

## **6<sup>th</sup> Standard Maths**

### **Ratio and Proportion**

There are two ways of comparison:

- (i) By taking difference
- (ii) By division.

The (ii) way is better than (i) way.

The comparison by division is called the ratio. In this way, we see how many times one quantity is to the other quantity.

For example: If Apala got 75 marks and Meenu got 25 marks in an examination, then we can say that the marks obtained by Apala are three times the marks obtained by Meenu.

#### **Ratio**

If we compare die two quantities in terms of 'how many times', then this comparison is known as the ratio.

Ratio is denoted by using the symbol ':'

For example, Apala's weight is 20 kg and her father's weight is 60 kg. We say that Apala's father's weight and Apala's weight are in the ratio  
 $= 60/20 = 3/1 = 3 : 1$ .

For comparison by ratio, the two quantities must be in the same units. If they are not, they must be expressed in the same units before the ratio is taken.

The same ratio may occur in different situations.

For example,

(i) Length of a room is 15 m and breadth is 10 m. So, the ratio of length of the room to the breadth of the room =  $15/10 = 3/2 = 3 : 2$

(ii) There are 30 girls and 20 boys in a class. Then, ratio of the number of girls to the number of boys =  $30/20 = 3/2 = 3 : 2$ .

A ratio may be treated as a fraction. Thus, the ratio  $2 : 3$  may be treated as  $2/3$ .

A ratio equivalent to a given ratio can be obtained by multiplying or dividing the numerator and denominator by the same number. Thus, few ratios equivalent to  $2 : 3$  are  $4 : 6, 6 : 9, 8 : 12$ , etc.

Similarly, few ratios equivalent to  $64 : 32$  are  $32 : 16, 16 : 8, 8 : 4, 4 : 2, 2 : 1$ , etc. If the fractions corresponding to equivalent ratios are equivalent, then the two ratios are equivalent.

The orders in which the quantities are taken to express their ratio is important. Note that the ratio  $2 : 3$  is different from  $3 : 2$ .

A ratio can be expressed in its lowest form. For example, ratio  $60 : 24$  is  $60/24$  in the form of a fraction. In its lowest form  $60/24 = 5/2 = 5 : 2$ . thus, in its lowest form ratio  $60 : 24$  is treated as  $5 : 2$ .

### **Proportion**

If two ratios are equal we say that they are in proportion and use the symbol to equate the two ratios.

For example,  $2 : 4 = 60 : 120$

we write  $2 : 4 :: 60 : 120$

and say that 2, 4, 60 and 120 are in proportion.

Again,

$2 : 5 \neq 60 : 15$

We say that 2, 5, 60 and 15 are not in proportion.

So, if two ratios are not equal, then we say that they are not in proportion.

Four quantities are said to be in proportion if the ratio of the first and the second quantities is equal to the ratio of the third and the fourth quantities.

Thus, four quantities 3, 10, 15, 50 are in proportion, since  $3/10 = 15/50$ .

We write  $3 : 10 :: 15 : 50$  and read as 3 is to 10 as 15 is to 50.

Here, the first and the fourth terms, i.e., 3 and 50 are called the extreme terms while the second and the third terms, i.e., 10 and 15 are called the middle terms.

The order of terms in a proportion is important, 3, 10, 15, 50 are in proportion but 3, 10, 50, 15 are not, since  $3/10 \neq 50/15$ .

### **Unitary Method**

The method in which, first we find the value of one unit and then the value of the required number of units is called the Unitary Method.

For example, if the price of 6 toys is ₹ 90 and we are to find out the price of 4 toys, then first we find the price of 1 toy as ₹  $90/6$  or ₹ 15. From this, we find the price of 4 toys as ₹  $15 \times 4$  or ₹ 60.