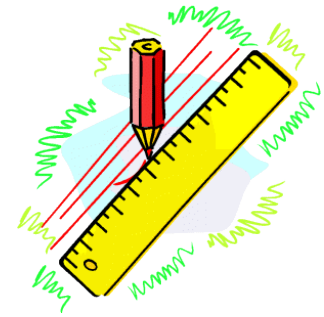


Inverse Variation

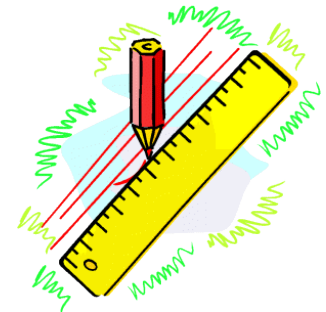
Inverse Variation



1. To explain the term Inverse Variation.

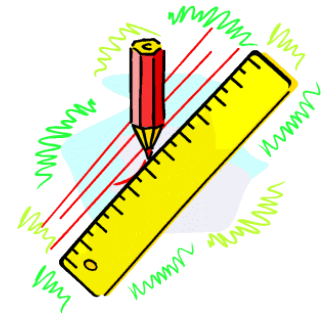
1. Understand the idea of Inverse Variation.
2. Solve simple inverse Variation problems.

How does it work?



- Bill is happy. He is thinking about that pizza he has ordered and will be delivered soon.
- One whole pizza just for him!!!

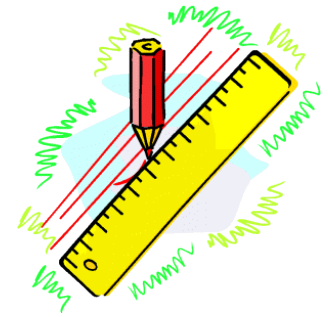
Now what?



- Oh look! His friend Gina is over.
- Well - sharing with one person means he will get just half of the pizza!
- But he likes Gina.



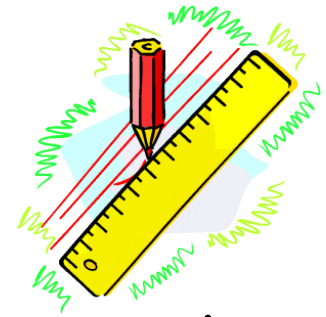
And...



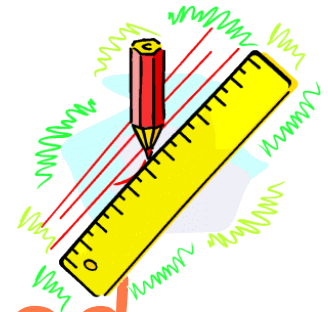
- Bill looks out the window...
- Robert is running to his house!
- Guess he heard about the pizza!
- Now Bill gets $\frac{1}{3}$ of it!
- RATS!



Oh well...



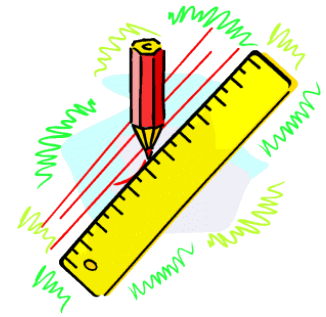
- Word is out on the street....
- Bill is getting pizza!
- Who invited Spike?
- What is happening to Bill's pizza?
- What does that have to do with an inverse variation?



Let's look at what happened...

- There was one pizza - 1
- Bill had one pizza - 1
- Gina shows up so Bill gets $\frac{1}{2}$ of the pizza
- Robert runs to Bill's house - Bill gets $\frac{1}{3}$ of the pizza
- Spike is headed to Bill's - Bill gets $\frac{1}{4}$ of the pizza!
- As each person enters, Bill gets less and less pizza.

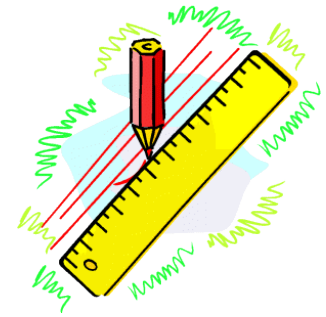
And...



- An algebraic form of this would be...
- Y = the pizza each one gets
- X = the number of people
- K = the constant (one pizza)
- $Y = K/X$
- As the number of people increased, the amount of pizza each person got decreased.
- That's easy!

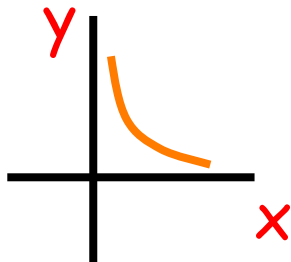
Inverse Variation

Inverse Variation



Inverse Variation is when one quantity increases and the other decreases. The two quantities are said to be **INVERSELY Variational** or (**INDIRECTLY Variational**) to each other.

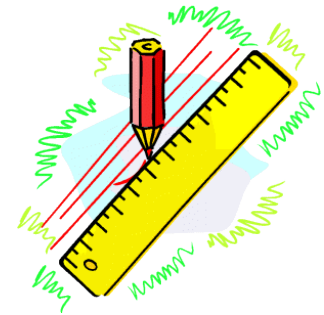
Example : Fill in the following table given x and y are inversely Variational.



x	1	2	4	8
y	80	40	20	10

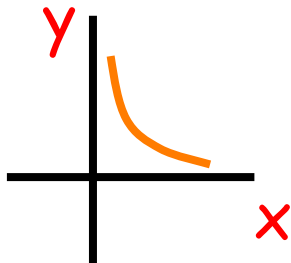
Inverse Variation

Inverse Variation



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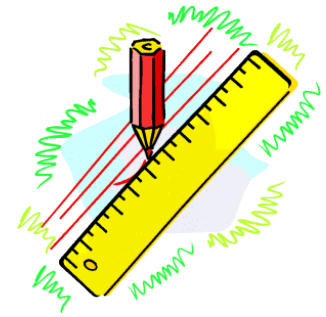
Example : If it takes 3 men 8 hours to build a wall.
How long will it take 4 men. (Less time !!)



Men	Hours
3	\Rightarrow 8
1	\Rightarrow $3 \times 8 = 24$ hours
4	\Rightarrow $24 \div 4 = 6$ hours

Inverse Variation

Inverse Variation



Example : It takes 10 men 12 months to build a house.
How long should it take 15 men.

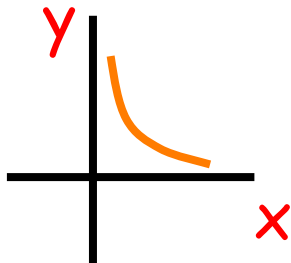
Men

Months

$$10 \Rightarrow 12$$

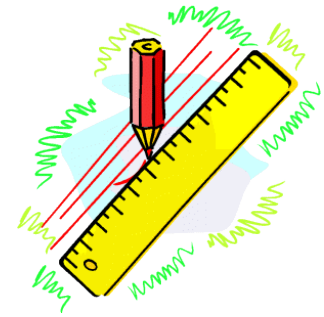
$$1 \Rightarrow 12 \times 10 = 120$$

$$15 \Rightarrow 120 \div 15 = 8 \text{ months}$$



Inverse Variation

Inverse Variation



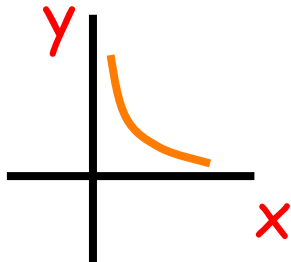
Example : At 8 m/s a journey takes 32 minutes.
How long should it take at 10 m/s.

Speed Time

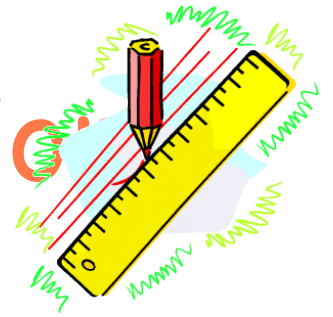
$$8 \Rightarrow 32 \text{ mins}$$

$$1 \Rightarrow 32 \times 8 = 256 \text{ mins}$$

$$10 \Rightarrow 256 \div 10 = 25.6 \text{ mins}$$

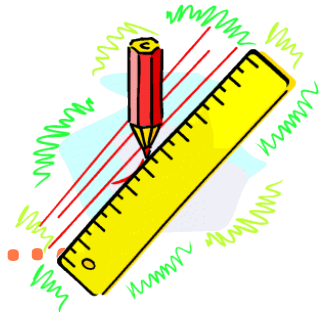


What is an inverse variation?



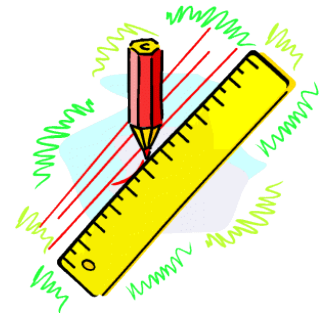
- An inverse variation is described by an equation of the form $y = k/x$, where $k \neq 0$.
- WHY?

Using what we did before...



- If y varies inversely as x , and $y = 3$ when $x = 12$, find x when $y = 4$.
- First find the value of the constant (K)

The review...

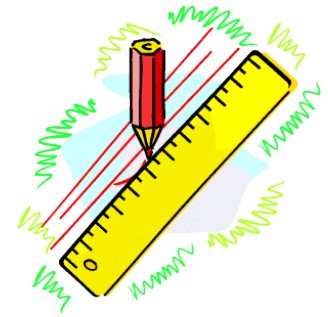


- The formula for an inverse variation is:

$$Y = \frac{k}{x}$$

- What if we solved for k , what would it look like?

To solve for k...



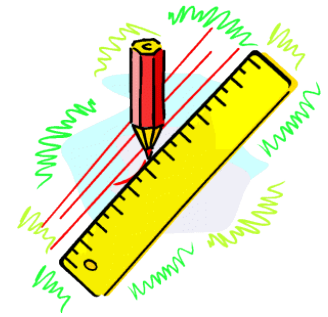
$$Y = \frac{k}{x}$$

now multiply both sides by x

$$X \cdot Y = \frac{k}{X} \cdot X \quad \text{cancel out your "x"s and you have}$$

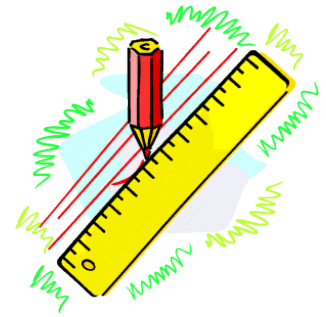
$$XY = k$$

Try this one...



- If Y varies inversely as X , and $y = 6$ when $x = 12$, find x when $y=9$.

One more example...



- If y varies inversely as x , if $y = 15$ when $x = 21$, find x when $y = 27$.