11 Calendar Problems

The following points are to be remembered while solving calendar problems.

- **An ordinary year** (normal year) has 365 days; or 52 weeks plus one extra day. The number of odd days in any normal year is 1.
- **A leap year** has 366 days; or 52 weeks plus two extra day The number of odd days in a leap year is 2.
- In one normal century, there are 24 leap years and 76 normal years. So, the total number of odd days in a century is 5 days.
- In four centuries, the total number of leap years is 97, because the fourth century year is a leap year. So, the total number of odd days in four centuries is zero i.e., (97 × 2 + 303 × 1 = 497, which is equal to exactly 71 weeks).
- Commencing from the first day of the Gregorian calendar (i.e., from 1 January 0001), the total number of odd days in one century is 5, in two centuries it is 3, in three centuries it is 1, and in four centuries it is zero. This cycle repeats for every four centuries.

Some basic information to be remembered:

If 1 March 1983 was a Tuesday, then
1 March 1982 was a Monday
1 March 1981 was a Sunday
1 March 1980 was a Saturday
1 March 1979 was a Thursday
1 March 1978 was a Wednesday
1 March 1984 was a Thursday
1 March 1985 was a Friday

If 1 February 1983 was a Tuesday, then
1 February 1982 was a Monday
1 February 1981 was a Sunday
1 February 1980 was a Saturday
1 February 1979 was a Thursday
1 February 1978 was a Wednesday
1 February 1984 was a Thursday
1 February 1985 was a Friday

Months	No. of days	Odd days
January	31	3
February	28/29	0/1 (ordinary/leap year)
March	31	3
April	30	2
May	31	3
June	30	2
July	31	3
August	31	3
September	30	2
October	31	3
November	30	2
December	31	3

Note

The present calendar which we follow is the Gregorian calendar having 52 weeks + one or two more days in a year according to normal (365 days with Feb of 28 days) or leap year (366 days with Feb of 29 days) and 7 days of a week from Sunday to Saturday. To check the leap year divide the year by 4 if it's divisible by 4 then it's the leap year otherwise it will be a normal year. For example 2000, 2004, 2020, etc. are divisible by 4 or the multiple of 4 said to be leap year.

In spite of all these ingenious corrections; there is still a small error in civil 4000 years contain 1.2 days than 4000 tropical years.

Example 1. If 5 January 1991 was a Saturday, what day of the week was 3 March 1992?

Solution: Since 1991 is an ordinary year, it has only 1 odd day. Thus, 5 January 1992 was 1 day after Saturday, that is Sunday.

Now, in January 1992, 26 days are remaining (31 − 5 = 26 days).

That is, 5 odd days (26 ÷ 7 = 3 weeks and 5 odd days).

In February 1992, there are 29 days, that is 1 odd days (26 ÷ 7 = 4 weeks and 1 odd day).

In March 1992, there are 3 odd day (we are calculating odd day only up to 3 March 1992).

Therefore, the total numbers of odd days after 5 January 1992 till 3 March 1992 is 5 + 1 + 3 = 9 days (1 week and 2 odd days), which is equivalent to 2 odd days. Therefore, 3 march 1992 was 2 days after Sunday, this is Tuesday.

Another method: We can also solve the above problem by another method.

The total number of days between 5 January 1991 and 3 March 1992 can be calculated as follows:

In 1992	– 360 (365 – 5 = 360)
In 1992 January	– 31
In 1992 February	– 29 (Leap year)
In March	– 3
423 days	

423 days means 60 weeks and 3 days

So, the number of odd days form 5 January 1991 to 3 March 1992 is 3.

Therefore, 3 March 1992 is 3 days after Saturday, that is Tuesday.

Answer: Tuesday

Example 2. What day of the week did 30 June 1974 fall ?

Solution: We shall first calculate the number of odd days till 31 December 1973.

Number of odd days in the first 1600 years = 0

Number of odd days in the next 300 years = 1

The number have 18 leap years and 55 ordinary years .

The number of odd days in 73 years

= $(2 \times 18) + (1 \times 55) = 36 + 55 = 91 = 13$ weeks and 0 odd days.

So, The total number of odd days till 31 December 1973 = 0 + 1 + 0 = 1 odd day.

Now, we shall calculate the number of odd days in 1974 till 30 June.

January	–	31 days	–	3 odd days
February	–	28 days	–	0 odd days
March	–	31 days	–	3 odd days
April	–	30 days	–	2 odd days
May	–	31 days	–	3 odd days
June	–	30 days	–	2 odd days

The total number of odd days in 1974 till June 30 = 3 + 0 + 3 + 2 + 3 + 2 = 13 = 1 week + 6 odd days.

So, the total numbers of odd days from the day of commencement of the calendar till 30 June 1974 is 1 + 6 = 7.

Seven odd days means 1 week + 0 odd day.

Therefore, 30 June 1974 was a Sunday.

Answer: Sunday

Example 3. On what dates of July 1776 did Sundays fall?

Solution: First, we shall find out what day was 1 July 1776.

1600 years have 0 odd days.

100 years have 5 odd days.

75 years comprises, 18 leap years and 57 ordinary years.

So, the number of odd days in 75 years

= $18 \times 2 + 57 = 93 = 13$ weeks and 2 odd days.

Thus, 1775 years have (0 + 5 + 2) = 7 odd days.

So, 0 odd days.

In 1776, till 1 July, the number of odd days in calculated as follows :

Month	January	February	March	April	May	June	July
Number of days	31	29	31	30	31	30	1

183 days = 26 weeks + 1 = 1 odd day

So, 1 July 1776 was Monday, and hence the first Sunday in July 1776 was on 7 July.

The other Sundays in July 1776 were on 14, 21, and 28 July.

Examples 4. Which year will have the same calendar as that of 2009 ?

(a) 2012   (b) 2016

(c) 2020   (d) 2015

Solution: (d) The year 2009 is an ordinary year.

The number of odd days from 2009 onwards:

Year	2009	2010	2011	2012	2013	2014
Number of odd days	1	1	1	2	1	1

So, total number of odd days = 7 and $\frac{7}{7} = 0$ days. [∵ 7/7 = 1 week and 0 odd days.]

Also, year 2015 is an ordinary year.

Therefore, same calendar as that of 2009 = 2015.

Note: The sum of odd days between the years should be zero.

Examples 5. What day of the week will 1st January, 2020 be, given that 1st January, 2009 is a Sunday?

(a) Thursday   (b) Saturday

(c) Monday   (d) Friday

Solution: (b) According to the question, 1st January, 2009 is a Sunday.

Year	2009	2010	2011	2012	2013	2014
Number of odd days	1	1	1	2	1	1
Year	2015	2016	2017	2018	2019	
Number of odd days	1	2	1	1	1	

So, Total number of odd days = 13

and $\frac{13}{7} = 6$ odd days.

[∵ Remainder = 6]

So, 6 days after Sunday = Required day = Sunday + 6 days = Saturday.

Multiple Choice Questions

1. How many days will there be from 26th January, 2004 to 15th May, 2004 (both days include)?
   a. 110   b. 111   c. 112   d. 113

2. If day after tomorrow is Saturday, what day was three days before yesterday?
   a. Sunday   b. Monday   c. Thursday   d. Saturday

3. If the second day of a month is a Friday, which of the following would be the last day of the next month which has 31 days?
   a. Sunday   b. Monday
   c. Tuesday   d. Data inadequate

4. In a month of 31 days, the third Wednesday falls on the 15th. What will be the last day of the month?
   a. Fourth Sunday   b. Fifth Wednesday
   c. Fifth Thursday   d. Fifth Friday

5. Saturday was a holiday for Republic day. 14th of the next month is again a holiday for Shvratri. What day was it on the 14th ?
   a. Monday   b. Tuesday   c. Thursday   d. Friday

6. If the first day of the year (other than the leap year) was Friday, then which was the last day of that year?
   a. Monday   b. Friday   c. Saturday   d. Sunday

7. If 1st October is Sunday, then 1st November will be:
   a. Monday   b. Tuesday
   c. Wednesday   d. Thursday

8. If February 1, 2008 is Wednesday, we what day is March 3, 2008?
   a. Sunday   b. Saturday   c. Friday   d. Monday

9. If it was Saturday on 17th December, 2009. What will be the day on 22 nd December, 2012?
   a. Sunday   b. Tuesday   c. Friday   d. Monday

10. On which dates of April, 2012 will a Sunday come?
    a. 5, 12, 19, 26   b. 1, 8, 15, 22, 29
    c. 3, 10, 17, 24   d. 7, 14, 21, 28

11. If 15th August, 2009 is on Saturday, then on which day of the week would the independence day be celebrated in the year 2109?
    a. Sunday   b. Monday   c. Saturday   d. Thursday

12. Deepa met Sonam on 28th August, 2008 which was a Thursday and promised to meet her again in the month of December in the next year but only on s Saturday On which of the following days could Deep meet Sonam?
    a. 6th, 31th, 20th, 27th   b. 4th, 11th, 18th, 25th
    c. 1st, 8th, 15th, 22nd, 29th   d. 5th, 12th, 19th, 26th

13. Laxmi Puja would be observed the day after tomorrow. Next week on the same day, the festival of Deepawali would be celebrated. If today is Sunday, then what would be the day four days after Deepawali?
    a. Saturday   b. Sunday
    c. Wednesday   d. Tuesday

14. An application was received by inward clerk in the afternoon of a week day. Next day he forwarded it to the table of the senior clerk, who was on leave that day. The senior clerk next day evening put up the application to the desk officer. Desk officer studied the application and disposed off the matter on the same day, i.e., Friday. Which day was the application received by the inward clerk?
    a. Saturday   b. Sunday
    c. Wednesday   d. Tuesday

15. Which year will have the same calendar as that of 2012 ?
    a. 2020   b. 2040   c. 2025   d. 2031

16. If December 2, 2008 was Tuesday, the day on the 217th day after December 2, 2007 would be:
    a. Wednesday   b. Monday   c. Thursday   d. Tuesday

17. Imagine that in a calendar year, there were 998 days and 12 days in a week, then no. of odd days in that year will be:
    a. 5   b. 6   c. 3   d. 2

18. If 18th February, 2005 falls on Friday then what will be the day on 18th February, 2007?
    a. Sunday   b. Wednesday
    c. Tuesday   d. Monday

19. If 20th February, 1996, which is your date of birth, is a Tuesday. On what day of the week will your birthday fall in the year 1998?
    a. Thursday   b. Tuesday
    c. Saturday   d. Friday

20. If Thursday was the day after the day before yesterday five days ago, what is the least number of days ago when Sunday was three days before the day after tomorrow?
    a. Two   b. Three
    c. Four   d. Five

21. Which two months in a year have the same calendar?
    a. April, December   b. September, December
    c. Day, August   d. August, December

22. On which day of the week does 28th August, 2009 fall?
  a. Sunday **b.** Monday **c.** Tuesday **d.** Friday
23. Deepa went to the movies nine days ago. She goes to the movies only on Thursday. What day of the week is today?
  a. Tuesday **b.** Sunday **c.** Thursday **d.** Saturday
24. Which of the following is not a leap year?
  a. 700 **b.** 800 **c.** 1200 **d.** 2018
25. January 1, 2008 is Tuesday. What day of the week lies on Jan 1, 2009?
  a. Monday **b.** Wednesday **c.** Thursday **d.** Sunday

ANSWERS

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
b	a	d	d	c	b	c	b	d	b
11.	**12.**	**13.**	**14.**	**15.**	**16.**	**17.**	**18.**	**19.**	**20.**
d	d	b	c	b	d	d	a	d	a
21.	**22.**	**23.**	**24.**	**25.**					
b	d	d	a	c					

SOLUTIONS

1. **(b)** Total number of days from 26th January, 2004 to 15th May, 2004 (both days included)

$$= \left(\frac{6}{Jan} + \frac{29}{Feb} + \frac{31}{Mar} + \frac{30}{Apr} + \frac{15}{May}\right) days = 111 \text{ days}$$

[∵ 2004 is a leap year. So, number of days in February = 29]

2. **(a)** According to the question,
Day after tomorrow = Saturday
So, today = Saturday – 2 days = Thursday
Also, yesterday = Thursday –1 day
= Wednesday.
Therefore, three days before yesterday
= Wednesday –3 days = Sunday.

3. **(d)** The number of days in the current month is not mentioned.
Therefore, the answer cannot be determined.

4. **(d)** According to the question,
15th of the month = 3rd Wednesday.
So, 15 + 7 = 22nd of the month = 4th Wednesday.
22 + 7 = 29th of the month = 5th Wednesday.
Therefore, last day of the month i.e., 31st
= 29th of the month + 2 days
= 5th Wednesday + 2 days = 5th Friday.

5. **(c)** According to the question, 26th January = Saturday.
So, 2nd February = Saturday [∵ Republic day = 26th January]
9th February = Saturday
16th February = Saturday
Therefore, 14th February = 16th February –2 days
= Saturday – days = Thursday.

6. **(b)** According to the question,
First day of the year (other than leap year)
= Friday

As we know that, in an ordinary year first day of the year = last day of the year.
Therefore, lat day of the year = First day of the year
= Friday.

7. **(c)** According to the question, 1st October = Sunday
Then, 8th October = Sunday. [∵ Every 7th day will be the same day countwise]
15th October = Sunday.
22nd October = Sunday.
So, 31st October = Sunday + 2 day = Tuesday
So, 1st November = Tuesday + 1 day = Wednesday.

8. **(b)** According to the question, 1st February,
2008 = Wednesday,
So, 8th February, 2008 = Wednesday,
15th February, 2008 = Wednesday,
22nd February, 2008 = Wednesday,
29th February, 2008 = Wednesday, [∴ 2008 is a leap year So, February = 29 days]
Therefore, 3rd March, 2008 = Wednesday + Wednesday + 3 days = Saturday.

9. **(d)** According to the question, 17th December,
2009 = Saturday
So, 17th December, 2012 = Saturday + 4 days = Wednesday.
[∵ 2010 and 2011 are ordinary years. So number of odd days = 1 + 1 = 2]
[∵ 2012 is a leap year, So number of odd days 2]
[∵ 2009 – 2010 = 1 odd day, 2010 –2011 = 1 odd day, 2011 –2012 = odd day]
So, 22nd December, 2012 = 17th December,
2012 + 5 days = Wednesday + 5 days = Monday.

10. **(b)** 1st April 2012 = 2000 years + 11 years + 1st January, 2012 to 1st April, 2012.
Number of odd days in 2000 years = 0
[∵ Multiple of 400 years = 0 odd days]
Number of odd days in 11 years = 2 leap years + 9 ordinary years.
$= (2 \times 2)$ odd days $+ (9 \times 1)$ odd days
$= 13$ odd days $= \frac{13}{7}$ odd days,

Also,

Months	January	February	March	April
No. of odd days	3	1	3	1

[∵ 2012 is a leap year. So, February = 1 odd day]

So, Number of odd days from 1st January, 2012 to 1st April,

$2012 = 8 = \dfrac{7}{7} = 1$ odd day.

So, total number of odd days = (0 + 6 + 1) odd days = 7 odd

days $= \dfrac{7}{7} = 0$ odd days.

So, 1st April, 2012 = Sunday.

So, 8th April, 2012 = Sunday.

15th April, 2012 = Sunday.

22nd April, 2012 = Sunday and 29th April,

2012 = Sunday.

11. **(d)** According to the question, 15th August,

2009 = Saturday

∵ 15th August, 2109 – 15th, August 2009 = 100 years.

So, number of odd days = 5

[∵ We know that 100 years = 5 odd days]

So, 15th August, 2019 = 15th August, 2009 + 5 days

= Saturday + 5 days = Thursday

12. **(d)** According to the question, 28th August,

2008 = Thursday.

So, 28th August, 2009 = Thursday + 1 = Friday

No. of odd days from August to November:

Months	Aug	Sep	Oct	Nov
No. of odd days	3	2	3	2

Total number of odd days

$= 3 + 2 + 3 + 2 = \dfrac{10}{7} = 3$ odd days.

So, 3rd day after Friday = Friday +3 days = Monday,

So, Saturday = Monday + 5 days = 5th December.

[∵ she could meet only on a Saturday]

So 5th December = Saturday

(5 + 7) i.e., 12th December = Saturday

(12 + 7) i.e., 19th December = Saturday

(19 + 7) i.e., 26th December = Saturday

[∵ Every 7th day will be the same day countwise]

So, Deepa can meet Sonam on = 5th, 12th, 19th and 26th.

13. **(b)** According to the question, Today = Sunday

So, day after tomorrow = Today + 2 days = Sunday + 2 days

= Tuesday = Laxmi Puja

So, Next week = Tuesday = Weepawali

[∵ Every 7th day will be the same day countwise]

Therefore, the day four days after Deepawali

= Tuesday + 5 days = Sunday.

14. **(c)** According to the question, Desk officer received the

application = Friday.

So, the application forwarded to the table of the senior clerk

= Thursday.

It is clear from the flowchart given below:

Desk officer = Friday

Senior clerk = Friday   ] Same day

Senior clerk's leave = Thursday

     Inward clerk = Wednesday   ] Next day

So, the application received by the inward clerk

= Wednesday.

15. **(b)** ∵ 2012 is a leap year.

So, 2012 + 28 = 2040.

[As we know that a leap year repeats itself after (7 × 4)

i.e., 28 years.]

So, year 2040 will have the same calendar a that of 2012.

16. **(d)** Number of odd day in 217 $= \dfrac{217}{7}$ = Remainder 0 = 0

Therefore, required day = Tuesday

17. **(d)** According to the question,

Number of days in a calendar year = 998.

Number of days in a week of that calendar year = 12

Therefore, number of odd days in that year

$= \dfrac{998}{12} = 83$ weeks + 2 odd days = 2 odd days.

18. **(a)** According to the question

18th February, 20015 = Friday.

So, 18th February, 2006 = Friday + 1 day = Saturday.

So, 18th February 2007 = Saturday + 1 day = Sunday.

[∵ 2005, 2006 and 2007 are ordinary years]

19. **(d)** According to the question 20th February,

1996 = Tuesday.

Number of odd days between 20th February, 1996 and 20th

February, 1998 = 3 days

[∵ 1996 – 1997 = 2 odd days and 1997 – 1998 = 1 odd day]

As we know that leap year to ordinary year = 2 odd days.

Ordinary year to ordinary year = 1 odd day. [∵ 1996 is a

leap year]

Therefore, birthday fall on 20th February, 1998 = Tuesday

+ 3 days = Friday.

20. **(a)** Day after the day before yesterday

= (yesterday –1 day) + 1 day = Yesterday.

Then, five days ago, yesterday = Thursday. (Given)

So, five days ago = Thursday + 1 day = Friday

So, today = Friday + 5 days = Wednesday and tomorrow

= today + 1 day

= Wednesday + 1 day = Thursday.

Day after tomorrow = today + 2 day = Wednesday + 2 days = Friday.

So, three days before the day after tomorrow

= (today + 2 days) −3 days = today −1 day = Yesterday.

So, it is on Monday that we say 'Yesterday was Sunday.

Therefore, last number of days ago = Wednesday – Monday = Two

21. (b) For April, December:

Months	April	May	June	July
No. of days	30	31	30	31
Months	Aug	Sept	Oct	Nov
No. of days	31	30	31	30

Total number of odd days $= 244 = \dfrac{244}{7} = 6$ odd days.

For September, December:

Months	Sept	Oct	Nov
No. of days	30	31	30

Total number of days $= 91 = \dfrac{91}{7} = 0$ odd days.

For May, August:

Months	May	June	July
No. of days	31	30	31

Total number of days

$= 92 = \dfrac{92}{7} = 1$ odd days.

For August, December:

Months	Aug	Sept	Oct	Nov
No. of days	31	30	31	30

Total number of days

$= 122 = \dfrac{122}{7} = 3$ odd days.

Since, there are 0 odd days between September and December.

Therefore, September and December have the same calendar in a year.

22. (d) 28th August, 2009=2000 years + 8 years + 1st January, 2009 to 28th August, 2009

Number of odd days in 2000 years = 0. [∵ Multiple of 400 years = 0 odd days.]

Number of odd days in 8 years = 2 leap years and 6 ordinary yers.

= (2 × 2) odd days and (6 × 1) odd days

= 10 odd days

$= \dfrac{10}{7} = 3$ odd days.

Also,

Months	Jan	Feb	March	April
No. of days	3	0	3	2
Months	May	June	July	Aug
No. of days	3	2	3	0

So, number of odd days form 1st January, 2009 to 28th August, 2009 $= 3+0+3+2+3+2+3+0 = 16$ odd days

$= \dfrac{16}{7} = 2$ odd days.

So, total number of odd days $= (0+3+2)$ odd days = 5 odd days.

So, 5th day = Friday

Therefore 28th August, 2009 = Friday.

23. (d) According to the question, 3rd December, 2009 = Sunday

So, 10th December, 2009 = Sunday,

17th December, 2009 = Sunday,

24th December, 2009 = Sunday,

31st December, 2009 = Sunday,

So, 3rd January, 2010 = Sunday + 3 days = Wednesday.

24. (a) The century divisible by 400 is a leap year.

∴ The year 700 is not a leap year.

25. (c) The year 2008 is a leap year. So it has 2 odd days.

1st day of the year 2008 is Tuesday. (Given)

So, 1st day of the year 2009 is 2 days beyond Tuesday.

Hence, it will be Thursday.

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