THE EQUATION OF A LINE

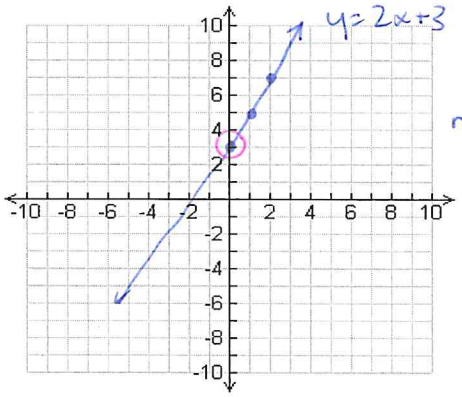
Graph these two lines – use a table of values, then plot the points:

a) $y = 2x + 3$

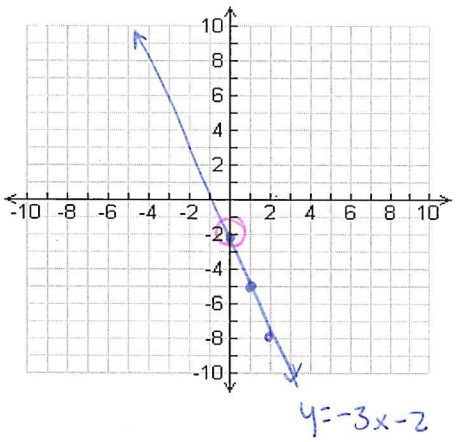
x	y	(x,y)
0	$y = 2(0) + 3 = 3$	(0, 3)
1	$y = 2(1) + 3 = 5$	(1, 5)
2	$y = 2(2) + 3 = 7$	(2, 7)

b) $y = -3x - 2$

x	y	(x,y)
0	$y = -3(0) - 2 = -2$	(0, -2)
1	$y = -3(1) - 2 = -5$	(1, -5)
2	$y = -3(2) - 2 = -8$	(2, -8)



$m = \frac{\text{rise}}{\text{run}} = \frac{4}{2} = 2$



$m = \frac{\text{rise}}{\text{run}} = \frac{-6}{2} = -3$

What is the SLOPE of each line?

a) 2 b) -3

Where does each line cross the y-axis?

a) 3 b) -2

INTRODUCING…ONE WAY TO WRITE THE EQUATION OF A LINE:

$$y = mx + b$$

slope

y-intercept

SLOPE Y-INTERCEPT FORM

Slope y-intercept form of a linear equation is written in the form of $y = mx + b$, where m is the slope and b is the y-intercept.

Example: Give the slope and y-intercept of each.

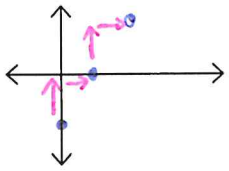
a) $y = 8x - 9$ Slope = 8 y-intercept = -9

b) $y = -\frac{3}{4}x + 2$ Slope = $-3/4$ y-intercept = 2

The advantage of slope y-intercept form: Easy to Graph!.

So...We can use the y = mx + b form to graph a line...

- **First** plot the y-intercept
- **Then** use m = $\frac{\text{rise}}{\text{run}}$ to plot the next 2 points

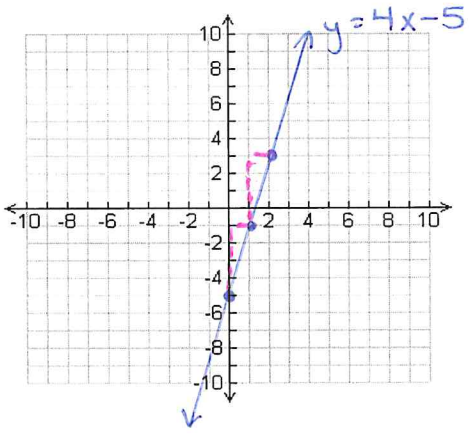


Example:
Graph y = 4x -5

$m = \frac{4}{1}$ (4 ← rise, 1 ← run)

up 4, right 1

b = -5 (y-intercept)



Graph y = -3x + 3

$m = \frac{-3}{1}$ (-3 ← rise, 1 ← run)

down 3, right 1

b = 3 (y-intercept)