

# Lesson 9-3

Monday, February 3, 2020 1:52 PM

A series of horizontal blue lines for writing, with a vertical red margin line on the left side.

Name \_\_\_\_\_

MB 539



### Lesson 9-3

### Use Multiplication to Divide

#### Solve & Share

A sandwich shop prepares large wraps and cuts them into fourths. Each fourth is one serving. William buys 5 whole wraps for a party. How many servings in all does he get? *Solve this problem any way you choose.*

#### Model with Math

How could fraction strips, bar diagrams, or other models help you visualize the problem?

**I can ...**  
connect dividing by a fraction to multiplication.

Content Standards 5.NF.B.7b, 5.NF.B.7c  
Mathematical Practices MP.2, MP.4, MP.7



$$5 \div \frac{1}{4} = 20$$

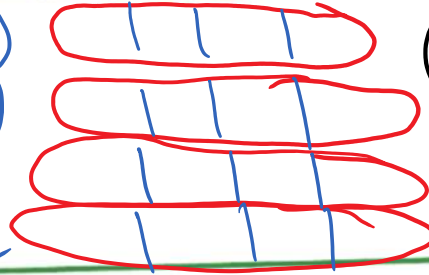
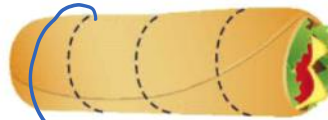
Keep, switch, flip

$$\frac{5}{1} \times \frac{4}{1}$$

$$\frac{20}{1}$$

$$\frac{1}{4} \times \frac{4}{1} = \frac{4}{4} = 1$$

20 servings



20 servings

**Look Back!** **MP.4 Model with Math** Write an equation that represents the problem about the wraps.

$$5 \div \frac{1}{4} = 20$$

$$5 \times 4 = 20$$

## Essential Question: How Is Dividing by a Fraction Related to Multiplication?

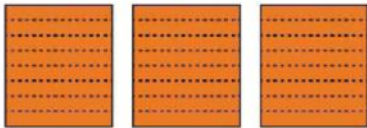
If a bottle of liquid plant food contains 3 cups, how many plants will you be able to feed? Explain why your answer makes sense.



You need to find how many eighths are in 3 cups.  
 $3 \div \frac{1}{8} = ?$



**B** How many  $\frac{1}{8}$ s are in 3?



Use a model and multiplication to solve.

Since there are 8 eighths in each whole, there are  $3 \times 8 = 24$  eighths in 3 wholes.

So,  $3 \div \frac{1}{8} = 24$ .

The plant food can feed 24 plants.

**C** Does the answer make sense? Do 24 eighths equal 3?

Use multiplication to check.

$$24 \times \frac{1}{8} = \frac{24}{8} = 3$$

Yes, 24 eighths equals 3, so the answer makes sense.

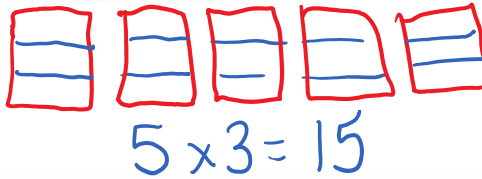
The inverse relationship between multiplication and division applies to fraction computation, too!

The division equation  $3 \div \frac{1}{8} = 24$  is true because the multiplication equation  $24 \times \frac{1}{8} = 3$  is true.



**Convince Me!** **MP.7 Use Structure** Use the same numbers in the multiplication equation  $15 \times \frac{1}{3} = 5$  to write a division equation. Draw a diagram to show that your division equation makes sense.

$$5 \div \frac{1}{3} = 15$$



Name \_\_\_\_\_



### Guided Practice

#### Do You Understand?

1. **MP.2 Reasoning** Explain how to use multiplication to find  $4 \div \frac{1}{5}$ .

There are five fifths in one whole. Five fifths multiplied by 4 wholes is a total of 20 parts.

2. Show how to use multiplication to check your answer to Exercise 1.

$$20 \times \frac{1}{5} = \frac{20}{5} = 4$$

#### Do You Know How?

3. Find  $3 \div \frac{1}{10}$ .

$$3 \times 10 = \frac{30}{1} = 30$$

4. Draw a model to find  $2 \div \frac{1}{6}$ .



5. Use a multiplication equation to check your answer to Exercise 4.

$$12 \times \frac{1}{6} = \frac{12}{6} = 2$$

$$20 \times \frac{1}{5} = \frac{20}{5} = 4$$

$$12 \div \frac{1}{6} = \frac{12}{\frac{1}{6}} = 72$$

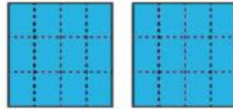
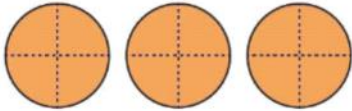
Complete 6, 12, 13, & 18

### ★ Independent Practice ★

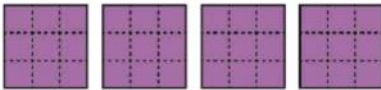
In 6–9, use the model to find each quotient. Use multiplication to check your answer.

6.  $3 \div \frac{1}{4}$

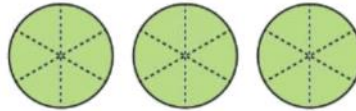
$= 12$      $12 \times \frac{1}{4} = \frac{12}{4} = 3 \Rightarrow 3 \div \frac{1}{4} = 12$



8.  $4 \div \frac{1}{9}$



9.  $3 \div \frac{1}{6}$



In 10–12, draw a model to find each quotient. Use multiplication to check your answer.

10.  $5 \div \frac{1}{6}$

11.  $4 \div \frac{1}{8}$

12.  $3 \div \frac{1}{3}$

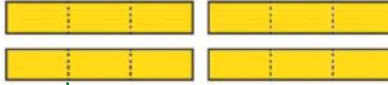
$3 \times \frac{3}{1} = \frac{9}{1} = 9$

$9 \times \frac{1}{3} = \frac{9 \times 1}{3} = \frac{9}{3} = 3$

\*For another example, see Set B on page 577.

## Math Practices and Problem Solving

13. **MP.4 Model with Math** Write and solve a division equation to find the number of  $\frac{1}{3}$ -pound hamburger patties that can be made from 4 pounds of ground beef.



$$4 \div \frac{1}{3} = 12 ; 12 \text{ patties}$$

14. Write and solve a word problem for the expression  $8 \div \frac{1}{2}$ .

15. **MP.7 Use Structure** Use the numbers in the multiplication equation  $28 \times \frac{1}{7} = 4$  to write a division equation involving division by a fraction.

16. **Number Sense** Sally and Timothy have two different answers for  $1,785 \div 35$ . Without dividing, how can you tell whose answer is wrong?

Sally:  $1,785 \div 35 = 51$   
 Timothy:  $1,785 \div 35 = 501$

17. **Higher Order Thinking** A restaurant charges \$3.50 for a slice of pie that is one sixth of a pie and \$3.00 for a slice that is one eighth of a pie. One day they baked 5 pies, all the same size. If they sell all the slices, would they make more money by slicing each pie into sixths or eighths? How much more? Explain.

$$5 \div \frac{1}{6} = 6$$

$$5 \div \frac{1}{8} = 8$$

$$5 \times 6 = 30 = 30 \text{ slices}$$

$$5 \times 8 = 40 = 40 \text{ slices}$$

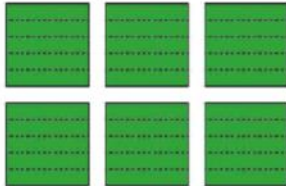
$$30 \times 3.50 = 105.00$$

$$40 \times 3.00 = 120$$

$$120 - 105 = 15$$

### Common Core Assessment

18. Javier drew a model to determine how many fifths are in 6 wholes.



#### Part A

Describe Javier's work by writing a division equation that includes a fraction.

$$6 \div \frac{1}{5} = 30$$

#### Part B

Check your answer by using the numbers in your division equation to write a multiplication equation.

$$30 \times \frac{1}{5} = \frac{30 \times 1}{5} = \frac{30}{5} = 6$$