

Chapter 4: Direct and Inverse Proportion

DIRECT PROPORTION

Two quantities are in direct proportion when while the value of one quantity (x) increase (or decrease) the value of the other(y) is also increased (or decreased) such a way that the ratio of two quantities does not change.

When two quantities x and y are in direct proportion, we can write $\frac{x_1}{y_1} = \frac{x_2}{y_2}$

Or, $\frac{x_1}{x_2} = \frac{y_1}{y_2}$ [y_1, y_2 are values of y corresponding to the values of x_1, x_2 of x respectively]

Examples

1. If cost of 6 note books each \$ 45. How much would coast of 8 note books

Solution

Let the cost of 8 note books be \$ x .

Cost of note books (\$)	No. of note books.
45	6
x	8

More the number of note books, the more would their cost be.

So, the number of note books and their cost are directly proportional to each other.

Hence

$$\frac{45}{x} = \frac{6}{8}$$

$$\Rightarrow x \times 6 = 45 \times 8$$

$$\Rightarrow x = \frac{45 \times 8}{6}$$

$$\Rightarrow x = 60$$

\therefore Cost of 8 note books is \$ 60.

INVERSE PROPORTION

Two quantities are in inverse proportion, when while the value of one quantity (x) is increased (or decreased), the value of other (y) is decreased (or increased) such a way that the product of two quantities remains constant.

We say that x varies inversely with y and y varies inversely with x .

When two quantities x and y are in inverse proportion, we can write $x_1y_1 = x_2y_2$
 [y_1, y_2 are values of y corresponding to the values of x_1, x_2 of x respectively]

Illustration

1. If 15 workers can build a wall in 48 hours how many workers will be required to do the same work in 30 hours.

Solution

Let the number of workers employed to build the wall in 30 hours be y .

No. of hours	No. of workers
48	15
30	y

More the number of workers, faster will they build the wall.

From the problem

$$48 \times 15 = 30 \times y$$

$$\Rightarrow y = \frac{48 \times 15}{30}$$

$$\Rightarrow y = 24$$

\therefore To finish the work in 30 hours, 24 workers are required.

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