

Fractions and Decimals

Indiana Academic Standards

6.1.1 Compare, order, and represent on a number line positive and negative integers, fractions, decimals (to hundredths), and mixed numbers.

Key Vocabulary

equivalent fractions (p. 204)

greatest common factor
(p. 197)

least common multiple
(p. 217)

simplest form (p. 217)

Real-World Link

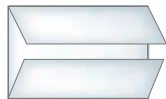
Dairy Products In the United States, the consumption of dairy products in a recent year was $587\frac{1}{8}$ pounds per person, which can also be written as 587.125 pounds per person.



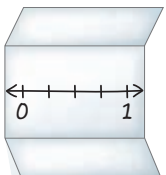
FOLDABLES[®] Study Organizer

Fractions and Decimals Make this Foldable to help you understand fractions and decimals. Begin with one sheet of $8\frac{1}{2}'' \times 11''$ paper.

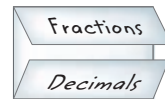
- 1** Fold top of paper down and bottom of paper up as shown.



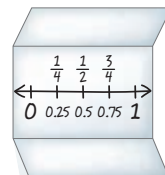
- 3** Unfold the paper and draw a number line in the middle of the paper.



- 2** Label the top fold Fractions and the bottom fold Decimals.



- 4** Label the fractions and decimals as shown.



GET READY for Chapter 4

Diagnose Readiness You have two options for checking Prerequisite Skills.

Option 2

IN Math Online

Take the Online Readiness Quiz at glencoe.com.

Option 1

Take the Quick Quiz below. Refer to the Quick Review for help.

QUICK Quiz

Tell whether each number is divisible by 2, 3, 4, 5, 6, 9, or 10.

(page 736)

- 67
- 891
- 145
- 202
- GAMES** Is it possible to divide 78 marbles evenly among 6 players? Justify your response.

Find the prime factorization of each number. (Lesson 1-2)

- 315
- 264
- 120
- 28
- TRAVEL** Mary drove 225 miles in one day. Find the prime factorization of this number.

Write each decimal in standard form. (Lesson 3-1)

- five and three tenths
- seventy-four hundredths
- two tenths
- sixteen thousandths

QUICK Review

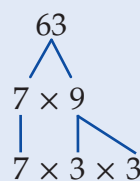
Example 1

Tell whether the number 756 is divisible by 2, 3, 5, 9, or 10.

- Yes, the ones digit, 6, is divisible by 2.
- Yes, the sum of the digits, 18, is divisible by 3.
- No, the ones digit is neither 0 nor 5.
- Yes, the sum of the digits is divisible by 9.
- No, the ones digit is not 0.

Example 2

Find the prime factorization of 315.



Write the number that is being factored at the top.

$$63 = 7 \times 9$$

$$9 = 3 \times 3$$

So, $63 = 3 \times 3 \times 7$ or $3^2 \times 7$.

Example 3

Write *twenty-seven and eighty-nine thousandths* in standard form.

10	1	0.1	0.01	0.001
tens	ones	tenths	hundredths	thousandths
2	7	0	8	9

The standard form is 27.089.

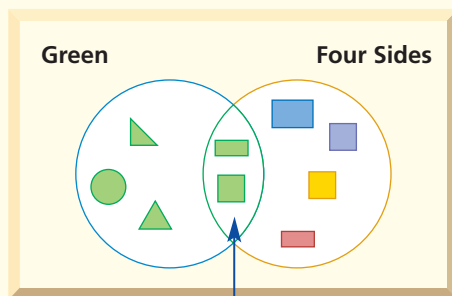
READING to SOLVE PROBLEMS

Academic Standards

P.5.1 Create and use representations to organize, record, and communicate mathematical ideas.

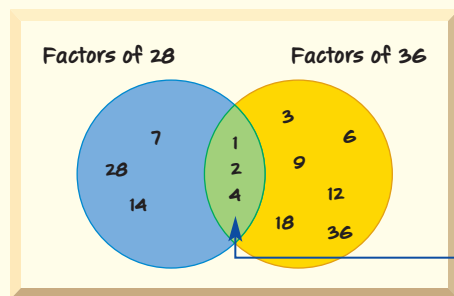
Make a Diagram

Making a diagram is a good strategy to use when you want to see how numbers or items are related. One kind of diagram is a Venn diagram. A *Venn diagram* uses overlapping circles to show the similarities and differences of two groups of items. Any item that is located where the circles overlap has a characteristic of both circles.



These are green shapes with four sides.

You can also make a Venn diagram using numbers. The Venn diagram below shows the factors of 28 in one circle and the factors of 36 in the second circle.



The common factors of 28 and 36 are 1, 2, and 4.

PRACTICE

Make a Venn diagram that shows the factors for each pair of numbers.

1. 8, 12
2. 20, 30
3. 25, 28
4. 15, 30
5. Organize the numbers 2, 5, 9, 27, 29, 35, and 43 into a Venn diagram. Use the headings *prime numbers* and *composite numbers*. What numbers are in the overlapping circles? Explain.

4-1

Greatest Common Factor

MAIN IDEA

Solve problems using the four-step plan.

IN Academic Standards

Preparation for 6.1.6

Solve problems involving addition, subtraction, multiplication and division of positive fractions and decimals and explain why a particular operation was used for a given situation.

New Vocabulary

Venn diagram
common factor
greatest common factor (GCF)

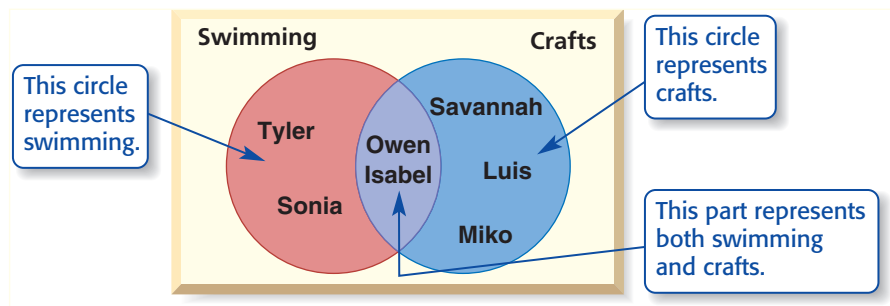
IN Math Online

glencoe.com

- Concepts in Motion
- Extra Examples
- Personal Tutor
- Self-Check Quiz

▶ GET READY for the Lesson

SUMMER CAMP The Venn diagram below shows which activities each camper participated in on Monday. **Venn diagrams** use overlapping circles to show common elements.



1. Who participated in swimming only?
2. Who participated in crafts only?
3. Who participated in both swimming and crafts?

Factors that are shared by two or more numbers are called **common factors**. The greatest of the common factors of two or more numbers is the **greatest common factor (GCF)** of the numbers.

To find common factors, you can make a list.

EXAMPLE Identify Common Factors

- 1 Identify the common factors of 16 and 24.

First, list the factors by pairs for each number. Then, circle the common factors.

Factors of 16

- ① × 16
- ② × ⑧
- ④ × 4

Factors of 24

- ① × 24
- ② × 12
- 3 × ⑧
- ④ × 6

The common factors are 1, 2, 4, and 8.

✓ CHECK Your Progress

Identify the common factors of each set of numbers.

a. 25, 60

b. 18, 27, 36

EXAMPLE Find the GCF by Listing Factors

2 Find the GCF of 60 and 54.

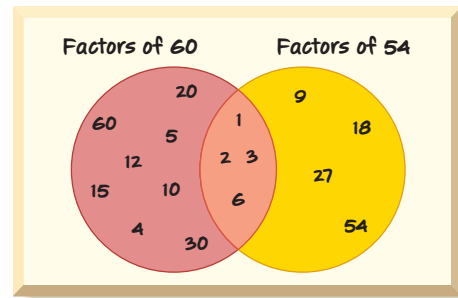
First make an organized list of the factors for each number.

60: $1 \times 60, 2 \times 30, 3 \times 20, 4 \times 15, 5 \times 12, 6 \times 10 \rightarrow 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60$

54: $1 \times 54, 2 \times 27, 3 \times 18, 6 \times 9 \rightarrow 1, 2, 3, 6, 9, 18, 27, 54$

The common factors are 1, 2, 3, and 6, and the greatest of these is 6. So, the greatest common factor or GCF of 60 and 54 is 6.

Use a Venn diagram to show the factors. Notice that the factors 1, 2, 3, and 6 are the common factors of 60 and 54 and the GCF is 6.



CHECK Your Progress

Find the GCF of each set of numbers.

c. 35, 60

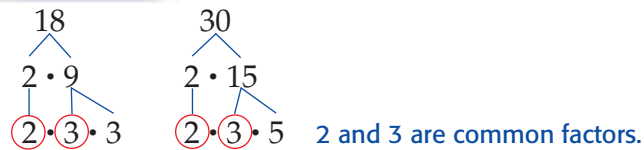
d. 15, 45

e. 12, 19

EXAMPLE Find the GCF by Using Prime Factors

3 Find the GCF of 18 and 30.

METHOD 1 Write the prime factorization.



METHOD 2 Divide by prime numbers.

$$\begin{array}{r} 2 \overline{)18} \quad 30 \\ \underline{36} \quad 30 \\ 30 \quad 30 \\ \underline{30} \quad 0 \end{array}$$

Divide both 18 and 30 by 2.

$$\begin{array}{r} 3 \overline{)9} \quad 15 \\ \underline{3} \quad 15 \\ 15 \quad 15 \\ \underline{15} \quad 0 \end{array}$$

Divide the quotients by 3.

Using either method, the common prime factors are 2 and 3. So, the GCF of 18 and 30 is 2×3 or 6.

CHOOSE Your Method

Find the GCF of each set of numbers.

f. 12, 66

g. 36, 45

h. 32, 48

Review Vocabulary

prime number a whole number that has exactly two factors, 1 and the number itself; *Example:* 7 (Lesson 1-2)

prime factorization a composite number expressed as a product of prime numbers; *Example:* $12 = 2 \times 2 \times 3$ (Lesson 1-2)



Real-World EXAMPLES

- 4 FOOD** A bakery arranges three different types of muffins in a display case. There should be an equal number of muffins in each row in the case. What is the greatest possible number of muffins in each row?

Muffins	
Type	Number
blueberry	40
cinnamon raisin	24
chocolate chip	32

factors of 40: **1, 2, 4, 5, 8, 10, 20, 40**

factors of 24: **1, 2, 3, 4, 6, 8, 12, 24**

factors of 32: **1, 2, 4, 8, 16, 32**

The GCF of 40, 24, and 32 is 8. So, the greatest number of muffins that could be placed in each row is 8.

- 5** How many rows of muffins are there if there are 8 in each row?

There is a total of $40 + 24 + 32$, or 96 muffins. So, the number of rows of muffins is $96 \div 8$, or 12.



CHECK Your Progress

HOBBIES Jerrica makes and sells beaded necklaces. She earned \$49 on Friday, \$42 on Saturday, and \$21 on Sunday selling necklaces at a local craft sale.

- If Jerrica sold each necklace for the same amount, what is the most she could have charged per necklace?
- How many necklaces did she sell?



CHECK Your Understanding

Example 1 Identify the common factors of each set of numbers.

(p. 197)

- 11, 44
- 12, 21, 30

Examples 2, 3 Find the GCF of each set of numbers.

(p. 198)

- 8, 32
- 24, 60
- 3, 12, 18
- 4, 10, 14

Examples 4, 5 **FOOD** For Exercises 7 and 8, use the following information.

(p. 199)

Oliver has 14 chocolate cookies and 21 iced cookies.

- If Oliver gives each friend an equal number of each type of cookie, what is the greatest number of friends with whom he can share his cookies?
- How many cookies did each friend receive?

Practice and Problem Solving

HOMework HELP

For Exercises	See Examples
9–12	1
13–16	2
17–22	3
23, 25	4
24, 26	5

Identify the common factors of each set of numbers.

- 9. 45, 75
- 10. 36, 90
- 11. 6, 21, 30
- 12. 16, 24, 40

Find the GCF of each set of numbers.

- 13. 12, 18
- 14. 18, 42
- 15. 48, 60
- 16. 30, 72
- 17. 14, 35, 84
- 18. 9, 18, 42
- 19. 16, 52, 76
- 20. 12, 30, 72
- 21. 37, 64, 72
- 22. 35, 63, 84

SCRAPBOOKING For Exercises 23 and 24, use the following information.

Annika is placing photos in a scrapbook. She has eight large photos, twelve medium photos, and sixteen small photos. Each page will have only one size of photo. She also wants to place the same amount of photos on each page.

- 23. What is the greatest number of photos that could be on each page? Justify your response.
- 24. How many pages will she use in all? Justify your response.

SHOPPING For Exercises 25 and 26, use the following information.

A grocery store sells boxes of juice in equal-size packs. Carla bought 18 boxes, Rico bought 36 boxes, and Winston bought 45 boxes.

- 25. What is the greatest number of boxes in each pack?
- 26. How many packs did each person buy?

Find three numbers with a GCF that is the indicated value.

- 27. 6
- 28. 14
- 29. 15

30. **TOYS** The table shows the number of each type of toy in a store. The toys will be placed on shelves so that each shelf has the same number of each type of toy. How many shelves are needed for each type of toy so that it has the greatest number of toys?

Toy	Amount
dolls	45
footballs	105
small cars	75



31. **ARTWORK** The table shows the amount of money Ms. Ayala made over three days selling 4×6 -inch prints at an arts festival. Each print cost the same amount. What is the most each print could have cost?

Ms. Ayala's Artwork	
Day	Amount (\$)
Friday	60
Saturday	144
Sunday	96

32. **NUMBER SENSE** What is the GCF of all the numbers in the pattern 9, 18, 27, 36, ...? Explain your reasoning.

Academic Standards • ISTEP+
Extra Practice, pp. 681, 709

**H.O.T. Problems**

33. **REASONING** When is the GCF of two or more numbers equal to one of the numbers? Explain your reasoning.

CHALLENGE Determine whether each statement is *true* or *false*. If true, explain why. If false, give a counterexample.

34. The GCF of any two even numbers is always even.

35. The GCF of any two odd numbers is always odd.

36. The GCF of an odd number and an even number is always even.

37. **OPEN ENDED** Find three numbers with a GCF that is one of the numbers. The sum of the two lesser numbers must equal the greatest number.

38. **Which One Doesn't Belong?** Identify the number that does not have the same greatest common factor as the other three. Explain your reasoning.

16

8

24

20

39. **WRITING IN MATH** Which method would you prefer to use to find the GCF of 48, 64, and 144? Explain your reasoning.

**ISTEP+ PRACTICE****Preparation for 6.1.6**

40. **SHORT RESPONSE** Find the greatest common factor of 28, 42, and 70.

41. Which number is *not* a common factor of 24 and 36?

A 2

B 6

C 12

D 24

42. Jeremiah has 32 baseball cards and 48 football cards. He will share his collection with his brother so that they each have the same number of each type of card. What is the greatest number of baseball cards they will each have?

F 4 cards

H 12 cards

G 8 cards

J 16 cards

Spiral Review

43. **PLAYS** After five performances, the total attendance of a play was 39,963. Which is a more reasonable estimate for the number of people who attended each performance: 7,000 or 8,000? (Lesson 3-10)

44. **MONEY** Marcus bought several baseball caps. Each cap cost \$16.40. If he spent a total of \$114.80, how many caps did he buy? (Lesson 3-9)

Order each set of decimals from least to greatest. (Lesson 3-2)

45. 7, 9.85, 8.3, and 3.9

46. 12.1, 13.3, 11.49, and 12

**GET READY for the Next Lesson**

PREREQUISITE SKILL Tell whether both numbers in each number pair are divisible by 2, 3, 4, 5, 6, or 10. (Page 736)

47. 9, 24

48. 15, 25

49. 9, 10

50. 10, 30

Explore 4-2

Math Lab Equivalent Fractions

MAIN IDEA

Solve problems using the four-step plan.

IN Academic Standards

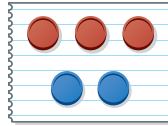
6.1.4 Recognize commonly used fractions, decimals, and percents and their equivalents and convert between any two representations of any non-negative rational numbers without the use of a calculator.

IN Math Online

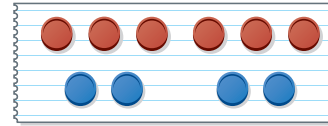
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• Concepts in Motion

Fractions are often used to describe the relationship between part of a set of objects and the whole set.



$\frac{3}{5}$ of the counters are red.



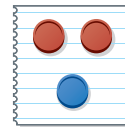
$\frac{6}{10}$ of the counters are red.

Fractions that share the same relationship between part and whole are said to be *equivalent*. In the models shown, 3 out of every 5 groups of counters are red. Therefore, $\frac{3}{5}$ and $\frac{6}{10}$ are equivalent fractions.

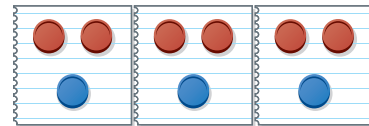
ACTIVITY

1 Use counters to generate a fraction equivalent to $\frac{2}{3}$.

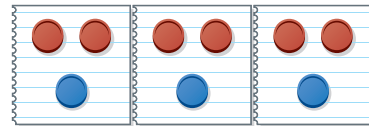
STEP 1 Model $\frac{2}{3}$ by forming a group of counters in which 2 out of 3 are red.



STEP 2 Combine two or more equal groups to form one larger group. The model shows 3 groups.



STEP 3 Name the fraction of the larger group that is red. Six out of 9 or $\frac{6}{9}$ of the larger group is red.



So, one fraction equivalent to $\frac{2}{3}$ is $\frac{6}{9}$.

✓ CHECK Your Progress

Use counters to name three fractions equivalent to each fraction.

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

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

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

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

You can also generate equivalent fractions by separating a larger group into two or more smaller groups that share the same part to whole relationship. This process is called *simplifying* a fraction.

ACTIVITY

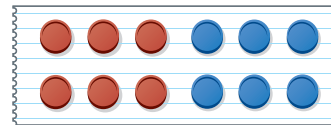
- 2 Use counters to generate a simpler fraction that is equivalent to $\frac{6}{12}$.

Study Tip

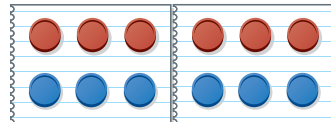
Equivalent fractions

There may be more than one simpler fraction that is equivalent to a given fraction. For example, you could also separate the 12 counters into equal groups of 2 counters where 1 counter in each group is red. So, $\frac{6}{12}$ also equals $\frac{1}{2}$.

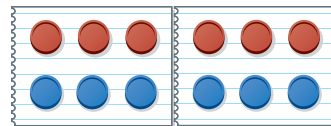
STEP 1 Model $\frac{6}{12}$ using counters.



STEP 2 Separate the counters into equal groups so that the relationship between the red counters and total number of counters in each group is the same.



STEP 3 Name the fraction of each smaller group that is red. Three out of 6 or $\frac{3}{6}$ of each smaller group is red.



So, one simpler fraction equivalent to $\frac{6}{12}$ is $\frac{3}{6}$.

CHECK Your Progress

Use counters to name a simpler fraction that is equivalent to each fraction.

e. $\frac{10}{16}$

f. $\frac{6}{21}$

g. $\frac{8}{24}$

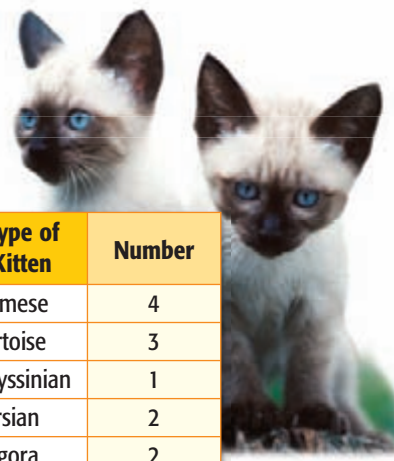
h. $\frac{24}{30}$

ANALYZE THE RESULTS

- In Activity 1, an equivalent fraction is created by combining equal groups that have the same number of red counters and the same number of total counters. What operation does this model?
- MAKE A CONJECTURE** Use the operation you found in Exercise 1 to generate a fraction equivalent to $\frac{7}{8}$. Justify your answer.
- In Activity 2, an equivalent fraction is created by separating a group of counters into equal groups that have the same number of red counters and the same number of total counters. What operation does this model?
- MAKE A CONJECTURE** Use the operation you found in Exercise 3 to generate a fraction equivalent to $\frac{30}{40}$. Justify your answer.

4-2

Simplifying Fractions



Type of Kitten	Number
Siamese	4
Tortoise	3
Abyssinian	1
Persian	2
Angora	2

MAIN IDEA

Solve problems using the four-step plan.

IN Academic Standards

6.1.4 Recognize commonly used fractions, decimals, and percents and their equivalents and convert between any two representations of any non-negative rational numbers without the use of a calculator.

New Vocabulary

equivalent fractions
simplest form

IN Math Online

glencoe.com

- Extra Examples
- Personal Tutor
- Self-Check Quiz

▶ GET READY for the Lesson

ANIMALS The table shows the different types of kittens found at a local pet store.

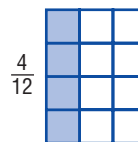
1. How many kittens are at the pet store?
2. How many Siamese kittens are there?

In the table above, you can compare the number of Siamese kittens to the total number of kittens by using a fraction.

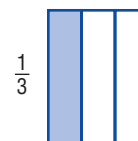
$$\frac{4}{12} \quad \leftarrow \text{Siamese kittens}$$

$$12 \quad \leftarrow \text{total number of kittens}$$

Equivalent fractions are fractions that have the same value. The fractions $\frac{4}{12}$ and $\frac{1}{3}$ name the same part of the whole. So, the fractions are equivalent.



That is, $\frac{4}{12} = \frac{1}{3}$.



To find equivalent fractions, you can multiply or divide the numerator and denominator by the same nonzero number.

$$\begin{aligned} \frac{4}{12} &= \frac{4 \div 4}{12 \div 4} \\ &= \frac{1}{3} \end{aligned}$$

So, 1 out of every 3 kittens at the pet store is Siamese.

EXAMPLES Write Equivalent Fractions

Replace each ■ with a number so the fractions are equivalent.

1 $\frac{5}{7} = \frac{\blacksquare}{21}$

$$\frac{5}{7} = \frac{15}{21}$$

(Arrows indicate multiplying both numerator and denominator by 3.)

Since $7 \times 3 = 21$, multiply the numerator and denominator by 3.

2 $\frac{12}{16} = \frac{6}{\blacksquare}$

$$\frac{12}{16} = \frac{6}{8}$$

Since $12 \div 2 = 6$, divide the numerator and denominator by 2.

CHECK Your Progress

Replace each \blacksquare with a number so the fractions are equivalent.

a. $\frac{3}{5} = \frac{\blacksquare}{20}$

b. $\frac{18}{24} = \frac{6}{\blacksquare}$

c. $\frac{\blacksquare}{7} = \frac{20}{35}$

A fraction is in **simplest form** when the GCF of the numerator and denominator is 1.

EXAMPLE Write Fractions in Simplest Form

3 Write $\frac{18}{24}$ in simplest form.

METHOD 1 Divide by common factors.

$$\frac{18}{24} = \frac{9}{12} = \frac{3}{4}$$

A common factor of 18 and 24 is 2.

A common factor of 9 and 12 is 3.

METHOD 2 Divide by the GCF.

factors of 18: 1, 2, 3, 6, 9, 18

factors of 24: 1, 2, 3, 4, 6, 8, 12, 24

The GCF of 18 and 24 is 6.

$$\frac{18}{24} = \frac{3}{4}$$

Divide the numerator and denominator by the GCF, 6.

Study Tip

Checking Solutions You can check the answer to Example 3 by multiplying the numerator and denominator by the GCF. The result should be the original fraction.

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

Since the GCF of 3 and 4 is 1, the fraction $\frac{3}{4}$ is in simplest form.

CHOOSE Your Method

Write each fraction in simplest form. If the fraction is already in simplest form, write *simplest form*.

d. $\frac{21}{24}$

e. $\frac{9}{15}$

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



You can often use mental math to divide both the numerator and denominator by their GCF.

Real-World EXAMPLE

4 NURSES Approximately 36 out of 60 nurses work in hospitals. Express the fraction $\frac{36}{60}$ in simplest form.

The GCF of 36 and 60 is 12.

$$\frac{\overset{3}{\cancel{36}}}{\underset{5}{\cancel{60}}} = \frac{3}{5} \quad \text{Mentally divide both the numerator and denominator by 12.}$$

So, $\frac{3}{5}$ or 3 out of every 5 nurses work in hospitals.

CHECK Your Progress

- g. **BASKETBALL** In a recent NBA season, Kirk Hinrich of the Chicago Bulls started 66 of the 76 games he played. Express the fractional part of the games he started in simplest form.
- h. **AIRPORTS** On Thursday, 40 out of a total of 192 flights were delayed due to weather. Express the fractional part of the delayed flights in simplest form.

Real-World Career

How Does a Nurse Use Math? Nurses use math to calculate correct doses of medicine for their patients.

IN Math Online

For more information, go to glencoe.com.



CHECK Your Understanding

Examples 1, 2
(pp. 204–205)

Replace each \blacksquare with a number so the fractions are equivalent.

1. $\frac{3}{8} = \frac{\blacksquare}{24}$

2. $\frac{4}{5} = \frac{40}{\blacksquare}$

3. $\frac{15}{25} = \frac{3}{\blacksquare}$

4. $\frac{21}{28} = \frac{\blacksquare}{4}$

Example 3
(p. 205)

Write each fraction in simplest form. If the fraction is already in simplest form, write *simplest form*.

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

6. $\frac{8}{25}$

7. $\frac{10}{38}$

8. $\frac{15}{45}$

Example 4
(p. 206)

9. **FOOD** The table shows the fraction of each type of baked good to be sold out of the total number of baked goods at the school bake sale. Express the fraction of baked goods that were muffins in simplest form.

School Bake Sale	
bread	$\frac{6}{50}$
cake	$\frac{6}{20}$
cookie	$\frac{26}{100}$
muffin	$\frac{24}{100}$
pie	$\frac{4}{50}$



Practice and Problem Solving

HOMEWORK HELP	
For Exercises	See Examples
10–17	1, 2
18–25	3
26, 27	4

Replace each \blacksquare with a number so the fractions are equivalent.

10. $\frac{1}{2} = \frac{\blacksquare}{8}$ 11. $\frac{1}{3} = \frac{\blacksquare}{27}$ 12. $\frac{\blacksquare}{5} = \frac{9}{15}$ 13. $\frac{\blacksquare}{6} = \frac{20}{24}$
 14. $\frac{7}{9} = \frac{14}{\blacksquare}$ 15. $\frac{12}{16} = \frac{3}{\blacksquare}$ 16. $\frac{30}{35} = \frac{\blacksquare}{7}$ 17. $\frac{36}{45} = \frac{\blacksquare}{5}$

Write each fraction in simplest form. If the fraction is already in simplest form, write *simplest form*.

18. $\frac{6}{9}$ 19. $\frac{4}{10}$ 20. $\frac{10}{38}$ 21. $\frac{27}{54}$
 22. $\frac{19}{37}$ 23. $\frac{32}{85}$ 24. $\frac{28}{77}$ 25. $\frac{15}{100}$

26. **BASEBALL** Brendan had a hit in 24 out of 36 times he batted. Express the fraction of times he hit safely in simplest form.
 27. **MUSIC** In a typical symphony orchestra, 16 out of every 100 musicians are first and second violin players. Express the fraction of the orchestra that are violinists in simplest form.

28. **SURVEYS** The table shows the results of a survey about favorite movie theater snacks. Write a fraction in simplest form that compares the number of people who chose popcorn to the total number of people surveyed.

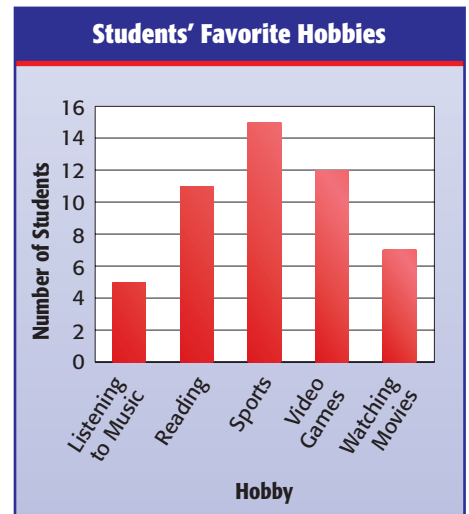
Favorite Movie Snack	
Snack	Frequency
popcorn	24
hot dog	12
nachos	11
chocolate	8
licorice	5



Write two fractions that are equivalent to the given fraction.

29. $\frac{4}{10}$ 30. $\frac{5}{12}$ 31. $\frac{12}{20}$ 32. $\frac{16}{44}$

33. **ANALYZE GRAPHS** The results of a survey of students' favorite hobbies are shown in the bar graph at the right. In simplest form, what fraction of the students chose video games as their favorite hobby?



34. **FIND THE DATA** Refer to the Data File on pages 16–19. Choose some data and write a real-world problem in which you would write equivalent fractions.

Academic Standards • ISTEP+
 Extra Practice, pp. 681, 709

**H.O.T. Problems**

35. **Which One Doesn't Belong?** Identify the fraction that does not belong with the other three. Explain your reasoning.

$\frac{6}{15}$

$\frac{10}{25}$

$\frac{4}{20}$

$\frac{22}{55}$

36. **CHALLENGE** Find a fraction equivalent to $\frac{3}{4}$. Its numerator and denominator, when added together, equal 84.

37. **WRITING IN MATH** Explain in your own words how to find a fraction that is equivalent to a given fraction.

ISTEP+ PRACTICE**6.1.4**

38. Tyler has read $\frac{4}{5}$ of his novel for reading class. Which student has also read the same amount as Tyler?

Student	Amount Read
Abby	$\frac{1}{2}$
Gustavo	$\frac{12}{15}$
Tonisha	$\frac{4}{10}$
Lance	$\frac{16}{15}$

- A Abby C Tonisha
B Gustavo D Lance

39. The fractions $\frac{2}{6}$, $\frac{3}{9}$, $\frac{4}{12}$, and $\frac{5}{15}$ are each equivalent to $\frac{1}{3}$. What is the relationship between the numerator and the denominator in each fraction that is equivalent to $\frac{1}{3}$?

- F The numerator is three times the denominator.
G The numerator is three more than the denominator.
H The denominator is three times the numerator.
J The denominator is three more than the numerator.

Spiral Review

Find the GCF of each set of numbers. (Lesson 4-1)

40. 40, 36

41. 45, 75

42. 120, 150

43. **GASOLINE** Benita spent \$38.40 at the gas station to fill up her car's gas tank. If she pumped 15 gallons of gasoline into her car, is about \$2, \$2.50, or \$3 a more reasonable answer for the cost of each gallon of gasoline? (Lesson 3-10)

Identify the solution of each equation from the list given. (Lesson 1-8)

44. $45 - h = 38$; 6, 7, 8

45. $66 = z - 23$; 88, 89, 90

GET READY for the Next Lesson

PREREQUISITE SKILL Divide. Include remainders in your answers. (Page 726)

46. $8 \div 3$

47. $19 \div 6$

48. $52 \div 8$

49. $67 \div 9$

4-3

Mixed Numbers and Improper Fractions

MAIN IDEA

Solve problems using the four-step plan.

IN Academic Standards

6.1.4 Recognize commonly used fractions, decimals, and percents and their equivalents and convert between any two representations of any non-negative rational numbers without the use of a calculator. Also addresses P.4.2.

New Vocabulary

mixed number
proper fraction
improper fraction

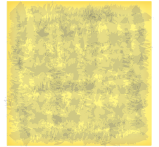
IN Math Online

glencoe.com

- Extra Examples
- Personal Tutor
- Self-Check Quiz
- Reading in the Content Area

MINI Lab

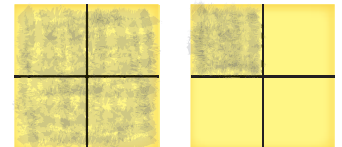
STEP 1 Shade one square self-stick note to represent the whole number 1.



STEP 2 Fold the shaded self-stick note into fourths.



STEP 3 Fold a second square self-stick note into four equal parts to show fourths. Shade one part to represent $\frac{1}{4}$.



1. How many shaded $\frac{1}{4}$ s are there?
2. What fraction is equivalent to $1\frac{1}{4}$?

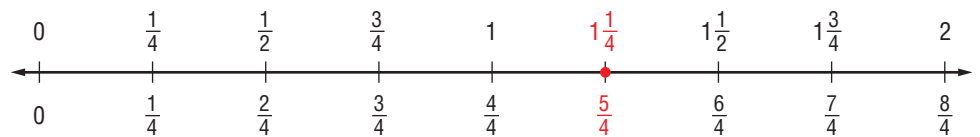
Make a model to show each number.

3. the number of thirds in $2\frac{2}{3}$
4. the number of halves in $4\frac{1}{2}$

A number like $1\frac{1}{4}$ is an example of a mixed number. A **mixed number** indicates the sum of a whole number and a fraction.

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

Notice that $1\frac{1}{4}$ and $\frac{5}{4}$ are graphed in the same position on the number line.



Proper fractions The numerators are less than the denominators.

Improper fractions The numerators are greater than or equal to the denominators.

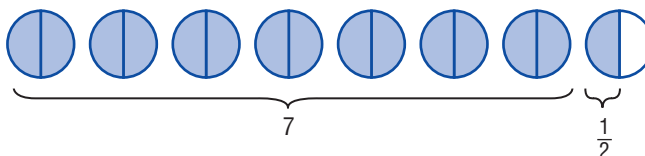
Mixed numbers and improper fractions have values that are greater than or equal to 1.



You can write mixed numbers as equivalent improper fractions using mental math. Multiply the whole number and denominator. Then add the numerator.

EXAMPLE Mixed Numbers as Improper Fractions

1 LIBERTY BELL Use the information at the left. Write the distance around the crown of the Liberty Bell as an improper fraction.



$$7\frac{1}{2} = \frac{(7 \times 2) + 1}{2} \quad \text{There are seven wholes, each with two parts, plus one part.}$$

$$= \frac{15}{2}$$

Real-World Link

The distance around the crown of the Liberty Bell in Philadelphia, Pennsylvania, is $7\frac{1}{2}$ feet.

Source: Independence Hall Association in Philadelphia



CHECK Your Progress

a. **SHIPS** The world's largest ship is the *Jahre Viking*, which measures 1,502 feet long. It can carry $4\frac{1}{5}$ million barrels of oil. Write $4\frac{1}{5}$ as an improper fraction.



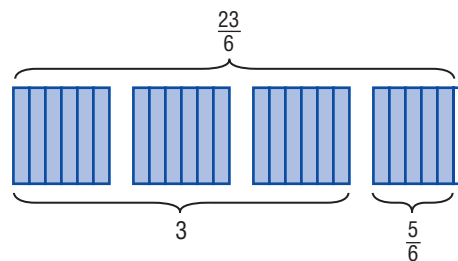
Improper fractions can also be written as equivalent mixed numbers or whole numbers. Divide the numerator by the denominator and express the remainder as a fraction.

EXAMPLE Improper Fractions as Mixed Numbers

2 Write $\frac{23}{6}$ as a mixed number.

Divide 23 by 6.

$$\begin{array}{r} 3\frac{5}{6} \\ 6 \overline{)23} \\ \underline{-18} \\ 5 \end{array} \quad \leftarrow \text{number of sixths left}$$



$$\text{So, } \frac{23}{6} = 3\frac{5}{6}.$$

CHECK Your Progress

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

- b. $\frac{7}{3}$ c. $\frac{18}{5}$ d. $\frac{26}{2}$ e. $\frac{5}{5}$

Reading Math

Fraction Bar Since a fraction represents division, $\frac{23}{6}$ means $23 \div 6$.

CHECK Your Understanding

Example 1 Write each mixed number as an improper fraction.

(p. 210)

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

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

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

4. **BASEBALL** The width of a certain type of baseball bat is $2\frac{1}{4}$ inches. Write this width as an improper fraction.

Example 2 Write each improper fraction as a mixed number or a whole number.

(p. 210)

5. $\frac{31}{6}$

6. $\frac{15}{4}$

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

Practice and Problem Solving

HOMEWORK HELP

For Exercises	See Examples
8–17	1
18–25	2

Write each mixed number as an improper fraction.

8. $6\frac{1}{3}$

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

10. $7\frac{4}{5}$

11. $1\frac{5}{8}$

12. $7\frac{1}{4}$

13. $5\frac{3}{4}$

14. $3\frac{5}{6}$

15. $4\frac{1}{6}$

16. **BOARD GAMES** The box for a popular board game is $10\frac{1}{2}$ inches wide. Write $10\frac{1}{2}$ as an improper fraction.

17. **RAIN FORESTS** The table shows the area of three tropical rain forests. Express the area of the Congo River Basin rain forest as an improper fraction.

Rain Forest	Area (square km)
Amazon	7 million
Congo River Basin	$1\frac{4}{5}$ million
Madagascar	110,000



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

18. $\frac{16}{5}$

19. $\frac{27}{5}$

20. $\frac{9}{8}$

21. $\frac{19}{8}$

22. $\frac{15}{3}$

23. $\frac{28}{4}$

24. $\frac{10}{10}$

25. $\frac{9}{9}$

26. Express *six and three-fifths* as an improper fraction.

27. **ANIMALS** A nine-banded armadillo sleeps an average of $17\frac{2}{5}$ hours per day. Write $17\frac{2}{5}$ as an improper fraction.

28. **HEIGHTS** Find the height of each student listed in the table in terms of feet. Write as a mixed number in simplest form.

Student	Height (inches)
Emilio	65
Destiny	58
Hoshi	61
Jasmine	59

29. **TIME** Monifa spent 75 minutes at the park on Sunday. How many hours did Monifa spend at the park?

Academic Standards • ISTEP+

Extra Practice, pp. 682, 709

**H.O.T. Problems**

30. **OPEN ENDED** Select a mixed number that is between $6\frac{3}{5}$ and $\frac{36}{5}$.
31. **SELECT A TOOL** Which of the following tools might you use to write $4\frac{1}{6}$ as an improper fraction? Justify your selection(s). Then use the tool(s) to solve the problem.
- draw a model
calculator
paper/pencil
32. **CHALLENGE** Write $2\frac{7}{4}$ and $3\frac{15}{15}$ in simplest form so that neither contains an improper fraction. Explain your reasoning.
33. **WRITING IN MATH** Explain how you know whether a fraction is less than, equal to, or greater than 1.

ISTEP+ PRACTICE

6.1.4

34. Which improper fraction is *not* equivalent to any of the mixed numbers in the table?

Cell Phone	Length (in.)
Julio's	$3\frac{1}{4}$
Morgan's	$2\frac{4}{5}$
Haylee's	$3\frac{3}{5}$

- A $\frac{14}{5}$ B $\frac{13}{4}$ C $\frac{18}{5}$ D $\frac{14}{4}$

35. Serena bought 30 oranges. How many dozen oranges did she buy?

F $1\frac{3}{4}$

G $2\frac{1}{4}$

H $2\frac{1}{2}$

J $2\frac{2}{3}$

Spiral Review

Write each fraction in simplest form. (Lesson 4-2)

36. $\frac{35}{42}$

37. $\frac{11}{12}$

38. $\frac{5}{20}$

Find the GCF of each set of numbers. (Lesson 4-1)

39. 9, 39

40. 33, 88

41. 24, 48, 63

42. Order the decimals 27.025, 26.98, 27.13, 27.9, and 27.131 from least to greatest. (Lesson 3-2)

GET READY for the Next Lesson

43. **PREREQUISITE SKILL** Singer B had 18 more chart hits than Singer C. Singer A and Singer C had 227 chart hits combined. Determine a reasonable answer for the value of x . (Lesson 3-10)

Singer	Total Chart Hits
A	x
B	94
C	y
D	69

Mid-Chapter Quiz

Lessons 4-1 through 4-3

Identify the common factors of each set of numbers. (Lesson 4-1)

1. 3, 9 2. 11, 33, 55

Find the GCF of each set of numbers. (Lesson 4-1)

3. 27, 45 4. 24, 40, 72

5. **MULTIPLE CHOICE** The table shows the number of shrimp ordered at a restaurant for three days.

Day	Shrimp
Monday	56
Tuesday	21
Wednesday	42

Each order contains the same number of shrimp. What is the greatest possible number of shrimp in each order?

(Lesson 4-1)

- A 8
B 7
C 6
D 3

Replace each \blacksquare with a number so the fractions are equivalent. (Lesson 4-2)

6. $\frac{2}{9} = \frac{\blacksquare}{45}$ 7. $\frac{5}{12} = \frac{25}{\blacksquare}$ 8. $\frac{27}{36} = \frac{\blacksquare}{4}$

9. **GRADES** On a quiz, Marta answered 4 out of 5 questions correctly. If each question is worth the same amount of points and the total number of points is twenty, what was Marta's score? (Lesson 4-2)

Write each fraction in simplest form. If the fraction is already in simplest form, write *simplest form*. (Lesson 4-2)

10. $\frac{15}{24}$ 11. $\frac{12}{42}$ 12. $\frac{9}{14}$



13. **RAINFALL** The world's driest city is Aswan, Egypt, which only receives an average of $\frac{32}{1,600}$ inches of rain each year. Write this fraction in simplest form. (Lesson 4-2)

Write each mixed number as an improper fraction. (Lesson 4-3)

14. $3\frac{5}{6}$ 15. $7\frac{3}{5}$ 16. $8\frac{4}{9}$



17. **MULTIPLE CHOICE** A local newspaper is reducing the width of its paper by $1\frac{3}{4}$ inches. What is this width as an improper fraction? (Lesson 4-3)

- F $\frac{4}{3}$ H $\frac{7}{3}$
G $\frac{8}{4}$ J $\frac{7}{4}$



18. **BAKING** Express the amount of butter in the table as an improper fraction. (Lesson 4-3)

Ingredient	Amount
flour	$2\frac{3}{4}$ cups
butter	$1\frac{1}{3}$ cups
chocolate chips	$1\frac{1}{2}$ cups

Write each improper fraction as a mixed number or a whole number. (Lesson 4-3)

19. $\frac{37}{9}$ 20. $\frac{69}{8}$ 21. $\frac{42}{14}$



22. **WHALES** One of the world's heaviest whales is the Fin Whale, which weighs $\frac{248}{5}$ tons. Write this weight as a mixed number or a whole number. (Lesson 4-3)

4-4

Problem-Solving Investigation

MAIN IDEA: Solve problems by making an organized list.

Academic Standards

P.5.1 Create and use representations to organize, record, and communicate mathematical ideas.

P.5.2 Select, apply, and translate among mathematical representations to solve problems. *Also addresses P.1.1.*

P.S.I. TEAM +

e-Mail: MAKE AN ORGANIZED LIST

DELMAR: My three best friends, Bethany, Terrence, and Chris, are coming to my birthday party. I want all four of us to sit together on the same side of the table.



YOUR MISSION: Make an organized list to find how many ways they can sit together on the same side of the table.

Understand	You know that, counting Delmar, four people are sitting on one side of the table. You need to know the number of possible arrangements.			
Plan	Make a list of all of the different possible arrangements. Use D for Delmar, B for Bethany, T for Terrence, and C for Chris.			
Solve	Listing D first:	Listing B first:	Listing T first:	Listing C first:
	DBTC	BDTC	TDBC	CDBT
	DBCT	BDCT	TDCB	CDTB
	DTBC	BTDC	TBDC	CBDT
	DTCB	BTCB	TBCD	CBTD
	DCBT	BCDT	TCDB	CTDB
	DCTB	BCTD	TCBD	CTBD
	There are 24 different ways the friends can sit along the same side of the table.			
Check	Check the answer by seeing if each person is accounted for six times in the first, second, and third positions. ✓			

Analyze The Strategy

- Analyze the 24 possible arrangements. Do you agree or disagree with the possibilities? Explain your reasoning.
- WRITING IN MATH** Explain how making an organized list helps you to solve a problem.

Mixed Problem Solving

Use the *make an organized list* strategy to solve Exercises 3–6.

3. **JEANS** A store has the following options for jeans.

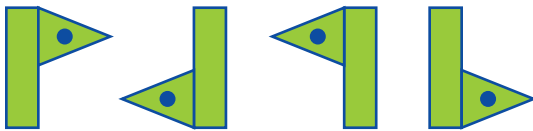
Length	Style	Color
short	straight leg	dark
medium	bootcut	light
long	flair	

How many combinations of length, style, and color are possible?

4. **NUMBER SENSE** How many different products are possible using the digits 2, 3, 6, and 8?

$$\begin{array}{r} \square \square \\ \times \square \square \\ \hline \end{array}$$

5. **PATTERNS** Where will the triangle with the circle be in the twentieth figure of this pattern?



6. **MONEY** Joaquin has \$0.75 to purchase a bottle of water from the vending machine. How many different combinations of change can he have if he only has nickels, dimes, and quarters? List the possibilities.

Use any strategy to solve Exercises 7–14. Some strategies are shown below.

PROBLEM-SOLVING STRATEGIES

- Make a table.
- Guess and check.

7. **NUMBER SENSE** A whole number less than 10 is multiplied by 0.8. The product is then added to 14.4 and the result is 20. What is the number?
8. **FOOD** A grocery store deli sells turkey, roast beef, and ham sandwiches. In how many ways can the sandwiches be arranged in the display case?



9. **CODES** The letters A, B, C, and D are used to identify different types of dogs at a dog show. How many different identification codes for dogs are there if A is always the first letter?

10. **MALLS** The table shows the number of monthly trips to the mall for several sixth-grade students. How many students went to the mall six or more times in the month?

Students' Monthly Trips to the Mall					
5	10	0	1	11	4
12	4	3	6	8	5
8	9	6	2	13	2

11. **MONEY** You would like to buy four gifts that cost \$15 each and one gift for \$10.99. How much money will you have left if you start with \$85.75?



12. **FOOD** Is \$7 enough money to buy a loaf of bread for \$0.98, one pound of cheese for \$2.29, and one pound of luncheon meat for \$3.29? Explain.

13. **HIKING** The number of miles Greg hiked in the first four days of a hiking trip are shown. At this rate, how many miles should he expect to hike at the end of the fifth day?

Day	Miles
1	2
2	3
3	5
4	8
5	■

14. **CARNIVALS** Lindsay and Marcello are setting up booths for the school carnival. There are six booths: ring toss, face-painting, snacks, tickets, balloon burst, and baseball toss. If the ticket booth and the snack booth must be first and second in line, respectively, in how many ways can the other booths be arranged?

4-5

Least Common Multiple

MAIN IDEA

Solve problems using the four-step plan.

IN Academic Standards

Preparation for 6.1.6

Solve problems involving addition, subtraction, multiplication and division of positive fractions and decimals and explain why a particular operation was used for a given situation.

New Vocabulary

multiple
common multiples
least common multiple (LCM)

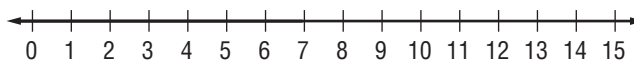
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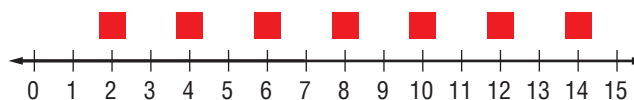
- Extra Examples
- Personal Tutor
- Self-Check Quiz

MINI Lab

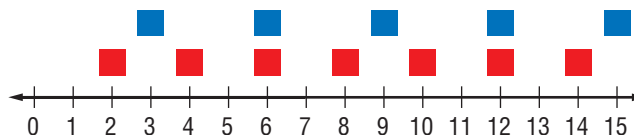
STEP 1 Draw a number line from 0 to 15.



STEP 2 Find the products of 2 and each of the numbers 1, 2, 3, 4, 5, 6, and 7. Place a red tile above each of the products on the number line.



STEP 3 Find the products of 3 and each of the numbers 1, 2, 3, 4, and 5. Place a blue tile above each of the products on the same number line.



1. Which of the products of 2 are also products of 3?
2. Find the least number that is a product of both 2 and 3.

A **multiple** of a number is the product of the number and any whole number (0, 1, 2, 3, 4, ...). Multiples that are shared by two or more numbers are **common multiples**.

EXAMPLE Identify Common Multiples

1 Identify the first three common multiples of 4 and 8.

First, list the nonzero multiples of each number.

multiples of 4: 4, 8, 12, 16, 20, 24, ... $1 \times 4, 2 \times 4, 3 \times 4, \dots$

multiples of 8: 8, 16, 24, 32, 40, 48, ... $1 \times 8, 2 \times 8, 3 \times 8, \dots$

Notice that 8, 16, and 24 are multiples common to both 4 and 8. So, the first three common multiples of 4 and 8 are 8, 16, and 24.

CHECK Your Progress

Identify the first three common multiples of each set of numbers.

- a. 2, 6
- b. 4, 5, 10



The least number that is a multiple of two or more whole numbers is the **least common multiple (LCM)** of the numbers. In Example 1, the least common multiple of 4 and 8 is 8.

In addition to listing the multiples, you can also use prime factors to find the least common multiple.

EXAMPLE Find the LCM

2 Find the LCM of 15 and 40.

Write the prime factorization of each number. Identify all common prime factors.

$$15 = 3 \times 5$$

$$40 = 2 \times 2 \times 2 \times 5$$

Find the product of the prime factors using each common prime factor only once and any remaining factors.

The LCM is $2 \times 2 \times 2 \times 3 \times 5$ or 120.

CHECK Your Progress

Find the LCM of each set of numbers.

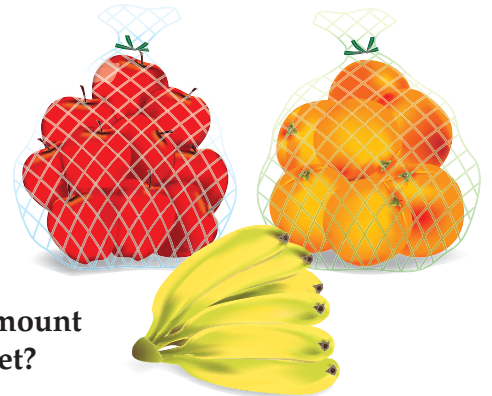
c. 4, 7

d. 3, 5, 7



Real-World EXAMPLE

3 FRUIT BASKETS Heritage Middle School is making fruit baskets for the community food bank. Apples are sold in bags of 10, oranges are sold in bags of 7, and there are 6 bananas in each bunch. How many of each should they buy so that they have an equal amount of each type of fruit in each basket?



Find the LCM using prime factors.

$$10: 2 \times 5$$

$$7: 7$$

$$6: 2 \times 3 \quad \text{Since 2 is a common prime factor, use it only once in the LCM.}$$

They will have the same amount of each item when they buy $2 \times 5 \times 7 \times 3$, or 210 pieces of each kind of fruit.

CHECK Your Progress

e. **RADIO** A radio station is having a promotion in which every 12th caller receives a free CD and every 20th caller receives free movie passes. Which caller will be the first one to receive both prizes?

Real-World Link

There are more than 2,500 varieties of apples grown in the United States and more than 7,500 varieties of apples grown around the world.

Source: University of Illinois at Urbana-Champaign



CHECK Your Understanding

Example 1 Identify the first three common multiples of each set of numbers.

(p. 216)

1. 7, 14

2. 2, 8, 12

Example 2 Find the LCM of each set of numbers.

(p. 217)

3. 6, 10

4. 2, 3, 13

Example 3 5. **MEDICINE** Marco gets an allergy shot every 3 weeks. Percy gets an allergy shot every 5 weeks. If Marco and Percy meet while getting an allergy shot, how many weeks will it be before they see each other again?

(p. 217)

Practice and Problem Solving

HOMEWORK HELP

For Exercises	See Examples
6–11	1
12–17	2
18, 19	3

Identify the first three common multiples of each set of numbers.

6. 2, 10

7. 1, 7

8. 6, 9

9. 3, 8

10. 4, 8, 10

11. 3, 9, 18

Find the LCM of each set of numbers.

12. 3, 4

13. 7, 9

14. 16, 20

15. 15, 12

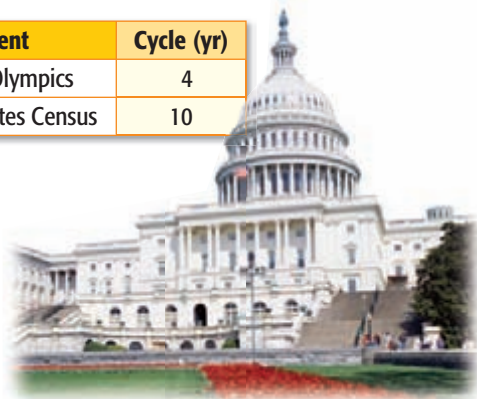
16. 15, 25, 75

17. 9, 12, 15

18. **MOON** A full moon occurs every 30 days. If the last full moon occurred on a Friday, how many days will pass before a full moon occurs again on a Friday?

19. **EVENTS** The cycles for two different events are shown in the table. Each of these events happened in the year 2000. What is the next year in which both will both happen?

Event	Cycle (yr)
Summer Olympics	4
United States Census	10



NUMBER SENSE For Exercises 20 and 21, use the following information.

The common multiples of x and 16 are 16, 32, 48, 64, 80, ...

The common multiples of y and z are 18, 36, 54, 72, 90, ...

20. Find four different possible values of x .

21. Find two different possible values each of y and z .

22. **PICTURES** For a yearbook picture, the marching band must line up in even rows. Describe the possible arrangements for the least number of people needed to be able to line up in rows of 5 or 6.

Academic Standards • ISTEP+

Extra Practice, pp. 682, 709

H.O.T. Problems

23. **FIND THE ERROR** D.J. and Trina are finding the LCM of 6 and 8. Who is correct? Explain your reasoning.



D.J.

$6 = 2 \times 3$
 $8 = 2 \times 2 \times 2$
 The LCM of 6 and 8 is 2.



Trina

$6 = 2 \times 3$
 $8 = 2 \times 2 \times 2$
 The LCM of 6 and 8 is $2 \times 2 \times 2 \times 3$ or 24.

24. **CHALLENGE** Is the statement below *sometimes*, *always*, or *never* true? Give at least two examples to support your reasoning.

The LCM of two numbers is the product of the two numbers.

25. **WRITING IN MATH** Create a problem about a real-world situation in which it would be helpful to find the least common multiple.

ISTEP+ PRACTICE**Preparation for 6.1.6**

26. Micah is buying items for a birthday party. If he wants to have the same amount of each item, what is the least number of packages of cups he needs to buy?

Party Supplies	
Item	Number in Each Package
cups	6
plates	8

- A 2 packages C 4 packages
 B 3 packages D 5 packages

27. What is the least common multiple of 5, 9, and 15?

- F 3
 G 29
 H 45
 J 60

Spiral Review

28. **HOMEWORK** Tama needs to study for a math test, read a chapter in her novel, and write a social studies report tonight. How many different ways can Tama order these three activities? (Lesson 4-4)
29. **FOOD** Sabino bought a carton of 18 eggs for his dad at the grocery store. How many dozen eggs did Sabino buy? (Lesson 4-3)

Replace each \blacksquare with a number so the fractions are equivalent. (Lesson 4-2)

30. $\frac{1}{5} = \frac{\blacksquare}{25}$

31. $\frac{3}{17} = \frac{9}{\blacksquare}$

32. $\frac{42}{48} = \frac{\blacksquare}{8}$

33. $\frac{33}{55} = \frac{3}{\blacksquare}$

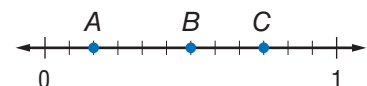
GET READY for the Next Lesson

PREREQUISITE SKILL Choose the letter of the point that represents each fraction.

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

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

36. $\frac{1}{6}$



4-6

Comparing and Ordering Fractions

MAIN IDEA

Solve problems using the four-step plan.

IN Academic Standards

6.1.1 Compare, order, and represent on a number line positive and negative integers, **fractions**, decimals (to hundredths), and **mixed numbers**.

New Vocabulary

least common denominator (LCD)

IN Math Online

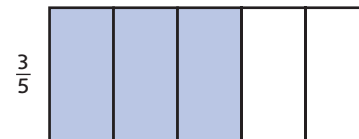
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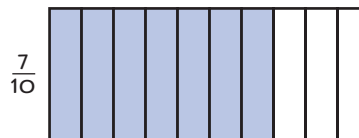
MINI Lab

Use a model to determine which fraction is greater, $\frac{3}{5}$ or $\frac{7}{10}$.

STEP 1 Draw a rectangle and shade $\frac{3}{5}$ of it.



STEP 2 Draw another rectangle that is the same size and shade $\frac{7}{10}$ of it.



1. Which fraction is greater?

Use a model to determine which fraction is greater.

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

3. $\frac{1}{6}$ or $\frac{2}{9}$

4. $\frac{3}{8}$ or $\frac{4}{7}$

To compare two fractions without using models, you can write them as fractions with the same denominator.

Compare Two Fractions

Key Concept

To compare two fractions you can follow these steps.

1. Find the **least common denominator (LCD)** of the fractions. That is, find the least common multiple of the denominators.
2. Write an equivalent fraction for each fraction using the LCD.
3. Compare the numerators.

EXAMPLES

Compare Fractions and Mixed Numbers

Replace each \bullet with $<$, $>$, or $=$ to make a true sentence.

1 $\frac{5}{8} \bullet \frac{7}{12}$

Step 1 The LCM of the denominators, 8 and 12, is 24. So, the LCD is 24.

Step 2 Write an equivalent fraction with a denominator of 24 for each fraction.

$$\frac{5}{8} = \frac{15}{24} \quad \frac{7}{12} = \frac{14}{24}$$

Step 3 $\frac{15}{24} > \frac{14}{24}$, since $15 > 14$. So, $\frac{5}{8} > \frac{7}{12}$.

Study Tip

Comparing Mixed Numbers
When comparing mixed numbers like $5\frac{1}{8}$ and $3\frac{7}{10}$, it is not necessary to find a common denominator.

Since $5 > 3$, $5\frac{1}{8} > 3\frac{7}{10}$.

2 $3\frac{1}{2} \bullet 3\frac{1}{4}$

Since the whole numbers are the same, compare $\frac{1}{2}$ and $\frac{1}{4}$.

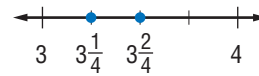
Step 1 The LCM of the denominators, 2 and 4, is 4. So, the LCD is 4.

Step 2 Write an equivalent fraction with a denominator of 4 for each fraction.

$$\frac{1}{2} = \frac{2}{4} \quad \frac{1}{4} = \frac{1}{4}$$

Step 3 $\frac{2}{4} > \frac{1}{4}$, since $2 > 1$. So, $3\frac{1}{2} > 3\frac{1}{4}$.

Check Graph $3\frac{1}{2}$ and $3\frac{1}{4}$ on a number line. Since 4 is the LCD, separate the number line from 3 to 4 into four equal parts. Then graph $3\frac{2}{4}$ and $3\frac{1}{4}$.



Since $3\frac{2}{4}$ is to the right of $3\frac{1}{4}$, the answer is correct.

✓ CHECK Your Progress

Replace each \bullet with $<$, $>$, or $=$ to make a true sentence.

a. $\frac{2}{3} \bullet \frac{4}{9}$

b. $\frac{5}{12} \bullet \frac{7}{8}$

c. $4\frac{1}{6} \bullet 4\frac{5}{18}$

You can use what you have learned about comparing fractions to order fractions.

EXAMPLE Order Fractions

3 Order the fractions $\frac{1}{2}$, $\frac{9}{14}$, $\frac{3}{4}$, and $\frac{5}{7}$ from least to greatest.

The LCD of the fractions is 28. So, rewrite each fraction with a denominator of 28.

$$\frac{1}{2} = \frac{14}{28} \quad \frac{3}{4} = \frac{21}{28} \quad \frac{9}{14} = \frac{18}{28} \quad \frac{5}{7} = \frac{20}{28}$$

Since $\frac{14}{28} < \frac{18}{28} < \frac{20}{28} < \frac{21}{28}$, the order of the original fractions from least to greatest is $\frac{1}{2}$, $\frac{9}{14}$, $\frac{5}{7}$, $\frac{3}{4}$.

✓ CHECK Your Progress

Order the fractions from least to greatest.

d. $\frac{1}{2}$, $\frac{5}{6}$, $\frac{2}{3}$, $\frac{3}{5}$

e. $\frac{4}{5}$, $\frac{3}{4}$, $\frac{2}{5}$, $\frac{1}{4}$

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

ISTEP+ EXAMPLE 6.1.1

- 4 The fraction of Earth covered by each ocean is shown in the table. Which ocean covers the least amount of Earth?
- A Arctic Ocean
 - B Atlantic Ocean
 - C Indian Ocean
 - D Pacific Ocean

Approximate Fraction of Earth Covered by Each Ocean	
Ocean	Fraction
Arctic	$\frac{1}{50}$
Atlantic	$\frac{1}{5}$
Indian	$\frac{7}{50}$
Pacific	$\frac{3}{10}$

Source: University of British Columbia Okanagan

Test-Taking Tip

Writing Equivalent Fractions Any common denominator can be used, but using the *least* common denominator usually makes the computation easier.

Read the Item You need to compare the fractions.

Solve the Item Rewrite the fractions with the LCD, 50.

$$\frac{1}{50} = \frac{1}{50} \quad \frac{1}{5} = \frac{10}{50} \quad \frac{7}{50} = \frac{7}{50} \quad \frac{3}{10} = \frac{15}{50}$$

So, $\frac{1}{50}$ is the least fraction, and the answer is A.

CHECK Your Progress

- g. Each day, Kayla walks $\frac{1}{3}$ mile, Nora walks $\frac{1}{6}$ mile, and Mercedes walks $\frac{4}{5}$ mile. Which list shows these distances in order from least to greatest?
- F $\frac{1}{3}$ mi, $\frac{1}{6}$ mi, $\frac{4}{5}$ mi
 - G $\frac{1}{6}$ mi, $\frac{4}{5}$ mi, $\frac{1}{3}$ mi
 - H $\frac{1}{3}$ mi, $\frac{4}{5}$ mi, $\frac{1}{6}$ mi
 - J $\frac{1}{6}$ mi, $\frac{1}{3}$ mi, $\frac{4}{5}$ mi

CHECK Your Understanding

Examples 1, 2 Replace each \bullet with $<$, $>$, or $=$ to make a true sentence.

(pp. 220–221)

1. $\frac{3}{7} \bullet \frac{1}{4}$ 2. $\frac{5}{7} \bullet \frac{15}{21}$ 3. $8\frac{9}{16} \bullet 8\frac{5}{8}$

Example 3 Order the fractions from least to greatest.

(p. 221)

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

Example 4 (p. 222)

6. **MULTIPLE CHOICE** In a survey about household odors, $\frac{7}{20}$ of the people said pet odors were the smelliest, $\frac{1}{10}$ voted for cooking odors, and $\frac{2}{5}$ chose garbage odors. Which odor did people choose the most?
- A pet odors
 - B cooking odors
 - C garbage odors
 - D cannot tell from data

Practice and Problem Solving

HOMEWORK HELP

For Exercises	See Examples
7–16	1, 2
17–22	3
33–35	4

Replace each \bullet with $<$, $>$, or $=$ to make a true statement.

7. $\frac{1}{3} \bullet \frac{3}{5}$ 8. $\frac{7}{8} \bullet \frac{5}{6}$ 9. $5\frac{6}{9} \bullet 5\frac{2}{3}$ 10. $7\frac{3}{4} \bullet 7\frac{9}{16}$
 11. $\frac{7}{12} \bullet \frac{1}{2}$ 12. $\frac{14}{18} \bullet \frac{7}{9}$ 13. $2\frac{4}{5} \bullet 2\frac{13}{15}$ 14. $10\frac{5}{8} \bullet 10\frac{20}{32}$

15. **MEASUREMENT** Which is shorter, $\frac{5}{8}$ of a foot or $\frac{3}{4}$ of a foot?

16. **MEASUREMENT** Which is greater, $\frac{2}{3}$ of a dozen or $\frac{3}{4}$ of a dozen?

Order the fractions from least to greatest.

17. $\frac{1}{2}, \frac{2}{3}, \frac{1}{4}, \frac{5}{6}$ 18. $\frac{2}{3}, \frac{2}{9}, \frac{5}{6}, \frac{11}{18}$
 19. $9\frac{1}{6}, 9\frac{2}{5}, 9\frac{3}{7}, 9\frac{3}{5}$ 20. $3\frac{5}{8}, 3\frac{3}{4}, 3\frac{1}{2}, 3\frac{9}{16}$

21. **INSECTS** Ling collected four small insects for his science class. The insects measured $\frac{3}{8}$ inch, $\frac{5}{16}$ inch, $\frac{3}{4}$ inch, and $\frac{1}{2}$ inch. Which insect is the longest?

22. **NECKLACES** Kate has three different beads that she is using to make a necklace. The first bead is $\frac{5}{6}$ inch long, the second bead is $\frac{7}{8}$ inch long, and the third bead is $\frac{3}{16}$ inch long. Which of these beads is the longest?

Replace each \bullet with $<$, $>$, or $=$ to make a true statement.

23. $\frac{3}{5} \bullet \frac{3}{20}$ 24. $5\frac{1}{3} \bullet 6\frac{1}{3}$ 25. $\frac{15}{24} \bullet 1\frac{5}{8}$ 26. $\frac{18}{4} \bullet 3\frac{1}{2}$

27. **ANALYZE TABLES** The world's five largest deserts are shown in the table. Order the areas from least to greatest.

Desert	Area (millions of square miles)
Sahara	$\frac{7}{2}$
Kalahari	$\frac{2}{10}$
Gobi	$\frac{2}{5}$
Australian	$1\frac{4}{10}$
Arabian	$\frac{1}{2}$



Source: Scholastic Book of World Records 2007

28. **BIKING** Tobias, Marcus, and Dominic rode their bicycles to the arcade. Tobias rode $\frac{12}{5}$ miles, Marcus rode $2\frac{1}{3}$ miles, and Dominic rode $\frac{9}{4}$ miles.

Which person rode closest to 2 miles? Explain your reasoning.

29. **FIND THE DATA** Refer to the Data File on pages 16–19. Choose some data and write a real-world problem in which you would compare two fractions.

30. **OPEN ENDED** Specify three fractions with different denominators that have an LCD of 24. Then arrange the fractions in order from least to greatest.

Academic Standards • ISTEP+

Extra Practice, pp. 683, 709

H.O.T. Problems

31. **CHALLENGE** Order $\frac{3}{8}$, $\frac{3}{7}$, and $\frac{3}{9}$ from least to greatest without writing equivalent fractions with a common denominator. Explain your strategy.
32. **WRITING IN MATH** Explain how to determine if $\frac{1}{6}$ is less than, greater than, or equal to $\frac{7}{9}$ without using the least common denominator.

ISTEP+ PRACTICE

6.1.1

33. Which statement about the mixed number $2\frac{3}{4}$ is true?

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

34. A plumber needs to drill a hole that is just slightly larger than $\frac{3}{16}$ inch in diameter. Which measure is the smallest but still larger than $\frac{3}{16}$ inch?

- F $\frac{3}{32}$ inch H $\frac{13}{64}$ inch
 G $\frac{5}{16}$ inch J $\frac{17}{32}$ inch

35. The table shows the fraction of Internet users that have done each activity online.

Activity	Fraction of Internet Users
Search for information	$\frac{9}{10}$
Check the weather	$\frac{19}{25}$
Download music	$\frac{1}{4}$
Write or read a blog	$\frac{9}{25}$

Source: Pew Internet and American Life Project

Which activity was reported most often?

- A downloading music
 B checking the weather
 C searching for information
 D writing or reading a blog

Spiral Review

36. **DECORATING** Sahale decorated his house with three strands of party lights. The red strand blinks every 4 seconds, the green strand blinks every 6 seconds, and the white strand blinks every 10 seconds. How many seconds will go by until the three strands blink at the same time? (Lesson 4-5)
37. Express $5\frac{3}{8}$ as an improper fraction. (Lesson 4-3)
38. **MONEY** Lydia has four quarters, three dimes, two nickels, two one-dollar bills, and one five-dollar bill. Write a fraction in simplest form that compares the number of bills to the total number of pieces of money she has. (Lesson 4-2)

GET READY for the Next Lesson

PREREQUISITE SKILL Write each decimal in standard form. (Lesson 3-1)

39. seven tenths 40. four and six tenths
 41. eighty-nine hundredths 42. twenty-five thousandths

4-7

Writing Decimals as Fractions

MAIN IDEA

Solve problems using the four-step plan.

IN Academic Standards

6.1.4 Recognize commonly used fractions, decimals, and percents and their equivalents and convert between any two representations of any non-negative rational numbers without the use of a calculator. Also addresses P.4.1, P.4.2.

New Vocabulary

rational number

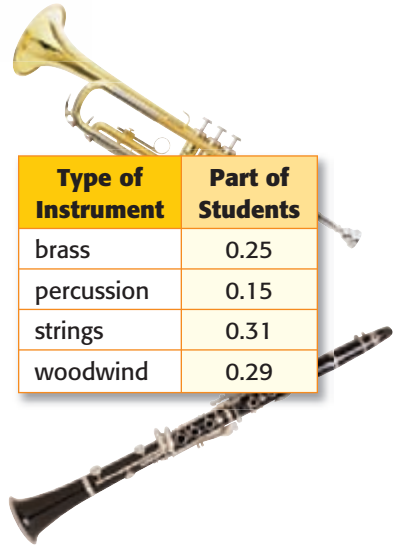
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▶ GET READY for the Lesson

MUSIC The table shows the part of students in the school orchestra that play each type of musical instrument.



Type of Instrument	Part of Students
brass	0.25
percussion	0.15
strings	0.31
woodwind	0.29

1. Write the word form of the decimal that represents the part of those surveyed who play a stringed instrument.
2. Write this decimal as a fraction.
3. Repeat Exercises 1 and 2 with each of the other decimals.

Decimals like 0.25, 0.15, 0.31, and 0.29 can be written as fractions with denominators of 10, 100, 1,000, and so on. Any number that can be written as a fraction is a **rational number**.

Write Decimals as Fractions

Key Concept

To write a decimal as a fraction, you can follow these steps.

1. Identify the place value of the last decimal place.
2. Write the decimal as a fraction using the place value as the denominator. If necessary, simplify the fraction.

EXAMPLES Write Decimals as Fractions

Write each decimal as a fraction in simplest form.

1 0.6

The place-value chart shows that the place value of the last decimal place is tenths. So, 0.6 means six tenths.

$$0.6 = \frac{6}{10} \quad \text{Say six tenths.}$$

$$= \frac{\overset{3}{\cancel{6}}}{\underset{5}{\cancel{10}}} \quad \text{Simplify. Divide the numerator and denominator by the GCF, 2.}$$

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

1,000	100	10	1	0.1	0.01	0.001	0.0001
thousands	hundreds	tens	ones	tenths	hundredths	thousandths	ten-thousandths
○	○	○	○	6	○	○	○

Study Tip

Mental Math Here are some commonly used decimal fraction equivalencies:

$$0.1 = \frac{1}{10}$$

$$0.2 = \frac{1}{5}$$

$$0.25 = \frac{1}{4}$$

$$0.5 = \frac{1}{2}$$

$$0.75 = \frac{3}{4}$$

It is helpful to memorize these.

2 0.45

$$0.45 = \frac{45}{100}$$

Say *forty-five hundredths*.

$$= \frac{\cancel{45}^9}{\cancel{100}^{20}}$$

Simplify. Divide by the GCF, 5.

$$= \frac{9}{20}$$

1,000	100	10	1	0.1	0.01	0.001	0.0001
thousands	hundreds	tens	ones	tenths	hundredths	thousandths	ten-thousandths
0	0	0	0	4	5	0	0

3 0.375

$$0.375 = \frac{375}{1,000}$$

Say *three hundred seventy-five thousandths*.

$$= \frac{\cancel{375}^3}{\cancel{1,000}^8}$$

Simplify. Divide by the GCF, 125.

$$= \frac{3}{8}$$

1,000	100	10	1	0.1	0.01	0.001	0.0001
thousands	hundreds	tens	ones	tenths	hundredths	thousandths	ten-thousandths
0	0	0	0	3	7	5	0

✓ CHECK Your Progress

Write each decimal as a fraction in simplest form.

a. 0.8

b. 0.28

c. 0.125

Decimals like 3.25, 26.82, and 125.54 can be written as mixed numbers in simplest form.

EXAMPLE Write Decimals as Mixed Numbers

4 SHELLS The table shows the average length of several kinds of seashells. Express the average length of the conch shell as a mixed number in simplest form.

Length of Seashells	
Shell	Average Length (in.)
Conch	9.85
Nautilus	6.5
Scallop	2.75
Tulip	8.0

Source: Sanibel Seashell Industries

$$9.85 = 9\frac{85}{100}$$

Say *nine and eighty-five hundredths*.

$$= 9\frac{\cancel{85}^{17}}{\cancel{100}^{20}}$$

Simplify.

$$= 9\frac{17}{20}$$

✓ CHECK Your Progress

d. **MILK** It takes approximately 4.65 quarts of milk to make a pound of cheese. Express this amount as a mixed number in simplest form.



Real-World Link

The Queen Conch is a mollusk that produces the beautiful shell shown above. A Queen Conch can live for 20–25 years in captivity.

Source: Conch Heritage Network

CHECK Your Understanding

Examples 1–4
(pp. 225–226)

Write each decimal as a fraction or mixed number in simplest form.

- | | | | |
|----------|----------|---------|---------|
| 1. 0.4 | 2. 0.5 | 3. 0.64 | 4. 0.75 |
| 5. 0.525 | 6. 0.375 | 7. 2.75 | 8. 5.12 |

Example 4
(p. 226)

9. **CARS** Mr. Ravenhead's car averages 23.75 miles per gallon of gasoline. Express this amount as a mixed number in simplest form.

Practice and Problem Solving

HOMEWORK HELP

For Exercises	See Examples
10–13	1
14–17, 22, 23	2
18–21	3
24–33	4

Write each decimal as a fraction in simplest form.

- | | | | |
|-----------|-----------|-----------|-----------|
| 10. 0.3 | 11. 0.7 | 12. 0.2 | 13. 0.5 |
| 14. 0.33 | 15. 0.21 | 16. 0.65 | 17. 0.82 |
| 18. 0.875 | 19. 0.425 | 20. 0.018 | 21. 0.004 |

22. **STOCKS** Last week a share of stock gained a total of 0.64 point. Express this gain as a fraction in simplest form.

23. **DISTANCE** Evita lives 0.85 mile from her school. Write this distance as a fraction in simplest form.

Write each decimal as a mixed number in simplest form.

- | | | | |
|----------|-----------|-----------|------------|
| 24. 8.9 | 25. 12.1 | 26. 14.06 | 27. 17.03 |
| 28. 9.35 | 29. 42.96 | 30. 7.425 | 31. 50.605 |

SANDWICHES For Exercises 32–34, refer to the table that shows the ingredients in an Italian sandwich at Johnny's Deli.

Ingredient	Amount (lb)
meat	0.35
vegetables	0.15
secret sauce	0.05
bread	0.05

32. What fraction of a pound is each ingredient?
33. How much more meat is in the sandwich than vegetables? Write the amount as a fraction in simplest form.
34. What is the total weight of the Italian sandwich? Write the amount as a fraction in simplest form.

35. **LADYBUGS** The average length of a ladybug can range from 0.08 to 0.4 inch. Find two lengths that are within the given span. Write them as fractions in simplest form.



Academic Standards • ISTEP+

Extra Practice, pp. 683, 709

36. **FENCES** William bought 20 yards of fencing. He used 5.9 yards to surround one flower garden and 10.3 yards to surround another garden. Write the amount remaining as a fraction in simplest form.

**H.O.T. Problems**

37. **CHALLENGE** Decide whether the following statement is *sometimes*, *always*, or *never* true. Explain your reasoning.

Any decimal that ends with a digit in the thousandths place can be written as a fraction with a denominator that is divisible by both 2 and 5.

38. **FIND THE ERROR** Eduardo and Laura are writing 4.28 as a mixed number. Who is correct? Explain your reasoning.



Eduardo

$$4.28 = 4\frac{28}{1,000}$$

or $4\frac{7}{250}$

$$4.28 = 4\frac{28}{100}$$

or $4\frac{7}{25}$



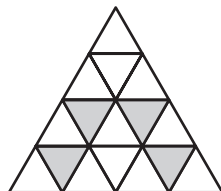
Laura

39. **WRITING IN MATH** Explain how to express 0.36 as a fraction.

**ISTEP+ PRACTICE**

6.1.4

40. Rafael shaded 0.25 of the design.



Which fraction in simplest form represents the shaded part of the design?

- A $\frac{1}{2}$ B $\frac{25}{100}$ C $\frac{4}{16}$ D $\frac{1}{4}$

41. Which of the following statements is *not* true?

F $0.6 = \frac{3}{5}$

G $0.125 = \frac{1}{8}$

H $2.015 = 2\frac{1}{200}$

J $10.38 = 10\frac{19}{50}$

Spiral Review

Replace each \bullet with $<$, $>$, or $=$ to make a true sentence. (Lesson 4-6)

42. $\frac{1}{3} \bullet \frac{2}{7}$

43. $7\frac{5}{9} \bullet 7\frac{6}{11}$

44. $\frac{3}{5} \bullet \frac{12}{20}$

45. $8\frac{4}{15} \bullet 9\frac{8}{27}$

46. Find the LCM of 15, 20, and 25. (Lesson 4-5)

47. **SWEATERS** A store sells sweaters in 5 different styles and 4 different colors. How many combinations of style and color are available?

(Lesson 4-4)

GET READY for the Next Lesson

PREREQUISITE SKILL Divide. (Page 726)

48. $45 \div 5$

49. $72 \div 4$

50. $112 \div 8$

51. $84 \div 4$

4-8

Writing Fractions as Decimals

MAIN IDEA

Solve problems using the four-step plan.

IN Academic Standards

6.1.4 Recognize commonly used fractions, decimals, and percents and their equivalents and convert between any two representations of any non-negative rational numbers without the use of a calculator. Also addresses P.4.1, P.4.2.

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▶ GET READY for the Lesson

BIRTH ORDER The table shows the responses to a survey of birth order.

1. Write the decimal for $\frac{3}{10}$.
2. Write the fraction equivalent to $\frac{1}{2}$ with a denominator of 10.
3. Write the decimal for the fraction you found in Exercise 2.

What is Your Birth Order?	Response
oldest child	$\frac{1}{20}$
middle child	$\frac{1}{2}$
youngest child	$\frac{3}{10}$
only child	$\frac{3}{20}$

Fractions with denominators of 10, 100, or 1,000 can be written as a decimal using place value. For fractions with denominators that are factors of 10, 100, or 1,000, you can write equivalent fractions with these denominators.

EXAMPLES Write Fractions as Decimals

- 1** Write $\frac{2}{5}$ as a decimal.

Since 5 is a factor of 10, write an equivalent fraction with a denominator of 10.

$$\frac{2}{5} = \frac{4}{10}$$

Since $5 \times 2 = 10$, multiply the numerator and denominator by 2.

$$= 0.4 \quad \text{Read 0.4 as four tenths.}$$

- 2** Write $\frac{3}{4}$ as a decimal.

Since 4 is a factor of 100, write an equivalent fraction with a denominator of 100.

$$\frac{3}{4} = \frac{75}{100}$$

Since $4 \times 25 = 100$, multiply the numerator and denominator by 25.

$$= 0.75 \quad \text{Read 0.75 as seventy-five hundredths.}$$

✓ CHECK Your Progress

Write each fraction as a decimal.

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

b. $\frac{14}{25}$

c. $\frac{102}{250}$



Any fraction can be written as a decimal by dividing the numerator by the denominator.

EXAMPLE Fractions as Decimals

3 Write $\frac{7}{8}$ as a decimal.

METHOD 1 Use paper and pencil.

$$\begin{array}{r} \frac{7}{8} \rightarrow \begin{array}{r} 0.875 \\ 8 \overline{)7.000} \\ \underline{-64} \\ 60 \\ \underline{-56} \\ 40 \\ \underline{-40} \\ 0 \end{array} \end{array}$$

Place the decimal point directly above the decimal point after 7.

To divide 7 by 8, place a decimal point after 7 and annex as many zeros as necessary to complete the division.

METHOD 2 Use a calculator.

$$7 \div 8 \text{ [ENTER]} = 0.875$$

Therefore, $\frac{7}{8} = 0.875$.

CHOOSE Your Method Write each fraction as a decimal.

d. $\frac{1}{8}$

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

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



Real-World EXAMPLE Mixed Numbers as Decimals

4 **INTERNET** Use the information at the left to write the number of Internet users per 100 people as a decimal.

$$55\frac{7}{50} = 55 + \frac{7}{50}$$

Definition of a mixed number

$$= 55 + \frac{14}{100}$$

Since $50 \times 2 = 100$, multiply the numerator and the denominator by 2.

$$= 55 + 0.14 \text{ or } 55.14$$

Read 55.14 as *fifty-five and fourteen hundredths*.

The number of Internet users per 100 people is 55.14.

Check Use a calculator. $55 + 7 \div 50 \text{ [ENTER]} = 55.14 \checkmark$

CHECK Your Progress

g. **POPULATION** In Nevada, there are $20\frac{2}{5}$ people per square mile. Express this fraction as a decimal.



Real-World Link

In the United States, there are $55\frac{7}{50}$ Internet users per 100 people.

Source: *Top 10 of Everything*



CHECK Your Understanding

Examples 1–3
(pp. 229–230)

Write each fraction or mixed number as a decimal.

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

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

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

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

5. $\frac{9}{25}$

6. $\frac{5}{16}$

Example 4
(p. 230)

7. $3\frac{7}{10}$

8. $6\frac{4}{25}$

9. $4\frac{9}{40}$

10. **ANIMALS** The Siberian tiger can grow up to $10\frac{4}{5}$ feet long. Express this length as a decimal.

Practice and Problem Solving

HOMEWORK HELP

For Exercises	See Examples
11–14	1, 2
15–18	3
19–24	4

Write each fraction or mixed number as a decimal.

11. $\frac{1}{20}$

12. $\frac{19}{25}$

13. $\frac{77}{200}$

14. $\frac{311}{500}$

15. $\frac{5}{8}$

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

17. $\frac{9}{16}$

18. $\frac{5}{32}$

19. $6\frac{1}{16}$

20. $8\frac{21}{40}$

21. $12\frac{43}{80}$

22. $9\frac{9}{32}$

23. **GAMES** A handheld video game is $5\frac{13}{16}$ inches long. Express this length as a decimal.

24. **SCHOOL** Rancho Middle School has an average of $23\frac{3}{8}$ students per teacher. Write this fraction as a decimal.

Replace each \bullet with $<$, $>$, or $=$ to make a true sentence.

25. $\frac{3}{4} \bullet 0.8$

26. $\frac{17}{40} \bullet 0.4$


27. $0.72 \bullet \frac{3}{4}$

28. **GEOMETRY** The length s of a side of a square can be found using the formula $s = \frac{1}{4}P$, where P is the perimeter. Express $\frac{1}{4}$ as a decimal.

29. **TRACK** Paloma can run the 100-meter dash in $16\frac{1}{5}$ seconds. Savannah's best time is 19.8 seconds. How much faster is Paloma than Savannah in the 100-meter dash?

30. **MEASUREMENT**

The table shows the wingspans of different birds. Using decimals, name the bird that has the smallest minimum wingspan and the bird that has the greatest maximum wingspan.



Bird	Minimum Wingspan (ft)	Maximum Wingspan (ft)
Whooping Crane	$7\frac{1}{6}$	$7\frac{1}{4}$
Bald Eagle	$6\frac{7}{12}$	$7\frac{1}{2}$
Black-Footed Albatross	$6\frac{3}{10}$	$7\frac{1}{12}$

Source: Cornell Lab of Ornithology

Academic Standards • ISTEP+

Extra Practice, pp. 683, 709

**H.O.T. Problems****CHALLENGE** Express each fraction as a decimal.

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

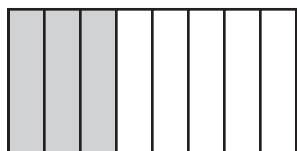
32. $\frac{2}{3}$

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

34. **REASONING** Explain why the decimals in Exercises 31–33 are called *repeating decimals*.35. **CHALLENGE** Write a fraction that can be expressed as a repeating decimal when two digits repeat.36. **OPEN ENDED** Write a fraction with a decimal value between $\frac{1}{2}$ and $\frac{3}{4}$. Write both the fraction and the equivalent decimal.37. **WRITING IN MATH** Summarize the two methods for expressing fractions as decimals. Describe when it is appropriate to use each method in your summary.**ISTEP+ PRACTICE**

6.1.4

38. Which decimal represents the shaded portion of the figure below?



- A 0.25
 B 0.333
 C 0.375
 D 0.4

39. The formula $d = v + \frac{1}{20}v^2$ can be used to find the distance d required to stop a certain model car traveling at v miles per hour. Which of the following best represents $\frac{1}{20}$?

- F 0.05
 G 0.21
 H 0.4
 J 1.2

**Spiral Review**

Write each decimal as a fraction or mixed number in simplest form.

(Lesson 4-7)

40. 0.25

41. 0.73

42. 8.118

43. 11.14

44. Which fraction is greater, $\frac{13}{40}$ or $\frac{3}{7}$? (Lesson 4-6)45. **FOOD** Twenty out of two dozen cupcakes are chocolate cupcakes. Write this amount as a fraction in simplest form. (*Hint*: 1 dozen = 12)

(Lesson 4-2)

GET READY for the Next Lesson**PREREQUISITE SKILL** Graph each number on the same number line.

46. 2.25

47. 1.5

48. 0.5

49. 3.75

4-9

Algebra: Ordered Pairs and Functions

MAIN IDEA

Solve problems using the four-step plan.

IN Academic Standards

6.2.5 Solve problems involving linear functions with integer values. Create a table and graph the resulting ordered pairs of integers on a grid. Look for patterns in how a change in one variable relates to a change in the second variable and write the equation.

New Vocabulary

coordinate plane
origin
x-axis
y-axis
ordered pair
x-coordinate
y-coordinate
graph

IN Math Online

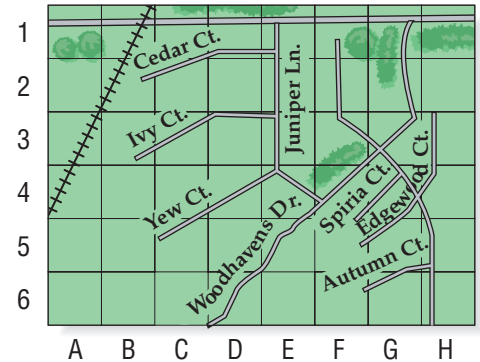
glencoe.com

- Concepts in Motion
- Extra Examples
- Personal Tutor
- Self-Check Quiz

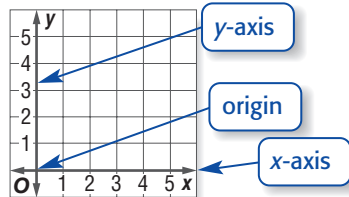
▶ GET READY for the Lesson

MAPS A street map is shown.

1. How is the map labeled?
2. Location C5 is closest to the end of which street?
3. Identify where Cedar Court and Juniper Lane intersect on the map.



In mathematics, points are located on a coordinate plane.



The **coordinate plane** is formed when two number lines intersect at their zero points. This point is called the **origin**. The horizontal number line is called the **x-axis**, and the vertical number line is called the **y-axis**.

You can use an **ordered pair** to name any point on the coordinate plane. The first number in an ordered pair is the **x-coordinate**, and the second number is the **y-coordinate**.

The x-coordinate corresponds to a number on the x-axis.

(3, 6)

The y-coordinate corresponds to a number on the y-axis.

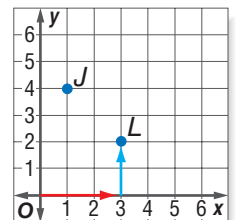
EXAMPLE Naming Points Using Ordered Pairs

1 Write the ordered pair that names point L.

Step 1 Start at the origin. Move right along the x-axis until you are under point L. The x-coordinate of the ordered pair is 3.

Step 2 Now move up until you reach point L. The y-coordinate is 2.

So, point L is named by the ordered pair (3, 2).



✓ CHECK Your Progress

- a. Write the ordered pair that names point J.



Study Tip

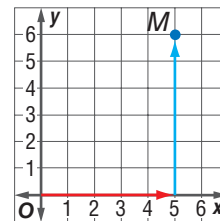
Coordinate Plane A coordinate plane is also called a coordinate grid.

You can also graph a point on a coordinate plane. To **graph** a point means to place a dot at the point named by an ordered pair.

EXAMPLES Graphing Ordered Pairs

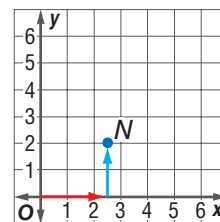
2 Graph the point $M(5, 6)$.

- Start at the origin.
- Move 5 units to the right on the x -axis.
- Then move 6 units up to locate the point.
- Draw a dot and label the dot M .



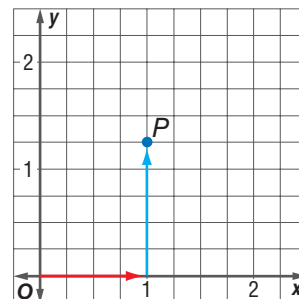
3 Graph the point $N(2\frac{1}{2}, 2)$.

- Start at the origin.
- The value $2\frac{1}{2}$ is halfway between 2 and 3. So, on the x -axis, move halfway between 2 and 3.
- Then move 2 units up to locate the point.
- Draw a dot and label the dot N .



4 Graph the point $P(1, 1.25)$.

- Start at the origin.
- Move 1 unit to the right on the x -axis.
- The value 1.25 is one-fourth of the way between 1 and 2. So, move one-fourth of the way between 1 and 2.
- Draw a dot and label the dot P .



Study Tip

Alternative Method To graph a fraction or a decimal, you can also draw the coordinate plane so that the axes are separated into halves, thirds, and so on.

✓ CHECK Your Progress

Graph and label each point on a coordinate plane.

b. $X(8, 0)$

c. $Y(2, 5\frac{1}{4})$

d. $Z(3.75, 6)$

Ordered pairs can also be used to graph functions.

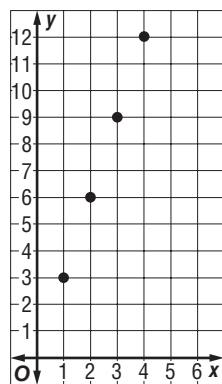
Real-World EXAMPLES

5 FUNDRAISER The cheerleaders at South Middle School are selling bracelets for a fundraiser. The costs of 1, 2, 3, and 4 bracelets are shown in the table. List this information as ordered pairs (number of bracelets, cost).

The ordered pairs are $(1, 3)$, $(2, 6)$, $(3, 9)$, and $(4, 12)$.

Bracelet Costs	
Number of Bracelets	Cost (\$)
1	3
2	6
3	9
4	12

6 Graph the ordered pairs in Example 5. Then describe the graph.



The points appear to fall on a line.

CHECK Your Progress

e. **BABYSITTING** Gloria earns \$5.50 each hour babysitting. She made a table showing her earnings for 0, 1, 2, and 3 hours of babysitting. List this information as ordered pairs (time, earnings).

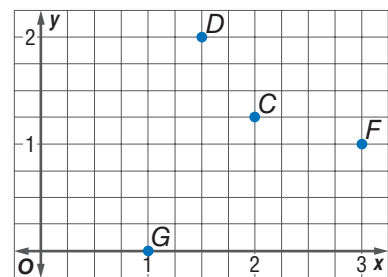
Time (h)	Earnings (\$)
0	0
1	5.5
2	11
3	16.5

f. Graph the ordered pairs. Then describe the graph.

CHECK Your Understanding

Example 1 (p. 233) Use the coordinate plane at the right to name the ordered pair for each point.

1. *G*
2. *D*
3. *C*
4. *F*



Examples 2–4 (p. 234) Graph and label each point on a coordinate plane.

5. $A(3, 7)$
6. $B(0, 4)$
7. $C(1.5, 6)$
8. $D(2, 4\frac{3}{4})$

BASKETBALL For Exercises 9 and 10, use the following information.

In basketball, each shot made from outside the 3-point line scores 3 points. The table at the right shows this relationship.

3-Point Shots Made	Total Points
0	0
1	3
2	6
3	9

Examples 5, 6 (pp. 234–235)

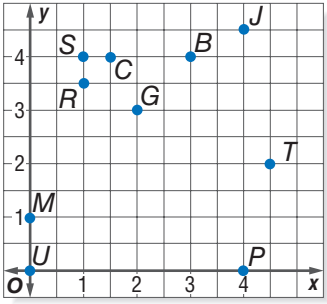
9. List this information as ordered pairs (3-point shots made, total number of points).
10. Graph the ordered pairs. Then describe the graph.

Practice and Problem Solving

HOMEWORK HELP

For Exercises	See Examples
11–20	1
21–28	2–4
29–32	5, 6

Use the coordinate plane at the right to name the ordered pair for each point.



- 11. P
- 12. G
- 13. B
- 14. M
- 15. S
- 16. U
- 17. T
- 18. R
- 19. J
- 20. C

Graph and label each point on a coordinate plane.

- 21. $L(6, 1)$
- 22. $M(3, 0)$
- 23. $N(3\frac{1}{2}, 5)$
- 24. $Q(0, 5\frac{1}{4})$
- 25. $R(1.5, 7)$
- 26. $P(4, 1.75)$
- 27. $A(2\frac{3}{4}, 2)$
- 28. $B(5, 4\frac{1}{4})$

MEASUREMENT For Exercises 29 and 30, use the following information.

The table gives the amount of fencing needed to create square pens with side lengths 5 , $5\frac{1}{4}$, $5\frac{1}{2}$, and $5\frac{3}{4}$ feet.

Side Length (ft)	5	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{3}{4}$
Amount of Fencing (ft)	20	21	22	23

- 29. List this information as ordered pairs (side length, amount of fencing).
- 30. Graph the ordered pairs. Then describe the graph.

READING For Exercises 31 and 32, use the following information.

It took Kevin 4 minutes to read one page in his book. The table shows the total time it took him to read 0, 1, 2, and 3 pages of the book.

Number of Pages	Total Time (min)
0	0
1	4
2	8
3	12

- 31. List this information as ordered pairs (number of pages, total time).
- 32. Graph the ordered pairs. Then describe the graph.
- 33. **MAPS** Your house is located at $(4, 1)$, which is 4 blocks east and 1 block north of the map's center, $(0, 0)$. If you walk two blocks east and one block north from your house to your friend's house, what are the coordinates of your friend's house?

- 34. **GEOMETRY** Three of the corners of a square drawn on a coordinate plane are located at $(3.5, 8)$, $(3.5, 3)$, and $(8.5, 8)$. What is the ordered pair of the fourth corner?

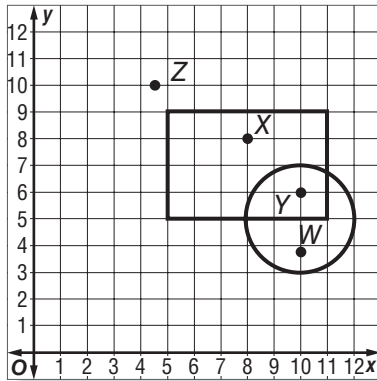
Academic Standards • ISTEP+
Extra Practice, pp. 684, 709

H.O.T. Problems

35. **OPEN ENDED** Give an example of an ordered pair that represents a point located on the x -axis.
36. **CHALLENGE** Give the coordinates of the point located halfway between $(2, 1)$ and $(2, 4)$.
37. **WRITING IN MATH** Explain why the ordered pair $(3, 2)$ is graphed at a different location than the ordered pair $(2, 3)$.

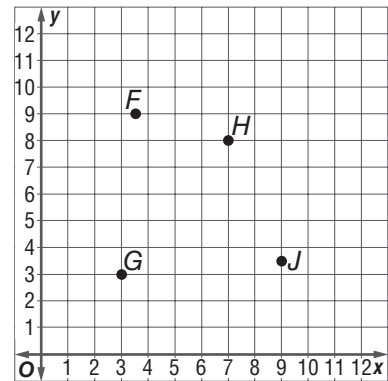
ISTEP+ PRACTICE 6.2.5

38. Which ordered pair represents a point located inside both the square and the circle?



- A $(9, 4)$ C $(8, 7)$
 B $(10, 6)$ D $(11, 8)$

39. What point on the grid below corresponds to the coordinate pair $(9, 3\frac{1}{2})$?



- F Point F H Point H
 G Point G J Point J

Spiral Review

40. **AREA** The formula $A = \frac{1}{2}(b_1 + b_2)h$ can be used to find the area A of a trapezoid given the length of the bases b_1 and b_2 and the height h . Express $\frac{1}{2}$ as a decimal. (Lesson 4-8)

Write each decimal as a fraction or mixed number in simplest form. (Lesson 4-7)

41. 1.34 42. 0.052 43. 13.008

44. **ROLLER COASTERS** If train A and train B, on a side-by-side roller coaster track, both leave the starting point at 9:00 A.M., at what time will they next leave the starting point together? (Lesson 4-5)

Roller Coaster Schedule	
Train	Departs
A	every 8 minutes
B	every 6 minutes

45. **BUSINESS** The manager of a shoe store wants to post a display of the number of shoes sold by each sales associate over each of the past 6 months. What type of statistical display would be most appropriate for this situation? (Lesson 2-8)

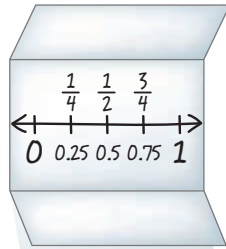
Study Guide and Review

FOLDABLES

Study Organizer

▶ GET READY to Study

Be sure the following Big Ideas are noted in your Foldable.



BIG Ideas

Simplest Form (Lesson 4-2)

To write a fraction in simplest form, either

- Divide the numerator and denominator by common factors until the only common factor is 1, or
- Divide the numerator and denominator by the GCF.

Comparing Fractions (Lesson 4-6)

To compare two fractions, follow these steps.

- Step 1** Find the least common denominator (LCD) of the fractions. That is, find the least common multiple of the denominators.
- Step 2** Write an equivalent fraction for each fraction using the LCD.
- Step 3** Compare the numerators.

Writing Decimals as Fractions (Lesson 4-7)

To write a decimal as a fraction, follow these steps.

- Step 1** Identify the place value of the last decimal place.
- Step 2** Write the decimal as a fraction using the place value as the denominator.
- Step 3** If necessary, simplify the fraction.

Key Vocabulary

common multiples (p. 216)	least common multiple (LCM) (p. 217)
equivalent fractions (p. 204)	mixed number (p. 209)
greatest common factor (GCF) (p. 197)	multiple (p. 216)
improper fraction (p. 209)	simplest form (p. 205)
least common denominator (LCD) (p. 220)	Venn diagram (p. 197)

Vocabulary Check

State whether each sentence is *true* or *false*. If *false*, replace the underlined word or number to make a true sentence.

- Fractions that have the same value are called equivalent fractions.
- The LCM of 2 and 8 is 2.
- To write a fraction in simplest form, divide the numerator and denominator by the GCF.
- The least common multiple of the denominators of two fractions is called the greatest common factor.
- The LCM of 2 and 4 is less than the GCF of 2 and 4.
- Multiples that are shared by two or more numbers are mixed numbers.
- A fraction is in simplest form when the LCD of the numerator and denominator is 1.
- An improper fraction is less than 1.
- $\frac{4}{5}$ and $\frac{12}{15}$ are common multiples.
- The GCF of 5 and 3 is 1.

Lesson-by-Lesson Review

4-1

Greatest Common Factor (pp. 197–201)



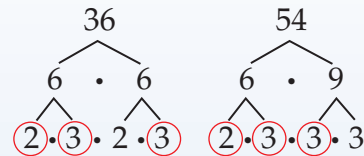
6.1.6

Find the GCF of each set of numbers.

11. 15, 18 12. 30, 36
 13. 28, 70 14. 26, 52, 65
15. **SCHOOL** For a class field trip, 45 boys and 72 girls will be placed into several groups. Each group will have the same number of boys and girls. What is the greatest number of groups that can be formed?

Example 1 Find the GCF of 36 and 54.

To find the GCF, you can use prime factors.



The common prime factors are 2, 3, and 3. The GCF of 36 and 54 is $2 \times 3 \times 3$ or 18.

4-2

Simplifying Fractions (pp. 204–208)



6.1.4

Replace each \blacksquare with a number so the fractions are equivalent.

16. $\frac{2}{3} = \frac{\blacksquare}{24}$ 17. $\frac{5}{8} = \frac{35}{\blacksquare}$
 18. $\frac{\blacksquare}{6} = \frac{12}{24}$ 19. $\frac{7}{\blacksquare} = \frac{63}{81}$

Write each fraction in simplest form. If the fraction is already in simplest form, write *simplest form*.

20. $\frac{21}{24}$ 21. $\frac{15}{80}$
22. **MUFFINS** Out of a dozen muffins, nine were blueberry muffins. Write this fraction in simplest form.

Example 2 Replace the \blacksquare with a number so that $\frac{4}{9}$ and $\frac{\blacksquare}{27}$ are equivalent.

Since $9 \times 3 = 27$, multiply the numerator and denominator by 3.

$$\frac{4}{9} = \frac{12}{27}$$

4-3

Mixed Numbers and Improper Fractions (pp. 209–212)



6.1.4

Write each mixed number as an improper fraction.

23. $3\frac{1}{4}$ 24. $5\frac{3}{8}$

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

25. $\frac{23}{4}$ 26. $9\frac{5}{5}$
27. **CRAFTS** Beth cut a piece of string into four $\frac{1}{3}$ -foot-long pieces. How long was the original piece of string?

Example 3 Write $4\frac{2}{5}$ as an improper fraction.

$$4\frac{2}{5} = \frac{(4 \times 5) + 2}{5} = \frac{22}{5}$$

Example 4 Write $\frac{49}{6}$ as a mixed number.

Divide 49 by 6.

$$\begin{array}{r} 8\frac{1}{6} \\ 6 \overline{)49} \\ \underline{-48} \\ 1 \end{array}$$

$$1 \text{ So, } \frac{49}{6} = 8\frac{1}{6}$$

4-4

PSI: Make an Organized List (pp. 214–215)P.5.1,
P.5.2Solve. Use the *make an organized list* strategy.

28. **COINS** When Rosa tossed a coin four times, she noticed that tails came up three times. In how many different ways could this have happened?
29. **STUFFED ANIMALS** Shaunae has 4 stuffed animals: a tiger, teddy bear, bunny, and frog. In how many ways can she arrange these animals on her shelf?
30. **CHILDREN** A couple has 4 children, 2 of whom are boys. How many different birth orders are possible if the boys were born in consecutive years?

Example 5 A true-false test contains three questions. How many different ways are there to complete the test?Make a list of all possible arrangements. Use T for a *true* answer to a question and F for a *false* answer.

TTT	} answering false for one question	answering false for none of the three questions
TTF		
TFT		
FTT	} answering false for two questions	
TFF		
FTF		
FFT		answering false for all three questions
FFF		

There are 8 ways to complete the test.

4-5

Least Common Multiple (pp. 216–219)

6.1.6

Find the LCM of each set of numbers.

31. 10, 25 32. 28, 35
33. Find the LCM of 8, 12, and 16.
34. What is the LCM of 12, 15, and 20?
35. **CRAFTS** Diana is making craft puppies out of clothespins, which are sold 40 per bag. One bag of plastic eyes is enough for exactly 25 puppies. How many bags of each should she buy so there will be no leftover clothespins or plastic eyes?
36. **LAWNS** Mr. Kwan mows his lawn every 2 days. Mr. Kwan's neighbor mows his lawn every 5 days. If both men mowed their lawn today, how many days will it be until they both mow their lawn on the same day?

Example 6 Find the LCM of 8 and 18.multiples of 8: 8, 16, 24, 32, 40, 48, 56, 64, **72**, ...multiples of 18: 18, 36, 54, **72**, ...

So, the LCM of 8 and 18 is 72.

Example 7 Find the LCM of 9 and 24.

Write the prime factorization of each number.

$$9 = 3 \times 3$$

$$24 = 2 \times 2 \times 2 \times 3$$

3 is a common prime factor

So, the LCM of 9 and 24 is $2 \times 2 \times 2 \times 3 \times 3$ or 72.

4-6

Comparing and Ordering Fractions (pp. 220–224)



6.1.1

Replace each ● with <, >, or = to make a true sentence.

37. $\frac{2}{5} \bullet \frac{4}{9}$ 38. $2\frac{12}{15} \bullet 2\frac{4}{5}$

39. $7\frac{3}{8} \bullet 7\frac{4}{10}$ 40. $\frac{7}{12} \bullet \frac{5}{9}$

Order the fractions from least to greatest.

41. $\frac{2}{3}, \frac{3}{4}, \frac{1}{2}, \frac{5}{9}$

42. $3\frac{7}{12}, \frac{5}{8}, 3\frac{5}{6}, \frac{3}{4}$

43. **MONEY** Which is more, $\frac{3}{4}$ of a dollar or $\frac{3}{5}$ of a dollar?

Example 8 Replace ● with <, >, or = to make $\frac{2}{5} \bullet \frac{3}{8}$ true.

First, find the LCD. The LCM of 5 and 8 is 40. So, the LCD is 40.

Next, rewrite both fractions with a denominator of 40.

$$\frac{2}{5} = \frac{16}{40} \quad \text{and} \quad \frac{3}{8} = \frac{15}{40}$$

(Note: Red arrows show 5 × 8 = 40 and 8 × 5 = 40)

Since $16 > 15$, $\frac{16}{40} > \frac{15}{40}$. So, $\frac{2}{5} > \frac{3}{8}$.

4-7

Writing Decimals as Fractions (pp. 225–228)



6.1.4

Write each decimal as a fraction or mixed number in simplest form.

44. 0.9

45. 0.35

46. 0.72

47. 0.125

48. 3.006

49. 9.315

50. 2.64

51. 0.048

52. **MEATBALLS** Peter bought 5.65 pounds of hamburger to make meatballs for a family reunion. Write 5.65 as a mixed number in simplest form.

Example 9 Write 0.85 as a fraction in simplest form.

$0.85 = \frac{85}{100}$ *Say eighty-five hundredths.*

$= \frac{17}{20}$ *Simplify. Divide the numerator and denominator by the GCF, 5.*

$= \frac{17}{20}$

Example 10 Write 7.4 as a mixed number in simplest form.

$7.4 = 7\frac{4}{10}$ *Say seven and four tenths.*

$= 7\frac{2}{5}$ *Simplify.*

$= 7\frac{2}{5}$

4-8

Writing Fractions as Decimals (pp. 229–232)



6.1.4

Write each fraction or mixed number as a decimal.

53. $\frac{7}{8}$

54. $\frac{9}{15}$

55. $\frac{21}{25}$

56. $4\frac{2}{16}$

57. $12\frac{3}{4}$

58. $8\frac{9}{16}$

59. **HOMEWORK** Jonah spent $\frac{3}{4}$ of an hour on his math homework. Write this time as a decimal.

Example 11 Write $\frac{5}{8}$ as a decimal.

$$\begin{array}{r} 0.625 \\ 8 \overline{)5.000} \\ \underline{-48} \\ 20 \\ \underline{-16} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

Divide 5 by 8.

So, $\frac{5}{8} = 0.625$.

4-9

Algebra: Ordered Pairs and Functions (pp. 233–237)



6.2.5

Use the coordinate plane at the right to name the ordered pair for each point.

60. B

61. C

62. D

63. E

Graph and label each point on a coordinate plane.

64. X(5, 0)

65. Y(4.75, 6)

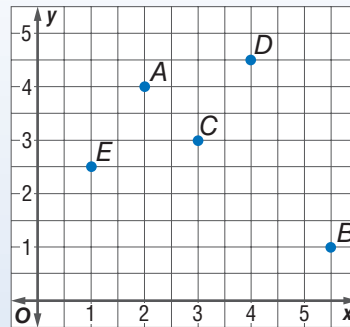
66. Z $\left(2, 8\frac{1}{2}\right)$

67. **MEASUREMENT** The table gives the ages and heights, in feet, of five students in Mr. Cole's science class.

Age	11	12	11.5	12.5
Height	5	5.5	5.25	5.75

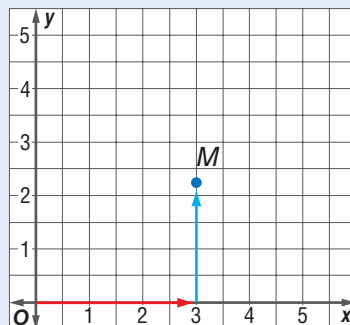
List this information as ordered pairs. Graph the ordered pairs. Then describe the graph.

Example 12 Use the coordinate plane below to name the ordered pair for point A.



Point A is named by the ordered pair (2, 4).

Example 13 Graph the point M $\left(3, 2\frac{1}{4}\right)$.



1. **MULTIPLE CHOICE** Find the GCF of 24, 48, and 84.

A 24 C 8
B 12 D 6

Replace each \blacksquare with a number so the fractions are equivalent.

2. $\frac{12}{18} = \frac{\blacksquare}{6}$ 3. $\frac{7}{9} = \frac{35}{\blacksquare}$

4. **DVDs** Danny has 8 action DVDs, 4 comedy DVDs, and 2 drama DVDs. Write a fraction in simplest form that compares the number of comedy DVDs to the total number of DVDs.

Write each mixed number as an improper fraction.

5. $2\frac{5}{7}$ 6. $4\frac{2}{3}$ 7. $1\frac{4}{7}$

8. **PHYSICS** The speed of sound is about $\frac{3,806}{5}$ miles per hour. Write this speed as a mixed number.

9. **MOVIES** In how many different ways can four friends sit next to each other in one row of a movie theater?

10. **MULTIPLE CHOICE** At the gym, Hilary swims every 6 days, runs every 4 days, and cycles every 16 days. If she did all three activities today, in how many days will she do all three activities again on the same day?

F 24 days H 48 days
G 26 days J 64 days

Find the LCM of each set of numbers.

11. 6, 15 12. 4, 9, 18

Replace each \bullet with $<$, $>$, or $=$ to make a true sentence.

13. $\frac{4}{7} \bullet \frac{3}{5}$ 14. $6\frac{1}{4} \bullet 6\frac{4}{18}$ 15. $\frac{2}{9} \bullet \frac{6}{27}$

16. Order the fractions $1\frac{5}{6}$, $1\frac{3}{4}$, $1\frac{2}{3}$, and $1\frac{7}{9}$ from least to greatest.

17. **MONEY** $\frac{19}{20}$ of all bills that are printed by the U.S. Treasury Department are used to replace worn-out money. Write this fraction as a decimal.

Write each decimal as a fraction or mixed number in simplest form.

18. 0.84 19. 7.015 20. 1.3

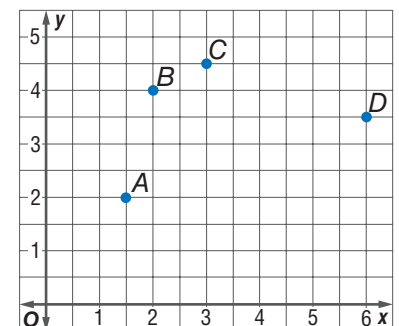
21. **SAVINGS** The table shows the amount of money Andrew saved in November.

Week	Total Saved (\$)
1	6
2	12
3	18
4	24

List this information as ordered pairs. Then graph the ordered pairs on a coordinate plane.

Use the coordinate plane to name the ordered pair for each point.

22. A
23. B
24. C
25. D



PART 1 Multiple Choice

Read each question. Then fill in the correct answer on the answer sheet provided by your teacher or on a sheet of paper.

1. Find the greatest common factor of 16, 24, and 40.

A 2 C 8
B 4 D 40

TEST-TAKING TIP

Question 1 Use the answer choices to help find a solution. To find the GCF, divide 16, 24 and 40 by each possible choice. The greatest value that divides evenly into all three numbers is the solution.

2. The formula $C = \frac{5}{9}(F - 32)$ can be used to convert a temperature from degrees Fahrenheit to degrees Celsius. Which of the following is closest in value to $\frac{5}{9}$?

F 5.9 H 1.8
G 4 J 0.56

3. The ages of people eating at a restaurant were 12, 7, 31, 15, 9, 12, 18, 22, and 14. What is the mean of these ages?

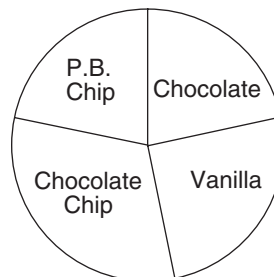
A 7 C 31
B 15.6 D 12.9

4. Brandi recorded the monthly rainfall for Portland, Oregon. Which list shows the monthly rainfall in order from greatest to least?

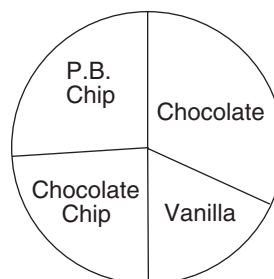
F 4.03 in., 4.14 in., 4.30 in., 4.31 in., 4.51 in.
G 4.51 in., 4.31 in., 4.30 in., 4.03 in., 4.14 in.
H 4.51 in., 4.31 in., 4.30 in., 4.14 in., 4.03 in.
J 4.51 in., 4.14 in., 4.30 in., 4.31 in., 4.03 in.

5. Of the 200 people Melanie surveyed about their favorite flavor of ice cream, 64 said chocolate, 36 said vanilla, 48 said chocolate chip, and 52 said peanut butter chip. Which circle graph best displays the data?

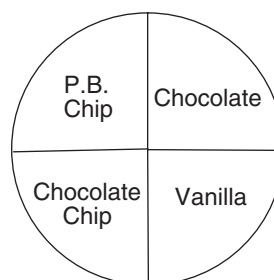
A Ice Cream Flavor



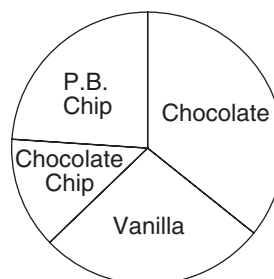
B Ice Cream Flavor



C Ice Cream Flavor

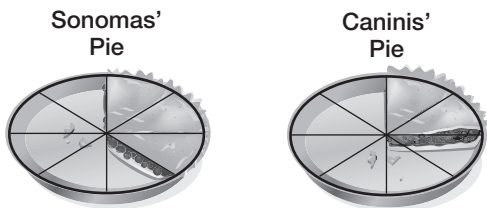


D Ice Cream Flavor





6. The Sonoma family and the Canini family each brought a pie to the picnic. Only a portion of each pie was eaten. The pictures below show how much of the pies were left. What portion of the pies was eaten altogether?



- F $\frac{5}{8}$
 G $1\frac{1}{4}$
 H $1\frac{3}{8}$
 J $1\frac{3}{4}$
7. Which of the following is the least common multiple of 4, 6, and 8?
 A 12
 B 16
 C 24
 D 48
8. Jill and 3 friends bought 4 movie tickets for \$24, 4 large drinks for \$4.25 each, and a jumbo popcorn for \$5.30. If they split the cost evenly, which equation can be used to find c , the amount each person should pay, not including tax?
 F $c = 24.00 + 4.25 + 5.30 \div 4$
 G $c = 24.00 + 4 \times 4.25 + (5.30 \div 4)$
 H $c = (24.00 + 4 \times 4.25 + 5.30) \div 4$
 J $c = (24.00 + 4.25 + 5.30) \div 4$

PART 2 Short Response/Grid In

Record your answers on the answer sheet provided by your teacher or on a sheet of paper.

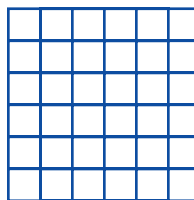
9. Agnes spent 12 minutes making her bed, 17 minutes dusting, 15 minutes vacuuming, and 24 minutes putting away laundry. How much total time in minutes did Agnes spend on cleaning her room?
10. Several families in a neighborhood were asked how many gallons of milk they buy each week. The results are shown below. What is the mode of the data?
 1, 3, 2, 2, 1, 1, 1, 3, 2, 1, 1, 1, 2, 2, 1, 3, 1, 1

PART 3 Extended Response

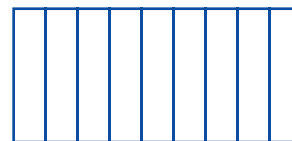
Record your answers on the answer sheet provided by your teacher or on a sheet of paper. Show your work.

11. Copy the models below. Both models have the same area.

Model A



Model B



- a. Shade 0.25 of Model A.
 b. Shade $\frac{1}{3}$ of Model B.
 c. Which model has the greater fraction of shaded area? Explain your answer.

NEED EXTRA HELP?

If You Missed Question...

Go to Lesson...

IN Academic Standards

1	2	3	4	5	6	7	8	9	10	11
4-1	4-7	2-6	3-2	1-1	1-1	4-5	1-4	1-1	2-7	4-2
P.1.1	P.1.1	6.2.3	P.1.1	7.1.3	P.1.1	6.2.2	6.2.5	P.1.1	P.1.1	6.2.3