

## • Multiplying by One-Digit Numbers

### Power Up

#### facts

Power Up C

#### count aloud

Count up and down by 5s between 1 and 51 (1, 6, 11, 16, ...).  
Count by 50¢ to \$5.00 and from \$5.00 to 50¢.

#### mental math

- a. **Multiplication:**  $4 \times 6$
- b. **Multiplication:**  $4 \times 60$
- c. **Multiplication:**  $4 \times 600$
- d. **Multiplication:**  $5 \times 8$
- e. **Multiplication:**  $5 \times 80$
- f. **Multiplication:**  $5 \times 800$
- g. **Measurement:** The string was 580 cm long. Oded cut a 60-cm piece from one end. How much string was left in the longer piece?
- h. **Number Sense:**  $5 \times 6 + 12 - 2 + 10 - 1$

#### problem solving

Quarters, dimes, nickels, and pennies are often put into paper or plastic rolls to make their value easier to identify. Quarters are put into rolls of 40 quarters. Dimes are put into rolls of 50 dimes. One roll of quarters has the same value as how many rolls of dimes?

#### Focus Strategy: Write an Equation

**Understand** We are told that coins are often put into rolls. Quarters are put into rolls of 40 quarters, and dimes are put into rolls of 50 dimes. We are asked to find how many rolls of dimes have the same value as one roll of quarters.

**Plan** We know the value of a quarter is 25¢ and the value of a dime is 10¢. As a first step, we can *write equations* to represent the total value of each coin roll. After we find the value of each coin roll, we will calculate how many dime rolls equal the value of one quarter roll.

**Solve** One quarter is 25¢, and there are 40 quarters in a roll. The equation to show the value of a roll of quarters is

$$40 \times 25¢ = \underline{\hspace{2cm}}$$

We can calculate this mentally. We think, “4 quarters is \$1, and 40 quarters is ten times 4 quarters, so 40 quarters is \$10.”

One dime is 10¢, and there are 50 dimes in a roll. The equation for the value of a roll of dimes is

$$50 \times 10¢ = \underline{\hspace{2cm}}$$

We think, “5 dimes is 50¢, so 50 dimes is  $10 \times 50¢$ , which is 500¢, or simply \$5.”

Now we know the value of a roll of quarters (\$10) and the value of roll of dimes (\$5). It is easy to see that **two rolls of dimes** have the same value as one roll of quarters:

$$2 \times \$5 = \$10$$

**Check** We know that our answer is reasonable because one roll of dimes has half the value of one roll of quarters, so two rolls of dimes have the same value as one roll of quarters.

## New Concept

### Thinking Skill

#### Discuss

How is multiplying whole dollars the same as multiplying whole numbers? How is it different?

We may solve the following problem either by adding or by multiplying:

*A ticket to the basketball game costs \$24. How much would three tickets cost?*

To find the answer by adding, we add the price of three tickets.

$$\begin{array}{r} 1 \\ \$24 \\ \$24 \\ + \$24 \\ \hline \$72 \end{array}$$

To find the answer by multiplying, we multiply \$24 by 3. First we multiply the 4 ones by 3. This makes 12 ones, which is the same as 1 ten and 2 ones. We write the 2 ones below the line and the 1 ten above the tens column.

$$\begin{array}{r} 1 \\ \$24 \\ \times 3 \\ \hline 2 \end{array}$$

Next we multiply the 2 tens by 3, making 6 tens. Then we add the 1 ten to make 7 tens.

$$\begin{array}{r} 1 \\ \$24 \\ \times 3 \\ \hline \$72 \end{array}$$

### Example 1

**A ticket to the show costs \$12. How much would four tickets cost?**

We may find the answer by adding or by multiplying.

$$\$12 + \$12 + \$12 + \$12 = \$48 \quad 4 \times \$12 = \$48$$

Four tickets would cost **\$48**.

### Example 2

**Six different times next month, a salesperson must make a 325-mile round trip. How many total miles will the salesperson travel next month?**

We multiply 5 ones by 6 and get 30. We write “0” below the line and “3” above the tens column. Next we multiply 2 tens by 6, making 12 tens, and add the 3 tens to get 15 tens. We write “5” below the line and “1” above the next digit. Then we multiply 3 hundreds by 6 and add the 1 hundred.

$$\begin{array}{r} 13 \\ 325 \\ \times 6 \\ \hline 1950 \end{array}$$

In six trips, the salesperson will travel **1950 miles**.

#### Thinking Skill

##### Connect

What is another name for the numbers 325 and 6?

### Example 3

Use dimes and pennies to illustrate  $3 \times \$0.14$ .

One dime and four pennies is  $\$0.14$ . We lay out three sets of these coins to show  $3 \times \$0.14$ .



We see that the total is 3 dimes and 12 pennies. Since 12 pennies is more than a dime, we trade ten pennies for a dime. The result is 4 dimes and 2 pennies. So  $3 \times \$0.14$  is  **$\$0.42$** .



**Discuss** Why are dimes and pennies a good model for multiplying cents?

### Example 4

Pens cost  $\$0.25$  each. What is the cost of 6 pens?

Each pen costs a quarter. We can find that 6 quarters is  $\$1.50$  using mental math. However, we will use this problem to practice the pencil-and-paper algorithm for multiplication. Think of  $\$0.25$  as 2 dimes and 5 pennies. First we multiply 5 pennies by 6, which makes 30 pennies. Since 30 pennies equals 3 dimes and 0 pennies, we write “0” below the line and “3” above the dimes column.

$$\begin{array}{r} 3 \\ \$0.25 \\ \times \quad 6 \\ \hline 0 \end{array}$$

Next we multiply 2 dimes by 6, making 12 dimes. Then we add the 3 dimes to make 15 dimes. Fifteen dimes equals 1 dollar and 5 dimes, so we write “5” below the line and “1” above the dollars column.

$$\begin{array}{r} 13 \\ \$0.25 \\ \times \quad 6 \\ \hline 50 \end{array}$$

#### Thinking Skill

##### Verify

How can we use mental math to decide if the answer is reasonable?

There are no dollars to multiply, so we write the 1 in the dollars place below the line. Finally, we insert the decimal point two places from the right-hand end and write the dollar sign.

$$\begin{array}{r} \phantom{1} \phantom{3} \\ \$0.25 \\ \times \phantom{0} \phantom{6} \\ \hline \$1.50 \end{array}$$

Six pens cost **\$1.50**.

**Discuss** Why do we place the decimal point two places from the right?

## Lesson Practice

Find each product:

a.  $\$36 \times 5$

b.  $50 \times 8$

c.  $7 \times \$0.43$

d.  $\begin{array}{r} 340 \\ \times 8 \\ \hline \end{array}$

e.  $\begin{array}{r} \$7.68 \\ \times 4 \\ \hline \end{array}$

f.  $\begin{array}{r} 560 \\ \times 6 \\ \hline \end{array}$

g.  $\begin{array}{r} \$394 \\ \times 7 \\ \hline \end{array}$

h.  $\begin{array}{r} 607 \\ \times 9 \\ \hline \end{array}$

i.  $\begin{array}{r} \$9.68 \\ \times 3 \\ \hline \end{array}$

- j. Each morning class at Lakeview School is 45 minutes long. There are 4 classes every morning. How many minutes do Lakeview School students attend classes each morning? Show how to find the number of minutes by adding and by multiplying.
- k. Devon bought three bottles of milk for \$2.14 each. Altogether, how much did the milk cost? Find the answer by multiplying.
- l. Nathan had five quarters in his pocket. Write and solve a multiplication equation that shows the value of the quarters in Nathan's pocket.

## Written Practice

*Distributed and Integrated*

- \* 1. **Represent** Draw a vertical line segment.

(12)

2. Cedric read 3 books. Each book had 120 pages. How many pages did Cedric read? Find the answer once by adding and again by multiplying.

(17)

**Formulate** For problems 3 and 4, write an equation and find the answer.

\*3. <sup>(11)</sup> The spider spun its web for 6 hours the first night and for some more hours the second night. If the spider spent a total of 14 hours spinning its web those two nights, how many hours did the spider spin the second night?

\*4. <sup>(16)</sup> After buying a notebook for \$1.45, Carmela had \$2.65. How much money did Carmela have before she bought the notebook?

$$\begin{array}{r} 5. \quad 24 \\ (17) \quad \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad \$36 \\ (17) \quad \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 45 \\ (17) \quad \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad \$56 \\ (17) \quad \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad \$3.25 \\ (17) \quad \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 432 \\ (17) \quad \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad \$2.46 \\ (17) \quad \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 364 \\ (17) \quad \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad c \\ (10) \quad + 147 \\ \hline 316 \end{array}$$

$$\begin{array}{r} 14. \quad \$4.20 \\ (13) \quad - \$3.75 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 604 \\ (14) \quad - w \\ \hline 406 \end{array}$$

$$\begin{array}{r} 16. \quad m \\ (14) \quad - 73 \\ \hline 800 \end{array}$$

$$17. \quad 3 + n + 15 + 9 = 60$$

<sup>(10)</sup>

$$18. \quad \$90 + \$6.75 + \$7.98 + \$0.02$$

<sup>(13)</sup>

\*19. **Connect** <sup>(13, 17)</sup> Doreen bought five pens for \$0.24 each. Altogether, how much did the pens cost? Find the answer to the problem by changing this addition problem into a multiplication problem:

$$\$0.24 + \$0.24 + \$0.24 + \$0.24 + \$0.24$$

20. Find the product:  $26 \times 7$

<sup>(17)</sup>

21. Think of two one-digit even numbers. Multiply them. Is the product odd or even?

<sup>(2, 15)</sup>

\*22. Compare:  $12 \times 1$   $\bigcirc$   $24 \times 0$

<sup>(4, 15)</sup>

23. **Represent** Use digits and a comparison symbol to write this comparison:

*Five hundred four thousand is less than five hundred fourteen thousand.*

24. **Connect** What number is missing in this counting sequence?

..., 21, 28, 35, \_\_\_\_\_, 49, 56, ...

25. Which digit in 375 shows the number of hundreds?

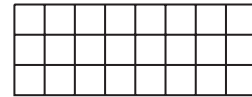
26. **Represent** What number is 10 more than these tally marks?

||||   ||||   |||

- \* 27. **Predict** Is the 100th term of this counting sequence odd or even? Explain how you know.

1, 3, 5, 7, ...

28. Write a multiplication problem that shows how to find the number of small squares in this rectangle.



29. **Connect** Use the Commutative Property to change the order of factors. Then multiply. Show your work.

$$\begin{array}{r} 5 \\ \times 24 \\ \hline \end{array}$$

- \* 30. **Multiple Choice** Tika's math class began 18 minutes ago. The class will end in 37 minutes. Which equation can be used to find the length in minutes of Tika's math class?

A  $18 + m = 37$

B  $m - 37 = 18$

C  $37 - m = 18$

D  $18 - m = 37$

### Early Finishers

Real-World Connection

Andres decided to add more fish to his aquarium. He bought 3 tetras that cost \$1.89 each and 4 mollies that cost \$2.75 each. Find the total cost of the fish that Andres added to his aquarium. Then show two different ways that the total cost can be found and use both methods to find the total. Compare the answers to see if they are the same.