

CALENDAR

1. What is a Calendar?

A calendar shows days, weeks and months of a year.

- Leap year → 366 days
- Non-leap (ordinary) year → 365 days

Rule to check leap year:

- Not divisible by 4 → NOT a leap year
- Divisible by 4 but not by 100 → Leap year (e.g. 1996, 2004)
- Divisible by 100 but not by 400 → NOT a leap year (e.g. 1700, 1800, 1900)
- Divisible by 400 → Leap year (e.g. 1600, 2000)

2. Odd Days — Key Idea

Extra days left after counting full weeks (groups of 7) are called ODD DAYS.

Period	Odd Days
Ordinary year (365 days)	1
Leap year (366 days)	2
100 years	5
200 years	3
300 years	1
400 years	0

Note: $365 = 7 \times 52 + 1$, and $366 = 7 \times 52 + 2$ → hence 1 and 2 odd days respectively.

3. Days of the Week (Codes 1–7)

Monday = 1, Tuesday = 2, Wednesday = 3, Thursday = 4, Friday = 5, Saturday = 6, Sunday = 7 (0)

To find the day: Take the given day, add the number of odd days, and count forward using this order.

4. How to Solve a Calendar Problem — 3 Steps

- Step 1: Find the total number of days between the two dates.
- Step 2: Divide by 7 and find the remainder → this is the number of odd days.
- Step 3: Starting from the known day, count forward by the odd days (using the weekday order) to get the answer.

5. Solved Examples

Example 1: If 30th March 2020 was Monday, find the day after 61 days.

$$61 = 7 \times 8 + 5 \rightarrow \text{Odd days} = 5$$

Monday + 5 days → Tue, Wed, Thu, Fri, Sat

Answer: Saturday

Example 2: 2nd April is Friday. Find the last day of the next month (May).

$$\text{Days from 3rd April to 31st May} = 28 (\text{April}) + 31 (\text{May}) = 59$$

$$59 = 7 \times 8 + 3 \rightarrow \text{Odd days} = 3$$

Friday + 3 days → Sat, Sun, Mon

Answer: Monday

Example 3: What was the day on 29th November 1972?

Odd days from 1600 years = 0

Odd days from 300 years (1601–1900) = 1

So odd days up to 1900 years = $0 + 1 = 1$

(Remaining odd days from 1901–1972, plus days till 29th Nov, are added the same way to reach the final answer.)

SUMMARY

- Leap year has 366 days; ordinary year has 365 days.
- 1 ordinary year = 1 odd day; 1 leap year = 2 odd days.
- 100 yrs → 5 odd days | 200 yrs → 3 | 300 yrs → 1 | 400 yrs → 0 odd days
- Odd days = remainder when total days $\div 7$.
- To find a future/past day: count forward/backward from the known day by the number of odd days.
- Weekday order to remember: Mon → Tue → Wed → Thu → Fri → Sat → Sun.

6. Finding the Odd Days in a Century — Step Method

Illustration: What day of the week was on 31st December 100 A.D.?

Step	What to do	Working
1	Write the given year as a multiple of 400.	Total years = 100
2	Find the number of ordinary years and leap years.	Leap years = $100/4 = 25$, but 100 is not divisible by 400 → $25 - 1 = 24$ leap years Ordinary years = $100 - 24 = 76$
3	Write the total odd days in the century.	Odd days = $76 \times 1 + 24 \times 2 = 76 + 48 = 124$ days
4	Divide total odd days by 7 — the remainder gives the last day.	$124 \div 7 = 17$ weeks + 5 odd days → 31st Dec 100 A.D. = Friday

Tip: A number is divisible by 4 if its last two digits are divisible by 4.

7. Number of Odd Days in a Century — Full Table

Century	No. of Odd Days (working)	Last Day of Century
100	$5 \times 1 = 5 = 7 \times 0 + 5$	Friday
200	$5 \times 2 = 10 = 7 \times 1 + 3$	Wednesday
300	$5 \times 3 = 15 = 7 \times 2 + 1$	Monday
400	$5 \times 4 + 1(\text{leap century}) = 21 = 7 \times 3 + 0$	Sunday
500	$5 \times 5 + 1 = 26 = 7 \times 3 + 5$	Friday
600	$5 \times 6 + 1 = 31 = 7 \times 4 + 3$	Wednesday
700	$5 \times 7 + 1 = 36 = 7 \times 5 + 1$	Monday
800	$5 \times 8 + 2 = 42 = 7 \times 6 + 0$	Sunday
1000	$5 \times 10 + 2 = 52 = 7 \times 7 + 3$	Wednesday
1400	$5 \times 14 + 3 = 73 = 7 \times 10 + 3$	Wednesday

1600	$5 \times 16 + 4 = 84 = 7 \times 12 + 0$	Sunday
1700	$5 \times 17 + 4 = 89 = 7 \times 12 + 5$	Friday
2000	$5 \times 20 + 5 = 105 = 7 \times 15 + 0$	Sunday
2100	$5 \times 21 + 5 = 110 = 7 \times 15 + 5$	Friday

Rule used: for k centuries (year = $100k$), Odd days = $(5k + \lfloor k/4 \rfloor) \bmod 7$. The extra $\lfloor k/4 \rfloor$ accounts for the leap-century years (400, 800, 1200, 1600, 2000...).