Julian Date

The number of days since noon on January 1, -4712, i.e., January 1, 4713 BC (Seidelmann 1992). It was proposed by J. J. Scaliger in 1583, so the name for this system derived from Julius Scaliger, not Julius Caesar. Scaliger defined Day One was as a day when three calendrical cycles converged. The first cycle was the 28 year period over which the Julian calendar repeats days of the week (the so-called solar number). After 28 years, all the dates fall on the same days of the week, so one need only buy 28 calendars. (Note that since the Gregorian calendar was adopted the calendar now takes 400 years to repeat.) The second was the 19 year golden number cycle over which phases of the moon almost land on the same dates of the year. The third cycle was the 15 year ancient Roman tax cycle of Emperor Constantine (the so-called indiction). Scaliger picked January 1, 4713 BC on the Julian calendar as Day One. The three cycles coincide every 7980 years (Tøndering).

The following table gives the Julian date for the "zeroth" of each month at 0 UT. So add $D+(H+(M+S/60)/60)/24$ to get the Julian date of a given day *D* of the month at a given time $HH:MM:SS$.

Month	1997	1998	1999	2000
January	245 0448.5	245 0813.5	245 1178.5	245 1543.5
February	245 0479.5	245 0844.5	245 1209.5	245 1574.5
March	245 0507.5	245 0872.5	245 1237.5	245 1603.5
April	245 0538.5	245 0903.5	245 1268.5	245 1634.5
May	245 0568.5	245 0933.5	245 1298.5	245 1664.5
June	245 0599.5	245 0964.5	245 1329.5	245 1695.5
July	245 0629.5	245 0994.5	245 1359.5	245 1725.5
August	245 0660.5	245 1025.5	245 1390.5	245 1756.5
September	245 0691.5	245 1056.5	245 1421.5	245 1787.5
October	245 0721.5	245 1086.5	245 1451.5	245 1817.5
November	245 0752.5	245 1117.5	245 1482.5	245 1848.5
December	245 0782.5	245 1147.5	245 1512.5	245 1878.5

Formulas for computing the Julian Date from year, month, and day in the Julian and Gregorian calendars are given below. Let $\mathrm{INT}(x)$ denote the integer part (sometimes known in mathematical circles as the floor function $\lfloor x \rfloor$), let *Y* be the year, *M* the month number (1=January, 2=February, etc.), *D* the day of the month, and *UT* the universal time.

For *all* AD dates in the Gregorian calendar,

$$JD = 367Y - \mathrm{INT}(7(Y + \mathrm{INT}((M+9)/12))/4) - \mathrm{INT}(3(\mathrm{INT}((Y+(M-9)/7)/100)+1)/4) + \mathrm{INT}(275M/9) + D + 1721028.5 + UT/24. \quad (1)$$

For Gregorian calendar dates 1901-2099, the formula can be simplified to

$$JD = 367Y - \mathrm{INT}(7(Y + \mathrm{INT}((M+9)/12))/4) + \mathrm{INT}(275M/9) + D + 1721013.5 + UT/24. \quad (2)$$

(Danby 1988, p. 207; Sinnott 1991, p. 183).

For Julian calendar dates with either negative (BC) or positive (AD),

$$JD = 367Y - \mathrm{INT}(7(Y + 5001 + \mathrm{INT}((M-9)/7))/4) + \mathrm{INT}(275M/9) + D + 1729776.5 + UT/24 \quad (3)$$

and for positive (AD) Julian calendar dates only,

$$JD = 367Y - \mathrm{INT}(7(Y + \mathrm{INT}((M+9)/12))/4) + \mathrm{INT}(275M/9) + D + 1721026.5 + UT/24 \quad (4)$$

(Sinnott 1991).

SEE ALSO: Golden Number, Gregorian Calendar, Indiction, Julian Epoch, Julian Year, Modified Julian Date

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