2 The Unitary Method

If the price of 12 eggs is ₹24 then the price of one egg is ₹24 ÷ 12 = ₹2. Knowing the price of one egg, one can easily find the price of any number of eggs.

Examples (i) Price of 10 eggs = (price of one egg) × 10 = ₹2 × 10 = ₹20.

(ii) Price of 15 eggs = (price of one egg) × 15 = ₹2 × 15 = ₹30.

This method of finding the value for a unit quantity (one) at first and then using it to find the value for the required quantity is called the unitary method. This method is widely used in arithmetic.

Direct Variation

Suppose 4 chocolates cost ₹160. So, 8 chocolates cost ₹320, 12 chocolates cost ₹480, 2 chocolates cost ₹80, and so on.

Here, (4 chocolates) : (8 chocolates) = 1 : 2 and ₹160 : ₹320 = 1 : 2;

∴ (4 chocolates) : (8 chocolates) : : ₹160 : ₹320.

Also, (4 chocolates) : (2 chocolates) = 2 : 1 and ₹160 : ₹80 = 2 : 1;

∴ (4 chocolates) : (2 chocolates) : : ₹160 : ₹80.

An increase or decrease in one quantity (here, the number of chocolates) leads to increase or decrease in the other quantity (here, the cost). So, we say that the cost varies (or changes) directly as the number of chocolates. In other words, the cost and the number of chocolates are in direct variation, or in direct proportion.

EXAMPLE **The cost of 6 identical pens is ₹96. Find the cost of 11 such pens.**

Solution Obviously, the more the number of pens, the more is the cost, and the less the number of pens, the less is the cost.

So, the number of pens and their costs are in direct variation (or proportion).

∴ ratio of the numbers = ratio of their costs

or $6 : 11 = ₹96 : (\text{cost of 11 pens})$

or $\frac{6}{11} = \frac{₹96}{\text{cost of 11 pens}}$

or $\text{cost of 11 pens} = \frac{11}{6} \times ₹96 = ₹176.$

Thus, the cost of 11 pens is ₹176.

Alternative method

The cost of 6 pens is ₹96.

∴ the cost of 1 pen is ₹96 ÷ 6 = ₹16.

∴ the cost of 11 pens is ₹16 × 11 = ₹176.

Solved Examples

EXAMPLE 1 **The price of 8 copies of a book is ₹960. Find the price of 5 copies of the book.**

Solution

The price of 8 copies of a book is ₹960.

∴ the price of 1 copy of the book is ₹960 ÷ 8 = ₹120.

∴ the price of 5 copies of the book is ₹120 × 5 = ₹600.

So, the price of 5 copies of the book is ₹600.

EXAMPLE 2 **If 7 identical packets of biscuits weigh 420 g, find the weight of 17 similar packets of biscuits.**

Solution

7 packets of biscuits weigh 420 g.

∴ 1 packet of biscuits weighs $420 \text{ g} \div 7 = \frac{420}{7} \text{ g} = 60 \text{ g}$.

∴ 17 packets of biscuits weigh 60 g × 17 = 1020 g = 1 kg 20 g.

Hence, 17 packets of biscuits weigh 1 kg 20 g.

EXAMPLE 3 **A worker earns ₹5330 in 13 days. How much does he earn in 8 days?**

Solution

In 13 days, the worker earns ₹5330.

∴ in 1 day, the worker earns ₹5330 ÷ 13 = ₹410.

∴ in 8 days, the worker earns ₹410 × 8 = ₹3280.

Hence, the worker earns ₹3280 in 8 days.

EXERCISE 2

1. If 6 kg of rice costs ₹93, find the cost of 14 kg of rice.
2. If 12 rubber balls cost ₹60, how many such balls can one buy for ₹90?
3. A boy runs 930 m in going round a field 3 times. What distance will he cover if he goes round the field 10 times?
4. 16 m of cloth costs ₹1456. A man requires 5 m of cloth to make a suit. How much will he spend on buying cloth for the suit?
5. The cost of 7 L of petrol is ₹427. How many litres of petrol can one buy for ₹732?
6. Sachhida earns ₹1,30,500 in 9 months. In how many months does he earn ₹72,500?
7. The quarterly tution fee for class 6 in a school is ₹13,500. What will be the fee for seven months?

8. The cost of 10 pencils is ₹25 and the cost of 5 chart papers is ₹10. How much money will you need to buy 5 pencils and 7 chart papers?

9. The railway fare for 3 adults from New Delhi to Bengaluru is ₹8880. What is the cost of such tickets for 5 adults?

10. If 11 containers of the same size contain 231 L of oil, how much oil will be there in 15 such containers?

11. A labourer earns ₹5400 in 12 days. How much will he earn in 7 days? In how many days will he earn ₹9450?

12. 7 identical packets of pulses weigh 840 g. How many packets weigh 600g?

13. A bottling machine fills 500 bottles in 15 minutes. How many bottles will it fill in 48 minutes?

14. A television set consumes 6 units of electricity in 4 hours. How many units will it consume in 14 hours?

ANSWERS

1. ₹217
2. 18 balls
3. 3 km 100 m
4. ₹455
5. 12 litres
6. 5 months
7. ₹31,500
8. ₹26.50
9. ₹14,800
10. 315 L
11. ₹3150; 21 days
12. 5 packets
13. 1600 bottles
14. 21 units