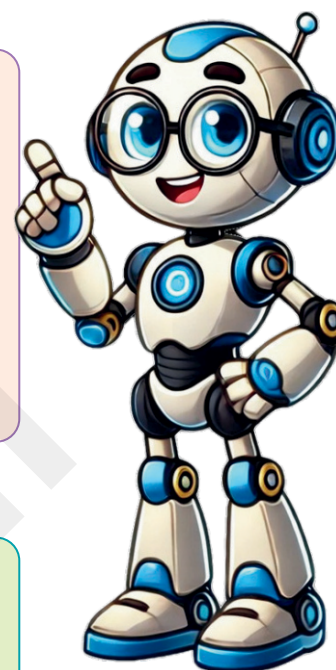# 12 Time and Calendar

We'll cover the following key points:

→ Introduction
→ Use of A.M. and P.M.
→ 24-Hour Clock Time
→ Time in Seconds
→ Addition and Subtraction of Times

→ Word Problems
→ Calendar
→ Calendar 2020

Do you Remember fundamental concept in previous class:

In class 3rd we learnt

→ Clock
→ Calendar, Months and Days of a Week

→ Learn from the Calendar

Hi, I'm EeeBee

Still curious? Talk to me by scanning the QR code.

Learning Outcomes

By the end of this chapter, students will be able to:

- Read the time on an analog clock (e.g., understand hours, minutes, and half-hours).
- Read the time on a digital clock (e.g., 2:30 or 5:45).
- Understand and use AM and PM to tell time in the morning and afternoon.
- Calculate the time between two given times (e.g., how much time has passed between 2:15 and 4:45?).
- Identify the days of the week and know the order of days (e.g., Monday, Tuesday, etc.).
- Understand how to use a calendar to find the date and the day of the week for any month.
- Understand months in a year and how many days are in each month (e.g., 31 days in January, 28 or 29 in February).
- Solve word problems related to time and calendar (e.g., "If school starts at 8:00 AM and ends at 3:00 PM, how many hours is that?").
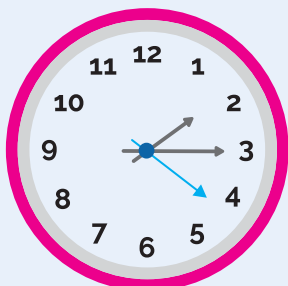
Read the time in the clocks and write it in am or pm and in words too.
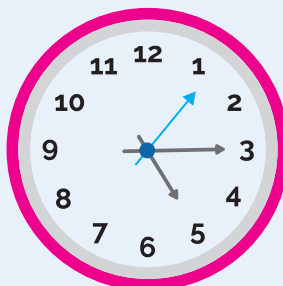

Morning
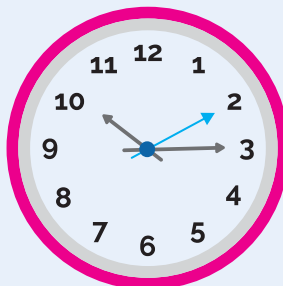

Evening

Afternoon

Midnight

Night

Evening

Morning

Morning

Introduction

Reading time is important in our day-to-day life. We know that the interval between one sunrise/sunset to the next is called a **day**. We have already learnt how to read time from a clock. Let us revise it with a few questions.

What is the time?

Most clocks and watches have an **hour hand** and a **minute hand**. Some watches and clocks have a **second hand** as well.

60 second	= 1 minute
60 minutes	= 1 hour
24 hours	= 1 day

In hours

When the minute hand is on 12, the time is in full hours.

The hour hand is at 4 in this clock.

    The minute hand is at 12.

    So, the time is **4 O'clock**.

In half hours

When the minute hand is on 6, the time is in half hours.

The hour hand is between 4 and 5 in this clock.

The minute hand is at 6.

So, the time is **04:30 or half past 4**.

Use of A.M. and P.M.

The hour hand is at 6.

The minute hand is at 12.

It is 6 O'clock.

It may be 6 O'clock in the morning.

It may be 6 O'clock in the evening.

So, the hour hand crosses 6 twice a day.

To differentiate the time weather it is morning or evening time, we use **a.m.** (ante meridiem) and **p.m.** (post meridiem).

The time in the evening is 6 p.m.

The time in the morning is 6 a.m.
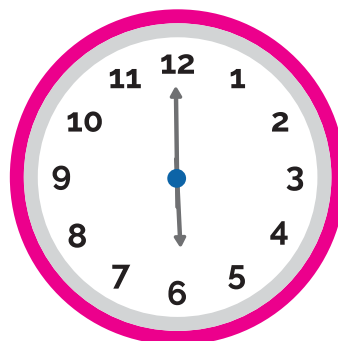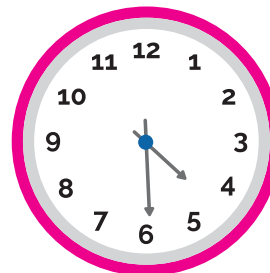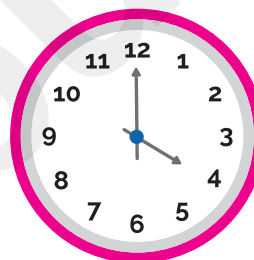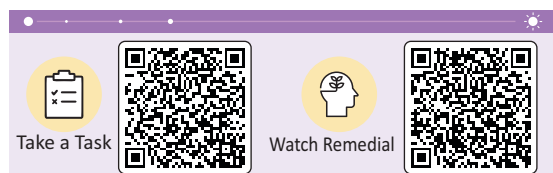
Similarly, 06:30 a.m. shows 06:30 in the morning.

06:30 p.m. shows 06:30 in the evening

01:00 a.m. shows 1 O'clock in the night.   (after 12 mid-night)

11:00 p.m. shows 11 O'clock in the night.   (before 12 mid-night)

A day begins at 12 mid-night and ends at 12 mid-night of the following day. We can say:

The time from 12 mid-night to 12 noon is noted as a.m.

and time from 12 noon to 12 mid-night as p.m.

📕 Exercise 12.1

1. **Fill in the blanks :**

(a) There are _____ minutes in an hour.

(b) There are _____ hours in a day.

(c) There are _____ days in a week.

(d) There are _____ days in a year.

(e) There are _____ months in a year.

2. **Read and write the time of each of the following clocks :**

(a)   (b)   (c)   (d)

3. **Change into minutes :**

(a) 7 days   (b) 8 days 3 hours   (c) 15 days 8 hours

4. **Change into hours :**

(a) 7 days   (b) 8 days 3 hours   (c) 15 days 8 hours.

5. **Write the time in a.m. or p.m.:**

(a) 06:20 in the evening   (b)   08:20 in the morning

(c) 12:30 in the day   (d)   10:00 in the day

(e) 04:20 in the night   (f)   05:40 in the evening

6. **Answer the following questions :**

(a) When do you go to school?   _____

(b) When do you return from school?   _____

(c) When do you take your lunch?   _____

(d) When do you watch TV? _____

(e) When do you go to bed? _____

7. What will be the time after 3 hours?

(a) 02:20 a.m. [ ]   (b) 09:00 p.m. [ ]

(c) 05:45 p.m. [ ]   (d) 07:50 a.m. [ ]

(e) 12 midnight [ ]   (f) 12 noon [ ]

24–Hour Clock Time

We normally use 12-hour clock. The hour-hand of the clock goes round the clock dial twice a day (24 hours). Some departments like Railways, Airlines and Armed forces use 24-hour clock time. Digital watches also show 24-hour clock time.

In a railway time table :

    1 p.m. is written as 13:00 hours.

    2 p.m. is written as 14:00 hours.

    3 p.m. is written as 16:00 hours.

Similarly,   10 p.m. is written as 22:00 hours.

    11 p.m. is written as 23:00 hours.

    12 midnight is written as 24:00 hours or 00:00 hours.

Now study the table given below:

12-hour clock time	24-hour clock time
12 mid-night	24:00 hours or 00:00 hours
1 a.m.	01:00 hours
03:50 a.m.	03:50 hours
09:50 a.m.	09:50 hours
11:30 a.m.	11:30 hours
12 noon	12:00 hours
01:00 p.m.	13:00 hours
04:40 p.m.	16:40 hours
08:40 p.m.	20:40 hours
11:20 p.m.	22:20 hours

From the table of 24-hour notation, we observe the following rules:

(a) 12 midnight is denoted by 24:00 hours or 00:00 hours.

(b) 12 noon is denoted by 12:00 hours.

Take a Task

Watch Remedial

(c) The numeral formed by the two digits from right denotes the number of minutes.

(d) If the numeral formed by the first two digits from the left is less than 12, it denotes the number of hours before noon. So, we use a.m. with it.

For example : 08:30 hours denotes 8:30 a.m.

11:50 hours denotes 11:50 a.m.

(e) If the numeral formed by the first two digits from the left is greater than 12, the difference between the number and 12 gives the number of hours after noon. So, we use p.m. with it.

For example : 18:30 hours denotes 06:30 p.m.

21:40 hours denotes 09:40 p.m.

Time in Seconds

We have learnt about hour-hand and minute-hand.

Now, see the thinnest hand which moves faster than the other two. It is called **second-hand**. It covers 60 small divisions in one minute.

The time taken by second-hand to move from one small division to the next small division is called a **second**.

second hand

1 minute = 60 seconds

Example 1: Convert 140 seconds into minutes.

Solution : We know, 60 seconds = 1 minute.

To convert seconds into minute, we divide the given seconds by 60.

Hence, 140 seconds = 2 minutes 20 seconds.
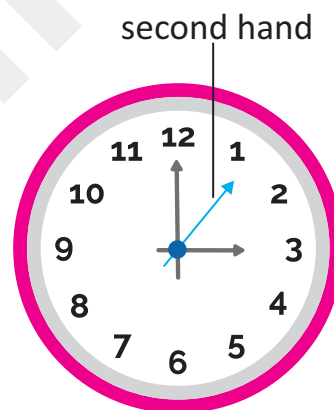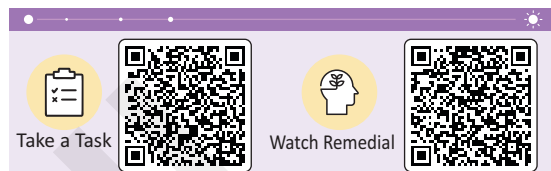
Working

$$\begin{array}{r} 2 \\ 60\overline{)140} \\ -120 \\ \hline 20 \end{array}$$

📖 Exercise 12.2

1. **Fill in the blanks:**

   (a) 12 mid-night is denoted by 24:00 hours or _____ hours.

   (b) 12 noon is denoted by _____ hours.

   (c) 1 p.m. is _____ hours.

   (d) 23:20 hours is _____ p.m.

2. Change into 12-hour clock time: (One is done for you)

(a) 09:30 hours ⟶ 9:30 a.m. (b) 10:20 hours

(c) 00:20 hours (d) 05:15 hours

(e) 22:30 hours (f) 06:05 hours

(g) 21:40 hours (h) 23:20 hours

(I) 17:52 hours (j) 22:05 hours

(k) 15:59 hours (l) 20:48 hours

3. Name the three hands of a clock.

4. How many seconds are there in 1 minute ?

5. Which is the smallest unit of time ?

Take a Task   Watch Remedial

Addition and Subtraction of Times
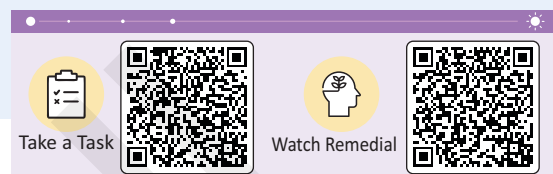
We use different units of time, i.e. second, minute, hour, day, week, month, year, decade, century, etc. These units have following relations :

(a) 60 seconds = 1 minute (b) 60 minutes = 1 hour

(c) 24 hours = 1 day (d) 7 days = 1 week

(e) 30 or 31 days = 1 month (f) 365 or 366 days = 1 year

(g) 12 months = 1 year (h) 52 weeks = 1 year

(i) 10 years = 1 decade (j) 100 years = 1 century

(k) 10 decades = 1 century

Using the above relations, we can convert the smaller unit of time into bigger unit of **time** and **vice-versa**.

Now consider the following examples :

Example 2: Convert into hours : (a) 2 days (b) 5 days 5 hours.

Solution : (a) 1 day = 24 hours

So, 2 days = 24 × 2 hours = 48 hours

(b) 5 days 5 hours = 5 × 24 hours + 5 hours

= 120 hours + 5 hours = 125 hours

Example 3: Convert 3 hours 45 minutes into minutes.

Solution: 3 hours 45 minutes = 3 × 60 minutes + 45 minutes

= (180 + 45) minutes = 225 minutes

Example 4: Convert : (a) 290 hours into days and hours.

(b) 3230 minutes into hours and minutes.

Solution: (a) To convert hours into days, we have to divide the hours by 24, i.e. 290 ÷ 24 .

∴ 290 hours = 12 days and 2 hours.

Working

```
        12
  24) 290
     − 24
       50
     − 48
        2
```

(b) To convert minutes into hours, we have to divide minutes by 60, i.e. 3230 ÷ 60.

Hence, 3230 minutes = 53 hours 50 minutes.

Working

```
        53
  60) 3230
     − 300
       230
     − 180
        50
```

Example 5: An express train takes 4 hours 30 minutes to reach Agra from Delhi. If train starts from Delhi at 07:45 a.m. then at what time will it reach Agra?

Solution: The train starts from Delhi at 07:45 a.m. and takes 4 hours 30 minutes to reach Agra. We add 4 hours 30 minutes to 7 hours 45 minutes.

11 hours 75 minutes

= 11 hours + (60 minutes + 15 minutes)

= 11 hours + 1 hour + 15 minutes

= 12 hours 15 minutes

= 12:15 p.m.

Therefore, train will reach Agra 12:15 p.m.

Hours	Minutes
7	45
+ 4	30
11	75

Example 6: A school starts at 07:15 a.m. and gets over after 6 hours 15 minutes. Then, at what time does the school get over ?

Solution: The school start at 7 hours 15 minutes and gets over after 6 hours 15 minutes.

Therefore, the school gets over at 01:30 p.m.

Hours	Minutes
7	15
+ 6	15
13	30

Example 7: Subtract the following:

(a) 16 hours 25 minutes from 32 hours 50 minutes.

(b) 21 hours 30 minutes from 46 hours 20 minutes.

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Solution: (a) First, arrange the times in columns and then subtract them.

hours	minutes
32	50
− 16	25
16	25

(Subtracting minutes from minutes and hours from hours)

Hence, the difference is 16 hours 25 minutes.

(b)

hours	minutes
46	20
−21	30
24	50

Working

In minutes column, 30 minutes cannot be subtracted from 20 minutes. So, we borrow 1 hour from 46 hours leaving 45 hours behind.

Now, 1 hour + 20 minutes
= 60 minutes + 20 minutes
= 80 minutes

Then, 80 − 30 = 50 minutes
Also, 45 − 21 = 24 hours.

Hence, the difference is 24 hours 50 minutes.

Example 8: An aeroplane leaves from Delhi at 05:20 a.m. It arrives at Bhubaneswar at 07:50 a.m. How long does it take to reach Bhubaneswar?

Solution: We need to find the interval between 5:20 a.m. and 07:50 a.m.

Hours	Minutes
7	50
− 5	20
2	30

Therefore, the aeroplane takes 2 hours 30 minutes for its journey from Delhi to Bhubaneswar.

📕 Exercise 12.3

1. Convert into hours :

(a) 9 days

(b) 5 days 8 hours

(c) 14 days 7 hours

(d) 10 days 18 hours

2. Convert into minutes (min.) :

(a) 8 hours

(b) 3 hours 52 min.

(c) 16 hours 10 min.

(d) 8 hours 35 min.

3. Convert into days and hours :

(a) 88 hours

(b) 219 hours

(c) 362 hours

(d) 909 hours

4. Add :

(a) 9 hours 30 minutes and 6 hours 40 minutes.

(b) 3 hours 20 minutes and 8 hours 50 minutes.

(c) 16 minutes 25 seconds and 17 minutes 35 seconds.

(d) 20 minutes 35 seconds and 15 minutes 35 seconds.

5. Find the difference between :

(a) 56 hours 28 minutes and 80 hours 38 minutes.

(b) 28 hours 35 minutes and 14 hours 50 minutes.

(c) 48 minutes 54 seconds and 53 minutes 44 seconds.

(d) 50 minutes 53 seconds and 60 minutes 29 seconds.

Word Problems

Problem Solving

Example 9: A car leaves Delhi for Agra at 6 : 30 a.m. It takes 4 hours to reach Agra. At what time will it reach Agra?

Solution: Car leaves from Delhi at 6:30 a.m. = 06:30

Time taken to reach Agra = 4 hours = 04:00

06:30	=	6 hours	30 minutes
04:00	=	4 hours	00 minutes
		10 hours	30 minutes

10 hours 30 minutes = 10:30 a.m.

Hence, the car will reach Agra at 10:30 a.m.

Example 10: Anil was admitted to a hospital on 15th May, 2011 and discharged on 15th June, 2011. How long did he remain in the hospital?

Solution: Anil was admitted on 15th May, 2011.

The no. of days in May that he remained in the hospital

= From 15th May to 31st May = 17 days

The no. of days in June that he remained in the hospital

= From 1st june to 14th june = 14 days

Total days = 17 + 14 = 31 days

Thus, Anil remained in the hospital for 31 days.

Exercise 12.4

Answer the following questions :

1. Hari leaves home at 09:30 a.m. He returns home at 06:00 p.m. on the same day. How long does he remain away from home?

2. A train leaves Delhi at 05:30 hours. It reaches Kolkata at 23:30 hours. How long does it take to reach Kolkata?

3. A bus leaves Delhi for Faridabad at 10:00 a.m. It takes 2 hours 15 minutes to reach Faridabad. At what time it will reach Faridabad?

4. Ravi travelled 6 hours 25 minutes by one bus and 3 hours 45 minutes by another bus. How much time did he travel in all?

5. Ranjeet leaves home for office at 09:30 a.m. and returns home at 05:15 p.m. How long does he remain away from home?

6. Deepika started doing her homework at 07:05 p.m. and finished it at 10:10 p.m. How long did it take her to do the homework?

7. A circus show starts at 04:15 p.m. It runs for 2 hours 45 minutes. At what time does it end?

Calendar

In Class lll, we have read what is calendar. We have also learnt how to find the dates and days of different occasions.

Now, let us learn more from calendar.

A calendar is the record of all the dates and days of twelve months of a year. Except the month February, other eleven months of a year have 30 or 31 days.

The number of days in February depends on the type of year, as follows:

Take a Task

Watch Remedial

Leap Year

The year divisible by 4 is called a leap year. **For example**, the years 1992, 1996, 2000, 2004, 2008, 2012 etc. are leap years. Examine that each of these years is divisible by 4.

In a leap year, February has 29 days. Other eleven months have 30 to 31 days. Also, there are 366 days in a leap year.

Ordinary Year

The year which is not a leap year, is called an ordinary year.

For example: 1993, 1994, 1995, 1997, 1998, 1999, 2001, 2002, 2003, 2005, 2006, 2007 etc. are ordinary years. In an ordinary year, February has 28 days. Other eleven months have 30 or 31 days. Also, there are 365 days in an ordinary year.

The calendar for the year 2020 is given below.

Calendar 2020

January
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

February
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

March
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

June
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

July
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

August
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

September
S	M	T	W	T	F	S
	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

October
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

November
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

December
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Look at the calendar carefully and consider following examples.

Example 11: Is the year 2020 a leap year ? How many days does February of this year contain?

Solution: Since 2020 is divisible by 4, it is a leap year. The month February of this year has 29 days.

Example 12: What is the day on 19th November, 2020? What will be the day after 22 days from this date?

Solution: The day on 19th November, 2020 is Thursday. Since same day is repeated after every 7 days, Thursday would come after 21 days ($7 \times 3 = 21$) from 19th November. Then, name of the day after 22 days from 19th November is the next day of Thursday i.e. Friday.

Example 13 : Find the days on the following dates of 2020:

Solution: (i) Since 13th April lies in Monday (M) column, 13th April will be Monday.

(ii) Since 29th August lies in the column of Saturday (S), that day will be Saturday.

Example 14: How many days are there from 14th March, 2020 to 19th October, 2020?

Solution: Days left in March = 31 – 13 = 18,

days in April = 30, days in May = 31,

days in June = 30, days in July = 31,

days left in October = 19.

Total no. of days = 18 + 30 + 31 + 30 + 31 + 31 + 19 = 220 days

Hence, there are 220 days from 14th March 2020 to 19th October 2020.

📖 Exercise 12.5

1. How many days are there in the February of a leap year?

2. Which of the following are leap years? 1972, 2000, 1986, 1980, 1994, 1992, 2007, 1998, 1964, 2002, 2006, 2004, 2008, 2010, 2016, 2018, 2020.

3. **Look at the calendar of the year 2020 and write the days corresponding to the following dates :**

   (a) 03.04.2020   (b) 11.07.2020   (c) 31.05.2020

   (d) 15.11.2021.   (e) 28.01.2020   (f) 21.12.2020

   (g) 19.3.2020   (h) 10.10.2020   (i) 30.08.2020

4. How many days are there from 16th April, 2020 to 7th July, 2020?

5. How many days are there from 28th August, 2020 to 25 th November, 2020?

6. Name two consecutive months in a year having 31 days each.

Think Tank

Gap Analyzer™

1. **Choose the correct option.**

   (a) How many weeks make 1 year?

   (i) 50 weeks   (ii) 60 weeks   (iii) 52 weeks

   (b) 2 hours 15 minutes =

   (i) 8100 seconds   (ii) 7800 seconds   (iii) 8000 seconds

   (c) The duration between 06:15 a.m. and 02:30 p.m. is

   (i) 7 hours 30 minutes   (ii) 8 hours   (iii) 8 hours 15 minutes

2. **Fill in the blanks :**

(a) 60 seconds = ☐ minute. (b) 24 hours = 1 ☐

(c) ☐ or ☐ days = 1 month. (d) ☐ years = 1 century.

(e) 365 or 366 days = ☐ year. (f) ☐ decades = 1 century.

3. **Match the following:**

(a) 6 days into hours (i) 8 hours 6 minutes

(b) 450 hours into day and hours (ii) 13 min 1 second

(c) 486 min into hours and minutes (iii) 3 years 9 months

(d) 781 second into minutes and seconds (iv) 144 hours

(e) 45 months into years and months (v) 18 days and 18 hours

Puzzle

Experiential Learning

Solve the puzzle:

Sonam's watch becomes 5 minutes faster every hour. Kapil's watch becomes 10 minutes slower every hour. If they come to work at 8 a.m and match their watches with each other. What time will their watches show when it is time to go home at 3 p.m? _____
_____.

Mental Math

Critical Thinking

1. On february 14th a boy said,"A forthnight more for our final exams." On which date did the exams begin?

2. Which is the shortest month?

3. Name the months whose number of days are a multiple of the smallest prime number _____.

HOTS

Critical Thinking

1. An evening show starts at 06:30 p.m. It runs for 2 hours 45 minutes. At what time does it end?

2. Seema arrived at her uncle's house on 14th May, 2020 and returned home on 25th June, 2020. How many days did she spend in her uncle's house?