LESSON 4.4

Study Guide

For use with the lesson "Write Linear Equations in Standard Form"

GOAL **Write equations in standard form.**

EXAMPLE 1 ## Write equivalent equations in standard form

Write two equations in standard form that are equivalent to $3x - 9y = 12$.

Solution

To write one equivalent equation, multiply each side by $\frac{1}{3}$.	To write another equivalent equation, multiply each side by 2.
$x - 3y = 4$	$6x - 18y = 24$

EXAMPLE 2 ## Write an equation from a graph

Write an equation in standard form of the line shown.

Solution

STEP 1 **Calculate** the slope.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 + 3}{1 + 2} = \frac{6}{3} = 2$$

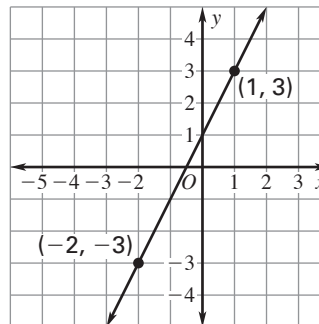**STEP 2** **Write** an equation in point-slope form. Use $(1, 3)$.

$y - y_1 = m(x - x_1)$ Write point-slope form.

$y - 3 = 2(x - 1)$ Substitute 2 for m, 1 for x, and 3 for y.

STEP 3 **Rewrite** the equation in standard form.

$y - 3 = 2x - 2$ Distributive property

$-2x + y = 1$ Collect variable terms on one side, constants on the other.

Exercises for Examples 1 and 2

1. Write two equations in standard form that are equivalent to $6x + 2y = 8$.

Write an equation in standard form of the line that passes through the given points.

2. $(4, 4), (8, 2)$

3. $(-2, 3), (-4, -5)$

Study Guide *continued*

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EXAMPLE 3 ### Write an equation of a line

Write equations of the horizontal and vertical lines that pass through the point (−2, 8).

Solution

The horizontal line has all the same y-coordinates. The y-coordinate of the given point is 8. So, an equation of the horizontal line is $y = 8$.

The vertical line has all the same x-coordinates. The x-coordinate of the given point is −2. So, an equation of the vertical line is $x = -2$.

Exercises for Example 3

Write equations of the horizontal and vertical lines that pass through the given point.

4. $(7, -2)$ **5.** $(-1, 5)$

EXAMPLE 4 ### Complete an equation in standard form

The graph of 5x + By = 6 is a line that passes through the point (2, 1). Find the missing coefficient and write the completed equation.

Solution

STEP 1 **Find** the value of B. Substitute the coordinates of the given point for x and y in the equation. Solve for B.

$5x + By = 6$ Write equation.

$5(2) + B(1) = 6$ Substitute 2 for x and 1 for y.

$B = -4$ Simplify.

STEP 2 **Complete** the equation.

$5x - 4y = 6$ Substitute −4 for B.

The completed equation is $5x - 4y = 6$.

Exercises for Example 4

Find the missing coefficient in the equation of the line that passes through the given point. Write the completed equation.

6. $Ax + 5y = 7, (4, 3)$ **7.** $4x + By = 6, (3, -2)$