

## QUICK GRAPHS OF LINEAR EQUATIONS

slope-intercept form:  $y = mx + b$

$\downarrow$                        $\downarrow$   
*slope*                      *y-intercept*  
                                     (where the line  
                                     crosses the y-axis)

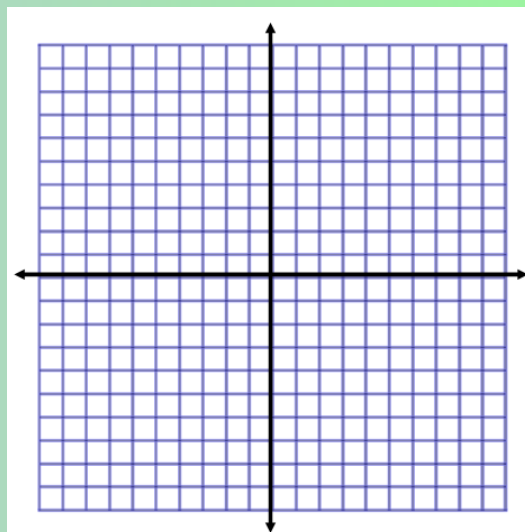
- a) The slope of a **horizontal line** is 0.
- b) The **equation** of a horizontal line is  $y = \#$ .
- c) The slope of a **vertical line** is undefined.
- d) The **equation** of a vertical line is  $x = \#$ .

### Graphing Equations in Slope-Intercept Form

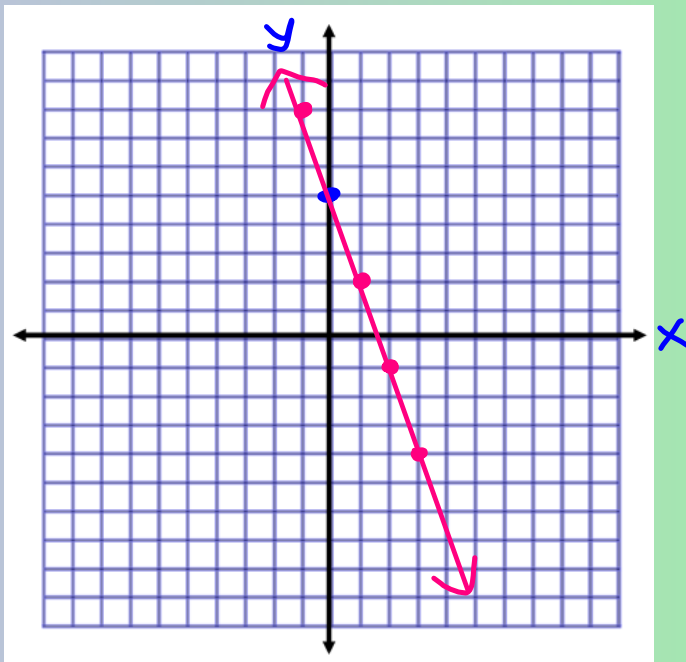
1. Write the equation in slope-intercept form (solve for  $y$ ).
2. Find the  $y$ -intercept and use it to plot the point where the line crosses the  $y$ -axis.
3. Find the slope and use it to plot a second point.
4. Draw a line through the two points.

#### Examples

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



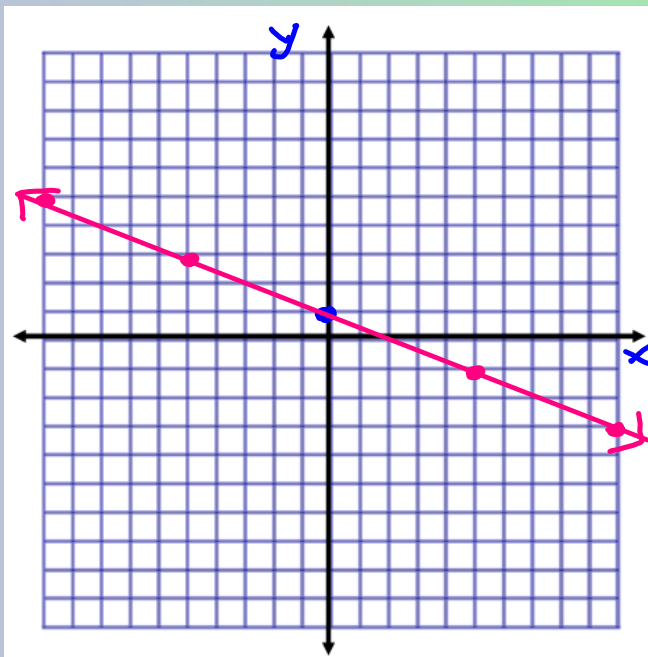
2. Graph  $y = -3x + 5$



$$m = -\frac{3}{1} \text{ down 3/up 3} \\ \text{1 right 1/left}$$

$$y\text{-int} = 5 \leftarrow \text{starting point}$$

3. Graph  $2x + 5y = 5$ .

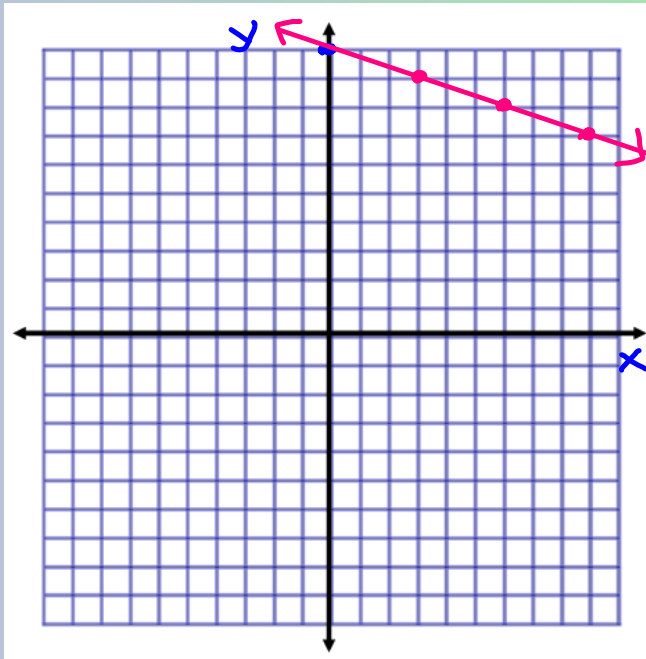


$$\begin{array}{r} 2x + 5y = 5 \\ -2x \qquad -2x \\ \hline 5y = -2x + 5 \\ \frac{5y}{5} = \frac{-2x}{5} + \frac{5}{5} \\ y = -\frac{2}{5}x + 1 \end{array}$$

$$m = -\frac{2}{5} \rightarrow \begin{array}{l} \frac{-2}{5} \text{ down 2} \\ \frac{5}{5} \text{ right 5} \end{array} \\ \downarrow \begin{array}{l} \frac{2}{-5} \text{ up 2} \\ -5 \text{ left 5} \end{array}$$

$$y\text{-int} = 1 \\ \text{starting point}$$

4. Graph  $3y - 18 = -x + 12$ .

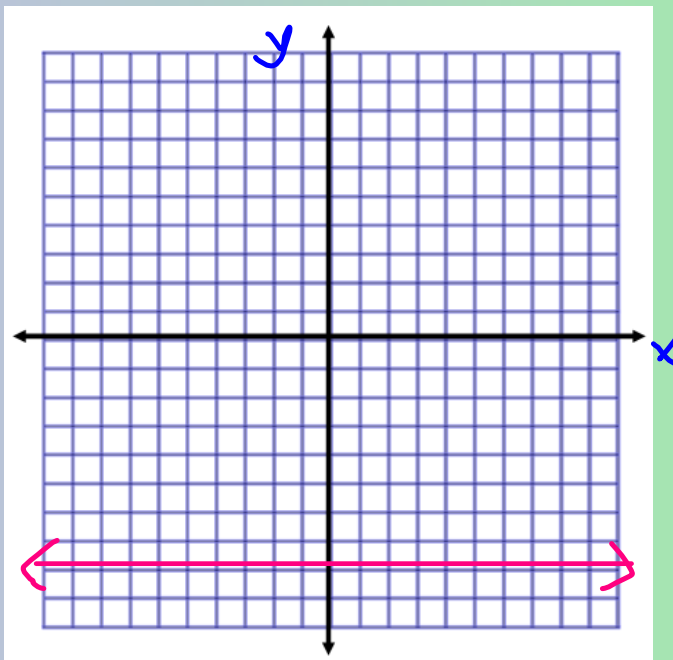


$$\begin{array}{r}
 3y - 18 = -x + 12 \\
 \hline
 \frac{3y}{3} = \frac{-x + 30}{3} \\
 y = -\frac{1}{3}x + 10
 \end{array}$$

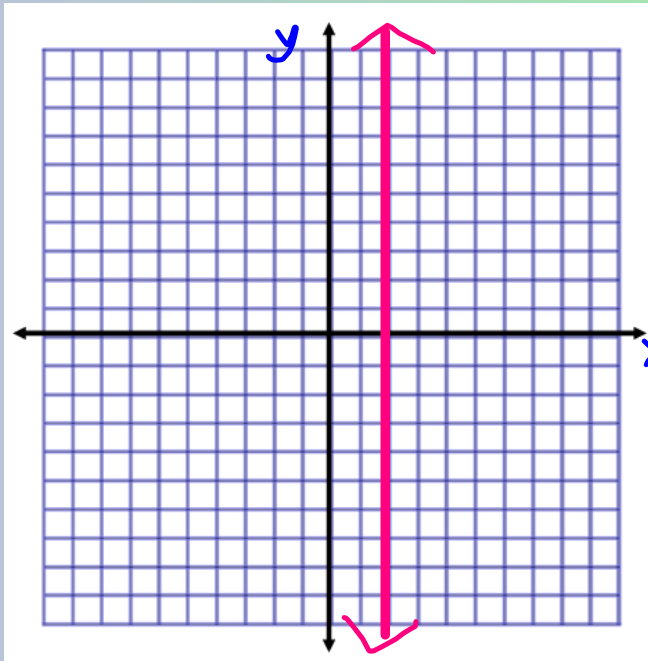
$m = -\frac{1}{3}$ 
  
 $\rightarrow$   $-\frac{1}{3}$  down 1, right 3
   
 ~~$\rightarrow$   $-\frac{1}{3}$  up 1, left 3~~

$y$ -int = 10

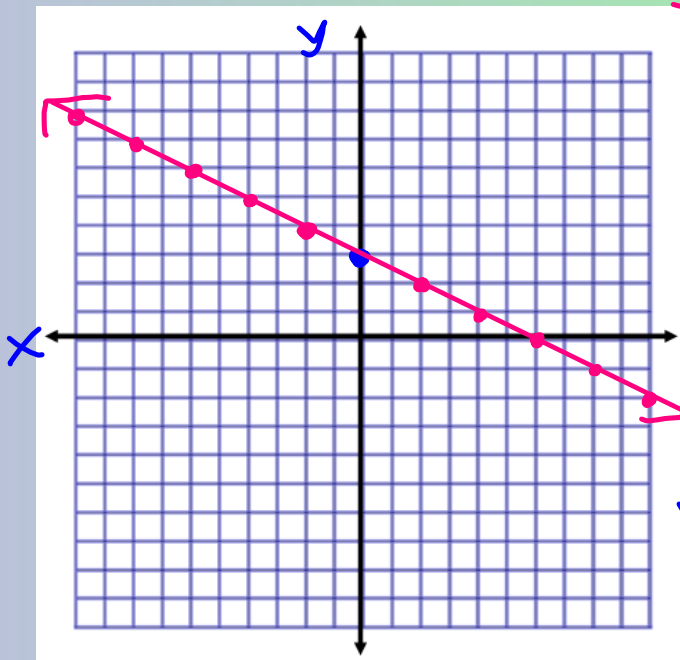
5. Graph  $y = -8$ . horizontal line



6. Graph  $x = 2$ . vertical line



7. Graph  $5x + 10y = 30$ .



$$\begin{array}{r} 5x + 10y = 30 \\ -5x \quad -5x \\ \hline 10y = -5x + 30 \\ \frac{10y}{10} = \frac{-5x}{10} + \frac{30}{10} \\ y = -\frac{1}{2}x + 3 \end{array}$$

$$m = -\frac{1}{2} \begin{array}{l} \nearrow -1 \text{ down } 1 \\ \searrow \frac{1}{2} \text{ right } 2 \\ \swarrow \frac{1}{2} \text{ up } 1 \\ \nwarrow -2 \text{ left } 2 \end{array}$$

$$y\text{-int} = 3$$

Another option to graph  $5x + 10y = 30$  is to graph using the intercepts.

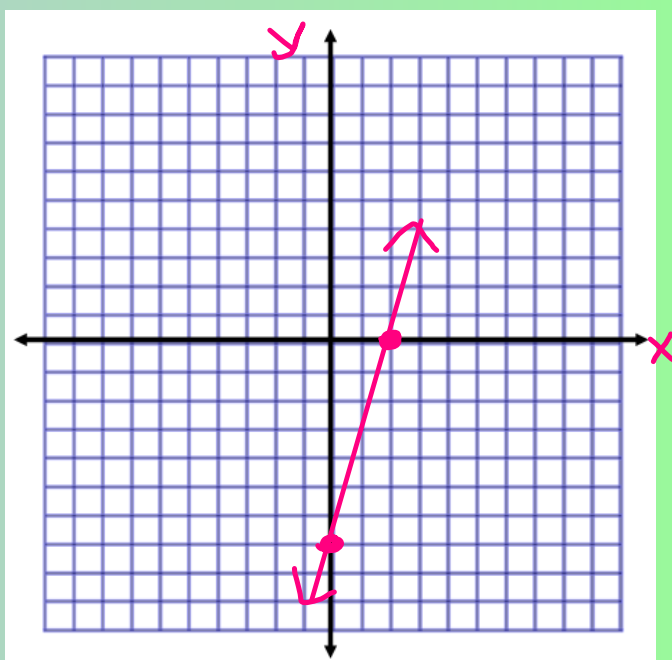
$x$ -intercept: where it crosses the  $x$ -axis  
Set  $y = 0$  and solve.

$y$ -intercept: where it crosses the  $y$ -axis  
Set  $x = 0$  and solve.

8. Draw the line with the given intercepts.

$x$ -intercept: 2

$y$ -intercept: -7



9. Graph by finding the intercepts.

$$3x - 2y = -6$$

x-int

$$3x - 2(\cancel{0}) = -6$$

$$\frac{3x}{3} = \frac{-6}{3}$$

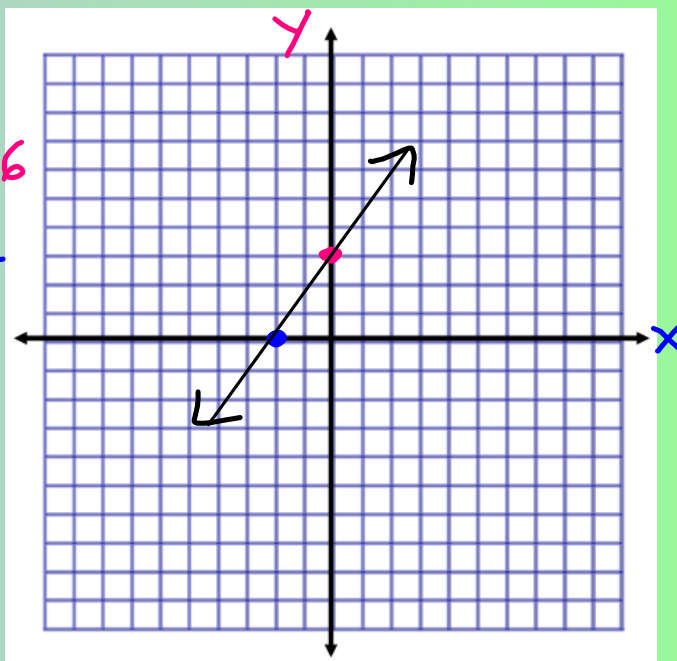
$$x = -2$$

y-int

$$3(\cancel{0}) - 2y = -6$$

$$\frac{-2y}{-2} = \frac{-6}{-2}$$

$$y = 3$$



10. Graph by finding the intercepts.

$$-4x + 2y = -14$$

x-int

$$-4x + 2(\cancel{0}) = -14$$

$$\frac{-4x}{-4} = \frac{-14}{-4}$$

$$x = \frac{7}{2} = 3.5$$

y-int

$$-4(\cancel{0}) + 2y = -14$$

$$\frac{2y}{2} = \frac{-14}{2}$$

$$y = -7$$

