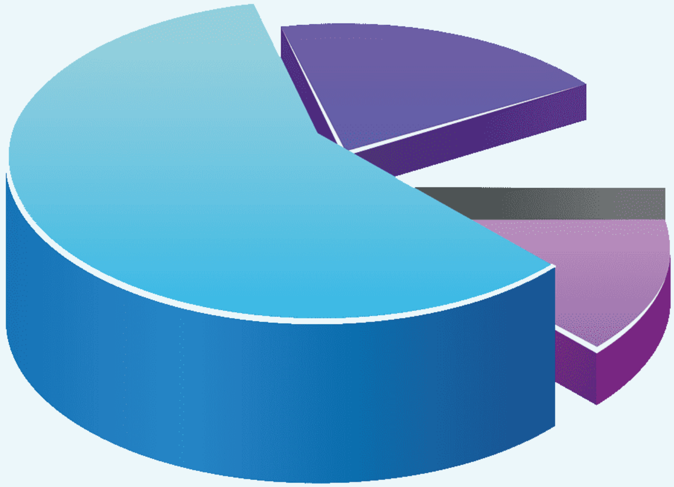

CHAPTER
4

Ratio and Proportion

INTRODUCTION

A ratio is a comparison between two or more similar quantities having the same dimensions, and therefore a ratio happens to be a dimensionless quantity.

A ratio and fraction are synonymous yet different entities. When we say that a:b is 2:3, we are talking about the ratio. A ratio is used for comparison purposes, but when we need to find the individual contributions or values, fractions are required for the same.

Therefore, if a:b is 4:3, we understand that for every value of 4 that a gets, b will get a value of 3, and so a gets a value of 4 for every 7 that they get together. This is called as fraction.

PROPERTIES OF RATIOS

1. Ratio is just a comparison and does not tell about the actual values. If the weight of two things is in the ration 5:6, their actual values are not known unless some other information is provided. As an example if the height of c and d is in the ratio 6:7, we do not know or cannot say anything about their actual height.

2. If $\frac{a}{2}=\frac{b}{3}=\frac{c}{4}$, then we can write

$$\frac{a}{2}=\frac{b}{3}=\frac{c}{4}=k$$

So, a = 2k, b = 3k and c = 4k

Therefore, a:b:c will be in the ratio 2:3:4.

3. If a:b:c is $\frac{1}{2} = \frac{1}{3} = \frac{1}{4}$

and we need to bring them to a different form, we will multiply by the LCM of the denominators (i.e. 2,3 and 4), which happens to be 12.

So, a:b:c will become $\frac{12}{2} = \frac{12}{3} = \frac{12}{4}$

APPLICATIONS OF RATIOS

The applications of ratios are illustrated by the following examples.

EXAMPLE 1

A bag has red and blue balls in the ratio 4:5. If the total number of balls is 81, find the number of blue balls. Solution: Number of blue balls

= $\frac{5}{9} \times 81 = 45$ blue balls

EXAMPLE 2

If a:b = 3:4 and d:b = 4:3, find the ratio between a and d.

Solution: The common variable is b, and therefore we need to make the value of be equal in both the ratios. a:b = 9:12 and d:b = 16:12

Therefore, a: d = 9:16