Graphing and Intercepts

Ex/ Ben sells ice cream at the baseball diamond. Sandwich bars are $2 each and cones are $3 each. Yesterday, his sales totalled $90. The equation $2b + 3c = 90$ can be used to describe the relationship.
   a) What do b and c stand for in the equation above?
   b) What is the minimum number of cones that could have been sold? Maximum number of cones?
   c) What is the minimum number of sandwich bars that could have been sold? Maximum number of sandwich bars?
   d) Sketch a graph of the relationship.
   e) Is it possible that Ben sold 10 sandwich bars?

a) $b = $ # of sandwich bars
   $c = $ # of cones

b) min = 0 cones, max = 30 cones $(90 \div 3)$

c) min = 0 bars, max = 45 bars $(90 \div 2)$

d)
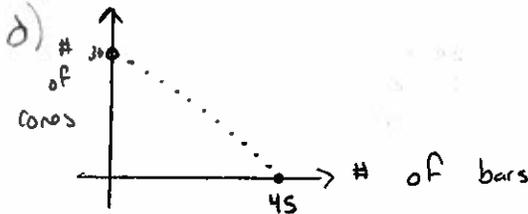
e) b = 10
$2b + 3c = 90$
$2(10) + 3c = 90$
$20 + 3c = 90$
$3c = 90 - 20$
$3c = 70$
$c = 70/3$ ← it divide unevenly

∴ Ben did **Not** sell 10 bars

Ex/ Amir earns $15/h working in a coffee shop and $13.5/h working in a grocery store. Last week he earned $270.
   a) Explain why $15x + 13.5y = 270$ models this case.
   b) Is this relation a straight line? How do you know?
   c) What is the minimum number of hours that he worked in the coffee shop? What is the maximum number of hours?
   d) What is the minimum number of hours that he worked in the grocery store? What is the maximum number of hours?
   e) Sketch the graph of the linear relation.
   f) Is it possible that he worked for 10 hours in the grocery store?

a) Amir gets $15 for every hour (x) at the coffee shop, and $13.5 for every hour (y) at the store. Altogether, he gets $270.

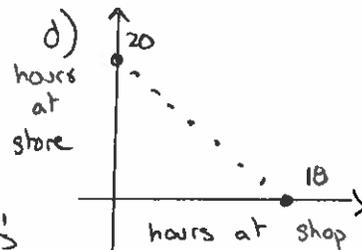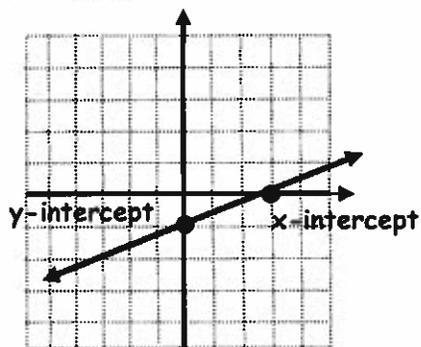b) Yes - constant amount (also no exponents in equation)

c)

x	y	
0	20	← max hours at grocery
18	0	← max hours at shop

d)

e) $15x + 13.5(10) = 270$
   $15x + 135 = 270$
   $15x = 270 - 135$
   $15x = 135$
   $x = 9$ ∴ Yes it's possible

- All linear relations can be graphed by finding the points where the line crosses the axes, but it is especially handy when the equation is in the order $ax + by = k$.

Intercepts Method

The y-intercept is where the graph crosses the y-axis. Here, the x-value is always zero.

The x-intercept is where the graph crosses the x-axis. Here, the y-value is always zero.

- Knowing this allows us to make a small table of values. One that only has two points in it.

x	y
0	
	0

←——— The y-intercept
←——— The x-intercept

- Once we fill the table with zeros, we can solve for the missing x or y-value.
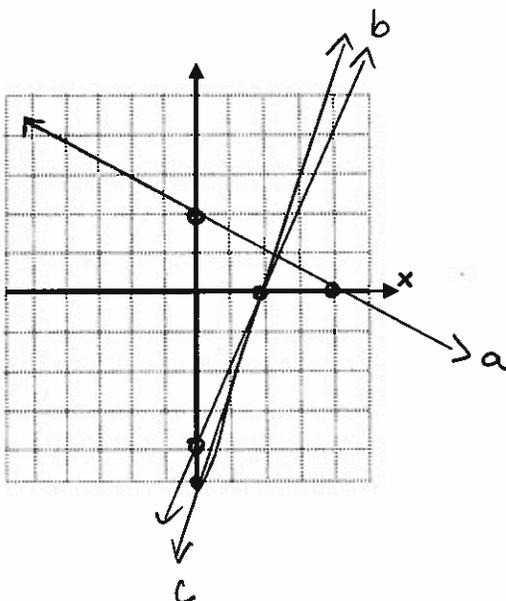
Ex/ Sketch.
   a) $2x + 4y = 8$

x	y
0	2
4	0

   b) $2x - y = 4$

x	y
0	-4
2	0

   c) $5x - 2y = 10$

x	y
0	-5
2	0

- There are two types of lines that don't have both an x-intercept and a y-intercept, we can tell because their equations don't have both letters.

i.e. $x = 4$ or $y = 2$