



PARTNERSHIPS



CHAPTER

5

Partnership

PARTNERSHIP PROBLEMS

One of the common applications of ratios is in problems called as partnership problems. Partnership problems are of two types:

1. Simple Partnership: When the money or capital of each partner is invested for the same time period, it is called as simple partnership in this case, the profit gets divided in the same ratio as the capital contributed by each after making deductions or adjustments if any as mentioned in the problem.

For example, if A, B and C invest Rs. 4000, Rs. 7000 and Rs. 9000, respectively, in a business, the profit at the end of the year will get divided in the ratio 4:7:9.

2. Compound Partnership: When the money or capital of each partner is invested for different time period, it is called as compound partnership. In this case, we first calculate the equivalent contribution of each partner by multiplying the capital with the period as the equivalent. The profit gets divided in the same ratio as the equivalent contribution after making deductions or adjustments if any as mentioned in the problem.

The use of ratios to solve partnership problems is illustrated with the following examples.

EXAMPLE 1

1. A and B invest Rs. 5000 and Rs. 7000 to start a business. At the end of the year, the profit earned was Rs. 100000. If A gets Rs. 16000 as salary for the entire year, find the difference between the total amount received by A and B for the year.

SOLUTION:

Profit earned = Rs. 100000

Salary = Rs. 16000

Remaining amount = Rs. 84000

This will get divided between A and B in the ratio 5:7.

$$\text{Share of A} = \frac{5}{12} \times 84000 = \text{Rs. } 35000$$

$$\text{Share of B} = \frac{7}{12} \times 84000 = \text{Rs. } 49000$$

Total amount received by A = Rs. 1600 + Rs. 35000 = Rs. 51000

Total amount received by B = Rs. 49000

Difference = Rs. 51000 – Rs. 49000 = Rs. 2000

EXAMPLE

2. **A, B and C started a business by contributing capital. A contributed Rs. 7000 for 5 months, B contributed Rs. 8000 for 2 months and C contributed Rs. 3000 for 7 months. In what ratio will the profit get divided at the end of the year?**

SOLUTION:

Equivalent contribution of A = Rs. 7000 × 5 = Rs. 35000

Equivalent contribution of B = Rs. 8000 × 2 = Rs. 16000

Equivalent contribution of C = Rs. 3000 × 7 = Rs. 21000

The profit will get divided in the ratio 35:16:21.

PROPORTIONALITY AND VARIATION

Another application of ratios is in problem involving proportionality and variations.

DIRECT PROPORTIONALITY

Y is said to be directly proportional to X if Y increases as X increases and Y decreases as X decreases. Here Y is called the dependent variable while X is the independent variable.

We write the relation in the form $Y = KX$ where K is called the constant of proportionality.

APPLICATIONS OF DIRECT PROPORTIONALITY

1. Distance covered is directly proportional to speed if time of travel is constant.
2. Amount of work done is directly proportional to the number of people if the number of days is constant.

INVERSE PROPORTIONALITY

Y is said to be inversely proportional to X if Y decreases as X increases and Y increases as X decreases. We write the relation in the form $Y = K/X$ where K is called the constant of proportionality.

APPLICATIONS OF INVERSE PROPORTIONALITY

1. Time taken is inversely proportional to speed if distance is constant.
2. Number of days is inversely proportional to the number of people, if the amount of work done is constant.

The concept of direct and inverse proportionality can be understood by the following illustrative examples.

EXAMPLE

3. **The height of a person is directly proportional to the square root of his age. At the age of 16, his height is 4 ft. What will be the height of the person when he is 25 years old?**

Solution: It is given that the height is directly proportional to the square root of the age. Therefore,

$$4 = K \times \sqrt{16} \Rightarrow K = 1$$

Now, $h = K \times \sqrt{25} \Rightarrow h = 5 \text{ ft}$

EXAMPLE

4. **A variable X varies directly as Y and inversely as the square of Z. The value of X is 25 when Y is 5 and Z is 10. Find the value of Y when X is 40 and Z is 5.**

Solution: Given that X varies directly as Y and inversely as the square of Z. Therefore,

$$X = \frac{KY}{Z^2}$$

In the first case:

$$25 = \frac{K \times 5}{100}$$

$$K = 25 \times 20 = 500$$

In the second case:

$$40 = 500 \times \frac{Y}{2} \Rightarrow Y = 2$$