

# The Distributive Property

To multiply a sum or difference by a number, multiply each number in the sum or difference by the number outside the parentheses, then evaluate.

Distributive Property	
<b>With addition:</b> $5(7 + 3) = 5(7) + 5(3)$	$a(b + c) = a(b) + a(c)$
<b>With subtraction:</b> $5(7 - 3) = 5(7) - 5(3)$	$a(b - c) = a(b) - a(c)$

**Example 2** Simplify each expression.

a.  $6(x + 9)$

$$\begin{aligned} 6(x + 9) &= 6(x) + 6(9) \\ &= 6x + 54 \end{aligned}$$

b.  $10(12 + z + 7)$

$$\begin{aligned} 10(12 + z + 7) &= 10(12) + 10(z) + 10(7) \\ &= 120 + 10z + 70 \\ &= 10z + 190 \end{aligned}$$

c.  $16(8w - 3)$

$$\begin{aligned} 16(8w - 3) &= 16(8w) - 16(3) \\ &= 128w - 48 \end{aligned}$$

d.  $5(4m - 3n - 1)$

$$\begin{aligned} 5(4m - 3n - 1) &= 5(4m) - 5(3n) - 5(1) \\ &= 20m - 15n - 5 \end{aligned}$$

## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

**Evaluate.**

1.  $25(7 + 11)$

2.  $4(13 - 5)$

3.  $9(16 + 7 - 8)$

4.  $-4(10 - 9 - 6)$

**Simplify the expression.**

5.  $4(y + 7)$

6.  $-2(z + 5)$

7.  $5(b - 11)$

8.  $-8(d - 1)$

9.  $12(4a + 13)$

10.  $9(20 + 17m)$

11.  $11(2k - 11)$

12.  $-7(-2n - 9)$

13.  $3(x + 4 + 9)$

14.  $6(25 + 6z + 10)$

15.  $8(p - 6 - 5)$

16.  $-10(4 + v - 1)$

17.  $7(2x + 7 + 9y)$

18.  $-4(4r - s + 17)$

19.  $-3(-12 - 3d - 8)$

20.  $2 - 6(2n - 9)$

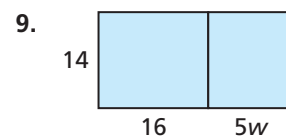
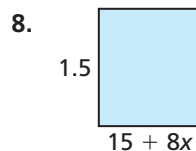
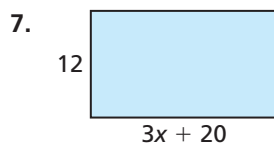
21.  $1.5(6c + 10d + 3)$

22.  $\frac{3}{4}\left(q + \frac{1}{6} + \frac{7}{8}\right)$

23.  $-2.4(5h - 10 + 4)$

24.  $0.5(2.6x + 5.8)$

**Write and simplify an expression for the area of the rectangle.**



# Evaluating Algebraic Expressions

An **algebraic expression** is an expression that may contain numbers, operations, and one or more symbols. A symbol that represents one or more numbers is called a **variable**. To evaluate an algebraic expression, substitute a number for each variable. Then use the order of operations to find the value of the numerical expression.

**Example 1** Evaluate each expression when  $x = 3$ .

a.  $5x + 7$

$$\begin{aligned} 5x + 7 &= 5(3) + 7 && \text{Substitute 3 for } x. \\ &= 15 + 7 && \text{Multiply.} \\ &= 22 && \text{Add.} \end{aligned}$$

b.  $14 - x^2$

$$\begin{aligned} 14 - x^2 &= 14 - 3^2 && \text{Substitute 3 for } x. \\ &= 14 - 9 && \text{Evaluate power.} \\ &= 5 && \text{Subtract.} \end{aligned}$$

c.  $2x^2 - 8x + 4$

$$\begin{aligned} 2x^2 - 8x + 4 &= 2(3)^2 - 8(3) + 4 && \text{Substitute 3 for } x. \\ &= 2(9) - 8(3) + 4 && \text{Evaluate power.} \\ &= 18 - 24 + 4 && \text{Multiply.} \\ &= -2 && \text{Simplify.} \end{aligned}$$

**Example 2** Evaluate each expression when  $x = -2$  and  $y = 6$ .

a.  $7x - 5y$

$$\begin{aligned} 7x - 5y &= 7(-2) - 5(6) \\ &= -14 - 30 \\ &= -44 \end{aligned}$$

b.  $x^2 - 2xy + y^2$

$$\begin{aligned} x^2 - 2xy + y^2 &= (-2)^2 - 2(-2)(6) + 6^2 \\ &= 4 - 2(-2)(6) + 36 \\ &= 4 - (-24) + 36 \\ &= 64 \end{aligned}$$

## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

Evaluate the expression when  $x = 2$  and  $y = -3$ .

- |                   |                    |                           |                         |
|-------------------|--------------------|---------------------------|-------------------------|
| 1. $3x + 10$      | 2. $14 - 2y$       | 3. $5 - y^2$              | 4. $4x^2 + 9$           |
| 5. $y^2 + 8y - 4$ | 6. $-3x^2 - x + 7$ | 7. $0.75x - 4x - 1.5$     | 8. $3(y + 8 - 4y)$      |
| 9. $2x + 3y$      | 10. $6y - 5x$      | 11. $4x^2 + 3y$           | 12. $x^2 - y^2$         |
| 13. $y - x + y^2$ | 14. $x^2y^2 + xy$  | 15. $\frac{x + y}{y - x}$ | 16. $\frac{2x + y}{xy}$ |

Copy and complete the table.

17.

$x$	0	1	2	3	4
$3x - 2$					

18.

$x$	-2	-1	0	1	2
$-4x + 1$					

19. **MONEY** You earn  $8x + 7y$  dollars for working  $x$  hours at a restaurant and  $y$  hours at a bus station. How much do you earn for working 12 hours at the restaurant and 16 hours at the bus station?

# Order of Operations

To evaluate numerical expressions, use a set of rules called the **order of operations**.

Order of Operations
1. Perform operations in <b>P</b> arentheses.
2. Evaluate numbers with <b>E</b> xponents.
3. <b>M</b> ultiply or <b>D</b> ivide from left to right.
4. <b>A</b> dd or <b>S</b> ubtract from left to right.

**Example 1** Evaluate each expression.

a.  $20 - 5 \cdot 6$

$$\begin{aligned} 20 - 5 \cdot 6 &= 20 - 30 \\ &= -10 \end{aligned}$$

Multiply 5 and 6.

Subtract 30 from 20.

b.  $12 \cdot 3 + 4^2 \div 8$

$$\begin{aligned} 12 \cdot 3 + 4^2 \div 8 &= 12 \cdot 3 + 16 \div 8 \\ &= 36 + 16 \div 8 \\ &= 36 + 2 \\ &= 38 \end{aligned}$$

Evaluate  $4^2$ .

Multiply 12 and 3.

Divide 16 by 8.

Add 36 and 2.

c.  $7(5 - 3) + 6^2 \div (-3)$

$$\begin{aligned} 7(5 - 3) + 6^2 \div (-3) &= 7(2) + 6^2 \div (-3) \\ &= 7(2) + 36 \div (-3) \\ &= 14 + 36 \div (-3) \\ &= 14 + (-12) \\ &= 2 \end{aligned}$$

Perform operation in parentheses.

Evaluate  $6^2$ .

Multiply 7 and 2.

Divide 36 by  $-3$ .

Add 14 and  $-12$ .

## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

Evaluate the expression.

1.  $8 + 2 \cdot 5$

2.  $40 \div 8 - 7$

3.  $5 \cdot 4^2 \div 8$

4.  $1 - 7 + 5^2$

5.  $\frac{3 - (-9)}{-10 + 6}$

6.  $\frac{2 + 4}{1 - 5} - 1$

7.  $(12 - 8)^2 \div 2^5$

8.  $18 + 9^2 - 7 \cdot (-3)$

9.  $32 \div 8 + 2 \cdot 8^2$

10.  $6 \div (7 \div 28)$

11.  $36 \div (1 - |2 - 7|)$

12.  $(-2)^2 \cdot 5 - 7(9 - 5)$

13.  $4(3 + 8) - 8^2 \div 32$

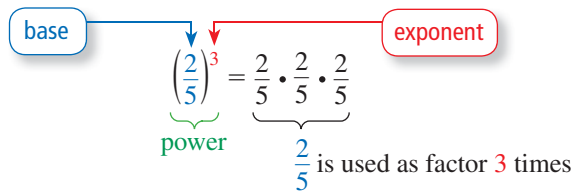
14.  $10(3 - 6)^3 + 41$

15.  $(2 - 5)^2 - (4 \cdot 5^2)$

16. **RESTAURANT** There are 82 people in a restaurant. Four groups of 3 leave and then five groups of 2 enter. Evaluate the expression  $82 - 4(3) + 5(2)$  to find how many people are in the restaurant.

# Powers and Exponents

A **power** is a product of repeated factors. The **base** of a power is the common factor. The **exponent** of a power indicates the number of times the base is used as a factor.



**Example 1** Write each product using exponents.

a.  $(-9) \cdot (-9) \cdot (-9) \cdot (-9) \cdot (-9)$

Because  $-9$  is used as a factor 5 times, its exponent is 5.

▶ So,  $(-9) \cdot (-9) \cdot (-9) \cdot (-9) \cdot (-9) = (-9)^5$ .

b.  $\pi \cdot \pi \cdot h \cdot h \cdot h$

Because  $\pi$  is used as a factor 2 times, its exponent is 2. Because  $h$  is used as a factor 3 times, its exponent is 3.

▶ So,  $\pi \cdot \pi \cdot h \cdot h \cdot h = \pi^2 h^3$ .

**Example 2** Evaluate each expression.

a.  $(-5)^4$

$$\begin{aligned} (-5)^4 &= (-5) \cdot (-5) \cdot (-5) \cdot (-5) \\ &= 625 \end{aligned}$$

Write as repeated multiplication.

Simplify.

b.  $-5^4$

$$\begin{aligned} -5^4 &= -(5 \cdot 5 \cdot 5 \cdot 5) \\ &= -625 \end{aligned}$$

Write as repeated multiplication.

Simplify.

## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

Write the product using exponents.

1.  $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$

2.  $\left(-\frac{1}{3}\right) \cdot \left(-\frac{1}{3}\right) \cdot \left(-\frac{1}{3}\right)$

3.  $x \cdot x \cdot y \cdot y \cdot y \cdot y \cdot y$

4.  $2.5 \cdot 2.5 \cdot b \cdot b \cdot b \cdot b$

5.  $(-n) \cdot (-n) \cdot (-n) \cdot (-n)$

6.  $(-12) \cdot (-12) \cdot v \cdot v \cdot v$

Evaluate the expression.

7.  $10^4$

8.  $-15^2$

9.  $\left(\frac{3}{4}\right)^3$

10.  $\left(-\frac{1}{2}\right)^5$

11. **VOLUME** Write an expression involving a power that represents the volume (in cubic centimeters) of the die shown. Then find the volume.



# Properties of Exponents

Product of Powers	Power of a Product	Power of a Power	
$a^m \cdot a^n = a^{m+n}$ Add exponents.	$(ab)^m = a^m b^m$ Find the power of each factor.	$(a^m)^n = a^{mn}$ Multiply exponents.	
Quotient of Powers	Power of a Quotient	Negative Exponent	Zero Exponent
$\frac{a^m}{a^n} = a^{m-n}, a \neq 0$ Subtract exponents.	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$ Find the power of the numerator and the power of the denominator.	$a^{-n} = \frac{1}{a^n}, a \neq 0$	$a^0 = 1, a \neq 0$

**Example 1** Evaluate (a)  $4 \cdot 9^0$  and (b)  $(-3)^{-4}$ .

a.  $4 \cdot 9^0 = 1$      **Definition of zero exponent**

b.  $(-3)^{-4} = \frac{1}{(-3)^4}$      **Definition of negative exponent**  
 $= \frac{1}{81}$      **Evaluate power.**

**Example 2** Simplify each expression. Write your answer using only positive exponents.

a.  $2^3 \cdot 2^4 = 2^7 = 128$

b.  $\frac{5^9}{5^6} = 5^{9-6} = 5^3 = 125$

c.  $\frac{12y^0}{x^{-7}} = 12y^0 x^7 = 12x^7$

d.  $\frac{x^6 \cdot x^2}{x^5} = \frac{x^{6+2}}{x^5} = x^{8-5} = x^3$

e.  $(z^4)^2 = z^{4 \cdot 2} = z^8$

f.  $(6mn)^3 = 6^3 \cdot m^3 \cdot n^3 = 216m^3n^3$

g.  $\left(\frac{y}{3}\right)^4 = \frac{y^4}{3^4} = \frac{y^4}{81}$

h.  $\frac{10x^6y^{-2}}{5x^3y} = \frac{10}{5} x^{(6-3)} y^{(-2-1)} = 2x^3y^{-3} = \frac{2x^3}{y^3}$

## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

Evaluate the expression.

1.  $(-9)^0$

2.  $-8^{-1}$

3.  $4^{-3}$

4.  $\frac{-5^0}{3^{-2}}$

Simplify the expression. Write your answer using only positive exponents.

5.  $2^9 \cdot 2^{-6}$

6.  $-\frac{10^8}{10^{12}}$

7.  $y \cdot y^{-5}$

8.  $\frac{x^7}{x^{-7}}$

9.  $-5x^7 \cdot x^{-11} \cdot 2x^4$

10.  $\frac{x^{-2}}{5z^0}$

11.  $(w^2)^{-3}$

12.  $(8xy)^2$

13.  $3x^5 \cdot (-2x)^4$

14.  $(-5m^2n^{-1})^3$

15.  $\frac{z^8}{z^{-2} \cdot z^9}$

16.  $\frac{(x^5)^3}{x^6}$

17.  $\left(\frac{3x}{2}\right)^3$

18.  $\left(\frac{6x^4}{5y}\right)^{-2}$

19.  $\frac{xy^{-2}}{x^4y^{-3}}$

20.  $\frac{8xy}{6x^5yz^{-2}}$

21. **METRIC SYSTEM** There are  $10^6$  micrometers in a meter and  $10^3$  meters in a kilometer. How many micrometers are there in  $10^6$  kilometers?

# Simplifying Algebraic Expressions

Parts of an algebraic expression are called *terms*. **Like terms** are terms that have the same variables raised to the same exponents. Constant terms are also like terms.

An algebraic expression is in **simplest form** when it has no like terms and no parentheses. To *combine* like terms that have variables, use the Distributive Property to add or subtract the coefficients.

**Example 1** Simplify  $8y + 7y$ .

$$\begin{aligned} 8y + 7y &= (8 + 7)y \\ &= 15y \end{aligned}$$

Distributive Property

Add coefficients.

**Example 2** Simplify  $2(x + 5) - 3(x - 2)$ .

$$\begin{aligned} 2(x + 5) - 3(x - 2) &= 2(x) + 2(5) - 3(x) - 3(-2) \\ &= 2x + 10 - 3x + 6 \\ &= 2x - 3x + 10 + 6 \\ &= -x + 16 \end{aligned}$$

Distributive Property

Multiply.

Group like terms.

Combine like terms.

**Example 3** Simplify  $xy + 3y - 2x + 5y - 3xy$ .

$$\begin{aligned} xy + 3y - 2x + 5y - 3xy &= xy - 3xy + 3y + 5y - 2x \\ &= -2xy + 8y - 2x \end{aligned}$$

Group like terms.

Combine like terms.

## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

Simplify the expression.

1.  $7x + 15x$

2.  $8y - 14y$

3.  $7d + 9 - 5d$

4.  $3w + 2(2 - 3w) + 2$

5.  $(x + 3) + (3x - 7)$

6.  $(5k + 6) + (4k - 8)$

7.  $(-7n + 6) + (5n + 15)$

8.  $(9z + 12) - (6z + 8)$

9.  $(8b + 1) - (-10b - 5)$

10.  $s(8 - 2t) + 3t(4 - 2s) + 5t$

11.  $qr + 2q^2 - 3qr - r^2 - 6q^2$

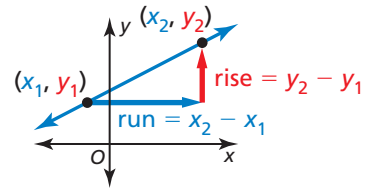
12.  $g^3(h - 4g) - h(3 - 2g^3)$

13. **EARNINGS** The original price of a model car is  $d$  dollars. You use a coupon and buy the kit for  $(d - 10)$  dollars. You assemble the model car and sell it for  $(2d - 20)$  dollars. Write an expression that represents your earnings. Interpret the expression.

# Slope of a Line

The **slope** of a nonvertical line is the ratio of vertical change (*rise*) to horizontal change (*run*) between any two points on the line. If a line in the coordinate plane passes through points  $(x_1, y_1)$  and  $(x_2, y_2)$ , then the slope  $m$  is

$$m = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

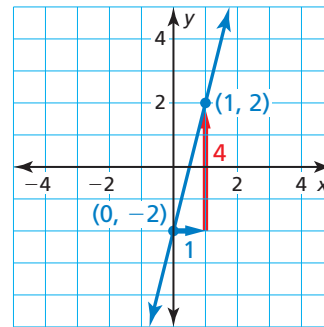


Slopes of Lines in the Coordinate Plane	
<b>Negative slope:</b> falls from left to right, as in line $j$	
<b>Positive slope:</b> rises from left to right, as in line $k$	
<b>Zero slope (slope of 0):</b> horizontal, as in line $l$	
<b>Undefined slope:</b> vertical, as in line $n$	

**Example 1** Find the slope of the line shown.

Let  $(x_1, y_1) = (0, -2)$  and  $(x_2, y_2) = (1, 2)$ .

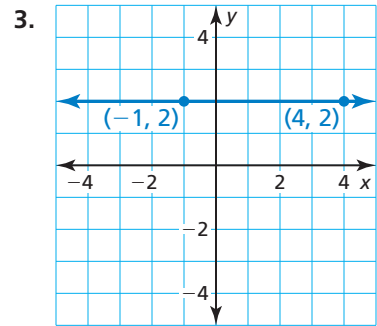
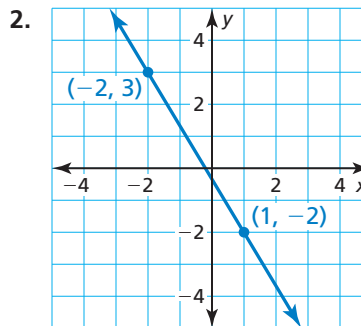
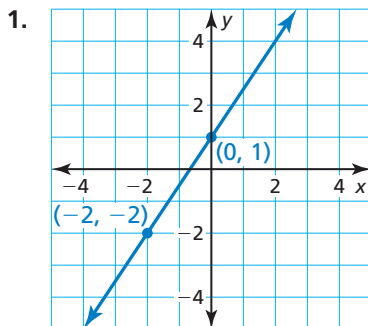
$$\begin{aligned} \text{slope} &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Write formula for slope.} \\ &= \frac{2 - (-2)}{1 - 0} && \text{Substitute.} \\ &= 4 && \text{Simplify.} \end{aligned}$$



## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

Find the slope of the line.

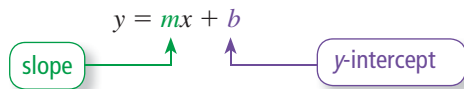
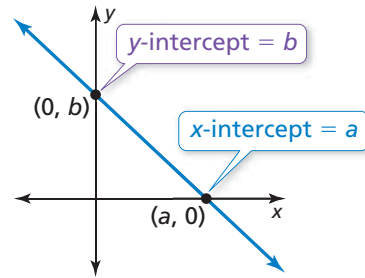


# Slope-Intercept Form

The **x-intercept** of a line is the  $x$ -coordinate of the point where the line crosses the  $x$ -axis. It occurs when  $y = 0$ .

The **y-intercept** of a line is the  $y$ -coordinate of the point where the line crosses the  $y$ -axis. It occurs when  $x = 0$ .

A linear equation written in the form  $y = mx + b$  is in **slope-intercept form**. The slope of the line is  $m$ , and the  $y$ -intercept of the line is  $b$ .



**Example 1** Identify the slope and the  $y$ -intercept of the graph of each linear equation.

a.  $y = -3x - 8$

$y = -3x + (-8)$  Write in slope-intercept form.

▶ The slope is  $-3$ , and the  $y$ -intercept is  $-8$ .

b.  $y - 4 = \frac{1}{3}x$

$y = \frac{1}{3}x + 4$  Add 4 to each side.

▶ The slope is  $\frac{1}{3}$ , and the  $y$ -intercept is  $4$ .

**Example 2** Find the  $x$ -intercept and the  $y$ -intercept of the graph of  $2x + y = 4$ .

To find the  $x$ -intercept, substitute 0 for  $y$  and solve for  $x$ .

$$\begin{aligned} 2x + y &= 4 \\ 2x + (0) &= 4 \\ x &= 2 \end{aligned}$$

▶ The  $x$ -intercept is 2, and the  $y$ -intercept is 4.

To find the  $y$ -intercept, substitute 0 for  $x$  and solve for  $y$ .

$$\begin{aligned} 2x + y &= 4 \\ 2(0) + y &= 4 \\ y &= 4 \end{aligned}$$

## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

Identify the slope and the  $y$ -intercept of the graph of the linear equation.

1.  $y = 4x + 7$

2.  $y = -\frac{1}{3}x + 8$

3.  $y = \frac{1}{9}x - 6$

4.  $y + 9 = -5x$

5.  $y - 2x = -6$

6.  $7 + y = -\frac{2}{3}x$

Find the  $x$ -intercept and the  $y$ -intercept of the graph of the equation.

7.  $y = 2x$

8.  $y = x + 8$

9.  $y = 3x + 6$

10.  $3x + y = 9$

11.  $2x + 3y = 12$

12.  $2x - 5y = 10$

13. **SHOPPING** The amount of money you spend on  $x$  books and  $y$  movies is given by the equation  $8x + 12y = 96$ . Find the intercepts of the graph of the equation. What do these values represent?



# Solving Linear Equations

To determine whether a value is a solution of an equation, substitute the value into the equation and simplify.

**Example 1** Determine whether (a)  $x = 1$  or (b)  $x = -2$  is a solution of  $5x - 1 = 4$ .

a.  $5x - 1 = -2x + 6$

$$5(1) - 1 \stackrel{?}{=} -2(1) + 6 \quad \text{Substitute.}$$

$$4 = 4 \quad \checkmark \quad \text{Simplify.}$$

► So,  $x = 1$  is a solution.

b.  $5x - 1 = -2x + 6$

$$5(-2) - 1 \stackrel{?}{=} -2(-2) + 6 \quad \text{Substitute.}$$

$$-11 \neq 10 \quad \times \quad \text{Simplify.}$$

► So,  $x = -2$  is *not* a solution.

To solve a linear equation, isolate the variable.

**Example 2** Solve each equation. Check your solution.

a.  $4x - 3 = 13$

$$4x - 3 + 3 = 13 + 3 \quad \text{Add 3.}$$

$$4x = 16 \quad \text{Simplify.}$$

$$\frac{4x}{4} = \frac{16}{4} \quad \text{Divide by 4.}$$

$$x = 4 \quad \text{Simplify.}$$

**Check**

$$4x - 3 = 13$$

$$4(4) - 3 \stackrel{?}{=} 13$$

$$13 = 13 \quad \checkmark$$

b.  $2(y - 8) = y + 6$

$$2y - 16 = y + 6 \quad \text{Distributive Property}$$

$$2y - y - 16 = y - y + 6 \quad \text{Subtract } y.$$

$$y - 16 = 6 \quad \text{Simplify.}$$

$$y - 16 + 16 = 6 + 16 \quad \text{Add 16.}$$

$$y = 22 \quad \text{Simplify.}$$

**Check**

$$2(y - 8) = y + 6$$

$$2(22 - 8) \stackrel{?}{=} 22 + 6$$

$$28 = 28 \quad \checkmark$$

## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

Determine whether (a)  $x = -1$  or (b)  $x = 3$  is a solution of the equation.

1.  $5x + 7 = 2$

2.  $-4x + 8 = -4$

3.  $2x - 1 = 3x - 4$

Solve the equation. Check your solution.

4.  $x - 9 = 24$

5.  $n + 14 = 0$

6.  $-16 = 4y$

7.  $-\frac{5}{6}t = -15$

8.  $81 = 46 - x$

9.  $4x + 5 = 1$

10.  $x + 5 = 11x$

11.  $9(y - 3) = 45$

12.  $6 = 7k + 8 - k$

13.  $6n + 3 = -4n + 7$

14.  $2c + 5 = 3(c - 8)$

15.  $18m + 3(2m + 8) = 0$

16.  $\frac{w - 6}{5} = 8$

17.  $\frac{15 + h}{3} = 10$

18.  $\frac{8 - 3x}{5} = x$

19.  $(8r + 6) + (4r - 1) = 14$

20.  $\frac{2}{3}y - 3 = 9$

21.  $\frac{1}{2}x - \frac{3}{10} = \frac{5}{2}x + \frac{7}{10}$

22. **MONEY** You have a total of \$3.25 in change made up of 25 pennies, 6 nickels, 2 dimes, and  $x$  quarters. How many quarters do you have?

# Writing Linear Equations

Given a point on a line and the slope of the line, you can write an equation of the line.

**Example 1** Write an equation in slope-intercept form of the line that passes through the point  $(-5, 6)$  and has a slope of  $\frac{3}{5}$ .

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

$$6 = \frac{3}{5}(-5) + b \quad \text{Substitute } \frac{3}{5} \text{ for } m, -5 \text{ for } x, \text{ and } 6 \text{ for } y.$$

$$6 = -3 + b \quad \text{Simplify.}$$

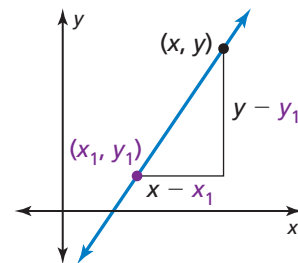
$$9 = b \quad \text{Solve for } b.$$

► So, the equation is  $y = \frac{3}{5}x + 9$ .

A linear equation written in the form  $y - y_1 = m(x - x_1)$  is in **point-slope form**. The line passes through the point  $(x_1, y_1)$ , and the slope of the line is  $m$ .

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

slope  
↓  
↑  
passes through  $(x_1, y_1)$



**Example 2** Write an equation in point-slope form of the line that passes through the point  $(-8, 3)$  and has a slope of  $\frac{3}{4}$ .

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

$$y - 3 = \frac{3}{4}[x - (-8)] \quad \text{Substitute } \frac{3}{4} \text{ for } m, -8 \text{ for } x_1, \text{ and } 3 \text{ for } y_1.$$

$$y - 3 = \frac{3}{4}(x + 8) \quad \text{Simplify.}$$

► So, the equation is  $y - 3 = \frac{3}{4}(x + 8)$ .

## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

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

1.  $(1, 3); m = 2$

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

3.  $(-2, 3); m = \frac{1}{2}$

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

5.  $(4, -2); m = -\frac{1}{4}$

6.  $(-7, -3); m = -\frac{2}{7}$

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

7.  $(1, 1); m = 5$

8.  $(-3, 4); m = 2$

9.  $(6, -3); m = \frac{3}{2}$

10.  $(5, 7); m = \frac{2}{5}$

11.  $(-4, 5); m = -\frac{3}{4}$

12.  $(-2, -3); m = -\frac{3}{8}$