



# 9 Divide Fractions and Mixed Numbers

## Key Words

improper fraction  
mixed number  
reciprocal

To divide with fractions, you must multiply by the **reciprocal** of the divisor. To find the reciprocal of a number, flip the numerator and denominator. The reciprocal of  $\frac{2}{3}$  is  $\frac{3}{2}$ .

A **mixed number** is a number with a whole number and a fraction, such as  $1\frac{1}{4}$ . An **improper fraction** is a fraction whose numerator is greater than or equal to its denominator, such as  $\frac{5}{4}$  and  $\frac{4}{4}$ .

To divide by a mixed number, first convert it to an improper fraction. Then multiply by the reciprocal of the fraction.

### Example 1

Divide:  $\frac{3}{4} \div \frac{2}{5}$

The divisor is  $\frac{2}{5}$ , so its reciprocal is  $\frac{5}{2}$ .

Multiply by the reciprocal of the divisor.

$$\frac{3}{4} \div \frac{2}{5} = \frac{3}{4} \times \frac{5}{2} = \frac{3 \times 5}{4 \times 2} = \frac{15}{8}$$

Convert the product to a mixed number.

$$\frac{15}{8} = 1\frac{7}{8}$$

$$\frac{3}{4} \div \frac{2}{5} = 1\frac{7}{8}$$

### Example 2

Divide:  $2\frac{7}{8} \div 1\frac{1}{4}$

Convert the mixed numbers to improper fractions.

$$2\frac{7}{8} = \frac{23}{8} \quad 1\frac{1}{4} = \frac{5}{4}$$

The divisor is  $\frac{5}{4}$ , so the reciprocal is  $\frac{4}{5}$ .

Multiply by the reciprocal of the divisor.

$$\frac{23}{8} \div \frac{5}{4} = \frac{23}{8} \times \frac{4}{5} = \frac{23 \times 4}{8 \times 5} = \frac{92}{40}$$

Convert the product to a mixed number and simplify.

$$\frac{92}{40} = 2\frac{12}{40} = 2\frac{3}{10}$$

$$2\frac{7}{8} \div 1\frac{1}{4} = 2\frac{3}{10}$$

## COMPARE

How is dividing fractions similar to multiplying fractions?

Duplicating any part of this book is prohibited by law.

# Guided Practice

Divide:  $\frac{5}{6} \div \frac{1}{4}$

**Step 1** Change the division to multiplication.  
Find the reciprocal of the divisor.

$$\frac{5}{6} \div \frac{1}{4} = \frac{5}{6} \times \frac{\square}{\square}$$

**REMEMBER**

To find the reciprocal of a fraction, flip the numerator and denominator.

**Step 2** Multiply the numerators. Multiply the denominators.

$$\frac{5}{6} \times \frac{4}{1} = \frac{5 \times 4}{6 \times 1} = \frac{\square}{\square}$$

**Step 3** Convert the product to a mixed number and simplify if necessary.

$$\frac{20}{6} = \underline{\hspace{2cm}}$$

$$\frac{5}{6} \div \frac{1}{4} = \underline{\hspace{2cm}}$$

Divide:  $3\frac{1}{2} \div 1\frac{1}{8}$

**Step 1** Convert the mixed numbers to improper fractions.

$$3\frac{1}{2} = \frac{\square}{\square} \quad 1\frac{1}{8} = \frac{\square}{\square}$$

**REMEMBER**

Multiply the whole number by the denominator. Then add the product to the numerator.

**Step 2** Change the division to multiplication.  
Find the reciprocal of the divisor.

$$\frac{7}{2} \div \frac{9}{8} = \frac{7}{2} \times \frac{\square}{\square}$$

**Step 3** Multiply the numerators. Multiply the denominators.

$$\frac{7}{2} \times \frac{8}{9} = \frac{7 \times 8}{2 \times 9} = \frac{\square}{\square}$$

**Step 4** Convert the product to a mixed number and simplify if necessary.

$$\frac{56}{18} = \underline{\hspace{2cm}}$$

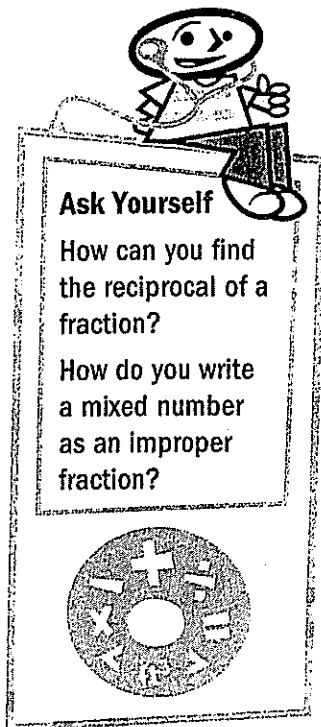
$$3\frac{1}{2} \div 1\frac{1}{8} = \underline{\hspace{2cm}}$$

Duplicating any part of this book is prohibited by law.



## Independent Practice

1. Describe the first step you must take when dividing mixed numbers.
- 
- 



Find each quotient.

2.  $4 \div \frac{1}{8} =$  \_\_\_\_\_

3.  $3 \div \frac{1}{6} =$  \_\_\_\_\_

4.  $\frac{1}{2} \div 2 =$  \_\_\_\_\_

5.  $2\frac{1}{4} \div \frac{1}{8} =$  \_\_\_\_\_

6.  $3\frac{1}{3} \div \frac{1}{3} =$  \_\_\_\_\_

7.  $4\frac{1}{2} \div 1\frac{1}{4} =$  \_\_\_\_\_

8. A baker has  $\frac{3}{4}$  ounce of salt. A recipe for a batch of muffins requires  $\frac{1}{8}$  ounce of salt. How many batches of muffins can the baker make from  $\frac{3}{4}$  ounce of salt?
- 

9. Gordon wants to run  $7\frac{1}{2}$  miles. The distance around a park is  $1\frac{1}{5}$  miles. How many times must Gordon run around the park to run the  $7\frac{1}{2}$  miles?
-

Find each quotient.

10.  $\frac{7}{8} \div \frac{3}{4} =$  \_\_\_\_\_

11.  $\frac{1}{2} \div \frac{3}{10} =$  \_\_\_\_\_

12.  $\frac{9}{10} \div \frac{5}{8} =$  \_\_\_\_\_

13.  $3\frac{3}{4} \div 1\frac{1}{2} =$  \_\_\_\_\_

14.  $3\frac{5}{8} \div 2\frac{3}{10} =$  \_\_\_\_\_

15.  $8\frac{2}{3} \div 2\frac{5}{6} =$  \_\_\_\_\_

16. A wooden board has a length of  $\frac{5}{6}$  yard. A builder wants to cut the board into pieces that are each  $\frac{1}{12}$  yard long. How many pieces will the builder be able to make?

\_\_\_\_\_

17. A grocer has  $\frac{7}{8}$  pound of walnuts. She wants to put them into bags so that each bag contains  $\frac{1}{5}$  pound of walnuts. How many bags will the grocer be able to make?

\_\_\_\_\_

18. The ceiling of a warehouse is  $9\frac{4}{5}$  feet tall. Shipping boxes are each  $1\frac{2}{5}$  feet tall. How many boxes can be stacked on top of each other inside the warehouse?

\_\_\_\_\_

19. A satellite rotates around Earth every  $4\frac{1}{8}$  hours. How many times will the satellite rotate around Earth in  $9\frac{3}{4}$  hours?

\_\_\_\_\_