m	h m	23 38	23 36	23 33	23 30
04	238 42.6	21.3	17 29.0	13.9	16 37.8	8.5	54.1	62	h m	h m	h m	23 25	23 28	23 29	23 30
05	253 42.5	21.0	32 01.9	13.9	16 29.3	8.6	54.1	60	h m	h m	h m	23 05	23 14	23 22	23 30
06	268 42.4	N22 20.7	46 34.8	14.0	S16 20.7	8.7	54.1	N 58 °	h m	h m	h m	22 57	23 09	23 20	23 29
07	283 42.3	20.4	61 07.8	14.1	16 12.0	8.8	54.1	56	h m	h m	h m	02 05	02 30	03 28	23 04
08	298 42.2	20.1	75 40.9	14.1	16 03.2	8.8	54.1	54	h m	h m	h m	02 49	03 41	02 43	23 00
M 09	313 42.1	.	90 14.0	14.1	15 54.4	8.9	54.1	52	h m	h m	h m	03 52	02 37	22 56	23 13
O 10	328 42.0	19.5	104 47.1	14.2	15 45.5	8.9	54.1	50	h m	h m	h m	02 18	03 19	04 02	22 32
N 11	343 41.9	19.2	119 20.3	14.3	15 36.6	9.0	54.1	45	h m	h m	h m	02 59	03 47	04 23	22 20
D 12	358 41.8	N22 18.9	133 53.6	14.3	S15 27.6	9.1	54.1	N 40 °	h m	h m	h m	22 11	22 38	23 04	23 28
A 13	13 41.7	18.6	148 26.9	14.3	15 18.5	9.1	54.1	35	h m	h m	h m	04 25	04 54	02 03	22 32
Y 14	28 41.6	18.3	163 00.2	14.4	15 09.4	9.2	54.1	30	h m	h m	h m	04 07	04 39	05 06	21 55
15	43 41.6	.	177 33.6	14.4	15 00.2	9.3	54.1	20	h m	h m	h m	04 34	05 03	05 27	21 43
16	58 41.5	17.6	192 07.0	14.4	14 50.9	9.3	54.1	N 10 °	h m	h m	h m	04 55	05 22	05 45	21 32
17	73 41.4	17.3	206 40.4	14.5	14 41.6	9.4	54.1	0	h m	h m	h m	05 13	05 39	06 02	21 21
18	88 41.3	N22 17.0	221 13.9	14.6	S14 32.2	9.4	54.1	S 10 °	h m	h m	h m	05 29	05 56	06 18	21 11
19	103 41.2	16.7	235 47.5	14.6	14 22.8	9.5	54.1	20	h m	h m	h m	06 12	06 36	01 00	21 49
20	118 41.1	16.4	250 21.1	14.6	14 13.3	9.6	54.1	30	h m	h m	h m	06 00	06 30	06 56	20 47
21	133 41.0	.	264 54.7	14.6	14 03.7	9.6	54.1	35	h m	h m	h m	06 08	06 39	07 07	20 40
22	148 40.9	15.8	279 28.3	14.8	13 54.1	9.7	54.1	40	h m	h m	h m	06 50	07 20	20 31	21 30
23	163 40.8	15.5	294 02.1	14.7	13 44.4	9.7	54.1	45	h m	h m	h m	06 26	07 03	07 36	20 21
10 00	178 40.8	N22 15.2	308 35.8	14.8	S13 34.7	9.8	54.1	S 50 °	h m	h m	h m	07 18	07 55	20 09	21 15
01	193 40.7	14.8	323 09.6	14.8	13 24.9	9.8	54.1	52	h m	h m	h m	07 25	08 05	20 04	21 11
02	208 40.6	14.5	337 43.4	14.9	13 15.1	9.9	54.1	54	h m	h m	h m	07 32	08 15	19 57	21 07
03	223 40.5	.	352 17.3	14.9	13 05.2	9.9	54.1	56	h m	h m	h m	07 41	08 26	19 51	21 02
04	238 40.4	13.9	6 51.2	14.9	12 55.3	10.0	54.1	58	h m	h m	h m	07 50	08 40	19 43	20 57
05	253 40.3	13.6	21 25.1	15.0	12 45.3	10.1	54.1	S 60 °	h m	h m	h m	08 00	08 55	19 34	20 51
06	268 40.2	N22 13.3	35 59.1	15.0	S12 35.2	10.0	54.1								
07	283 40.1	12.9	50 33.1	15.0	12 25.2	10.2	54.1								
T 08	298 40.1	12.6	65 07.1	15.1	12 15.0	10.2	54.1								
U 09	313 40.0	.	79 41.2	15.1	12 04.8	10.2	54.1								
E 10	328 39.9	12.0	94 15.3	15.1	11 54.6	10.3	54.1								
S 11	343 39.8	11.7	108 49.4	15.2	11 44.3	10.4	54.1								
S 12	358 39.7	N22 11.3	123 23.6	15.2	S11 33.9	10.3	54.1								
D 13	13 39.6	11.0	137 57.8	15.2	11 23.6	10.5	54.1								
A 14	28 39.5	10.7	152 32.0	15.3	11 13.1	10.5	54.1								
Y 15	43 39.4	.	167 06.3	15.2	11 02.6	10.5	54.2								
16	58 39.4	10.1	181 40.5	15.4	10 52.1	10.5	54.2								
17	73 39.3	09.7	196 14.9	15.3	10 41.6	10.7	54.2								
18	88 39.2	N22 09.4	210 49.2	15.4	S10 30.9	10.6	54.2								
19	103 39.1	09.1	225 23.6	15.4	10 20.3	10.7	54.2								
20	118 39.0	08.8	239 58.0	15.4	10 09.6	10.8	54.2								
21	133 38.9	.	254 32.4	15.4	9 58.8	10.7	54.2								
22	148 38.9	08.1	269 06.8	15.5	9 48.1	10.9	54.2								
23	163 38.8	07.8	283 41.3	15.5	9 37.2	10.8	54.2								
11 00	178 38.7	N22 07.4	298 15.8	15.5	S 9 26.4	10.9	54.2	N 40 °	h m	h m	h m	08 01	08 59	09 58	10 56
01	193 38.6	07.1	312 50.3	15.6	9 15.5	11.0	54.2	35	h m	h m	h m	19 45	20 21	08 11	09 07
02	208 38.5	06.8	327 24.9	15.5	9 04.5	10.9	54.2	30	h m	h m	h m	19 31	20 04	08 19	09 13
03	223 38.4	.	341 59.4	15.6	8 53.6	11.1	54.3	20	h m	h m	h m	18 08	19 36	08 34	09 24
04	238 38.3	06.1	356 34.0	15.6	8 42.5	11.0	54.3	N 10 °	h m	h m	h m	18 26	18 48	19 15	08 47
05	253 38.3	05.8	11 08.6	15.6	8 31.5	11.1	54.3	0	h m	h m	h m	18 31	18 57	08 59	09 42
06	268 38.2	N22 05.5	25 43.2	15.6	S 8 20.4	11.1	54.3	S 10 °	h m	h m	h m	17 53	18 15	18 41	09 11
W 07	283 38.1	05.1	40 17.8	15.7	8 09.3	11.2	54.3	20	h m	h m	h m	17 55	18 26	09 23	10 00
E 08	298 38.0	04.8	54 52.5	15.7	7 58.1	11.2	54.3	30	h m	h m	h m	17 15	17 41	18 11	09 37
D 09	313 37.9	.	69 27.2	15.6	7 46.9	11.2	54.3	35	h m	h m	h m	17 04	17 31	18 03	09 46
N 10	328 37.8	04.1	84 01.8	15.7	7 35.7	11.3	54.3	40	h m	h m	h m	16 50	17 21	17 54	09 55
N 11	343 37.8	03.8	98 36.5	15.7	7 24.4	11.3	54.3	45	h m	h m	h m	16 35	17 08	17 45	10 06
E 12	358 37.7	N22 03.4	113 11.2	15.8	S 7 13.1	11.3	54.4	S 50 °	h m	h m	h m	16 16	16 33	17 34	10 19
S 13	13 37.6	03.1	127 46.0	15.7	7 01.8	11.4	54.4	52	h m	h m	h m	16 06	16 46	17 29	10 25
D 14	28 37.5	02.8	142 20.7	15.7	6 50.4	11.4	54.4	54	h m	h m	h m	15 56	16 39	17 24	10 32
A 15	43 37.4	.	156 55.4	15.8	6 39.0	11.4	54.4	56	h m	h m	h m	15 45	16 31	17 19	10 40
Y 16	58 37.4	02.1	171 30.2	15.8	6 27.6	11.5	54.4	58	h m	h m	h m	15 31	16 21	17 13	10 48
17	73 37.3	01.7	186 05.0	15.7	6 16.1	11.4	54.4	S 60 °	h m	h m	h m	15 16	16 11	17 06	10 58
18	88 37.2	N22 01.4	200 39.7	15.8	S 6 04.7	11.5	54.4								
19	103 37.1	01.1	215 14.5	15.8	5 53.2	11.6	54.4								
20	118 37.0	00.7	229 49.3	15.8	5 41.6	11.6	54.5								
21	133 37.0	.	244 24.1	15.8	5 30.0	11.5	54.5								
22	148 36.9	22 00.0	258 58.9	15.8	5 18.5	11.7	54.5								
23	163 36.8	N21 59.7	273 33.7	15.8	S 5 06.8										

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec	GHA	v	Dec	d	HP	Naut.	Civil		8	9	10	11
	d h	o ' / o '	o ' / o '	o ' / o '	o ' / o '	o ' / o '	o ' / o '				h m	h m	h m	h m
8 00	177 16.9 S 4 56.8	19 02.6 5.7 N16 49.7 10.1 60.9	N 72	04 28	05 48	06 55	13 53	16 25	18 41	20 50				
01	192 17.0 55.8	33 27.3 5.7 16 39.6 10.3 60.9	N 70	04 38	05 49	06 50	14 24	16 39	18 45	20 45				
02	207 17.2 54.9	47 52.0 5.8 16 29.3 10.4 60.9	68	04 45	05 51	06 46	14 46	16 50	18 48	20 41				
03	222 17.3 . . 53.9	62 16.8 5.8 16 18.9 10.5 60.9	66	04 52	05 52	06 42	15 04	16 59	18 50	20 37				
04	237 17.5 52.9	76 41.6 5.9 16 08.4 10.6 60.9	64	04 57	05 52	06 40	15 18	17 07	18 52	20 34				
05	252 17.7 51.9	91 06.5 6.0 15 57.8 10.7 60.9	62	05 01	05 53	06 37	15 30	17 13	18 54	20 32				
06	267 17.8 S 4 51.0	105 31.5 6.0 N15 47.1 10.8 60.9	60	05 05	05 53	06 35	15 40	17 19	18 55	20 29				
07	282 18.0 50.0	119 56.5 6.1 15 36.3 10.9 60.9	N 58	05 08	05 54	06 33	15 48	17 24	18 57	20 27				
T 08	297 18.1 49.0	134 21.6 6.2 15 25.4 11.0 60.9	56	05 11	05 54	06 31	15 56	17 28	18 58	20 26				
H 09	312 18.3 . . 48.0	148 46.8 6.2 15 14.4 11.2 60.9	54	05 13	05 54	06 29	16 03	17 32	18 59	20 24				
U 10	327 18.4 47.1	163 12.0 6.3 15 03.2 11.2 60.9	52	05 15	05 54	06 28	16 09	17 35	19 00	20 23				
R 11	342 18.6 46.1	177 37.3 6.4 14 52.0 11.4 60.9	50	05 17	05 54	06 27	16 14	17 39	19 01	20 21				
S 12	357 18.7 S 4 45.1	192 02.7 6.4 N14 40.6 11.4 60.9	45	05 20	05 54	06 24	16 26	17 45	19 03	20 19				
D 13	12 18.9 44.1	206 28.1 6.4 14 29.2 11.5 60.9	N 40	05 23	05 54	06 21	16 36	17 51	19 05	20 16				
A 14	27 19.1 43.2	220 53.5 6.6 14 17.7 11.6 60.9	35	05 24	05 54	06 19	16 44	17 56	19 06	20 14				
Y 15	42 19.2 . . 42.2	235 19.1 6.6 14 06.1 11.8 60.9	30	05 25	05 53	06 17	16 51	18 00	19 08	20 13				
16	57 19.4 41.2	249 44.7 6.7 13 54.3 11.8 60.9	20	05 26	05 51	06 14	17 04	18 08	19 10	20 10				
17	72 19.5 40.2	264 10.4 6.7 13 42.5 11.9 60.9	N 10	05 25	05 49	06 10	17 15	18 14	19 12	20 07				
18	87 19.7 S 4 39.3	278 36.1 6.8 N13 30.6 12.0 60.9	0	05 22	05 46	06 07	17 25	18 21	19 14	20 05				
19	102 19.8 38.3	293 01.9 6.9 13 18.6 12.0 60.9	S 10	05 18	05 43	06 04	17 35	18 27	19 15	20 02				
20	117 20.0 37.3	307 27.8 6.9 13 06.6 12.2 60.9	20	05 13	05 38	06 01	17 46	18 33	19 17	20 00				
21	132 20.2 . . 36.3	321 53.7 7.0 12 54.4 12.2 60.9	30	05 04	05 32	05 56	17 58	18 41	19 20	19 57				
22	147 20.3 35.4	336 19.7 7.1 12 42.2 12.4 60.9	35	04 58	05 28	05 54	18 05	18 45	19 21	19 55				
23	162 20.5 34.4	350 45.8 7.2 12 29.8 12.4 60.9	40	04 52	05 24	05 51	18 13	18 50	19 22	19 54				
9 00	177 20.6 S 4 33.4	5 12.0 7.2 N12 17.4 12.4 60.9	45	04 43	05 18	05 48	18 23	18 55	19 24	19 52				
01	192 20.8 32.4	19 38.2 7.2 12 05.0 12.6 60.9	S 50	04 32	05 11	05 44	18 34	19 02	19 26	19 49				
02	207 20.9 31.5	34 04.4 7.4 11 52.4 12.6 60.9	52	04 26	05 08	05 42	18 39	19 05	19 27	19 48				
03	222 21.1 . . 30.5	48 30.8 7.4 11 39.8 12.7 60.9	54	04 20	05 04	05 40	18 45	19 08	19 28	19 47				
04	237 21.3 29.5	62 57.2 7.4 11 27.1 12.8 60.9	56	04 13	05 00	05 38	18 51	19 12	19 29	19 46				
05	252 21.4 28.5	77 23.6 7.6 11 14.3 12.8 60.8	S 60	03 56	04 50	05 33	19 06	19 20	19 32	19 42				
F	SUN		MOON				Lat.	Sunset		Moonset				
	GHA	Dec	GHA	v	Dec	d	HP	Sunset	Civil	Naut.	8	9	10	11
D 12	357 22.5 S 4 21.7	178 30.7 8.0 N 9 43.1 13.2 60.8	N 72	17 28	18 36	19 57	08 49	08 15	07 52	07 32				
A 13	12 22.7 20.7	192 57.7 8.0 9 29.9 13.3 60.7	N 70	17 33	18 34	19 46	08 16	07 58	07 45	07 33				
Y 14	27 22.8 19.7	207 24.7 8.1 9 16.6 13.4 60.7	68	17 37	18 32	19 38	07 52	07 45	07 39	07 33				
I 15	42 23.0 . . 18.7	221 51.8 8.2 9 03.2 13.4 60.7	66	17 40	18 31	19 31	07 33	07 35	07 34	07 34				
16	57 23.2 17.8	236 19.0 8.2 8 49.8 13.5 60.7	64	17 43	18 30	19 26	07 18	07 25	07 30	07 34				
17	72 23.3 16.8	250 46.2 8.3 8 36.3 13.5 60.7	62	17 45	18 30	19 21	07 05	07 18	07 27	07 34				
18	87 23.5 S 4 15.8	265 13.5 8.3 N 8 22.8 13.6 60.7	60	17 47	18 29	19 17	06 54	07 11	07 24	07 35				
19	102 23.6 14.8	279 40.8 8.5 8 09.2 13.6 60.6	N 58	17 49	18 28	19 14	06 45	07 05	07 21	07 35				
20	117 23.8 13.9	294 08.3 8.4 7 55.6 13.6 60.6	56	17 51	18 28	19 11	06 36	06 59	07 18	07 35				
21	132 24.0 . . 12.9	308 35.7 8.5 7 42.0 13.7 60.6	54	17 53	18 28	19 09	06 29	06 54	07 16	07 35				
22	147 24.1 11.9	323 03.2 8.6 7 28.3 13.7 60.6	52	17 54	18 28	19 07	06 22	06 50	07 14	07 36				
23	162 24.3 10.9	337 30.8 8.7 7 14.6 13.8 60.6	50	17 55	18 27	19 05	06 16	06 46	07 12	07 36				
10 00	177 24.4 S 4 09.9	351 58.5 8.7 N 7 00.8 13.8 60.6	45	17 58	18 27	19 01	06 03	06 37	07 08	07 36				
01	192 24.6 09.0	6 26.2 8.7 6 47.0 13.8 60.5	N 40	18 00	18 27	18 59	05 52	06 30	07 04	07 36				
02	207 24.8 08.0	20 53.9 8.8 6 33.2 13.8 60.5	35	18 03	18 28	18 57	05 42	06 24	07 01	07 37				
03	222 24.9 . . 07.0	35 21.7 8.9 6 19.4 13.9 60.5	30	18 04	18 28	18 56	05 34	06 18	06 59	07 37				
04	237 25.1 06.0	49 49.6 8.9 6 05.5 13.9 60.5	N 10	18 11	18 32	18 56	05 07	06 00	06 50	07 38				
05	252 25.3 05.0	64 17.5 9.0 5 51.6 13.9 60.5	0	18 14	18 35	18 59	04 55	05 52	06 46	07 38				
06	267 25.4 S 4 04.1	78 45.5 9.1 N 5 37.7 14.0 60.4	S 10	18 17	18 38	19 02	04 43	05 43	06 42	07 38				
07	282 25.6 03.1	93 13.6 9.0 5 23.7 14.0 60.4	20	18 20	18 42	19 08	04 30	05 35	06 38	07 38				
S 08	297 25.7 02.1	107 41.6 9.2 5 09.7 14.0 60.4	30	18 24	18 48	19 16	04 15	05 24	06 33	07 39				
A 09	312 25.9 . . 01.1	122 09.8 9.2 4 55.7 14.0 60.4	35	18 26	18 52	19 22	04 06	05 18	06 30	07 39				
T 10	327 26.1 4 00.1	136 38.0 9.2 4 41.7 14.0 60.3	40	18 29	18 56	19 29	03 56	05 12	06 26	07 39				
U 11	342 26.2 3 59.2	151 06.2 9.3 4 27.7 14.1 60.3	45	18 32	19 02	19 37	03 44	05 04	06 23	07 39				
R 12	357 26.4 S 3 58.2	165 34.5 9.3 N 4 13.6 14.0 60.3	S 50	18 36	19 09	19 48	03 30	04 54	06 18	07 40				
D 13	12 26.6 57.2	180 02.8 9.4 3 59.6 14.1 60.3	52	18 38	19 12	19 53	03 23	04 50	06 16	07 40				
A 14	27 26.7 56.2	194 31.2 9.5 3 45.5 14.1 60.2	54	18 40	19 16	19 59	03 15	04 45	06 13	07 40				
Y 15	42 26.9 . . 55.2	208 59.7 9.5 3 31.4 14.1 60.2	56	18 42	19 20	20 06	03 07	04 39	06 11	07 40				
16	57 27.0 54.3	223 28.2 9.5 3 17.3 14.1 60.2	58	18 44	19 24	20 14	02 57	04 33	06 08	07 40				
17	72 27.2 53.3	237 56.7 9.6 3 03.2 14.1 60.2	S 60	18 47	19 29	20 22	02 47	04 26	06 05	07 40				
18	SUN		MOON				Day	Eqn. of Time		Mer.				
	27.4 S 3 52.3	252 25.3 9.6 N 2 49.1 14.1 60.1	00 ^h	12 ^h	Pass.	Upper	Mer.	Mer. Pass.	Age	Phase				
19	102 27.5 51.3	266 53.9 9.7 2 35.0 14.1 60.1	8	10 53	10 45	12 11	23 38	11 10	13 98					
20	117 27.7 50.3	281 22.6 9.7 2 20.9 14.1 60.1	9											