

Calendar

The year consists of 365 days, 5 hours, 48 minutes (52 weeks and 1 odd day). An extra day is added once in every fourth year which was called the leap year, which has 366 days (52 weeks and 2 odd days).

To find the day of any given date of the year, you need to understand the calendar calculations:

1. First thing to remember, first January 1 AD was Monday therefore, we must count days from Sunday. This means the 0th day was Sunday, so the 7th day was Sunday again and so on and so forth.
2. The day gets repeated after every seventh day (concept of a week), if today is Monday, then 28th day from now will also be Monday as it is a multiple of 7 ($28/7 = 4$, so four weeks). Here the 30th day will be calculated by $30/7$, which is 4 weeks and 2 days, these two days are called odd days. With starting day as Monday and two odd days, the day will be Wednesday; this point is the most critical in calendars. The other way of looking at it is since the 28th day is Monday, so the 30th day will be Wednesday. But you have to understand and use the concept of odd days as the question may be about thousands of years.
3. In a normal year there are 365 days so 52 weeks and 1 odd day, in a leap year there are 366 days so 52 weeks and 2 odd days.
4. In 100 years there are 24 leap years and 76 normal years, so the number of odd days are $24(2) + 76 = 124$, which is 17 weeks + 5 odd days, so 100 years have 5 odd days.
5. In 200 years the number of odd days is twice the number in 100 years which is 10, which is one week and 3 odd days, so 200 years have 3 odd days. In 300 years, the number of odd days is 15, which is two weeks and 1 odd day, so 300 years have one odd day.
6. 400 year is a leap year; similarly the multiples of 400 are also leap years.
7. In 400 years, the number of odd days become $20 + 1$ (from the leap year), so total days are 21, which is three weeks and 0 odd days. In 400 years there are 0 odd days

Example1: What was the day on 25th January, 1975?

Counting the years $1600 + 300 + 74$

In 1600 years, there are zero odd days

In 300 years, there is one odd day

In 74 years, there are 18 leap years and 56 normal years, so the odd days are:

$$18(2) + 56(1) = 36 + 56 = 92,$$

Which is 13 weeks and 1 odd day

In 25 days of January, 1975, there are 3 weeks and 4 odd days

Total odd days = $0 + 1 + 1 + 4$, six odd days, so it was a Saturday.

Q1. What day of the week was 20th June 1837?

Ans. 20th June, 1837 means 1836 complete years + first 5 months of the year 1837 + 20 days of June

1600 years give no odd days

200 years give 3 odd days

36 years give $(36 + 9)$ or 3 odd days

Thus 1836 years give 6 odd days

From 1st January to 20th June there are 3 odd days

Odd days: January 3, Feb. 0, March 3, April 2, May 3, June 6 = 17

Thus the total number of odd days = $6 + 3$ or 2 odd days

This means that the 20th of June fell on 2nd day commencing from Monday.

The required day was Tuesday.

Q2. How many times does the 29th day of the month occur in 400 consecutive years?

Ans. In 400 consecutive years there are 97 leap years. Hence, in 400 consecutive years February has the 29th day 97 times and the remaining eleven months have the 29th day 400×11 or 4400 times.

Thus the 29th day of the month occurs

$$= 4400 + 97 = 4497 \text{ times.}$$

Q3. Today is 3rd November. The day of the week is Monday. This is a leap year. What will be the day of the week on this date after 3 years?

Ans. This is a leap year. So, none of the next 3 years will be leap years. Each year will give one odd day so the day of the week will be 3 odd days beyond Monday i.e. it will be Thursday.

Q4. December 9, 2001 is Sunday. What was the day on December 9, 1971? (CAT)

- a) Thursday (b) Wednesday
(c) Saturday (d) Sunday

Ans. Total number of days = $30 \times 365 + 8$ days from leap years = 10958
Thus number of weeks = = 1565
Hence December 9, 1971 must have been Tuesday.

Q5. The calendar of year 1982 is same as which year

Ans. We need to have 0 odd days, counting from 1982,

Year	Odd days	Total
1982	1	1
1983	1	2
1984	2	4
1985	1	5
1986	1	6
1987	1	7
1988	2	9
1989	1	10
1990	1	11
1991	1	12
1992	2	14
1993	1	

Therefore 1988 could be the year with the same calendar as 1982, but it's a leap year and 1982 is not. Therefore next is 1993, where it fits, so calendar of 1982 is same as 1993

Q6. If today is Monday, what will be the day 350 days from now?

Ans. 350 days, $350/7 = 50$, no odd days, so it will be a Monday.

Q7. If today is Monday, what will be the day one year and 50 days from now?

Ans. Cannot be determined, as we don't know if it is a leap year or not.

Q8. The calendar for the year 1984 is same as which upcoming year.

Ans. Follow the process as done in Question 5, remember it has to be a leap year, since 1984 is a leap year, answer is 2012