

# Calendar

English Calendar

Hindu calendar  $\xleftarrow{+56}$

$\Downarrow$  (2023)  
Gregorian Calendar

$\Downarrow$   
Vikram calendar  
(2079)

$\downarrow -78$   
National Calendar

$\Downarrow$   
Saka Calendar  
(1945)

Leap year  
occurs mostly  
every 4 years but  
every 100 years we  
skip a leap year unless  
you are divisible  
by 400.

Leap year

Ex: 1600 ( $\checkmark$ )  
2000 ( $\checkmark$ )  
1700 (X)  
2100 (X)

Century years

non-century year

divisible by 400

divisible by 4

400  
800  
1200  
...  
2400

$\frac{2024}{4}$   $\rightarrow$  Hence it is a leap year

Normal year  
100  
200  
300  
500  
...  
1900

They are in century, hence divided by 400 but they are not divisible by 400 hence they are normal years.

# For probability trick  $\Rightarrow$

1-100  $\Rightarrow$  24  
101-200  $\Rightarrow$  24  
201-300  $\Rightarrow$  24  
301-400  $\Rightarrow$  25

97 out of 400  
 $\Rightarrow$  leap year

## Odd days concept

20hms 12

Odd days  $\Rightarrow \frac{\text{Total days}}{7} \Rightarrow$  Remainder is known as odd days.

Normal year  $\Rightarrow 365 \text{ days} \Rightarrow \frac{365}{7} \Rightarrow 1 \text{ Remainder}$

1 day is odd day in normal year.

a. Probability to get 53<sup>rd</sup> Monday in normal year.

1 Jan  
31 Dec } 52 weeks  
                   $\downarrow$   
                  52 Mondays

1 day odd  
S M T W T F S

$\frac{1}{7} \Rightarrow P(53^{\text{rd}} \text{ Monday})$

1 year	odd days
Normal year	1
leap year	2

1-100 year  $\begin{cases} \rightarrow 24 \text{ leap} \times 2 = 48 \text{ odd days in 2 leap year} \\ \rightarrow 76 \text{ normal} \times 1 = 76 \text{ odd days in 1 normal year} \end{cases} \Rightarrow \frac{124}{7} = 17 \text{ odd days}$



1-100 yr — ⑤  
 101-200 yr — ⑤  
 201-300 yr — ⑤  
 301-400 yr — ⑥

$\left. \begin{array}{l} 1-100 \text{ yr} \\ 101-200 \text{ yr} \end{array} \right\} \frac{10}{7} = ③$   
 $\left. \begin{array}{l} 201-300 \text{ yr} \\ 301-400 \text{ yr} \end{array} \right\} \frac{15}{7} = ①$   
 $\left. \begin{array}{l} 1-100 \text{ yr} \\ 101-200 \text{ yr} \\ 201-300 \text{ yr} \\ 301-400 \text{ yr} \end{array} \right\} \frac{21}{7} = 0$

yr	odd days
100	5
200	3
300	1
400	0

201-400  
 leap  $\downarrow$  75  $\times$  1  
 $\downarrow$  25  
 $\times 2$   
 $\downarrow$  50 + 75 = 125  
 $\frac{125}{7} \Rightarrow ⑥ \text{ Rem}$

Jan  $\rightarrow \frac{31}{7} \Rightarrow 3 \text{ odd days}$

Feb  $\rightarrow$  Normal  $\Rightarrow \frac{28}{7} \Rightarrow 0 \text{ odd day}$   
 Leap  $\Rightarrow \frac{29}{7} \Rightarrow 1 \text{ odd day}$

March  $\Rightarrow \frac{31}{7} \Rightarrow 3 \text{ odd days}$

April  $\Rightarrow \frac{30}{7} \Rightarrow 2 \text{ odd days}$

May  $\Rightarrow \frac{31}{7} \Rightarrow 3 \text{ odd days}$

Dec  $\Rightarrow \frac{31}{7} \Rightarrow 3 \text{ odd days}$

yr  
month  
day

Total odd days  
7

Rem	day
0	Sunday
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday

15 Aug 2022

year completed

$4\sqrt{21} \overline{) 52}$   
leap years

2000  $\rightarrow 0$

$21-5 = 16 \times 1 \rightarrow 16$

Remaining

22

$5 \text{ leap} \times 2 \rightarrow 10$

26

current year 2022

Jan  $\rightarrow 3$

Feb  $\rightarrow 0$  / leap total 1

March  $\rightarrow 3$

April  $\rightarrow 2$

May  $\rightarrow 3$

June  $\rightarrow 2$

July  $\rightarrow 3$  / 16

Aug - 15 day gone

odd days

year = 26

month = 16

day = 15 (if the day gone in month)

57

$\frac{\text{Total}}{7} = \frac{57}{7} = \text{Remainder} \Rightarrow 1$  So, Monday

26 Jan 2022

year completed

$4\sqrt{21} \overline{) 5}$   
leap years

2000  $\rightarrow 0$

21  $\rightarrow 16 \times 1 = 16$

$5 \times 2 = 10$

26 odd days

current year  
2022

Jan 26

year  $\Rightarrow 26$

month  $\Rightarrow 0$

days  $\Rightarrow \frac{26}{52/7} = 3$

So, Wednesday

25 August 1947

yr gone  
1946

Current year  
1947

$$\begin{array}{r} 1900 \\ 1600 - 0 \\ 300 - 1 \end{array}$$

$$\begin{array}{r} 46 \\ 35 \text{ Normal } \times 1 = 35 \\ 11 \text{ LY } \times 2 = 22 \\ \hline 58 \end{array}$$

$$\begin{array}{r} 4 \overline{)46} (11 \\ 44 \\ \hline 2 \end{array}$$

Jan  $\rightarrow$  3  
 Feb  $\rightarrow$  0  
 March  $\rightarrow$  3  
 April  $\rightarrow$  2  
 May  $\rightarrow$  3  
 June  $\rightarrow$  2  
 July  $\rightarrow$  3  
 Aug  $\rightarrow$  15

16

yr = 58  
 month = 16  
 day = 15

Total odd days =  $\frac{89}{7} = 5$  Friday

### Shifting Calendar

25 Aug 1945  $\rightarrow$  Wednesday  
 15 Aug 1946  $\rightarrow$  Thursday  
 15 Aug 1947  $\rightarrow$  Friday  
 29 Feb 1948  $\rightarrow$  +2  
 15 Aug 1948  $\rightarrow$  Sunday  
 15 Aug 1949  $\rightarrow$  Monday



26 Jan 2022 → Wednesday  
     ↓ +1  
 26 Jan 2023 → Thursday  
     ↓ +1  
 26 Jan 2024 → Friday  
     ↓ +2 { 29 Feb 2024 }  
 26 Jan 2025 → Sunday

26 Feb 2023 → Sunday  
     ↓ +1  
 26 Feb 2024 → Monday  
     ↓ +2  
 29 Feb 2024 → Wednesday

Q.2

11 Aug 2001 → Saturday Ans  
 11 Aug 2002 → Saturday  
 11 Aug 2003 → Monday  
 29 Feb 2004 11 Aug 2004 → Wednesday  
 11 Aug 2005 → Thursday  
 11 Aug 2006 → Friday  
 11 Aug 2007 → Saturday  
 29 Feb 2008 11 Aug 2008 → Monday  
 11 Aug 2009 → Tuesday  
 11 Aug 2010 → Wednesday

alternate

gap b/w 2001 & 2010  $\Rightarrow$  9 yrs  $\begin{cases} \nearrow 2LY \Rightarrow 4 \text{ odd days} \\ \searrow 7NY \Rightarrow 7 \text{ odd days} \end{cases}$

$\Rightarrow \frac{11}{7} \Rightarrow$  Remainder  $\Rightarrow$  (4)

(11)

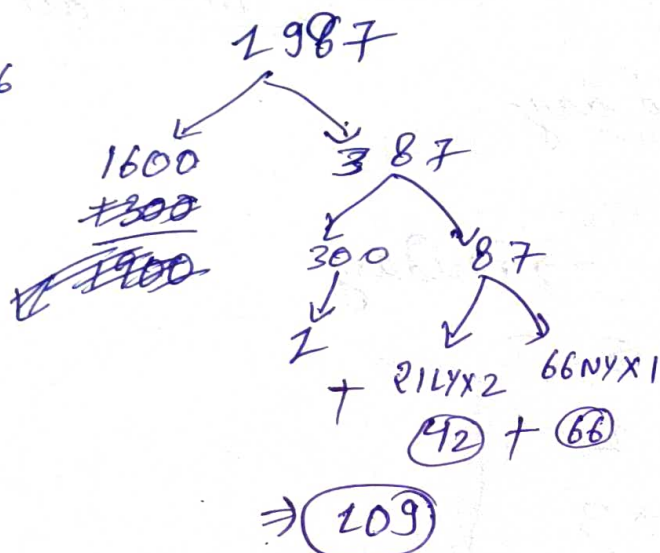
12 Aug 2010  $\Rightarrow$  Wednesday  $\xrightarrow{4 \text{ days back}}$  Saturday Aug

Q3

1 Aug 1988

$87 - 21 = 66$

$$\begin{array}{r} 21 \\ 4 \overline{) 87} \\ \underline{8} \phantom{0} \\ 7 \\ \underline{7} \\ 0 \end{array}$$



1988

Jan  $\rightarrow 3$   
 Feb  $\rightarrow 1$   
 March  $\rightarrow 3$   
 April  $\rightarrow 2$   
 May  $\rightarrow 3$   
 June  $\rightarrow 2$   
 July  $\rightarrow 3$   
 Aug  $\rightarrow$  (1)

(17)

yr = 109  
 month = 17  
 day = 1

$\frac{127}{7} = \text{Rem} \Rightarrow$  (1)  $\rightarrow$  Monday

1 Aug 1988  $\rightarrow$  Monday

5 Aug 1988  $\rightarrow$  Friday

12 Aug 1988  $\rightarrow$  Friday

19 Aug 1988  $\rightarrow$  Friday

26 Aug 1988  $\rightarrow$  Friday

5, 12, 19, 26

Ans

Q.4 16 July 2000 → Sunday

31  
16  
15

July	→ 15
Aug	→ 3
Sep	→ 2
Oct	→ 3
Nov	→ 2
Dec	→ 20

20 Dec 2000

+ 45  
7 = 3 day forward

+ 3

Wednesday Aug

Q.5  $\frac{365}{8} \Rightarrow$  1 odd days

Q.6 26 Jan → Friday

31  
26  
5

Jan	→ 5
Feb	→ 1
March	→ 3
April	→ 2
May	→ 3
June	→ 2
July	→ 3
Aug	→ 15

+ 34  
7 → 6 days forward

+ 6

15 Aug

Thursday Aug

⑧

1 Jan 0001 Monday

1 Jan 0401 Monday

21st century → 1 Jan 2001 Monday



## For self purpose

## TRICKS

<sup>0</sup> Sunday    <sup>1</sup> Monday    <sup>2</sup> Tuesday    <sup>3</sup> Wed    <sup>4</sup> Thurs    <sup>5</sup> Friday    <sup>6</sup> Saturday    { Days }

## { Month }

J	0
F	3
M	3
A	6
M	1
J	4
J	6
A	2
S	5
O	0
N	3
D	5

\* 1 week → 7 days

\* 1 year → 52 weeks + '1' odd day

\* Leap year → 52 weeks + 2 odd day

\* Ordinary year → 28 Feb

\* Leap year → 29 Feb

## { year }

1600 - 1699 → 6

1700 - 1799 → 4

1800 - 1899 → 2

1900 - 1999 → 0

2000 - 2099 → 6

26<sup>th</sup> Jan 1947 (?)

1. Last two digit 47

2. Divide by 4 11  
{ Take quotient }

3. Take the date 26

4. Take no. of the M 0

5. Take no. of the Y 0

84

6. Divide by 7 →  $\frac{84}{7} \Rightarrow '0' \Rightarrow \text{Sunday}$   
(Take rem)

5<sup>th</sup> Oct 2016

16

04

5

0

6

31

$\frac{31}{7} \rightarrow '3' \Rightarrow \text{Wednesday}$

→ reh LY hai Toh Last  
 mei aaya hua day se  
 '-1' kauma hota hai  
 lekin woh -1 sirf  
 Jan, Feb ke liye  
 kauma hota hai

Q1 29th Feb 2012

12  
03  
29  
03  
06  
53

7  
7) 53  
49  
4

4 - 1  $\Rightarrow$  3  $\Rightarrow$  Wednesday

because it is a leap year in the ques and also month is February.

Q1 What dates of May 2002 will Monday fall.

1st May 2002

02  
00  
01  
01  
06  
10

7) 10  
7  
3

Wed

1 Wed  
2 Thurs  
3 Fri  
4 Sat  
5 Sun  
6 Mon

6, 13, 20, 27

Q1 1 March 2006 = Wednesday  
1 March 2010 falls?

2007  $\rightarrow$  1  
2008  $\rightarrow$  2  
2009  $\rightarrow$  1  
2010  $\rightarrow$  1

5 odd days

Wed  
+5  
Monday

or

gap = 4 yrs  
2006 2010  
3 NY 1 LY  
3x1 + 1x2

Wed  
+5  
Monday

5  
5

Q1 Today is Monday, after 64 days it will be?

2005  $\rightarrow$  odd day

9  
7) 64  
63  
1

Monday  
+1

Tuesday

Q1 8th March 2006  $\rightarrow$  Wednesday  
8th March 2005  $\rightarrow$  ?

2005  $\rightarrow$  odd day

Wednesday  
-1

Tuesday



Q The last day of the century cannot be ?

100 yrs	→	5	{ Friday }
200 yrs	→	3	{ Wednesday }
300 yrs	→	1	{ Monday }
400 yrs	→	0	{ Sunday }

Tues, Thurs, Saturday

TT's

Q How many days are there in  $X$  weeks  $X$  days?

$X$  weeks  $X$  days

$$7X + X \Rightarrow 8X$$

No. of days in a week.

Use  $7X_1 + X_2$

when weeks  $X_1$  and Days  $X_2$

Use  $8X$

If both are same.

Q It was Monday on 17<sup>th</sup> March 1980. What was the day of the week on 12<sup>th</sup> July 1980.

$$\frac{14 + 30 + 31 + 30 + 12}{7} \rightarrow 12^{\text{th}} \text{ July} = \frac{117}{7} = 5$$

(31-17)

Mon + 5  $\Rightarrow$  Saturday

Q Radha celebrated her wedding anniversary on Tuesday 30<sup>th</sup> Sept 1997. When will she celebrated her next wedding anniversary on the same day?

1998  $\rightarrow$  1

1999  $\rightarrow$  1

2000  $\rightarrow$  2

2001  $\rightarrow$  1

2002  $\rightarrow$  1

2003  $\rightarrow$  1/7

1997 + 6 yrs  $\Rightarrow$  2003

for any purpose

# Conditions for Twin Calendar

- ① Both years should have the same day on 1st January.
- ② Both years should follow the same pattern that means leap year should be leap year and ordinary year should be ordinary year.

Q: What will be the next same calendar which exactly follows as 1989.

1989 → 1

90 → 1

91 → 1

92 → 2

93 → 1

94 → 1

(Ordinary year) ✓

→ 1995 (Ordinary year) ✓

## \* Key points

