

# Lesson 5

## ▶ Dividing Fractions

Monitoring Progress:  
▶ Quiz 1



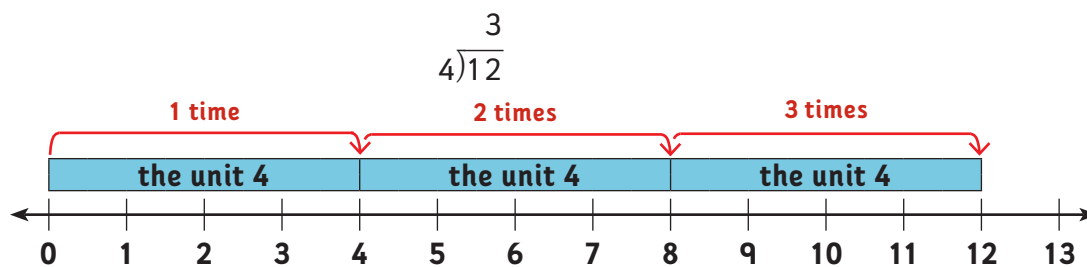
### ▶ Dividing Fractions

## What happens when we divide fractions?

Before we talk about dividing fractions, it's important to remember what it means to divide whole numbers. Here's a very simple model using a number line. We see that the unit 4 breaks up 12 three times. The unit 4 is a single unit.

### Example 1

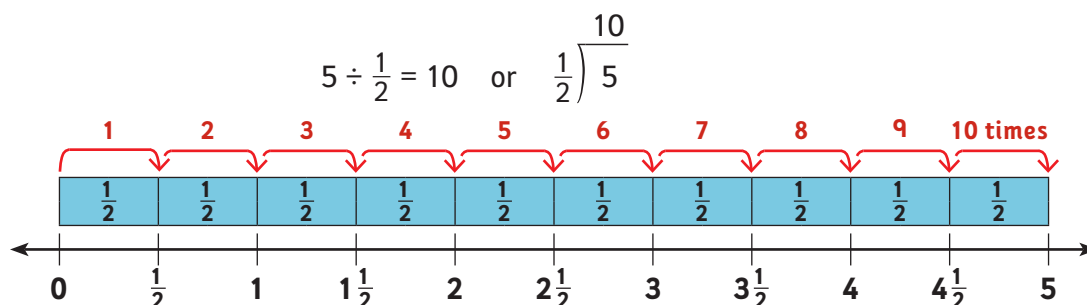
Use a number line to show division of whole numbers.



Now look at what happens when we divide a whole number by a fraction. The fraction  $\frac{1}{2}$  is a single unit that breaks up 5. It breaks it up 10 times.

### Example 2

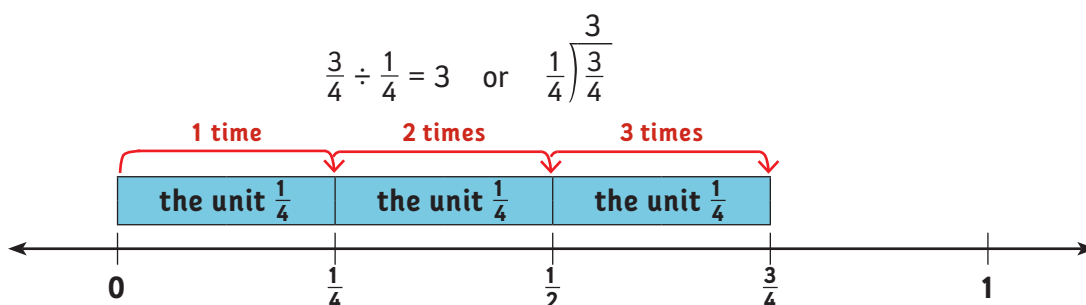
Use a number line to show a whole number divided by a fraction.



We use the number line to help us understand what is happening when we divide one fraction by another fraction. In each of the previous examples, we broke up a whole number by a unit. We call this unit the divisor. In Example 1, this divisor was a whole number, and in Example 2 it was a fraction. In the next example, we will break up a fraction by a unit that is also a fraction.

## Example 3

Use a number line to show division of fractions.



Let's think about the difference between division of whole numbers and division of fractions. Look at the difference in the quotient in the two problems below. Generally, when we divide whole numbers, the quotient is smaller than the number being divided (the dividend). When we divide fractions, this is generally the opposite.

Whole Numbers	Fractions
$\begin{array}{r} 6 \\ 5 \overline{) 30} \end{array}$	$\begin{array}{r} \frac{8}{9} \\ \frac{3}{4} \overline{) \frac{2}{3}} \end{array}$

The quotient 6 is smaller than the number 30. The quotient  $\frac{8}{9}$  is larger than the number  $\frac{2}{3}$ .

Remembering this difference between quotients and what we see when we use the number line helps us make sense of what is happening when we divide one fraction by another fraction.



When we divide one fraction by another, the quotient is often larger than the dividend.



## What is the shortcut for dividing fractions?

The shortcut for dividing fractions is to flip over, or invert, the second fraction, then multiply. This is the *traditional method* for dividing fractions.

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

Invert and multiply

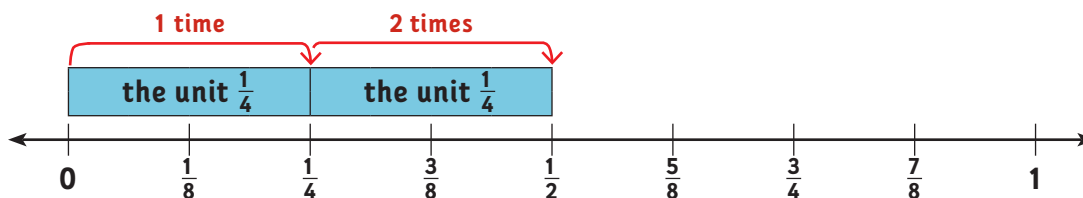
$$\frac{4}{8} \div \frac{1}{4} = \frac{4}{8} \cdot \frac{4}{1}$$

$$\frac{4}{8} \cdot \frac{4}{1} = \frac{16}{8}$$

Simplify the answer

$$\frac{16}{8} = \frac{2}{1} \text{ or } 2$$

The number line helps us see why this shortcut works. We divide the divisor  $\frac{1}{4}$  into the fraction. It breaks up the fraction  $\frac{4}{8}$  exactly 2 times.



Let's practice the traditional method for dividing fractions in Example 1.

### Example 1

Solve the problem using the traditional method for dividing fractions.

The shortcut for dividing fractions is to invert the second fraction, then multiply.

$$\frac{2}{4} \div \frac{6}{8} = \frac{2}{4} \cdot \frac{8}{6} = \frac{16}{24} = \frac{2}{3}$$



### Apply Skills

Turn to *Interactive Text*, page 13.



### Monitoring Progress

Quiz 1



### Reinforce Understanding

Use the *mBook Study Guide* to review lesson concepts.

## Homework

## Activity 1

**Multiply across and simplify the answer.**

1.  $\frac{1}{2} \cdot \frac{3}{4}$

2.  $\frac{4}{5} \cdot \frac{2}{3}$

3.  $\frac{4}{6} \cdot \frac{1}{2}$

4.  $\frac{2}{5} \cdot \frac{5}{10}$

## Activity 2

**Divide using invert and multiply. Simplify the answer.**

1.  $\frac{4}{5} \div \frac{1}{5}$

2.  $\frac{8}{9} \div \frac{1}{3}$

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

## Activity 3

**Answer the questions about the important statistics for the data set.**

Data Set: 1, 2, 2, 3, 4, 4, 5, 6, 6, 6, 7, 8, 25

1. The number 25 is called a(n) \_\_\_\_\_ because it is so different from the other data.
2. The number 25 impacts the \_\_\_\_\_ more than the median.
3. The number 6 is called the \_\_\_\_\_.
4. The range is 24 because it represents the distance between the \_\_\_\_\_ and the \_\_\_\_\_.

## Activity 4 • Distributed Practice

**Solve.**

1. List the first 6 multiples for 6 and 9. Find any common multiples.
2. List the factors of 36 and 48. What is the greatest common factor?
3. What is the least common denominator for  $\frac{3}{5} - \frac{1}{9}$ ?
4.  $\frac{3}{2} + \frac{5}{4}$
5.  $\frac{6}{7} - \frac{5}{7}$
6.  $\frac{4}{6} - \frac{2}{9}$
7.  $420 \div 10$