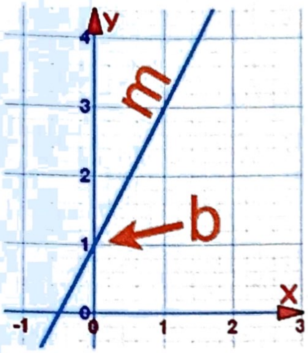
Name: Key
7/8A

Date: ____________________
Classwork 9.4

Slope Intercept Equation & Graphing

A **linear** **equation** is an equation for a straight line. There are many ways of writing a linear equation, but this year we will focus on the **slope-intercept** **method**:



the # infront o x

slope

$$y = mx + b$$

y-intercept

the # attached with the sign

m Slope $\frac{\text{ryse}}{\text{run}}$ $\frac{y_2 - y_1}{x_2 - x_1}$

$\boxed{\text{Move}}$

$\boxed{\text{Begin}}$

b y intercept (x, y)

(where the line crosses the y-axis)

If given a linear equation in slope intercept form, then one could find the slope (m) and y-intercept (b).

Example #1: State the slope and y-intercept of the following equations:

a: $y = \frac{2}{3}x \boxed{-4}$ b: $y = \frac{-1}{6}x \boxed{+5}$ c: $y = \frac{1}{3}x \boxed{-1}$ d: $y = 2x \boxed{}$

m = $\frac{2}{3}$ m = $-\frac{1}{6}$ m = $\frac{1}{3}$ m = $\frac{2}{1}$

b = $(0, -4)$ b = $(0, 5)$ b = $(0, -1)$ b = $(0, 0)$

Working Backwards (Gnikrow) ;)

If given the slope (m) and y-intercept (b), then one can write a linear equation in slope intercept form.

Example #2: Write a linear equation that satisfies the following requirements:

a: slope = $\frac{1}{2}$; y-intercept = −3

$m = \frac{1}{2}$ $b = -3$

$\boxed{y = \frac{1}{2}x - 3}$

b: slope = 5; y-intercept = 11

$m = 5$ $b = 11$

$\boxed{y = 5x + 11}$

c: $m = \frac{-2}{3}$; b =0

$y = -\frac{2}{3}x + 0$

$\boxed{y = -\frac{2}{3}x}$

d: horizontal line that crosses y-axis at 5

$m = 0$ $b = 5$

$y = 0x + 5$

$\boxed{y = 5}$

Example #3:

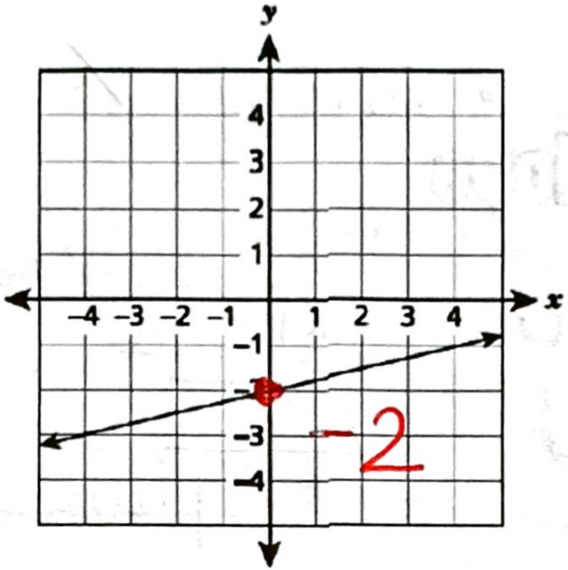
b value

Which function of x has the **least** value for the y-intercept?

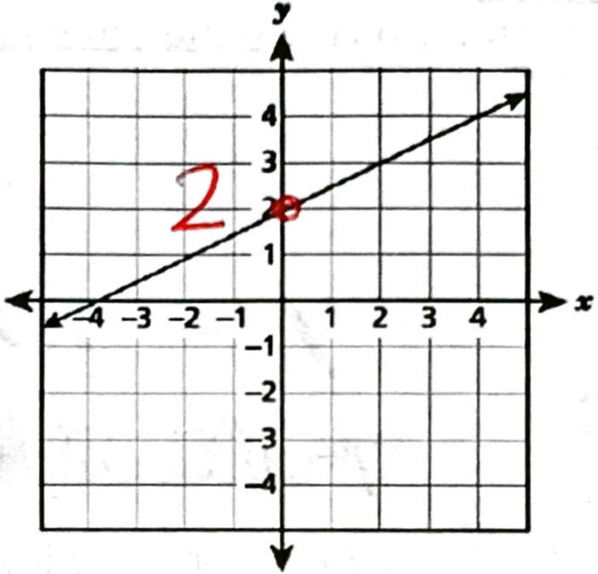
A $y = -4x \boxed{+ 15}$

C $y = 2x \boxed{- 3}$

B



D



➢ *Instead of using the table, you can use the slope-intercept form of an equation to graph the function.*

Example #4: Graph: $y = 3x + 1$

more!

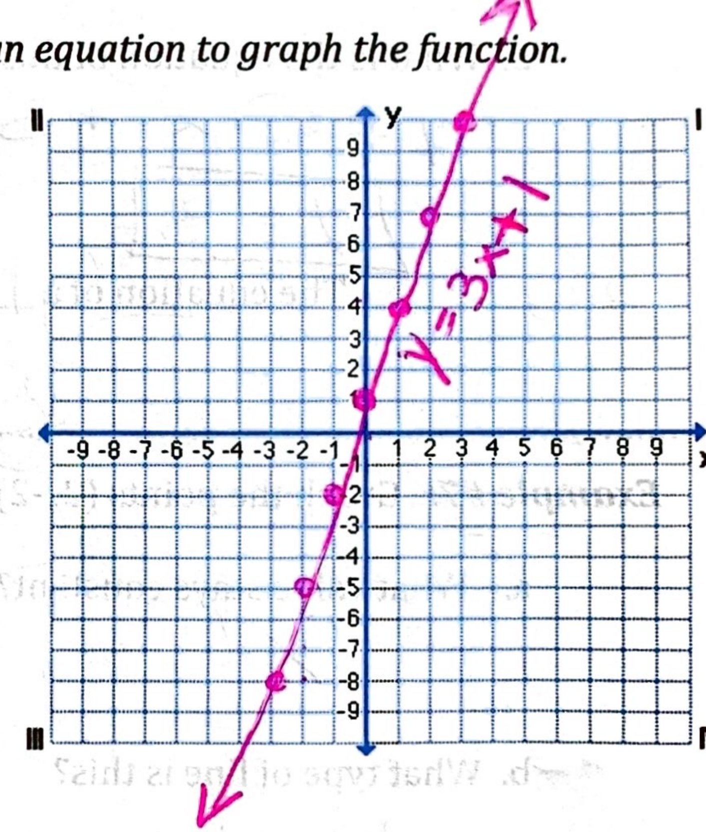
m = $\frac{3}{1}$ always write as fraction for $\frac{\text{ryse}}{\text{run}}$

b = (0, 1) begin!

Solution: (1, 4)

any point on the line

In which quadrant will the line never enter? IV



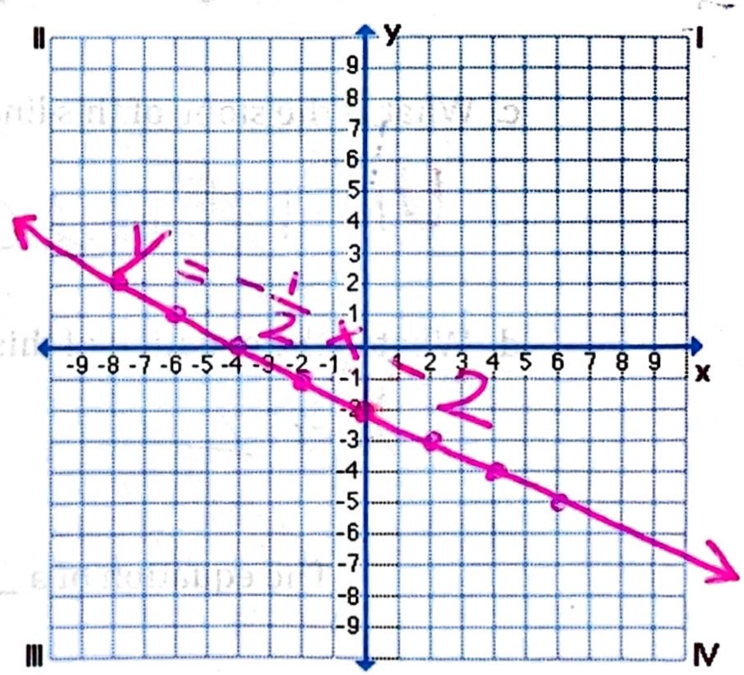
Example #5: Graph: $y = -\frac{1}{2}x - 2$

m = $\frac{-1}{2}$ down 1 right 2

b = (0, -2)

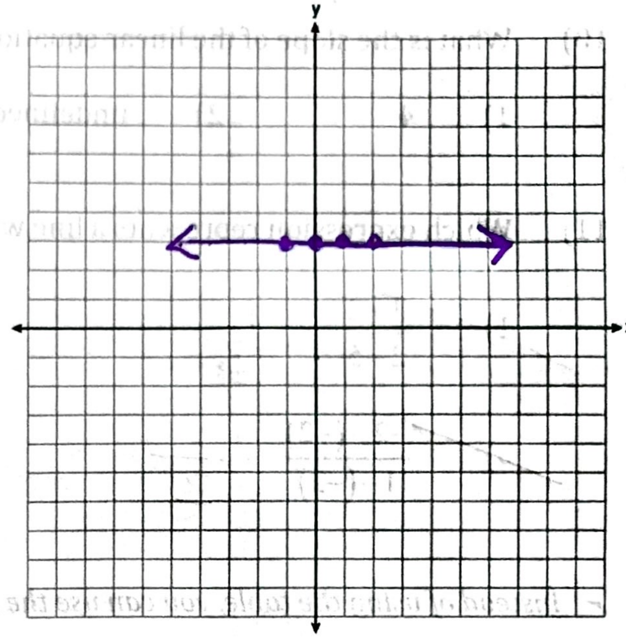
Solution: (0, -4)

In which quadrant will the line never enter? I



Horizontal vs. Vertical Lines

Example #6: Graph the points (-1,3) (0,3) (1,3) (2,3) and connect them.



a. What value stays constant? What is its value?

y 3

b. What type of line is this?

horizontal

c. What is the slope of this line?

$m = 0$

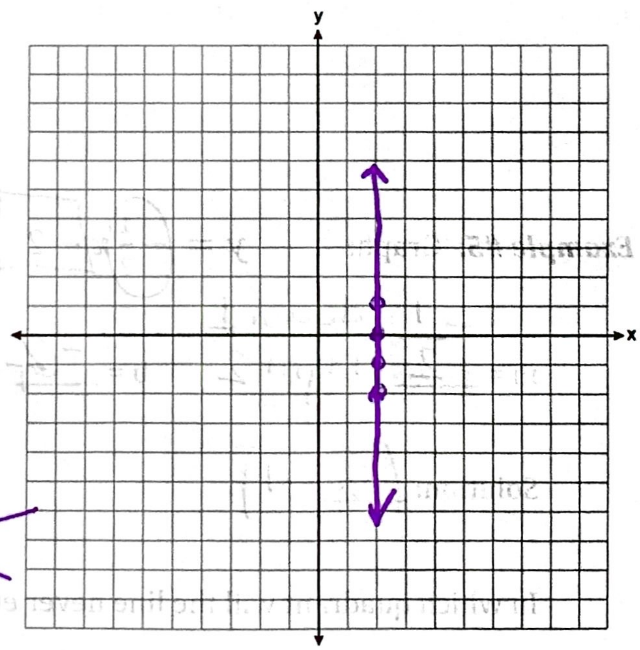
d. What is the equation of this line? $b = 3$

$y = 0x + 3$

$\boxed{y = 3}$

The equation of a <u>horiz</u> line is always in the form <u>y</u> = <u>#</u>.

Example #7: Graph the points (2, -2) (2, -1) (2, 0) (2, 1) and connect them.



a. What value stays constant? What is its value?

x 2

b. What type of line is this?

Vertical

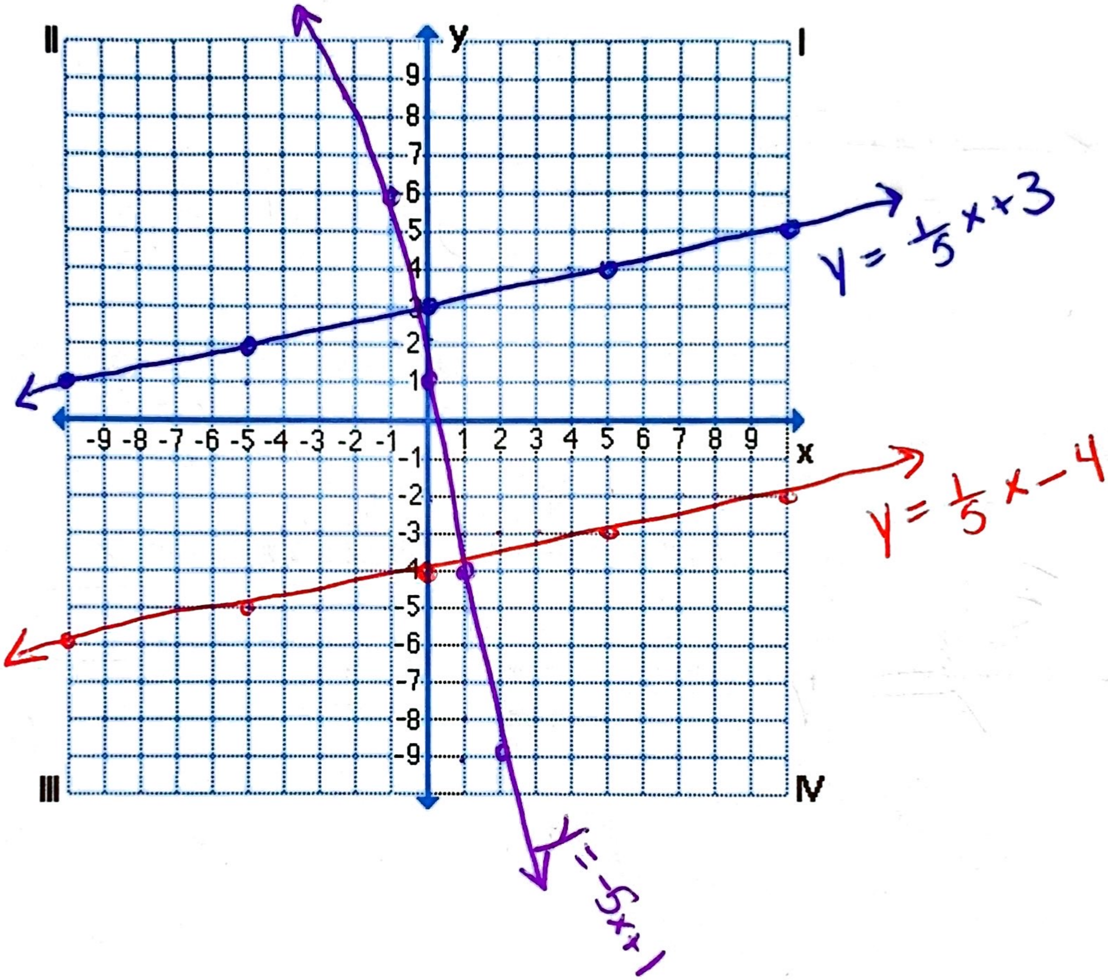
c. What is the slope of this line?

Undefined

d. What is the equation of this line? ~~y=mx+b~~

$X = 2$

The equation of a <u>vertical</u> line is always in the form <u>X</u> = <u>#</u>.



Do you notice anything about the lines and their slopes?

$y = \frac{1}{5}x - 4$

$y = \frac{1}{5}x + 3$

➔ Parallel lines have the same slope

$y = -\frac{5}{1}x + 1$

$y = \frac{1}{5}x + 3$

➔ Perpendicular lines have negative reciprical slopes

forms 90 angle