**Essential Question** How does rewriting a word problem help you solve the word problem?

1 ACTIVITY: Rewriting a Word Problem

Work with a partner. Read the problem several times. Think about how you could rewrite the problem. Leave out information that you do not need to solve the problem.

Given Problem (63 words)

Your minivan has a flat, rectangular area in the back. When you fold down the rear seats of the van and move them forward, the width of the rectangular area in the van is increased by 2 feet, as shown in the diagram.

5 ft

⊢2 ft⊢ 3 ft ⊣
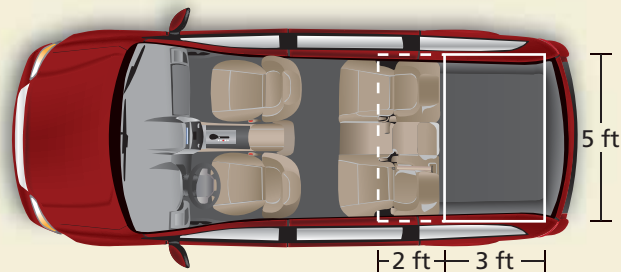
By how many square feet does the rectangular area increase when the rear seats are folded down and moved forward?
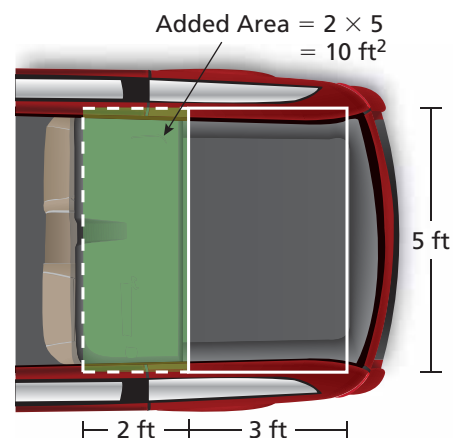
Rewritten Problem (28 words)

When you fold down the back seats of a minivan, the added area is a 5-foot by 2-foot rectangle. What is the area of this rectangle?

Can you make the problem even simpler?

Rewritten Problem (words)

Added Area = 2 × 5
= 10 ft^2

5 ft

⊢ 2 ft ⊣ 3 ft ⊣
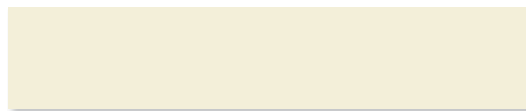
Explain why your rewritten problem is easier to read.

COMMON CORE

Writing Equations
In this lesson, you will
• write word sentences as equations.
Learning Standard
6.EE.6

Math
Practice 1

Analyze Givens
What information
do you need to
solve the problem?

2 ACTIVITY: Rewriting a Word Problem

Work with a partner. Rewrite each problem using fewer words. Leave out information that you do not need to solve the problem. Then solve the problem.

a. (63 words)

A supermarket is having its grand opening on Saturday morning. Every fifth customer will receive a $10 coupon for a free turkey. Every seventh customer will receive a $3 coupon for 2 gallons of ice cream. You are the manager of the store and you expect to have 400 customers. How many of each type of coupon should you plan to give away?

b. (71 words)

You and your friend are at a football game. The stadium is 4 miles from your home. You each brought $5 to spend on refreshments. During the third quarter of the game, you say, "I read that the greatest distance that a baseball has been thrown is 445 feet 10 inches." Your friend says, "That's about one and a half times the length of the football field." Is your friend correct?

c. (90 words)

You are visiting your cousin who lives in the city. To get back home, you take a taxi. The taxi charges $2.10 for the first mile and $0.90 for each additional mile. After riding 13 miles, you decide that the fare is going to be more than the $20 you have with you. So, you tell the driver to stop and let you out. Then you call a friend and ask your friend to come and pick you up. After paying the driver, how much of your $20 is left?

What Is Your Answer?

3. IN YOUR OWN WORDS How does rewriting a word problem help you solve the word problem? Make up a word problem that has more than 50 words. Then show how you can rewrite the problem using at most 25 words.

"Solving a math word problem is like making maple syrup."

"You need to boil down 40 gallons of sap from a sugar maple tree to get 1 gallon of syrup."

Practice Use what you learned about writing equations to complete Exercises 4 and 5 on page 298.

Key Vocabulary
equation, *p. 296*

An **equation** is a mathematical sentence that uses an equal sign, $=$, to show that two expressions are equal.

Expressions	*Equations*
$4 + 8$	$4 + 8 = 12$
$x + 8$	$x + 8 = 12$

To write a word sentence as an equation, look for key words or phrases such as *is*, *the same as*, or *equals* to determine where to place the equal sign.

EXAMPLE 1 Writing Equations

Write the word sentence as an equation.

a. The sum of a number n and 7 is 15.

The sum of a number n and 7 is 15.

$$n + 7 \qquad = 15 \qquad \textit{Sum of means addition.}$$

An equation is $n + 7 = 15$.

b. A number y decreased by 4 is 3.

A number y decreased by 4 is 3.

$$y - 4 \qquad = 3 \qquad \textit{Decreased by means subtraction.}$$

An equation is $y - 4 = 3$.

c. 12 times a number p equals 48.

12 times a number p equals 48.

$$12p \qquad = \qquad 48 \qquad \textit{Times means multiplication.}$$

An equation is $12p = 48$.

On Your Own

Now You're Ready
Exercises 6–13

Write the word sentence as an equation.

1. 9 less than a number b equals 2.

2. The product of a number g and 5 is 30.

3. A number k increased by 10 is the same as 24.

4. The quotient of a number q and 4 is 12.

Multi-Language Glossary at BigIdeasMath.com

EXAMPLE 2   **Writing an Equation**

Ten servers decorate 25 tables for a wedding. Each table is decorated as shown. Let c be the total number of white and purple candles. Which equation can you use to find c?

  (**A**) $c = 25 + (4 \times 6)$ (**B**) $c = 25(4 + 6)$

  (**C**) $c = 10(25 + 4 + 6)$ (**D**) $c = 10(4 + 6)$

Words   The total number of candles   is   the number of tables   times   the number of candles on each table.

Variable   Let c be the total number of candles.

Equation c $=$ 25 $\times$ $(4 + 6)$

⫶∴   The correct answer is (**B**).

EXAMPLE 3   **Real-Life Application**

After two rounds, 24 students are eliminated from a spelling bee. There are 96 students remaining. Write an equation you can use to find the number of students that started the spelling bee.

Words   The number of students that started   minus   the number of students eliminated   is   the number of students remaining.

Reading

The word *eliminated* means *subtraction*.

Variable   Let s be the number of students that started.

Equation s $-$ 24 $=$ 96

⫶∴   An equation is $s - 24 = 96$.

🔴 **On Your Own**

  5.   You enter an elevator and go down 7 floors. You exit on the 10th floor. Write an equation you can use to find the floor where you entered the elevator.

  6.   Together you and a friend have \$52. Your friend has \$28. Write an equation you can use to find how much money you have.

  7.   A typical person takes about 24,000 breaths each day. Write an equation you can use to find the number of breaths a typical person takes each minute.

✓ Vocabulary and Concept Check

1. **VOCABULARY** How are expressions and equations different?

2. **DIFFERENT WORDS, SAME QUESTION** Which is different? Write "both" equations.

   | 4 less than a number n is 8. | A number n is 4 less than 8. |

   | A number n minus 4 equals 8. | 4 subtracted from a number n is 8. |

3. **OPEN-ENDED** Write a word sentence for the equation $28 - n = 5$.

Practice and Problem Solving

Rewrite the problem using fewer words. Leave out information that you do not need to solve the problem. Then solve the problem.

4. In a cross-country race you run at a steady rate of 7 minutes per mile. After 21 minutes, you finish in fourth place. How long is the race?

5. For a science project, you record the high temperature each day. The high temperature on Day 1 was 6° less than on Day 4 and 4° less than on Day 10. The high temperature on Day 10 was 62°F. What was the high temperature on Day 1?

**Write the word sentence as an equation.**

6. The sum of a number x and 4 equals 12.

7. A number y decreased by 9 is 8.

8. 9 times a number b is 36.

9. A number w divided by 5 equals 6.

10. 54 equals 9 more than a number t.

11. 5 is one-fourth of a number c.

12. 11 is the quotient of a number y and 6.

13. 9 less than a number n equals 27.

14. **ERROR ANALYSIS** Describe the error in writing the sentence as an equation.

   > A number n is 5 more than 12.
   > $n + 5 = 12$

15. **FUNDRAISING** Students and faculty raised $6042 for band uniforms. The faculty raised $1780. Write an equation you can use to find the amount a raised by the students.

16. **GOLF** You hit a golf ball 90 yards. It travels three-fourths of the distance to the hole. Write an equation you can use to find the distance d from the tee to the hole.

90 yd

d

tee
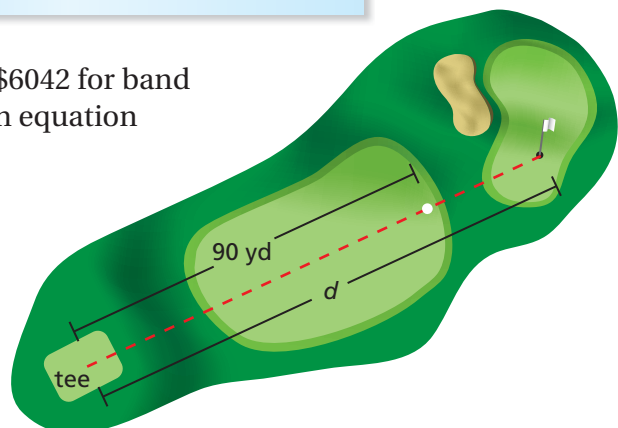
GEOMETRY Write an equation that you can use to find the value of *x*.

17. Perimeter of triangle: 16 in.

18. Perimeter of square: 30 mm
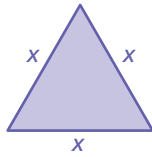
19. MUSIC You sell instruments at a Caribbean music festival. You earn $326 by selling 12 sets of maracas, 6 sets of claves, and *x djembe* drums. Write an equation you can use to find the number of *djembe* drums you sold.

$16

$5

$14

20. SALES TAX Find a sales receipt from a store that shows the total price and the total amount paid including sales tax.

   a. Write an equation you can use to find the sales tax rate *r*.

   b. Can you use *r* to find the *percent* for the sales tax? Explain.

21. STRAWBERRIES You buy a basket of 24 strawberries. You eat them as you walk to the beach. It takes the same amount of time to walk each block. When you are halfway there, half of the berries are gone. After walking 3 more blocks, you still have 5 blocks to go. You reach the beach 28 minutes after you began. One-sixth of your strawberries are left.

   a. Is there enough information to find the time it takes to walk each block? Explain.

   b. Is there enough information to find how many strawberries you ate while walking the last block? Explain.

$2

22. **Geometry** A triangle is cut from a rectangle. The height of the triangle is half of the unknown side length *s*. The area of the shaded region is 84 square inches. Write an equation you can use to find the side length *s*.

14 in.

s
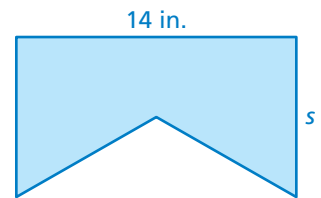
Fair Game Review   What you learned in previous grades & lessons

Evaluate the expression when *a* = 7.   *(Section 3.1)*

23. $6 + a$

24. $a - 4$

25. $4a$

26. $\dfrac{35}{a}$

27. MULTIPLE CHOICE Which expression is equivalent to $8(x + 3)$?   *(Section 3.4)*

   (A) $8x + 3$
   (B) $8x + 24$
   (C) $8x + 11$
   (D) $x + 24$