



# Leap Year

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## Why in News?

In 2024, February 29<sup>th</sup> marks Leap Day, an additional day added to the calendar during leap years. This extra day, known as Leap Year Day, extends the year to a total of 366 days.

## What is a leap year?

### ▪ Leap Year:

- A leap year has **366 days** in a year as opposed to the regular 365 days. The extra day is added to February, the shortest month of the year, as February 29.
- A solar calendar signifies one complete orbit of the Earth around the Sun. The Earth's orbit takes about **365 days, 5 hours, 48 minutes, and 46 seconds** to simplify, a regular year is rounded to 365 days.
  - To account for the extra time, **rounded up to six hours, 24 hours (one full day)** are added to every fourth year.
- Without leap years, the **calendar would become out of sync with the seasons** over time.
  - The extra day keeps calendars and seasons from gradually falling out of sync and **impacting harvesting, planting and other cycles based on the seasons.**

### ▪ Evolution of Leap Years:

- The Julian calendar's approximation of the solar year led to accumulating errors over time, primarily due to a slight overcompensation.
- By the 16th century, the calendar was approximately **10 days ahead of the solar year, prompting the need for reform.**
- Pope Gregory XIII initiated calendar reform in 1582, removing ten days to realign the calendar with the solar year.
- To prevent future errors, the Gregorian calendar introduced a refined leap year rule, **omitting three leap years every 400 years.**

### ▪ Math of Leap Year:

- Leap years are always **multiples of four like 2016, 2020, 2024**, but a year that is a multiple of four is not always a leap year.
- The Gregorian leap year rule states that the **year number must be divisible by four, except for end-of-century years (ending in '00'), which must be divisible by 400.**
  - This means that the year **2000 was a leap year, although 1900 was not.** 2024, 2028, 2032 and 2036 are all leap years.
- This extra rule is needed because **adding a leap day every four years actually overcompensates for the slight difference** in the solar year. It turns out that adding a leap day every four years adds a little too much time, about 44 minutes more than necessary.
  - So, by skipping leap years for **centuries that aren't divisible by 400**, we fine-tune the calendar to stay even closer to the actual solar year and keep the seasons in check.

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