8th Standard- Maths

Direct and Inverse Proportions

Need for Concepts of Variation

To find out the quantity of each item needed by Mohan or, the time taken by five students to complete the job, we need study some concepts of variation. We will study the following types of variation:

- Direct variation
- Inverse variation

Direct proportion

Two quantities x and y are said to be in direct proportion if whenever the value of x increases (or decreases), then the value of y increases (or decreases) in such a way that the ratio xy remams constant.

When x and y are in direct proportions, we have:

x1/y1=x2/y2=x3/y3

Inverse proportion

Two quantities x and y are said to be in inverse proportion, if whenever the value of x increases (or decreases), then the value of y decreases (or increases) in such a way that xy remains constant.

When x and y are in inverse proportion, then

$x_1 \times y_1 = x_2 \times y_2 = x_3 \times y_3$, and so on.

Two quantities may be linked in two ways:

- Both increase or decrease together proportionally.
- If one increases, the other decreases proportionally and vice-versa.

The first way is named as direct variation whereas the second way is named as an inverse variation.

Direct Proportion

If two quantities are related in such a way that an increase in one leads to a corresponding proportional increase in the other, then such a variation is called direct variation.

Thus, two numbers x and y are said to vary in direct proportion if $x/y = k$ or $x = ky$ where k is a constant.

In this case, if y_1, y_2 are the values of y corresponding to the values x_1, x_2 of x respectively, then

$x1/y1=x2/y2$

Inverse Proportion

If two quantities are related in such a way that in increase in one quantity leads to a corresponding proportional decrease in the other and vice-versa, then such a variation is called inverse proportion.

Thus, two quantities x and y are said to vary in inverse proportion if $xy = k$ where k is a constant of proportionality.

In this case, if y_1, y_2 are the values of y corresponding to the values x_1, x_2 of x respectively, then

$x_1y_1 = x_2y_2$ or $x1/x2=y2/y1$