Nighttime astronomical calendar program. Select a site: *SELECT SITE* - Enter single-character code: n .. new site (enter all parameters). x .. exit without change (current: Kitt Peak) k .. Kitt Peak s .. Shattuck Observatory c .. Cambridge, MA - Harvard Coll. Obs. h .. Mt. Hopkins, AZ (MMT, FLWO) p .. Palomar Observatory t .. Tololo (Cerro Tololo Interamerican Obs.) r .. Roque de los Muchachos, La Palma, Canary Is. b .. Black Moshannon Obs., Penn State U. d .. Dominion Astrophysical Obs., Victoria, BC m .. Mauna Kea, Hawaii l .. Lick Observatory Any other char .. OTHER (You'll be prompted for params.) Your answer –¿ The site you've selected is: Kitt Peak. Type 0 for ordinary text, 1 for TeX-style output with one month per page, or 2 for TeX-style output with two months per page: You'll have to edit the TeX output ... look for 'CUT HERE'

This program takes a while to run and produces wide and voluminous output. You probably want to run it in background. See source code or documentation for details of what program will expect. To exit now, give a negative year at the next prompt. Year to print, negative to abort:

```
          ***** 2019 Night-time Astronomical Calendar for Kitt Peak *****

                By John Thorstensen, Dartmouth College

   This calendar is designed to provide information useful for the planning of nighttime observations.
The format should minimize confusion;  each line gives the phenomena for a single (local!) night,
and each line is labeled with both evening and morning (local) day and date.
Note that all times given are LOCAL CIVIL (zone) times.

   The rise/set times printed are the times at which the center of the object is 50 arcminutes below
the geometrical horizon.  At the given twilight, the center of the sun is 18.0 degrees below the geometrical horizon.

   The moon positions (and rise/set times) are generated by an implementation of the Low-Precision formulae
in the Astronomical Almanac.  The Almanac states that the error seldom exceeds 0.3 degrees.
Topocentric corrections are included.  Comparisons with tables for Kitt Peak in the NOAO Newsletter
indicate that the rise-set times are good to +- 2 min or so.  The moon's RA, Dec, and illuminated fraction
are given for local midnight, regardless of whether the moon is actually up at that time.
Note that the moonrise and moonset times are not printed if they occur near mid-day.

   The LST at evening and morning twilight are tabulated.  This gives an accurate idea of the
range of RA's accessible during the night.

   The JD is given (severely rounded off) for local midnight.  Again, this avoids any ambiguity.

   Some credits:  The sidereal time and Julian date routines were originally coded in PL/I by
Steve Maker of Dartmouth College.  The algorithms originated in the old American Ephemeris.
The routine to convert JD back to calendar date is adapted from Numerical Recipes in C, by Press et al.

    CAUTIONS:  I believe that the program which generates these tables is reasonably accurate.  However,
it has not been exhaustively tested, so you should be sure to run 'sanity checks' on the results.  Also,
in view of the approximations used, the results should not be used when high precision is needed.
Extension to dates far from the present (1990) should be done with great caution.  The code has
not been tested for the eastern or southern hemishpheres.  Rise/set times are slightly incaccurate and
rather confusing at circumpolar latitudes, where the concept of a 'night' is blurry.

The daylight savings time conventions (if used) are quite specific (to U. S., post-1986) and subject to change.
I know that the code has many infelicities; if you should find actual errors,please notify
   John.Thorstensen@dartmouth.edu


  [This output comes from a (hopefully) portable, completely self-contained program in the c language.  It is available
from the author and may be used freely for scientific or educational purposes.  If you use it for profit,
please contact the author to arrange a (modest!) fee.
Source code is copyright John Thorstensen, 1990.]
```

MOON PHASES FOR 2019, at Kitt Peak

Times and dates are given in local time, zone = 7 hr West.
They are generally better than +- 2 minutes.

The end of the previous year and the beginning of the next are included for continuity.

NEW		1ST		FULL		LAST	
Dec 07	0 22	Dec 15	4 50	Dec 22	10 50	Dec 29	2 37
Jan 05	18 30	Jan 13	23 46	Jan 20	22 17	Jan 27	14 12
Feb 04	14 05	Feb 12	15 27	Feb 19	8 54	Feb 26	4 30
Mar 06	9 05	Mar 14	3 27	Mar 20	18 43	Mar 27	21 11
Apr 05	1 52	Apr 12	12 06	Apr 19	4 12	Apr 26	15 19
May 04	15 47	May 11	18 13	May 18	14 12	May 26	9 35
Jun 03	3 03	Jun 09	23 01	Jun 17	1 31	Jun 25	2 48
Jul 02	12 17	Jul 09	3 57	Jul 16	14 40	Jul 24	18 20
Jul 31	20 13	Aug 07	10 33	Aug 15	5 31	Aug 23	7 59
Aug 30	3 38	Sep 05	20 12	Sep 13	21 35	Sep 21	19 44
Sep 28	11 28	Oct 05	9 48	Oct 13	14 11	Oct 21	5 42
Oct 27	20 40	Nov 04	3 24	Nov 12	6 37	Nov 19	14 13
Nov 26	8 08	Dec 03	23 59	Dec 11	22 15	Dec 18	21 59
Dec 25	22 16	Jan 02	21 47	Jan 10	12 23	Jan 17	6 01

***** 2019 JANUARY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Tue Jan 01/Wed Jan 02	8485.8	6 20 08	17 38	19 00	6 00	7 22	1 20	12 21	4 17	.....	13	15 53.0	-15 52
Wed Jan 02/Thu Jan 03	8486.8	6 24 05	17 39	19 01	6 00	7 22	1 24	12 25	5 14	.....	7	16 43.6	-18 41
Thu Jan 03/Fri Jan 04	8487.8	6 28 01	17 40	19 02	6 01	7 22	1 29	12 30	6 09	16 02	3	17 34.9	-20 37
Fri Jan 04/Sat Jan 05	8488.8	6 31 58	17 40	19 02	6 01	7 23	1 34	12 34	7 01	16 48	1	18 26.4	-21 36
Sat Jan 05/Sun Jan 06	8489.8	6 35 54	17 41	19 03	6 01	7 23	1 38	12 38	7 49	17 37	0	19 17.8	-21 35
Sun Jan 06/Mon Jan 07	8490.8	6 39 51	17 42	19 04	6 01	7 23	1 43	12 42	.....	18 29	1	20 08.3	-20 37
Mon Jan 07/Tue Jan 08	8491.8	6 43 47	17 43	19 05	6 01	7 23	1 47	12 46	.....	19 22	4	20 57.6	-18 47
Tue Jan 08/Wed Jan 09	8492.8	6 47 44	17 44	19 05	6 01	7 23	1 52	12 50	.....	20 15	9	21 45.4	-16 11
Wed Jan 09/Thu Jan 10	8493.8	6 51 41	17 45	19 06	6 01	7 23	1 57	12 54	.....	21 09	15	22 31.8	-12 56
Thu Jan 10/Fri Jan 11	8494.8	6 55 37	17 45	19 07	6 01	7 23	2 02	12 58	.....	22 02	22	23 17.2	- 9 11
Fri Jan 11/Sat Jan 12	8495.8	6 59 34	17 46	19 07	6 01	7 23	2 06	13 02	.....	22 56	30	0 02.1	- 5 02
Sat Jan 12/Sun Jan 13	8496.8	7 03 30	17 47	19 08	6 01	7 22	2 11	13 06	.....	23 50	39	0 47.2	- 0 39
Sun Jan 13/Mon Jan 14	8497.8	7 07 27	17 48	19 09	6 01	7 22	2 16	13 10	.....	0 46	49	1 33.3	3 52
Mon Jan 14/Tue Jan 15	8498.8	7 11 23	17 49	19 10	6 01	7 22	2 20	13 14	.....	1 43	59	2 21.3	8 21
Tue Jan 15/Wed Jan 16	8499.8	7 15 20	17 50	19 11	6 01	7 22	2 25	13 18	.....	2 44	70	3 12.1	12 35
Wed Jan 16/Thu Jan 17	8500.8	7 19 16	17 51	19 11	6 01	7 22	2 30	13 21	.....	3 47	79	4 06.5	16 19
Thu Jan 17/Fri Jan 18	8501.8	7 23 13	17 51	19 12	6 01	7 22	2 35	13 25	.....	4 52	88	5 05.0	19 14
Fri Jan 18/Sat Jan 19	8502.8	7 27 10	17 52	19 13	6 01	7 21	2 39	13 29	.....	5 57	94	6 07.3	20 59
Sat Jan 19/Sun Jan 20	8503.8	7 31 06	17 53	19 14	6 01	7 21	2 44	13 33	16 21	6 59	99	7 12.3	21 17
Sun Jan 20/Mon Jan 21	8504.8	7 35 03	17 54	19 14	6 00	7 21	2 49	13 36	17 27	7 57	100	8 18.0	19 59
Mon Jan 21/Tue Jan 22	8505.8	7 38 59	17 55	19 15	6 00	7 20	2 53	13 40	18 37	.....	98	9 22.4	17 10
Tue Jan 22/Wed Jan 23	8506.8	7 42 56	17 56	19 16	6 00	7 20	2 58	13 44	19 49	.....	93	10 23.9	13 10
Wed Jan 23/Thu Jan 24	8507.8	7 46 52	17 57	19 17	6 00	7 19	3 03	13 47	20 58	.....	86	11 22.1	8 22
Thu Jan 24/Fri Jan 25	8508.8	7 50 49	17 58	19 18	5 59	7 19	3 08	13 51	22 05	.....	77	12 17.3	3 12
Fri Jan 25/Sat Jan 26	8509.8	7 54 45	17 59	19 18	5 59	7 19	3 12	13 55	23 10	.....	66	13 10.1	- 2 00
Sat Jan 26/Sun Jan 27	8510.8	7 58 42	18 00	19 19	5 59	7 18	3 17	13 58	0 12	.....	56	14 01.4	- 6 55
Sun Jan 27/Mon Jan 28	8511.8	8 02 39	18 01	19 20	5 58	7 18	3 22	14 02	1 12	.....	45	14 51.9	-11 22
Mon Jan 28/Tue Jan 29	8512.8	8 06 35	18 01	19 21	5 58	7 17	3 27	14 05	2 11	.....	35	15 42.2	-15 09
Tue Jan 29/Wed Jan 30	8513.8	8 10 32	18 02	19 22	5 57	7 16	3 31	14 09	3 09	.....	26	16 32.9	-18 10
Wed Jan 30/Thu Jan 31	8514.8	8 14 28	18 03	19 22	5 57	7 16	3 36	14 12	4 04	.....	18	17 23.9	-20 18
Thu Jan 31/Fri Feb 01	8515.8	8 18 25	18 04	19 23	5 56	7 15	3 41	14 16	4 57	.....	11	18 15.1	-21 29

***** 2019 FEBRUARY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Fri Feb 01/Sat Feb 02	8516.8	8 22 21	18 05	19 24	5 56	7 15	3 46	14 19	5 46	.....	6	19 06.2	-21 41
Sat Feb 02/Sun Feb 03	8517.8	8 26 18	18 06	19 25	5 55	7 14	3 50	14 22	6 32	16 24	2	19 56.7	-20 57
Sun Feb 03/Mon Feb 04	8518.8	8 30 14	18 07	19 26	5 55	7 13	3 55	14 26	7 13	17 16	0	20 46.1	-19 18
Mon Feb 04/Tue Feb 05	8519.8	8 34 11	18 08	19 26	5 54	7 12	4 00	14 29	7 51	18 10	0	21 34.2	-16 52
Tue Feb 05/Wed Feb 06	8520.8	8 38 08	18 09	19 27	5 53	7 12	4 05	14 32	.....	19 03	2	22 20.9	-13 46
Wed Feb 06/Thu Feb 07	8521.8	8 42 04	18 10	19 28	5 53	7 11	4 09	14 36	.....	19 57	5	23 06.4	-10 07
Thu Feb 07/Fri Feb 08	8522.8	8 46 01	18 11	19 29	5 52	7 10	4 14	14 39	.....	20 51	10	23 51.1	- 6 04
Fri Feb 08/Sat Feb 09	8523.8	8 49 57	18 11	19 29	5 51	7 09	4 19	14 42	.....	21 44	16	0 35.6	- 1 46
Sat Feb 09/Sun Feb 10	8524.8	8 53 54	18 12	19 30	5 51	7 08	4 23	14 45	.....	22 39	24	1 20.6	2 40
Sun Feb 10/Mon Feb 11	8525.8	8 57 50	18 13	19 31	5 50	7 08	4 28	14 49	.....	23 34	33	2 06.8	7 04
Mon Feb 11/Tue Feb 12	8526.8	9 01 47	18 14	19 32	5 49	7 07	4 33	14 52	.....	0 32	43	2 55.1	11 16
Tue Feb 12/Wed Feb 13	8527.8	9 05 43	18 15	19 33	5 48	7 06	4 38	14 55	.....	1 32	53	3 46.2	15 04
Wed Feb 13/Thu Feb 14	8528.8	9 09 40	18 16	19 33	5 47	7 05	4 42	14 58	.....	2 34	64	4 40.9	18 12
Thu Feb 14/Fri Feb 15	8529.8	9 13 37	18 17	19 34	5 47	7 04	4 47	15 01	.....	3 37	74	5 39.4	20 23
Fri Feb 15/Sat Feb 16	8530.8	9 17 33	18 17	19 35	5 46	7 03	4 52	15 04	.....	4 39	84	6 41.3	21 20
Sat Feb 16/Sun Feb 17	8531.8	9 21 30	18 18	19 36	5 45	7 02	4 56	15 07	.....	5 38	92	7 45.4	20 48
Sun Feb 17/Mon Feb 18	8532.8	9 25 26	18 19	19 36	5 44	7 01	5 01	15 10	16 10	6 32	97	8 49.9	18 43
Mon Feb 18/Tue Feb 19	8533.8	9 29 23	18 20	19 37	5 43	7 00	5 06	15 13	17 21	7 21	100	9 53.2	15 14
Tue Feb 19/Wed Feb 20	8534.8	9 33 19	18 21	19 38	5 42	6 59	5 10	15 16	18 32	.....	99	10 54.1	10 40
Wed Feb 20/Thu Feb 21	8535.8	9 37 16	18 22	19 39	5 41	6 58	5 15	15 19	19 43	.....	96	11 52.4	5 26
Thu Feb 21/Fri Feb 22	8536.8	9 41 12	18 22	19 39	5 40	6 57	5 20	15 22	20 51	.....	89	12 48.2	- 0 01
Fri Feb 22/Sat Feb 23	8537.8	9 45 09	18 23	19 40	5 39	6 56	5 25	15 25	21 57	.....	81	13 42.2	- 5 19
Sat Feb 23/Sun Feb 24	8538.8	9 49 06	18 24	19 41	5 38	6 55	5 29	15 28	23 01	.....	72	14 35.1	-10 09
Sun Feb 24/Mon Feb 25	8539.8	9 53 02	18 25	19 42	5 37	6 54	5 34	15 31	0 02	.....	61	15 27.3	-14 19
Mon Feb 25/Tue Feb 26	8540.8	9 56 59	18 26	19 42	5 36	6 53	5 39	15 34	1 02	.....	51	16 19.4	-17 39
Tue Feb 26/Wed Feb 27	8541.8	10 00 55	18 26	19 43	5 35	6 52	5 43	15 37	1 59	.....	41	17 11.4	-20 03
Wed Feb 27/Thu Feb 28	8542.8	10 04 52	18 27	19 44	5 34	6 50	5 48	15 40	2 53	.....	32	18 03.3	-21 29
Thu Feb 28/Fri Mar 01	8543.8	10 08 48	18 28	19 45	5 33	6 49	5 53	15 42	3 44	.....	23	18 54.8	-21 54

***** 2019 MARCH *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Fri Mar 01/Sat Mar 02	8544.8	10 12 45	18 29	19 45	5 32	6 48	5 57	15 45	4 30	.....	16	19 45.6	-21 21
Sat Mar 02/Sun Mar 03	8545.8	10 16 41	18 29	19 46	5 30	6 47	6 02	15 48	5 13	.....	10	20 35.2	-19 52
Sun Mar 03/Mon Mar 04	8546.8	10 20 38	18 30	19 47	5 29	6 46	6 07	15 51	5 51	.....	5	21 23.5	-17 35
Mon Mar 04/Tue Mar 05	8547.8	10 24 35	18 31	19 48	5 28	6 45	6 11	15 54	6 27	16 58	2	22 10.4	-14 36
Tue Mar 05/Wed Mar 06	8548.8	10 28 31	18 32	19 48	5 27	6 43	6 16	15 56	7 00	17 52	0	22 56.2	-11 02
Wed Mar 06/Thu Mar 07	8549.8	10 32 28	18 32	19 49	5 26	6 42	6 21	15 59	7 32	18 46	0	23 41.2	- 7 02
Thu Mar 07/Fri Mar 08	8550.8	10 36 24	18 33	19 50	5 24	6 41	6 25	16 02	.....	19 40	2	0 25.7	- 2 44
Fri Mar 08/Sat Mar 09	8551.8	10 40 21	18 34	19 50	5 23	6 40	6 30	16 04	.....	20 34	6	1 10.5	1 43
Sat Mar 09/Sun Mar 10	8552.8	10 44 17	18 35	19 51	5 22	6 38	6 35	16 07	.....	21 30	12	1 56.2	6 09
Sun Mar 10/Mon Mar 11	8553.8	10 48 14	18 35	19 52	5 21	6 37	6 39	16 10	.....	22 26	19	2 43.4	10 23
Mon Mar 11/Tue Mar 12	8554.8	10 52 10	18 36	19 53	5 19	6 36	6 44	16 13	.....	23 25	27	3 32.9	14 15
Tue Mar 12/Wed Mar 13	8555.8	10 56 07	18 37	19 53	5 18	6 35	6 49	16 15	.....	0 25	37	4 25.3	17 31
Wed Mar 13/Thu Mar 14	8556.8	11 00 04	18 37	19 54	5 17	6 33	6 54	16 18	.....	1 26	48	5 20.8	19 55
Thu Mar 14/Fri Mar 15	8557.8	11 04 00	18 38	19 55	5 16	6 32	6 58	16 20	.....	2 26	59	6 19.3	21 14
Fri Mar 15/Sat Mar 16	8558.8	11 07 57	18 39	19 56	5 14	6 31	7 03	16 23	.....	3 24	70	7 20.2	21 14
Sat Mar 16/Sun Mar 17	8559.8	11 11 53	18 40	19 56	5 13	6 30	7 08	16 26	.....	4 19	80	8 22.2	19 49
Sun Mar 17/Mon Mar 18	8560.8	11 15 50	18 40	19 57	5 12	6 28	7 12	16 28	.....	5 09	89	9 24.2	16 58
Mon Mar 18/Tue Mar 19	8561.8	11 19 46	18 41	19 58	5 10	6 27	7 17	16 31	.....	5 54	95	10 24.9	12 54
Tue Mar 19/Wed Mar 20	8562.8	11 23 43	18 42	19 59	5 09	6 26	7 22	16 34	17 17	6 36	99	11 23.9	7 56
Wed Mar 20/Thu Mar 21	8563.8	11 27 39	18 42	19 59	5 08	6 25	7 26	16 36	18 26	7 15	100	12 21.0	2 27
Thu Mar 21/Fri Mar 22	8564.8	11 31 36	18 43	20 00	5 06	6 23	7 31	16 39	19 34	.....	98	13 16.7	- 3 06
Fri Mar 22/Sat Mar 23	8565.8	11 35 33	18 44	20 01	5 05	6 22	7 36	16 41	20 41	.....	93	14 11.5	- 8 22
Sat Mar 23/Sun Mar 24	8566.8	11 39 29	18 44	20 02	5 03	6 21	7 41	16 44	21 46	.....	86	15 05.8	-13 02
Sun Mar 24/Mon Mar 25	8567.8	11 43 26	18 45	20 03	5 02	6 19	7 45	16 46	22 48	.....	77	16 00.0	-16 52
Mon Mar 25/Tue Mar 26	8568.8	11 47 22	18 46	20 03	5 01	6 18	7 50	16 49	23 49	.....	68	16 53.9	-19 43
Tue Mar 26/Wed Mar 27	8569.8	11 51 19	18 47	20 04	4 59	6 17	7 55	16 51	0 46	.....	58	17 47.6	-21 30
Wed Mar 27/Thu Mar 28	8570.8	11 55 15	18 47	20 05	4 58	6 16	7 59	16 54	1 39	.....	48	18 40.5	-22 13
Thu Mar 28/Fri Mar 29	8571.8	11 59 12	18 48	20 06	4 57	6 14	8 04	16 57	2 27	.....	39	19 32.4	-21 54
Fri Mar 29/Sat Mar 30	8572.8	12 03 08	18 49	20 06	4 55	6 13	8 09	16 59	3 11	.....	30	20 22.9	-20 38
Sat Mar 30/Sun Mar 31	8573.8	12 07 05	18 49	20 07	4 54	6 12	8 14	17 02	3 51	.....	22	21 11.8	-18 30
Sun Mar 31/Mon Apr 01	8574.8	12 11 02	18 50	20 08	4 52	6 10	8 18	17 04	4 28	.....	15	21 59.2	-15 38

***** 2019 APRIL *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Mon Apr 01/Tue Apr 02	8575.8	12 14 58	18 51	20 09	4 51	6 09	8 23	17 07	5 02	.....	9	22 45.2	-12 09
Tue Apr 02/Wed Apr 03	8576.8	12 18 55	18 51	20 10	4 49	6 08	8 28	17 09	5 33	.....	4	23 30.4	- 8 12
Wed Apr 03/Thu Apr 04	8577.8	12 22 51	18 52	20 11	4 48	6 07	8 33	17 12	6 04	17 34	1	0 15.1	- 3 53
Thu Apr 04/Fri Apr 05	8578.8	12 26 48	18 53	20 11	4 47	6 05	8 38	17 14	6 35	18 28	0	1 00.0	0 36
Fri Apr 05/Sat Apr 06	8579.8	12 30 44	18 53	20 12	4 45	6 04	8 42	17 17	.....	19 24	1	1 45.7	5 08
Sat Apr 06/Sun Apr 07	8580.8	12 34 41	18 54	20 13	4 44	6 03	8 47	17 19	.....	20 21	4	2 32.8	9 30
Sun Apr 07/Mon Apr 08	8581.8	12 38 37	18 55	20 14	4 42	6 02	8 52	17 22	.....	21 19	8	3 22.0	13 31
Mon Apr 08/Tue Apr 09	8582.8	12 42 34	18 55	20 15	4 41	6 00	8 57	17 24	.....	22 20	15	4 13.6	16 57
Tue Apr 09/Wed Apr 10	8583.8	12 46 31	18 56	20 16	4 40	5 59	9 02	17 27	.....	23 20	23	5 08.0	19 35
Wed Apr 10/Thu Apr 11	8584.8	12 50 27	18 57	20 17	4 38	5 58	9 06	17 29	.....	0 21	33	6 05.0	21 10
Thu Apr 11/Fri Apr 12	8585.8	12 54 24	18 57	20 17	4 37	5 57	9 11	17 32	.....	1 19	44	7 03.9	21 30
Fri Apr 12/Sat Apr 13	8586.8	12 58 20	18 58	20 18	4 35	5 56	9 16	17 34	.....	2 13	55	8 03.9	20 30
Sat Apr 13/Sun Apr 14	8587.8	13 02 17	18 59	20 19	4 34	5 54	9 21	17 37	.....	3 03	66	9 03.7	18 08
Sun Apr 14/Mon Apr 15	8588.8	13 06 13	19 00	20 20	4 33	5 53	9 26	17 40	.....	3 48	77	10 02.6	14 34
Mon Apr 15/Tue Apr 16	8589.8	13 10 10	19 00	20 21	4 31	5 52	9 31	17 42	.....	4 29	86	11 00.1	10 01
Tue Apr 16/Wed Apr 17	8590.8	13 14 06	19 01	20 22	4 30	5 51	9 35	17 45	.....	5 08	93	11 56.3	4 48
Wed Apr 17/Thu Apr 18	8591.8	13 18 03	19 02	20 23	4 28	5 50	9 40	17 47	17 13	5 46	98	12 51.5	- 0 44
Thu Apr 18/Fri Apr 19	8592.8	13 22 00	19 02	20 24	4 27	5 49	9 45	17 50	18 19	6 24	100	13 46.3	- 6 13
Fri Apr 19/Sat Apr 20	8593.8	13 25 56	19 03	20 25	4 26	5 47	9 50	17 52	19 25	.....	99	14 41.0	-11 16
Sat Apr 20/Sun Apr 21	8594.8	13 29 53	19 04	20 26	4 24	5 46	9 55	17 55	20 30	.....	95	15 36.1	-15 37
Sun Apr 21/Mon Apr 22	8595.8	13 33 49	19 04	20 27	4 23	5 45	10 00	17 58	21 33	.....	90	16 31.4	-19 01
Mon Apr 22/Tue Apr 23	8596.8	13 37 46	19 05	20 28	4 22	5 44	10 05	18 00	22 33	.....	83	17 26.8	-21 20
Tue Apr 23/Wed Apr 24	8597.8	13 41 42	19 06	20 29	4 20	5 43	10 10	18 03	23 29	.....	74	18 21.7	-22 29
Wed Apr 24/Thu Apr 25	8598.8	13 45 39	19 07	20 29	4 19	5 42	10 15	18 05	0 21	.....	65	19 15.5	-22 32
Thu Apr 25/Fri Apr 26	8599.8	13 49 35	19 07	20 30	4 18	5 41	10 19	18 08	1 08	.....	56	20 07.6	-21 31
Fri Apr 26/Sat Apr 27	8600.8	13 53 32	19 08	20 31	4 16	5 40	10 24	18 11	1 50	.....	46	20 57.7	-19 36
Sat Apr 27/Sun Apr 28	8601.8	13 57 29	19 09	20 32	4 15	5 39	10 29	18 13	2 28	.....	37	21 46.0	-16 53
Sun Apr 28/Mon Apr 29	8602.8	14 01 25	19 09	20 33	4 14	5 38	10 34	18 16	3 02	.....	28	22 32.6	-13 31
Mon Apr 29/Tue Apr 30	8603.8	14 05 22	19 10	20 34	4 13	5 37	10 39	18 19	3 34	.....	20	23 18.0	- 9 39
Tue Apr 30/Wed May 01	8604.8	14 09 18	19 11	20 35	4 11	5 36	10 44	18 21	4 05	.....	13	0 02.8	- 5 23

***** 2019 MAY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Wed May 01/Thu May 02	8605.8	14 13 15	19 12	20 36	4 10	5 35	10 49	18 24	4 36	.....	7	0 47.6	- 0 53
Thu May 02/Fri May 03	8606.8	14 17 11	19 12	20 37	4 09	5 34	10 54	18 27	5 07	.....	3	1 33.2	3 43
Fri May 03/Sat May 04	8607.8	14 21 08	19 13	20 38	4 08	5 33	10 59	18 30	5 41	18 12	1	2 20.1	8 14
Sat May 04/Sun May 05	8608.8	14 25 04	19 14	20 39	4 07	5 32	11 04	18 32	6 17	19 11	0	3 09.2	12 28
Sun May 05/Mon May 06	8609.8	14 29 01	19 14	20 40	4 05	5 31	11 09	18 35	.....	20 12	2	4 00.8	16 10
Mon May 06/Tue May 07	8610.8	14 32 57	19 15	20 41	4 04	5 30	11 14	18 38	.....	21 14	6	4 55.2	19 05
Tue May 07/Wed May 08	8611.8	14 36 54	19 16	20 42	4 03	5 30	11 19	18 41	.....	22 15	12	5 52.2	20 58
Wed May 08/Thu May 09	8612.8	14 40 51	19 17	20 43	4 02	5 29	11 24	18 44	.....	23 15	20	6 51.0	21 38
Thu May 09/Fri May 10	8613.8	14 44 47	19 17	20 44	4 01	5 28	11 29	18 46	.....	0 11	30	7 50.6	20 56
Fri May 10/Sat May 11	8614.8	14 48 44	19 18	20 45	4 00	5 27	11 34	18 49	.....	1 02	41	8 49.8	18 55
Sat May 11/Sun May 12	8615.8	14 52 40	19 19	20 46	3 59	5 26	11 39	18 52	.....	1 47	52	9 47.8	15 41
Sun May 12/Mon May 13	8616.8	14 56 37	19 19	20 47	3 58	5 26	11 43	18 55	.....	2 29	64	10 44.1	11 28
Mon May 13/Tue May 14	8617.8	15 00 33	19 20	20 48	3 57	5 25	11 48	18 58	.....	3 07	74	11 38.8	6 32
Tue May 14/Wed May 15	8618.8	15 04 30	19 21	20 49	3 56	5 24	11 53	19 01	.....	3 44	84	12 32.4	1 12
Wed May 15/Thu May 16	8619.8	15 08 26	19 22	20 50	3 55	5 24	11 58	19 04	.....	4 20	91	13 25.6	- 4 14
Thu May 16/Fri May 17	8620.8	15 12 23	19 22	20 51	3 54	5 23	12 03	19 07	.....	4 57	97	14 19.1	- 9 25
Fri May 17/Sat May 18	8621.8	15 16 20	19 23	20 52	3 53	5 22	12 08	19 10	18 12	5 36	99	15 13.2	-14 05
Sat May 18/Sun May 19	8622.8	15 20 16	19 24	20 53	3 52	5 22	12 13	19 13	19 16	6 18	100	16 08.3	-17 56
Sun May 19/Mon May 20	8623.8	15 24 13	19 24	20 54	3 51	5 21	12 18	19 16	20 18	.....	98	17 04.0	-20 46
Mon May 20/Tue May 21	8624.8	15 28 09	19 25	20 55	3 51	5 21	12 23	19 19	21 17	.....	93	18 00.0	-22 27
Tue May 21/Wed May 22	8625.8	15 32 06	19 26	20 56	3 50	5 20	12 28	19 22	22 12	.....	87	18 55.3	-22 58
Wed May 22/Thu May 23	8626.8	15 36 02	19 26	20 57	3 49	5 20	12 33	19 26	23 01	.....	80	19 49.2	-22 20
Thu May 23/Fri May 24	8627.8	15 39 59	19 27	20 58	3 48	5 19	12 37	19 29	23 46	.....	72	20 41.0	-20 42
Fri May 24/Sat May 25	8628.8	15 43 55	19 28	20 59	3 47	5 19	12 42	19 32	0 26	.....	63	21 30.6	-18 11
Sat May 25/Sun May 26	8629.8	15 47 52	19 28	21 00	3 47	5 18	12 47	19 35	1 02	.....	53	22 18.2	-14 59
Sun May 26/Mon May 27	8630.8	15 51 49	19 29	21 01	3 46	5 18	12 52	19 39	1 34	.....	44	23 04.1	-11 14
Mon May 27/Tue May 28	8631.8	15 55 45	19 30	21 02	3 46	5 17	12 57	19 42	2 06	.....	35	23 49.0	- 7 03
Tue May 28/Wed May 29	8632.8	15 59 42	19 30	21 02	3 45	5 17	13 02	19 45	2 36	.....	26	0 33.6	- 2 36
Wed May 29/Thu May 30	8633.8	16 03 38	19 31	21 03	3 44	5 17	13 06	19 49	3 06	.....	18	1 18.7	2 01
Thu May 30/Fri May 31	8634.8	16 07 35	19 31	21 04	3 44	5 16	13 11	19 52	3 39	.....	11	2 05.0	6 36
Fri May 31/Sat Jun 01	8635.8	16 11 31	19 32	21 05	3 43	5 16	13 16	19 55	4 13	.....	5	2 53.4	11 00

***** 2019 JUNE *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Sat Jun 01/Sun Jun 02	8636.8	16 15 28	19 33	21 06	3 43	5 16	13 21	19 59	4 52	17 58	2	3 44.4	14 57
Sun Jun 02/Mon Jun 03	8637.8	16 19 24	19 33	21 06	3 42	5 16	13 25	20 02	5 36	19 01	0	4 38.6	18 13
Mon Jun 03/Tue Jun 04	8638.8	16 23 21	19 34	21 07	3 42	5 15	13 30	20 06	6 27	20 04	1	5 35.8	20 31
Tue Jun 04/Wed Jun 05	8639.8	16 27 18	19 34	21 08	3 42	5 15	13 35	20 10	.....	21 07	4	6 35.3	21 35
Wed Jun 05/Thu Jun 06	8640.8	16 31 14	19 35	21 09	3 41	5 15	13 39	20 13	.....	22 05	10	7 35.9	21 16
Thu Jun 06/Fri Jun 07	8641.8	16 35 11	19 35	21 09	3 41	5 15	13 44	20 17	.....	22 59	18	8 36.2	19 33
Fri Jun 07/Sat Jun 08	8642.8	16 39 07	19 36	21 10	3 41	5 15	13 48	20 21	.....	23 47	28	9 35.0	16 35
Sat Jun 08/Sun Jun 09	8643.8	16 43 04	19 36	21 10	3 41	5 15	13 53	20 24	.....	0 30	39	10 31.6	12 34
Sun Jun 09/Mon Jun 10	8644.8	16 47 00	19 37	21 11	3 40	5 15	13 58	20 28	.....	1 09	50	11 26.1	7 49
Mon Jun 10/Tue Jun 11	8645.8	16 50 57	19 37	21 12	3 40	5 15	14 02	20 32	.....	1 45	61	12 19.0	2 38
Tue Jun 11/Wed Jun 12	8646.8	16 54 53	19 38	21 12	3 40	5 15	14 07	20 36	.....	2 21	72	13 11.0	- 2 42
Wed Jun 12/Thu Jun 13	8647.8	16 58 50	19 38	21 13	3 40	5 15	14 11	20 39	.....	2 56	82	14 02.9	- 7 53
Thu Jun 13/Fri Jun 14	8648.8	17 02 47	19 38	21 13	3 40	5 15	14 15	20 43	.....	3 33	89	14 55.4	-12 39
Fri Jun 14/Sat Jun 15	8649.8	17 06 43	19 39	21 14	3 40	5 15	14 20	20 47	.....	4 13	95	15 49.0	-16 45
Sat Jun 15/Sun Jun 16	8650.8	17 10 40	19 39	21 14	3 40	5 15	14 24	20 51	18 05	4 57	99	16 43.7	-19 57
Sun Jun 16/Mon Jun 17	8651.8	17 14 36	19 39	21 14	3 40	5 15	14 29	20 55	19 05	5 44	100	17 39.3	-22 05
Mon Jun 17/Tue Jun 18	8652.8	17 18 33	19 40	21 15	3 40	5 15	14 33	20 59	20 01	.....	99	18 34.9	-23 03
Tue Jun 18/Wed Jun 19	8653.8	17 22 29	19 40	21 15	3 40	5 15	14 37	21 03	20 54	.....	96	19 29.7	-22 51
Wed Jun 19/Thu Jun 20	8654.8	17 26 26	19 40	21 15	3 40	5 16	14 41	21 07	21 41	.....	91	20 22.9	-21 34
Thu Jun 20/Fri Jun 21	8655.8	17 30 22	19 40	21 16	3 41	5 16	14 45	21 12	22 23	.....	85	21 13.9	-19 20
Fri Jun 21/Sat Jun 22	8656.8	17 34 19	19 41	21 16	3 41	5 16	14 50	21 16	23 00	.....	78	22 02.7	-16 20
Sat Jun 22/Sun Jun 23	8657.8	17 38 16	19 41	21 16	3 41	5 16	14 54	21 20	23 34	.....	69	22 49.4	-12 42
Sun Jun 23/Mon Jun 24	8658.8	17 42 12	19 41	21 16	3 41	5 16	14 58	21 24	0 06	.....	60	23 34.7	- 8 38
Mon Jun 24/Tue Jun 25	8659.8	17 46 09	19 41	21 16	3 42	5 17	15 02	21 28	0 36	.....	51	0 19.2	- 4 16
Tue Jun 25/Wed Jun 26	8660.8	17 50 05	19 41	21 16	3 42	5 17	15 06	21 33	1 06	.....	41	1 03.7	0 17
Wed Jun 26/Thu Jun 27	8661.8	17 54 02	19 41	21 16	3 42	5 17	15 10	21 37	1 37	.....	32	1 49.0	4 53
Thu Jun 27/Fri Jun 28	8662.8	17 57 58	19 41	21 16	3 43	5 18	15 14	21 41	2 10	.....	23	2 36.1	9 20
Fri Jun 28/Sat Jun 29	8663.8	18 01 55	19 42	21 16	3 43	5 18	15 18	21 46	2 46	.....	15	3 25.8	13 28
Sat Jun 29/Sun Jun 30	8664.8	18 05 51	19 42	21 16	3 44	5 18	15 22	21 50	3 27	.....	8	4 18.7	17 02
Sun Jun 30/Mon Jul 01	8665.8	18 09 48	19 42	21 16	3 44	5 19	15 25	21 55	4 15	17 47	3	5 14.9	19 44

***** 2019 JULY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Mon Jul 01/Tue Jul 02	8666.8	18 13 45	19 42	21 16	3 45	5 19	15 29	21 59	5 10	18 50	0	6 14.3	21 18
Tue Jul 02/Wed Jul 03	8667.8	18 17 41	19 42	21 16	3 45	5 20	15 33	22 04	6 11	19 53	0	7 15.7	21 29
Wed Jul 03/Thu Jul 04	8668.8	18 21 38	19 41	21 16	3 46	5 20	15 37	22 08	.....	20 50	3	8 17.6	20 13
Thu Jul 04/Fri Jul 05	8669.8	18 25 34	19 41	21 15	3 47	5 21	15 40	22 13	.....	21 42	8	9 18.3	17 33
Fri Jul 05/Sat Jul 06	8670.8	18 29 31	19 41	21 15	3 47	5 21	15 44	22 17	.....	22 28	16	10 16.8	13 43
Sat Jul 06/Sun Jul 07	8671.8	18 33 27	19 41	21 15	3 48	5 22	15 48	22 22	.....	23 09	26	11 12.9	9 03
Sun Jul 07/Mon Jul 08	8672.8	18 37 24	19 41	21 14	3 49	5 22	15 51	22 27	.....	23 47	36	12 06.7	3 54
Mon Jul 08/Tue Jul 09	8673.8	18 41 20	19 41	21 14	3 49	5 23	15 55	22 31	.....	0 23	48	12 58.9	- 1 26
Tue Jul 09/Wed Jul 10	8674.8	18 45 17	19 40	21 14	3 50	5 23	15 58	22 36	.....	0 58	59	13 50.5	- 6 39
Wed Jul 10/Thu Jul 11	8675.8	18 49 14	19 40	21 13	3 51	5 24	16 02	22 41	.....	1 35	69	14 42.1	-11 29
Thu Jul 11/Fri Jul 12	8676.8	18 53 10	19 40	21 13	3 52	5 24	16 05	22 45	.....	2 13	79	15 34.5	-15 43
Fri Jul 12/Sat Jul 13	8677.8	18 57 07	19 40	21 12	3 52	5 25	16 09	22 50	.....	2 54	87	16 27.9	-19 08
Sat Jul 13/Sun Jul 14	8678.8	19 01 03	19 39	21 12	3 53	5 25	16 12	22 55	.....	3 39	93	17 22.3	-21 34
Sun Jul 14/Mon Jul 15	8679.8	19 05 00	19 39	21 11	3 54	5 26	16 16	23 00	17 54	4 28	97	18 17.2	-22 53
Mon Jul 15/Tue Jul 16	8680.8	19 08 56	19 39	21 10	3 55	5 27	16 19	23 04	18 47	5 20	100	19 11.9	-23 04
Tue Jul 16/Wed Jul 17	8681.8	19 12 53	19 38	21 10	3 56	5 27	16 22	23 09	19 36	6 14	100	20 05.5	-22 08
Wed Jul 17/Thu Jul 18	8682.8	19 16 49	19 38	21 09	3 56	5 28	16 25	23 14	20 20	.....	98	20 57.4	-20 11
Thu Jul 18/Fri Jul 19	8683.8	19 20 46	19 37	21 08	3 57	5 28	16 29	23 19	20 59	.....	95	21 47.1	-17 24
Fri Jul 19/Sat Jul 20	8684.8	19 24 43	19 37	21 08	3 58	5 29	16 32	23 24	21 34	.....	89	22 34.7	-13 56
Sat Jul 20/Sun Jul 21	8685.8	19 28 39	19 36	21 07	3 59	5 30	16 35	23 28	22 06	.....	83	23 20.6	- 9 59
Sun Jul 21/Mon Jul 22	8686.8	19 32 36	19 36	21 06	4 00	5 30	16 38	23 33	22 37	.....	75	0 05.3	- 5 40
Mon Jul 22/Tue Jul 23	8687.8	19 36 32	19 35	21 05	4 01	5 31	16 41	23 38	23 06	.....	66	0 49.6	- 1 10
Tue Jul 23/Wed Jul 24	8688.8	19 40 29	19 35	21 04	4 02	5 32	16 44	23 43	23 36	.....	57	1 34.2	3 24
Wed Jul 24/Thu Jul 25	8689.8	19 44 25	19 34	21 03	4 03	5 32	16 47	23 48	0 07	.....	47	2 20.0	7 52
Thu Jul 25/Fri Jul 26	8690.8	19 48 22	19 33	21 03	4 04	5 33	16 50	23 53	0 41	.....	37	3 08.0	12 05
Fri Jul 26/Sat Jul 27	8691.8	19 52 18	19 33	21 02	4 05	5 34	16 53	23 58	1 19	.....	27	3 58.7	15 49
Sat Jul 27/Sun Jul 28	8692.8	19 56 15	19 32	21 01	4 05	5 34	16 56	0 02	2 03	.....	18	4 52.9	18 50
Sun Jul 28/Mon Jul 29	8693.8	20 00 12	19 31	21 00	4 06	5 35	16 59	0 07	2 53	.....	11	5 50.6	20 51
Mon Jul 29/Tue Jul 30	8694.8	20 04 08	19 31	20 59	4 07	5 36	17 02	0 12	3 52	17 34	5	6 51.2	21 36
Tue Jul 30/Wed Jul 31	8695.8	20 08 05	19 30	20 58	4 08	5 36	17 05	0 17	4 57	18 34	1	7 53.4	20 53
Wed Jul 31/Thu Aug 01	8696.8	20 12 01	19 29	20 57	4 09	5 37	17 08	0 22	6 06	19 30	0	8 55.5	18 42

***** 2019 AUGUST *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Thu Aug 01/Fri Aug 02	8697.8	20 15 58	19 28	20 56	4 10	5 38	17 11	0 27	.....	20 20	2	9 56.2	15 12
Fri Aug 02/Sat Aug 03	8698.8	20 19 54	19 27	20 54	4 11	5 38	17 14	0 32	.....	21 04	7	10 54.5	10 40
Sat Aug 03/Sun Aug 04	8699.8	20 23 51	19 27	20 53	4 12	5 39	17 17	0 37	.....	21 45	14	11 50.4	5 29
Sun Aug 04/Mon Aug 05	8700.8	20 27 47	19 26	20 52	4 13	5 40	17 19	0 42	.....	22 22	23	12 44.4	0 02
Mon Aug 05/Tue Aug 06	8701.8	20 31 44	19 25	20 51	4 14	5 40	17 22	0 46	.....	22 59	34	13 37.0	- 5 21
Tue Aug 06/Wed Aug 07	8702.8	20 35 41	19 24	20 50	4 15	5 41	17 25	0 51	.....	23 35	45	14 29.2	-10 22
Wed Aug 07/Thu Aug 08	8703.8	20 39 37	19 23	20 49	4 16	5 42	17 28	0 56	.....	0 13	56	15 21.6	-14 47
Thu Aug 08/Fri Aug 09	8704.8	20 43 34	19 22	20 47	4 17	5 42	17 30	1 01	.....	0 54	66	16 14.6	-18 24
Fri Aug 09/Sat Aug 10	8705.8	20 47 30	19 21	20 46	4 18	5 43	17 33	1 06	.....	1 37	75	17 08.3	-21 03
Sat Aug 10/Sun Aug 11	8706.8	20 51 27	19 20	20 45	4 19	5 44	17 36	1 11	.....	2 24	84	18 02.6	-22 38
Sun Aug 11/Mon Aug 12	8707.8	20 55 23	19 19	20 44	4 20	5 44	17 39	1 16	.....	3 15	90	18 56.8	-23 06
Mon Aug 12/Tue Aug 13	8708.8	20 59 20	19 18	20 42	4 21	5 45	17 41	1 21	17 33	4 08	95	19 50.2	-22 28
Tue Aug 13/Wed Aug 14	8709.8	21 03 16	19 17	20 41	4 22	5 46	17 44	1 26	18 18	5 02	99	20 42.2	-20 48
Wed Aug 14/Thu Aug 15	8710.8	21 07 13	19 16	20 40	4 22	5 46	17 47	1 30	18 58	5 57	100	21 32.4	-18 14
Thu Aug 15/Fri Aug 16	8711.8	21 11 10	19 15	20 39	4 23	5 47	17 49	1 35	19 35	.....	99	22 20.6	-14 56
Fri Aug 16/Sat Aug 17	8712.8	21 15 06	19 14	20 37	4 24	5 48	17 52	1 40	20 08	.....	97	23 07.1	-11 05
Sat Aug 17/Sun Aug 18	8713.8	21 19 03	19 13	20 36	4 25	5 48	17 54	1 45	20 39	.....	93	23 52.2	- 6 49
Sun Aug 18/Mon Aug 19	8714.8	21 22 59	19 12	20 35	4 26	5 49	17 57	1 50	21 08	.....	87	0 36.7	- 2 19
Mon Aug 19/Tue Aug 20	8715.8	21 26 56	19 11	20 33	4 27	5 49	18 00	1 55	21 38	.....	80	1 21.1	2 15
Tue Aug 20/Wed Aug 21	8716.8	21 30 52	19 10	20 32	4 28	5 50	18 02	1 59	22 08	.....	72	2 06.2	6 46
Wed Aug 21/Thu Aug 22	8717.8	21 34 49	19 08	20 30	4 29	5 51	18 05	2 04	22 40	.....	63	2 52.9	11 02
Thu Aug 22/Fri Aug 23	8718.8	21 38 45	19 07	20 29	4 30	5 51	18 07	2 09	23 15	.....	53	3 41.9	14 53
Fri Aug 23/Sat Aug 24	8719.8	21 42 42	19 06	20 28	4 31	5 52	18 10	2 14	23 55	.....	42	4 33.9	18 07
Sat Aug 24/Sun Aug 25	8720.8	21 46 39	19 05	20 26	4 31	5 53	18 12	2 19	0 41	.....	32	5 29.1	20 27
Sun Aug 25/Mon Aug 26	8721.8	21 50 35	19 04	20 25	4 32	5 53	18 15	2 24	1 34	.....	22	6 27.4	21 39
Mon Aug 26/Tue Aug 27	8722.8	21 54 32	19 03	20 23	4 33	5 54	18 17	2 28	2 35	.....	14	7 28.1	21 31
Tue Aug 27/Wed Aug 28	8723.8	21 58 28	19 01	20 22	4 34	5 55	18 20	2 33	3 41	17 14	7	8 29.7	19 55
Wed Aug 28/Thu Aug 29	8724.8	22 02 25	19 00	20 21	4 35	5 55	18 22	2 38	4 52	18 06	2	9 31.0	16 54
Thu Aug 29/Fri Aug 30	8725.8	22 06 21	18 59	20 19	4 36	5 56	18 25	2 43	6 04	18 54	0	10 30.7	12 41
Fri Aug 30/Sat Aug 31	8726.8	22 10 18	18 58	20 18	4 36	5 56	18 27	2 47	.....	19 36	1	11 28.5	7 37
Sat Aug 31/Sun Sep 01	8727.8	22 14 14	18 56	20 16	4 37	5 57	18 30	2 52	.....	20 16	5	12 24.3	2 04

***** 2019 SEPTEMBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Sun Sep 01/Mon Sep 02	8728.8	22 18 11	18 55	20 15	4 38	5 58	18 32	2 57	.....	20 54	12	13 18.8	- 3 33
Mon Sep 02/Tue Sep 03	8729.8	22 22 08	18 54	20 13	4 39	5 58	18 35	3 02	.....	21 32	20	14 12.5	- 8 53
Tue Sep 03/Wed Sep 04	8730.8	22 26 04	18 53	20 12	4 40	5 59	18 37	3 06	.....	22 11	30	15 06.1	-13 38
Wed Sep 04/Thu Sep 05	8731.8	22 30 01	18 51	20 10	4 40	6 00	18 40	3 11	.....	22 51	40	15 59.9	-17 34
Thu Sep 05/Fri Sep 06	8732.8	22 33 57	18 50	20 09	4 41	6 00	18 42	3 16	.....	23 35	51	16 54.1	-20 32
Fri Sep 06/Sat Sep 07	8733.8	22 37 54	18 49	20 08	4 42	6 01	18 45	3 21	.....	0 21	61	17 48.6	-22 24
Sat Sep 07/Sun Sep 08	8734.8	22 41 50	18 48	20 06	4 43	6 01	18 47	3 25	.....	1 11	71	18 42.8	-23 08
Sun Sep 08/Mon Sep 09	8735.8	22 45 47	18 46	20 05	4 43	6 02	18 50	3 30	.....	2 03	79	19 36.3	-22 46
Mon Sep 09/Tue Sep 10	8736.8	22 49 43	18 45	20 03	4 44	6 03	18 52	3 35	.....	2 57	86	20 28.4	-21 20
Tue Sep 10/Wed Sep 11	8737.8	22 53 40	18 44	20 02	4 45	6 03	18 55	3 39	16 58	3 52	92	21 18.7	-18 59
Wed Sep 11/Thu Sep 12	8738.8	22 57 37	18 42	20 00	4 46	6 04	18 57	3 44	17 36	4 46	97	22 07.2	-15 51
Thu Sep 12/Fri Sep 13	8739.8	23 01 33	18 41	19 59	4 46	6 04	19 00	3 49	18 10	5 40	99	22 54.0	-12 06
Fri Sep 13/Sat Sep 14	8740.8	23 05 30	18 40	19 57	4 47	6 05	19 02	3 53	18 41	6 34	100	23 39.6	- 7 53
Sat Sep 14/Sun Sep 15	8741.8	23 09 26	18 38	19 56	4 48	6 06	19 05	3 58	19 11	.....	99	0 24.3	- 3 23
Sun Sep 15/Mon Sep 16	8742.8	23 13 23	18 37	19 55	4 49	6 06	19 07	4 03	19 40	.....	96	1 08.8	1 15
Mon Sep 16/Tue Sep 17	8743.8	23 17 19	18 36	19 53	4 49	6 07	19 10	4 07	20 10	.....	91	1 53.9	5 51
Tue Sep 17/Wed Sep 18	8744.8	23 21 16	18 34	19 52	4 50	6 08	19 12	4 12	20 41	.....	85	2 40.2	10 15
Wed Sep 18/Thu Sep 19	8745.8	23 25 12	18 33	19 50	4 51	6 08	19 15	4 17	21 15	.....	77	3 28.3	14 14
Thu Sep 19/Fri Sep 20	8746.8	23 29 09	18 32	19 49	4 52	6 09	19 17	4 21	21 52	.....	68	4 19.0	17 38
Fri Sep 20/Sat Sep 21	8747.8	23 33 06	18 30	19 47	4 52	6 09	19 20	4 26	22 34	.....	58	5 12.5	20 13
Sat Sep 21/Sun Sep 22	8748.8	23 37 02	18 29	19 46	4 53	6 10	19 22	4 31	23 23	.....	47	6 08.7	21 46
Sun Sep 22/Mon Sep 23	8749.8	23 40 59	18 28	19 45	4 54	6 11	19 25	4 35	0 19	.....	37	7 07.2	22 04
Mon Sep 23/Tue Sep 24	8750.8	23 44 55	18 26	19 43	4 54	6 11	19 27	4 40	1 21	.....	26	8 07.1	20 59
Tue Sep 24/Wed Sep 25	8751.8	23 48 52	18 25	19 42	4 55	6 12	19 30	4 45	2 28	.....	17	9 07.1	18 31
Wed Sep 25/Thu Sep 26	8752.8	23 52 48	18 24	19 40	4 56	6 12	19 33	4 49	3 38	16 42	9	10 06.3	14 47
Thu Sep 26/Fri Sep 27	8753.8	23 56 45	18 22	19 39	4 56	6 13	19 35	4 54	4 49	17 26	3	11 04.2	10 02
Fri Sep 27/Sat Sep 28	8754.8	0 00 41	18 21	19 38	4 57	6 14	19 38	4 59	6 00	18 07	0	12 00.6	4 35
Sat Sep 28/Sun Sep 29	8755.8	0 04 38	18 20	19 36	4 58	6 14	19 40	5 03	7 10	18 46	1	12 56.0	- 1 09
Sun Sep 29/Mon Sep 30	8756.8	0 08 35	18 19	19 35	4 58	6 15	19 43	5 08	.....	19 24	4	13 50.8	- 6 47
Mon Sep 30/Tue Oct 01	8757.8	0 12 31	18 17	19 34	4 59	6 16	19 46	5 12	.....	20 03	9	14 45.5	-11 57

***** 2019 OCTOBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Tue Oct 01/Wed Oct 02	8758.8	0 16 28	18 16	19 32	5 00	6 16	19 48	5 17	.....	20 44	17	15 40.6	-16 22
Wed Oct 02/Thu Oct 03	8759.8	0 20 24	18 15	19 31	5 00	6 17	19 51	5 22	.....	21 28	25	16 36.1	-19 47
Thu Oct 03/Fri Oct 04	8760.8	0 24 21	18 13	19 30	5 01	6 18	19 53	5 26	.....	22 14	35	17 31.8	-22 04
Fri Oct 04/Sat Oct 05	8761.8	0 28 17	18 12	19 29	5 02	6 18	19 56	5 31	.....	23 04	45	18 27.1	-23 10
Sat Oct 05/Sun Oct 06	8762.8	0 32 14	18 11	19 27	5 02	6 19	19 59	5 35	.....	23 57	55	19 21.4	-23 05
Sun Oct 06/Mon Oct 07	8763.8	0 36 10	18 10	19 26	5 03	6 20	20 01	5 40	.....	0 51	65	20 14.1	-21 55
Mon Oct 07/Tue Oct 08	8764.8	0 40 07	18 08	19 25	5 04	6 20	20 04	5 45	.....	1 46	74	21 04.9	-19 47
Tue Oct 08/Wed Oct 09	8765.8	0 44 04	18 07	19 24	5 04	6 21	20 07	5 49	.....	2 40	81	21 53.7	-16 49
Wed Oct 09/Thu Oct 10	8766.8	0 48 00	18 06	19 22	5 05	6 22	20 10	5 54	.....	3 34	88	22 40.8	-13 12
Thu Oct 10/Fri Oct 11	8767.8	0 51 57	18 05	19 21	5 06	6 22	20 12	5 59	16 44	4 28	94	23 26.5	- 9 04
Fri Oct 11/Sat Oct 12	8768.8	0 55 53	18 03	19 20	5 06	6 23	20 15	6 03	17 14	5 22	97	0 11.3	- 4 35
Sat Oct 12/Sun Oct 13	8769.8	0 59 50	18 02	19 19	5 07	6 24	20 18	6 08	17 43	6 15	99	0 56.0	0 06
Sun Oct 13/Mon Oct 14	8770.8	1 03 46	18 01	19 18	5 08	6 24	20 21	6 12	18 13	7 10	100	1 41.2	4 49
Mon Oct 14/Tue Oct 15	8771.8	1 07 43	18 00	19 17	5 08	6 25	20 23	6 17	18 43	.....	98	2 27.5	9 22
Tue Oct 15/Wed Oct 16	8772.8	1 11 39	17 59	19 15	5 09	6 26	20 26	6 22	19 16	.....	94	3 15.6	13 35
Wed Oct 16/Thu Oct 17	8773.8	1 15 36	17 58	19 14	5 10	6 27	20 29	6 26	19 52	.....	89	4 06.0	17 13
Thu Oct 17/Fri Oct 18	8774.8	1 19 33	17 56	19 13	5 10	6 27	20 32	6 31	20 33	.....	81	4 59.0	20 04
Fri Oct 18/Sat Oct 19	8775.8	1 23 29	17 55	19 12	5 11	6 28	20 35	6 35	21 19	.....	73	5 54.5	21 54
Sat Oct 19/Sun Oct 20	8776.8	1 27 26	17 54	19 11	5 12	6 29	20 38	6 40	22 11	.....	63	6 52.0	22 32
Sun Oct 20/Mon Oct 21	8777.8	1 31 22	17 53	19 10	5 12	6 30	20 41	6 45	23 10	.....	52	7 50.5	21 50
Mon Oct 21/Tue Oct 22	8778.8	1 35 19	17 52	19 09	5 13	6 30	20 44	6 49	0 13	.....	41	8 49.2	19 49
Tue Oct 22/Wed Oct 23	8779.8	1 39 15	17 51	19 08	5 14	6 31	20 47	6 54	1 20	.....	30	9 47.0	16 31
Wed Oct 23/Thu Oct 24	8780.8	1 43 12	17 50	19 07	5 15	6 32	20 50	6 59	2 28	.....	20	10 43.6	12 10
Thu Oct 24/Fri Oct 25	8781.8	1 47 08	17 49	19 06	5 15	6 33	20 52	7 03	3 37	.....	11	11 39.0	7 02
Fri Oct 25/Sat Oct 26	8782.8	1 51 05	17 48	19 05	5 16	6 33	20 56	7 08	4 46	16 39	5	12 33.5	1 25
Sat Oct 26/Sun Oct 27	8783.8	1 55 02	17 47	19 04	5 17	6 34	20 59	7 13	5 54	17 16	1	13 27.8	- 4 18
Sun Oct 27/Mon Oct 28	8784.8	1 58 58	17 46	19 03	5 17	6 35	21 02	7 17	7 03	17 54	0	14 22.4	- 9 46
Mon Oct 28/Tue Oct 29	8785.8	2 02 55	17 45	19 03	5 18	6 36	21 05	7 22	.....	18 34	2	15 17.7	-14 37
Tue Oct 29/Wed Oct 30	8786.8	2 06 51	17 44	19 02	5 19	6 37	21 08	7 26	.....	19 17	6	16 13.9	-18 35
Wed Oct 30/Thu Oct 31	8787.8	2 10 48	17 43	19 01	5 19	6 37	21 11	7 31	.....	20 03	12	17 10.7	-21 25
Thu Oct 31/Fri Nov 01	8788.8	2 14 44	17 42	19 00	5 20	6 38	21 14	7 36	.....	20 53	20	18 07.4	-23 01

***** 2019 NOVEMBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Fri Nov 01/Sat Nov 02	8789.8	2 18 41	17 41	18 59	5 21	6 39	21 17	7 40	.....	21 46	29	19 03.2	-23 21
Sat Nov 02/Sun Nov 03	8790.8	2 22 37	17 41	18 59	5 22	6 40	21 20	7 45	.....	22 41	38	19 57.4	-22 31
Sun Nov 03/Mon Nov 04	8791.8	2 26 34	17 40	18 58	5 22	6 41	21 24	7 50	.....	23 37	48	20 49.4	-20 39
Mon Nov 04/Tue Nov 05	8792.8	2 30 31	17 39	18 57	5 23	6 41	21 27	7 54	.....	0 32	57	21 39.0	-17 55
Tue Nov 05/Wed Nov 06	8793.8	2 34 27	17 38	18 57	5 24	6 42	21 30	7 59	.....	1 27	67	22 26.5	-14 27
Wed Nov 06/Thu Nov 07	8794.8	2 38 24	17 37	18 56	5 25	6 43	21 33	8 04	.....	2 21	75	23 12.4	-10 27
Thu Nov 07/Fri Nov 08	8795.8	2 42 20	17 37	18 55	5 25	6 44	21 37	8 09	.....	3 14	83	23 57.2	- 6 03
Fri Nov 08/Sat Nov 09	8796.8	2 46 17	17 36	18 55	5 26	6 45	21 40	8 13	.....	4 08	89	0 41.6	- 1 23
Sat Nov 09/Sun Nov 10	8797.8	2 50 13	17 35	18 54	5 27	6 46	21 43	8 18	16 14	5 02	95	1 26.5	3 24
Sun Nov 10/Mon Nov 11	8798.8	2 54 10	17 35	18 53	5 28	6 47	21 47	8 23	16 44	5 58	98	2 12.7	8 06
Mon Nov 11/Tue Nov 12	8799.8	2 58 06	17 34	18 53	5 28	6 47	21 50	8 27	17 16	6 56	100	3 00.7	12 32
Tue Nov 12/Wed Nov 13	8800.8	3 02 03	17 33	18 52	5 29	6 48	21 54	8 32	17 51	7 55	99	3 51.1	16 28
Wed Nov 13/Thu Nov 14	8801.8	3 06 00	17 33	18 52	5 30	6 49	21 57	8 37	18 31	.....	97	4 44.4	19 39
Thu Nov 14/Fri Nov 15	8802.8	3 09 56	17 32	18 52	5 31	6 50	22 01	8 41	19 16	.....	92	5 40.3	21 51
Fri Nov 15/Sat Nov 16	8803.8	3 13 53	17 32	18 51	5 31	6 51	22 04	8 46	20 07	.....	85	6 38.2	22 50
Sat Nov 16/Sun Nov 17	8804.8	3 17 49	17 31	18 51	5 32	6 52	22 08	8 51	21 04	.....	77	7 37.2	22 28
Sun Nov 17/Mon Nov 18	8805.8	3 21 46	17 31	18 50	5 33	6 53	22 11	8 55	22 06	.....	67	8 35.9	20 45
Mon Nov 18/Tue Nov 19	8806.8	3 25 42	17 30	18 50	5 34	6 54	22 15	9 00	23 10	.....	56	9 33.4	17 47
Tue Nov 19/Wed Nov 20	8807.8	3 29 39	17 30	18 50	5 34	6 54	22 19	9 05	0 16	.....	45	10 29.3	13 44
Wed Nov 20/Thu Nov 21	8808.8	3 33 35	17 29	18 49	5 35	6 55	22 22	9 10	1 23	.....	33	11 23.6	8 53
Thu Nov 21/Fri Nov 22	8809.8	3 37 32	17 29	18 49	5 36	6 56	22 26	9 14	2 29	.....	23	12 16.7	3 30
Fri Nov 22/Sat Nov 23	8810.8	3 41 29	17 29	18 49	5 37	6 57	22 30	9 19	3 36	.....	14	13 09.3	- 2 06
Sat Nov 23/Sun Nov 24	8811.8	3 45 25	17 28	18 49	5 37	6 58	22 33	9 24	4 42	15 49	7	14 02.3	- 7 36
Sun Nov 24/Mon Nov 25	8812.8	3 49 22	17 28	18 49	5 38	6 59	22 37	9 28	5 49	16 26	2	14 56.2	-12 41
Mon Nov 25/Tue Nov 26	8813.8	3 53 18	17 28	18 48	5 39	7 00	22 41	9 33	6 56	17 07	0	15 51.4	-17 02
Tue Nov 26/Wed Nov 27	8814.8	3 57 15	17 28	18 48	5 40	7 00	22 45	9 38	8 01	17 51	1	16 47.9	-20 23
Wed Nov 27/Thu Nov 28	8815.8	4 01 11	17 27	18 48	5 40	7 01	22 49	9 42	.....	18 39	3	17 45.1	-22 32
Thu Nov 28/Fri Nov 29	8816.8	4 05 08	17 27	18 48	5 41	7 02	22 52	9 47	.....	19 32	8	18 42.1	-23 24
Fri Nov 29/Sat Nov 30	8817.8	4 09 04	17 27	18 48	5 42	7 03	22 56	9 52	.....	20 27	14	19 37.8	-23 01
Sat Nov 30/Sun Dec 01	8818.8	4 13 01	17 27	18 48	5 43	7 04	23 00	9 56	.....	21 24	22	20 31.3	-21 30

***** 2019 DECEMBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2019 at start)	JDmid (-2450000)	LMSTmidn	Sun: set	Sun: twi.end	Sun: twi.beg	Sun: rise	LST twilight: eve	LST twilight: morn	Moon: rise	Moon: set	Moon: %illum	Moon: RA	Moon: Dec
Sun Dec 01/Mon Dec 02	8819.8	4 16 58	17 27	18 48	5 43	7 05	23 04	10 01	.....	22 21	31	21 22.3	-19 01
Mon Dec 02/Tue Dec 03	8820.8	4 20 54	17 27	18 48	5 44	7 05	23 08	10 06	.....	23 17	40	22 10.8	-15 46
Tue Dec 03/Wed Dec 04	8821.8	4 24 51	17 27	18 48	5 45	7 06	23 12	10 10	.....	0 11	49	22 57.1	-11 55
Wed Dec 04/Thu Dec 05	8822.8	4 28 47	17 27	18 48	5 45	7 07	23 16	10 15	.....	1 05	59	23 42.0	- 7 39
Thu Dec 05/Fri Dec 06	8823.8	4 32 44	17 27	18 48	5 46	7 08	23 20	10 20	.....	1 58	68	0 26.1	- 3 04
Fri Dec 06/Sat Dec 07	8824.8	4 36 40	17 27	18 49	5 47	7 09	23 24	10 24	.....	2 52	76	1 10.3	1 40
Sat Dec 07/Sun Dec 08	8825.8	4 40 37	17 27	18 49	5 47	7 09	23 29	10 29	.....	3 47	84	1 55.6	6 24
Sun Dec 08/Mon Dec 09	8826.8	4 44 33	17 27	18 49	5 48	7 10	23 33	10 34	.....	4 43	91	2 42.6	10 58
Mon Dec 09/Tue Dec 10	8827.8	4 48 30	17 27	18 49	5 49	7 11	23 37	10 38	15 49	5 42	96	3 32.3	15 10
Tue Dec 10/Wed Dec 11	8828.8	4 52 27	17 27	18 49	5 49	7 12	23 41	10 43	16 27	6 43	99	4 25.0	18 43
Wed Dec 11/Thu Dec 12	8829.8	4 56 23	17 28	18 50	5 50	7 12	23 45	10 47	17 10	7 45	100	5 21.1	21 22
Thu Dec 12/Fri Dec 13	8830.8	5 00 20	17 28	18 50	5 51	7 13	23 50	10 52	18 00	.....	99	6 19.9	22 49
Fri Dec 13/Sat Dec 14	8831.8	5 04 16	17 28	18 50	5 51	7 14	23 54	10 57	18 56	.....	95	7 20.3	22 54
Sat Dec 14/Sun Dec 15	8832.8	5 08 13	17 28	18 51	5 52	7 14	23 58	11 01	19 57	.....	89	8 20.8	21 32
Sun Dec 15/Mon Dec 16	8833.8	5 12 09	17 29	18 51	5 53	7 15	0 02	11 06	21 03	.....	80	9 20.0	18 48
Mon Dec 16/Tue Dec 17	8834.8	5 16 06	17 29	18 51	5 53	7 15	0 07	11 10	22 09	.....	70	10 17.1	14 56
Tue Dec 17/Wed Dec 18	8835.8	5 20 02	17 30	18 52	5 54	7 16	0 11	11 15	23 16	.....	60	11 12.0	10 13
Wed Dec 18/Thu Dec 19	8836.8	5 23 59	17 30	18 52	5 54	7 17	0 15	11 19	0 21	.....	48	12 05.0	4 57
Thu Dec 19/Fri Dec 20	8837.8	5 27 56	17 30	18 53	5 55	7 17	0 20	11 24	1 26	.....	37	12 56.8	- 0 33
Fri Dec 20/Sat Dec 21	8838.8	5 31 52	17 31	18 53	5 55	7 18	0 24	11 28	2 30	.....	26	13 48.4	- 6 01
Sat Dec 21/Sun Dec 22	8839.8	5 35 49	17 31	18 54	5 56	7 18	0 29	11 33	3 35	.....	17	14 40.6	-11 08
Sun Dec 22/Mon Dec 23	8840.8	5 39 45	17 32	18 54	5 56	7 19	0 33	11 37	4 40	.....	10	15 34.0	-15 38
Mon Dec 23/Tue Dec 24	8841.8	5 43 42	17 32	18 55	5 57	7 19	0 38	11 41	5 44	15 44	4	16 28.9	-19 17
Tue Dec 24/Wed Dec 25	8842.8	5 47 38	17 33	18 55	5 57	7 19	0 42	11 46	6 47	16 29	1	17 25.0	-21 51
Wed Dec 25/Thu Dec 26	8843.8	5 51 35	17 33	18 56	5 58	7 20	0 47	11 50	7 45	17 19	0	18 21.7	-23 11
Thu Dec 26/Fri Dec 27	8844.8	5 55 31	17 34	18 56	5 58	7 20	0 51	11 54	.....	18 13	1	19 17.8	-23 15
Fri Dec 27/Sat Dec 28	8845.8	5 59 28	17 35	18 57	5 58	7 21	0 56	11 59	.....	19 10	4	20 12.4	-22 09
Sat Dec 28/Sun Dec 29	8846.8	6 03 25	17 35	18 58	5 59	7 21	1 00	12 03	.....	20 07	9	21 04.6	-19 59
Sun Dec 29/Mon Dec 30	8847.8	6 07 21	17 36	18 58	5 59	7 21	1 05	12 07	.....	21 04	16	21 54.3	-16 58
Mon Dec 30/Tue Dec 31	8848.8	6 11 18	17 37	18 59	5 59	7 22	1 09	12 12	.....	22 00	23	22 41.5	-13 18
Tue Dec 31/Wed Jan 01	8849.8	6 15 14	17 37	18 59	6 00	7 22	1 14	12 16	.....	22 54	32	23 26.7	- 9 09