

## Lesson 6-3

## Example 1

Name the slope and y-intercept for the line with the given equation. Graph each line on a coordinate plane.

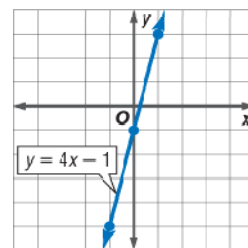
a.  $y = 4x - 1$

b.  $2x + 4y = 8$

## Solution

- a. Rewrite the equation so that the operation sign is addition:  $y = 4x + (-1)$ .

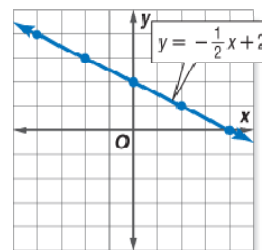
The slope is the coefficient of the  $x$ -term. The  $y$ -intercept is the constant. So the slope is 4 and the  $y$ -intercept is -1. To graph the line, plot the point  $(0, -1)$ . Then use the slope, 4, to plot two or three additional points.



- b. Rewrite the equation in slope-intercept form. Solve for  $y$ .

$$\begin{aligned} 2x + 4y &= 8 \\ 2x - 2x + 4y &= 8 - 2x \\ 4y &= -2x + 8 \\ \frac{4y}{4} &= \frac{-2x + 8}{4} \\ y &= -\frac{1}{2}x + 2 \end{aligned}$$

The slope is  $-\frac{1}{2}$ , and the  $y$ -intercept is 2. To graph the line, plot point  $(0, 2)$ . Then use the slope,  $-\frac{1}{2}$ , to plot two or three additional points.



**Example 2**

Write an equation of a line using the information given.

a.  $(6, 3)$ ,  $y$ -intercept is  $-6$

b.  $m = 2$ , point on line is  $(3, -2)$

**Solution**

a. The  $y$ -intercept coordinates are  $(0, -6)$ . Use ordered pairs to calculate slope.

$$m = \frac{3 - (-6)}{6 - 0} = \frac{9}{6} = \frac{3}{2} \quad \text{Use slope formula.}$$

Substitute  $m = \frac{3}{2}$  and  $b = -6$ . The equation of the line is  $y = \frac{3}{2}x - 6$ .

b. To find the value of  $b$ , use the slope and the point given in  $y = mx + b$ .

$$y = mx + b \quad \text{Use slope-intercept form.}$$

$$-2 = 2(3) + b \quad m = 2, x = 3, y = -2$$

$$-2 = 6 + b$$

$$-8 = b$$

Substitute  $m = 2$  and  $b = -8$ . The equation of the line is  $y = 2x - 8$ .

**Example 3**

Use the graph to write the equations of lines  $a$  and  $b$ .

**Solution**

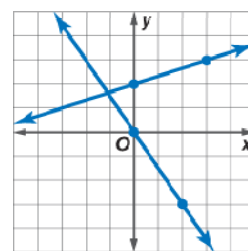
a. Choose two points on the line, and count rise units

and run units.  $m = \frac{1}{3}$ . The line crosses the  $y$ -axis at

$(0, 2)$ . The equation is  $y = \frac{1}{3}x + 2$ .

b. The rise is  $-3$  units and the run is  $2$  units, so  $m = -\frac{3}{2}$ .

The line cross the  $y$ -axis at  $(0, 0)$ . The equation is  $y = -\frac{3}{2}x$ .



**Example 4**

Write the equation of the line using the given information.

a. slope is  $\frac{3}{4}$ , point on line is (5, 0)

b. points on line are (-1, 4) and (2, -5)

**Solution**

a. Use  $m = \frac{3}{4}$ ,  $x_1 = 5$  and  $y_1 = 0$ .

$$y - y_1 = m(x - x_1)$$

$$y - 0 = \frac{3}{4}(x - 5)$$

$$y = \frac{3}{4}x - \frac{15}{4}$$

b. Find the slope.

$$m = \frac{-5 - 4}{2 - (-1)} = \frac{-9}{3} = -3$$

Select either point to use. Substitute.

Use  $m = -3$ ,  $x_1 = -1$  and  $y_1 = 4$ .

$$y - y_1 = m(x - x_1)$$

$$y - 4 = -3(x - (-1))$$

$$y - 4 = -3x - 3$$

$$y = -3x + 1$$