

LESSON
4.3**Study Guide**

For use with the lesson "Write Linear Equations in Point-Slope Form"

GOAL Write linear equations in point-slope form.**Vocabulary**The **point-slope form** of the equation of the nonvertical line through a given point (x_1, y_1) with a slope of m is $y - y_1 = m(x - x_1)$.**EXAMPLE 1** Write an equation in point-slope form**Write an equation in point-slope form of the line that passes through the point (5, 1) and has a slope of -3 .****Solution**

$$y - y_1 = m(x - x_1) \quad \text{Write point-slope form.}$$

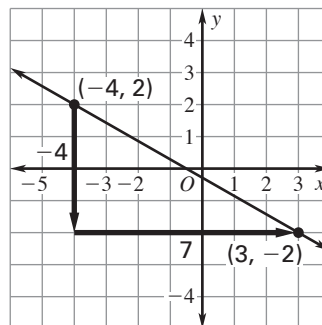
$$y - 1 = -3(x - 5) \quad \text{Substitute } -3 \text{ for } m, 5 \text{ for } x, \text{ and } 1 \text{ for } y.$$

Exercises for Example 1**Write an equation in point-slope form of the line that passes through the given point and has the given slope.**

- $(-3, -2); m = 5$
- $(1, 4); m = -4$
- $(6, -8); m = -\frac{4}{9}$

EXAMPLE 2 Graph an equation in point-slope form**Graph the equation $y - 2 = -\frac{4}{7}(x + 4)$.****Solution**

Because the equation is in point-slope form, you know that the line has a slope of $-\frac{4}{7}$ and passes through the point $(-4, 2)$. Plot the point $(-4, 2)$. Find a second point on the line using the slope. Draw a line through the two points.

**Exercise for Example 2**

- Graph the equation $y + 3 = 4(x + 2)$.

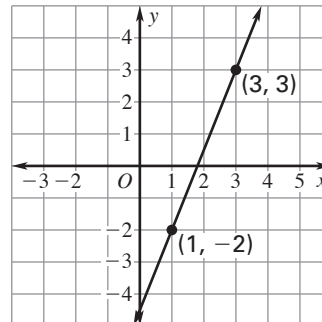
LESSON
4.3**Study Guide** *continued*
*For use with the lesson "Write Linear Equations in Point-Slope Form"***EXAMPLE 3** Use point slope form to write an equation

Write an equation in point-slope form of the line shown.

Solution

STEP 1 Find the slope of the line.

$$\begin{aligned}
 m &= \frac{y_2 - y_1}{x_2 - x_1} \\
 &= \frac{3 - (-2)}{3 - 1} \\
 &= \frac{5}{2}
 \end{aligned}$$



STEP 2 Write the equation in point-slope form. You can use either point.

Method 1 Use (3, 3).

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

$$y - 3 = \frac{5}{2}(x - 3)$$

Method 2 Use (1, -2).

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

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

CHECK Check that the equations are equivalent by writing them in slope-intercept form.

$$y - 3 = \frac{5}{2}(x - 3)$$

$$y = \frac{5}{2}x - \frac{9}{2}$$

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

$$y = \frac{5}{2}x - \frac{9}{2}$$

Exercises for Example 3

- Write an equation in point-slope form of the line that passes through the points $(-3, 8)$ and $(4, -13)$.
- Write an equation in point-slope form of the line that passes through the points $(10, -6)$, $(-6, 8)$.