

# Lesson 5

## Audio Tutor 1/16 Listen and Understand

# Divide Mixed Numbers

**Objective** Divide mixed numbers.



Trail mix may also include pumpkin seeds, dried apricots and figs, banana chips, and assorted nuts.

### Learn About It

Natalia combined raisins, sunflower seeds, peanuts, walnuts, and coconut to make  $6\frac{1}{4}$  pounds of trail mix for a hiking trip. How many  $1\frac{1}{4}$ -pound bags of trail mix can Natalia make?

Divide.  $6\frac{1}{4} \div 1\frac{1}{4} = \square$

**STEP 1** Write the mixed numbers as improper fractions.

$$6\frac{1}{4} \div 1\frac{1}{4} = \frac{25}{4} \div \frac{5}{4}$$

**STEP 2** Rewrite using the reciprocal of the divisor.

$$\frac{25}{4} \div \frac{5}{4} = \frac{25}{4} \times \frac{4}{5}$$

**STEP 3** Simplify by using prime factorization. Then multiply.

$$\begin{aligned} \frac{25}{4} \times \frac{4}{5} &= \frac{5 \times \overset{1}{\cancel{5}} \times \overset{1}{\cancel{2}} \times \overset{1}{\cancel{2}}}{\underset{1}{\cancel{2}} \times \underset{1}{\cancel{2}} \times \underset{1}{\cancel{5}}} = 5 \end{aligned}$$

**Solution:** Natalia can make five  $1\frac{1}{4}$ -pound bags of trail mix.

### Other Examples

#### A. Mixed Numbers and Fractions

$$\begin{aligned} 4\frac{3}{8} \div \frac{5}{6} &= \frac{35}{8} \div \frac{5}{6} \\ &= \frac{35}{8} \times \frac{6}{5} = \frac{\overset{1}{\cancel{5}} \times 7 \times \overset{1}{\cancel{2}} \times 3}{2 \times 2 \times \overset{1}{\cancel{2}} \times \overset{1}{\cancel{5}}} \\ &= \frac{21}{4} = 5\frac{1}{4} \end{aligned}$$

#### B. Divide a Whole Number by a Mixed Number

$$\begin{aligned} 3 \div 6\frac{3}{5} &= \frac{3}{1} \div \frac{33}{5} \\ &= \frac{3}{1} \times \frac{5}{33} = \frac{\overset{1}{\cancel{3}} \times 5}{1 \times \overset{1}{\cancel{3}} \times 11} \\ &= \frac{5}{11} \end{aligned}$$

### Guided Practice

Divide. Express each quotient in simplest form.

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

2.  $1\frac{1}{2} \div \frac{5}{6}$

3.  $2\frac{3}{5} \div 1\frac{7}{10}$

4.  $4\frac{8}{9} \div 2\frac{2}{3}$

5.  $3\frac{1}{3} \div 6\frac{2}{3}$

6.  $2\frac{5}{12} \div 3\frac{1}{3}$

### Ask Yourself

- Did I change the mixed numbers to improper fractions?
- Did I invert the divisor?

**Explain Your Thinking** ▶ How is multiplying by a proper fraction related to dividing by a mixed number?



## Practice and Problem Solving

Divide. Express each quotient in simplest form.

7.  $2\frac{1}{2} \div 3$

8.  $10 \div 2\frac{3}{4}$

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

10.  $4\frac{5}{7} \div 3\frac{2}{3}$

11.  $\frac{1}{2} \div 3\frac{4}{5}$

12.  $3\frac{3}{4} \div 2$

13.  $2\frac{4}{5} \div \frac{7}{8}$

14.  $2\frac{1}{3} \div 1\frac{2}{5}$

15.  $3\frac{2}{3} \div 2\frac{1}{2}$

16.  $\frac{2}{3} \div 4\frac{1}{6}$

17.  $\frac{3}{4} \div 2\frac{1}{3}$

18.  $6\frac{3}{4} \div 2\frac{1}{4}$

19.  $3\frac{4}{5} \div 8\frac{1}{5}$

20.  $2\frac{7}{8} \div 1\frac{1}{2}$

21.  $1\frac{3}{4} \div 1\frac{3}{4}$

22.  $4\frac{2}{3} \div 1\frac{5}{6}$


 **Data** Use the recipe at the right for Problems 24–26.

### Chocolate Chip Cookies

$2\frac{1}{4}$ cups flour	$\frac{1}{4}$ cup packed brown sugar
1 teaspoon baking soda	1 teaspoon vanilla extract
1 teaspoon salt	2 eggs
1 cup margarine	2 cups chocolate chips
$\frac{3}{4}$ cup white sugar	

23. Natalia made  $5\frac{1}{2}$  pounds of trail mix to share with friends during a charity walk. Does Natalia have enough trail mix to fill seven  $\frac{3}{4}$ -pound bags? Explain.

24. **Predict** The recipe on the right makes 1 batch of cookies. Suppose you changed the recipe to include a 2-pound bag of flour ( $1 \text{ cup} = \frac{1}{2}$  pound). Would you have enough flour to make 4 batches? Explain.

 25. **Write About It** Suppose you changed the recipe to include a 4-pound bag of white sugar ( $1 \text{ cup} = \frac{1}{2}$  pound). How many batches of cookies could you make? Explain how you solved the problem.

26. **What's Wrong?** Leroy decided to change the recipe to include a 3-pound bag of brown sugar ( $1 \text{ cup} = \frac{1}{2}$  pound). Leroy divided 3 by  $\frac{1}{2}$  and found that he could make 6 batches. What mistake did Leroy make? Explain.

## Mixed Review and Test Prep

### Open Response

Write an equivalent percent or decimal for each. (Ch. 4, Lesson 4)

27. 38%

28. 2.48

29. 88%

30. 46.5%

31. 0.07

32. 6.9

33. 0.135

34. 303%

35. 0.002

36. Niko divided  $4\frac{1}{2}$  pounds of fruit salad into  $1\frac{1}{2}$ -pound containers. How many containers did he use? (Ch. 6, Lesson 5)

Explain how you found your answer.



# Divide Mixed Numbers

Divide. Express each quotient in simplest form.

1.  $1\frac{1}{2} \div 2\frac{2}{3}$  \_\_\_\_\_

2.  $1\frac{1}{3} \div \frac{5}{12}$  \_\_\_\_\_

3.  $1\frac{7}{8} \div 2\frac{13}{16}$  \_\_\_\_\_

4.  $1\frac{2}{7} \div 1\frac{13}{14}$  \_\_\_\_\_

5.  $2\frac{2}{5} \div 6$  \_\_\_\_\_

6.  $3\frac{3}{5} \div 2\frac{1}{10}$  \_\_\_\_\_

7.  $1\frac{5}{7} \div 2\frac{1}{7}$  \_\_\_\_\_

8.  $3\frac{3}{4} \div 1\frac{9}{16}$  \_\_\_\_\_

9.  $2\frac{4}{5} \div 2\frac{1}{10}$  \_\_\_\_\_

10.  $3\frac{3}{5} \div 1\frac{11}{25}$  \_\_\_\_\_

11.  $6\frac{2}{3} \div 4\frac{4}{9}$  \_\_\_\_\_

12.  $3\frac{3}{5} \div 3\frac{9}{15}$  \_\_\_\_\_

13.  $3\frac{4}{5} \div \frac{1}{10}$  \_\_\_\_\_

14.  $6\frac{2}{3} \div 2$  \_\_\_\_\_

## Test Prep

15. What is the simplest form for  $1\frac{1}{2} \div 2\frac{3}{4}$ ?

A  $\frac{6}{11}$

C  $1\frac{5}{6}$

B  $\frac{12}{22}$

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

16. Ian has  $4\frac{1}{2}$  cups of flour he wants to split equally among  $2\frac{1}{2}$  recipe portions. How much flour will be in each portion? Explain how you got your answer.

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# Divide Mixed Numbers

## How to Divide Mixed Numbers

Find  $3\frac{1}{8} \div 2\frac{1}{4}$ .

**Step 1:** Rewrite the mixed numbers as improper fractions.

$$3\frac{1}{8} \div 2\frac{1}{4} = \frac{25}{8} \div \frac{9}{4}$$

**Step 2:** Rewrite as a multiplication problem using the reciprocal of the divisor.

$$\frac{25}{8} \times \frac{4}{9}$$

**Step 3:** Simplify using prime factorization. Then multiply.

Simplify.

$$\frac{25}{8} \times \frac{4}{9} =$$

$$\frac{5 \times 5 \times \cancel{2}^1 \times \cancel{2}^1}{\underset{1}{\cancel{2}} \times \underset{1}{\cancel{2}} \times 2 \times 3 \times 3} = \frac{25}{18}$$

$$\frac{25}{18} = 1\frac{7}{18}$$

Divide. Express each quotient in simplest form.

1.  $4 \div 2\frac{1}{6}$

2.  $8 \div 2\frac{3}{4}$

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

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

5.  $4\frac{1}{2} \div 1\frac{1}{3}$

6.  $3\frac{1}{6} \div \frac{1}{2}$

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

8.  $6 \div 2\frac{3}{4}$

9.  $5\frac{1}{2} \div 2\frac{1}{3}$

10.  $9 \div 2\frac{5}{6}$

11.  $\frac{3}{5} \div 2\frac{1}{2}$

12.  $3\frac{3}{4} \div 2$

## Problem Solving

Show Your Work

13. Chen-Yi equally divided  $2\frac{1}{2}$  gallons of fruit punch into four containers. How much fruit punch is in each container?