Class 8: Linear Equations

Objective: The objective of this class is to understand the basic concepts of linear equations through y = mx + b and the point slope form.

Outcome: The outcome of this class is to be able to understand and explain what the process is to compute y = mx + b and produce a graph. In addition, the outcome of the class is come up with the equation of a line through the point slope form.

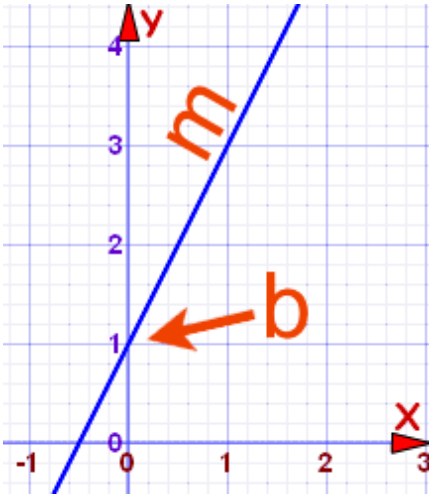
Directions: All of the following information should be answered in a google document. There are more directions in each part for further explanation.

Part I: Equation of a straight line (20 points)
Read the notes, watch the video and answer the corresponding questions, play around with the online graph, and complete the practice problems at the end.

Notes:

The equation of a straight line is written: y = mx + b

What does it stand for?



y = how far up

x = how far along

m = Slope or Gradient (how steep the line is)

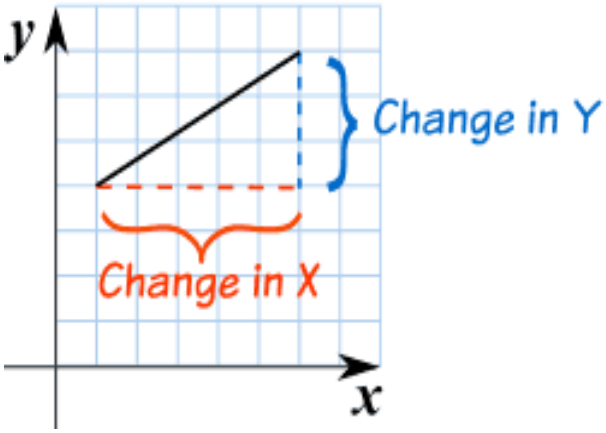
b = the Y Intercept (where the line crosses the Y axis)

How do you find "m" and "b"?

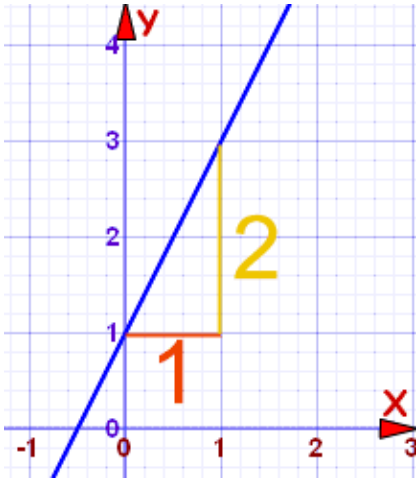
- b is easy: just see where the line crosses the Y axis.
- m (the Slope) needs some calculation:

$$m = \frac{\text{change in y}}{\text{change in x}}$$

"Change in y divided by the change in x"



Example:



$$m = \frac{2}{1} = 2$$

b = 1 *(where the line crosses the Y-Axis)*

So: y = 2x + 1

... choose any value for x and find the matching value for y

For example, when x is 1:

$$y = 2\times\mathbf{1} + 1 = 3$$

Check for yourself that x=1 and y=3 is actually on the line.

Or we could choose another value for x, such as 7:

$$y = 2\times\mathbf{7} + 1 = 15$$

And so when x=7 you will have y=15

Video: Watch the following video on apply y = mx + b, and answer the questions in google docs:

1. What is a constant and what is a coefficient? Give three examples of each.
2. What is the commutative property? Give two examples
3. In your own words, what is “m” and show is it solved.

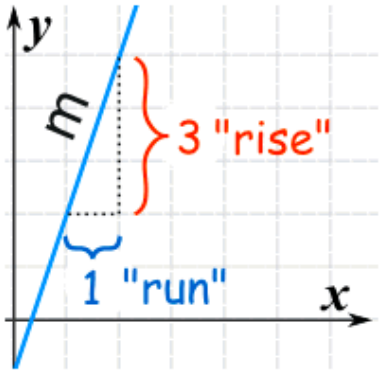
Graph: Play around with this online graph. Create five different linear lines/graphs, screenshot and post them to google docs.

Extra Notes on slope “M” :

Rise and Run

Sometimes the words "rise" and "run" are used.

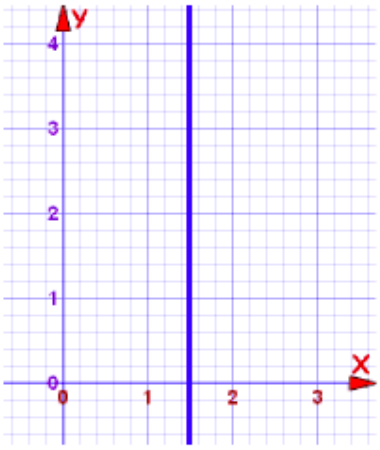
- Rise is how far up
- Run is how far along



And so the slope "m" is:

$$m = \frac{\text{rise}}{\text{run}}$$

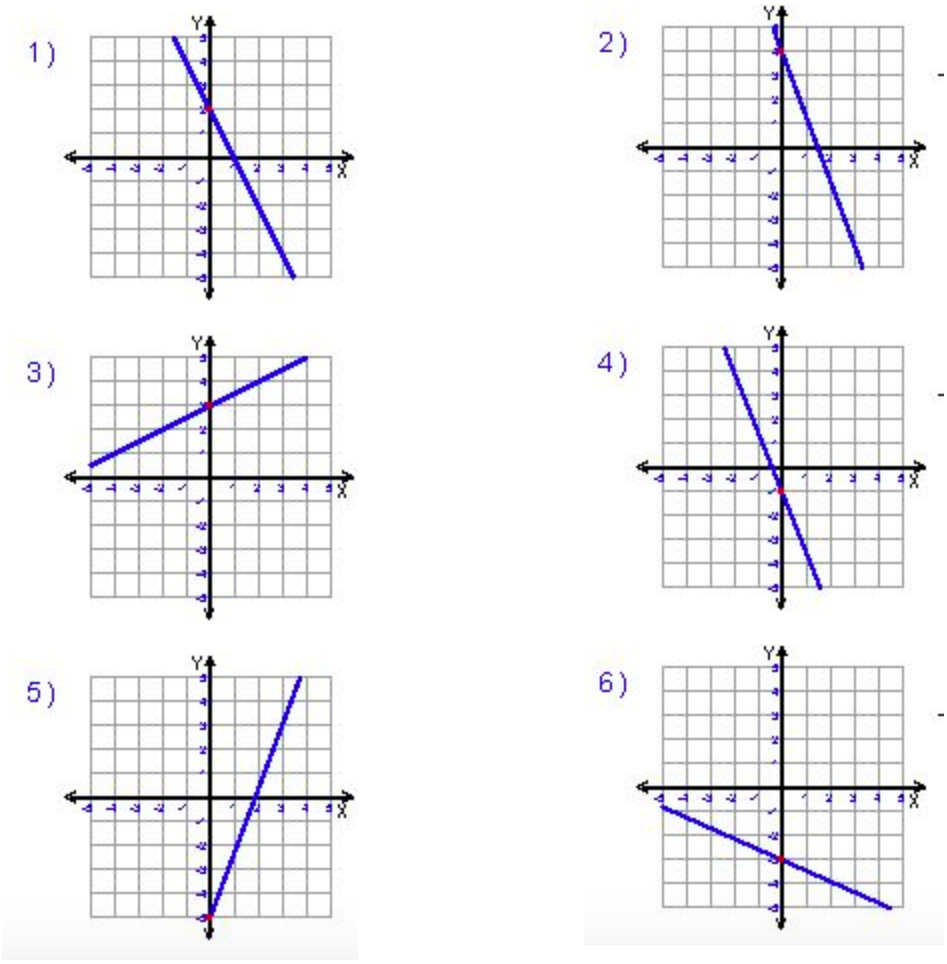
You might find that easier to remember



What is the equation for a vertical line?

The slope is **undefined** ... and where does it cross the Y-Axis?

Practice: In your google docs, find the slope of each of the lines. Then, find the "b" to come up with the equation y = mx + b. Explain your final answer in two to three sentences.



Part II: Point Slope Equation of a Line (30 points)
Visit the website, answer the essay question and complete the quiz at the end.

Website: Go to the website on the home page for notes.
Short Essay: Go to the assignment on the home page.
Quiz: Complete the online quiz by going to the home page.

Congratulations you have finished class 8!