

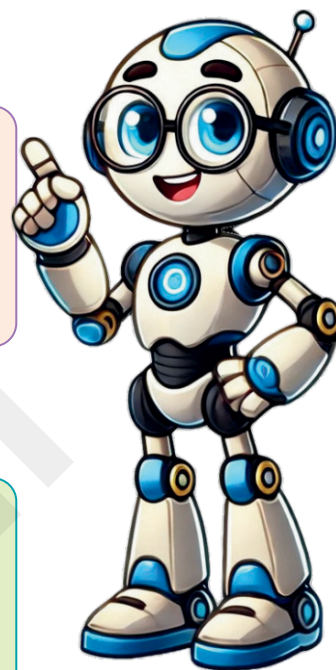
**We'll cover the following key points:**

- Addition of Time
- Subtraction of Time
- What is Temperature?

**Do you Remember fundamental concept in previous class.**

**In class 4<sup>th</sup> we learnt**

- Addition and Subtraction of Times
- Problems on Addition and Subtraction of Times
- Calendar
- Time Duration



**EeeBee**



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## Learning Outcomes

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

- Understand the concept of time and its measurement in hours, minutes, and seconds.
- Convert time from one unit to another (e.g., hours to minutes, minutes to seconds).
- Read and interpret time from analog and digital clocks.
- Solve problems related to time duration, including addition and subtraction of time.
- Understand the concept of temperature and its measurement in Celsius.
- Interpret and record temperature readings using a thermometer.
- Convert temperatures between Celsius and Fahrenheit (basic understanding).
- Solve real-life problems involving time and temperature, such as time taken for activities or changes in temperature.
- Compare and order events based on time and temperature.



## Warm Up

Experiential Learning

### How old are you? Read and interpret?

Fill in the calendar page given below with the dates of the month your birthday falls in. Write your birthday in red.



Enter the detail of your date of birth.

Date \_\_\_\_\_

Month \_\_\_\_\_

Year \_\_\_\_\_

You have been living for:

Months :

Hours:

Weeks:

Minutes:

Days:

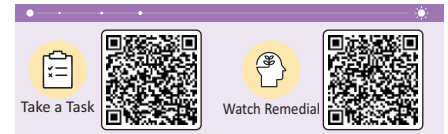
Seconds:

## Introduction

We have already learnt how to read time from clock and convert days into hours, hours into minutes and minutes into seconds. We have also learnt to express the time in a.m. and p.m. We shall now extend these ideas in addition and subtraction of time.

## Addition of Time

### Addition of Hours, Minutes and Seconds



### Working Rules

To find the addition of two or more than two times

- Step 1:** Write hours, minutes and seconds of each time interval column-wise.
- Step 2:** First, add seconds. If it is greater than or equal to 60 seconds, carry 1 minute to next column. (i.e., the minutes column) and subtract 60 from the sum of seconds. If it is less than 60 seconds, write as it is.
- Step 3:** Then, add minutes. If it is greater than or equal to 60 minutes, carry 1 hour to next column (i.e., the hours column) and subtract 60 from the sum of minutes. If it is less than 60 minutes, write as it is.
- Step 4:** Lastly, add the hours of the hours column and hence find the required sum.

**Example 1:** Add 12 hours 21 minutes 35 seconds and 8 hours 20 minutes 21 seconds.

**Solution :**

Hours	Minutes	Seconds
12	21	35
+ 8	20	21
20	41	56

Thus, 12 hours 21 minutes 35 seconds + 8 hours 20 minutes 21 seconds  
= 20 hours 41 minutes 56 seconds

**Example 2:** Add 13 hours 45 minutes 25 seconds and 10 hours 35 minutes 40 seconds .

**Solution :**

Hours	Minutes	Seconds
13	45	25
+ 10	35	40
23	80	65

→

Hours	Minutes	Seconds
13	45	25
+ 10	35	40
24	21	05

Carry 1 h = 60 min and 1 min = 60 sec are shown in the final result.

## STEPS

**Adding seconds :**  $25 + 40 = 65 > 60$

Subtract 60 from 65 and carry over 1 minute to the minutes column.

Also, put 5 ( $65 - 60 = 5$ ) under the seconds column.

**Adding minutes :** 1 minute (carried over) + (45 + 35) minutes = 81 minutes.

Since  $81 > 60$ , subtract 60 from 81 and carry over 1 hour to the hour column.

Also, put 21 ( $81 - 60 = 21$ ) under the minutes column.

**Adding hours :** q hour (carried over) + (13 + 10) hours = 24 hours

So, 13 hours 45 minutes 25 seconds + 10 hours 35 minutes 40 seconds  
= 24 hours 21 minutes 5 seconds

**Example 3 :** Manish starts his journey. He walks 45 minutes by foot and further walks for 1 hour 25 minutes to arrive the destination.

**Problem Solving**

How much total time does he take to reach the destination.

**Solution :**

Hours	Minutes		Hours	Minutes
00	45		<sup>1</sup> 00	45
+ 1	25	→	+ 1	25
1	70		2	<sup>1</sup> 10

Therefore, total time taken to reach the destination is 2 hours 10 minutes.

**Example 4 :** Add 35 hours 45 seconds and 3 hours 30 seconds.

**Solution :**

Hours	Minutes	Seconds		Hours	Minutes	Seconds
35	00	45		<sup>1</sup> 35	00	45
+ 3	00	30	→	+ 13	00	30
38	00	75		38	<sup>1</sup> 01	<sup>1</sup> 15

Therefore, 35 hours 45 seconds + 3 hours 30 seconds

= 38 hours 1 minute 15 second

## Addition of Days and Hours



### Working Rules

To find the sum of two or more than two times, (i.e. Days and Hours)

**Step 1:** Write days and hours column-wise.

**Step 2:** First, add hours. If it is greater than or equal to 24, subtract 24 from the sum of hours and carry over 1 to the days column.

**Step 3:** Then, add the days in the column alongwith the carried over day from the hours column to find the required sum.

**Example 5 :** Add 3 days 20 hours and 6 days 15 hours.

**Solution :**

Days	Hours		Days	Hours
3	20		3	20
+ 6	15		+ 6	15
9	35		10	11

Diagram illustrating the addition process: 3 days 20 hours + 6 days 15 hours = 10 days 11 hours. The diagram shows the sum of hours (35) being reduced by 24 (1 day) to get 11 hours, and the carry-over (1 day) being added to the sum of days (9) to get 10 days. A box labeled "1 day = 24 hr" is shown next to the 11 hours result.

**REMEMBER**



Since 24 hours = 1 day, we subtract 24 from the sum of hours and carry 1 to the days column.

**STEPS**

**Step 1:** Add hours in the hours column. 20 hours + 15 hours = 35 hours. Since 35 hours > 24 hours, subtract 24 from 35, i.e.,  $35 - 24 = 11$  and place 11 under the hours column.

Also, carry over 1 day to the days column.

**Step 2:** Now, add the days in the days column alongwith the carried over day from the hours column. So,  $1 + 3 + 6 = 10$  days.

Therefore, 3 days 20 hours + 6 days 15 hours = 10 days 11 hours



## Exercise 12.1

Knowledge Application

**1. Add the following :**

- (a) 8 hours 35 minutes and 3 hours 35 minutes
- (b) 21 hours 20 minutes and 16 hours 40 minutes

**2. Add the following :**

- (a) 8 hours 21 minutes 35 seconds and 7 hours 11 minutes 9 seconds
- (b) 3 hours 37 minutes 43 seconds and 2 hours 35 minutes 22 seconds
- (c) 1 hour 42 minutes 55 seconds and 9 hours 39 minutes 18 seconds

**3. Fill in the blanks :**

- (a) 9 days 13 hours + 5 days 2 hours = \_\_\_\_\_ .
- (b) 7 days 12 hours + 3 days 20 hours = \_\_\_\_\_ .

(c) 3 days 21 hours + 6 days 19 hours = \_\_\_\_\_ .

## Subtraction of Time



### Working Rules

To find the difference between the two times, say Hours and Minutes

**Step 1 :** First, arrange the hours and minutes column-wise. Place the smaller time (in hours and minutes) below the large time (in hours and minutes).

**Step 2 :** Then, subtract the minutes. Use the usual subtraction rule with borrow 60 (∵ 1 hour = 60 minutes).

**Step 3 :** Lastly, subtract the hours to find the required difference. Use the usual subtraction rule for it.

**Example 6 :** Find the time interval between 7 : 40 a.m. and 1 : 20 p.m.

**Solution :** Convert 7 :40 a.m into hours.

We know that 7 : 40 a.m. = 0740 hours = 7 hours 40 minutes

Convert 1 : 20 p.m. into hours i.e., 1 : 20 p.m. = 1320 hours

= 13 hours 20 minutes

Now, subtract 7 hours 40 minutes from 13 hours 20 minutes.

Hours	Minutes		Hours	Minutes
<span style="border: 1px solid red; padding: 2px;">12</span> (13 - 1 = 12)	<span style="border: 1px solid red; padding: 2px;">80</span> (60 + 20 = 80)		12	80
13	20		12	80
- 7	40	→	- 7	40
<hr/>			<hr/>	
			5	40
			<hr/>	<hr/>

Hence, time interval between 7 : 40 a.m. and 1 : 20 p.m. is **5 hours 40 minutes**.

**Example 7 :** Sanju goes to bed at 10 : 30 p.m. and gets up next morning at 7 : 50 a.m. How long does she sleep ?

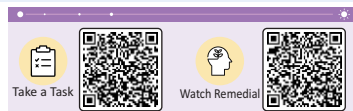
**Solution :** 10 : 30 p.m. to 11.00 p.m. = 30 minutes

11.00 p.m. to 7.00 a.m. (next morning) = 8 hours

7 : 00 a.m. to 7 : 50 a.m. = 50 minutes

Total time = 8 hours 80 minutes

Since 80 > 60, carry over 1 to hours and subtract 60 from minutes.



$$\begin{aligned}\text{So, total time} &= (8 \text{ hours} + 1 \text{ hour}) + (80 \text{ minutes} - 60 \text{ minutes}) \\ &= 9 \text{ hours } 20 \text{ minutes}\end{aligned}$$

Therefore, Sanju sleeps for **9 hours 20 minutes**.

**Example 8 :** One athlete runs certain distance in 3 minutes 25 seconds and another athlete runs the same distance in 2 minutes 55 seconds. What is the time difference between them?

**Solution :**

Minutes	Seconds		Minutes	Second
<span style="border: 1px solid red; padding: 0 2px;">2</span> (3 - 1 = 2)	<span style="border: 1px solid red; padding: 0 2px;">85</span> (60 + 25 = 85)		2	85
3	25		2	55
- 2	55	→	- 2	55
			0	30

Thus, 3 minutes 25 seconds - 2 minutes 55 seconds = 30 seconds

Hence, the time difference between the two athletes is **30 seconds**.

### Subtraction of Days and Hours



#### Working Rules

**To find the difference between the two times, say Days and Hours**

**Step 1 :** First, arrange the days and hours column-wise.

Place the smaller time (in days and hours) below the larger time (in days and hours.)

**Step 2 :** Then, subtract the hours. Use the usual subtraction rule with borrow 24 (∵ 1 day = 24 hours).

**Step 3 :** Lastly, subtract the days to find the required difference. Use the usual subtraction rule for it.

**Example 9 :** Subtract 8 days 18 hours from 12 days 10 hours.

**Solution :**

Days	Hours		Days	Hours
<span style="border: 1px solid red; padding: 0 2px;">11</span> (12 - 1 = 11)	<span style="border: 1px solid red; padding: 0 2px;">34</span> (24 + 10 = 34)		11	34
12	10		8	18
- 8	18	→	- 8	18
			3	16

Therefore, 12 days 10 hours - 8 days 18 hours = **3 days 16 hours**.



## Exercise 12.2

Knowledge Application

### 1. Subtract :

(a) 12 hours 46 minutes from 18 hours 55 minutes.

(b) 6 hours 20 minutes from 10 hours.

### 2. Find the interval between 8 : 25 a.m. and 4 : 10 p.m.

### 3. A school starts at 7 : 15 a.m. and closes at 2 p.m. Find the duration of the working hours of the school.

### 4. An aeroplane leaves Delhi at 6:30 p.m. and arrives Kolkata at 8 : 20 p.m. How much time does it take to arrive Kolkata from Delhi ?

### 5. Ankur left his home at 8 o'clock in the morning and returned back at 5 : 30 p.m. How many hours and minutes did he stay outside his home?

## What is Temperature?

We know the measurement of weight (mass), length, capacity and time.

Another important measurement for life is temperature.

The level of hotness or coldness of an object is expressed as its temperature. To measure weight, capacity, length and time, we use their respective standard units. For temperature, the unit is degree.

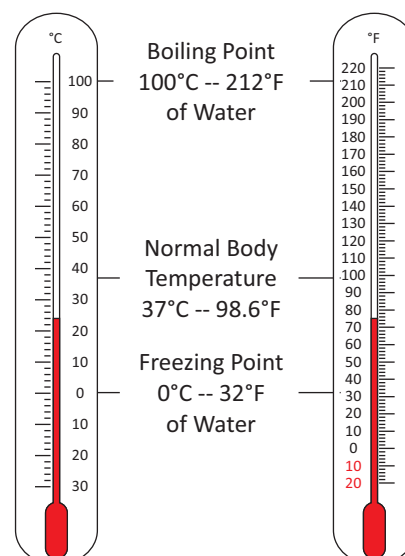
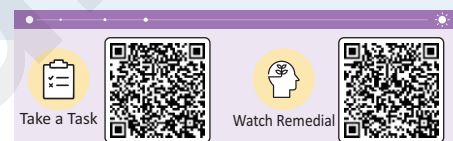
We adopt two different systems of measurement of temperature. They are **degree Fahrenheit** and **degree Celsius**. They are written as  $^{\circ}\text{F}$  and  $^{\circ}\text{C}$  respectively. In one system, the degree of temperature is known as degree Fahrenheit (Write as  $^{\circ}\text{F}$ ) and in the other system, it is known as degree Celsius (written as  $^{\circ}\text{C}$ )

### Thermometer

The instrument used to measure temperature is known as thermometer. Each thermometer has a scale. Some thermometers have scale in degree Fahrenheit ( $^{\circ}\text{F}$ ) and some have scale in degree Celsius ( $^{\circ}\text{C}$ )

The Fahrenheit thermometer is marked from  $0^{\circ}$  to  $212^{\circ}$ . The Celsius thermometer is marked from  $0^{\circ}$  to  $100^{\circ}$ .

The structure and the working of the both types of thermometers is the same.



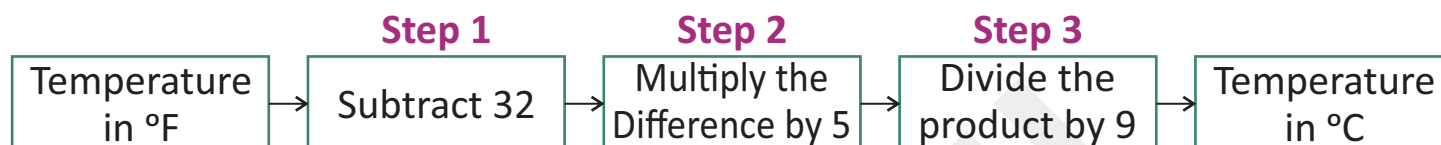


The normal human body temperature is  $98.6^{\circ}\text{F}$  or  $37^{\circ}\text{C}$ . Pure water freezes at  $0^{\circ}\text{C}$  or  $32^{\circ}\text{F}$ , it boils at  $100^{\circ}\text{C}$  or  $212^{\circ}\text{F}$ . From this, we learn that the same level of hotness or coldness of an object is expressed by two different number of degrees of the two scales. This means to measure the relative temperature of two objects, we need to know their temperature on the same scale.

### Conversion From Celsius to Fahrenheit and Vice Versa

If the given temperature is in  $^{\circ}\text{C}$ , we can convert it into  $^{\circ}\text{F}$  and vice versa. The rules which are used in conversion process are given below :

#### CONVERSION RULE ( $^{\circ}\text{F}$ TO $^{\circ}\text{C}$ )



**Example 10 :** Convert 122 into degree Celsius.

**Solution :**

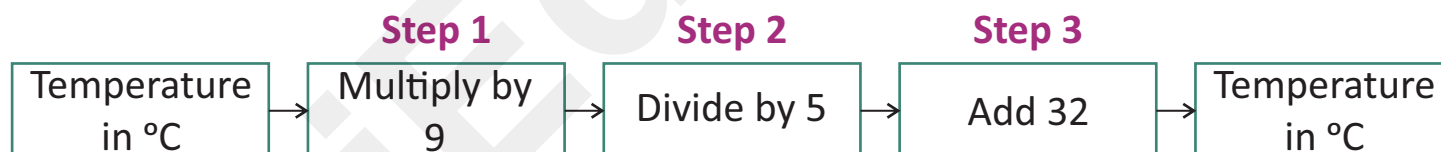
**Step 1.** Subtract 32 from given  $^{\circ}\text{F}$ , i.e.  $122 - 32 = 90$  .

**Step 2.** Multiply the obtained difference in Step 1 by 5, i.e.  $90 \times 5 = 450$

**Step 3.** Divide the product obtained in Step 2 by 9, i.e.  $450 \div 9 = 50$

Thus,  $122^{\circ}\text{F} = 50^{\circ}\text{C}$ .

#### CONVERSION RULE ( $^{\circ}\text{C}$ TO $^{\circ}\text{F}$ )



**Example 11 :** The temperature of water in glass A is  $55^{\circ}\text{C}$  and the temperature of water in glass B is  $125^{\circ}\text{F}$ . Water of which glass is hotter ?

**Solution :** First convert  $55^{\circ}\text{C}$  into  $^{\circ}\text{F}$ . For conversion follow these steps :

Step 1. Multiply  $^{\circ}\text{C}$  by 9 :  $55 \times 9 = 495$

Step 2. Divide the product by 5 :  $495 \div 5 = 99$

Step 3. Add 32 to the quotient :  $99 + 32 = 131^{\circ}\text{F}$

Now, the temperature of water in glass A is  $131^{\circ}\text{F}$  and temperature of water in glass B is  $125^{\circ}\text{F}$ .

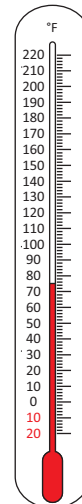
Therefore, the water in **glass A** is hotter.

## Clinical Thermometer

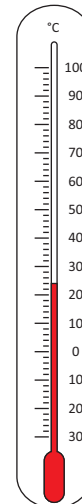
Thermometer used to measure the body temperature of human beings is called clinical thermometer. It has scale between  $94^{\circ}\text{F}$  and  $108^{\circ}\text{F}$

The normal human body temperature is  $98.6^{\circ}\text{F}$ . Higher than the normal temperature indicates fever and less than the normal temperature is the indication of weakness.

To measure the temperature, the thermometer is caught from upper-end (not from the mercury bulb-end) and kept in the mouth under the tongue. In case of young children, it is kept under the armpit.



A Clinical Thermometer with the Celsius Scale



A Clinical Thermometer with the Fahrenheit Scale



## Exercise 12.3

### Knowledge Application

### 1. Multiple Choice Questions (MCQ)

Choose the correct option.

(a) If the temperature is  $80^{\circ}\text{C}$ , then temperature in  $^{\circ}\text{F}$  will be

- (i)  $184^{\circ}\text{F}$  ☐ (ii)  $192^{\circ}\text{F}$  ☐ (iii)  $176^{\circ}\text{F}$  ☐ (iv)  $175^{\circ}\text{F}$  ☐

(b) If the temperature is  $75^{\circ}\text{C}$ , then the temperature in  $^{\circ}\text{F}$  will be

- (i)  $167^{\circ}\text{F}$  ☐ (ii)  $156^{\circ}\text{F}$  ☐ (iii)  $172^{\circ}\text{F}$  ☐ (iv)  $188^{\circ}\text{F}$  ☐

(c) If the temperature is  $40^{\circ}\text{C}$ , then the temperature in  $^{\circ}\text{F}$  will be

- (i)  $104^{\circ}\text{F}$  ☐ (ii)  $103^{\circ}\text{F}$  ☐ (iii)  $102^{\circ}\text{F}$  ☐ (iv)  $105^{\circ}\text{F}$  ☐

(d) If the temperature is  $104^{\circ}\text{F}$ , then the temperature in  $^{\circ}\text{C}$  will be

- (i)  $52^{\circ}\text{C}$  ☐ (ii)  $40^{\circ}\text{C}$  ☐ (iii)  $46^{\circ}\text{F}$  ☐ (iv)  $99^{\circ}\text{F}$  ☐

### 2. Convert into $^{\circ}\text{F}$ :

- (a)  $90^{\circ}\text{C}$  (b)  $55^{\circ}\text{C}$  (c)  $25^{\circ}\text{C}$   
(d)  $75^{\circ}\text{C}$  (e)  $80^{\circ}\text{C}$

### 3. Convert into $^{\circ}\text{C}$ :

- (a)  $113^{\circ}\text{F}$  (b)  $176^{\circ}\text{F}$  (c)  $212^{\circ}\text{F}$   
(d)  $41^{\circ}\text{F}$  (e)  $77^{\circ}\text{F}$

4. Change the following temperature into Fahrenheit scale :

- (a)  $60^{\circ}\text{C}$  (b)  $85^{\circ}\text{C}$  (c)  $150^{\circ}\text{C}$   
 (d)  $100^{\circ}\text{C}$  (e)  $35^{\circ}\text{C}$  (f)  $50^{\circ}\text{C}$

5. On a particular day, the maximum and minimum temperatures are recorded as  $35^{\circ}\text{C}$  and  $20^{\circ}\text{C}$  respectively. Express the difference of two temperatures in Fahrenheit.

6. One day the minimum temperature in Kolkata was recorded as  $80.8^{\circ}\text{F}$ . What was the temperature in degree Celsius on that day?



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Take a Test

1. Tick (✓) the correct option.

(a) Add 13hr 45 min 35 sec + 16 hr 35 min 40 sec

(i) 29 hr 20 min 15 sec

☐

(ii) 30 hr 21 min 15 sec

☐

(iii) 30 hr 21 min 15 sec

☐

(iv) 30 hr 22 min 15 sec

☐

(b) 5 days 21 hr + 6 days + 3 hr =

(i) 12 days 1 hr

☐

(ii) 12 days

☐

(iii) 13 day

☐

(iv) None of these

☐

(c) Which instruments used to measure temperature?

(i) Thermometer

☐

(ii) Stethoscope

☐

(iii) Both (i) & (ii)

☐

(iv) None of these

☐

(d) The normal human body temperature is \_\_\_\_\_  $^{\circ}\text{F}$ .

(i) 96.6

☐

(ii) 97.6

☐

(iii) 98.6

☐

(iv) 99.6

☐

2. Fill in the blanks :

(a) 4 hr 40 min + 6 hr 10 min = \_\_\_\_\_

(b) 3 years 8 months + \_\_\_\_\_ = 6 years 1 month

(c) 2 hr 25 min + 3 hr 50 min = \_\_\_\_\_

(d) 1 year 11 months + 1 year 10 months = \_\_\_\_\_

**3. Match the following :**

(a) 8 hr 50 min – 6 hr 35 min

(b) 8 years 6 months – 2 years 4 months

(c) 10 hr 20 min – 4 hr 45 min

(d) 11 years 3 months – 5 years 8 months

(e) 7 hr 5 min – 5 hr 45 min

(i) 5 hr 35 min

(ii) 2 hr 40 min

(iii) 5 years 7 months

(iv) 2 hr 15 min

(v) 6 years 2 months



## Mental Math

Experiential Learning

**Match the following :**

**Column A**

(i) 30°C

(ii) 100°C

(iii) 40°C

(iv) 50°C

(v) 10°C

(vi) 35°C

**Column B**

(a) 104°F

(b) 95°F

(c) 212°F

(d) 50°F

(e) 86°F

(f) 122°F