

CALENDER

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• The Calender starts on 1st January and ends on 31st December. The year is classified into two years types:

1. Ordinary years (365 days)

2. Leap year (365 days)

• In an Ordinary year, there are 365 days which means $52 \times 7 + 1$, or 52 weeks and one odd day.

• There are 3 types of questions asked in exams.

Odd days:-

Odd days are the number of days in a year that are more than a complete week. To calculate the number of odd days in a year, you can divide the total number of days by 7, and the remainder is the number of odd days.

Formulas of Calender for Number of odd Days.

- 1 ordinary year has 1 odd day. ($365 = 52 \times 7 + 1$)
- 1 leap year has 2 odd days. ($366 = 52 \times 7 + 2$)
- 100 years has 5 odd days.
- 200 years has 3 odd days $5 \times 2 = 10 \Rightarrow 10/7 = 3$ odd days ^{Rem}
- 300 years has 1 odd days $5 \times 3 = 15 \Rightarrow 15/7 = 1$ odd days
- 400 years has 0 odd days $5 \times 4 + 1 = 21/7 = 0$
(it is a leap year)

(2)

- Similarly, all the 4th Centuries 800 years, 1200 years, 1600 years, 2000 years etc. have odd days.
- Mapping of the number of odd days to the days of the week.

Days	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
No. of odd days	0/7	1	2	3	4	5	6

Type I: Given To Find the day of given date.

Question 1: What was the day on 27th May 2006?

Soln:
27th May, 2006 = (2005 years + period from 1.1.2006 to 27.5.2006)

To calculate number of odd days till 2000, we need.

No. of days in 1600 years = 0

Now, for calculating odd days in the next five years,

$$\begin{aligned} 5 \text{ years} &= (4 \text{ ordinary years} + 1 \text{ leap year}) = (4+1) \\ &= 5 \text{ odd days.} \end{aligned}$$

Now, to calculate no. of odd days from 1st January 2006 to 27th May 2006.

$$\begin{aligned} \text{Jan (31)} + \text{Feb (28)} + \text{Mar (31)} + \text{Apr (30)} + \text{May (27)} \\ = 147 \text{ days.} \end{aligned}$$

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To No. of odd days in 147 days = $147/7$
 $= 21 \text{ weeks} + 0 \text{ odd days}$

To. No. of odd days in the entire period
 $= 0(2000 \text{ years}) + 6(5 \text{ years}) + 0(\text{Period of days})$
 $= 6 \text{ odd days.}$

Days	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
No. of odd days	0	1	2	3	4	5	6

As per the table, on 27th May 2006 the day was Saturday.

Questions 2:- Find out the day for 28th of May 2007

Solution: 28 May 2007 = (2006 + time 1st Jan 2007 to 27th May 2007)

No. of odd days in 2000 years = 0

Calculation for 6 years = (5 ordinary year + 1 leap year)
 $= (5 \times 1) + (1 \times 2)$
 $= 7 \text{ odd days.}$

Also total days = 31 Jan (31) + Feb (28) + Mar (31) + Apr (30)
 $+ \text{May (28)}$
 $= 148$

Total No. of odd days in these 148 days = (21 weeks + 1 day)
 $= 1 \text{ odd day}$

$$\text{Total odd days} = 0 + 67 + 1 = 8$$

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As per the table, on 28th May 2007 the day was ~~Mod~~ Monday

Type II: To find the day of the week for the given date when some other date or day is specified.

Question 1. It was a Saturday on 8th Dec 2007, what was the day on 8th Dec 2006?

Soln:

2006 was an ordinary year.

Therefore the no. of odd days in 2006 was = 1

Now, 8th Dec 2007 will be 1 day beyond the day on 8th Dec 2006 due to one odd day.

Since 8th Dec was Saturday, therefore, 8th Dec 2006 was Friday.

Question 2: If it is Sunday on Jan 1, 2006, determine the day on Jan 1, 2010?

Soln:

Odd days from year 2006 to 2009 = 1 + 1 + 2 + 1

(because 2008 is leap year) = 5 days.

There, it was now, Jan 1 is a

Add 5 days from Jan 1, 2006 in Sunday.

Therefore is Friday.

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Type III :- To-Identify the year having same calendar.

Question 1:- which year will have the same calendar as that of the year 2007?

Soln:

Count the number of odd days from the year 2007 onwards to get the sum equal to 0 odd days. Next to the year is the answer.

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
odd Days	1	2	1	1	1	2	1	1	1	2	1	

Sum = 14 odd days = 0 odd days.

Therefore, calendar of the year 2018 will have the same calendar as that of the year 2017.

Answer:- 2018.

Question 2:- which year will have the same calendar as that of the year 1998?

Soln:

Count the no. of odd day from the year 1998 onwards to get the sum equal to 0 odd day.

Year	1998	1999	2000	2001	2002	2003	2004
odd days	1	1	2	1	1	1	1

Answer:- 2004

Sum = 7 odd days = 0.

Therefore, calendar of the year 2004 will be the same as that of the year 1998

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PRACTICE Questions:-

~~Question 1:-~~ Which of the following is not a.

Question 1:- Find out the day after 61 days, if today is ~~Mod~~ Monday?

Soln:

It takes Seven days to repeat each day in a week.

Therefore, after 63 days, it will be on Monday.

And after 61 days, it will be on Saturday.

Question 2:- For April 2001, on what all dates will it be Wednesday?

Soln:

Determining the day on 1st April 2001 =

(2000 years + time from 1.1 to 1.4)

No. of odd days in 2000 years = 0

~~Also~~ Calculation for Jan No. of odd days in the period.

Total Also Total days = Jan(31) + Feb(28) + Mar(31) + Apr(1)

$$= 91 / 7 = \cancel{0} \text{ odd } 13 \text{ w} + 0 \text{ odd days.}$$

$$= 0 \text{ odd days.}$$

Total odd days = 0 + 0 = 0 odd days.

As per the table, on 1st April 2001 the day was Sunday.

Therefore, dates on which Wednesday will fall

= 4, 11, 18, 25 as counted by 7 days each.

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Question 3:- Calculate the no. of days in ~~p~~
'P' weeks and P days.

Soln:

$$P \text{ weeks and } P \text{ days} = (7P + P) \text{ days.}$$

$$= \underline{8P \text{ days.}}$$

Question 4:- Among the following, which of
these is not a leap year?

Options:- (a) 300 (c) 400
(b) 1200 (d) None of the above.

Soln:

The number which is divisible by 4, 100
and 400 is a leap year.

Therefore, the year 300 is not a leap year.

Answer:- (a) 300