

**Practice with Examples**

For use with pages 279–284

**GOAL**

Use slope and any point on a line to write an equation of the line and use a linear model to make predictions about a real-life situation

**VOCABULARY**Two nonvertical lines are **parallel** if and only if they have the same slope.**EXAMPLE 1****Writing an Equation of a Line**Write an equation of the line that passes through the point  $(-2, 5)$  and has a slope of 3.**SOLUTION**Find the  $y$ -intercept.

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

$$5 = 3(-2) + b \quad \text{Substitute 3 for } m, -2 \text{ for } x, \text{ and 5 for } y.$$

$$5 = -6 + b \quad \text{Simplify.}$$

$$11 = b \quad \text{Solve for } b.$$

The  $y$ -intercept is  $b = 11$ .

Now write an equation of the line, using slope-intercept form.

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

$$y = 3x + 11 \quad \text{Substitute 3 for } m \text{ and 11 for } b.$$

**Exercises for Example 1**

Write an equation of the line that passes through the point and has the given slope. Write the equation in slope-intercept form.

1.  $(1, -6), m = -2$

2.  $(-3, -2), m = 4$

3.  $(4, 5), m = -1$

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**EXAMPLE 2**

### Writing Equations of Parallel Lines

Write an equation of the line that is parallel to the line  $y = 2x + 1$  and passes through the point  $(1, 5)$ .

**SOLUTION**

The given line has a slope of  $m = 2$ . A parallel line through  $(1, 5)$  must also have a slope of  $m = 2$ . Use this information to find the  $y$ -intercept.

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

$$5 = 2(1) + b \quad \text{Substitute 2 for } m, 1 \text{ for } x, \text{ and 5 for } y.$$

$$5 = 2 + b \quad \text{Simplify.}$$

$$3 = b \quad \text{Solve for } b.$$

The  $y$ -intercept is  $b = 3$ .

Write an equation using the slope-intercept form.

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

$$y = 2x + 3 \quad \text{Substitute 2 for } m \text{ and 3 for } b.$$

### Exercises for Example 2

**Write an equation of the line that is parallel to the given line and passes through the given point.**

4.  $y = 4x - 1$ ,  $(2, 3)$

5.  $y = x + 6$ ,  $(-3, 0)$

6.  $y = -2x + 3$ ,  $(1, -1)$

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### EXAMPLE 3 Writing and Using a Linear Model

The cost of parking in a municipal garage is a base fee plus \$1.25 for each hour that you park. Your cost for 5 hours is \$10.25. Write a linear equation that models the total cost  $y$  of parking in terms of the number of hours  $x$ .

#### SOLUTION

The slope is 1.25 and  $(x, y) = (5, 10.25)$  is a point on the line.

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

$$10.25 = (1.25)(5) + b \quad \text{Substitute 1.25 for } m, 5 \text{ for } x, \text{ and } 10.25 \text{ for } y.$$

$$10.25 = 6.25 + b \quad \text{Simplify.}$$

$$4 = b \quad \text{The } y\text{-intercept is } b = 4.$$

Write an equation of the line using  $m = 1.25$  and  $b = 4$ .

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

$$y = 1.25x + 4 \quad \text{Substitute 1.25 for } m \text{ and } 4 \text{ for } b.$$

#### Exercise for Example 3

7. Use the linear equation from Example 3 to estimate the total cost  $y$  of parking for 7 hours.