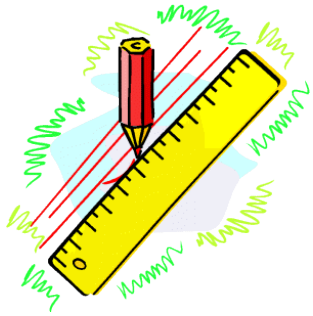
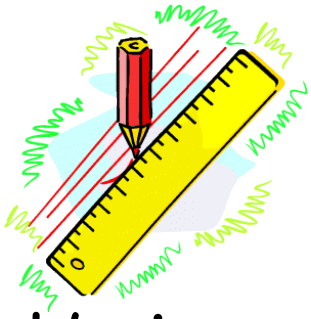


Direct Variation

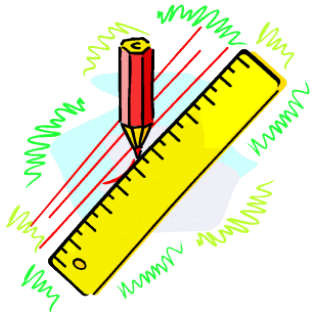
Direct Variation

How Does it Work?



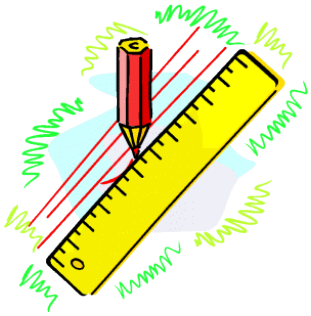
- Bill is happy. He is thinking about that bag of candy that his mom just bought!
- One entire bag of candy just for him!!!
- That's 25 pieces of candy all to himself!!!

Now What?



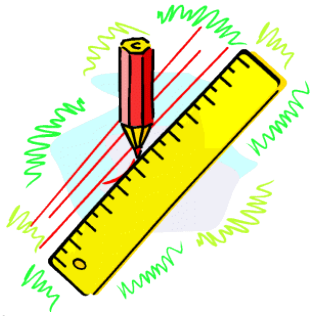
- Oh look! His friend Gina is over.
- She even brought a bag of candy with her!!
- Her bag has 25 pieces too!!
- Now, two people and 50 pieces of candy!
- It's cool - Bill likes Gina.

And?



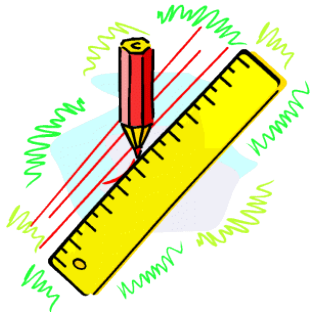
- Bill looks out the window…
- Robert is running to his house! What's that he's holding?
- He has a bag of candy too!
- His bag also has 25 pieces!
- Now there are 3 people to share 75 pieces of candy!
- OH MY!!

Oh well…



- Word is out on the street….
- Bill is having a party?!
- Who invited Spike?
- It's okay – Spike is bringing a bag of candy to share with the group.
- Another 25 pieces to share!
- What does that have to do with a direct variation?

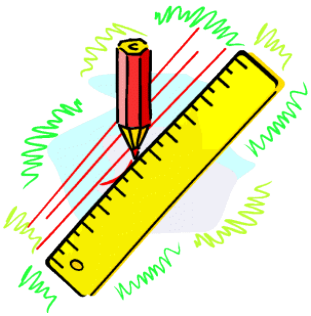
Let us look at what happened…



- Bill had one bag of candy - 25 pieces
- Gina arrives with a bag of candy – 50 pieces
- Robert runs to Bill's house with a bag of candy – 75 pieces
- Spike is headed to Bill's with a bag of candy – 100 pieces
- As each person enters, the number of pieces of candy increases

Direct Variation

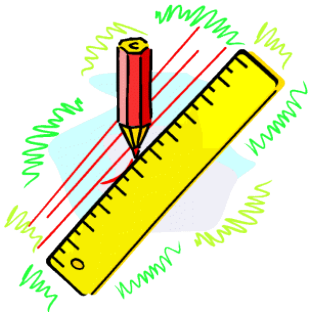
Direct Variation



- An algebraic form of this would be…
- Y = the total amount of candy
- X = the number of people
- K = the constant (amount of candy in each bag)
- Y = KX
- As the number of people increased, the total amount of candy increased.
- That's easy!

Direct Variation

More Examples



Two quantities, (for example, number of cakes and total cost) are said to be in DIRECT Variation, if :

" .. When you double the number of cakes
you double the cost."

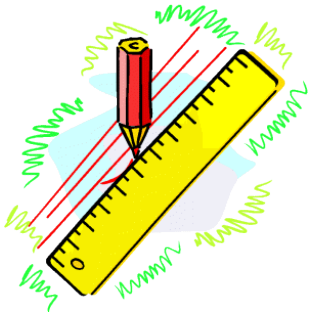
Example : The cost of 6 cakes is $4.20. find the cost of 5 cakes.

Write down two quantities that are in direct variation.

Cakes		Cost
6	⇨	4.20
1	⇨	4.20 ÷ 6 = 0.70
5	⇨	0.70 x 5 = $3.50

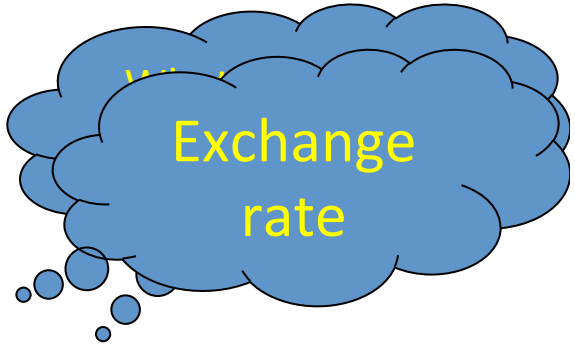
Direct Variation

More Examples

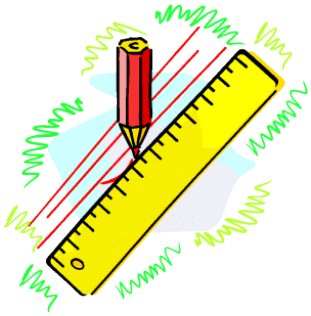


Example : When I was in Paris last summer, I exchanged $45 for €30.
How many $ I need, to get €50.

€	$
30	⇨ 45
1	⇨ 45 ÷ 30 = 1.5
50	⇨ 1.5 x 50 = $75



Direct Variation



Direct Variation

Example : To make scrambled eggs for 2 people we need 2eggs, 4g butter and 40 ml of milk. How much of each for
(a) 4 people (b) Just himself

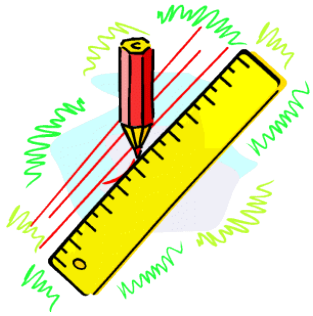
(a) Simply multiple by 2 :

4 eggs, 8g butter, 80 ml of milk.

(b) Simply half original amounts:

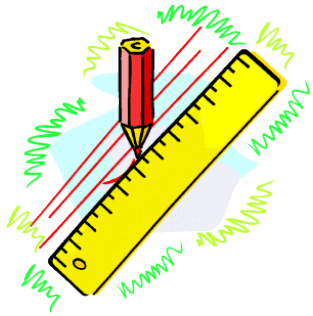
1 eggs, 2g butter, 20 ml of milk.

What is a Direct Variation?



- A direct variation is described by an equation of the form y = kx, where
- $K \neq 0$
- As x increases y increases.
- The graph is a straight line that always passes through the origin.

Direct Variation



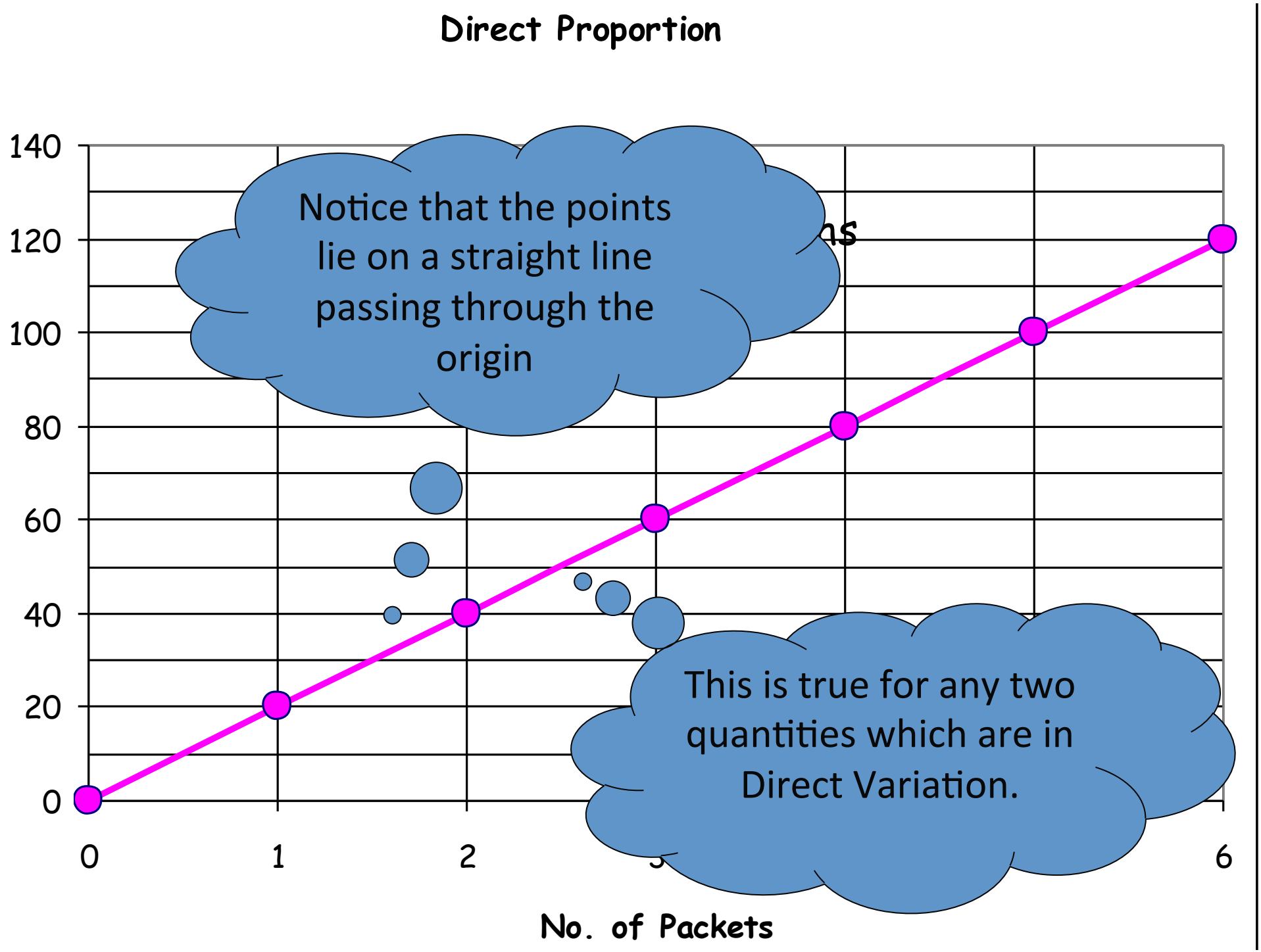
Direct Variation Graphs

The table below shows the cost of packets of "Biscuits".

No. of Pkts	1	2	3	4	5	6
Cost (p)	20	40	60	80	100	120

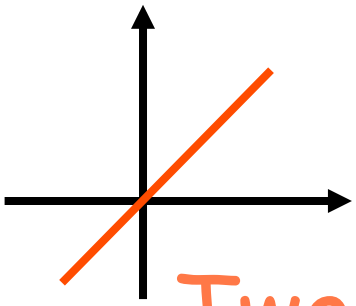
We can construct a graph to represent this data.

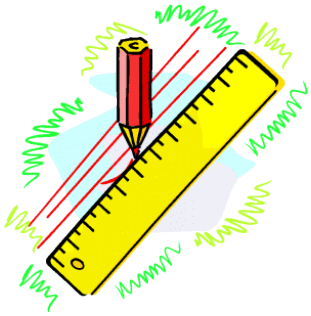
What type of graph do we expect ?


Direct Proportion
140
120
100
80
60
40
20
0
0
1
2
6
No. of Packets
Notice that the points lie on a straight line passing through the origin
This is true for any two quantities which are in Direct Variation.

Direct Variation

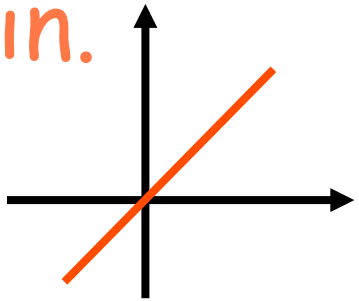
Direct Variation Graphs



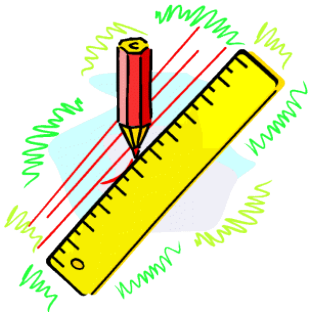


KeyPoint

Two quantities which are in Direct Variation always lie on a straight line passing through the origin.



Direct Variation



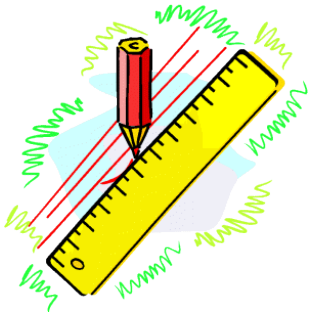
Direct Variation Graphs

Example : Plot the points in the table below. Are they in Direct Variation?

X	1	2	3	4
y	3	6	9	12

We plot the points (1,3) , (2,6) , (3,9) , (4,12)

Direct Variation

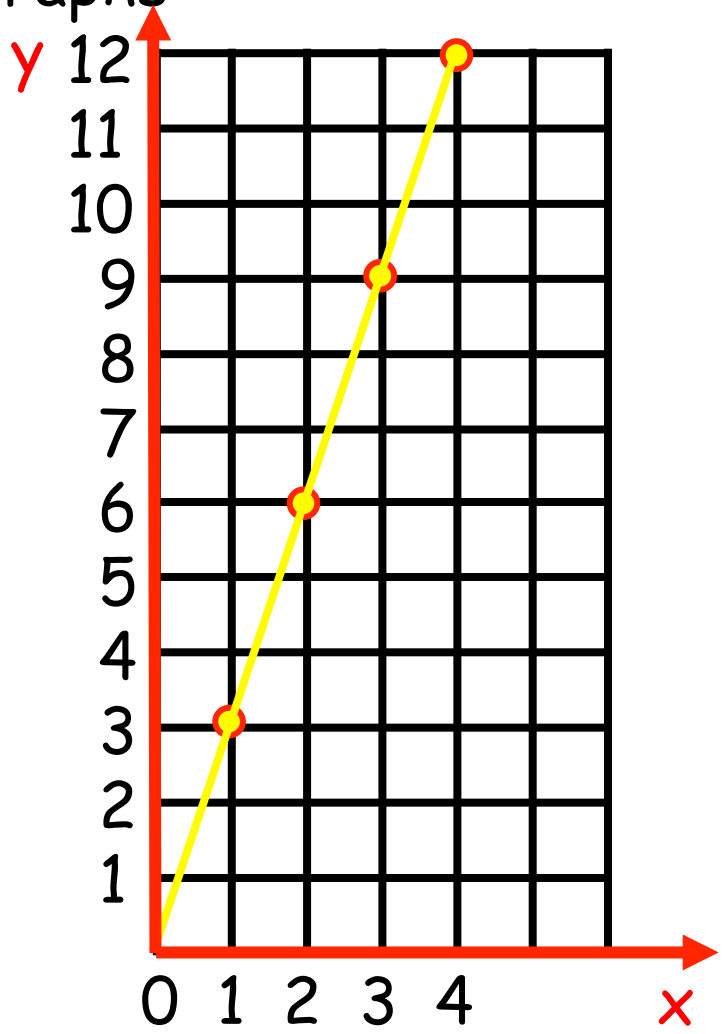


Direct Variation Graphs

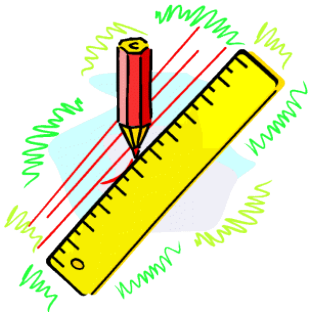
Plotting the points

(1,3) , (2,6) , (3,9) , (4,12)

Since we have a straight line passing through the origin x and y are in Direct Variation.

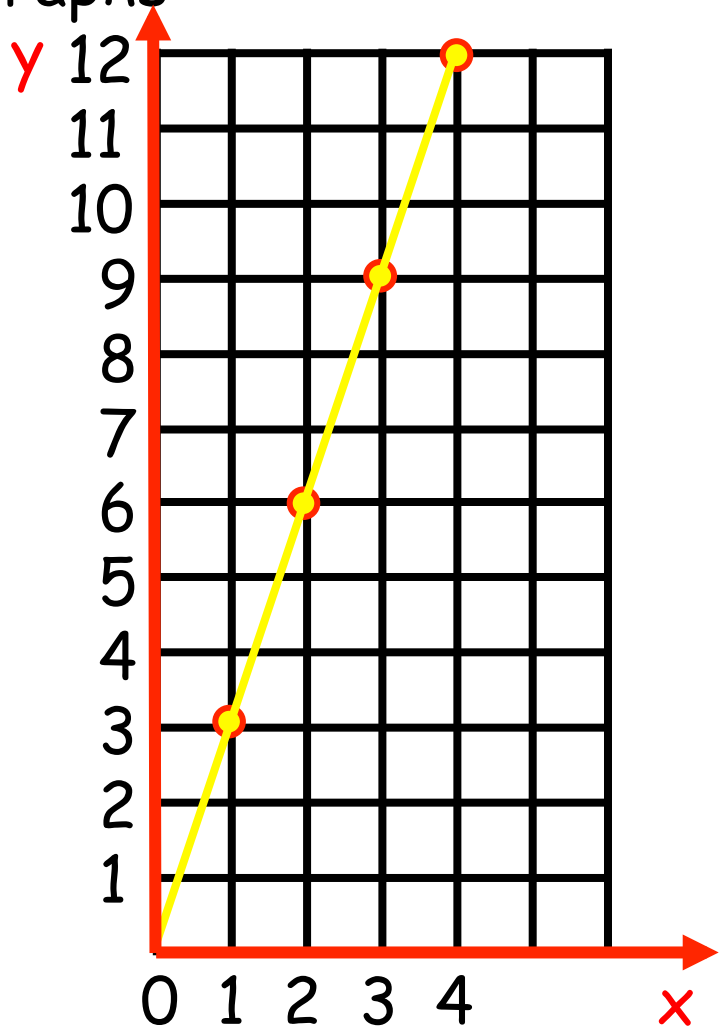


Direct Variation



Direct Variation Graphs

Find the formula connecting y and x.



Formula has the form :

$y = kx$

Gradient = 3

Formula is : $y = 3x$