

Topic

10

# Fractions, Mixed Numbers, and Decimals



1

The Great Owlet Moth of Brazil has one of the largest wingspans of all insects. Just how large is it? You will find out in Lesson 10-7.

2

How many miles per hour do San Francisco's cable cars travel? You will find out in Lesson 10-3.



Lesson  
**10-1**



**NS 1.5 Grade 4** Explain different interpretations of fractions, for example, parts of a whole, parts of a set, and division of whole numbers by whole numbers; explain equivalence of fractions (see Standard 4.0). Also **NS 1.0**

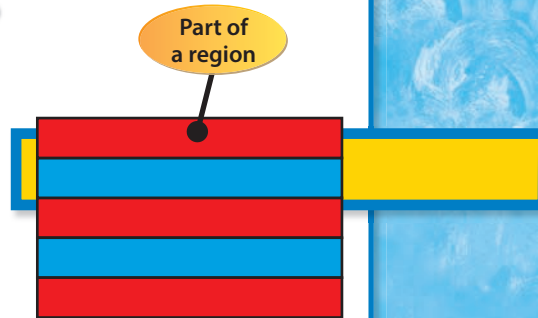
# Meanings of Fractions

## What is the meaning of a fraction?

A **fraction** describes one or more parts of a whole that is divided into equal parts. The whole can be a region, a set, or a segment.

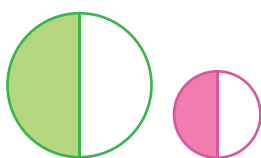
**numerator**  $\frac{3}{5}$  ← number of equal parts that are red  
**denominator**  $\frac{3}{5}$  ← total number of equal parts

In the flag shown at the right,  $\frac{3}{5}$  of the flag is red.



### Another Example Does a fraction such as $\frac{1}{2}$ always represent the same amount?

In each figure below,  $\frac{1}{2}$  of the figure is shaded. Does  $\frac{1}{2}$  represent the same amount for both figures? Explain.



No. Even though  $\frac{1}{2}$  of each figure is shaded, the whole in the first figure is much larger than the whole in the second figure. The amount of the whole determines what the fraction represents.

#### Explain It

1. In each segment,  $\frac{3}{4}$  of the segment is shaded. Does  $\frac{3}{4}$  of the first segment represent the same amount as  $\frac{3}{4}$  of the second? Explain.



## Guided Practice\*

### Do you know HOW?

In 1 and 2, write the fraction that names the shaded part.



### Do you UNDERSTAND?

3. What fraction names the blue part of the flag in the example at the top?
4. What fraction names the part of the animals that are dogs in the example at the top?
5. If a quilt has 16 equal parts and 4 of the parts are yellow, what fraction names the part that is yellow? What fraction names the part that is not yellow?

Part of a set



There are 8 animals.  
3 out of 8 are cats.  
 $\frac{3}{8}$  of the animals are cats.

Part of a segment

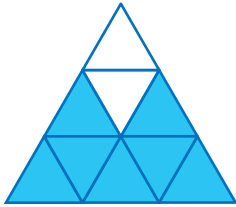


There are 4 parts to the segment.  
1 of the parts is shaded.  
 $\frac{1}{4}$  of the segment is shaded.

## Independent Practice

In **6** through **10**, write the fraction that names the shaded part.

6.



9.

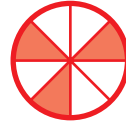


You can count the number of shaded parts to find the numerator.

7.



8.



10.

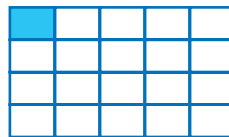


In **11** through **14**, write the fraction that names the unshaded part.

11.



12.



13.



14.



In **15** through **17**, draw a model to show each fraction.

15. 8 out of 9 as part of a region

16. 6 out of 7 as part of a set

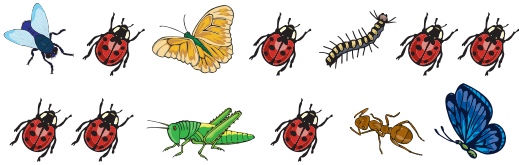
17. 3 out of 5 as part of a segment



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## Problem Solving

18. Ladybugs are easy to identify because they are red with black spots. What fraction of the insects shown below are ladybugs?



20. Write a numerical expression for each word expression:
- fifty-two divided by 2
  - the product of twenty-two and two
  - five dollars less than eighteen dollars
  - eighty increased by 5

22. John bought a shirt and a CD. The CD cost \$13 and the shirt cost \$17 more than the CD. How much did John spend in all?

24. If you throw a bowling ball and knock down four pins, what fraction of the total number of pins are still standing?

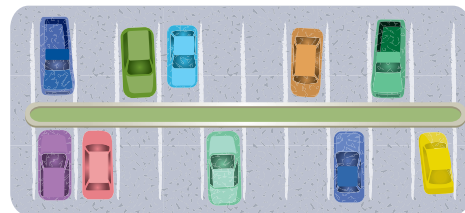


- A  $\frac{4}{10}$                       C  $\frac{4}{6}$   
 B  $\frac{6}{10}$                       D  $\frac{4}{5}$
26. About 4 square feet out of every 5 square feet of exhibit space at a state fair is used by the Auto Show. What fraction of the exhibit space represents this estimated space used by the Auto Show?

19. What fraction of the fruit are pineapples?



21. What fraction of the parking spaces are in use?



23. **Writing to Explain** Explain how to round 456 to the hundreds place.

25. **Think About the Process** How could you find the numerator of the fraction that represents the shaded part of the square that is divided into 4 equal parts?



- A Count the total parts that are shaded.  
 B Count the total parts that are unshaded.  
 C Count the total number of shaded and unshaded parts.  
 D Subtract the number of unshaded parts from the shaded parts.

# Algebra Connections

## What's a Rule?

Remember that tables can be used to show relationships between pairs of numbers.

<i>Number of Feet</i>	1	2	3	4
<i>Number of Inches</i>	12	24	36	48

If you know a length in feet, you can multiply by 12 to find the length in inches. When you know a length in inches, you can divide by 12 to find the length in feet.

### Example:

What rule connects the number of hours to the number of days? Find the missing numbers.

<i>Number of Days</i>	1	2	3	4	■	■
<i>Number of Hours</i>	24	48	72	96	120	240

Rule:

Divide the number of hours by 24 to find the number of days.

$$120 \div 24 = 5. \text{ So, } 120 \text{ hours} = 5 \text{ days.}$$

$$240 \div 24 = 10. \text{ So, } 240 \text{ hours} = 10 \text{ days.}$$

For 1 through 7, find a rule. Then find the missing numbers in the chart.

1.

<i>Quarters</i>	4	8	12	16	20	60
<i>Dollars</i>	1	2	3	4	■	■

2.

<i>Apples</i>	30	35	40	45	50	75
<i>Baskets</i>	6	7	8	9	■	■

3.

<i>Loaves</i>	1	2	3	4	5	9
<i>Slices</i>	20	40	60	80	■	■

4.

<i>Cups</i>	3	4	5	6	7	10
<i>Fluid Ounces</i>	24	32	40	48	■	■

5.

<i>Marbles</i>	<i>Bags</i>
50	1
100	2
150	3
200	■
450	■

6.

<i>Tomatoes</i>	<i>Containers</i>
30	2
45	3
60	4
75	5
120	■

7.

<i>Yards</i>	<i>Inches</i>
1	36
2	72
3	108
4	144
10	■

# Lesson 10-2



**NS 1.5** Identify and represent on a number line decimals, fractions, mixed numbers, and positive and negative integers.

## Fractions and Division

**How can fractions be used to show division?**

Al, Lisa, Franco, and Laura are making a collage. They will share 3 rectangular strips of colored paper. What fraction represents the part of a whole strip of paper each will get?



1 whole



1 whole

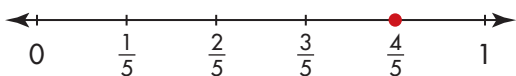


1 whole

Find  $3 \div 4$ .

### Another Example How can you use a number line to represent fractions?

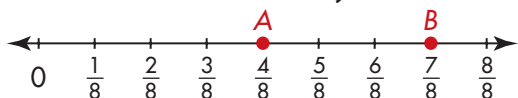
One way to find a point on a number line that represents a fraction is to divide a unit segment (0 to 1) into equal parts. To find  $\frac{4}{5}$ , divide the segment into 5 equal parts.



Then find the point  $\frac{4}{5}$  of the way from 0 to 1.

#### Explain It

1. Explain how you would find the fraction  $\frac{2}{5}$  on the number line above.
2. What fraction is shown by Point A below? Point B?



### Guided Practice\*

#### Do you know HOW?

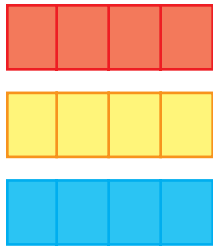
Give each answer as a fraction.

- |                |               |
|----------------|---------------|
| 1. $1 \div 2$  | 2. $1 \div 4$ |
| 3. $9 \div 10$ | 4. $5 \div 8$ |
| 5. $3 \div 4$  | 6. $7 \div 9$ |
| 7. $7 \div 11$ | 8. $3 \div 6$ |

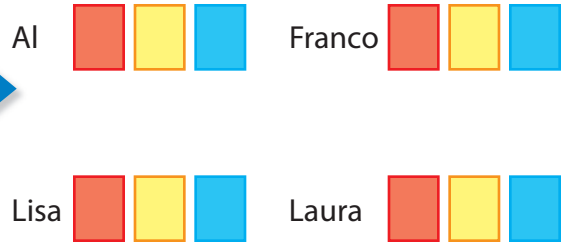
#### Do you UNDERSTAND?

9. **Writing to Explain** How can you represent  $\frac{3}{4}$  on a number line?
10. Four friends want to share three loaves of bread. One student suggests that each of the three loaves be divided into 4 equal parts. If each person gets 3 of the parts, how much of a whole loaf does each person get in all?

One way to divide 3 wholes into 4 equal parts is to first divide each whole into 4 equal parts. Each part is  $\frac{1}{4}$  of a whole.



Rearrange the  $\frac{1}{4}$  pieces. Each person gets 3 of the  $\frac{1}{4}$  pieces. Each gets  $\frac{3}{4}$ . So  $3 \div 4 = \frac{3}{4}$ .



## Independent Practice

In **11** through **14**, write each as a fraction. Then show each on a number line.

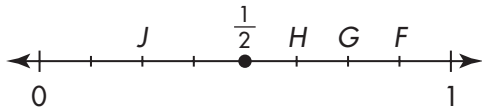
**11.**  $1 \div 3$

**12.**  $2 \div 3$

**13.**  $3 \div 4$

**14.**  $1 \div 2$

In **15** through **18**, use the number line to name each point with a fraction.



**15.** *F*

**16.** *G*

**17.** *H*

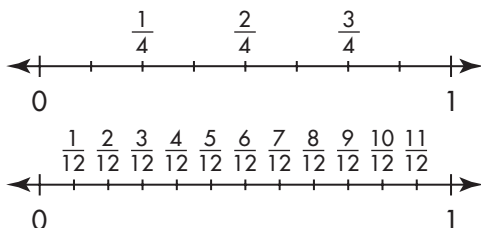
**18.** *J*

## Problem Solving

**19. Algebra** Which expression represents "30 subtracted from a number"?

- A**  $30n$
- B**  $30 - n$
- C**  $30 + n$
- D**  $n - 30$

**21.** Which fraction is closer to 1:  $\frac{3}{4}$  or  $\frac{5}{12}$ ? Use the number lines below to justify your answer.



**20. Think About the Process** There are 6 pieces of construction paper for 7 people. Each person needs an equal amount. What is the first step to divide the construction paper?

- A** Cut each piece of construction paper into 6 equal parts.
- B** Cut each piece of construction paper into 7 equal parts.
- C** Cut each piece of construction paper into 13 equal parts.
- D** Cut each piece of construction paper into 42 equal parts.

# Lesson 10-3



**NS 1.0** Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.

## Mixed Numbers and Improper Fractions

How are mixed numbers and improper fractions related?

Jack has 20 square tiles. He uses them to cover box lids with 3 rows of 3 square tiles. What number can name the total region covered by the tiles?



### Guided Practice\*

#### Do you know HOW?

Write each improper fraction as a mixed number or each mixed number as an improper fraction.

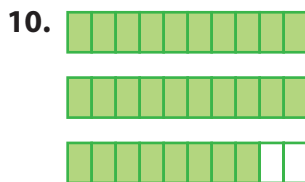
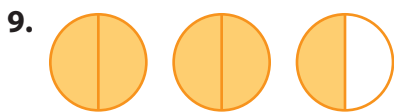
- |                    |                   |
|--------------------|-------------------|
| 1. $\frac{3}{2}$   | 2. $2\frac{3}{4}$ |
| 3. $3\frac{1}{4}$  | 4. $\frac{7}{6}$  |
| 5. $9\frac{1}{10}$ | 6. $\frac{21}{2}$ |

#### Do you UNDERSTAND?

- What is a general rule for writing a mixed number as an improper fraction?
- Writing to Explain** Simone thinks that  $\frac{8}{4}$  is not an improper fraction because  $8 \div 4 = 2$ . Is she correct? Explain.

### Independent Practice

In **9** and **10**, write an improper fraction and a mixed number for the model.



In **11** through **18**, write each improper fraction as a mixed number or each mixed number as an improper fraction.

- |                    |                   |                     |                    |
|--------------------|-------------------|---------------------|--------------------|
| 11. $4\frac{1}{2}$ | 12. $\frac{3}{2}$ | 13. $4\frac{9}{10}$ | 14. $5\frac{3}{4}$ |
| 15. $\frac{22}{3}$ | 16. $\frac{5}{4}$ | 17. $8\frac{2}{3}$  | 18. $6\frac{1}{3}$ |



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A **mixed number** is a whole number and a fraction. You can write  $20 \div 9$  as a mixed number. You know that  $20 \div 9 = \frac{20}{9}$ .

Divide the numerator by the denominator.

$$\begin{array}{r} 2 \\ 9 \overline{)20} \\ \underline{18} \\ 2 \end{array}$$

Write the remainder as a fraction. Put the remainder over the divisor.

So,  $20 \div 9 = \frac{20}{9}$  or  $2\frac{2}{9}$ .

An **improper fraction** is a fraction whose numerator is greater than or equal to its denominator.

Write  $2\frac{2}{9}$  as an improper fraction.

Multiply the denominator of the fraction by the whole number.  $9 \times 2 = 18$ .

Add the numerator of the fraction.  $18 + 2 = 20$

Write using the same denominator.

So,  $2\frac{2}{9} = \frac{20}{9}$



### Problem Solving

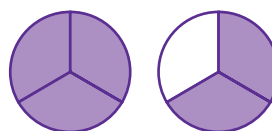
19. The Long Term Parking sculpture in France contains 60 cars embedded in concrete. It is 65.6 feet high. How tall is the Long Term Parking sculpture as a mixed number and an improper fraction?

20. **Reasoning** Is  $\frac{5}{5}$  an improper fraction? Explain your reasoning.

21. When transporting passengers, cable cars in San Francisco travel at a steady rate of  $9\frac{5}{10}$  miles per hour. Write  $9\frac{5}{10}$  as an improper fraction.

22. The weights in pounds of 4 packages are given below. Order the weights from least to greatest.  
0.9   0.03   1.8   0.14

23. Write an improper fraction and mixed number for the shaded portion of the model.



24. A board is  $4\frac{2}{3}$  feet long. How could you change  $4\frac{2}{3}$  into an improper fraction?

A Add 4 and  $\frac{2}{3}$ .

B Divide 4 by  $\frac{2}{3}$ .

C Multiply 4 by 3. Then, add 2. Write that number as a numerator over a denominator of 3.

D Multiply 4 by 2 and then add 3. Write as a numerator over a denominator of 3.

# Lesson 10-4



**NS 1.5 Grade 4** Explain different interpretations of fractions, for example, parts of a whole, parts of a set, and division of whole numbers by whole numbers; explain equivalence of fractions (see Standard 4.0).

## Equivalent Fractions

How do you find equivalent fractions?

Out of 12 apples, 8 are red. So,  $\frac{8}{12}$  of the apples are red. Hannah says that  $\frac{4}{6}$  of the apples are red, and Sam says that  $\frac{2}{3}$  are red. Who is correct?



### Guided Practice\*

#### Do you know HOW?

In **1** through **6**, find two equivalent fractions for each fraction.

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

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

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

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

5.  $\frac{9}{18}$

6.  $\frac{8}{10}$

#### Do you UNDERSTAND?

7. Sam said that  $\frac{4}{12}$  of the apples are green. Name two equivalent fractions for  $\frac{4}{12}$ .

8. **Writing to Explain** Jon said that it would be impossible to write all fractions equivalent to  $\frac{1}{2}$ . Is he right?

### Independent Practice

In **9** through **12**, find the missing nonzero number to make the fractions equivalent.

9.  $\frac{1 \times \square = 6}{3 \times \square = 18}$

10.  $\frac{17 \div \square = 1}{34 \div \square = 2}$

11.  $\frac{30 \div \square = 6}{35 \div \square = 7}$

12.  $\frac{9 \times \square = 36}{12 \times \square = 48}$

In **13** through **16**, find the missing numerator to make the fractions equivalent.

13.  $\frac{1}{3} = \frac{\square}{9}$

14.  $\frac{7}{9} = \frac{\square}{63}$

15.  $\frac{30}{40} = \frac{\square}{8}$

16.  $\frac{15}{35} = \frac{\square}{7}$

In **17** through **24**, find the missing denominator to make the fractions equivalent.

17.  $\frac{5}{12} = \frac{10}{\square}$

18.  $\frac{2}{7} = \frac{10}{\square}$

19.  $\frac{14}{80} = \frac{7}{\square}$

20.  $\frac{6}{18} = \frac{3}{\square}$

21.  $\frac{80}{100} = \frac{20}{\square}$

22.  $\frac{12}{\square} = \frac{3}{16}$

23.  $\frac{10}{\square} = \frac{2}{5}$

24.  $\frac{7}{\square} = \frac{21}{36}$

You can multiply or divide the numerator and denominator by the same nonzero number to get equivalent fractions.

### One Way

Use multiplication.  
Multiply 4 and 6 by 2.

$$\frac{4}{6} = \frac{8}{12}$$

The fractions  $\frac{4}{6}$  and  $\frac{8}{12}$  are equivalent fractions.

### Another Way

Use division.  
Divide 4 and 6 by 2.

$$\frac{4}{6} = \frac{2}{3}$$

The fractions  $\frac{4}{6}$  and  $\frac{2}{3}$  are equivalent fractions.

So, Hannah and Sam were both correct since  $\frac{8}{12}$  is equivalent to  $\frac{4}{6}$ , and  $\frac{2}{3}$  is equivalent to  $\frac{4}{6}$ .

### Problem Solving

25. Ming dropped a package of 8 light bulbs and 2 of the bulbs broke. Write two equivalent fractions to represent the fraction of the bulbs that broke.

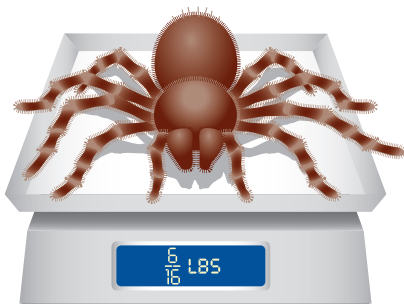
27. What is the least amount you can spend to buy 7 books?

Sale! 2 for \$5.50  
or 1 for \$3.00



29. It rained 0.45 inch on Friday, 2.2 inches on Saturday, and 1.02 inches on Sunday. How much more did it rain on Saturday than on Friday and Sunday combined?
31. A 2-year old goliath bird-eating spider weighs 6 ounces, or  $\frac{6}{16}$  of a pound. Which fraction is equivalent to  $\frac{6}{16}$ ?

- A  $\frac{1}{4}$   
B  $\frac{1}{3}$   
C  $\frac{1}{8}$   
D  $\frac{3}{8}$



26. Marcus spelled 20 out of 25 words correctly. What fraction of the words did he spell correctly? What fraction of the words did he spell incorrectly? Write two equivalent fractions for each.

28. **Writing to Explain** Explain why  $\frac{6}{15}$  and  $\frac{3}{5}$  are NOT equivalent fractions.

30. It takes about 12 minutes to hard boil an egg. What fraction of an hour is 12 minutes?

- A  $\frac{1}{4}$                       C  $\frac{2}{5}$   
B  $\frac{1}{5}$                       D  $\frac{2}{3}$

32. Maurice ran  $\frac{1}{2}$  of a mile, or 2,640 feet in 3 minutes 30 seconds. Which of the following is NOT an equivalent fraction for  $\frac{1}{2}$ ?

- A  $\frac{2}{4}$                       C  $\frac{17}{34}$   
B  $\frac{10}{20}$                     D  $\frac{16}{30}$

Lesson  
**10-5**



**NS 1.1 Grade 6** Compare and order positive and negative fractions, decimals, and mixed numbers and place them on a number line.

# Comparing and Ordering Fractions and Mixed Numbers

**How can you compare fractions?**

Shawna and Tom walked two different paths in Trout park. Shawna walked  $\frac{5}{6}$  mile. Tom walked  $\frac{3}{4}$  mile. Which is greater,  $\frac{5}{6}$  or  $\frac{3}{4}$ ?



## Another Example How can you order fractions and mixed numbers?

Write  $2\frac{5}{12}$ ,  $\frac{11}{12}$ ,  $3\frac{1}{6}$ , and  $2\frac{1}{3}$  in order from greatest to least.

You know that  $\frac{11}{12} < 1$  and all the mixed numbers are greater than 1. So,  $\frac{11}{12}$  is the least number.

When comparing mixed numbers, look at the whole number parts. Since  $3 > 2$ , you know that  $3\frac{1}{6}$  is greater than both  $2\frac{1}{3}$  and  $2\frac{5}{12}$ .

Next, compare  $2\frac{1}{3}$  and  $2\frac{5}{12}$ .

Since the whole numbers are the same, compare the fractions.

Compare  $\frac{1}{3}$  and  $\frac{5}{12}$ . Change  $\frac{1}{3}$  to  $\frac{4}{12}$ .  $\frac{4}{12} < \frac{5}{12}$ .

So,  $2\frac{1}{3} < 2\frac{5}{12}$ .

From greatest to least, the numbers are  $3\frac{1}{6}$ ,  $2\frac{5}{12}$ ,  $2\frac{1}{3}$ ,  $\frac{11}{12}$ .

## Guided Practice\*

### Do you know HOW?

Compare. Write  $>$ ,  $<$  or  $=$  for each  $\bigcirc$ .

1.  $\frac{3}{5} \bigcirc \frac{4}{5}$

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

Order the numbers from least to greatest.

3.  $\frac{2}{3}, \frac{1}{4}, \frac{9}{10}$

4.  $1\frac{2}{3}, 2\frac{1}{4}, 1\frac{9}{10}$

### Do you UNDERSTAND?

5. How do you know that  $\frac{5}{12}$  is less than  $\frac{1}{2}$ ?

6. How do you know that  $5\frac{1}{12} > 4\frac{1}{2}$  without finding a common denominator for both fraction parts?

### One Way

To compare fractions, find a common denominator by writing the multiples of each denominator.

**4:** 4, 8, **12**, 16, 20, ...

**6:** 6, **12**, 18, 24, ...

Use 12 as the common denominator.

$$\frac{5}{6} \times \frac{2}{2} = \frac{10}{12} \quad \frac{3}{4} \times \frac{3}{3} = \frac{9}{12}$$

$$\frac{10}{12} > \frac{9}{12}, \text{ so, } \frac{5}{6} > \frac{3}{4}.$$

### Another Way

You can multiply the denominators to find a common denominator.

Compare  $\frac{3}{4}$  and  $\frac{5}{6}$ .

Multiply denominators:  $4 \times 6 = 24$ .

Use 24 as the common denominator.

$$\frac{5}{6} \times \frac{4}{4} = \frac{20}{24} \quad \frac{3}{4} \times \frac{6}{6} = \frac{18}{24}$$

$$\frac{20}{24} > \frac{18}{24}, \text{ so, } \frac{5}{6} > \frac{3}{4}.$$

## Independent Practice

In **7** through **10**, compare the numbers. Write  $>$ ,  $<$  or  $=$  for each  $\bigcirc$ .



You can always multiply the denominators to find a common denominator.

**7.**  $\frac{3}{4} \bigcirc \frac{4}{5}$

**8.**  $\frac{9}{10} \bigcirc \frac{18}{20}$

**9.**  $3\frac{6}{7} \bigcirc 3\frac{13}{14}$

**10.**  $1\frac{7}{8} \bigcirc 1\frac{2}{3}$

In **11** and **12**, order the numbers from least to greatest.

**11.**  $\frac{1}{2}, \frac{1}{4}, \frac{5}{6}, \frac{3}{4}$

**12.**  $2\frac{1}{2}, 1\frac{7}{8}, 2\frac{3}{4}, 2\frac{3}{5}$

### Problem Solving

**13.** Birdhouses can provide homes for many different kinds of birds. The size of the opening will determine the kind of bird that can use it. Order the data in the table from least to greatest.

**14.** Sarah rode her bike  $2\frac{1}{2}$  miles on Thursday,  $2\frac{7}{10}$  miles on Friday, and  $2\frac{5}{8}$  miles on Saturday. Which day did she ride farthest?

**15.** At the school fair, 157 tickets were sold. The tickets cost \$3 apiece. The goal was to make \$300 in ticket sales. By how much was the goal exceeded?

**A** \$71

**C** \$371

**B** \$171

**D** \$471

Data

Type of Bird	Size of Birdhouse Opening (in inches)
Screech owl	3
Chickadee	$1\frac{1}{8}$
House wren	1
Tree swallow	$1\frac{1}{2}$

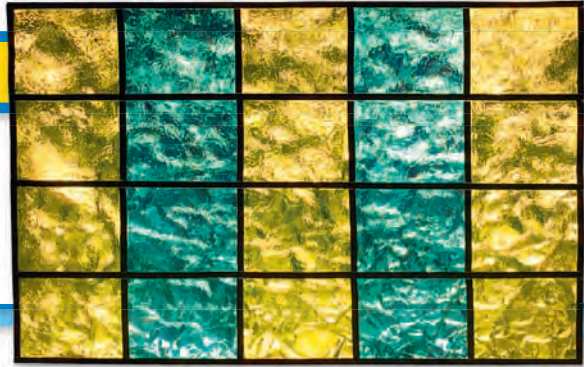


**NS 2.4 Grade 6** Determine the least common multiple and the greatest common divisor of whole numbers; use them to solve problems with fractions (e.g., to find a common denominator to add two fractions or to find the reduced form for a fraction).

## Fractions in Simplest Form

How can you write a fraction in simplest form?

A stained glass window has 20 panes. Out of 20 sections, 12 are yellow. So  $\frac{12}{20}$  of the panes are yellow. Notice how the picture also shows that  $\frac{3}{5}$  are yellow.



### Another Example How can you use the GCF to find the simplest form of a fraction?

There are 36 students in the fifth-grade class. Twenty-seven will go to the mathematics competition. What is the simplest form of the fraction of the class going to competition?

**A**  $\frac{1}{9}$

**B**  $\frac{2}{5}$

**C**  $\frac{3}{4}$

**D**  $\frac{7}{8}$

**Factors of 27:** 1, 3, 9, 27

**Factors of 36:** 1, 2, 3, 4, 6, 9, 18, 36.

The GCF of 27 and 36 is 9.

Then, divide the numerator and denominator by the GCF.

$$\frac{27 \div 9}{36 \div 9} = \frac{3}{4}$$

The simplest form of  $\frac{27}{36}$  is  $\frac{3}{4}$ .

The correct choice is **C**.

### Explain It

1. In finding the simplest form in the Another Example, do you get the same answer if you list factor pairs? Explain.
2. John said that he divided the numerator and denominator of  $\frac{18}{54}$  by 2, so  $\frac{9}{27}$  is the simplest form of the fraction. Do you agree? Explain.

A fraction is in **simplest form** when its numerator and denominator have no common factor other than 1.

To write  $\frac{12}{20}$  in simplest form, find a common factor of the numerator and the denominator. Since 12 and 20 are even numbers, they have 2 as a factor.

Divide both 12 and 20 by 2.

$$\frac{12 \div 2}{20 \div 2} = \frac{6}{10}$$

Both 6 and 10 are even. Divide both by 2.

$$\frac{6 \div 2}{10 \div 2} = \frac{3}{5}$$

Since 3 and 5 have no common factor other than 1,  $\frac{3}{5}$  is in simplest form.

## Guided Practice\*

### Do you know HOW?

In **1** through **6**, write each fraction in simplest form.

1.  $\frac{16}{32}$

2.  $\frac{10}{14}$

3.  $\frac{33}{77}$

4.  $\frac{16}{20}$

5.  $\frac{30}{40}$

6.  $\frac{10}{15}$

### Do you UNDERSTAND?

7. In the stained glass window pattern above, what fraction in simplest form names the green tiles?
8. **Writing to Explain** Why is it easier to divide the numerator and denominator by the GCF rather than any other factor?

## Independent Practice

For **9** through **32**, write each fraction in simplest form.

9.  $\frac{300}{400}$

10.  $\frac{55}{60}$

11.  $\frac{3}{6}$

12.  $\frac{75}{100}$

13.  $\frac{14}{21}$

14.  $\frac{4}{12}$

15.  $\frac{42}{48}$

16.  $\frac{63}{70}$

17.  $\frac{18}{21}$

18.  $\frac{22}{44}$

19.  $\frac{6}{42}$

20.  $\frac{15}{25}$

21.  $\frac{9}{81}$

22.  $\frac{12}{100}$

23.  $\frac{7}{21}$

24.  $\frac{16}{30}$

25.  $\frac{99}{121}$

26.  $\frac{122}{144}$

27.  $\frac{28}{42}$

28.  $\frac{32}{80}$

29.  $\frac{40}{80}$

30.  $\frac{11}{22}$

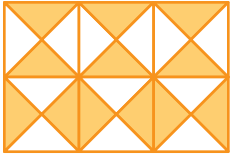
31.  $\frac{60}{80}$

32.  $\frac{8}{100}$



## Problem Solving

33. Write a fraction in simplest form that shows the shaded part of the figure.



35. **Writing to Explain** Explain how you know that  $\frac{55}{80}$  is not in simplest form.
37. **Writing to Explain** Can you assume that any fraction is in simplest form if either the numerator or denominator is a prime number?
39. Mayflies can live at the bottom of lakes for 2 to 3 years before they become winged adults. Mayflies are between  $\frac{4}{10}$  inches and 1.6 inches long. If this mayfly is  $\frac{4}{10}$  of an inch long, how can you write  $\frac{4}{10}$  in simplest form?
- A  $\frac{1}{6}$                       C  $\frac{2}{5}$   
B  $\frac{1}{4}$                       D  $\frac{8}{20}$
41. **Think About the Process** Rita sells birdhouses for \$10 each. She uses  $3\frac{1}{2}$  ft of wood for each birdhouse. Which operation would she use to find how much money she will receive if she sells 14 birdhouses?
- A Multiplication  
B Division  
C Addition  
D Subtraction
34. Mrs. Lok is planning a 600-mile trip. Her car has an 18-gallon gas tank and gets 29 miles per gallon. Will 1 tank full of gas be enough for the trip?
36. If 5 packages of hot dogs cost \$10.25, what is the cost of 1 package?
38. A store manager wants to give away the last 84 samples of hand cream. She counts 26 customers in the store. She will give each customer the same number of free samples. How many free samples will each customer get?
40. **Reasoning** Use divisibility rules to find a number that satisfies the given conditions.
- a a number greater than 75 that is divisible by 2 and 5.  
b a three-digit number divisible by 3, 5 and 6.
42. **Think About the Process** A parking garage has 4 levels with 28 spaces on each level. If 52 spaces are occupied, which of the following shows a way to find the number of spaces that are unoccupied?
- A Add 28 to the product of 52 and 4.  
B Add 52 to the product of 28 and 4.  
C Subtract 28 from the product of 52 and 4.  
D Subtract 52 from the product of 4 and 28.





Find the difference. Estimate to check if the answer is reasonable.

$$\begin{array}{r} 1. \quad 19,450 \\ - \quad 8,275 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 81,025 \\ - \quad 4,827 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 75,075 \\ - \quad 6,038 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 67,890 \\ - \quad 23,458 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 96,375 \\ - \quad 5,240 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 6,363 \\ - \quad 5,454 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 51,515 \\ - \quad 17,171 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 8,898 \\ - \quad 7,361 \\ \hline \end{array}$$

Find the sum. Estimate to check if the answer is reasonable.

$$9. \quad 45.98 + 3.4$$

$$10. \quad 17.9 + 0.87$$

$$11. \quad 35.89 + 3.4$$

$$12. \quad 41.28 + 7.9$$

$$13. \quad 650.05 + 25.2$$

$$14. \quad 9.4 + 0.186$$

$$15. \quad 0.345 + 2.34 + 14.7$$

$$16. \quad 6.87 + 4.512 + 18.4$$

$$17. \quad 37.02 + 0.98$$

**Error Search** Find each answer that is not correct. Write it correctly and explain the error.

$$\begin{array}{r} 18. \quad 6.78 \\ \times \quad 5 \\ \hline 33.9 \end{array}$$

$$\begin{array}{r} 19. \quad 0.27 \\ + \quad 0.85 \\ \hline 1.11 \end{array}$$

$$20. \quad 3.5 - 0.29 = 0.6$$

$$21. \quad \begin{array}{r} 0.38 \\ 2 \overline{)7.60} \end{array}$$

## Number Sense

**Estimating and Reasoning** Write whether each statement is true or false. Explain your reasoning.

22. The value of  $n \div n \times n$  will always equal  $n$ , as long as  $n$  is not zero.
23. The difference of 6.8 and 1.02 is closer to 5 than 6.
24. The expression  $(8 + 8) \div 8 \times 8$  equals 16.
25. The quotient of  $45,894 \div 2$  will have a remainder of 1.
26. The product of  $400 \times 750$  is 20,000 less than 280,000.
27. The expression  $3.56d$  equals 12.816 when  $d = 3.6$ .

# Lesson 10-7



**NS 1.0** Compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.

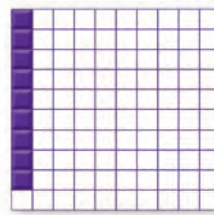
## Tenths and Hundredths

How can you write a fraction as a decimal?

A fraction such as  $\frac{3}{10}$  or  $\frac{9}{100}$  can be shown by a model.



$$\frac{3}{10}$$



$$\frac{9}{100}$$

### Other Examples

How can you use division to write a fraction as a decimal?

Write  $\frac{3}{5}$  as a decimal.

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

Divide the numerator by the denominator.

$$\begin{array}{r} 0.6 \\ 5 \overline{)3.0} \\ \underline{-30} \\ 0 \end{array}$$

Insert a decimal point after 3 and annex zeros as needed.  
So,  $\frac{3}{5} = 0.6$ .

Write  $\frac{1}{4}$  as a decimal.

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

$$\begin{array}{r} 0.25 \\ 4 \overline{)1.00} \\ \underline{-8} \downarrow \\ 20 \\ \underline{-20} \\ 0 \end{array}$$

Insert a decimal point after 1 and annex zeros as needed.  
So,  $\frac{1}{4} = 0.25$ .

#### Explain It

- How can you write  $\frac{9}{100}$  as a division problem?
- In the second example, how many zeros did you need to annex after 1 when you divided 1 by 4?

### Guided Practice\*

#### Do you know HOW?

Write each decimal as a fraction and each fraction as a decimal.

- 0.1
- 0.02
- $\frac{9}{10}$
- $\frac{7}{100}$
- Use division to change  $\frac{11}{20}$  to a decimal.

#### Do you UNDERSTAND?

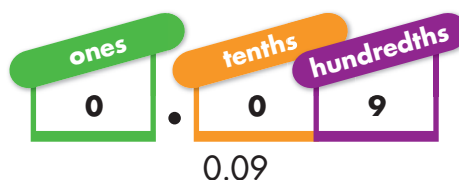
- Describe two ways to write a decimal as a fraction.
- Writing to Explain** How is  $\frac{3}{10}$  equal to 0.3?

The word name for  $\frac{3}{10}$  is three tenths. Three tenths can be shown on a place-value chart,



So,  $\frac{3}{10} = 0.3$ .

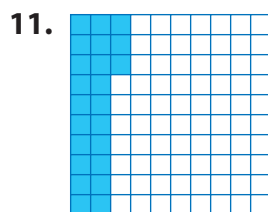
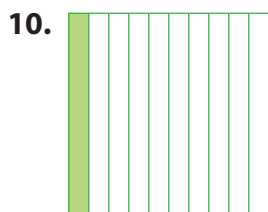
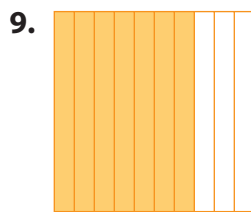
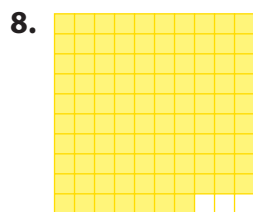
The word name for  $\frac{9}{100}$  is nine hundredths. Nine hundredths can be shown on a place-value chart,



So,  $\frac{9}{100} = 0.09$ .

## Independent Practice

In **8** through **11**, write a decimal and fraction for the shaded portion of each model.



In **12** through **19**, write each decimal as either a fraction or a mixed number.

**12.** 3.2

**13.** 0.7

**14.** 0.23

**15.** 9.75

**16.** 7.7

**17.** 0.4

**18.** 0.81

**19.** 2.43

In **20** through **27**, write each fraction or mixed number as a decimal.

**20.**  $2\frac{1}{100}$

**21.**  $9\frac{3}{10}$

**22.**  $\frac{9}{10}$

**23.**  $1\frac{18}{100}$

**24.**  $6\frac{31}{100}$

**25.**  $4\frac{1}{10}$

**26.**  $\frac{4}{10}$

**27.**  $6\frac{6}{100}$

Use division to change each fraction to a decimal.

**28.**  $\frac{2}{5}$

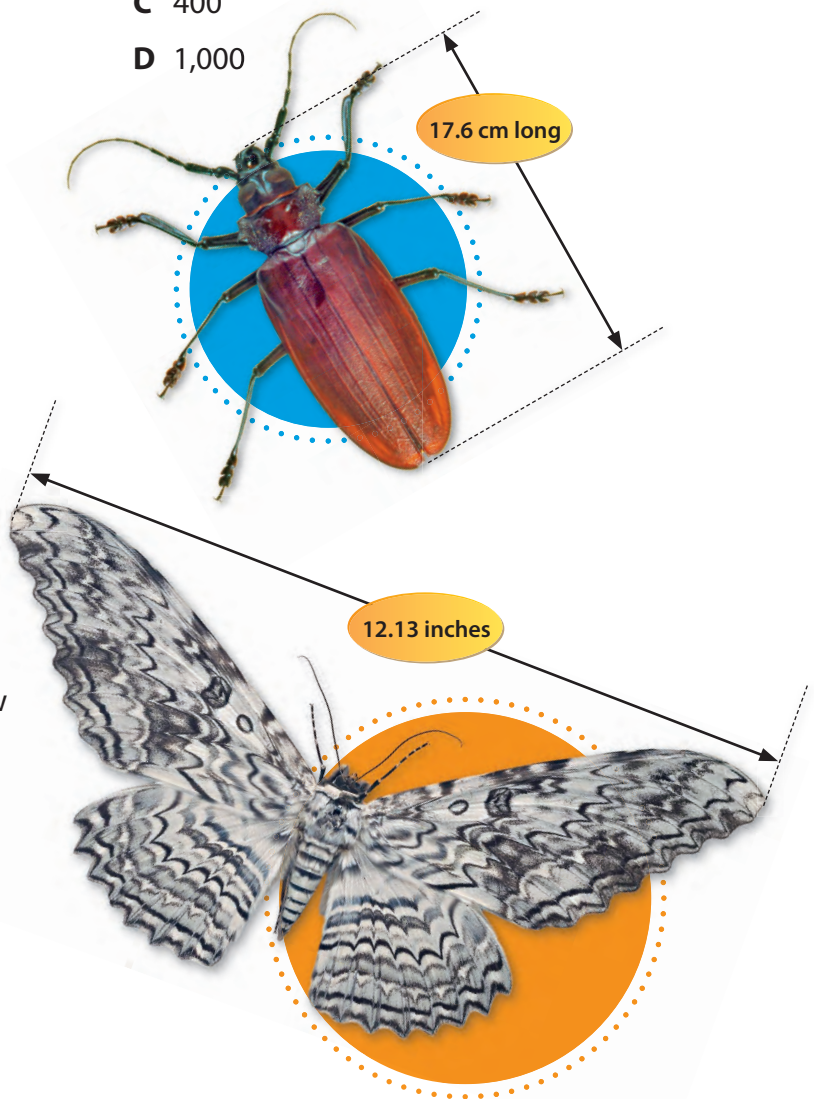
**29.**  $\frac{3}{25}$

**30.**  $\frac{7}{50}$

**31.**  $\frac{9}{20}$

## Problem Solving

32. What is  $\frac{97}{100}$  as a decimal?  
**A** 97.0                      **C** 0.97  
**B** 9.7                         **D** 0.097
33. Kate drives 234 miles in 5 hours. Felix only has to drive one half the distance that Kate does. How many miles does Felix have to drive?
34. What is the value of the underlined digit? 457,140,167
35. What is the best estimate for this product?  
 $81 \times 409$
36. Jorge is packing books into boxes. Each box can hold 16 books. Which expression can be used to find the total number of boxes that he needs in order to pack 96 books?  
**A**  $96 \div 16$   
**B**  $96 - 16$   
**C**  $96 + 16$   
**D**  $96 \times 16$
37. At a high-school graduation, there were 200 students in the class. They were seated in 5 different sections of the auditorium. How many graduates were seated in each section?  
**A** 40  
**B** 195  
**C** 400  
**D** 1,000
38. *Titanus giganteus* is one of the largest known beetles on Earth.  
**a** How long is *Titanus giganteus* written as a mixed number?  
**b** How long is *Titanus giganteus* written as an improper fraction?
39. The Great Owlet Moth has a wingspan of 12.13 inches. Write this number as a mixed number.
40. **Think About the Process** A design is divided into 5 equal parts and  $\frac{2}{5}$  are shaded. How would you change  $\frac{2}{5}$  to a decimal?  
**A** Divide 2 by 5.  
**B** Divide 5 by 2.  
**C** Multiply 2 by 5.  
**D** Add 2 and 5.



# Mixed Problem Solving

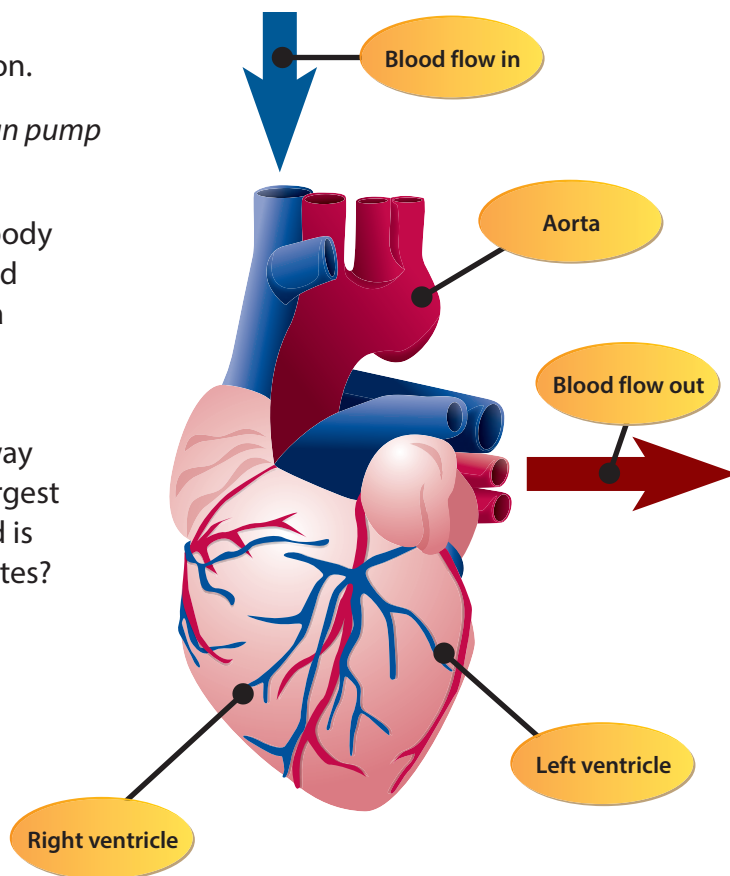
The human body is very complex. It is made up of systems of organs. These organs consist of tissues, which are made of many cells.

1. Muscles make up about  $\frac{4}{10}$  of the average person's body mass. Write  $\frac{4}{10}$  in decimal form.
2. An average ten-year-old weighs about  $86\frac{1}{2}$  pounds and has muscles that weigh about  $34\frac{1}{5}$  pounds. Write these weights in decimal form.
3. A person is born with about  $\frac{25}{100}$  liters of blood. Write  $\frac{25}{100}$  in decimal form.
4. About how much do the muscles of two average ten-year-olds weigh? Write this weight in decimal form.
5. A cell is comprised of mostly water. About  $\frac{70}{100}$  of the material in a typical cell is water. What is this fraction written in decimal form?
6. The part of the brain called the gray matter is a layer about  $2\frac{5}{10}$  millimeters thick. Write the thickness of the gray matter in decimals.

In **7** and **8**, use the following information.

*The left ventricle of an average person can pump about 5.25 liters of blood per minute.*

7. The total volume of blood in the body is the same as the amount pumped per minute. Write this amount as a mixed number in simplest form.
8. The left ventricle pumps blood away from the heart into your body's largest artery, the aorta. How much blood is pumped into the aorta in 10 minutes?  
**A** 0.525 liters      **C** 52.5 liters  
**B** 5.25 liters      **D** 525 liters



# Lesson 10-8



**NS 1.0** Compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.

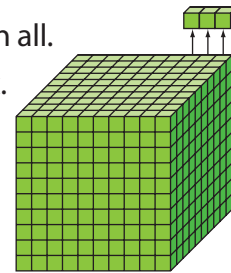
## Thousandths

### How are fractions related to decimals?

A large box is filled with cubes. There are 1,000 cubes in all.

Each cube can be thought of as  $\frac{1}{1,000}$  of the whole box.

Think about pulling 3 cubes from the box. Since one cube can be shown as  $\frac{1}{1,000}$ , this means that 3 cubes could be shown by  $\frac{3}{1,000}$ . How can you use a decimal to represent this fraction?



$10 \times 10 \times 10$

### Guided Practice\*

#### Do you know HOW?

In **1** through **4**, write each decimal as a fraction or mixed number.

1. 0.003
2. 0.050
3. 7.001
4. 0.393

In **5** through **8**, write each fraction as a decimal.

5.  $\frac{389}{1,000}$
6.  $3\frac{673}{1,000}$
7.  $\frac{211}{1,000}$
8.  $\frac{90}{1,000}$

#### Do you UNDERSTAND?

9. **Writing to Explain** How is  $\frac{3}{10}$  different from  $\frac{3}{1000}$  in place value?
10. How would you write the fraction of cubes that are left when 3 cubes are pulled from the box in the model above?

### Independent Practice

In **11** through **18**, write each decimal as a fraction or mixed number.

11. 0.007
12. 0.008
13. 0.065
14. 0.900
15. 0.832
16. 0.023
17. 3.078
18. 5.001

In **19** through **26**, write each fraction or mixed number as a decimal.

19.  $\frac{434}{1,000}$
20.  $3\frac{499}{1,000}$
21.  $\frac{873}{1,000}$
22.  $\frac{309}{1,000}$
23.  $1\frac{17}{1,000}$
24.  $\frac{9}{1,000}$
25.  $\frac{990}{1,000}$
26.  $5\frac{707}{1,000}$



# Lesson 10-9

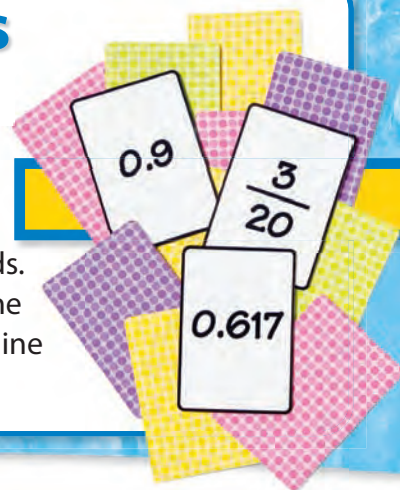


**NS 1.5** Identify and represent on a number line decimals, fractions, mixed numbers, and positive and negative integers.

## Fractions and Decimals on the Number Line

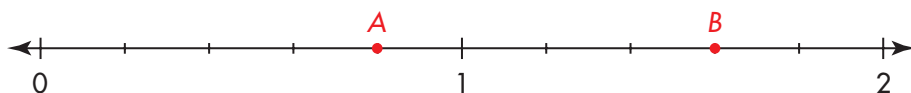
How can you locate fractions and decimals on the same number line?

Jules is playing a game in which she chooses 3 cards. Each is labeled with a fraction or a decimal. Then she must locate a point for each number on a number line that is divided into 10 segments between 0 and 1.



### Another Example How can you name points on a number line?

What fraction or mixed number can name Point A? Point B?  
What decimal can name Point A? Point B?



The segment between 0 and 1 is divided into 5 equal parts. So, Point A is named by  $\frac{4}{5}$ . You could use division to change  $\frac{4}{5}$  to 0.8. Point B is named by  $1\frac{3}{5}$ . Since  $3 \div 5 = 0.6$ , another name for Point B is 1.6.

$$\begin{array}{r} 0.8 \\ 5 \overline{)4.0} \\ - 40 \\ \hline 0 \end{array} \qquad \begin{array}{r} 0.6 \\ 5 \overline{)3.0} \\ - 30 \\ \hline 0 \end{array}$$

### Explain It

- Which is farther to the right on the number line,  $\frac{1}{4}$  or 0.2? Why?

## Guided Practice\*

### Do you know HOW?

Show each set of numbers on the same number line.

- $\frac{8}{10}$ , 0.2, 0.7
- $\frac{18}{20}$ , 0.1,  $\frac{6}{10}$
- $\frac{11}{10}$ , 0.65, 0.311

### Do you UNDERSTAND?

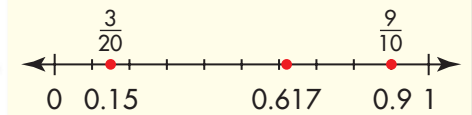
- Is  $\frac{9}{10}$  to the left or right of 1 on the number line? Explain.
- Will 0.617 be to the left or right of  $\frac{6}{10}$  on a number line?
- Writing to Explain** Explain how you can find 0.311 on the number line.



### What You Think

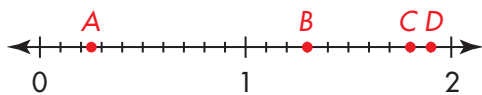
- I know that 0.9 also means  $\frac{9}{10}$ . I can easily locate  $\frac{9}{10}$ .
- I know that  $\frac{3}{20}$  means  $3 \div 20$ . I can divide to find  $3 \div 20 = 0.15$ .  
0.1 = 0.10 and 0.2 = 0.20. So, 0.15 is halfway between 0.1 and 0.2.
- 0.6 = 0.600 and 0.7 = 0.700. So 0.617 is between 0.6 and 0.7. It is closer to 0.6 than 0.7.

### What You Show



## Independent Practice

In **7** through **10**, name the fraction or mixed number and decimal that identifies each point.



**7.** Point A

**8.** Point B

**9.** Point C

**10.** Point D



Remember to count over from 0 on the number line to find the number of parts of the whole.

Draw a number line to show each set of numbers. Then order the numbers from least to greatest.

**11.**  $\frac{2}{5}$ , 0.35, 0.7

**12.**  $\frac{7}{20}$ , 0.15,  $\frac{12}{25}$

**13.**  $\frac{3}{4}$ , 0.1, 0.22

### Problem Solving

**14. Number Sense** Nadia has  $2\frac{1}{2}$  pounds of tomatoes, 2.7 pounds of chicken, 2.1 pounds of celery, and  $2\frac{2}{5}$  pounds of tomatillos. Which food weighs the most?

**15.** The top three scores in an ice-dancing competition were 60.53, 59.29, and 61.07. Order the scores from least to greatest.

**16.** If you located the following numbers on a number line, which would be closest to 0?

0.2,  $\frac{2}{100}$ ,  $\frac{3}{5}$ ,  $\frac{2}{20}$

**A** 0.2

**C**  $\frac{3}{5}$

**B**  $\frac{2}{100}$

**D**  $\frac{2}{20}$

**17.** Chris bought an apple for \$0.58 with a \$1 bill and received \$0.42 in change. What is the least number of coins he could have received?

**A** 4

**C** 6

**B** 5

**D** 7



**MR 2.3** Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning. Also **NS 1.1, 1.7**  
**Grade 4**

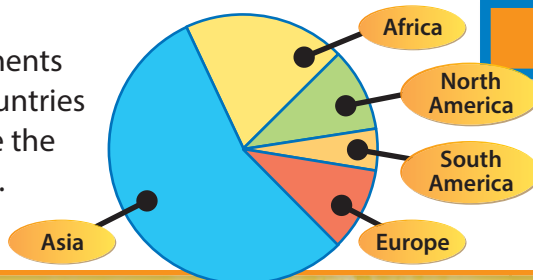
**Problem Solving**

# Writing to Explain

How do you write a math explanation?

The circle graph shows the continents where the 20 most populated countries of the world are located. Estimate the fractional part for each continent. Explain how you decided.

**Locations of the 20 Most Populated Countries in the World**



## Guided Practice\*

### Do you know HOW?

1. Estimate the fractional part of the square that is shaded. Explain how you decided.

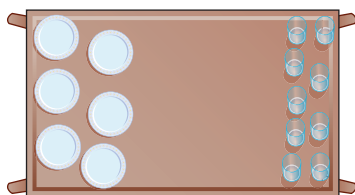


### Do you UNDERSTAND?

2. Draw a picture to show  $\frac{2}{3}$  as a benchmark fraction.
3. **Write a Problem** Write a real-world problem that involves a benchmark fraction. Your problem should ask for an explanation as part of the solution.

## Independent Practice

For 4 and 5, use the picture below.



4. Estimate the part of the table that is covered with plates. Explain how you decided.
5. Estimate the part of the table that is covered with glasses. Explain how you decided.
6. Draw a kitchen table. Using plates, show the benchmark fraction,  $\frac{3}{4}$ . Explain how you decided the number of many plates to draw.

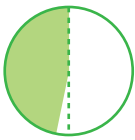
### Stuck? Try this....

- What do I know?
- What am I asked to find?
- What diagram can I use to help understand the problem?
- Can I use addition, subtraction, multiplication, or division?
- Is all of my work correct?
- Did I answer the right question?
- Is my answer reasonable?



Animated Glossary  
[www.pearsonsuccessnet.com](http://www.pearsonsuccessnet.com)

To estimate a fractional amount, use a **benchmark fraction** that is close to the actual fractional amount.



about  $\frac{1}{2}$



about  $\frac{1}{4}$



about  $\frac{1}{3}$

### Writing a Math Explanation

Use words, pictures, numbers, or symbols to write a good math explanation.

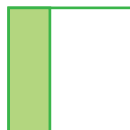
**Asia:** If you draw a line from the top of the graph to the bottom, you can see this continent is a little more than  $\frac{1}{2}$ .

**Africa:** This part is a little less than  $\frac{1}{4}$ .

**Europe and North America:** About 10 of each of these can fill the circle, so this is about  $\frac{1}{10}$ .

**South America:** This part is less than the part for Europe, so I'll say about  $\frac{1}{20}$ .

7. Estimate the fractional part of the square that is shaded. Explain how you decided.



8. Estimate the part of the square that is NOT shaded. Explain how you decided.



9. Draw a rectangle and shade about  $\frac{1}{3}$  of it. Explain how you decided how much to shade.

10. Draw two circles that are different sizes. Shade about  $\frac{1}{8}$  of each. Are the shaded parts the same amount? Explain.

11. The Mayfield Little League baseball diamond is being covered with a tarp because of rain. About how much of the diamond is NOT covered with the tarp?



12. Cereal is a good source of protein. How many quarter cups of cereal are there in  $6\frac{1}{4}$  cups?
13. A refreshment stand at the fair was open for 3 hours. Four people each took turns working at the stand for the same amount of time. How many minutes did each person work?

For 14, decide if there is extra or missing information. Solve if possible.

14. Gene's new car gets 35 miles per gallon. Matt's car gets 32 miles per gallon. How many more gallons of gas will Matt's car use than Gene's car to go to the beach?

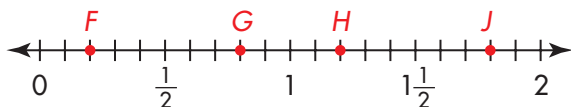
1. To make a stained glass window, Robert used 16 pieces of glass. Seven of the pieces were red. What fraction of the pieces were red? (10-1)

A  $\frac{7}{16}$   
 B  $\frac{9}{16}$   
 C  $\frac{7}{9}$   
 D  $\frac{16}{7}$

2. How can  $\frac{12}{18}$  be written in simplest form? (10-6)

A Multiply 12 and 18 by their GCF, 3.  
 B Multiply 12 and 18 by their GCF, 6.  
 C Divide 12 and 18 by their GCF, 3.  
 D Divide 12 and 18 by their GCF, 6.

3. Which point on the number line represents 1.2 or  $1\frac{1}{5}$ ? (10-9)



- A Point F  
 B Point G  
 C Point H  
 D Point J
4. Jason ran  $2\frac{9}{10}$  miles on Monday,  $1\frac{4}{5}$  miles on Tuesday, and  $1\frac{7}{10}$  miles on Thursday. Which list has the miles Jason ran from least to greatest? (10-5)

A  $1\frac{4}{5}, 2\frac{9}{10}, 1\frac{7}{10}$   
 B  $1\frac{4}{5}, 1\frac{7}{10}, 2\frac{9}{10}$   
 C  $1\frac{7}{10}, 2\frac{9}{10}, 1\frac{4}{5}$   
 D  $1\frac{7}{10}, 1\frac{4}{5}, 2\frac{9}{10}$

5. The atomic weight of hydrogen is 1.008. Which of the following mixed numbers is the same as 1.008? (10-8)

A  $1\frac{8}{1000}$   
 B  $1\frac{8}{100}$   
 C  $1\frac{8}{10}$   
 D  $1\frac{10}{8}$

6. A store has the floor plan shown. The area of the women's department is 600 ft<sup>2</sup>. Find the best estimate of the total area of the store. (10-10)



- A Women's is about  $\frac{1}{3}$  of the total area, so the store is about  $600 \times 3$  or 200 ft<sup>2</sup>.  
 B Women's is about  $\frac{1}{3}$  of the total area, so the store is about  $3 \times 600$  or 1,800 ft<sup>2</sup>.  
 C Women's is about  $\frac{1}{4}$  of the total area, so the store is about  $600 \div 4$  or 150 ft<sup>2</sup>.  
 D Women's is about  $\frac{1}{4}$  of the total area, so the store is about  $4 \times 600$  or 2,400 ft<sup>2</sup>.

7. To amend the Constitution of the United States,  $\frac{2}{3}$  of each house of Congress must approve the amendment. Is  $\frac{7}{12}$  of a house's approval enough? (10-5)

A No, because  $\frac{7}{12} < \frac{2}{3}$   
 B No, because  $\frac{7}{12} > \frac{2}{3}$   
 C Yes, because  $\frac{7}{12} < \frac{2}{3}$   
 D Yes, because  $\frac{7}{12} > \frac{2}{3}$

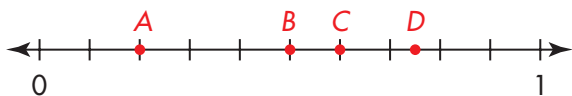
8. Which is equal to  $5\frac{3}{10}$ ? (10-3)

A  $\frac{53}{50}$   
 B  $\frac{25}{10}$   
 C  $\frac{53}{10}$   
 D  $\frac{15}{10}$

9. About  $\frac{2}{5}$  of U.S. households own at least one dog. Which is equal to  $\frac{2}{5}$ ? (10-7)

A 0.6  
 B 0.4  
 C 0.2  
 D 0.04

10. What is the value of Point A on the number line? (10-9)



A  $\frac{2}{5}$   
 B  $\frac{1}{5}$   
 C 0.5  
 D 0.4

11. The table shows water fowl that Hong counted at the lake. What fraction of the water fowl listed are Mallards? (10-6)

Water Fowl Type	Number
Canadian geese	5
Crane	3
Mallards	12

A  $\frac{3}{5}$   
 B  $\frac{8}{12}$   
 C  $\frac{3}{2}$   
 D  $\frac{5}{3}$

12. Which of the following fractions is equivalent to  $\frac{3}{8}$ ? (10-4)

A  $\frac{13}{18}$   
 B  $\frac{9}{14}$   
 C  $\frac{9}{24}$   
 D  $\frac{1}{6}$

13. Which of the following equals  $\frac{15}{8}$ ? (10-8)

A 1.875  
 B 1.625  
 C 1.58  
 D 1.375

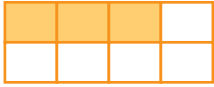
14. Which represents  $3 \div 5$  written as a fraction? (10-2)

A  $\frac{5}{3}$   
 B  $1\frac{2}{3}$   
 C  $\frac{3}{5}$   
 D 0.6

## Set A, pages 214–216

You can find the part of the whole, part of the set, or part of a segment using a model.

Write the fraction that names the shaded part.



The model shows  $\frac{3}{8}$  shaded.

**Remember** that the numerator tells you how many equal-sized parts are shaded. The denominator tells you the total number of equal-sized parts.

Write fractions for the shaded and unshaded portions of each model.



## Set B, pages 218–219

José and three friends want to create chalkboard art in three equal-sized spaces on the playground. How much of each space will each student get?

To show  $3 \div 4$ , you can use a fraction.

$$3 \div 4 = \frac{3}{4}$$

Each student will get  $\frac{3}{4}$  of one space.

**Remember** that to show a fraction on the number line, you need to divide the number line into equal parts.

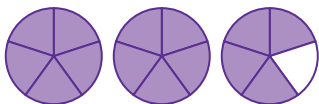
Give each answer as a fraction. Then show each on a number line.

1.  $1 \div 4$

2.  $2 \div 5$

## Set C, pages 220–221

Write the improper fraction and mixed number.



There are 2 wholes shaded and  $\frac{4}{5}$  of 1 whole shaded. You can see that this is  $2\frac{4}{5}$  or  $\frac{14}{5}$ .

You can also follow the steps below to write  $2\frac{4}{5}$  as an improper fraction.

**Step 1**

Multiply the denominator of the fraction by the whole number.  
 $2 \times 5 = 10$

**Step 2**

Add the numerator of the fraction to the product of the denominator and the whole number.  
 $10 + 4 = 14$

**Step 3**

Write the fraction using the same denominator.  $\frac{14}{5}$

**Remember** that an improper fraction and a mixed number can represent the same value.

Write each mixed number as an improper fraction.

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

2.  $2\frac{2}{3}$

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

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

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

6.  $9\frac{7}{8}$

Write each improper fraction as a mixed number.

7.  $\frac{4}{3}$

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

9.  $\frac{6}{4}$

10.  $\frac{12}{9}$

11.  $\frac{31}{7}$

12.  $\frac{46}{5}$

**Set D**, pages 222–223

Write two fractions equivalent to  $\frac{3}{7}$ .

To form equivalent fractions, multiply both the numerator and denominator of the given fraction by the same number.

$$\frac{3 \times 4}{7 \times 4} = \frac{12}{28}, \frac{3 \times 5}{7 \times 5} = \frac{15}{35}$$

So,  $\frac{12}{28}$  and  $\frac{15}{35}$  are equivalent to  $\frac{3}{7}$ .

**Remember** that you multiply or divide both the numerator and denominator to find equivalent fractions.

Write two fractions that are equivalent to each of the following.

- |                  |                  |
|------------------|------------------|
| 1. $\frac{1}{2}$ | 2. $\frac{3}{4}$ |
| 3. $\frac{2}{3}$ | 4. $\frac{5}{7}$ |

**Set E**, pages 224–225

Compare  $\frac{4}{16}$  and  $\frac{3}{8}$ .

To compare numbers, you can find a common denominator. Write multiples of each number.

Circle the common multiple.

16: 16, 32, 48, ...

8: 8, 16, 24, ...

Use 16 as the common denominator.

$$\frac{4}{16} = \frac{4}{16} \quad \frac{3 \times 2}{8 \times 2} = \frac{6}{16}$$

$$\frac{4}{16} < \frac{6}{16}, \text{ and so } \frac{4}{16} < \frac{3}{8}.$$

Write  $\frac{1}{5}$ ,  $\frac{1}{8}$ ,  $\frac{3}{10}$ , and  $1\frac{1}{2}$  in order from least to greatest.

$$\frac{1}{8} < \frac{1}{5} \text{ because both numerators are 1, and } 8 > 5.$$

$$\frac{1}{5} < \frac{3}{10} \text{ because } \frac{1}{5} = \frac{2}{10} \text{ and } \frac{2}{10} < \frac{3}{10}.$$

$1\frac{1}{2}$  is greater than any of the values because it is greater than 1.

So, the order is  $\frac{1}{8}$ ,  $\frac{1}{5}$ ,  $\frac{3}{10}$ ,  $1\frac{1}{2}$ .

**Remember** that you can always find a common denominator by multiplying the denominators together.

Compare. Write  $>$ ,  $<$ , or  $=$  for each  $\bigcirc$ .

- |  |  |
|--|--|
| 1. $\frac{2}{5} \bigcirc \frac{3}{10}$ | 2. $\frac{9}{12} \bigcirc \frac{1}{5}$   |
| 3. $\frac{7}{12} \bigcirc \frac{1}{3}$ | 4. $\frac{8}{15} \bigcirc \frac{20}{45}$ |
| 5. $\frac{3}{6} \bigcirc \frac{4}{7}$  | 6. $\frac{9}{10} \bigcirc \frac{18}{19}$ |

Order the numbers from the least to greatest.

7.  $\frac{2}{3}, \frac{1}{4}, \frac{2}{5}, \frac{1}{3}$
8.  $\frac{2}{7}, \frac{1}{10}, \frac{1}{3}, \frac{5}{6}$
9.  $\frac{9}{10}, 1\frac{3}{5}, \frac{4}{7}, \frac{11}{12}$
10.  $3\frac{1}{2}, 3\frac{1}{8}, 3\frac{2}{5}, 3\frac{7}{8}$

## Set F, pages 226–228

Write  $\frac{21}{36}$  in simplest form.

To express a fraction in simplest form, divide the numerator and denominator by the greatest common factor.

The GCF of 21 and 36 is 3.

$$\frac{21 \div 3}{36 \div 3} = \frac{7}{12}$$

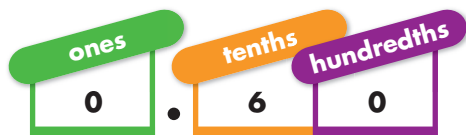
**Remember** that the simplest form can also be found by dividing by common factors until the common factor is 1.

Write each fraction in simplest form.

1.  $\frac{45}{60}$
2.  $\frac{32}{96}$
3.  $\frac{24}{30}$
4.  $\frac{42}{49}$

## Set G, pages 230–232

You can write fractions as decimals using a place-value chart. You read  $\frac{60}{100}$  as 60 hundredths. The decimal for  $\frac{60}{100}$  is shown below.



You can see that  $\frac{60}{100} = 0.60$ .

**Remember** that to write a decimal, you need to pay particular attention to the denominator of the fraction.

For **1** and **2**, write each decimal as a fraction.

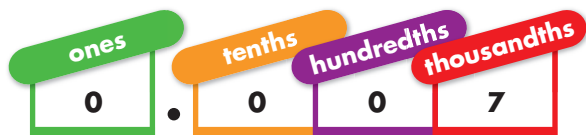
1. 0.3
2. 0.42

For **3** and **4**, write each fraction or mixed number as a decimal.

3.  $1\frac{2}{10}$
4.  $\frac{9}{100}$

## Set H, pages 234–235

You can write fractions as decimals using a place value chart. You read  $\frac{7}{1,000}$  as seven thousandths. The decimal for  $\frac{7}{1,000}$  is shown below.



You can see that  $\frac{7}{1,000} = 0.007$ .

**Remember** that to write a decimal with thousandths place, you need to use three decimal places after the decimal.

For **1** and **2**, write each decimal as a fraction.

1. 0.192
2. 0.042

For **3** and **4**, write each fraction as a decimal.

3.  $\frac{189}{1,000}$
4.  $\frac{3}{1,000}$



**Set I**, pages 236–237

You can use a number line to locate fractions and decimals, and compare values.

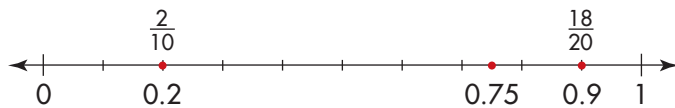
Locate  $0.2$ ,  $\frac{18}{20}$ , and  $0.75$  on a number line.

You know that  $0.2$  also means  $\frac{2}{10}$ .

You know that  $\frac{18}{20}$  also means  $18 \div 20$ .

Use division to find  $18 \div 20 = 0.90$ .

$0.7 = 0.70$  and  $0.8 = 0.80$ . So,  $0.75$  is halfway between  $0.7$  and  $0.8$ .



So the order from least to greatest is  $0.2$ ,  $0.75$ , and  $\frac{18}{20}$ .

**Set J**, pages 238–239

When you are asked to explain how you found your answer, follow these steps:

**Step 1**

Break the process into steps.

**Step 2**

Use pictures and words to explain.

**Step 3**

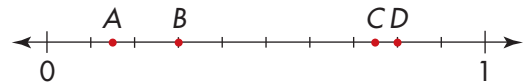
Tell about things to watch out for and be careful about.

**Step 4**

Write your steps in order using words like *find* and *put*.

**Remember** to divide the number line into equal sized segments to find the correct location for each fraction or decimal.

In **1** through **4**, name the fraction that identifies each point on the number line.



1. Point A
2. Point B
3. Point C
4. Point D

**Remember** to show your work clearly so that others can understand it.

1. Sara's paper airplane flew 8.5 yards. Jason's flew  $8\frac{2}{3}$  yards. Michael's flew  $8\frac{1}{4}$  yards and Denise's flew  $8\frac{1}{6}$  yards. Whose airplane flew the farthest? Explain how you found your answer.
2. The school play lasted 1 hour 45 minutes. It ended at 9:15 P.M. What time did the play start? Explain how you found your answer.