

Calendar Curiosities

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WHAT is the longest year in history? Did you know there is at least one Friday the 13th every year? How many Friday the 13ths can occur in a single year? Interestingly, the dates 4/4 (4 April), 6/6 (6 June), 8/8 (8 August), 10/10 (10 October), and 12/12 (12 December) all fall on the same day of the week in any given year. What are leap years, and why does February have fewer days than any other month? Did you know that February 30th existed in Sweden for a short period?

A calendar is a system of measuring and recording times in terms of days and years. Have you ever thought about how life would be without a calendar? Many different types of calendars were developed and used by people in various parts of the world.

Most ancient calendars, including those of Greece, were based on lunar months, so it was necessary to insert extra months to align the calendar with the seasons.

The ancient Egyptian calendar date was based on the solar system, which had a 365-day year, unlike the Babylonians, Greeks, and early Romans.

The Roman Calendar

The calendar consisted of 10 months, six of 30 days, and four of 31 days, making a total of 304 days, with March (Martius) being the first month and December as the last month of the year. The 304-day Roman calendar didn't work long because it didn't synchronise with the seasons.

January (Ianuarius) and February (Februarius) were added to the original 10 months by the second king of Rome, Numa, who reformed the calendar around 700 BCE. The system allowed the year to have 355 days divided into 12 months of different lengths. In addition to the two months, Numa added a leap month in some years.

The Julian Calendar

The earlier Roman calendar was reformed by Julius Caesar in 46 BC. To retain the position of the seasons, the length of the months was rearranged as 6 months with 31 days (Martius, Maius, Quintilis, October, December, and Ianuarius), 5 months with 30 days (Aprilis, Iunius, Sextilis, September, and November), and 1 month with 28 days (Februarius). Quintilis was later named July after Julius Caesar. Afterwards, Sextilis (named August after the Emperor Augustus) was made of 31 days. February was 28 days long, except that in every fourth year, a day was added (called a leap year).

Initially, the Roman calendar consisted of 10 months, with March (Martius) being the first month. That is why

February (the last month of the year) is terminated at 28 days. This also explains why the prefixes of month names, i.e., September, October, November, and December are all "off" by two. Later, the Romans officially recognised 1 January as the first day of the year.

The Julian calendar year was slightly longer than the solar year, as the Julian calendar creates an error of 1 day every 128 years.

The Gregorian Calendar

The Gregorian calendar was first introduced in February 1582 by Pope Gregory XIII as a replacement for the Julian calendar and is commonly used today.

For adopting the Gregorian calendar, 10 days were dropped in October 1582, i.e., 4 October, followed by 15 October, as shown in Table 1. The leap year rules were changed as follows:

- Any year that is divisible by 4 is a leap year. If the year is exactly divisible by 100, it is not a leap year unless the year is also evenly divisible by 400. For example, 1700, 1800, 1900, 2100, 2200, and 2300 are not leap years, but 1600, 2000, and 2400 are leap years.

Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	2	3	4	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

In the Gregorian calendar, the tropical year is approximated as $36597/400$ days = 365.2425 days and is achieved by having 97 leap years every 400 years. The Gregorian calendar creates an error of about one day every 3236 years.

So, if the leap year falling every 3200 years is skipped in the Gregorian calendar, then the number of leap years in the 3200-year cycle will be $97 \times 8 - 1 = 775$. This will give a much better approximation to the length of the tropical year, as $365775/3200$ days = 365.2421875 days. This could be achieved by dropping one leap year from the Gregorian calendar every 3200 years so that years divisible by 3200 become non-leap years.

The Gregorian calendar is the most commonly used. The Gregorian calendar was adopted in England by dropping 11