Notes 3.3B
Graphing Linear Equations Using Intercepts

Steps to Graphing Using Intercepts

- 1. Find both the x- and y-intercepts.
- 2. Plot the intercepts on the graph.
- 3. Connect the intercepts with a line.

To Check:

Find a third set of coordinate points using a table. The third point should be on the line.

I. Finding the x- and y-intercepts.

A. Finding the *x*-intercept

- For the equation $2x + y = 6$, we know that y must equal 0. What must x equal?

- Substitute in 0 for y and simplify.

$$2x + 0 = 6$$

$$2x = 6$$

$$x = 3$$

- So (3, 0) is the *x*-intercept of the line.

B. Finding the *y*-intercept

- For the equation $2x + y = 6$, we know that x must equal 0. What must y equal?

- Substitute in 0 for x and simplify.

$$2(0) + y = 6$$
$$0 + y = 6$$
$$y = 6$$

- So (0, 6) is the *y*-intercept of the line.

To summarize….

- To find the x-intercept, substitute in 0 for y.

- To find the y-intercept, substitute in 0 for x.

II. Graphing Using Intercepts

1. Find the x and y- intercepts of $x = 4y - 5$. Graph the equation.

Step 1: Find the intercepts.

- ***x*-intercept:**
- Plug in $y = 0$

$$x = 4y - 5$$
$$x = 4(0) - 5$$
$$x = 0 - 5$$
$$x = -5$$

- (-5, 0) is the *x*-intercept

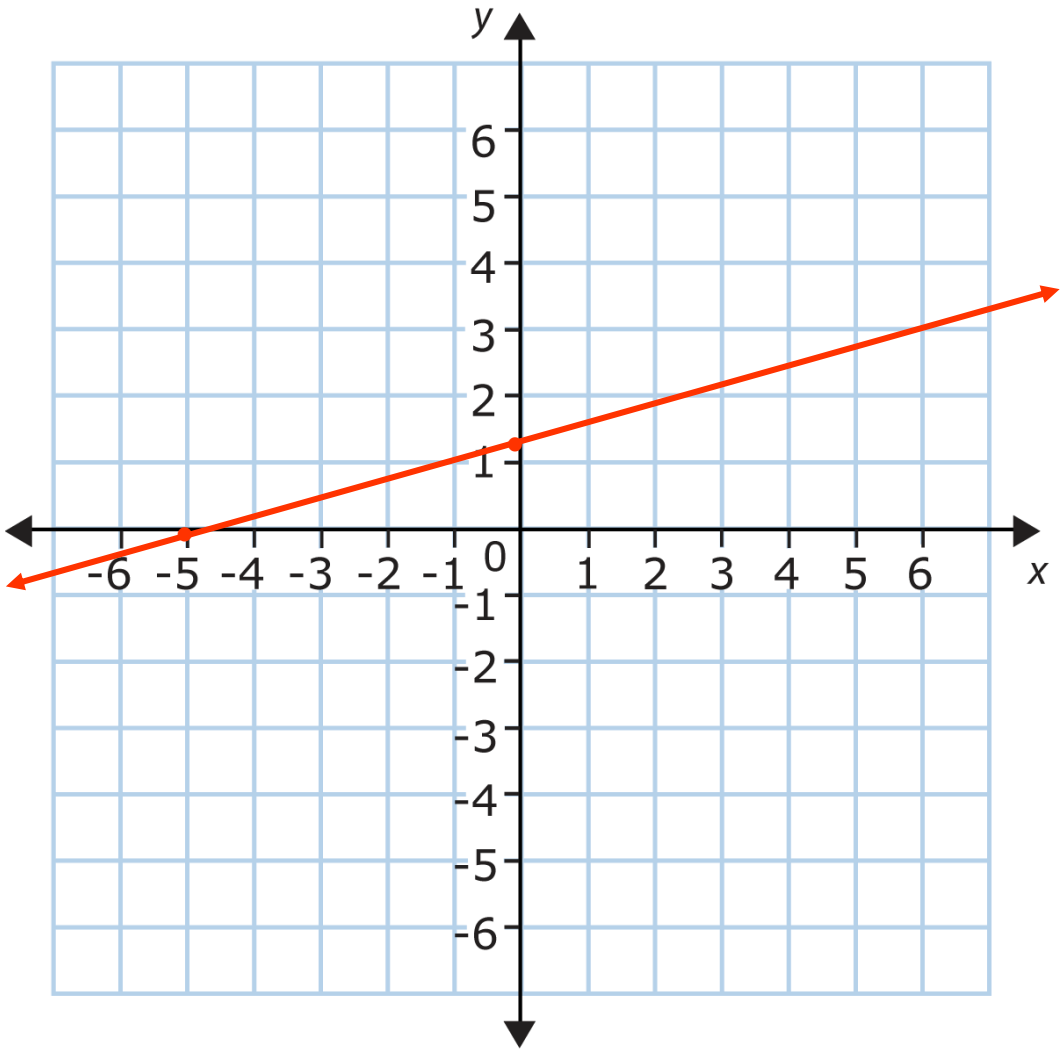
- ***y*-intercept:**
- Plug in $x = 0$

$$x = 4y - 5$$
$$0 = 4y - 5$$
$$5 = 4y$$
$$\frac{5}{4} = y$$

- $(0, \frac{5}{4})$ is the *y*-intercept

Step 2: Plot the intercepts

Step 3: Connect the intercepts with a line



2. Find the x and y-intercepts of $g(x) = -3x - 1$*

- ***x*-intercept**
- Plug in $y = 0$

$$g(x) = -3x - 1$$
$$0 = -3x - 1$$
$$1 = -3x$$
$$-\frac{1}{3} = x$$

- $(-\frac{1}{3}, 0)$ is the x-intercept

- ***y*-intercept**
- Plug in $x = 0$

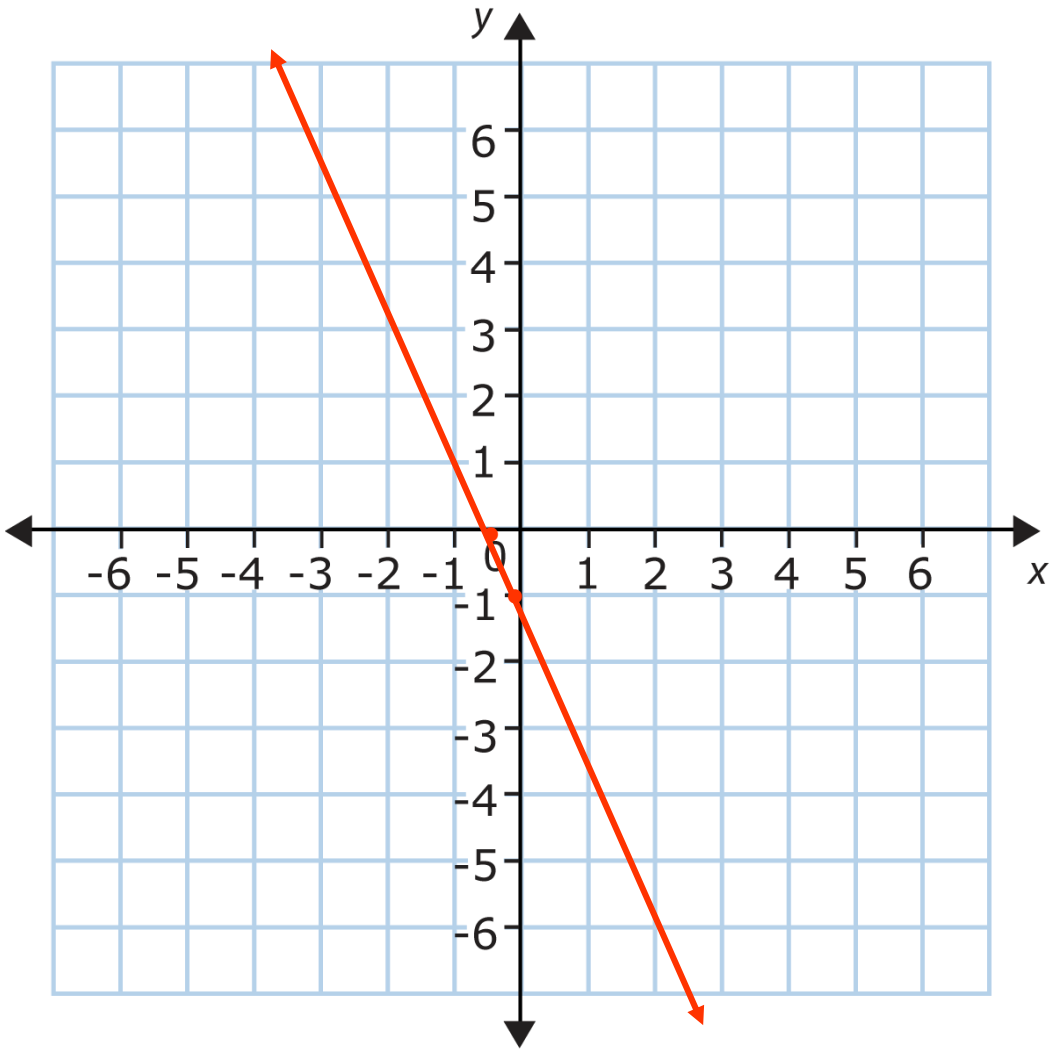
$$g(x) = -3(0) - 1$$
$$g(x) = 0 - 1$$
$$g(x) = -1$$

- (0, -1) is the y-intercept

g(x)** is the same as ***y

Step 2: Plot the intercepts

Step 3: Connect the intercepts with a line



3. Find the x and y-intercepts of $6x - 3y = -18$

- ***x*-intercept**
- Plug in $y = 0$

$$6x - 3y = -18$$
$$6x - 3(0) = -18$$
$$6x - 0 = -18$$
$$6x = -18$$
$$x = -3$$

- (-3, 0) is the *x*-intercept

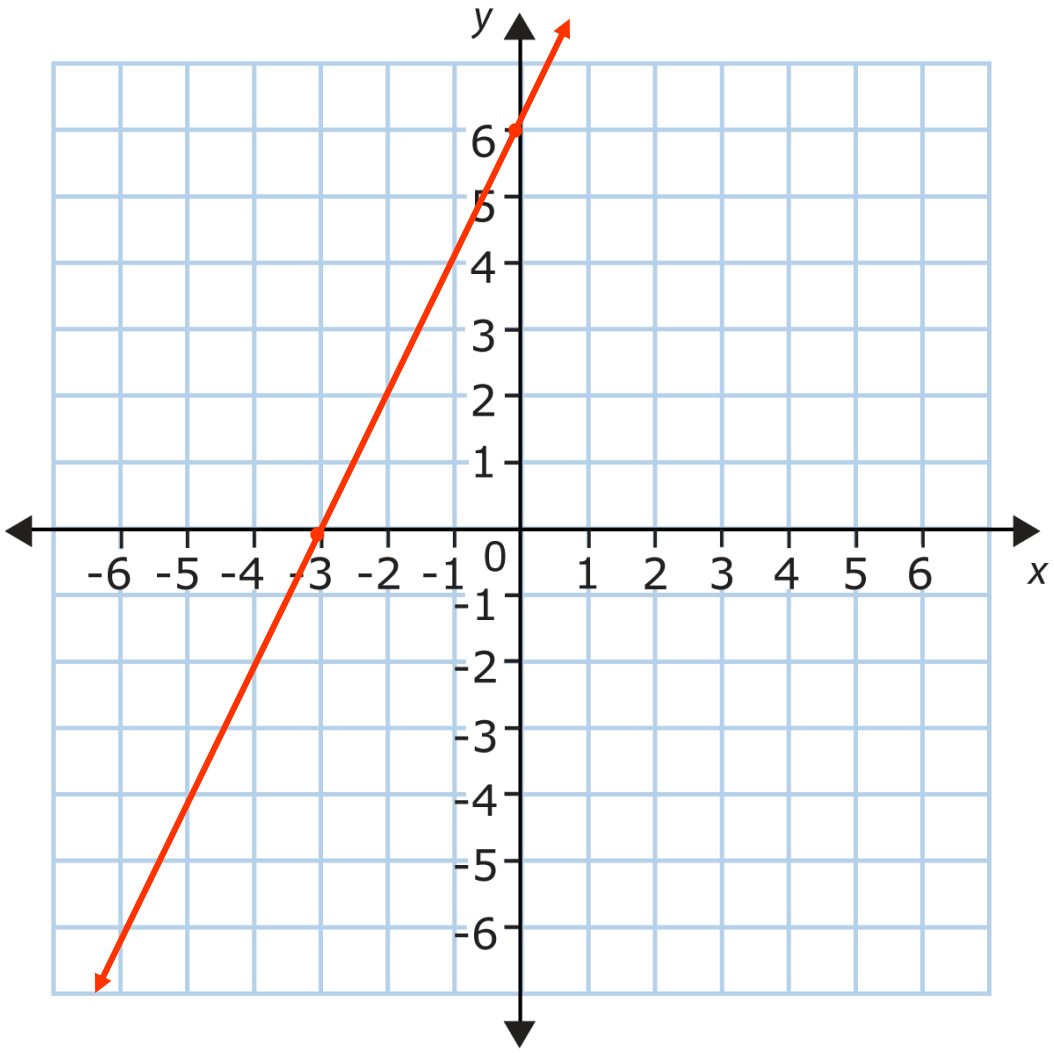
- ***y*-intercept**
- Plug in $x = 0$

$$6x - 3y = -18$$
$$6(0) - 3y = -18$$
$$0 - 3y = -18$$
$$-3y = -18$$
$$y = 6$$

- (0, 6) is the y-intercept

Step 2: Plot the intercepts

Step 3: Connect the intercepts with a line

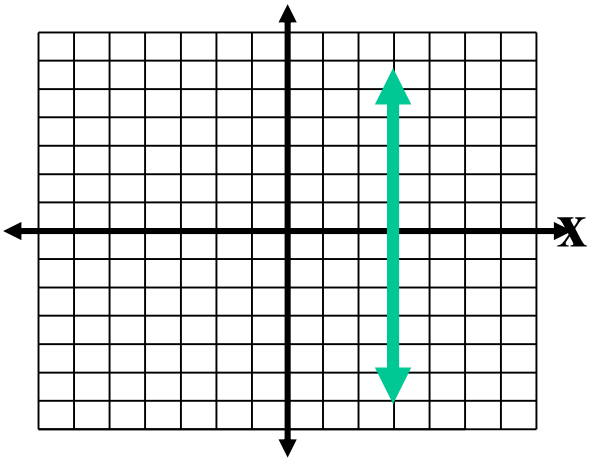


4. Find the *x* and *y*-intercepts of $x = 3$

- ***x*-intercept**
- Plug in $y = 0$.

  There is no y. Why?
- $x = 3$ is a vertical line so x always equals 3.
- (3, 0) is the *x*-intercept.

- ***y*-intercept**
- A vertical line never crosses the *y*-axis.
- There is no *y*-intercept.



5. Find the *x* and *y*-intercepts of $y = -2$

- ***x*-intercept**
- Plug in $y = 0$.

  y cannot = 0 because $y = -2$.
- $y = -2$ is a horizontal line so it never crosses the *x*-axis.
- There is no *x*-intercept.

- ***y*-intercept**
- $y = -2$ is a horizontal line so y always equals -2.
- (0,-2) is the *y*-intercept.