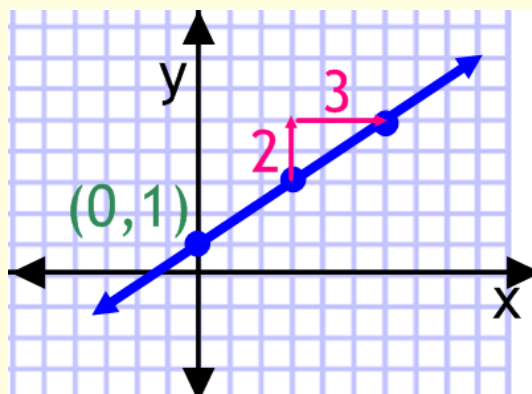


## 3.5 Graph Using Slope-Intercept Form

$$y = mx + b$$

↗ slope      ↘ y-intercept

$$y = \frac{2}{3}x + 1$$



### Example 1

Identify the slope and y-intercept of the line with the given equations.

$y = mx + b$

a)  $y = -4x + 5$

$$m = -4$$

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

b)  $2x - y = 8$

$$\begin{array}{r} y = mx + b \\ \hline 2x - \boxed{y} = 8 \\ \hline -2x \qquad -2x \\ \hline \boxed{-y} = \frac{-2x + 8}{-1} \\ \hline y = 2x - 8 \end{array}$$

$$m = 2$$

$$y\text{-int} = -8$$

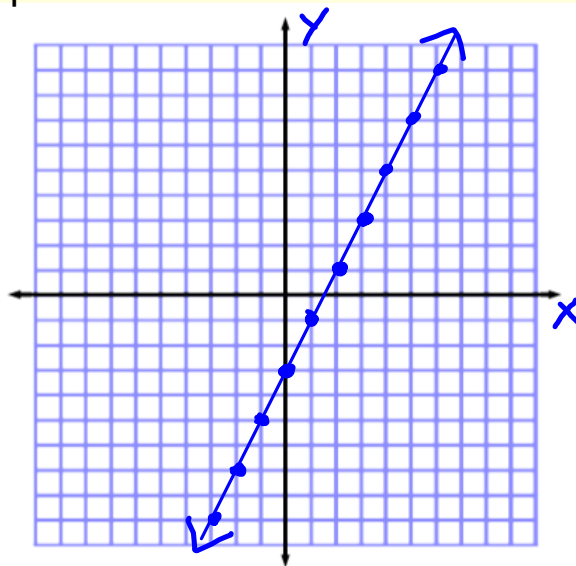
Example 2Graph the equation  $-4x + 2y = -6$ .

- First rewrite the equation in slope-intercept form.
- Identify the slope and y-intercept.
- Plot the y-intercept.
- Use the slope to locate another point.

$$\begin{array}{r} -4x + 2y = -6 \\ +4x \quad +4x \\ \hline 2y = 4x - 6 \\ \frac{2y}{2} = \frac{4x}{2} - \frac{6}{2} \\ y = 2x - 3 \end{array}$$

$m = \frac{2}{1}$  up 2 right 1

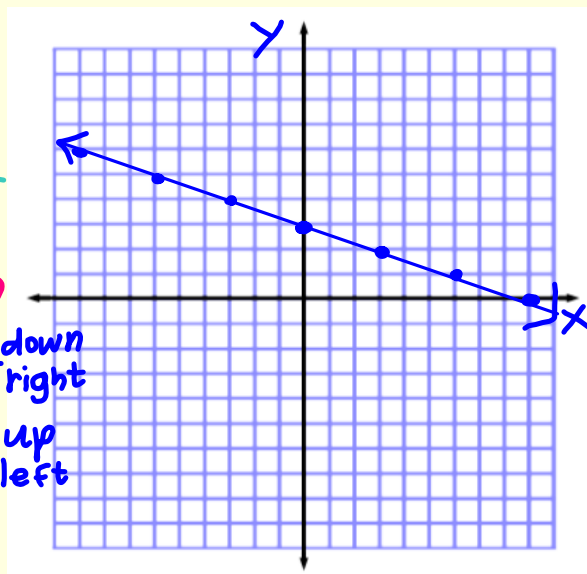
Start  $\times$  y-int = -3

Example 3Graph the equation  $x + 3y = 9$ .

$$\begin{array}{r} x + 3y = 9 \\ -x \quad -x \\ \hline 3y = -x + 9 \\ \frac{3y}{3} = \frac{-x}{3} + \frac{9}{3} \\ y = -\frac{1}{3}x + 3 \end{array}$$

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

Start y-int = 3



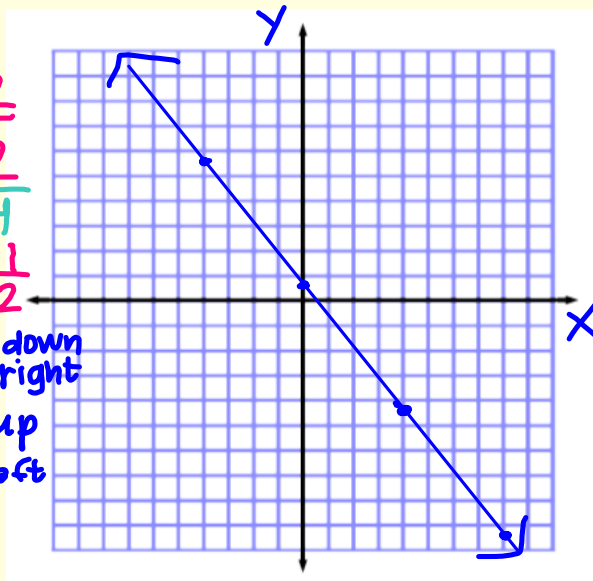
Example 4Graph the equation  $-5x - 4y + 2 = 0$ 

$$\begin{array}{r} -5x - 4y + 2 = 0 \\ +5x \quad \quad \quad -2 \\ \hline -4y = -5x - 2 \end{array}$$

$$\frac{-4y}{-4} = \frac{-5x - 2}{-4}$$

$$y = -\frac{5}{4}x + \frac{1}{2}$$

$$m = -\frac{5}{4} \begin{array}{l} \rightarrow \frac{5}{4} \text{ down} \\ \rightarrow \frac{5}{4} \text{ right} \\ \rightarrow \frac{5}{4} \text{ up} \\ \rightarrow \frac{5}{4} \text{ left} \end{array}$$

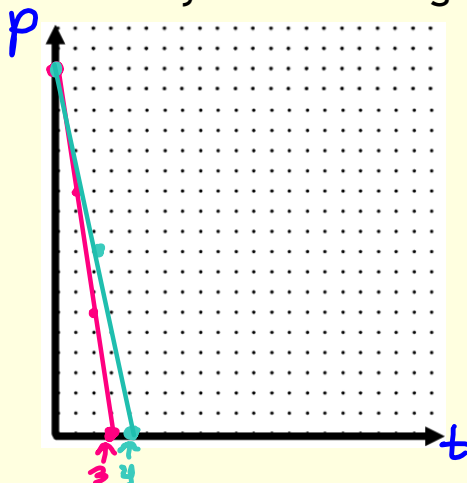
Start  $y\text{-int} = \frac{1}{2}$ Example 5  $-4.5 \rightarrow -4\frac{1}{2} \rightarrow -\frac{9}{2}$ 

You can use a laser or inkjet printer to print an 18-page report. The laser printer prints 6 pages/min and the inkjet printer prints 4.5 pages/min. The models give the number of pages left to print after  $t$  minutes.

laser:  $p = -6t + 18 \rightarrow y = -6x + 18$   $m = -\frac{6}{1}$   $\begin{array}{l} \text{down } 6 \\ \text{right } 1 \end{array}$

inkjet:  $p = -4.5t + 18 \rightarrow y = -4.5x + 18$   $m = -\frac{9}{2}$   $\begin{array}{l} \text{down } 9 \\ \text{right } 2 \end{array}$

- a) Graph both models in the same coordinate plane.  
 b) How many minutes do you save using the laser printer?



$$4 \text{ min} - 3 \text{ min} =$$

1 minute

Two lines in the same plane are parallel if they do not intersect.  
Parallel lines have the same slope.

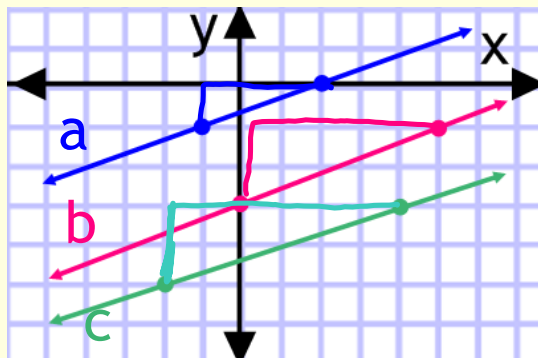
### Example 6

Determine which of the lines are parallel.  
Explain your reasoning.

$$\text{line a: } m = \frac{1}{3}$$

$$\text{line b: } m = \frac{2}{5}$$

$$\text{line c: } m = \frac{2}{6} = \frac{1}{3}$$



a & c are parallel  
b/c have same slope

### Example 7

Tell whether the graphs of the two equations are parallel lines. Explain your reasoning.  
Then graph to check your answer.

$$2x + 3y = -8$$

$$3y = -2x - 8$$

$$y = -\frac{2}{3}x - \frac{8}{3}$$

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

$$y\text{-int} = -\frac{8}{3} = -2\frac{2}{3}$$

$$6y = -4x + 1$$

$$y = -\frac{2}{3}x + \frac{1}{6}$$

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

$$y\text{-int} = \frac{1}{6}$$

parallel b/c  
Same slope

