

Equations for a Line

- **Slope-Intercept Form** $y = mx + b$
- **Standard Form** $Ax + By = C$
- **Point-Slope Form** $y - y_1 = m(x - x_1)$

For 1-6, write the equation of each line.

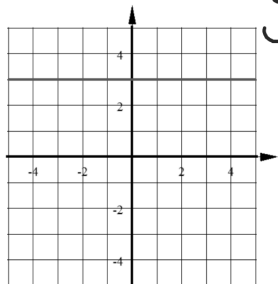
1. The line has a slope of zero and passes through the point $(9, -7)$

$$y + 7 = 0(x - 9) \quad y = -7$$

2. The line passes through the points $(2, -4)$ & $(1, -4)$ $m = 0$

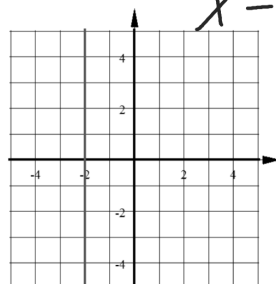
$$y = -4$$

3. The line in the graph below:



$$y = 3$$

4. The line in the graph below:



$$x = -2$$

5. The line passes through the points $(11, -8)$ & $(11, 3)$

$$x = 11$$

6. The line has an undefined slope and passes through $(1, 2)$

$$x = 1$$

For 7 and 8, find the the x and y intercepts of each equation. Give answer as a reduced fraction if you must round the decimal or it is repeating..

7. $10x - 2y = 40$

x-int=

$$10x = 40$$

$$x = 4$$

y-int=

$$-2y = 40$$

$$y = -20$$

8. $9x + 12y = 16$

x-int=

$$9x = 16$$

$$x = 16/9$$

y-int=

$$12y = 16$$

$$y = 4/3$$

9. Write this equation in Slope-Intercept Form: $-15x - 20y = 40$

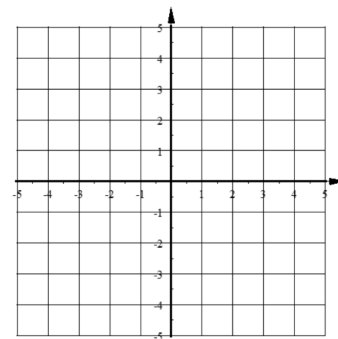
$$y = -\frac{3}{4}x - 2$$

$$\frac{-20y}{-20} = \frac{40 + 15x}{-20}$$

Section 6-3: Standard Form of a Linear Equation

$$Ax + By = C$$

A, B, and C are real numbers
Both A and B can't be zero.



What is true about EVERY point on the y-axis?

the x-coordinate is zero

What is true about EVERY point on the x-axis?

the y-coordinate is zero

The y-intercept of a line is where the line intersects the y-axis.
It is where $x = 0$.

Given this equation:

$$4x + 6y = 24$$

~~$4x + 6y = 24$~~

$$6y = 24$$

$$y = 4$$

Find the y-intercept.

Find the x and y intercepts of each line.

1. $10x - 4y = 20$

x-int: $10x - 4(0) = 20$ y-int: $10(0) - 4y = 20$

$$10x = 20$$

$$-4y = 20$$

$$\frac{10x}{10} = \frac{20}{10}$$

$$\frac{-4x}{-4} = \frac{20}{-4}$$

$$x\text{-int} = 2$$

$$y\text{-int} = -5$$

2. $-12x + 8y = -28$

$$x\text{-int} = -28/-12 = 7/3$$

$$y\text{-int} = -28/8 = -7/2$$

3. $x + y = 9$

$$x\text{-int} = 9/1 = 9$$

$$y\text{-int} = 9/1 = 9$$

In general: Given the equation $Ax + By = C$

$$x\text{-int} = \frac{C}{A}$$

$$y\text{-int} = \frac{C}{B}$$

Write the equation of the line that passes through this pair of points. Give your answer in Slope-Intercept Form

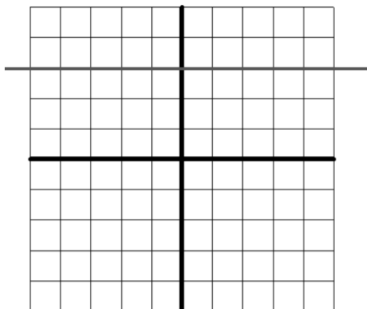
(4, 1) and (-7, 1)

$$y = 1$$

EQ: $y = 1$ This is $Ax + By = C$ when $A = 0$

Whenever $A = 0$ the line is Horizontal

What is true about every point on this line?



They all have the same y-coordinate

What is the slope? zero

What is the y-intercept? 3

What is the equation?

$$y = 3$$

The equation of every horizontal line:

$$y = \#$$

This number is the y-intercept or the y-coordinate of any point on the line.

Write the equation of the line that passes through this pair of points.

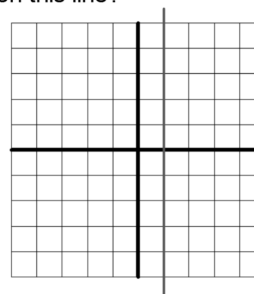
(3, 5) and (3, -2)

EQ: $x = 3$ This is $Ax + By = C$ when $B = 0$

Whenever $B = 0$ the line is **Vertical**

A vertical line is the only line that can't be written in Slope-Intercept Form

What is true about every point on this line?



They all have the same x-coordinate

What is the slope? undefined

What is the y-intercept?

There is no y-int

What is the equation?

$$x = 1$$

The equation of every vertical line:

$$x = \#$$

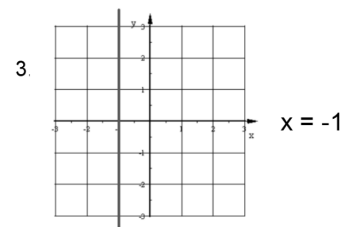
This number is the x-intercept or the x-coordinate of any point on the line.

What is the equation of each line?

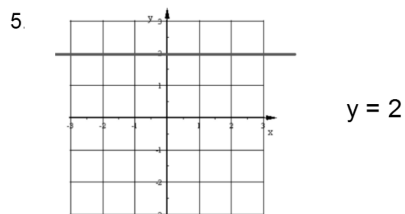
1. Passes through $(-8, -4)$ and $(11, -4)$

$$y = -4$$

2. Slope is zero and the line passes through the point $(-4, 1)$ $y = 1$



4. Slope is undefined and the line passes through the point $(-9, 0)$
 $x = -9$



6. Passes through $(32, -9)$ and $(32, 47)$ $x = 32$

Standard Form: $Ax + By = C$

A, B, and C should be Integers

Write each equation into Standard Form:

1. $y = -2x + 8$

$$+2x + 2x + 2x + y = 8$$

$$2x + y = 8$$

2. $y = \frac{2}{3}x - 11$

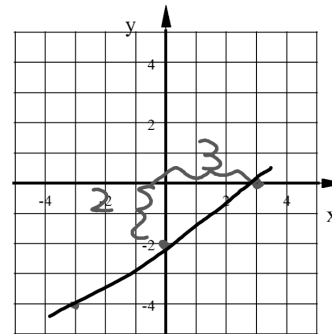
$$-\frac{2}{3}x + y = -11$$

Write this equation in Slope-Intercept Form:

$$12x - 8y = 40$$
$$y = mx + b$$
$$\frac{-8y}{-8} = \frac{-12x + 40}{-8}$$
$$y = \frac{3}{2}x - 5$$

Graphing lines in Standard Form:

$$8x - 12y = 24$$



$$x \text{ int: } 8x = 24$$
$$x = 3$$
$$y \text{ int: } -12y = 24$$
$$y = -2$$

You can now finish Hwk #39

Sec 6-3

Pages 301-302

Problems 5-8, 10, 11, 19, 20, 36, 37, 49, 50

For 49 & 50 write eq in Slope-Intercept Form only

IXL #15 - S.4 & S.21 due Friday at 4pm!