EXAMPLE 2 **Evaluate an expression**

MOVIES The total cost of seeing a movie at a theater can be represented by the expression $a + r$ where a is the cost (in dollars) of admission and r is the cost (in dollars) of refreshments. Suppose you pay $7.50 for admission and $7.25 for refreshments. Find the total cost.

Solution

$$\text{Total cost} = a + r \qquad \text{Write expression.}$$
$$= 7.50 + 7.25 \qquad \text{Substitute 7.50 for } a \text{ and 7.25 for } r.$$
$$= 14.75 \qquad \text{Add.}$$

▶ The total cost is $14.75.

EXPRESSIONS USING EXPONENTS A **power** is an expression that represents repeated multiplication of the same factor. For example, 81 is a power of 3 because $81 = 3 \cdot 3 \cdot 3 \cdot 3$. A power can be written in a form using two numbers, a **base** and an **exponent** . The exponent represents the number of times the base is used as a factor, so 81 can be written as 3^4.

$$\underbrace{3^4}_{\text{power}} = \underbrace{3 \cdot 3 \cdot 3 \cdot 3}_{\text{4 factors of 3}}$$

base exponent

EXAMPLE 3 **Read and write powers**

Write the power in words and as a product.

Power	Words	Product
a. 7^1	seven to the first power	7
b. 5^2	five to the second power, or five *squared*	$5 \cdot 5$
c. $\left(\frac{1}{2}\right)^3$	one half to the third power, or one half *cubed*	$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$
d. z^5	z to the fifth power	$z \cdot z \cdot z \cdot z \cdot z$

WRITE EXPONENTS
For a number raised to the first power, you usually do not write the exponent 1. For instance, you write 7^1 simply as 7.

✓ **GUIDED PRACTICE** for Examples 2 and 3

5. WHAT IF? In Example 2, suppose you go back to the theater with a friend to see an afternoon movie. You pay for both admissions. Your total cost (in dollars) can be represented by the expression $2a$. If each admission costs $4.75, what is your total cost?

Write the power in words and as a product.

6. 9^5 **7.** 2^8 **8.** n^4