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:

```
          ***** 2017 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 2017, 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 28 | 23 54 | Jan 05 | 12 48 | Jan 12 | 4 35 | Jan 19 | 15 14 |
| Jan 27 | 17 08 | Feb 03 | 21 20 | Feb 10 | 17 34 | Feb 18 | 12 35 |
| Feb 26 | 8 00 | Mar 05 | 4 34 | Mar 12 | 7 55 | Mar 20 | 9 01 |
| Mar 27 | 19 59 | Apr 03 | 11 41 | Apr 10 | 23 09 | Apr 19 | 3 00 |
| Apr 26 | 5 18 | May 02 | 19 48 | May 10 | 14 44 | May 18 | 17 36 |
| May 25 | 12 46 | Jun 01 | 5 43 | Jun 09 | 6 11 | Jun 17 | 4 35 |
| Jun 23 | 19 33 | Jun 30 | 17 52 | Jul 08 | 21 09 | Jul 16 | 12 28 |
| Jul 23 | 2 47 | Jul 30 | 8 24 | Aug 07 | 11 13 | Aug 14 | 18 17 |
| Aug 21 | 11 32 | Aug 29 | 1 14 | Sep 06 | 0 05 | Sep 12 | 23 27 |
| Sep 19 | 22 31 | Sep 27 | 19 55 | Oct 05 | 11 42 | Oct 12 | 5 27 |
| Oct 19 | 12 13 | Oct 27 | 15 23 | Nov 03 | 22 24 | Nov 10 | 13 38 |
| Nov 18 | 4 43 | Nov 26 | 10 03 | Dec 03 | 8 49 | Dec 10 | 0 53 |
| Dec 17 | 23 31 | Dec 26 | 2 20 | Jan 01 | 19 25 | Jan 08 | 15 27 |

***** 2017 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) (2017 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 Jan 01/Mon Jan 02 | 7755.8 | 6 22 03 | 17 39 | 19 01 | 6 00 | 7 22 | 1 22 | 12 23 | ..... | 21 08 | 15 | 21 58.8 | -11 54 |
| Mon Jan 02/Tue Jan 03 | 7756.8 | 6 25 59 | 17 39 | 19 01 | 6 00 | 7 22 | 1 26 | 12 27 | ..... | 22 06 | 23 | 22 49.6 | - 8 17 |
| Tue Jan 03/Wed Jan 04 | 7757.8 | 6 29 56 | 17 40 | 19 02 | 6 01 | 7 22 | 1 31 | 12 32 | ..... | 23 06 | 33 | 23 40.4 | - 4 13 |
| Wed Jan 04/Thu Jan 05 | 7758.8 | 6 33 52 | 17 41 | 19 03 | 6 01 | 7 23 | 1 36 | 12 36 | ..... | 0 07 | 43 | 0 31.8 | 0 09 |
| Thu Jan 05/Fri Jan 06 | 7759.8 | 6 37 49 | 17 42 | 19 03 | 6 01 | 7 23 | 1 40 | 12 40 | ..... | 1 10 | 54 | 1 24.5 | 4 36 |
| Fri Jan 06/Sat Jan 07 | 7760.8 | 6 41 45 | 17 42 | 19 04 | 6 01 | 7 23 | 1 45 | 12 44 | ..... | 2 14 | 66 | 2 19.1 | 8 53 |
| Sat Jan 07/Sun Jan 08 | 7761.8 | 6 45 42 | 17 43 | 19 05 | 6 01 | 7 23 | 1 50 | 12 48 | ..... | 3 19 | 76 | 3 16.1 | 12 44 |
| Sun Jan 08/Mon Jan 09 | 7762.8 | 6 49 39 | 17 44 | 19 06 | 6 01 | 7 23 | 1 54 | 12 52 | ..... | 4 26 | 86 | 4 15.8 | 15 50 |
| Mon Jan 09/Tue Jan 10 | 7763.8 | 6 53 35 | 17 45 | 19 06 | 6 01 | 7 23 | 1 59 | 12 56 | ..... | 5 31 | 93 | 5 17.6 | 17 53 |
| Tue Jan 10/Wed Jan 11 | 7764.8 | 6 57 32 | 17 46 | 19 07 | 6 01 | 7 23 | 2 04 | 13 00 | 16 12 | 6 33 | 98 | 6 20.7 | 18 42 |
| Wed Jan 11/Thu Jan 12 | 7765.8 | 7 01 28 | 17 47 | 19 08 | 6 01 | 7 23 | 2 09 | 13 04 | 17 13 | 7 30 | 100 | 7 23.4 | 18 11 |
| Thu Jan 12/Fri Jan 13 | 7766.8 | 7 05 25 | 17 47 | 19 09 | 6 01 | 7 22 | 2 13 | 13 08 | 18 16 | ..... | 99 | 8 24.3 | 16 27 |
| Fri Jan 13/Sat Jan 14 | 7767.8 | 7 09 21 | 17 48 | 19 09 | 6 01 | 7 22 | 2 18 | 13 12 | 19 19 | ..... | 96 | 9 22.4 | 13 43 |
| Sat Jan 14/Sun Jan 15 | 7768.8 | 7 13 18 | 17 49 | 19 10 | 6 01 | 7 22 | 2 23 | 13 16 | 20 22 | ..... | 90 | 10 17.2 | 10 17 |
| Sun Jan 15/Mon Jan 16 | 7769.8 | 7 17 14 | 17 50 | 19 11 | 6 01 | 7 22 | 2 27 | 13 19 | 21 22 | ..... | 83 | 11 08.9 | 6 24 |
| Mon Jan 16/Tue Jan 17 | 7770.8 | 7 21 11 | 17 51 | 19 12 | 6 01 | 7 22 | 2 32 | 13 23 | 22 19 | ..... | 74 | 11 58.1 | 2 21 |
| Tue Jan 17/Wed Jan 18 | 7771.8 | 7 25 08 | 17 52 | 19 12 | 6 01 | 7 21 | 2 37 | 13 27 | 23 15 | ..... | 65 | 12 45.5 | - 1 42 |
| Wed Jan 18/Thu Jan 19 | 7772.8 | 7 29 04 | 17 53 | 19 13 | 6 01 | 7 21 | 2 42 | 13 31 | 0 09 | ..... | 55 | 13 31.8 | - 5 35 |
| Thu Jan 19/Fri Jan 20 | 7773.8 | 7 33 01 | 17 54 | 19 14 | 6 01 | 7 21 | 2 46 | 13 35 | 1 02 | ..... | 46 | 14 17.8 | - 9 10 |
| Fri Jan 20/Sat Jan 21 | 7774.8 | 7 36 57 | 17 55 | 19 15 | 6 00 | 7 20 | 2 51 | 13 38 | 1 54 | ..... | 37 | 15 04.0 | -12 21 |
| Sat Jan 21/Sun Jan 22 | 7775.8 | 7 40 54 | 17 56 | 19 16 | 6 00 | 7 20 | 2 56 | 13 42 | 2 47 | ..... | 28 | 15 51.0 | -15 03 |
| Sun Jan 22/Mon Jan 23 | 7776.8 | 7 44 50 | 17 56 | 19 16 | 6 00 | 7 20 | 3 01 | 13 46 | 3 39 | ..... | 20 | 16 39.1 | -17 08 |
| Mon Jan 23/Tue Jan 24 | 7777.8 | 7 48 47 | 17 57 | 19 17 | 5 59 | 7 19 | 3 05 | 13 49 | 4 30 | ..... | 13 | 17 28.5 | -18 31 |
| Tue Jan 24/Wed Jan 25 | 7778.8 | 7 52 43 | 17 58 | 19 18 | 5 59 | 7 19 | 3 10 | 13 53 | 5 21 | ..... | 7 | 18 19.1 | -19 06 |
| Wed Jan 25/Thu Jan 26 | 7779.8 | 7 56 40 | 17 59 | 19 19 | 5 59 | 7 18 | 3 15 | 13 56 | 6 09 | 16 13 | 3 | 19 10.6 | -18 50 |
| Thu Jan 26/Fri Jan 27 | 7780.8 | 8 00 37 | 18 00 | 19 20 | 5 58 | 7 18 | 3 19 | 14 00 | 6 56 | 17 06 | 1 | 20 02.6 | -17 40 |
| Fri Jan 27/Sat Jan 28 | 7781.8 | 8 04 33 | 18 01 | 19 20 | 5 58 | 7 17 | 3 24 | 14 04 | 7 39 | 18 02 | 0 | 20 54.7 | -15 38 |
| Sat Jan 28/Sun Jan 29 | 7782.8 | 8 08 30 | 18 02 | 19 21 | 5 58 | 7 17 | 3 29 | 14 07 | ..... | 19 00 | 2 | 21 46.6 | -12 48 |
| Sun Jan 29/Mon Jan 30 | 7783.8 | 8 12 26 | 18 03 | 19 22 | 5 57 | 7 16 | 3 34 | 14 10 | ..... | 20 00 | 5 | 22 38.1 | - 9 18 |
| Mon Jan 30/Tue Jan 31 | 7784.8 | 8 16 23 | 18 04 | 19 23 | 5 57 | 7 15 | 3 38 | 14 14 | ..... | 21 00 | 11 | 23 29.4 | - 5 17 |
| Tue Jan 31/Wed Feb 01 | 7785.8 | 8 20 19 | 18 05 | 19 24 | 5 56 | 7 15 | 3 43 | 14 17 | ..... | 22 01 | 19 | 0 20.9 | - 0 58 |

***** 2017 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) (2017 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 Feb 01/Thu Feb 02 | 7786.8 | 8 24 16 | 18 06 | 19 24 | 5 56 | 7 14 | 3 48 | 14 21 | ..... | 23 03 | 29 | 1 12.9 | 3 27 |
| Thu Feb 02/Fri Feb 03 | 7787.8 | 8 28 12 | 18 06 | 19 25 | 5 55 | 7 14 | 3 53 | 14 24 | ..... | 0 06 | 39 | 2 06.1 | 7 44 |
| Fri Feb 03/Sat Feb 04 | 7788.8 | 8 32 09 | 18 07 | 19 26 | 5 54 | 7 13 | 3 57 | 14 27 | ..... | 1 10 | 50 | 3 01.1 | 11 37 |
| Sat Feb 04/Sun Feb 05 | 7789.8 | 8 36 06 | 18 08 | 19 27 | 5 54 | 7 12 | 4 02 | 14 31 | ..... | 2 14 | 62 | 3 58.1 | 14 51 |
| Sun Feb 05/Mon Feb 06 | 7790.8 | 8 40 02 | 18 09 | 19 28 | 5 53 | 7 11 | 4 07 | 14 34 | ..... | 3 18 | 73 | 4 57.1 | 17 12 |
| Mon Feb 06/Tue Feb 07 | 7791.8 | 8 43 59 | 18 10 | 19 28 | 5 52 | 7 11 | 4 12 | 14 37 | ..... | 4 19 | 82 | 5 57.5 | 18 26 |
| Tue Feb 07/Wed Feb 08 | 7792.8 | 8 47 55 | 18 11 | 19 29 | 5 52 | 7 10 | 4 16 | 14 41 | ..... | 5 17 | 90 | 6 58.5 | 18 27 |
| Wed Feb 08/Thu Feb 09 | 7793.8 | 8 51 52 | 18 12 | 19 30 | 5 51 | 7 09 | 4 21 | 14 44 | ..... | 6 10 | 96 | 7 58.8 | 17 16 |
| Thu Feb 09/Fri Feb 10 | 7794.8 | 8 55 48 | 18 13 | 19 31 | 5 50 | 7 08 | 4 26 | 14 47 | 17 01 | 6 58 | 99 | 8 57.3 | 14 59 |
| Fri Feb 10/Sat Feb 11 | 7795.8 | 8 59 45 | 18 14 | 19 31 | 5 49 | 7 07 | 4 30 | 14 50 | 18 03 | 7 41 | 100 | 9 53.4 | 11 51 |
| Sat Feb 11/Sun Feb 12 | 7796.8 | 9 03 41 | 18 14 | 19 32 | 5 49 | 7 06 | 4 35 | 14 53 | 19 04 | ..... | 98 | 10 46.8 | 8 07 |
| Sun Feb 12/Mon Feb 13 | 7797.8 | 9 07 38 | 18 15 | 19 33 | 5 48 | 7 05 | 4 40 | 14 56 | 20 04 | ..... | 94 | 11 37.8 | 4 04 |
| Mon Feb 13/Tue Feb 14 | 7798.8 | 9 11 35 | 18 16 | 19 34 | 5 47 | 7 04 | 4 45 | 15 00 | 21 01 | ..... | 88 | 12 26.8 | - 0 04 |
| Tue Feb 14/Wed Feb 15 | 7799.8 | 9 15 31 | 18 17 | 19 34 | 5 46 | 7 04 | 4 49 | 15 03 | 21 57 | ..... | 81 | 13 14.5 | - 4 07 |
| Wed Feb 15/Thu Feb 16 | 7800.8 | 9 19 28 | 18 18 | 19 35 | 5 45 | 7 03 | 4 54 | 15 06 | 22 51 | ..... | 72 | 14 01.5 | - 7 54 |
| Thu Feb 16/Fri Feb 17 | 7801.8 | 9 23 24 | 18 19 | 19 36 | 5 44 | 7 02 | 4 59 | 15 09 | 23 44 | ..... | 64 | 14 48.3 | -11 17 |
| Fri Feb 17/Sat Feb 18 | 7802.8 | 9 27 21 | 18 20 | 19 37 | 5 43 | 7 01 | 5 03 | 15 12 | 0 37 | ..... | 54 | 15 35.5 | -14 12 |
| Sat Feb 18/Sun Feb 19 | 7803.8 | 9 31 17 | 18 20 | 19 38 | 5 43 | 7 00 | 5 08 | 15 15 | 1 29 | ..... | 45 | 16 23.4 | -16 31 |
| Sun Feb 19/Mon Feb 20 | 7804.8 | 9 35 14 | 18 21 | 19 38 | 5 42 | 6 59 | 5 13 | 15 18 | 2 21 | ..... | 36 | 17 12.3 | -18 09 |
| Mon Feb 20/Tue Feb 21 | 7805.8 | 9 39 10 | 18 22 | 19 39 | 5 41 | 6 58 | 5 17 | 15 21 | 3 11 | ..... | 27 | 18 02.4 | -19 01 |
| Tue Feb 21/Wed Feb 22 | 7806.8 | 9 43 07 | 18 23 | 19 40 | 5 40 | 6 56 | 5 22 | 15 24 | 4 00 | ..... | 19 | 18 53.4 | -19 03 |
| Wed Feb 22/Thu Feb 23 | 7807.8 | 9 47 04 | 18 24 | 19 40 | 5 39 | 6 55 | 5 27 | 15 27 | 4 48 | ..... | 12 | 19 45.2 | -18 11 |
| Thu Feb 23/Fri Feb 24 | 7808.8 | 9 51 00 | 18 24 | 19 41 | 5 38 | 6 54 | 5 32 | 15 29 | 5 33 | ..... | 6 | 20 37.4 | -16 27 |
| Fri Feb 24/Sat Feb 25 | 7809.8 | 9 54 57 | 18 25 | 19 42 | 5 37 | 6 53 | 5 36 | 15 32 | 6 16 | 16 47 | 2 | 21 29.8 | -13 52 |
| Sat Feb 25/Sun Feb 26 | 7810.8 | 9 58 53 | 18 26 | 19 43 | 5 35 | 6 52 | 5 41 | 15 35 | 6 57 | 17 47 | 0 | 22 22.1 | -10 31 |
| Sun Feb 26/Mon Feb 27 | 7811.8 | 10 02 50 | 18 27 | 19 43 | 5 34 | 6 51 | 5 46 | 15 38 | 7 36 | 18 48 | 1 | 23 14.4 | - 6 35 |
| Mon Feb 27/Tue Feb 28 | 7812.8 | 10 06 46 | 18 28 | 19 44 | 5 33 | 6 50 | 5 50 | 15 41 | ..... | 19 51 | 3 | 0 06.9 | - 2 15 |
| Tue Feb 28/Wed Mar 01 | 7813.8 | 10 10 43 | 18 28 | 19 45 | 5 32 | 6 49 | 5 55 | 15 44 | ..... | 20 54 | 9 | 0 59.8 | 2 14 |

***** 2017 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) (2017 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 Mar 01/Thu Mar 02 | 7814.8 | 10 14 39 | 18 29 | 19 46 | 5 31 | 6 48 | 6 00 | 15 47 | ..... | 21 58 | 16 | 1 53.5 | 6 38 |
| Thu Mar 02/Fri Mar 03 | 7815.8 | 10 18 36 | 18 30 | 19 46 | 5 30 | 6 46 | 6 04 | 15 49 | ..... | 23 03 | 25 | 2 48.5 | 10 41 |
| Fri Mar 03/Sat Mar 04 | 7816.8 | 10 22 33 | 18 31 | 19 47 | 5 29 | 6 45 | 6 09 | 15 52 | ..... | 0 08 | 36 | 3 45.1 | 14 05 |
| Sat Mar 04/Sun Mar 05 | 7817.8 | 10 26 29 | 18 31 | 19 48 | 5 27 | 6 44 | 6 14 | 15 55 | ..... | 1 11 | 47 | 4 43.1 | 16 38 |
| Sun Mar 05/Mon Mar 06 | 7818.8 | 10 30 26 | 18 32 | 19 49 | 5 26 | 6 43 | 6 18 | 15 58 | ..... | 2 13 | 59 | 5 42.1 | 18 08 |
| Mon Mar 06/Tue Mar 07 | 7819.8 | 10 34 22 | 18 33 | 19 49 | 5 25 | 6 42 | 6 23 | 16 00 | ..... | 3 11 | 69 | 6 41.5 | 18 29 |
| Tue Mar 07/Wed Mar 08 | 7820.8 | 10 38 19 | 18 34 | 19 50 | 5 24 | 6 40 | 6 28 | 16 03 | ..... | 4 04 | 79 | 7 40.4 | 17 39 |
| Wed Mar 08/Thu Mar 09 | 7821.8 | 10 42 15 | 18 34 | 19 51 | 5 23 | 6 39 | 6 32 | 16 06 | ..... | 4 52 | 88 | 8 37.9 | 15 46 |
| Thu Mar 09/Fri Mar 10 | 7822.8 | 10 46 12 | 18 35 | 19 52 | 5 21 | 6 38 | 6 37 | 16 08 | ..... | 5 36 | 94 | 9 33.4 | 12 58 |
| Fri Mar 10/Sat Mar 11 | 7823.8 | 10 50 08 | 18 36 | 19 52 | 5 20 | 6 37 | 6 42 | 16 11 | 16 51 | 6 16 | 98 | 10 26.8 | 9 29 |
| Sat Mar 11/Sun Mar 12 | 7824.8 | 10 54 05 | 18 36 | 19 53 | 5 19 | 6 35 | 6 46 | 16 14 | 17 50 | 6 53 | 100 | 11 18.2 | 5 34 |
| Sun Mar 12/Mon Mar 13 | 7825.8 | 10 58 02 | 18 37 | 19 54 | 5 18 | 6 34 | 6 51 | 16 16 | 18 48 | 7 28 | 99 | 12 07.8 | 1 26 |
| Mon Mar 13/Tue Mar 14 | 7826.8 | 11 01 58 | 18 38 | 19 55 | 5 16 | 6 33 | 6 56 | 16 19 | 19 45 | ..... | 97 | 12 56.2 | - 2 42 |
| Tue Mar 14/Wed Mar 15 | 7827.8 | 11 05 55 | 18 39 | 19 55 | 5 15 | 6 32 | 7 01 | 16 22 | 20 40 | ..... | 92 | 13 43.8 | - 6 39 |
| Wed Mar 15/Thu Mar 16 | 7828.8 | 11 09 51 | 18 39 | 19 56 | 5 14 | 6 30 | 7 05 | 16 24 | 21 34 | ..... | 87 | 14 31.3 | -10 15 |
| Thu Mar 16/Fri Mar 17 | 7829.8 | 11 13 48 | 18 40 | 19 57 | 5 12 | 6 29 | 7 10 | 16 27 | 22 27 | ..... | 79 | 15 18.8 | -13 23 |
| Fri Mar 17/Sat Mar 18 | 7830.8 | 11 17 44 | 18 41 | 19 58 | 5 11 | 6 28 | 7 15 | 16 30 | 23 20 | ..... | 71 | 16 06.9 | -15 57 |
| Sat Mar 18/Sun Mar 19 | 7831.8 | 11 21 41 | 18 41 | 19 58 | 5 10 | 6 26 | 7 19 | 16 32 | 0 12 | ..... | 62 | 16 55.8 | -17 50 |
| Sun Mar 19/Mon Mar 20 | 7832.8 | 11 25 37 | 18 42 | 19 59 | 5 08 | 6 25 | 7 24 | 16 35 | 1 02 | ..... | 53 | 17 45.4 | -18 59 |
| Mon Mar 20/Tue Mar 21 | 7833.8 | 11 29 34 | 18 43 | 20 00 | 5 07 | 6 24 | 7 29 | 16 37 | 1 52 | ..... | 43 | 18 35.9 | -19 18 |
| Tue Mar 21/Wed Mar 22 | 7834.8 | 11 33 31 | 18 43 | 20 01 | 5 06 | 6 23 | 7 33 | 16 40 | 2 39 | ..... | 34 | 19 27.0 | -18 45 |
| Wed Mar 22/Thu Mar 23 | 7835.8 | 11 37 27 | 18 44 | 20 01 | 5 04 | 6 21 | 7 38 | 16 42 | 3 24 | ..... | 25 | 20 18.6 | -17 20 |
| Thu Mar 23/Fri Mar 24 | 7836.8 | 11 41 24 | 18 45 | 20 02 | 5 03 | 6 20 | 7 43 | 16 45 | 4 08 | ..... | 17 | 21 10.5 | -15 04 |
| Fri Mar 24/Sat Mar 25 | 7837.8 | 11 45 20 | 18 45 | 20 03 | 5 01 | 6 19 | 7 48 | 16 48 | 4 49 | ..... | 10 | 22 02.6 | -12 00 |
| Sat Mar 25/Sun Mar 26 | 7838.8 | 11 49 17 | 18 46 | 20 04 | 5 00 | 6 18 | 7 52 | 16 50 | 5 30 | ..... | 4 | 22 54.9 | - 8 15 |
| Sun Mar 26/Mon Mar 27 | 7839.8 | 11 53 13 | 18 47 | 20 04 | 4 59 | 6 16 | 7 57 | 16 53 | 6 09 | 17 33 | 1 | 23 47.7 | - 3 59 |
| Mon Mar 27/Tue Mar 28 | 7840.8 | 11 57 10 | 18 48 | 20 05 | 4 57 | 6 15 | 8 02 | 16 55 | 6 49 | 18 37 | 0 | 0 41.2 | 0 34 |
| Tue Mar 28/Wed Mar 29 | 7841.8 | 12 01 06 | 18 48 | 20 06 | 4 56 | 6 14 | 8 07 | 16 58 | ..... | 19 43 | 2 | 1 35.8 | 5 09 |
| Wed Mar 29/Thu Mar 30 | 7842.8 | 12 05 03 | 18 49 | 20 07 | 4 54 | 6 12 | 8 11 | 17 00 | ..... | 20 50 | 6 | 2 31.8 | 9 28 |
| Thu Mar 30/Fri Mar 31 | 7843.8 | 12 09 00 | 18 50 | 20 08 | 4 53 | 6 11 | 8 16 | 17 03 | ..... | 21 57 | 13 | 3 29.3 | 13 12 |
| Fri Mar 31/Sat Apr 01 | 7844.8 | 12 12 56 | 18 50 | 20 09 | 4 52 | 6 10 | 8 21 | 17 05 | ..... | 23 03 | 22 | 4 28.2 | 16 04 |

***** 2017 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) (2017 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 Apr 01/Sun Apr 02 | 7845.8 | 12 16 53 | 18 51 | 20 09 | 4 50 | 6 09 | 8 26 | 17 08 | ..... | 0 07 | 33 | 5 27.9 | 17 52 |
| Sun Apr 02/Mon Apr 03 | 7846.8 | 12 20 49 | 18 52 | 20 10 | 4 49 | 6 07 | 8 30 | 17 10 | ..... | 1 07 | 44 | 6 27.7 | 18 30 |
| Mon Apr 03/Tue Apr 04 | 7847.8 | 12 24 46 | 18 52 | 20 11 | 4 47 | 6 06 | 8 35 | 17 13 | ..... | 2 01 | 55 | 7 26.6 | 17 57 |
| Tue Apr 04/Wed Apr 05 | 7848.8 | 12 28 42 | 18 53 | 20 12 | 4 46 | 6 05 | 8 40 | 17 15 | ..... | 2 51 | 66 | 8 23.8 | 16 19 |
| Wed Apr 05/Thu Apr 06 | 7849.8 | 12 32 39 | 18 54 | 20 13 | 4 45 | 6 04 | 8 45 | 17 18 | ..... | 3 35 | 76 | 9 18.9 | 13 45 |
| Thu Apr 06/Fri Apr 07 | 7850.8 | 12 36 35 | 18 54 | 20 14 | 4 43 | 6 02 | 8 49 | 17 21 | ..... | 4 15 | 84 | 10 11.8 | 10 29 |
| Fri Apr 07/Sat Apr 08 | 7851.8 | 12 40 32 | 18 55 | 20 14 | 4 42 | 6 01 | 8 54 | 17 23 | ..... | 4 53 | 91 | 11 02.7 | 6 43 |
| Sat Apr 08/Sun Apr 09 | 7852.8 | 12 44 29 | 18 56 | 20 15 | 4 40 | 6 00 | 8 59 | 17 26 | ..... | 5 28 | 96 | 11 51.9 | 2 40 |
| Sun Apr 09/Mon Apr 10 | 7853.8 | 12 48 25 | 18 56 | 20 16 | 4 39 | 5 59 | 9 04 | 17 28 | 17 36 | 6 02 | 99 | 12 40.1 | - 1 28 |
| Mon Apr 10/Tue Apr 11 | 7854.8 | 12 52 22 | 18 57 | 20 17 | 4 38 | 5 57 | 9 09 | 17 31 | 18 31 | 6 36 | 100 | 13 27.6 | - 5 30 |
| Tue Apr 11/Wed Apr 12 | 7855.8 | 12 56 18 | 18 58 | 20 18 | 4 36 | 5 56 | 9 14 | 17 33 | 19 25 | ..... | 99 | 14 15.1 | - 9 16 |
| Wed Apr 12/Thu Apr 13 | 7856.8 | 13 00 15 | 18 58 | 20 19 | 4 35 | 5 55 | 9 18 | 17 36 | 20 19 | ..... | 96 | 15 02.7 | -12 37 |
| Thu Apr 13/Fri Apr 14 | 7857.8 | 13 04 11 | 18 59 | 20 20 | 4 33 | 5 54 | 9 23 | 17 38 | 21 12 | ..... | 91 | 15 50.9 | -15 26 |
| Fri Apr 14/Sat Apr 15 | 7858.8 | 13 08 08 | 19 00 | 20 21 | 4 32 | 5 53 | 9 28 | 17 41 | 22 05 | ..... | 85 | 16 39.9 | -17 35 |
| Sat Apr 15/Sun Apr 16 | 7859.8 | 13 12 04 | 19 01 | 20 21 | 4 31 | 5 51 | 9 33 | 17 43 | 22 56 | ..... | 78 | 17 29.5 | -18 59 |
| Sun Apr 16/Mon Apr 17 | 7860.8 | 13 16 01 | 19 01 | 20 22 | 4 29 | 5 50 | 9 38 | 17 46 | 23 45 | ..... | 69 | 18 19.7 | -19 35 |
| Mon Apr 17/Tue Apr 18 | 7861.8 | 13 19 58 | 19 02 | 20 23 | 4 28 | 5 49 | 9 43 | 17 48 | 0 33 | ..... | 60 | 19 10.4 | -19 20 |
| Tue Apr 18/Wed Apr 19 | 7862.8 | 13 23 54 | 19 03 | 20 24 | 4 26 | 5 48 | 9 48 | 17 51 | 1 18 | ..... | 51 | 20 01.4 | -18 13 |
| Wed Apr 19/Thu Apr 20 | 7863.8 | 13 27 51 | 19 03 | 20 25 | 4 25 | 5 47 | 9 52 | 17 54 | 2 02 | ..... | 41 | 20 52.4 | -16 15 |
| Thu Apr 20/Fri Apr 21 | 7864.8 | 13 31 47 | 19 04 | 20 26 | 4 24 | 5 46 | 9 57 | 17 56 | 2 43 | ..... | 31 | 21 43.6 | -13 29 |
| Fri Apr 21/Sat Apr 22 | 7865.8 | 13 35 44 | 19 05 | 20 27 | 4 22 | 5 45 | 10 02 | 17 59 | 3 23 | ..... | 22 | 22 34.9 | -10 01 |
| Sat Apr 22/Sun Apr 23 | 7866.8 | 13 39 40 | 19 05 | 20 28 | 4 21 | 5 44 | 10 07 | 18 01 | 4 02 | ..... | 14 | 23 26.8 | - 5 57 |
| Sun Apr 23/Mon Apr 24 | 7867.8 | 13 43 37 | 19 06 | 20 29 | 4 20 | 5 43 | 10 12 | 18 04 | 4 41 | ..... | 7 | 0 19.6 | - 1 29 |
| Mon Apr 24/Tue Apr 25 | 7868.8 | 13 47 33 | 19 07 | 20 30 | 4 18 | 5 41 | 10 17 | 18 07 | 5 22 | 17 21 | 2 | 1 13.7 | 3 11 |
| Tue Apr 25/Wed Apr 26 | 7869.8 | 13 51 30 | 19 08 | 20 31 | 4 17 | 5 40 | 10 22 | 18 09 | 6 04 | 18 28 | 0 | 2 09.6 | 7 44 |
| Wed Apr 26/Thu Apr 27 | 7870.8 | 13 55 27 | 19 08 | 20 32 | 4 16 | 5 39 | 10 27 | 18 12 | ..... | 19 37 | 1 | 3 07.6 | 11 50 |
| Thu Apr 27/Fri Apr 28 | 7871.8 | 13 59 23 | 19 09 | 20 33 | 4 15 | 5 38 | 10 32 | 18 15 | ..... | 20 46 | 5 | 4 07.5 | 15 10 |
| Fri Apr 28/Sat Apr 29 | 7872.8 | 14 03 20 | 19 10 | 20 34 | 4 13 | 5 37 | 10 37 | 18 17 | ..... | 21 54 | 11 | 5 08.7 | 17 27 |
| Sat Apr 29/Sun Apr 30 | 7873.8 | 14 07 16 | 19 10 | 20 35 | 4 12 | 5 36 | 10 42 | 18 20 | ..... | 22 58 | 20 | 6 10.3 | 18 31 |
| Sun Apr 30/Mon May 01 | 7874.8 | 14 11 13 | 19 11 | 20 36 | 4 11 | 5 35 | 10 47 | 18 23 | ..... | 23 56 | 30 | 7 11.0 | 18 18 |

***** 2017 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) (2017 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 May 01/Tue May 02 | 7875.8 | 14 15 09 | 19 12 | 20 37 | 4 10 | 5 34 | 10 51 | 18 25 | ..... | 0 49 | 40 | 8 09.7 | 16 55 |
| Tue May 02/Wed May 03 | 7876.8 | 14 19 06 | 19 13 | 20 38 | 4 08 | 5 34 | 10 56 | 18 28 | ..... | 1 36 | 51 | 9 05.9 | 14 32 |
| Wed May 03/Thu May 04 | 7877.8 | 14 23 02 | 19 13 | 20 39 | 4 07 | 5 33 | 11 01 | 18 31 | ..... | 2 17 | 62 | 9 59.3 | 11 24 |
| Thu May 04/Fri May 05 | 7878.8 | 14 26 59 | 19 14 | 20 40 | 4 06 | 5 32 | 11 06 | 18 34 | ..... | 2 55 | 72 | 10 50.3 | 7 44 |
| Fri May 05/Sat May 06 | 7879.8 | 14 30 56 | 19 15 | 20 41 | 4 05 | 5 31 | 11 11 | 18 36 | ..... | 3 30 | 81 | 11 39.4 | 3 45 |
| Sat May 06/Sun May 07 | 7880.8 | 14 34 52 | 19 16 | 20 42 | 4 04 | 5 30 | 11 16 | 18 39 | ..... | 4 04 | 88 | 12 27.1 | - 0 22 |
| Sun May 07/Mon May 08 | 7881.8 | 14 38 49 | 19 16 | 20 43 | 4 03 | 5 29 | 11 21 | 18 42 | ..... | 4 37 | 94 | 13 14.2 | - 4 26 |
| Mon May 08/Tue May 09 | 7882.8 | 14 42 45 | 19 17 | 20 44 | 4 02 | 5 28 | 11 26 | 18 45 | ..... | 5 11 | 98 | 14 01.1 | - 8 18 |
| Tue May 09/Wed May 10 | 7883.8 | 14 46 42 | 19 18 | 20 45 | 4 00 | 5 28 | 11 31 | 18 48 | 18 13 | 5 46 | 100 | 14 48.4 | -11 49 |
| Wed May 10/Thu May 11 | 7884.8 | 14 50 38 | 19 18 | 20 46 | 3 59 | 5 27 | 11 36 | 18 51 | 19 07 | 6 23 | 100 | 15 36.3 | -14 50 |
| Thu May 11/Fri May 12 | 7885.8 | 14 54 35 | 19 19 | 20 47 | 3 58 | 5 26 | 11 41 | 18 54 | 19 59 | ..... | 98 | 16 25.2 | -17 15 |
| Fri May 12/Sat May 13 | 7886.8 | 14 58 31 | 19 20 | 20 48 | 3 57 | 5 25 | 11 46 | 18 57 | 20 51 | ..... | 95 | 17 14.8 | -18 55 |
| Sat May 13/Sun May 14 | 7887.8 | 15 02 28 | 19 21 | 20 49 | 3 56 | 5 25 | 11 51 | 18 59 | 21 41 | ..... | 90 | 18 05.2 | -19 48 |
| Sun May 14/Mon May 15 | 7888.8 | 15 06 25 | 19 21 | 20 50 | 3 55 | 5 24 | 11 56 | 19 02 | 22 30 | ..... | 83 | 18 56.0 | -19 49 |
| Mon May 15/Tue May 16 | 7889.8 | 15 10 21 | 19 22 | 20 51 | 3 54 | 5 23 | 12 01 | 19 05 | 23 16 | ..... | 75 | 19 46.8 | -18 58 |
| Tue May 16/Wed May 17 | 7890.8 | 15 14 18 | 19 23 | 20 52 | 3 54 | 5 23 | 12 06 | 19 08 | 23 59 | ..... | 67 | 20 37.5 | -17 16 |
| Wed May 17/Thu May 18 | 7891.8 | 15 18 14 | 19 23 | 20 53 | 3 53 | 5 22 | 12 10 | 19 12 | 0 40 | ..... | 57 | 21 28.0 | -14 46 |
| Thu May 18/Fri May 19 | 7892.8 | 15 22 11 | 19 24 | 20 54 | 3 52 | 5 21 | 12 15 | 19 15 | 1 19 | ..... | 47 | 22 18.3 | -11 34 |
| Fri May 19/Sat May 20 | 7893.8 | 15 26 07 | 19 25 | 20 55 | 3 51 | 5 21 | 12 20 | 19 18 | 1 57 | ..... | 36 | 23 08.8 | - 7 45 |
| Sat May 20/Sun May 21 | 7894.8 | 15 30 04 | 19 25 | 20 56 | 3 50 | 5 20 | 12 25 | 19 21 | 2 35 | ..... | 26 | 23 59.9 | - 3 29 |
| Sun May 21/Mon May 22 | 7895.8 | 15 34 00 | 19 26 | 20 57 | 3 49 | 5 20 | 12 30 | 19 24 | 3 13 | ..... | 17 | 0 52.3 | 1 05 |
| Mon May 22/Tue May 23 | 7896.8 | 15 37 57 | 19 27 | 20 57 | 3 49 | 5 19 | 12 35 | 19 27 | 3 54 | ..... | 9 | 1 46.5 | 5 41 |
| Tue May 23/Wed May 24 | 7897.8 | 15 41 54 | 19 27 | 20 58 | 3 48 | 5 19 | 12 40 | 19 30 | 4 38 | ..... | 4 | 2 43.1 | 10 02 |
| Wed May 24/Thu May 25 | 7898.8 | 15 45 50 | 19 28 | 20 59 | 3 47 | 5 18 | 12 45 | 19 34 | 5 26 | 18 22 | 1 | 3 42.3 | 13 48 |
| Thu May 25/Fri May 26 | 7899.8 | 15 49 47 | 19 29 | 21 00 | 3 46 | 5 18 | 12 49 | 19 37 | 6 20 | 19 31 | 1 | 4 43.7 | 16 39 |
| Fri May 26/Sat May 27 | 7900.8 | 15 53 43 | 19 29 | 21 01 | 3 46 | 5 18 | 12 54 | 19 40 | ..... | 20 39 | 3 | 5 46.5 | 18 17 |
| Sat May 27/Sun May 28 | 7901.8 | 15 57 40 | 19 30 | 21 02 | 3 45 | 5 17 | 12 59 | 19 44 | ..... | 21 43 | 9 | 6 49.3 | 18 36 |
| Sun May 28/Mon May 29 | 7902.8 | 16 01 36 | 19 31 | 21 03 | 3 45 | 5 17 | 13 04 | 19 47 | ..... | 22 41 | 17 | 7 50.6 | 17 37 |
| Mon May 29/Tue May 30 | 7903.8 | 16 05 33 | 19 31 | 21 04 | 3 44 | 5 17 | 13 09 | 19 50 | ..... | 23 32 | 26 | 8 49.3 | 15 30 |
| Tue May 30/Wed May 31 | 7904.8 | 16 09 29 | 19 32 | 21 04 | 3 44 | 5 16 | 13 13 | 19 54 | ..... | 0 16 | 36 | 9 44.8 | 12 30 |
| Wed May 31/Thu Jun 01 | 7905.8 | 16 13 26 | 19 32 | 21 05 | 3 43 | 5 16 | 13 18 | 19 57 | ..... | 0 56 | 47 | 10 37.2 | 8 54 |

***** 2017 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) (2017 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 Jun 01/Fri Jun 02 | 7906.8 | 16 17 23 | 19 33 | 21 06 | 3 43 | 5 16 | 13 23 | 20 01 | ..... | 1 33 | 57 | 11 27.1 | 4 56 |
| Fri Jun 02/Sat Jun 03 | 7907.8 | 16 21 19 | 19 33 | 21 07 | 3 42 | 5 16 | 13 28 | 20 04 | ..... | 2 07 | 67 | 12 15.2 | 0 49 |
| Sat Jun 03/Sun Jun 04 | 7908.8 | 16 25 16 | 19 34 | 21 07 | 3 42 | 5 15 | 13 32 | 20 08 | ..... | 2 40 | 76 | 13 02.2 | - 3 18 |
| Sun Jun 04/Mon Jun 05 | 7909.8 | 16 29 12 | 19 34 | 21 08 | 3 42 | 5 15 | 13 37 | 20 11 | ..... | 3 13 | 84 | 13 48.7 | - 7 15 |
| Mon Jun 05/Tue Jun 06 | 7910.8 | 16 33 09 | 19 35 | 21 09 | 3 41 | 5 15 | 13 42 | 20 15 | ..... | 3 48 | 90 | 14 35.5 | -10 53 |
| Tue Jun 06/Wed Jun 07 | 7911.8 | 16 37 05 | 19 35 | 21 09 | 3 41 | 5 15 | 13 46 | 20 19 | ..... | 4 23 | 95 | 15 22.9 | -14 05 |
| Wed Jun 07/Thu Jun 08 | 7912.8 | 16 41 02 | 19 36 | 21 10 | 3 41 | 5 15 | 13 51 | 20 22 | 17 55 | 5 02 | 98 | 16 11.4 | -16 43 |
| Thu Jun 08/Fri Jun 09 | 7913.8 | 16 44 58 | 19 36 | 21 11 | 3 40 | 5 15 | 13 55 | 20 26 | 18 47 | 5 43 | 100 | 17 00.8 | -18 39 |
| Fri Jun 09/Sat Jun 10 | 7914.8 | 16 48 55 | 19 37 | 21 11 | 3 40 | 5 15 | 14 00 | 20 30 | 19 38 | 6 28 | 99 | 17 51.3 | -19 48 |
| Sat Jun 10/Sun Jun 11 | 7915.8 | 16 52 52 | 19 37 | 21 12 | 3 40 | 5 15 | 14 04 | 20 34 | 20 27 | ..... | 97 | 18 42.3 | -20 06 |
| Sun Jun 11/Mon Jun 12 | 7916.8 | 16 56 48 | 19 38 | 21 12 | 3 40 | 5 15 | 14 09 | 20 37 | 21 14 | ..... | 93 | 19 33.5 | -19 31 |
| Mon Jun 12/Tue Jun 13 | 7917.8 | 17 00 45 | 19 38 | 21 13 | 3 40 | 5 15 | 14 13 | 20 41 | 21 59 | ..... | 87 | 20 24.5 | -18 03 |
| Tue Jun 13/Wed Jun 14 | 7918.8 | 17 04 41 | 19 38 | 21 13 | 3 40 | 5 15 | 14 18 | 20 45 | 22 40 | ..... | 80 | 21 15.1 | -15 47 |
| Wed Jun 14/Thu Jun 15 | 7919.8 | 17 08 38 | 19 39 | 21 14 | 3 40 | 5 15 | 14 22 | 20 49 | 23 19 | ..... | 72 | 22 05.2 | -12 47 |
| Thu Jun 15/Fri Jun 16 | 7920.8 | 17 12 34 | 19 39 | 21 14 | 3 40 | 5 15 | 14 26 | 20 53 | 23 57 | ..... | 62 | 22 55.0 | - 9 10 |
| Fri Jun 16/Sat Jun 17 | 7921.8 | 17 16 31 | 19 40 | 21 15 | 3 40 | 5 15 | 14 31 | 20 57 | 0 33 | ..... | 52 | 23 44.9 | - 5 05 |
| Sat Jun 17/Sun Jun 18 | 7922.8 | 17 20 27 | 19 40 | 21 15 | 3 40 | 5 15 | 14 35 | 21 01 | 1 10 | ..... | 41 | 0 35.5 | - 0 41 |
| Sun Jun 18/Mon Jun 19 | 7923.8 | 17 24 24 | 19 40 | 21 15 | 3 40 | 5 15 | 14 39 | 21 05 | 1 48 | ..... | 30 | 1 27.5 | 3 50 |
| Mon Jun 19/Tue Jun 20 | 7924.8 | 17 28 21 | 19 40 | 21 15 | 3 41 | 5 16 | 14 43 | 21 09 | 2 29 | ..... | 20 | 2 21.7 | 8 14 |
| Tue Jun 20/Wed Jun 21 | 7925.8 | 17 32 17 | 19 41 | 21 16 | 3 41 | 5 16 | 14 47 | 21 14 | 3 14 | ..... | 12 | 3 18.5 | 12 14 |
| Wed Jun 21/Thu Jun 22 | 7926.8 | 17 36 14 | 19 41 | 21 16 | 3 41 | 5 16 | 14 52 | 21 18 | 4 03 | ..... | 5 | 4 18.0 | 15 29 |
| Thu Jun 22/Fri Jun 23 | 7927.8 | 17 40 10 | 19 41 | 21 16 | 3 41 | 5 16 | 14 56 | 21 22 | 4 59 | 18 16 | 1 | 5 20.0 | 17 42 |
| Fri Jun 23/Sat Jun 24 | 7928.8 | 17 44 07 | 19 41 | 21 16 | 3 42 | 5 17 | 15 00 | 21 26 | 6 00 | 19 23 | 0 | 6 23.2 | 18 38 |
| Sat Jun 24/Sun Jun 25 | 7929.8 | 17 48 03 | 19 41 | 21 16 | 3 42 | 5 17 | 15 04 | 21 31 | ..... | 20 25 | 2 | 7 26.1 | 18 13 |
| Sun Jun 25/Mon Jun 26 | 7930.8 | 17 52 00 | 19 41 | 21 16 | 3 42 | 5 17 | 15 08 | 21 35 | ..... | 21 20 | 7 | 8 27.1 | 16 32 |
| Mon Jun 26/Tue Jun 27 | 7931.8 | 17 55 56 | 19 41 | 21 16 | 3 43 | 5 18 | 15 12 | 21 39 | ..... | 22 10 | 14 | 9 25.2 | 13 48 |
| Tue Jun 27/Wed Jun 28 | 7932.8 | 17 59 53 | 19 42 | 21 16 | 3 43 | 5 18 | 15 16 | 21 44 | ..... | 22 53 | 22 | 10 20.1 | 10 19 |
| Wed Jun 28/Thu Jun 29 | 7933.8 | 18 03 50 | 19 42 | 21 16 | 3 44 | 5 18 | 15 20 | 21 48 | ..... | 23 32 | 32 | 11 12.0 | 6 22 |
| Thu Jun 29/Fri Jun 30 | 7934.8 | 18 07 46 | 19 42 | 21 16 | 3 44 | 5 19 | 15 24 | 21 52 | ..... | 0 08 | 42 | 12 01.4 | 2 12 |
| Fri Jun 30/Sat Jul 01 | 7935.8 | 18 11 43 | 19 42 | 21 16 | 3 45 | 5 19 | 15 27 | 21 57 | ..... | 0 42 | 52 | 12 49.2 | - 1 59 |

***** 2017 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) (2017 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 Jul 01/Sun Jul 02 | 7936.8 | 18 15 39 | 19 42 | 21 16 | 3 45 | 5 20 | 15 31 | 22 01 | ..... | 1 15 | 62 | 13 36.0 | - 6 01 |
| Sun Jul 02/Mon Jul 03 | 7937.8 | 18 19 36 | 19 41 | 21 16 | 3 46 | 5 20 | 15 35 | 22 06 | ..... | 1 49 | 71 | 14 22.7 | - 9 47 |
| Mon Jul 03/Tue Jul 04 | 7938.8 | 18 23 32 | 19 41 | 21 16 | 3 46 | 5 20 | 15 39 | 22 10 | ..... | 2 24 | 79 | 15 09.7 | -13 08 |
| Tue Jul 04/Wed Jul 05 | 7939.8 | 18 27 29 | 19 41 | 21 15 | 3 47 | 5 21 | 15 42 | 22 15 | ..... | 3 02 | 87 | 15 57.6 | -15 57 |
| Wed Jul 05/Thu Jul 06 | 7940.8 | 18 31 25 | 19 41 | 21 15 | 3 48 | 5 21 | 15 46 | 22 20 | ..... | 3 42 | 92 | 16 46.6 | -18 08 |
| Thu Jul 06/Fri Jul 07 | 7941.8 | 18 35 22 | 19 41 | 21 15 | 3 48 | 5 22 | 15 50 | 22 24 | 17 34 | 4 26 | 97 | 17 36.7 | -19 33 |
| Fri Jul 07/Sat Jul 08 | 7942.8 | 18 39 19 | 19 41 | 21 14 | 3 49 | 5 22 | 15 53 | 22 29 | 18 24 | 5 12 | 99 | 18 27.8 | -20 08 |
| Sat Jul 08/Sun Jul 09 | 7943.8 | 18 43 15 | 19 41 | 21 14 | 3 50 | 5 23 | 15 57 | 22 34 | 19 12 | 6 03 | 100 | 19 19.4 | -19 50 |
| Sun Jul 09/Mon Jul 10 | 7944.8 | 18 47 12 | 19 40 | 21 13 | 3 50 | 5 23 | 16 00 | 22 38 | 19 58 | ..... | 99 | 20 11.0 | -18 38 |
| Mon Jul 10/Tue Jul 11 | 7945.8 | 18 51 08 | 19 40 | 21 13 | 3 51 | 5 24 | 16 04 | 22 43 | 20 40 | ..... | 96 | 21 02.3 | -16 34 |
| Tue Jul 11/Wed Jul 12 | 7946.8 | 18 55 05 | 19 40 | 21 12 | 3 52 | 5 25 | 16 07 | 22 48 | 21 21 | ..... | 91 | 21 53.0 | -13 45 |
| Wed Jul 12/Thu Jul 13 | 7947.8 | 18 59 01 | 19 39 | 21 12 | 3 53 | 5 25 | 16 10 | 22 52 | 21 59 | ..... | 84 | 22 43.1 | -10 16 |
| Thu Jul 13/Fri Jul 14 | 7948.8 | 19 02 58 | 19 39 | 21 11 | 3 53 | 5 26 | 16 14 | 22 57 | 22 35 | ..... | 76 | 23 32.9 | - 6 18 |
| Fri Jul 14/Sat Jul 15 | 7949.8 | 19 06 54 | 19 39 | 21 11 | 3 54 | 5 26 | 16 17 | 23 02 | 23 11 | ..... | 66 | 0 22.9 | - 1 59 |
| Sat Jul 15/Sun Jul 16 | 7950.8 | 19 10 51 | 19 38 | 21 10 | 3 55 | 5 27 | 16 20 | 23 07 | 23 48 | ..... | 55 | 1 13.7 | 2 27 |
| Sun Jul 16/Mon Jul 17 | 7951.8 | 19 14 48 | 19 38 | 21 09 | 3 56 | 5 27 | 16 24 | 23 11 | 0 26 | ..... | 44 | 2 05.9 | 6 50 |
| Mon Jul 17/Tue Jul 18 | 7952.8 | 19 18 44 | 19 37 | 21 09 | 3 57 | 5 28 | 16 27 | 23 16 | 1 07 | ..... | 33 | 3 00.3 | 10 53 |
| Tue Jul 18/Wed Jul 19 | 7953.8 | 19 22 41 | 19 37 | 21 08 | 3 58 | 5 29 | 16 30 | 23 21 | 1 53 | ..... | 23 | 3 57.3 | 14 21 |
| Wed Jul 19/Thu Jul 20 | 7954.8 | 19 26 37 | 19 36 | 21 07 | 3 59 | 5 29 | 16 33 | 23 26 | 2 44 | ..... | 14 | 4 56.9 | 16 56 |
| Thu Jul 20/Fri Jul 21 | 7955.8 | 19 30 34 | 19 36 | 21 06 | 3 59 | 5 30 | 16 37 | 23 31 | 3 41 | ..... | 6 | 5 58.4 | 18 23 |
| Fri Jul 21/Sat Jul 22 | 7956.8 | 19 34 30 | 19 35 | 21 06 | 4 00 | 5 31 | 16 40 | 23 36 | 4 43 | 18 06 | 2 | 7 00.8 | 18 33 |
| Sat Jul 22/Sun Jul 23 | 7957.8 | 19 38 27 | 19 35 | 21 05 | 4 01 | 5 31 | 16 43 | 23 40 | 5 48 | 19 05 | 0 | 8 02.4 | 17 24 |
| Sun Jul 23/Mon Jul 24 | 7958.8 | 19 42 23 | 19 34 | 21 04 | 4 02 | 5 32 | 16 46 | 23 45 | ..... | 19 58 | 1 | 9 02.1 | 15 05 |
| Mon Jul 24/Tue Jul 25 | 7959.8 | 19 46 20 | 19 34 | 21 03 | 4 03 | 5 33 | 16 49 | 23 50 | ..... | 20 45 | 5 | 9 59.0 | 11 51 |
| Tue Jul 25/Wed Jul 26 | 7960.8 | 19 50 17 | 19 33 | 21 02 | 4 04 | 5 33 | 16 52 | 23 55 | ..... | 21 27 | 11 | 10 53.0 | 8 01 |
| Wed Jul 26/Thu Jul 27 | 7961.8 | 19 54 13 | 19 32 | 21 01 | 4 05 | 5 34 | 16 55 | 24 00 | ..... | 22 05 | 18 | 11 44.2 | 3 50 |
| Thu Jul 27/Fri Jul 28 | 7962.8 | 19 58 10 | 19 32 | 21 00 | 4 06 | 5 34 | 16 58 | 0 05 | ..... | 22 40 | 27 | 12 33.4 | - 0 26 |
| Fri Jul 28/Sat Jul 29 | 7963.8 | 20 02 06 | 19 31 | 20 59 | 4 07 | 5 35 | 17 01 | 0 10 | ..... | 23 15 | 36 | 13 21.1 | - 4 35 |
| Sat Jul 29/Sun Jul 30 | 7964.8 | 20 06 03 | 19 30 | 20 58 | 4 08 | 5 36 | 17 04 | 0 15 | ..... | 23 49 | 46 | 14 08.3 | - 8 30 |
| Sun Jul 30/Mon Jul 31 | 7965.8 | 20 09 59 | 19 29 | 20 57 | 4 09 | 5 36 | 17 07 | 0 19 | ..... | 0 24 | 56 | 14 55.3 | -12 00 |
| Mon Jul 31/Tue Aug 01 | 7966.8 | 20 13 56 | 19 29 | 20 56 | 4 10 | 5 37 | 17 09 | 0 24 | ..... | 1 01 | 65 | 15 42.9 | -15 01 |

***** 2017 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) (2017 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 Aug 01/Wed Aug 02 | 7967.8 | 20 17 52 | 19 28 | 20 55 | 4 11 | 5 38 | 17 12 | 0 29 | ..... | 1 40 | 74 | 16 31.4 | -17 25 |
| Wed Aug 02/Thu Aug 03 | 7968.8 | 20 21 49 | 19 27 | 20 54 | 4 12 | 5 39 | 17 15 | 0 34 | ..... | 2 22 | 82 | 17 21.0 | -19 05 |
| Thu Aug 03/Fri Aug 04 | 7969.8 | 20 25 46 | 19 26 | 20 53 | 4 13 | 5 39 | 17 18 | 0 39 | ..... | 3 08 | 89 | 18 11.6 | -19 58 |
| Fri Aug 04/Sat Aug 05 | 7970.8 | 20 29 42 | 19 25 | 20 52 | 4 14 | 5 40 | 17 21 | 0 44 | ..... | 3 57 | 94 | 19 03.1 | -19 58 |
| Sat Aug 05/Sun Aug 06 | 7971.8 | 20 33 39 | 19 24 | 20 50 | 4 14 | 5 41 | 17 24 | 0 49 | 17 54 | 4 49 | 98 | 19 55.0 | -19 03 |
| Sun Aug 06/Mon Aug 07 | 7972.8 | 20 37 35 | 19 24 | 20 49 | 4 15 | 5 41 | 17 26 | 0 54 | 18 38 | 5 44 | 100 | 20 46.9 | -17 15 |
| Mon Aug 07/Tue Aug 08 | 7973.8 | 20 41 32 | 19 23 | 20 48 | 4 16 | 5 42 | 17 29 | 0 59 | 19 20 | ..... | 100 | 21 38.5 | -14 37 |
| Tue Aug 08/Wed Aug 09 | 7974.8 | 20 45 28 | 19 22 | 20 47 | 4 17 | 5 43 | 17 32 | 1 03 | 19 59 | ..... | 98 | 22 29.6 | -11 16 |
| Wed Aug 09/Thu Aug 10 | 7975.8 | 20 49 25 | 19 21 | 20 46 | 4 18 | 5 43 | 17 34 | 1 08 | 20 37 | ..... | 93 | 23 20.3 | - 7 22 |
| Thu Aug 10/Fri Aug 11 | 7976.8 | 20 53 21 | 19 20 | 20 44 | 4 19 | 5 44 | 17 37 | 1 13 | 21 13 | ..... | 87 | 0 10.8 | - 3 04 |
| Fri Aug 11/Sat Aug 12 | 7977.8 | 20 57 18 | 19 19 | 20 43 | 4 20 | 5 45 | 17 40 | 1 18 | 21 50 | ..... | 79 | 1 01.8 | 1 24 |
| Sat Aug 12/Sun Aug 13 | 7978.8 | 21 01 15 | 19 18 | 20 42 | 4 21 | 5 45 | 17 43 | 1 23 | 22 27 | ..... | 69 | 1 53.7 | 5 49 |
| Sun Aug 13/Mon Aug 14 | 7979.8 | 21 05 11 | 19 17 | 20 41 | 4 22 | 5 46 | 17 45 | 1 28 | 23 07 | ..... | 58 | 2 47.1 | 9 57 |
| Mon Aug 14/Tue Aug 15 | 7980.8 | 21 09 08 | 19 16 | 20 39 | 4 23 | 5 47 | 17 48 | 1 33 | 23 50 | ..... | 47 | 3 42.5 | 13 32 |
| Tue Aug 15/Wed Aug 16 | 7981.8 | 21 13 04 | 19 15 | 20 38 | 4 24 | 5 47 | 17 50 | 1 38 | 0 37 | ..... | 35 | 4 40.1 | 16 20 |
| Wed Aug 16/Thu Aug 17 | 7982.8 | 21 17 01 | 19 14 | 20 37 | 4 25 | 5 48 | 17 53 | 1 42 | 1 30 | ..... | 25 | 5 39.5 | 18 06 |
| Thu Aug 17/Fri Aug 18 | 7983.8 | 21 20 57 | 19 12 | 20 35 | 4 26 | 5 48 | 17 56 | 1 47 | 2 28 | ..... | 15 | 6 40.1 | 18 41 |
| Fri Aug 18/Sat Aug 19 | 7984.8 | 21 24 54 | 19 11 | 20 34 | 4 27 | 5 49 | 17 58 | 1 52 | 3 30 | ..... | 8 | 7 40.8 | 18 00 |
| Sat Aug 19/Sun Aug 20 | 7985.8 | 21 28 50 | 19 10 | 20 33 | 4 27 | 5 50 | 18 01 | 1 57 | 4 35 | 17 45 | 3 | 8 40.2 | 16 08 |
| Sun Aug 20/Mon Aug 21 | 7986.8 | 21 32 47 | 19 09 | 20 31 | 4 28 | 5 50 | 18 03 | 2 02 | 5 40 | 18 35 | 0 | 9 37.6 | 13 15 |
| Mon Aug 21/Tue Aug 22 | 7987.8 | 21 36 44 | 19 08 | 20 30 | 4 29 | 5 51 | 18 06 | 2 07 | 6 44 | 19 19 | 0 | 10 32.5 | 9 38 |
| Tue Aug 22/Wed Aug 23 | 7988.8 | 21 40 40 | 19 07 | 20 28 | 4 30 | 5 52 | 18 08 | 2 11 | ..... | 19 59 | 3 | 11 25.0 | 5 32 |
| Wed Aug 23/Thu Aug 24 | 7989.8 | 21 44 37 | 19 06 | 20 27 | 4 31 | 5 52 | 18 11 | 2 16 | ..... | 20 36 | 8 | 12 15.3 | 1 15 |
| Thu Aug 24/Fri Aug 25 | 7990.8 | 21 48 33 | 19 04 | 20 26 | 4 32 | 5 53 | 18 14 | 2 21 | ..... | 21 12 | 14 | 13 04.1 | - 3 02 |
| Fri Aug 25/Sat Aug 26 | 7991.8 | 21 52 30 | 19 03 | 20 24 | 4 33 | 5 54 | 18 16 | 2 26 | ..... | 21 46 | 22 | 13 52.0 | - 7 05 |
| Sat Aug 26/Sun Aug 27 | 7992.8 | 21 56 26 | 19 02 | 20 23 | 4 33 | 5 54 | 18 19 | 2 31 | ..... | 22 22 | 30 | 14 39.5 | -10 47 |
| Sun Aug 27/Mon Aug 28 | 7993.8 | 22 00 23 | 19 01 | 20 21 | 4 34 | 5 55 | 18 21 | 2 35 | ..... | 22 58 | 39 | 15 27.1 | -14 00 |
| Mon Aug 28/Tue Aug 29 | 7994.8 | 22 04 19 | 19 00 | 20 20 | 4 35 | 5 56 | 18 24 | 2 40 | ..... | 23 36 | 49 | 16 15.3 | -16 37 |
| Tue Aug 29/Wed Aug 30 | 7995.8 | 22 08 16 | 18 58 | 20 18 | 4 36 | 5 56 | 18 26 | 2 45 | ..... | 0 17 | 58 | 17 04.4 | -18 32 |
| Wed Aug 30/Thu Aug 31 | 7996.8 | 22 12 13 | 18 57 | 20 17 | 4 37 | 5 57 | 18 29 | 2 50 | ..... | 1 02 | 68 | 17 54.3 | -19 41 |
| Thu Aug 31/Fri Sep 01 | 7997.8 | 22 16 09 | 18 56 | 20 16 | 4 38 | 5 57 | 18 31 | 2 55 | ..... | 1 49 | 76 | 18 45.2 | -19 59 |

***** 2017 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) (2017 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 Sep 01/Sat Sep 02 | 7998.8 | 22 20 06 | 18 55 | 20 14 | 4 38 | 5 58 | 18 34 | 2 59 | ..... | 2 40 | 84 | 19 36.7 | -19 24 |
| Sat Sep 02/Sun Sep 03 | 7999.8 | 22 24 02 | 18 53 | 20 13 | 4 39 | 5 59 | 18 36 | 3 04 | ..... | 3 34 | 90 | 20 28.5 | -17 54 |
| Sun Sep 03/Mon Sep 04 | 8000.8 | 22 27 59 | 18 52 | 20 11 | 4 40 | 5 59 | 18 39 | 3 09 | 17 16 | 4 30 | 96 | 21 20.4 | -15 33 |
| Mon Sep 04/Tue Sep 05 | 8001.8 | 22 31 55 | 18 51 | 20 10 | 4 41 | 6 00 | 18 41 | 3 13 | 17 56 | 5 28 | 99 | 22 12.1 | -12 24 |
| Tue Sep 05/Wed Sep 06 | 8002.8 | 22 35 52 | 18 49 | 20 08 | 4 42 | 6 00 | 18 44 | 3 18 | 18 35 | 6 27 | 100 | 23 03.7 | - 8 36 |
| Wed Sep 06/Thu Sep 07 | 8003.8 | 22 39 48 | 18 48 | 20 07 | 4 42 | 6 01 | 18 46 | 3 23 | 19 13 | ..... | 99 | 23 55.3 | - 4 18 |
| Thu Sep 07/Fri Sep 08 | 8004.8 | 22 43 45 | 18 47 | 20 05 | 4 43 | 6 02 | 18 49 | 3 28 | 19 50 | ..... | 95 | 0 47.2 | 0 15 |
| Fri Sep 08/Sat Sep 09 | 8005.8 | 22 47 42 | 18 46 | 20 04 | 4 44 | 6 02 | 18 51 | 3 32 | 20 27 | ..... | 89 | 1 40.0 | 4 49 |
| Sat Sep 09/Sun Sep 10 | 8006.8 | 22 51 38 | 18 44 | 20 03 | 4 45 | 6 03 | 18 54 | 3 37 | 21 07 | ..... | 81 | 2 34.0 | 9 08 |
| Sun Sep 10/Mon Sep 11 | 8007.8 | 22 55 35 | 18 43 | 20 01 | 4 45 | 6 04 | 18 56 | 3 42 | 21 49 | ..... | 71 | 3 29.6 | 12 56 |
| Mon Sep 11/Tue Sep 12 | 8008.8 | 22 59 31 | 18 42 | 20 00 | 4 46 | 6 04 | 18 58 | 3 46 | 22 35 | ..... | 60 | 4 26.9 | 15 57 |
| Tue Sep 12/Wed Sep 13 | 8009.8 | 23 03 28 | 18 40 | 19 58 | 4 47 | 6 05 | 19 01 | 3 51 | 23 25 | ..... | 49 | 5 25.7 | 17 58 |
| Wed Sep 13/Thu Sep 14 | 8010.8 | 23 07 24 | 18 39 | 19 57 | 4 48 | 6 05 | 19 03 | 3 56 | 0 20 | ..... | 38 | 6 25.4 | 18 49 |
| Thu Sep 14/Fri Sep 15 | 8011.8 | 23 11 21 | 18 38 | 19 55 | 4 48 | 6 06 | 19 06 | 4 00 | 1 20 | ..... | 27 | 7 25.0 | 18 27 |
| Fri Sep 15/Sat Sep 16 | 8012.8 | 23 15 17 | 18 36 | 19 54 | 4 49 | 6 07 | 19 08 | 4 05 | 2 22 | ..... | 18 | 8 23.5 | 16 55 |
| Sat Sep 16/Sun Sep 17 | 8013.8 | 23 19 14 | 18 35 | 19 52 | 4 50 | 6 07 | 19 11 | 4 10 | 3 25 | ..... | 10 | 9 20.3 | 14 22 |
| Sun Sep 17/Mon Sep 18 | 8014.8 | 23 23 10 | 18 34 | 19 51 | 4 50 | 6 08 | 19 14 | 4 14 | 4 28 | 17 13 | 4 | 10 15.0 | 11 00 |
| Mon Sep 18/Tue Sep 19 | 8015.8 | 23 27 07 | 18 32 | 19 50 | 4 51 | 6 08 | 19 16 | 4 19 | 5 30 | 17 54 | 1 | 11 07.4 | 7 04 |
| Tue Sep 19/Wed Sep 20 | 8016.8 | 23 31 04 | 18 31 | 19 48 | 4 52 | 6 09 | 19 19 | 4 24 | 6 30 | 18 32 | 0 | 11 58.0 | 2 50 |
| Wed Sep 20/Thu Sep 21 | 8017.8 | 23 35 00 | 18 30 | 19 47 | 4 53 | 6 10 | 19 21 | 4 28 | ..... | 19 08 | 1 | 12 47.1 | - 1 29 |
| Thu Sep 21/Fri Sep 22 | 8018.8 | 23 38 57 | 18 28 | 19 45 | 4 53 | 6 10 | 19 24 | 4 33 | ..... | 19 43 | 5 | 13 35.3 | - 5 40 |
| Fri Sep 22/Sat Sep 23 | 8019.8 | 23 42 53 | 18 27 | 19 44 | 4 54 | 6 11 | 19 26 | 4 38 | ..... | 20 18 | 10 | 14 23.1 | - 9 32 |
| Sat Sep 23/Sun Sep 24 | 8020.8 | 23 46 50 | 18 26 | 19 43 | 4 55 | 6 12 | 19 29 | 4 42 | ..... | 20 54 | 16 | 15 10.9 | -12 57 |
| Sun Sep 24/Mon Sep 25 | 8021.8 | 23 50 46 | 18 24 | 19 41 | 4 55 | 6 12 | 19 31 | 4 47 | ..... | 21 32 | 24 | 15 59.0 | -15 48 |
| Mon Sep 25/Tue Sep 26 | 8022.8 | 23 54 43 | 18 23 | 19 40 | 4 56 | 6 13 | 19 34 | 4 52 | ..... | 22 12 | 32 | 16 47.8 | -17 59 |
| Tue Sep 26/Wed Sep 27 | 8023.8 | 23 58 39 | 18 22 | 19 38 | 4 57 | 6 13 | 19 36 | 4 56 | ..... | 22 55 | 42 | 17 37.2 | -19 24 |
| Wed Sep 27/Thu Sep 28 | 8024.8 | 0 02 36 | 18 20 | 19 37 | 4 57 | 6 14 | 19 39 | 5 01 | ..... | 23 41 | 51 | 18 27.3 | -19 59 |
| Thu Sep 28/Fri Sep 29 | 8025.8 | 0 06 33 | 18 19 | 19 36 | 4 58 | 6 15 | 19 42 | 5 05 | ..... | 0 30 | 60 | 19 18.0 | -19 43 |
| Fri Sep 29/Sat Sep 30 | 8026.8 | 0 10 29 | 18 18 | 19 34 | 4 59 | 6 15 | 19 44 | 5 10 | ..... | 1 22 | 70 | 20 09.0 | -18 34 |
| Sat Sep 30/Sun Oct 01 | 8027.8 | 0 14 26 | 18 17 | 19 33 | 4 59 | 6 16 | 19 47 | 5 15 | ..... | 2 17 | 78 | 21 00.2 | -16 32 |

***** 2017 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) (2017 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 Oct 01/Mon Oct 02 | 8028.8 | 0 18 22 | 18 15 | 19 32 | 5 00 | 6 17 | 19 49 | 5 19 | ..... | 3 13 | 86 | 21 51.5 | -13 41 |
| Mon Oct 02/Tue Oct 03 | 8029.8 | 0 22 19 | 18 14 | 19 31 | 5 01 | 6 17 | 19 52 | 5 24 | 16 30 | 4 12 | 92 | 22 43.0 | -10 07 |
| Tue Oct 03/Wed Oct 04 | 8030.8 | 0 26 15 | 18 13 | 19 29 | 5 01 | 6 18 | 19 55 | 5 28 | 17 08 | 5 13 | 97 | 23 34.8 | - 5 56 |
| Wed Oct 04/Thu Oct 05 | 8031.8 | 0 30 12 | 18 11 | 19 28 | 5 02 | 6 19 | 19 57 | 5 33 | 17 46 | 6 15 | 100 | 0 27.3 | - 1 22 |
| Thu Oct 05/Fri Oct 06 | 8032.8 | 0 34 08 | 18 10 | 19 27 | 5 03 | 6 19 | 20 00 | 5 38 | 18 24 | 7 18 | 99 | 1 20.8 | 3 22 |
| Fri Oct 06/Sat Oct 07 | 8033.8 | 0 38 05 | 18 09 | 19 25 | 5 03 | 6 20 | 20 03 | 5 42 | 19 03 | ..... | 97 | 2 15.9 | 7 58 |
| Sat Oct 07/Sun Oct 08 | 8034.8 | 0 42 02 | 18 08 | 19 24 | 5 04 | 6 21 | 20 05 | 5 47 | 19 45 | ..... | 91 | 3 12.7 | 12 07 |
| Sun Oct 08/Mon Oct 09 | 8035.8 | 0 45 58 | 18 07 | 19 23 | 5 05 | 6 21 | 20 08 | 5 52 | 20 31 | ..... | 84 | 4 11.3 | 15 30 |
| Mon Oct 09/Tue Oct 10 | 8036.8 | 0 49 55 | 18 05 | 19 22 | 5 05 | 6 22 | 20 11 | 5 56 | 21 21 | ..... | 74 | 5 11.4 | 17 52 |
| Tue Oct 10/Wed Oct 11 | 8037.8 | 0 53 51 | 18 04 | 19 21 | 5 06 | 6 23 | 20 14 | 6 01 | 22 16 | ..... | 63 | 6 12.0 | 19 02 |
| Wed Oct 11/Thu Oct 12 | 8038.8 | 0 57 48 | 18 03 | 19 19 | 5 07 | 6 23 | 20 16 | 6 05 | 23 14 | ..... | 52 | 7 12.2 | 18 56 |
| Thu Oct 12/Fri Oct 13 | 8039.8 | 1 01 44 | 18 02 | 19 18 | 5 07 | 6 24 | 20 19 | 6 10 | 0 15 | ..... | 41 | 8 11.1 | 17 38 |
| Fri Oct 13/Sat Oct 14 | 8040.8 | 1 05 41 | 18 01 | 19 17 | 5 08 | 6 25 | 20 22 | 6 15 | 1 17 | ..... | 30 | 9 07.8 | 15 18 |
| Sat Oct 14/Sun Oct 15 | 8041.8 | 1 09 37 | 17 59 | 19 16 | 5 09 | 6 25 | 20 25 | 6 19 | 2 19 | ..... | 20 | 10 02.2 | 12 07 |
| Sun Oct 15/Mon Oct 16 | 8042.8 | 1 13 34 | 17 58 | 19 15 | 5 09 | 6 26 | 20 28 | 6 24 | 3 20 | ..... | 13 | 10 54.2 | 8 20 |
| Mon Oct 16/Tue Oct 17 | 8043.8 | 1 17 31 | 17 57 | 19 14 | 5 10 | 6 27 | 20 31 | 6 28 | 4 20 | 16 30 | 6 | 11 44.3 | 4 12 |
| Tue Oct 17/Wed Oct 18 | 8044.8 | 1 21 27 | 17 56 | 19 13 | 5 11 | 6 28 | 20 33 | 6 33 | 5 18 | 17 06 | 2 | 12 33.1 | - 0 06 |
| Wed Oct 18/Thu Oct 19 | 8045.8 | 1 25 24 | 17 55 | 19 12 | 5 11 | 6 28 | 20 36 | 6 38 | 6 15 | 17 41 | 0 | 13 20.9 | - 4 20 |
| Thu Oct 19/Fri Oct 20 | 8046.8 | 1 29 20 | 17 54 | 19 11 | 5 12 | 6 29 | 20 39 | 6 42 | 7 12 | 18 16 | 0 | 14 08.4 | - 8 20 |
| Fri Oct 20/Sat Oct 21 | 8047.8 | 1 33 17 | 17 53 | 19 10 | 5 13 | 6 30 | 20 42 | 6 47 | ..... | 18 51 | 2 | 14 56.0 | -11 56 |
| Sat Oct 21/Sun Oct 22 | 8048.8 | 1 37 13 | 17 52 | 19 09 | 5 14 | 6 31 | 20 45 | 6 52 | ..... | 19 28 | 6 | 15 43.9 | -15 01 |
| Sun Oct 22/Mon Oct 23 | 8049.8 | 1 41 10 | 17 51 | 19 08 | 5 14 | 6 31 | 20 48 | 6 56 | ..... | 20 07 | 11 | 16 32.5 | -17 26 |
| Mon Oct 23/Tue Oct 24 | 8050.8 | 1 45 06 | 17 49 | 19 07 | 5 15 | 6 32 | 20 51 | 7 01 | ..... | 20 49 | 18 | 17 21.6 | -19 07 |
| Tue Oct 24/Wed Oct 25 | 8051.8 | 1 49 03 | 17 48 | 19 06 | 5 16 | 6 33 | 20 54 | 7 05 | ..... | 21 34 | 25 | 18 11.3 | -19 59 |
| Wed Oct 25/Thu Oct 26 | 8052.8 | 1 53 00 | 17 47 | 19 05 | 5 16 | 6 34 | 20 57 | 7 10 | ..... | 22 21 | 34 | 19 01.2 | -20 00 |
| Thu Oct 26/Fri Oct 27 | 8053.8 | 1 56 56 | 17 46 | 19 04 | 5 17 | 6 35 | 21 00 | 7 15 | ..... | 23 12 | 43 | 19 51.4 | -19 10 |
| Fri Oct 27/Sat Oct 28 | 8054.8 | 2 00 53 | 17 46 | 19 03 | 5 18 | 6 35 | 21 03 | 7 19 | ..... | 0 04 | 53 | 20 41.5 | -17 28 |
| Sat Oct 28/Sun Oct 29 | 8055.8 | 2 04 49 | 17 45 | 19 02 | 5 18 | 6 36 | 21 06 | 7 24 | ..... | 0 59 | 62 | 21 31.6 | -14 58 |
| Sun Oct 29/Mon Oct 30 | 8056.8 | 2 08 46 | 17 44 | 19 01 | 5 19 | 6 37 | 21 09 | 7 29 | ..... | 1 56 | 72 | 22 21.8 | -11 43 |
| Mon Oct 30/Tue Oct 31 | 8057.8 | 2 12 42 | 17 43 | 19 01 | 5 20 | 6 38 | 21 12 | 7 33 | ..... | 2 55 | 81 | 23 12.5 | - 7 49 |
| Tue Oct 31/Wed Nov 01 | 8058.8 | 2 16 39 | 17 42 | 19 00 | 5 21 | 6 39 | 21 16 | 7 38 | ..... | 3 55 | 89 | 0 03.9 | - 3 24 |

***** 2017 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) (2017 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 Nov 01/Thu Nov 02 | 8059.8 | 2 20 35 | 17 41 | 18 59 | 5 21 | 6 39 | 21 19 | 7 43 | 16 17 | 4 58 | 95 | 0 56.7 | 1 20 |
| Thu Nov 02/Fri Nov 03 | 8060.8 | 2 24 32 | 17 40 | 18 58 | 5 22 | 6 40 | 21 22 | 7 47 | 16 56 | 6 04 | 99 | 1 51.4 | 6 07 |
| Fri Nov 03/Sat Nov 04 | 8061.8 | 2 28 29 | 17 39 | 18 58 | 5 23 | 6 41 | 21 25 | 7 52 | 17 37 | 7 11 | 100 | 2 48.5 | 10 38 |
| Sat Nov 04/Sun Nov 05 | 8062.8 | 2 32 25 | 17 39 | 18 57 | 5 23 | 6 42 | 21 28 | 7 57 | 18 22 | ..... | 98 | 3 48.2 | 14 32 |
| Sun Nov 05/Mon Nov 06 | 8063.8 | 2 36 22 | 17 38 | 18 56 | 5 24 | 6 43 | 21 32 | 8 01 | 19 11 | ..... | 93 | 4 50.0 | 17 27 |
| Mon Nov 06/Tue Nov 07 | 8064.8 | 2 40 18 | 17 37 | 18 56 | 5 25 | 6 44 | 21 35 | 8 06 | 20 06 | ..... | 86 | 5 53.0 | 19 08 |
| Tue Nov 07/Wed Nov 08 | 8065.8 | 2 44 15 | 17 36 | 18 55 | 5 26 | 6 44 | 21 38 | 8 11 | 21 05 | ..... | 77 | 6 55.8 | 19 27 |
| Wed Nov 08/Thu Nov 09 | 8066.8 | 2 48 11 | 17 36 | 18 54 | 5 26 | 6 45 | 21 42 | 8 15 | 22 07 | ..... | 67 | 7 57.1 | 18 26 |
| Thu Nov 09/Fri Nov 10 | 8067.8 | 2 52 08 | 17 35 | 18 54 | 5 27 | 6 46 | 21 45 | 8 20 | 23 11 | ..... | 55 | 8 55.7 | 16 16 |
| Fri Nov 10/Sat Nov 11 | 8068.8 | 2 56 04 | 17 34 | 18 53 | 5 28 | 6 47 | 21 48 | 8 25 | 0 13 | ..... | 44 | 9 51.3 | 13 11 |
| Sat Nov 11/Sun Nov 12 | 8069.8 | 3 00 01 | 17 34 | 18 53 | 5 29 | 6 48 | 21 52 | 8 30 | 1 15 | ..... | 34 | 10 43.9 | 9 29 |
| Sun Nov 12/Mon Nov 13 | 8070.8 | 3 03 58 | 17 33 | 18 52 | 5 29 | 6 49 | 21 55 | 8 34 | 2 14 | ..... | 24 | 11 34.1 | 5 23 |
| Mon Nov 13/Tue Nov 14 | 8071.8 | 3 07 54 | 17 32 | 18 52 | 5 30 | 6 50 | 21 59 | 8 39 | 3 12 | ..... | 16 | 12 22.6 | 1 07 |
| Tue Nov 14/Wed Nov 15 | 8072.8 | 3 11 51 | 17 32 | 18 51 | 5 31 | 6 50 | 22 02 | 8 44 | 4 08 | ..... | 10 | 13 09.9 | - 3 09 |
| Wed Nov 15/Thu Nov 16 | 8073.8 | 3 15 47 | 17 31 | 18 51 | 5 32 | 6 51 | 22 06 | 8 48 | 5 04 | 16 16 | 5 | 13 56.8 | - 7 13 |
| Thu Nov 16/Fri Nov 17 | 8074.8 | 3 19 44 | 17 31 | 18 51 | 5 32 | 6 52 | 22 09 | 8 53 | 5 59 | 16 51 | 1 | 14 43.8 | -10 57 |
| Fri Nov 17/Sat Nov 18 | 8075.8 | 3 23 40 | 17 30 | 18 50 | 5 33 | 6 53 | 22 13 | 8 58 | 6 54 | 17 27 | 0 | 15 31.2 | -14 12 |
| Sat Nov 18/Sun Nov 19 | 8076.8 | 3 27 37 | 17 30 | 18 50 | 5 34 | 6 54 | 22 17 | 9 02 | 7 48 | 18 05 | 1 | 16 19.4 | -16 51 |
| Sun Nov 19/Mon Nov 20 | 8077.8 | 3 31 33 | 17 30 | 18 50 | 5 35 | 6 55 | 22 20 | 9 07 | ..... | 18 45 | 3 | 17 08.2 | -18 47 |
| Mon Nov 20/Tue Nov 21 | 8078.8 | 3 35 30 | 17 29 | 18 49 | 5 35 | 6 56 | 22 24 | 9 12 | ..... | 19 29 | 7 | 17 57.7 | -19 55 |
| Tue Nov 21/Wed Nov 22 | 8079.8 | 3 39 27 | 17 29 | 18 49 | 5 36 | 6 57 | 22 28 | 9 17 | ..... | 20 15 | 12 | 18 47.4 | -20 12 |
| Wed Nov 22/Thu Nov 23 | 8080.8 | 3 43 23 | 17 28 | 18 49 | 5 37 | 6 57 | 22 31 | 9 21 | ..... | 21 05 | 19 | 19 37.1 | -19 38 |
| Thu Nov 23/Fri Nov 24 | 8081.8 | 3 47 20 | 17 28 | 18 49 | 5 38 | 6 58 | 22 35 | 9 26 | ..... | 21 56 | 27 | 20 26.6 | -18 14 |
| Fri Nov 24/Sat Nov 25 | 8082.8 | 3 51 16 | 17 28 | 18 49 | 5 38 | 6 59 | 22 39 | 9 31 | ..... | 22 49 | 36 | 21 15.7 | -16 01 |
| Sat Nov 25/Sun Nov 26 | 8083.8 | 3 55 13 | 17 28 | 18 48 | 5 39 | 7 00 | 22 43 | 9 35 | ..... | 23 44 | 45 | 22 04.5 | -13 05 |
| Sun Nov 26/Mon Nov 27 | 8084.8 | 3 59 09 | 17 27 | 18 48 | 5 40 | 7 01 | 22 47 | 9 40 | ..... | 0 40 | 55 | 22 53.4 | - 9 31 |
| Mon Nov 27/Tue Nov 28 | 8085.8 | 4 03 06 | 17 27 | 18 48 | 5 41 | 7 02 | 22 50 | 9 45 | ..... | 1 38 | 65 | 23 42.8 | - 5 24 |
| Tue Nov 28/Wed Nov 29 | 8086.8 | 4 07 02 | 17 27 | 18 48 | 5 41 | 7 03 | 22 54 | 9 49 | ..... | 2 38 | 75 | 0 33.3 | - 0 53 |
| Wed Nov 29/Thu Nov 30 | 8087.8 | 4 10 59 | 17 27 | 18 48 | 5 42 | 7 03 | 22 58 | 9 54 | ..... | 3 41 | 84 | 1 25.7 | 3 51 |
| Thu Nov 30/Fri Dec 01 | 8088.8 | 4 14 56 | 17 27 | 18 48 | 5 43 | 7 04 | 23 02 | 9 59 | ..... | 4 46 | 92 | 2 20.7 | 8 31 |

***** 2017 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) (2017 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 Dec 01/Sat Dec 02 | 8089.8 | 4 18 52 | 17 27 | 18 48 | 5 44 | 7 05 | 23 06 | 10 03 | 16 09 | 5 54 | 97 | 3 18.9 | 12 49 |
| Sat Dec 02/Sun Dec 03 | 8090.8 | 4 22 49 | 17 27 | 18 48 | 5 44 | 7 06 | 23 10 | 10 08 | 16 56 | 7 04 | 100 | 4 20.3 | 16 20 |
| Sun Dec 03/Mon Dec 04 | 8091.8 | 4 26 45 | 17 27 | 18 48 | 5 45 | 7 07 | 23 14 | 10 13 | 17 49 | 8 12 | 99 | 5 24.4 | 18 44 |
| Mon Dec 04/Tue Dec 05 | 8092.8 | 4 30 42 | 17 27 | 18 48 | 5 46 | 7 07 | 23 18 | 10 17 | 18 48 | ..... | 96 | 6 29.8 | 19 44 |
| Tue Dec 05/Wed Dec 06 | 8093.8 | 4 34 38 | 17 27 | 18 49 | 5 46 | 7 08 | 23 22 | 10 22 | 19 51 | ..... | 89 | 7 34.5 | 19 15 |
| Wed Dec 06/Thu Dec 07 | 8094.8 | 4 38 35 | 17 27 | 18 49 | 5 47 | 7 09 | 23 26 | 10 27 | 20 57 | ..... | 81 | 8 36.9 | 17 25 |
| Thu Dec 07/Fri Dec 08 | 8095.8 | 4 42 31 | 17 27 | 18 49 | 5 48 | 7 10 | 23 31 | 10 31 | 22 03 | ..... | 71 | 9 35.9 | 14 29 |
| Fri Dec 08/Sat Dec 09 | 8096.8 | 4 46 28 | 17 27 | 18 49 | 5 48 | 7 10 | 23 35 | 10 36 | 23 06 | ..... | 60 | 10 31.1 | 10 49 |
| Sat Dec 09/Sun Dec 10 | 8097.8 | 4 50 25 | 17 27 | 18 49 | 5 49 | 7 11 | 23 39 | 10 40 | 0 08 | ..... | 50 | 11 23.2 | 6 40 |
| Sun Dec 10/Mon Dec 11 | 8098.8 | 4 54 21 | 17 28 | 18 50 | 5 50 | 7 12 | 23 43 | 10 45 | 1 07 | ..... | 39 | 12 12.6 | 2 20 |
| Mon Dec 11/Tue Dec 12 | 8099.8 | 4 58 18 | 17 28 | 18 50 | 5 50 | 7 13 | 23 47 | 10 50 | 2 04 | ..... | 30 | 13 00.4 | - 2 00 |
| Tue Dec 12/Wed Dec 13 | 8100.8 | 5 02 14 | 17 28 | 18 50 | 5 51 | 7 13 | 23 52 | 10 54 | 3 00 | ..... | 21 | 13 47.3 | - 6 09 |
| Wed Dec 13/Thu Dec 14 | 8101.8 | 5 06 11 | 17 28 | 18 51 | 5 52 | 7 14 | 23 56 | 10 59 | 3 54 | ..... | 14 | 14 33.9 | -10 00 |
| Thu Dec 14/Fri Dec 15 | 8102.8 | 5 10 07 | 17 29 | 18 51 | 5 52 | 7 14 | 0 00 | 11 03 | 4 49 | ..... | 8 | 15 20.8 | -13 23 |
| Fri Dec 15/Sat Dec 16 | 8103.8 | 5 14 04 | 17 29 | 18 51 | 5 53 | 7 15 | 0 04 | 11 08 | 5 42 | 16 04 | 4 | 16 08.4 | -16 12 |
| Sat Dec 16/Sun Dec 17 | 8104.8 | 5 18 00 | 17 29 | 18 52 | 5 53 | 7 16 | 0 09 | 11 12 | 6 35 | 16 44 | 1 | 16 56.8 | -18 21 |
| Sun Dec 17/Mon Dec 18 | 8105.8 | 5 21 57 | 17 30 | 18 52 | 5 54 | 7 16 | 0 13 | 11 17 | 7 26 | 17 26 | 0 | 17 46.0 | -19 43 |
| Mon Dec 18/Tue Dec 19 | 8106.8 | 5 25 54 | 17 30 | 18 53 | 5 54 | 7 17 | 0 18 | 11 21 | 8 15 | 18 12 | 1 | 18 35.6 | -20 15 |
| Tue Dec 19/Wed Dec 20 | 8107.8 | 5 29 50 | 17 31 | 18 53 | 5 55 | 7 17 | 0 22 | 11 26 | ..... | 19 00 | 3 | 19 25.3 | -19 56 |
| Wed Dec 20/Thu Dec 21 | 8108.8 | 5 33 47 | 17 31 | 18 53 | 5 56 | 7 18 | 0 26 | 11 30 | ..... | 19 51 | 8 | 20 14.8 | -18 45 |
| Thu Dec 21/Fri Dec 22 | 8109.8 | 5 37 43 | 17 32 | 18 54 | 5 56 | 7 18 | 0 31 | 11 35 | ..... | 20 43 | 13 | 21 03.7 | -16 47 |
| Fri Dec 22/Sat Dec 23 | 8110.8 | 5 41 40 | 17 32 | 18 54 | 5 56 | 7 19 | 0 35 | 11 39 | ..... | 21 37 | 20 | 21 51.9 | -14 05 |
| Sat Dec 23/Sun Dec 24 | 8111.8 | 5 45 36 | 17 33 | 18 55 | 5 57 | 7 19 | 0 40 | 11 44 | ..... | 22 32 | 29 | 22 39.8 | -10 45 |
| Sun Dec 24/Mon Dec 25 | 8112.8 | 5 49 33 | 17 33 | 18 56 | 5 57 | 7 20 | 0 44 | 11 48 | ..... | 23 28 | 38 | 23 27.6 | - 6 53 |
| Mon Dec 25/Tue Dec 26 | 8113.8 | 5 53 29 | 17 34 | 18 56 | 5 58 | 7 20 | 0 49 | 11 52 | ..... | 0 25 | 48 | 0 15.9 | - 2 38 |
| Tue Dec 26/Wed Dec 27 | 8114.8 | 5 57 26 | 17 34 | 18 57 | 5 58 | 7 20 | 0 53 | 11 57 | ..... | 1 24 | 59 | 1 05.5 | 1 52 |
| Wed Dec 27/Thu Dec 28 | 8115.8 | 6 01 23 | 17 35 | 18 57 | 5 59 | 7 21 | 0 58 | 12 01 | ..... | 2 26 | 69 | 1 57.2 | 6 26 |
| Thu Dec 28/Fri Dec 29 | 8116.8 | 6 05 19 | 17 36 | 18 58 | 5 59 | 7 21 | 1 02 | 12 05 | ..... | 3 31 | 79 | 2 51.8 | 10 49 |
| Fri Dec 29/Sat Dec 30 | 8117.8 | 6 09 16 | 17 36 | 18 59 | 5 59 | 7 21 | 1 07 | 12 09 | ..... | 4 38 | 88 | 3 49.9 | 14 41 |
| Sat Dec 30/Sun Dec 31 | 8118.8 | 6 13 12 | 17 37 | 18 59 | 6 00 | 7 22 | 1 12 | 12 14 | ..... | 5 46 | 95 | 4 51.8 | 17 41 |
| Sun Dec 31/Mon Jan 01 | 8119.8 | 6 17 09 | 17 38 | 19 00 | 6 00 | 7 22 | 1 16 | 12 18 | 16 26 | 6 54 | 99 | 5 56.5 | 19 28 |