

CALENDAR

A chart or series of pages showing days, weeks and months of a particular year is called calendar.

Modern calendar has two types of calendar years.

1. Leap year: It has 366 days.

2. Non-leap or common or ordinary year: It has 365 days.

A year is divided into twelve months.

No.	Name of month	Number of days
1	January	31
2	February	28 days (29 days in a leap year)
3	March	31
4	April	30
5	May	31
6	June	30
7	July	31
8	August	31
9	September	30
10	October	31
11	November	30
12	December	31

Months are divided into weeks. A week has 7 days.

Days of a week are:

- | | | | |
|-----------|-------------|--------------|-------------|
| 1. Monday | 2. Tuesday | 3. Wednesday | 4. Thursday |
| 5. Friday | 6. Saturday | 7. Sunday | |

The international standard is to start the week on Monday.

Note

We count the days in the order given above.

Weeks are numbered 1 to 52 in a year.

To determine whether a year is a leap year:

1. Any year which is not divisible by 4 is not a leap year e.g. 2001, 2002, 2003, 2005 etc.
2. Any year which is divisible by 4 but not divisible by 100 is a leap year e.g. 1904, 1908, 1912 etc.
3. Any year which is divisible by 400 is a leap year e.g. 1200, 1600, 2000 etc. These century years are called century leap years.
4. Any year which is divisible by 100 but not divisible by 400 is not a leap year e.g. 1700, 1800, 1900 etc.

Odd Days

In an ordinary (non-leap year) year, there are 365 days i.e. $(52 \times 7 + 1)$ days means 52 weeks and one day. This additional day is called an **odd day**.

In leap year, there are 366 days i.e. $(52 \times 7 + 2)$ days means 52 weeks and two days. So, in a leap year there are **2 odd days**.

In a century i.e. 100 years, there are 24 leap years and 76 non-leap years. This means there are $24 \times 2 + 76 \times 1$ i.e. 124 odd days. Since 7 days make a week, so $124 = 7 \times 17 + 5$ i.e. 5 odd days.

$\therefore$ There are 5 odd days in a century.

Similarly, we can find:

In 200 years, there are 3 odd days.

In 300 years, there are 1 odd day.

In 400 years, we have $5 \times 4 + 1$ (leap century) odd days

i.e. 21 odd days which is equivalent to 0 odd days

$$(\because 21 = 3 \times 7 + 0)$$

ILLUSTRATIVE EXAMPLES

Example 1. If 30th March 2020 was Monday, what would be the day after 61 days?

Solution. Given that on 30th March 2020, it was Monday.

Number of days = 61

$$= 7 \times 8 + 5$$

Number of odd days = 5.

Since 30th March was Monday and there are 5 odd days in next 61 days i.e. Tuesday, Wednesday, Thursday, Friday and Saturday.

$\therefore$ The day after 61 days of 30th March 2020 is Saturday.

Example 2. If the second day of April month is a Friday, then find the last day of the next month.

Solution. Given 2nd April is Friday.

From 3rd April to last day of the next month.

$$\text{Number of days} = 28 + 31 = 59$$

April May

So, the number of odd days = $7 \times 8 + 3$ i.e. 3 days.

Since 2nd April is Friday and there are 3 odd days upto last day of next month i.e. Saturday, Sunday, Monday.

$\therefore$ The last day of the next month is Monday.

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

Solution. We know that:

In 1600 years 0 odd days

In 300 years 1 odd day

So, in 1900 years $0 + 1 = 1$ odd day

Now from 1901 to 1971, there are 17 leap years and 54 non-leap years. So, the number of odd days is $17 \times 2 + 54 \times 1 = 88$ odd days or $88 = 7 \times 12 + 4$ i.e. 4 odd days (upto 31st December 1971).

Since 1972 is a leap year, so from 01 January 1972 to 29 November 1972, we have

$$31 + 29 + 31 + 30 + 31 + 30 + 31 + 31 + 30 + 31 + 29 = 334 \text{ days}$$

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov

$$\therefore 334 = 7 \times 47 + 5$$

$\Rightarrow$ in these 334 days there are 5 odd days.

So, the total number of odd days = $1 + 4 + 5 = 10$

$$\therefore 10 = 1 \times 7 + 3 \Rightarrow 3 \text{ odd days}$$

i.e. Monday, Tuesday and Wednesday.

∴ The 29th November 1972 is Wednesday.

Example 4. If 4th October 1986 was Saturday, what would be the day on 10th April 1991?

Solution. Number of odd days:

From 5th October 1986 to 4th October 1987 = 1

From 5th October 1987 to 4th October 1988 = 2

($\because$ 1988 is a leap year)

From 5th October 1988 to 4 October 1989 = 1

From 5th October 1989 to 4 October 1990 = 1

Now from 5th October 1990 to 10th April 1991

$$\begin{array}{ccccccc} \text{Number of days} = & 27 & + & 30 & + & 31 & + & 31 & + & 28 & + & 31 & + & 10 \\ & \text{Oct} & & \text{Nov} & & \text{Dec} & & \text{Jan} & & \text{Feb} & & \text{Mar} & & \text{Apr} \\ & 1990 & & 1990 & & 1990 & & 1991 & & 1991 & & 1991 & & 1991 \\ & = 188 \text{ days} & & & & & & & & & & & & \end{array}$$

So, number of odd days = $7 \times 26 + 6$ i.e. 6 odd days

$$\therefore \text{Total number of odd days} = 1 + 2 + 1 + 1 + 6 = 11$$

$$\therefore 11 = 7 \times 1 + 4 \Rightarrow 4 \text{ odd days.}$$

Since 4th October 1986 was Saturday and there are 4 odd days upto 10th April 1991 i.e. Sunday, Monday, Tuesday, Wednesday

$\therefore$ 10th April 1991 is Wednesday.

Example 5. If 15 February 2010 was Monday, what was the day on 10 January 2006?

Solution. Number of odd days:

From 10 January 2006 to 9 January 2007 = 1

From 10 January 2007 to 9 January 2008 = 1

From 10 January 2008 to 9 January 2009 = 2

($\because$ 2008 is a leap year)

From 10 January 2009 to 9 January 2010 = 1

Now from 10 January 2010 to 14 February 2010

$$\begin{array}{rcccl} \text{Number of days} & = & 22 & + & 14 & = & 36 \\ & & \text{Jan. 2010} & & \text{Feb. 2010} & & \end{array}$$

So, the number of odd days = $7 \times 5 + 1$ i.e. 1 day.

$\therefore$ The total number of odd days = $1 + 1 + 2 + 1 + 1 = 6$

Since 15 February was Monday, we have to count 6 odd days backwards, therefore, it was Tuesday.

Hence, 10 January 2006 was Tuesday.

Example 6. Monday fell on which dates of June 2003?

Solution. Let us find the day on 1 June 2003.

We know that:

In 2000 years 0 odd days

In 2001 (non-leap year) 1 odd day

In 2002 (non-leap year) 1 odd day

Now from 1 January 2003 to 1 June 2003

$$\begin{aligned} \text{Number of days} &= \underset{\text{Jan}}{31} + \underset{\text{Feb}}{28} + \underset{\text{Mar}}{31} + \underset{\text{Apr}}{30} + \underset{\text{May}}{31} + \underset{\text{Jun}}{1} \\ &= 152 \text{ days} \end{aligned}$$

So, number of odd days = $7 \times 21 + 5$ i.e. 5 odd days

$\therefore$ Total number of odd days = $1 + 1 + 5 = 7$ odd days

$\therefore 7 = 7 \times 1 + 0 \Rightarrow 0$ odd days.

$\therefore$ 1 June 2003 is Sunday

(Note that Sunday is also counted as 0 day)

$\Rightarrow$ 2 June 2003 is Monday.

So, Monday fell on dates 2, 9, 16, 23, 30 of June 2003.



EXERCISE 3.2

- Workout for the day of week on the given date
 - 4th January 2002
 - 13th August 1975
 - 28th December 1998.
- Workout for the day of week on the given date:
 - 22nd November 2025
 - 21st September 2080
 - 18th October 2100.
- If today is a Tuesday, what will be the day on 7706th day?
- If 22 April 1970 was Wednesday, what will be the day on 31 May 1999?
- If 10 June 1948 was Thursday, what will be the day on 16 November 1969?
- If 8 March 1996 was Friday, what was the day on 8 March 1993?
- Thursday fell on which dates of April 2007?
- Saturday fell on which dates of May 1999?
- Rahul's birthday is on Saturday 5th June. On what day of the week will be Radhika's birthday in the same year, if Radhika was born on 13th September?
- Indian government has announced a complete lockdown for entire country from the mid-night of 25th March 2020 till the mid-night of 14th April 2020 due to pandemic diseases Covid-19 out break. But keeping in view the grim situation the lockdown was further extended till 3rd May 2020.
 - Calculate the total number of days for which the lockdown lasted.
 - If 25th March 2020 is Wednesday, then find which day of the week will fall on 3rd May 2020.

Answers

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|------------------|---------------------|--------------|-----------|
| 1. (i) Friday | (ii) Wednesday | (iii) Monday | |
| 2. (i) Saturday | (ii) Saturday | (iii) Monday | |
| 3. Monday | 4. Monday | 5. Sunday | 6. Monday |
| 7. 5, 12, 19, 26 | 8. 1, 8, 15, 22, 29 | 9. Monday | |
| 10. (i) 39 days | (ii) Sunday | | |