

DIRECT VARIATION & INVERSE VARIATION

DIRECT VARIATION:

When two quantities or variables such that an increase or decrease in one of them increases or decreases the other respectively, they are said to be DIRECT VARIATION each other.

Example:

Distance travelled and speed. Both of them are indirect variation that means if you increase the speed at which you travel you tend to cover more distance at the same time. At the same time if you decrease the speed the duration also decrease . So one of the quantity increases the other quantity also increases, if one if the quantity decreases then the other quantity also decreases. This is called as direct variation.

INVERSE VARIATION:

When two quantities/ variables are such that an increase / decrease in one of them decreases/increases the other respectively, they are said to be INVERSE VARIATION with each other.

Example:

Speed and time. If you increase the speed at which you are travelling then you travel faster, so you decrease the time in which you cover the same distance, but if you are travelling slower than you are travelling with a lesser speed than your time or duration of travel would increase. One of them increases the other decreases , one of them decreases the other decreases. This is called as inverse variation.

So the number of hours and number of likes are said to be in direct variation. H proportional L.

2 hours ,14 likes. When the things are in direct variation then you can cross multiply.

| | |
|---|------|
| H | L |
| 2 | 14 |
| ? | 1960 |

$$\frac{H}{L} \propto \frac{L}{H}$$

$$? \times 14 = 2 \times 1960$$

$$? = 2 \times 140 = 280 \text{ hours}$$

So, he spent 280 hours to get 1960 likes. Notice that the number of likes increasing and the time is also increasing, this is what directly proportional is all about.

Example:

The number of friends "F" one makes on a social networking site is inversely proportional to the number of friend requests "R" received. If Davis got 2400 requests and made 250 friends, how many less friends would he have made if he got 1800 requests?

Now the number friends F and the number of friend request he gets are inversely proportional to each other

$F \propto \frac{1}{R}$

$F \quad R$

$250 \leftrightarrow 2400$

$33.33 \leftrightarrow 18000$

$x \propto \frac{1}{y}$

$250 \times 2400 = ? \times 18000$

$\frac{250 \times 2400}{18000} = ? = \frac{25 \times 24}{183} = \frac{100}{3}$

33.33

From 250 to 33 around how many less friends would he have made is $250 - 33 = 217$.

So, it is 217 less number of friends.

➤ Lets look at a question which involves both direct variation and inverse variation.

The weight of Labrador is directly proportional to the number of pounds of meet it consumes a day. However, it is inversely proportional to the number of miles it runs a day. A Labrador puppy "Shiro" weighed 15 pounds of meat and made to run 5 miles a day. Instead, if it was fed 3.6 pounds of meat and made to run 8 miles a day, how heavy it would have been.

| | |
|-----------|-----------|
| 15 pounds | 2pounds |
| ? | 3.6pounds |
| W | M |
| 15 | 2 |
| ? | 3.6 |

So, these are in direct variation, what we need to do is cross multiply them

$W \propto M$

$15 \times 3.6 = 2 \times ? \Rightarrow ? = 15 \times 1.8 = 27$

27 pounds is the weight when the dog ran 5 miles a day. If it ran 8 miles a day then how much could be the weight. These are in inverse variation

| | |
|----|---|
| W | M |
| 27 | 5 |
| ? | 8 |

$$\underline{W} \propto \frac{1}{\underline{Miles}}$$
$$\Rightarrow 27 \times 5 = ? \times 8 \Rightarrow ? = \frac{135}{8} \approx \textcircled{17}$$

The weight of the Labrador puppy would have been 17 approximately. So, instead of weighing 15 pounds it could have weighed 17 pounds had it been fed a little more meet and made to run a little more, instead of feeding 2 pounds if you fed Labrador puppy with 3.6 pounds of meet that you made it run 8 miles instead of 5 miles then puppy would have grown 2 pounds heavier.