We will be able to:

1. Graph linear equations by plotting points.
2. Graph linear equations by intercepts.
3. Graph vertical and horizontal lines.
4. Applications of Linear Equations.

Linear Equation:

A Linear equation in two variable (in Standard Form) looks like this

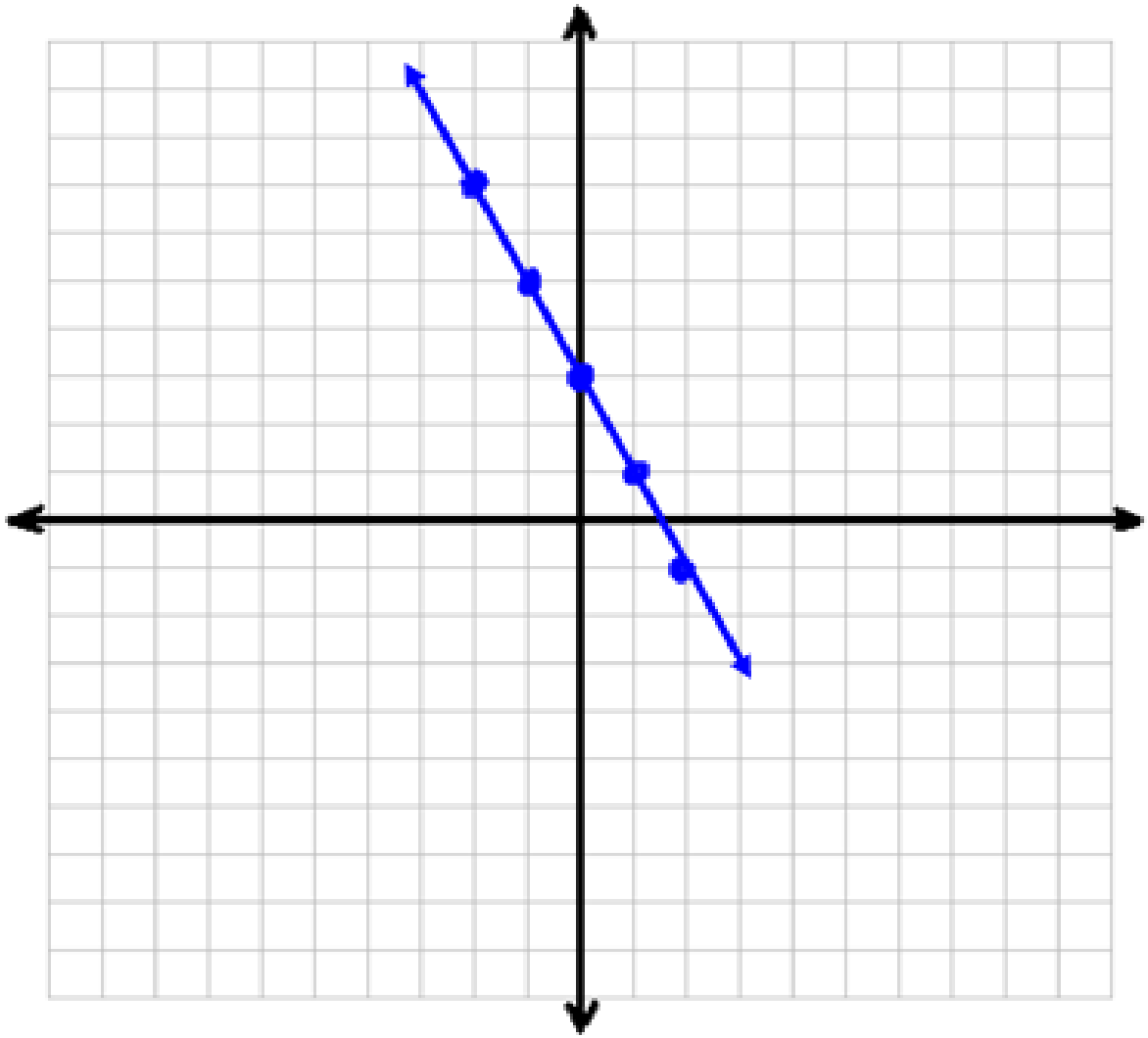
$$Ax + By = C$$

where A, B, and C are real numbers. A and B cannot BOTH be 0.

Graph by Plotting Points:

Example 1: $4x + 2y = 6$ $\Rightarrow 2y = -4x + 6 \rightarrow y = -2x + 3$

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



Graph by Intercepts:

We can graph a line by finding the X and Y intercepts. We find each, plot, connect the dots and, voila, we have a line. :)

Here's how:

X-Intercept: Let y = 0 in the equation and then solve for x. This is your x - intercept.

Y- Intercept: Let x = 0 in the equation and then solve for y. This is your y - intercept.

Graph by Intercepts:

Example 2: $3x + 2y = 12$

x- int: (4, 0)

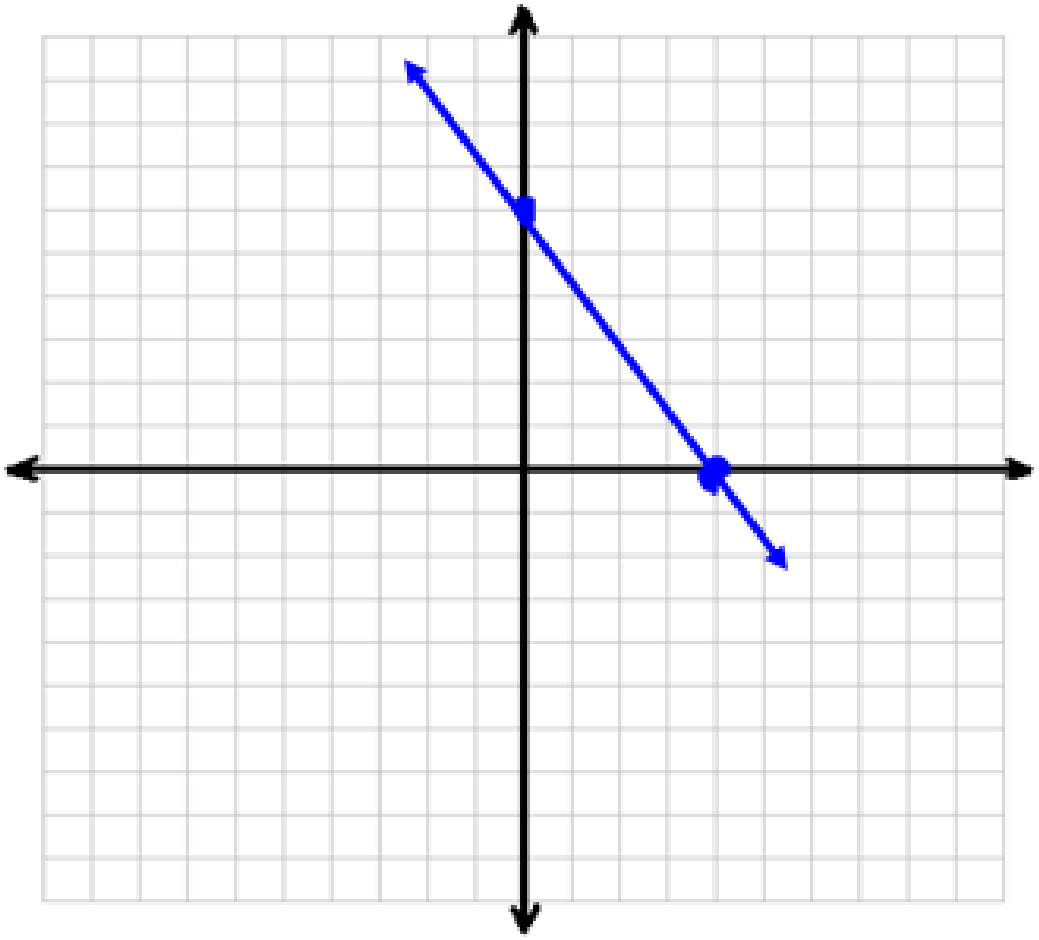
$\frac{3x}{3} = \frac{12}{3}$

$x = 4$

y- int: (0, 6)

$2y = 12$

$y = 6$



Graph by Intercepts:

Example 3: $4x - 5y = 20$

x- int: (5, 0)

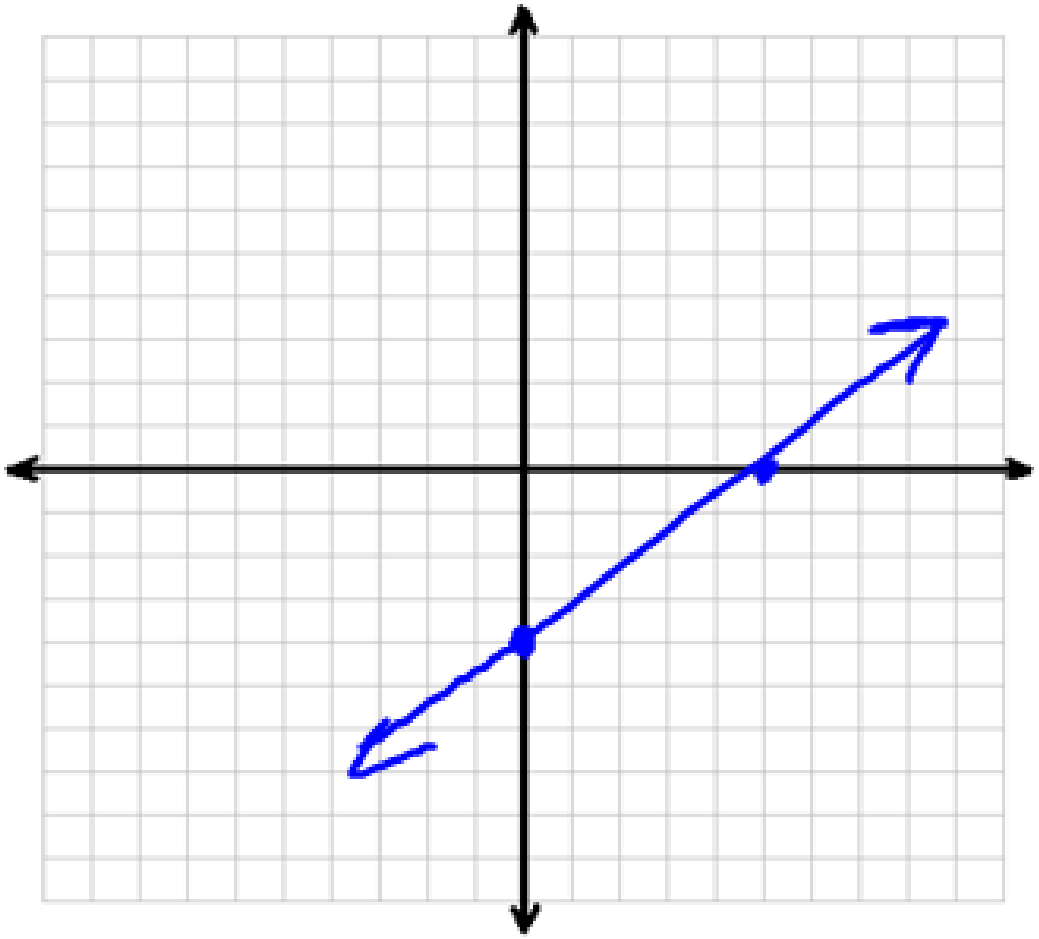
$4x = 20$

$x = 5$

y- int: (0, -4)

$-5y = 20$

$y = -4$



Graph by Intercepts:

Example 4: $x + 3y = 0$

x- int: (0,0)

$x = 0$

y- int: (0,0)

$3y = 0$

$y = 0$

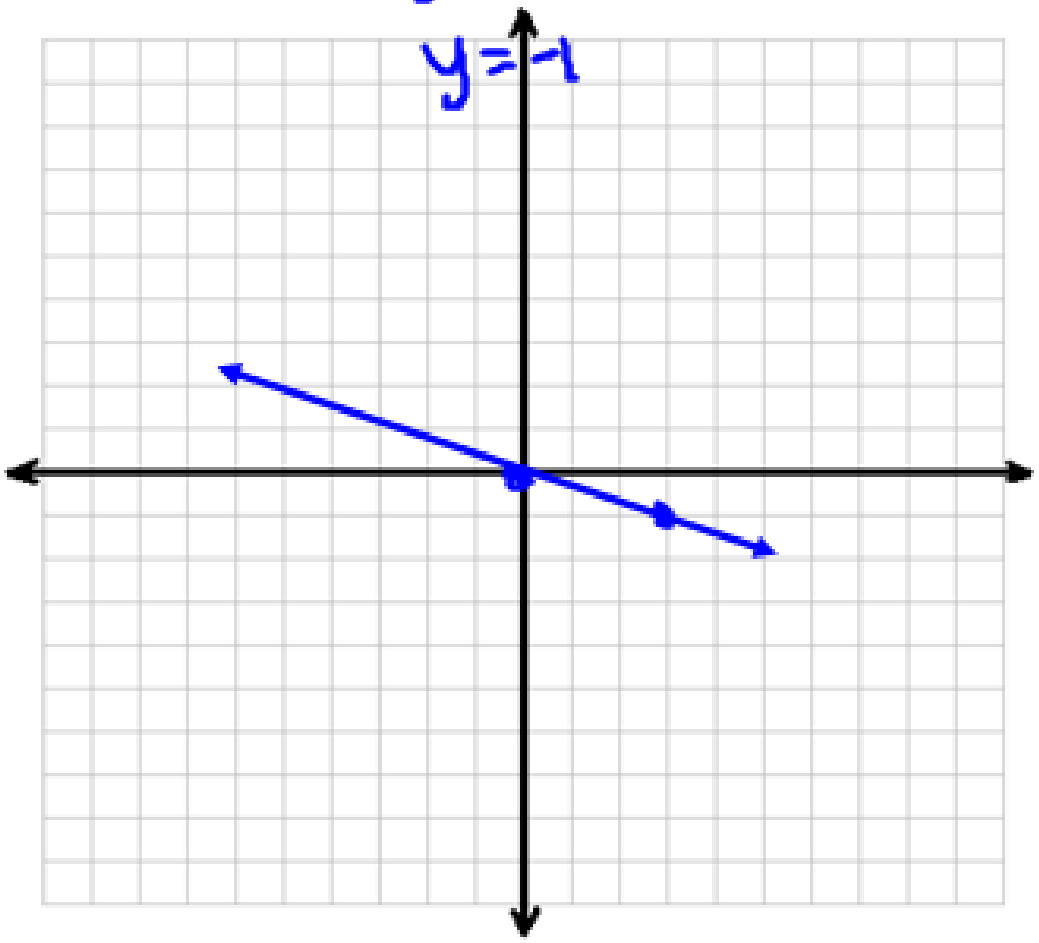
Pick $x = 3$

$3 + 3y = 0$

$-3 \quad -3$

$\frac{3y}{3} = \frac{-3}{3}$

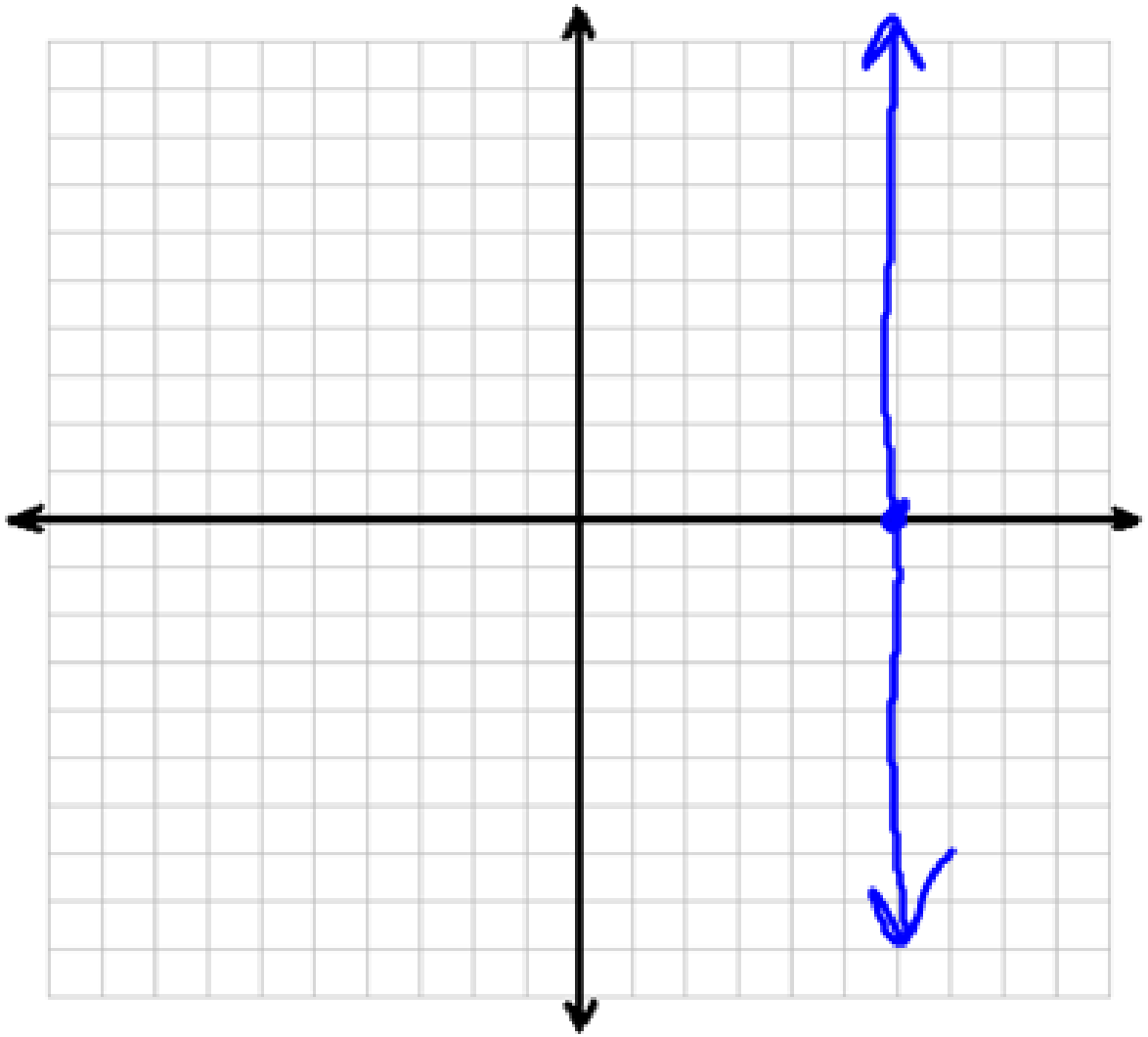
(3, -1)



Graph by Plotting Points:

Example 5: $x = 6$

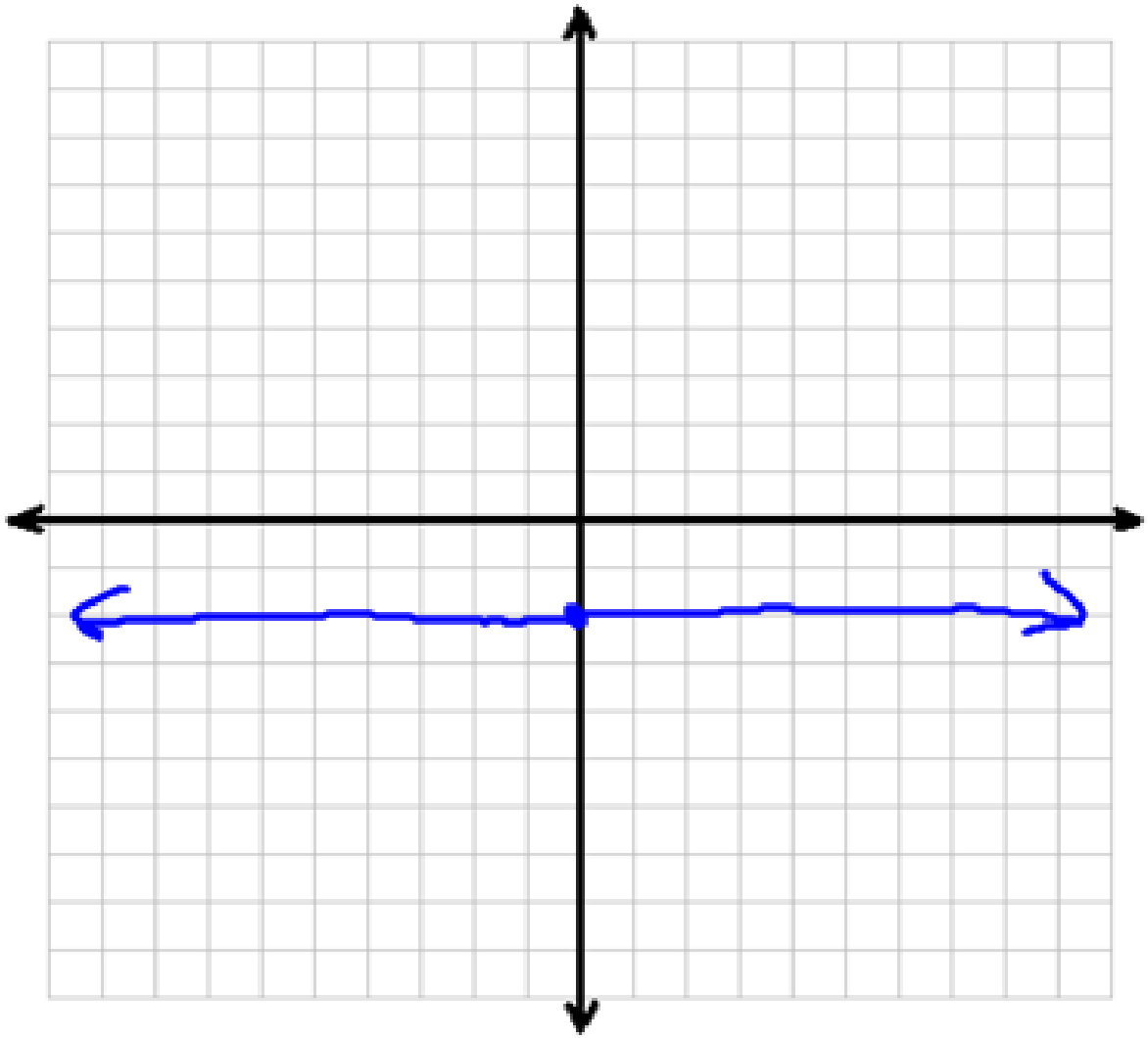
x	y
6	0
6	2
6	1
6	−1
6	−2



Graph by Plotting Points:

Example 6: $y = -2$

x	y
0	-2
-3	-2
15	-2



A **Vertical Line** is given by an equation of the form

$$x = a$$

where a is the x – intercept.

A **Horizontal Line** is given by an equation of the form

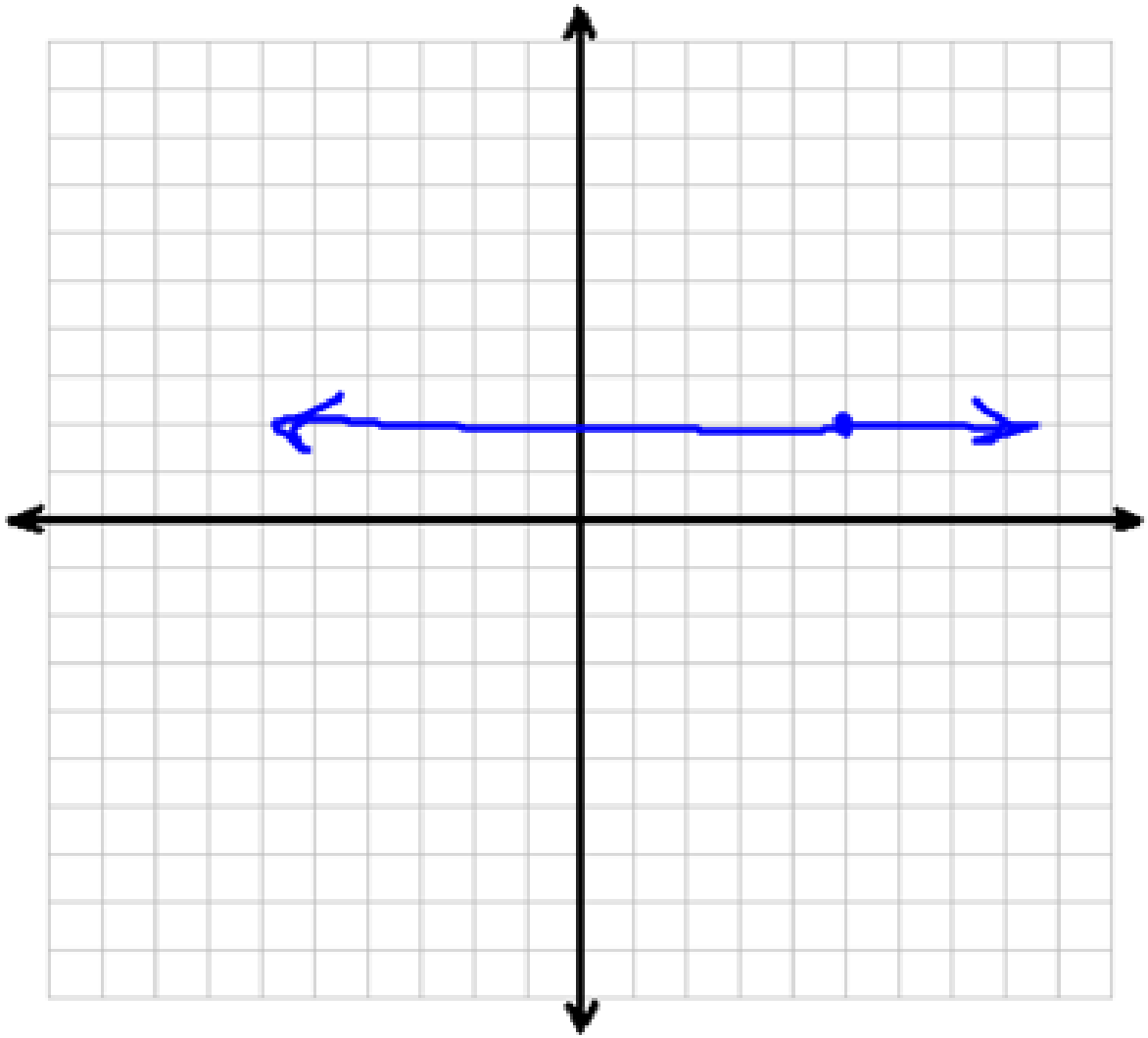
$$y = b$$

where b is the y – intercept.

Example 7: Write an equation of a horizontal line that goes through the point (5,2) and graph.

y =

$y = 2$



Definition:

A **Linear Function** is a function of the form

$$f(x) = mx + b$$

where m and b are real numbers. The graph of a linear function is called a *line*.

Applications:

Example 8: Tony's weekly salary at Apple Chevrolet is 0.75% of his weekly sales plus $450. The linear function

$$S(x) = 0.0075x + 450$$

describes Tony's weekly salary, S, as a linear function of his weekly sales, x.

a.) What is the implied Domain?

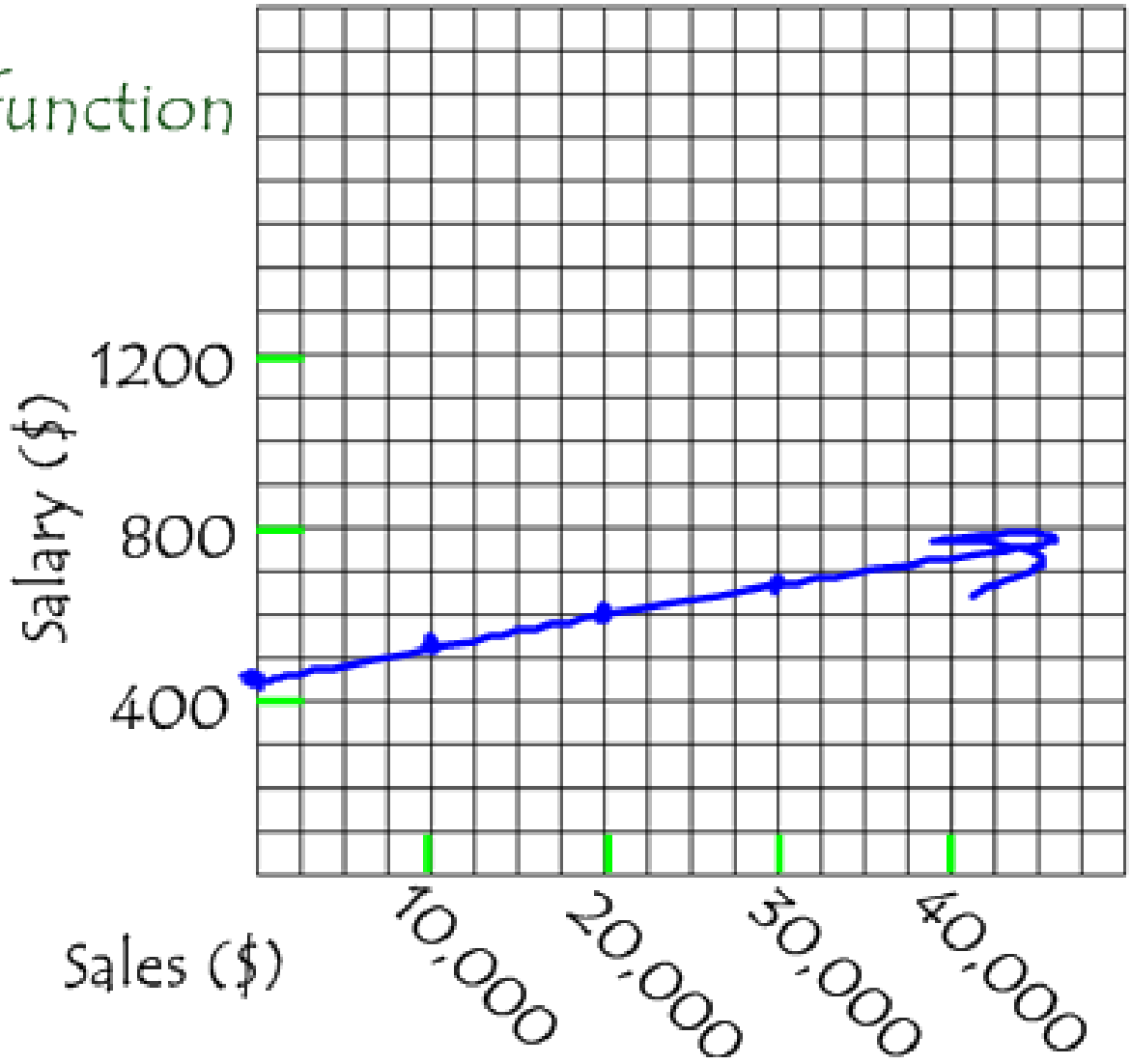
$[0, \infty)$

Example 8: Tony's weekly salary at Apple Chevrolet

$$S(x) = 0.0075x + 450$$

b.) Draw a graph of the function

x	y = S(x)
0	450
10,000	525
20,000	600
30,000	675



Example 8: Tony's weekly salary at Apple Chevrolet

$$S(x) = 0.0075x + 450$$

c.) If Tony sells cars worth a total of $42,000 (x) in one week, what is his salary?

$S(42{,}000) = .0075(42{,}000) + 450$

$S(42{,}000) = 765$

His salary is $765 for the week.

d.) If Tony earned $840 (y) one week, what was the value of the cars that he sold (x)?

$840 = .0075x + 450$

$-450 \qquad -450$

$390 = .0075x$

$\frac{390}{.0075} = \frac{.0075x}{.0075} \rightarrow x = 52{,}000$

The value of the cars he sold was $52,000.

Homework:

Pg. 196: #'s 4-8 all, 13, 15, 17, 21, 27, 31, 35-49 odds

(18 problems)