CHAPTER 12

AVERAGES

12.1 BASIC CONCEPT

A man earns ₹ 20, ₹ 25, ₹ 28, ₹ 23 and ₹ 24 on five consecutive days of a week. Thus, he earns a total of ₹ (20 + 25 + 28 + 23 + 24) = ₹ 120.

To find his average earning per day, his total earning is divided by the number of days.

$\therefore$ Average earning per day = ₹ $\frac{120}{5}$ = ₹ 24

Average earning does not mean that the man earned everyday ₹ 24. But, had he earned ₹ 24 everyday, his total earning in 5 days would have been 5 × ₹ 24 = ₹ 120.

To find the average of given quantities of the same kind and in the same units :

Step 1 : Find the sum of all the given quantities.

Step 2 : Divide the sum, obtained in step 1, by the number of quantities.

Example 1 :

Find the average of 26 kg, 35 kg, 28 kg, 32 kg and 30 kg.

Solution :

Step 1 : Sum of all the given quantities

= 26 kg + 35 kg + 28 kg + 32 kg + 30 kg

= 151 kg

Step 2 : Number of quantities = 5

$\therefore$ **Average** = $\frac{\text{Sum of quantities}}{\text{Their number}}$

= $\frac{151 \text{ kg}}{5}$ = **30.2 kg** **(Ans.)**

$$\text{Average} = \frac{\text{Sum of all the given quantities}}{\text{Number of the given quantities}}$$

$\Rightarrow$ Total (sum) of all the quantities = Their average × number of quantities

1. The average is also known as the ***mean*** or the ***arithmetic mean.***
2. The quantities whose average is to be determined, should be in the same unit.
3. The unit of average is the same as the unit of given quantities.

Example 2 :

Dinesh's average marks in 8 subjects are 35. What are his total marks ?

Solution :

Total marks obtained by Dinesh

= His average marks × number of subjects

= 35 × 8 = **280** **(Ans.)**

Example 3 :

The average height of 8 boys in a class is 168 cm. When a new boy joins the group, the average height becomes 167 cm. Find the height of this ninth boy.

Solution :

Total height of 8 boys = 168 cm × 8 = 1344 cm. [∵ Total = Average × No.]

and total height of 9 boys = 167 cm × 9 = 1503 cm.

∴ **Height of the ninth boy** = 1503 cm – 1344 cm = **159 cm** **(Ans.)**

EXERCISE 12

1. Find the mean (average) of the following numbers :
   (i) 2, 1.5, 2.5, 4.5 and 3.5 (ii) 10, 11, 13, 12 and 14
2. The rainfall on 10 consecutive days was 5·8 cm, 2.4 cm, 3.0 cm, 6.2 cm, 1.8 cm, 4.1 cm, 3.5 cm, 5.3 cm, 2.9 cm, and 4.0 cm. Find the average daily rainfall during these days.
3. The average weight of 6 boys is 58 kg. When a seventh boy joins them, the average drops to 57 kg. What is the weight of the seventh boy ?
4. The average age of 16 students is 15 years. When a boy of age 18 years leaves; what will be the average age of remaining 15 students ?
5. The average age of 5 chidren in a family is 10 years. If the ages of four of them are 12, 14, 15 and 8 years, what is the age of the fifth child ?
6. The average attendance of a school for the first four days of a week was 540. The average attendance for first five days was 522. What was the attendance on the fifth day ?
7. There are 50 boys in a class whose average age is 12 years. There are 40 boys in another class whose average age is 15 years. What is the average age of both the classes taken together ?
8. The minimum temperatures of a place in a certain week beginning from Monday are 20°C, 17.5°C, 21°C, 16.5°C, 17.8°C and 18.2°C. The minimum temperature for Sunday was not known. If the average minimum temperature for the whole week was 19°C, what was the minimum temperature on Sunday.
9. The average age of 30 soldiers is 25 years. The average age of first fifteen of them is 24 years and the average age of last 14 of them is 26 years. What is the age of the sixteenth soldier ?

   The age of 16th soldier
   = total age of all the 30 soldiers – (total age of first 15 soldiers + total age of last 14 soldiers).
10. The average temperature for the first four days of the week was 39°C. The average of the whole week was 40°C. What was the average temperature during the last three days of the week ?