



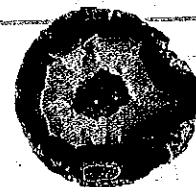
### In the Real World

**Geodes** A geode is a hollow rock whose interior is lined with crystals. Many geodes are small enough to fit in your hand, but a giant geode in Spain is 26 feet long and can hold 10 people inside. How does this geode's length compare with the length of your hand?

### Example 2

### Using the Distributive Property

**Geodes** After touring a cave, you visit the gift shop and buy 3 geodes. Each geode costs \$5.95. Use the distributive property and mental math to find the total cost of the geodes.



#### Solution

Total cost = $3(5.95)$	Write expression for total cost.
$= 3(6 - 0.05)$	Rewrite 5.95 as $6 - 0.05$ .
$= 3(6) - 3(0.05)$	Distributive property
$= 18 - 0.15$	Multiply using mental math.
$= 17.85$	Subtract using mental math.

**Answer** The total cost of the geodes is \$17.85.

### ✓ Checkpoint

Use the distributive property to evaluate the expression.

1.  $3(8 + 5)$       2.  $(2 + 9)2$       3.  $6(11 - 4)$       4.  $(3 - 14)(-5)$

Evaluate the expression using the distributive property and mental math.

5.  $4(105)$       6.  $3(97)$       7.  $5(2.9)$       8.  $8(7.02)$

Two variable expressions that have the same value for all values of the variable(s) are called **equivalent variable expressions**. You can use the distributive property to write equivalent variable expressions.

### Example 3

### Writing Equivalent Variable Expressions

Use the distributive property to write an equivalent variable expression.

a.  $3(x + 7) = 3(x) + 3(7)$       Distributive property  
 $= 3x + 21$       Multiply.

b.  $(n + 4)(-2) = n(-2) + 4(-2)$       Distributive property  
 $= -2n + (-8)$       Multiply.  
 $= -2n - 8$       Definition of subtraction

c.  $-5(2y - 3) = -5(2y) + (-5)(-3)$       Distributive property  
 $= -10y + 15$       Multiply.  
 $= -10y + 15$       Definition of subtraction

### ✓ Checkpoint

Use the distributive property to write an equivalent variable expression.

9.  $8(x + 2)$       10.  $(7 - t)(-4)$       11.  $9(3m + 5)$       12.  $-2(6y - 4)$

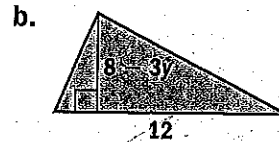
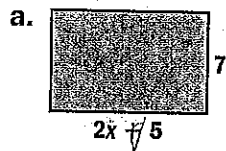
### Review Help

For help with basic geometric figures, see p. 785.

### Example 4

### Finding Areas of Geometric Figures

Find the area of the rectangle or triangle.



**Solution**

- a. Use the formula for the area of a rectangle.

$$\begin{aligned} A &= lw \\ &= (2x + 5)(7) \\ &= 2x(7) + 5(7) \\ &= 14x + 35 \end{aligned}$$

**Answer** The area is  $(14x + 35)$  square units.

- b. Use the formula for the area of a triangle.

$$\begin{aligned} A &= \frac{1}{2}bh = \frac{1}{2}(12)(8 - 3y) \\ &= 6(8 - 3y) \\ &= 6(8) - 6(3y) \\ &= 48 - 18y \end{aligned}$$

**Answer** The area is  $(48 - 18y)$  square units.

## 2.2 Exercises

More Practice, p. 804

INTERNET

eWorkbook Plus

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### Guided Practice

- Vocabulary Check**
1. What property is illustrated by the statement  $3(4 - 9) = 3(4) - 3(9)$ ?
  2. Are  $2(x + 1)$  and  $2x + 1$  equivalent variable expressions? Explain.

**Skill Check** Evaluate the expression using the distributive property and mental math.

3.  $3(96)$
4.  $6(103)$
5.  $2(8.95)$
6.  $4(7.09)$

Use the distributive property to write an equivalent variable expression.

7.  $2(x - 6)$
8.  $(y + 11)(-3)$
9.  $5(4k + 9)$
10.  $-4(2n - 7)$

11. **Game Room** You are building a game room adjacent to your living room. The widths of the two rooms must be the same. There are no restrictions on the game room's length  $l$ .



- a. Write an expression for the total area of both rooms by multiplying their common width by their combined length.
- b. Write a second expression for the total area by finding the area of each room separately and then adding the two areas.
- c. Show that the expressions from parts (a) and (b) are equivalent.

# Practice and Problem Solving

## Homework Help

Example	Exercises
1	12-19, 36, 41-43
2	20-27, 37
3	28-35, 44, 45
4	38-40



- More Examples
- eTutorial Plus

Use the distributive property to evaluate the expression.

12.  $2(5 + 3)$     13.  $5(9 - 3)$     14.  $(4 - 10)7$     15.  $(7.2 + 1.9)2$   
 16.  $-10(18 + 8)$     17.  $(6 + 21)(-3)$     18.  $(12 - 7)(-4)$     19.  $6(-2.3 + 3.8)$

Evaluate the expression using the distributive property and mental math.

20.  $4(98)$     21.  $7(109)$     22.  $(211)(-3)$     23.  $-5(396)$   
 24.  $8(3.1)$     25.  $2(1.99)$     26.  $-6(10.95)$     27.  $(4.02)(-9)$

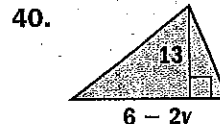
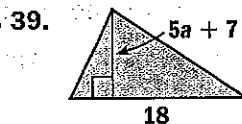
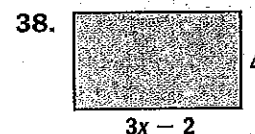
Use the distributive property to write an equivalent variable expression.

28.  $4(x - 2)$     29.  $3(y + 9)$     30.  $-2(3 - r)$     31.  $(s + 20)(-7)$   
 32.  $6(2p + 1)$     33.  $-5(5q - 4)$     34.  $-9(11 - 6m)$     35.  $(-2n - 3)(-8)$

36. **Basketball** There are 29 teams in the National Basketball Association (NBA). Each team can have a maximum of 12 healthy players plus 3 players on injured reserve. Use the distributive property to find the maximum number of players who can be in the NBA.

37. **Snowfall** Utah Olympic Park, site of the 2002 Olympic Winter Games, gets an average of 295 inches of snow each year. Use estimation to predict the total snowfall in Utah Olympic Park over a 5 year period. Justify your answer using the distributive property and mental math.

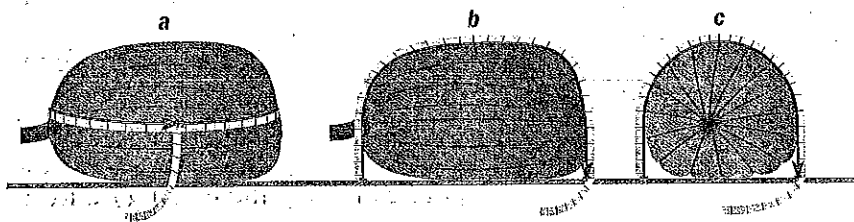
**Geometry** Find the area of the rectangle or triangle.



Use the distributive property to evaluate the expression.

41.  $5(7 + 2 + 4)$     42.  $-3(9 - 1 + 6)$     43.  $(21 - 11 - 3)4$

44. **Giant Pumpkins** A giant pumpkin can be difficult to weigh directly on a scale. To estimate the weight, you can first measure the distances  $a$ ,  $b$ , and  $c$  (in inches) as shown below. The weight  $W$  (in pounds) can then be approximated using the formula  $W = 1.9(a + b + c)$ .



- a. Use the distributive property to write the given formula without parentheses.  
 b. For a certain pumpkin,  $a = 132$  inches,  $b = 91$  inches, and  $c = 85$  inches. Approximate the weight of the pumpkin to the nearest pound.

## Study Strategy

In Exercises 41-44, you can use an extended version of the distributive property. For example, an expression of the form

$$a(b + c + d)$$

can be written as

$$ab + ac + ad.$$