Calculating the Julian date and J2000

The_Cynster November 8, 2019 Calculations Astrology

The Julian date is a continuous count of the solar days and fraction of the day elapsed since the beginning of the Julian period (4713 BC) at noon. It is often used in time standard conversion because the Julian calendar is simple.

J2000 is the current epoch and is the count of the Julian days since January 1st 2000 at noon UT.

How to calculate the Julian date

The Julian date of a date on the Gregorian calendar (the calendar most of us use) at a given time can be calculated using the following formula.

JD = 367Y − INT(7(Y + INT((M + 9)/12))/4) − INT(3(INT((Y + (M − 9)/7)/100) + 1)/4) + INT(275M/9) + D + 1721028.5 + TIME/24

TIME can be measured using any time standard but it must be converted to decimal hours.

To convert from UTC to terrestrial time use,

TT = UTC + leap seconds added to UTC to date + 32.184

A chart showing the leap seconds that have been added to UTC can be found here

J2000

The Julian date on January 1st 2000 at noon was 2451545.0. J2000 is calculated using,

J2000 = JD − 2451545.0

An example

The information for this example came from the Astro databank, linked below.

Marilyn Manson

Born on January 5th 1969 at 8:05pm (20:05) EST

Y =1969

M = 1

D = 5

UTC TIME = 25.083333333333333

JD = 367Y − INT(7(Y + INT((M + 9)/12))/4) − INT(3(INT((Y + (M − 9)/7)/100) + 1)/4) + INT(275M/9) + D + 1721028.5 + TIME/24

JD = 367*1969 − INT(7*(1969 + INT((1 + 9)/12))/4) − INT(3*(INT((1969 + (1 − 9)/7)/100) + 1)/4) + INT(275*1/9) + 5 + 1721028.5 + 25.083333333333333/24

JD= 2440227.54513888889

J2000 = JD – 2451545.0

J2000 = 2440227.54513888889 – 2451545.0

J2000 = -11317.4548611

Links

- **Wolfram article about Julian dates**
  - http://scienceworld.wolfram.com/astronomy/JulianDate.html
- **Astro databank**
  - https://www.astro.com/astro-databank/Main_Page

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One thought on “Calculating the Julian date and J2000”

Mohamoud A. Mohamoud November 19, 2022 at 2:45 am

Hi there,
I am interested in finding out on how to calculate the date and time of next new moon for any location in the globe throughout the year. I will need a Mathematical equation I can use in Excel spreadsheet.

Please help me find this. Thanks
Mohamoud

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