STUDY LINK 8•1

Comparing Fractions

SRB 66–68 83–88

Circle the greater fraction for each pair.

1. $\frac{3}{8}$ or $\frac{3}{6}$ **2.** $\frac{2}{3}$ or $\frac{2}{9}$ **3.** $\frac{4}{7}$ or $\frac{5}{6}$

4. $\frac{19}{20}$ or $\frac{4}{8}$ **5.** $\frac{11}{21}$ or $\frac{9}{17}$ **6.** $\frac{4}{7}$ or $\frac{6}{11}$

7. Explain how you got your answer for Problem 5.

_____

_____

_____

Write the decimal equivalent for each fraction.

8. $\frac{3}{4} =$ _____ **9.** $\frac{2}{3} =$ _____ **10.** $\frac{5}{8} =$ _____

11. $\frac{7}{10} =$ _____ **12.** $\frac{11}{20} =$ _____ **13.** $\frac{21}{25} =$ _____

14. Explain how you can do Problem 10 without using a calculator.

_____

_____

Use >, <, or = to make each number sentence true.

15. $\frac{1}{2} + \frac{5}{8}$ _____ 1 **16.** $\frac{2}{3} + \frac{2}{6}$ _____ 1 **17.** $\frac{7}{9} + \frac{3}{5}$ _____ 1

18. 1 _____ $\frac{6}{10} + \frac{5}{20}$ **19.** 1 _____ $\frac{3}{8} + \frac{4}{9}$ **20.** 1 _____ $\frac{6}{7} + \frac{1}{8}$

21. Explain how you found the answer to Problem 20.

_____

_____

Practice

22. 675 ∗ 42 = _____ **23.** 28,350 ÷ 675 = _____

24. 67.5 − 0.42 = _____ **25.** 28,350 + 42 + 67.08 = _____

Name Date Time

LESSON 8•1

Exploring Least Common Multiples

One way to find a common denominator is to use the least common multiple. The LCM is the smallest number that is a multiple of the given denominators.

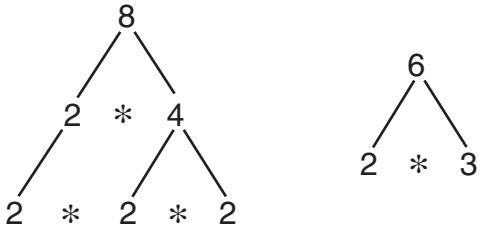
You can find the least common multiple by making lists of multiples.

Find the least common multiple for $\frac{4}{9}$, $\frac{5}{6}$, and $\frac{1}{4}$. List the multiples of each denominator.

- Multiples of 9: _____
- Multiples of 6: _____
- Multiples of 4: _____
- Least common multiple: _____

Another way to find the least common multiple is to use prime factorization.

Find the least common multiple for 8 and 6.



Step 1 Use factor trees to find the prime factorization.

Step 2 Count the appearance of each different prime number. Note only the largest counts.

- 2 appears 3 times in the prime factorization of 8.
- 3 appears once in the prime factorization of 6.

Step 3 Write a multiplication expression using these counts.

- $2 * 2 * 2 * 3 = 24$ so 24 is the least common multiple of 8 and 6.

Use the prime factorization method to find the LCM.

1. 9, 6, and 4
LCM: _____

2. 20 and 90
LCM: _____

3. 15 and 49
LCM: _____

4. 12, 15, and 25
LCM: _____

5. What might be an advantage or disadvantage to using the prime factorization method to find the least common multiple?

_____

_____

Name Date Time

STUDY LINK 8•2

Adding Mixed Numbers

SRB 61 63 70

Rename each mixed number in simplest form.

1. $3\frac{6}{5} =$ $4\frac{1}{5}$

2. $\frac{16}{8} =$ _____

3. $9\frac{5}{3} =$ _____

4. $1\frac{7}{5} =$ _____

5. $4\frac{6}{4} =$ _____

6. $5\frac{10}{6} =$ _____

Add. Write each sum as a whole number or mixed number in simplest form.

7. $3\frac{1}{4} + 2\frac{3}{4} =$ _____

8. $4\frac{1}{5} + 3\frac{4}{5} =$ _____

9. $9\frac{1}{3} + 4\frac{2}{3} =$ _____

10. $3\frac{5}{7} + 8\frac{6}{7} =$ _____

11. $\frac{15}{8} + 3\frac{3}{8} =$ _____

12. $4\frac{2}{9} + 5\frac{5}{9} =$ _____

Add.

13. $2\frac{5}{8} + 6\frac{3}{4}$

14. $7\frac{1}{2} + 3\frac{2}{3}$

15. $4\frac{6}{9} + 3\frac{7}{12}$

16. $5\frac{3}{4} + 2\frac{4}{5}$

Practice

17. 3,540 ÷ 6 = _____

18. 1,770 ÷ 3 = _____

19. 7,080 / 12 = _____

20. (590 ∗ 5) ÷ 2 = _____

STUDY LINK 8•3

Subtracting Mixed Numbers

SRB 71 72

Fill in the missing numbers.

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

2. $4\frac{5}{6} = \square\frac{11}{6}$

3. $2\frac{1}{9} = 1\frac{\square}{9}$

4. $6\frac{3}{7} = \square\frac{10}{7}$

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

6. $7\frac{2}{3} = \square\frac{\square}{3}$

Subtract. Write your answers in simplest form.

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

8. $6\frac{2}{3} - 4\frac{1}{3}$

9. $5\frac{4}{5} - 3\frac{3}{5}$

10. $4 - \frac{3}{8} =$ _____

11. $6 - \frac{5}{9} =$ _____

12. $5 - 2\frac{3}{10} =$ _____

13. $7 - 4\frac{3}{4} =$ _____

14. $3\frac{2}{5} - 1\frac{3}{5} =$ _____

15. $4\frac{3}{8} - 3\frac{7}{8} =$ _____

Practice

16. $654 * 205 =$ _____

17. $654 * 502 =$ _____

18. $654 * 250 =$ _____

19. $654 * 520 =$ _____

Number Sense 2.3; Number Sense 1.0

Name Date Time

LESSON 8•3

Addition and Subtraction Patterns

Add.

1. **a.** $\frac{1}{1} + \frac{1}{2} =$ _____ **b.** $\frac{1}{2} + \frac{1}{3} =$ _____ **c.** $\frac{1}{3} + \frac{1}{4} =$ _____

d. $\frac{1}{4} + \frac{1}{5} =$ _____ **e.** $\frac{1}{5} + \frac{1}{6} =$ _____

2. What pattern do you notice in Problems 1a–1e? _____

_____

_____

3. Use the pattern above to solve these problems.

a. $\frac{1}{6} + \frac{1}{7} =$ _____ **b.** $\frac{1}{10} + \frac{1}{11} =$ _____ **c.** $\frac{1}{99} + \frac{1}{100} =$ _____

4. Do you think this pattern also works for problems like $\frac{1}{8} + \frac{1}{3}$? Explain.

_____

_____

5. The plus signs in Problem 1 have been replaced with minus signs. Find each answer.

a. $\frac{1}{1} - \frac{1}{2} =$ _____ **b.** $\frac{1}{2} - \frac{1}{3} =$ _____ **c.** $\frac{1}{3} - \frac{1}{4} =$ _____

d. $\frac{1}{4} - \frac{1}{5} =$ _____ **e.** $\frac{1}{5} - \frac{1}{6} =$ _____

f. Describe the pattern. _____

_____

_____

STUDY LINK 8•4

More Fraction Problems

SRB 66–68

1. Circle all the fractions below that are greater than $\frac{3}{4}$.

$\frac{4}{5}$ $\frac{13}{20}$ $\frac{1}{2}$ $\frac{18}{25}$ $\frac{9}{12}$ $\frac{155}{200}$ $\frac{7}{11}$

Rewrite each expression by renaming the fractions with a common denominator.
Then decide whether the sum or difference is greater than $\frac{1}{2}$, less than $\frac{1}{2}$, or equal to $\frac{1}{2}$.
Circle your answer.

2. $\frac{1}{10} + \frac{2}{7}$ _____ $> \frac{1}{2}$ $< \frac{1}{2}$ $= \frac{1}{2}$

3. $\frac{5}{6} - \frac{1}{4}$ _____ $> \frac{1}{2}$ $< \frac{1}{2}$ $= \frac{1}{2}$

4. $\frac{18}{20} - \frac{2}{5}$ _____ $> \frac{1}{2}$ $< \frac{1}{2}$ $= \frac{1}{2}$

5. $\frac{3}{4} - \frac{1}{3}$ _____ $> \frac{1}{2}$ $< \frac{1}{2}$ $= \frac{1}{2}$

Fraction Puzzle

6. Select and place three different numbers so the sum is as large as possible.

Procedure: Select three different numbers from this list: 1, 2, 3, 4, 5, 6.

- Write the same number in each square.
- Write a different number in the circle.
- Write a third number in the hexagon.
- Add the two fractions.

$\frac{\square}{\bigcirc} + \frac{\hexagon}{\square}$ _____

Example: $\frac{\boxed{2}}{(4)} + \frac{\langle 3 \rangle}{\boxed{2}} = \frac{8}{4} = 2$

Practice

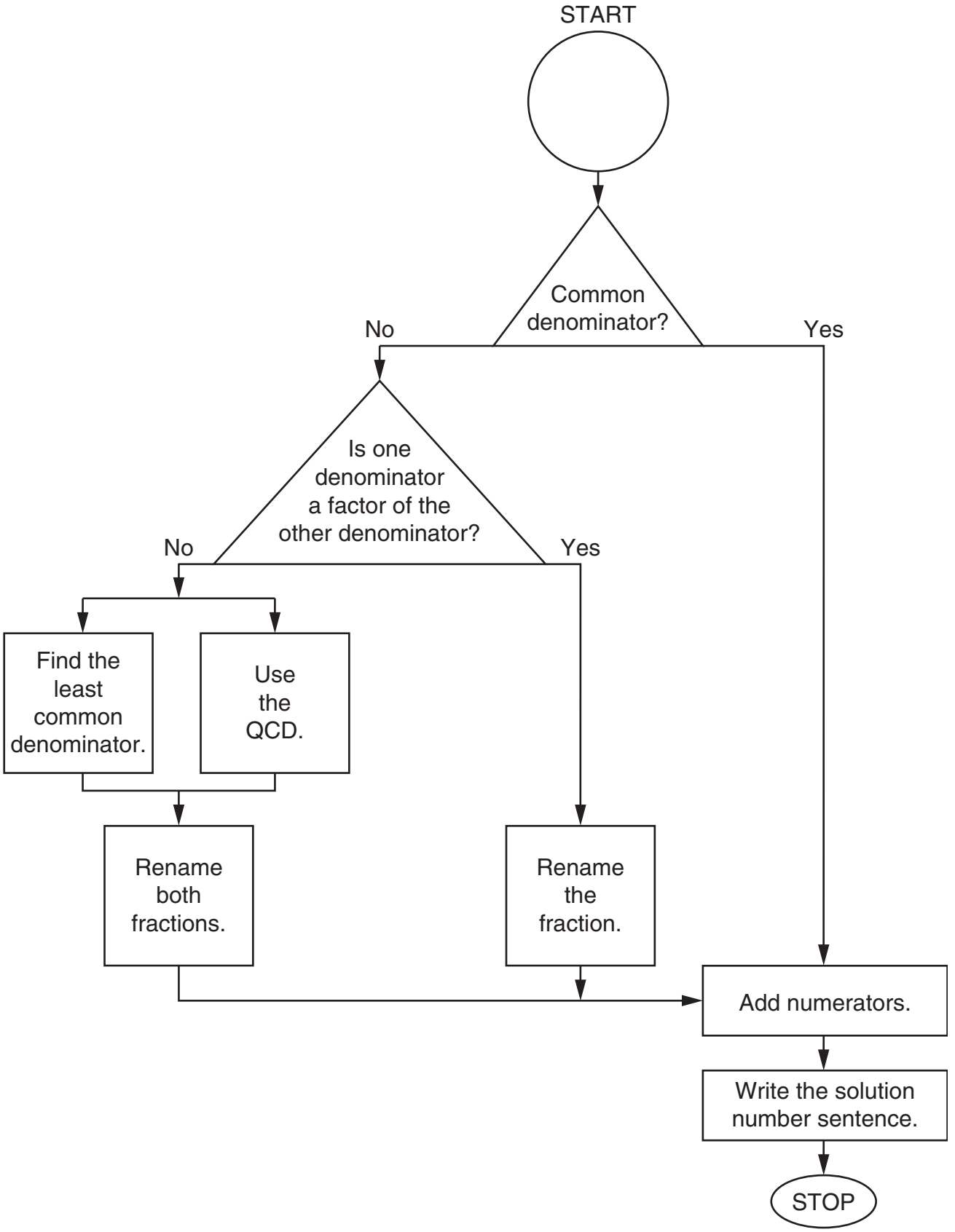
7. 3 − 2.564 = _____ **8.** 3 ∗ 2.564 = _____

9. 16 − 5.438 = _____ **10.** 3,049 / 15 = _____

Name Date Time

LESSON 8•4

Charting Common Denominators



Name Date Time

LESSON 8•4

Exploring Equivalent Fractions

1. Do equivalent fractions convert to the same decimal? _____

2. Complete the fraction column in the table so there are 10 equivalent fractions.

3. Use your calculator to convert each fraction to a decimal. Write the display in the decimal column. (Don't forget to use a repeat bar, if necessary.)

Fractions	Decimals

4. Explain your results. Describe the relationship between the equivalent fractions and their decimal form.

_____

_____

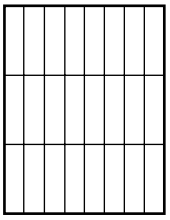
_____

STUDY LINK 8•5

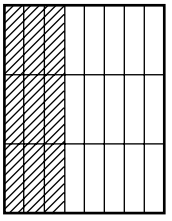
Fractions of a Fraction

SRB 76 243

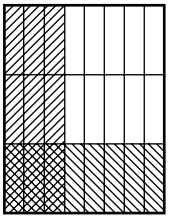
Example:



The whole rectangle represents ONE.



Shade $\frac{3}{8}$ of the interior.



Shade $\frac{1}{3}$ of the interior in a different way.

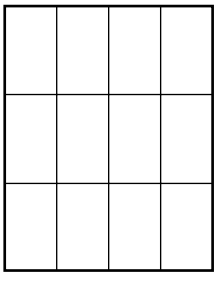
The double shading shows that $\frac{1}{3}$ of $\frac{3}{8}$ is $\frac{3}{24}$, or $\frac{1}{8}$.

In each of the following problems, the whole rectangle represents ONE.

1. Shade $\frac{3}{4}$ of the interior.

Shade $\frac{1}{3}$ of the interior in a different way.

The double shading shows that

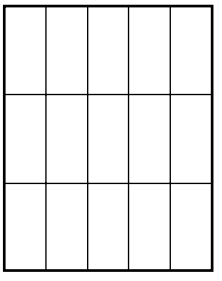


$\frac{1}{3}$ of $\frac{3}{4}$ is _____.

2. Shade $\frac{3}{5}$ of the interior.

Shade $\frac{2}{3}$ of the interior in a different way.

The double shading shows that

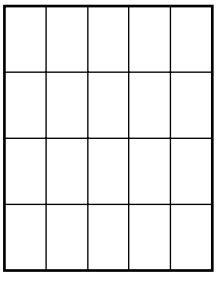


$\frac{2}{3}$ of $\frac{3}{5}$ is _____.

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

Shade $\frac{3}{4}$ of the interior in a different way.

The double shading shows that

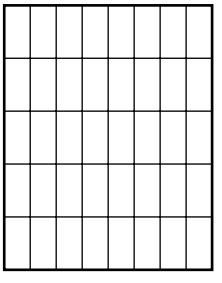


$\frac{3}{4}$ of $\frac{4}{5}$ is _____.

4. Shade $\frac{5}{8}$.

Shade $\frac{3}{5}$ of the interior in a different way.

The double shading shows that



$\frac{3}{5}$ of $\frac{5}{8}$ is _____.

5. Nina and Phillip cut Mr. Ferguson's lawn. Nina worked alone on her half, but Phillip shared his half equally with his friends, Ezra and Benjamin. What fraction of the earnings should each person get?

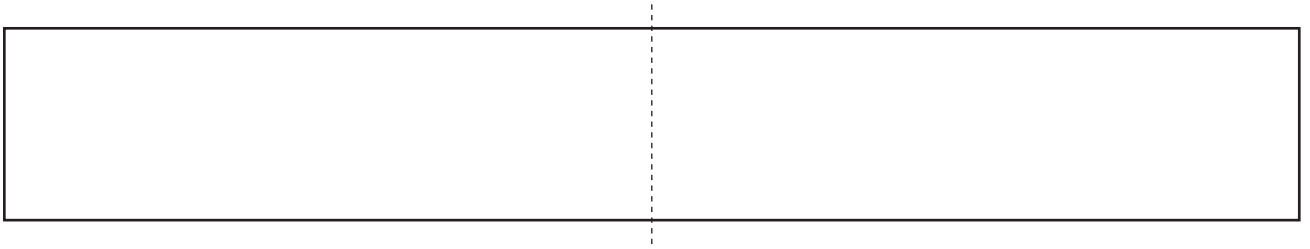
_____

Name Date Time

LESSON 8•5

Equivalent Fractions

Use the fraction stick to find equivalent fractions. A whole stick is worth 1.



1. Divide the fraction stick into 4 equal parts.

Find the equivalent fraction.

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

2. Divide the fraction stick into 8 equal parts.

Find the equivalent fractions.

$\frac{1}{2} = \frac{\square}{4} = \frac{\square}{8}$

3. Divide the fraction stick into 16 equal parts.

Find the equivalent fractions.

$\frac{1}{2} = \frac{\square}{4} = \frac{\square}{8} = \frac{\square}{16}$

Name Date Time

LESSON 8•6

An Area Model for Fraction Multiplication

1. Use the rectangle at the right to find $\frac{2}{3} * \frac{3}{4}$.

$\frac{2}{3} * \frac{3}{4} =$ _____

Your completed drawing in Problem 1 is called an **area model.**

Use area models to complete the following.

2.

$\frac{2}{3} * \frac{1}{5} =$ _____

3.

$\frac{3}{4} * \frac{2}{5} =$ _____

4.

$\frac{1}{4} * \frac{5}{6} =$ _____

5.

$\frac{3}{8} * \frac{3}{5} =$ _____

6.

$\frac{1}{2} * \frac{5}{8} =$ _____

7.

$\frac{5}{6} * \frac{4}{5} =$ _____

8. Explain how you sketched and shaded the rectangle to solve Problem 7.

_____

_____

_____

_____

_____

_____

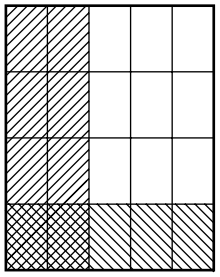
STUDY LINK 8•6

Multiplying Fractions

Write a number model for each area model.

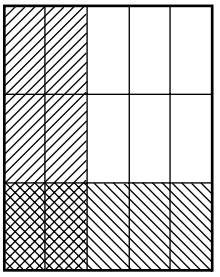
SRB 74 76

Example:



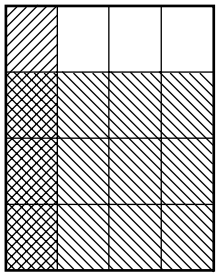
$\frac{1}{4} * \frac{2}{5} = \frac{2}{20}$, or $\frac{1}{10}$

1.



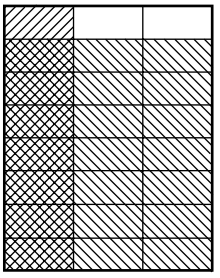
_____

2.



_____

3.



_____

Reminder: $\frac{a}{b} * \frac{c}{d} = \frac{a * c}{b * d}$

Multiply.

4. $\frac{3}{7} * \frac{2}{10} =$ _____

5. $\frac{5}{6} * \frac{2}{3} =$ _____

6. $\frac{1}{2} * \frac{1}{4} =$ _____

7. $\frac{4}{5} * \frac{3}{5} =$ _____

8. $\frac{2}{3} * \frac{3}{8} =$ _____

9. $\frac{1}{7} * \frac{5}{9} =$ _____

10. Matt is making cookies for the school fund-raiser. The recipe calls for $\frac{2}{3}$ cup of chocolate chips. He decides to triple the recipe. How many cups of chocolate chips does he need? _____ cups

11. The total number of goals scored by both teams in the field-hockey game was 15. Julie's team scored $\frac{3}{5}$ of the goals. Julie scored $\frac{1}{3}$ of her team's goals. How many goals did Julie's team score? _____ goals

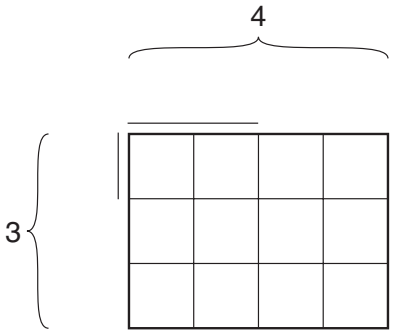
How many goals did Julie score? _____ goals

Number Sense 2.4; Number Sense 2.5

LESSON 8•6

Fraction Multiplication

Problem 1



a. How many squares are in this grid? _____

b. How many squares represent $\frac{1}{3}$ of $\frac{1}{2}$ of the grid.

_____ Shade these squares.

c. Think of the total number of squares in the grid as the denominator and the shaded squares as the numerator, and write the fraction. $\frac{1}{3}$ of $\frac{1}{2}$ = _____

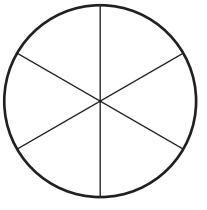
d. Write the number model you would use to find the area of this rectangle.
Reminder: Area = length ∗ width

Area = _____

e. The number model to find the fractional part of the rectangle is the same as the number model to find the area of the rectangle. Write the number model you would use to find the fractional part of the rectangle. _____

Problem 2

Linda bakes a peach pie. She serves $\frac{1}{2}$ of the pie for dessert. She saves $\frac{1}{3}$ of what is left for her mom.



a. Shade the circle to represent the piece of the pie that should be saved.

b. Think of the total number of pie pieces as the denominator and the shaded piece as the numerator, and write the fraction. _____

c. Write a number sentence to show how you could find the fractional part of the pie that was saved without counting pie pieces. _____

To find a fraction *of* a fraction, multiply.

Try This

Write and solve a number model to find the fractional part of the pie left after subtracting dessert and the piece saved for Linda's mom.

Name Date Time

LESSON 8•6

Using Area Models to Multiply Fractions

Use area models to complete the following problems.

1.

$\frac{3}{4} * \frac{1}{6} =$ _____

2.

$\frac{2}{3} * \frac{1}{2} =$ _____

3.

$\frac{3}{4}$ of $\frac{1}{2} =$ _____

4.

$\frac{3}{8} * \frac{3}{4} =$ _____

5.

$\frac{1}{6}$ of $\frac{3}{4} =$ _____

6.

$\frac{3}{5} * \frac{1}{6} =$ _____

Make up your own fraction multiplication problems.
Use area models to help you solve them.

7.

_____ = _____

8.

_____ = _____

STUDY LINK 8•7

Multiplying Fractions and Whole Numbers

Use the fraction multiplication algorithm to calculate the following products.

SRB 73

1. $\frac{5}{3} * 9 =$ _____

2. $\frac{3}{8} * 12 =$ _____

3. $\frac{1}{8} * 5 =$ _____

4. $20 * \frac{3}{4} =$ _____

5. $\frac{5}{6} * 14 =$ _____

6. $27 * \frac{2}{9} =$ _____

7. Use the given rule to complete the table.

Rule
$\triangle = \square * 4$

in ($\square$)	out ($\triangle$)
$\frac{2}{3}$	
$\frac{4}{5}$	
$\frac{8}{9}$	
$\frac{5}{4}$	
$\frac{7}{3}$	

8. What is the rule for the table below?

Rule

in ($\square$)	out ($\triangle$)
2	$\frac{1}{2}$
3	$\frac{3}{4}$
$\frac{5}{6}$	$\frac{5}{24}$
$\frac{2}{3}$	$\frac{1}{6}$

9. Make and complete your own "What's My Rule?" table on the back of this page.

LESSON 8•7

Simplifying Fraction Factors

An Algorithm for Fraction Multiplication

$$\frac{a}{b} * \frac{c}{d} = \frac{a * c}{b * d}$$

The denominator of the product is the product of the factor denominators, and the numerator of the product is the product of the factor numerators.

The commutative property lets us write $\frac{a * c}{b * d}$ as $\frac{c * a}{d * b}$. Study the examples.

Example 1: $\frac{7}{8} * \frac{16}{21} = \frac{7 * 16}{8 * 21} = \frac{112}{168}$. $\frac{112}{168} \div \frac{8}{8} = \frac{14}{21}$, or $\frac{2}{3}$

Example 2: $\frac{7}{8} * \frac{16}{21} = \frac{7 * 16}{8 * 21} = \frac{16}{8} * \frac{7}{21} = \frac{2}{1} * \frac{1}{3} = \frac{2 * 1}{1 * 3} = \frac{2}{3}$

1. Describe the similarities and differences between Examples 1 and 2.

_____

_____

_____

_____

Example 3: $\frac{\overset{1}{\cancel{7}}}{\underset{1}{\cancel{8}}} * \frac{\overset{2}{\cancel{16}}}{\underset{3}{\cancel{21}}} = \frac{1 * 2}{1 * 3} = \frac{2}{3}$

2. Describe the similarities and differences between Examples 2 and 3.

_____

_____

_____

_____

Use what you have discovered to solve the following problems. Show your work.

3. $\frac{14}{60} * \frac{12}{21} =$ _____

4. $\frac{36}{88} * \frac{33}{72} =$ _____

5. $\frac{25}{54} * \frac{36}{45} =$ _____

Name Date Time

STUDY LINK 8•8

Multiplying Fractions and Mixed Numbers

SRB 76–78

1. Multiply.

a. $5\frac{3}{4} * \frac{2}{6} =$ _____

b. $\frac{5}{8} * \frac{2}{5} =$ _____

c. $4\frac{1}{4} * \frac{5}{6} =$ _____

d. $2\frac{1}{3} * 3\frac{1}{8} =$ _____

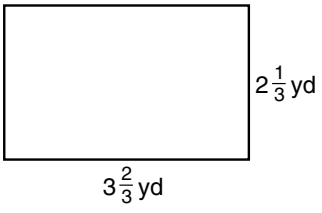
e. $3\frac{1}{12} * 1\frac{3}{5} =$ _____

f. $2\frac{4}{5} * 3\frac{2}{8} =$ _____

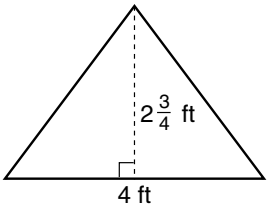
2. Find the area of each figure below.

Area of a Rectangle	Area of a Triangle	Area of a Parallelogram
$A = b * h$	$A = \frac{1}{2} * b * h$	$A = b * h$

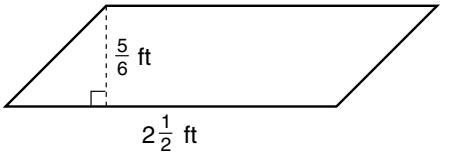
a.



b.

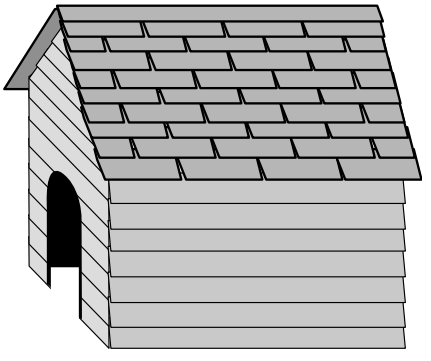


c.



Area = _____ yd^2 Area = _____ ft^2 Area = _____ ft^2

3. The dimensions of a large doghouse are $2\frac{1}{2}$ times the dimensions of a small doghouse.

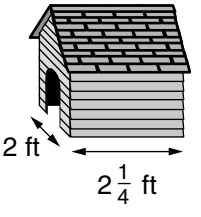


a. If the width of the small doghouse is 2 feet, what is the width of the large doghouse?

_____ feet

b. If the length of the small doghouse is $2\frac{1}{4}$ feet, what is the length of the large doghouse?

_____ feet



STUDY LINK 8•9

Fractions, Decimals, and Percents

SRB 26 48 51 83 89

1. Complete the table so each number is shown as a fraction, decimal, and percent.

Fraction	Decimal	Percent
		45%
	0.3	
$\frac{2}{10}$		
	0.15	

2. Use your percent sense to estimate the discount for each item. Then calculate the discount for each item. (If necessary, round to the nearest cent.)

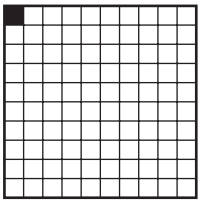
Item	List Price	Percent of Discount	Estimated Discount	Calculated Discount
Saguaro cactus with arms	$400.00	25%		
Life-size wax figure of yourself	$10,000.00	16%		
Manhole cover	$78.35	10%		
Live scorpion	$14.98	5%		
10,000 honeybees	$29.00	30%		
Dinner for one on the Eiffel Tower	$88.00	6%		
Magician's box for sawing a person in half	$4,500.00	18%		
Fire hydrant	$1,100.00	35%		

Source: *Everything Has Its Price*

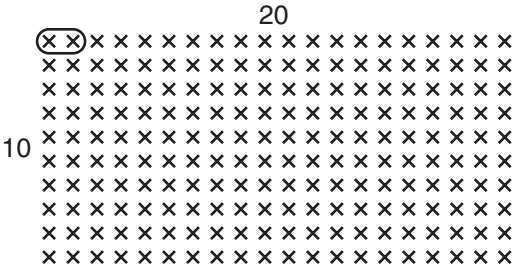
LESSON 8•9

Finding the Percent of a Number

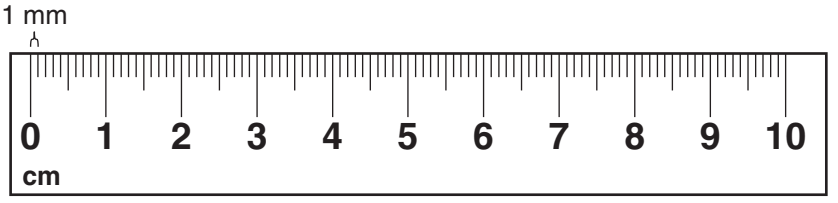
The unit percent is 1% or 0.01. For example, the unit percent of 100 is 1; the unit percent of 200 is 2; the unit percent of 10 is 0.1.



1% of 100



1% of 200



1% of 10 cm

Another way to think of the unit percent of a number is to think: *What number times 100 equals the whole?* For example, $1 * 100 = 100$; $2 * 100 = 200$; $0.1 * 100 = 10$

To find the unit percent of a whole, multiply by 0.01 or $\frac{1}{100}$.

Solve.

1. 1% of 84 = _____ **2.** 1% of 35 = _____ **3.** 1% of 628 = _____

The unit percent can be used to find other percents of a whole. For example, if you want to find 8% of 200:

- Calculate the unit percent: 1% of 200 = $200 * 0.01 = 2$
- Check your answer: $2 * 100 = 200$.
- Multiply your answer by the percent you are finding: $2 * 8 = 16$; 8% of 200 = 16

Solve.

4. 19% of 84 = _____ **5.** 72% of 35 = _____ **6.** 37% of 628 = _____

7. Think about the steps you followed in Problems 4–6. First you multiplied the unit percent by 0.01, and then you multiplied the product by the number of percents. How can you find the percent of a number by multiplying only once? Provide an example.

_____

_____

_____

Name Date Time

LESSON 8•9

Calculating Discounts

There are 2 steps to finding a discounted total:

- Calculate the amount that represents the percent of discount.
- Subtract the calculated discount from the original total. This is the discounted total.

Calculate the discounted total for the following problems. Show your work on the back of this sheet.

1. A computer store has an Internet special for their customers. If Carla spends $50.00 or more, she gets 10% off her order. The shipping and handling charge is 4% of the original total. Carla buys $68.00 in software. What is her total charge?

_____

2. The Hartfield School District wants to get the government discount for telephone service. The discount is based on the percent of students qualifying for the National School Lunch Program. 32% of students in this urban district qualify. The district pays about $3,500 per month for telephone service. Use the table below to find how much the district would save.

Percent of Students	Urban Discount	Rural Discount
Less than 1%	20%	25%
1% to 19%	40%	50%
20% to 34%	50%	60%
35% to 49%	60%	70%
50% to 74%	80%	80%
75% to 100%	90%	90%

The Hartfield School District is eligible for a _____ discount. The district will save about _____ per month for its telephone service. With the government discount, the district will pay about _____ per month.

3. At the Goose Island Family Restaurant, if the original bill is $75.00 or more, the kids' meals are discounted 3%. If the original bill is $95.70, with $23.00 for kids' meals, what is the discounted amount? _____ What is the discounted total? _____

Name Date Time

STUDY LINK 8•10

Unit Fractions

Finding the worth of the unit fraction will help you solve each problem below.

1. If $\frac{4}{5}$ of a number is 16, what is $\frac{1}{5}$ of the number? _____

What is the number? _____

2. Our football team won $\frac{3}{4}$ of the games that it played. It won 12 games. How many games did it play? _____ (unit)

3. When a balloon had traveled 800 miles, it had completed $\frac{2}{3}$ of its journey. What was the total length of its trip? _____ (unit)

4. Grandpa had some buttons. Twenty buttons were red. The red buttons represent $\frac{5}{8}$ of all the buttons. How many buttons did Grandpa have? _____ (unit)

5. Tiana jogged $\frac{6}{8}$ of the way to school in 12 minutes. If she continues at the same speed, how long will her entire jog to school take? _____ (unit)

6. After 35 minutes, Hayden had completed $\frac{7}{10}$ of his math test. If he has a total of 55 minutes to complete the test, do you think he will finish in time? _____

Explain: _____

_____

7. Complete the table using the given rule.

Rule

out = 60% of in

in	out
100	
60	
	42
110	
	72
35	

8. Find the rule. Then complete the table.

Rule

out = _____ of in

in	out
24	9
72	27
56	21
80	30
	15
32	

Name Date Time

LESSON 8•10

Fraction of and Percent of a Number

George practiced finding the fraction of and the percent of a number. He completed the tables below. George thinks there is something wrong with his answers, but he doesn't know how to fix it.

$\frac{1}{4}$ of 12 =	3
$\frac{2}{4}$ of 12 =	6
$\frac{3}{4}$ of 12 =	12
$\frac{4}{4}$ of 12 =	24

20% of 40 =	6
40% of 40 =	12
60% of 40 =	18
80% of 40 =	24
100% of 40 =	30

1. Study George's tables and then explain how he should correct his work.

2. Write the correct answers.

$\frac{1}{4}$ of 12 =	
$\frac{2}{4}$ of 12 =	
$\frac{3}{4}$ of 12 =	
$\frac{4}{4}$ of 12 =	

20% of 40 =	
40% of 40 =	
60% of 40 =	
80% of 40 =	
100% of 40 =	

Name Date Time

LESSON 8•10

Fraction and Percent of a Number Methods

1. Alton collected 252 marbles but lost $\frac{4}{7}$ of them on his way to school. When he arrived at school, how many marbles did Alton have left? _____

Explain how you found your answer.

_____

_____

2. Circle the letter of each method below that you could use to solve Problem 1.

a. You can find $\frac{4}{7}$ of 252 by multiplying $252 * \frac{4}{7}$ and simplifying.

b. You can find $\frac{4}{7}$ of 252 by dividing 252 by 4 and multiplying the result by 7.

c. You can find the unit fraction by dividing 252 by 7, and then find $\frac{4}{7}$ of 252 by multiplying the unit fraction value by 4.

3. For any method you did *not* circle, explain why it will not work.

_____

_____

4. The regular price for in-line skates is $125 at a local store. The store was having a promotion: Buy one pair of in-line skates and get a second pair for 75% of the regular price. How much would a second pair of in-line skates cost? _____

Explain how you found your answer.

_____

_____

5. Circle the letter of each method below that you could use to solve Problem 4.

a. You can rename 75% as a fraction and then multiply $125 by the fraction to find 75% of $125.

b. You can find the cost of the second pair by multiplying $125 by $\frac{1}{4}$ and subtracting the product from $125.

c. You can find the cost of the second pair by dividing $125 by 4.

6. For any method you did *not* circle, explain why it will not work.

_____

_____

Name Date Time

LESSON 8•11

Classroom Survey

Number in Household	Number of Students
1–2	
3–5	
6 or more	

Language at Home	Number of Students
English	
Spanish	
Other	

Handedness	Number of Students
right	
left	

Years at Current Address	Number of Students
0 or 1	
2	
3	
4	
5	
6 or more	

Name Date Time

STUDY LINK 8•11

Fraction Review

SRB 59 66 68 73 76

Write three equivalent fractions for each fraction.

1. $\frac{7}{8}$ _____ **2.** $\frac{3}{4}$ _____

3. $\frac{6}{12}$ _____ **4.** $\frac{2}{3}$ _____

Circle the fraction that is closer to $\frac{1}{2}$.

5. $\frac{3}{8}$ or $\frac{4}{5}$ **6.** $\frac{4}{7}$ or $\frac{5}{9}$ **7.** $\frac{7}{8}$ or $\frac{7}{9}$ **8.** $\frac{4}{10}$ or $\frac{7}{12}$

9. Explain how you found your answer for Problem 8.

_____

_____

_____

_____

Solve. Write your answers in simplest form.

10. _____ $= \frac{5}{6} + \frac{3}{4}$ **11.** $\frac{7}{9} - \frac{1}{6} =$ _____

12. $8 - \frac{2}{3} =$ _____ **13.** $\frac{7}{8} - \frac{1}{6} =$ _____

14. $\frac{3}{4}$ of $\frac{2}{5}$ is _____. **15.** $4 * \frac{5}{6} =$ _____

Practice

16. 64,072 − 15,978 = _____ **17.** 2,297 ÷ 45 → _____

18. 1,674 − 1,204 = _____ **19.** 326 + 684 + 934 = _____

LESSON 8•11

Using a Calculator with Percents

Finding the percent of a number is the same as multiplying the number by the percent. Usually, it's easiest to change the percent to a decimal and use a calculator.

Example: What is 65% of 55?

$65\% = \frac{65}{100} = 0.65$

Write the fraction and decimal for each percent.

1. 18% = _____ = _____

2. 60% = _____ = _____

3. 89% = _____ = _____

4. 7.5% = _____ = _____

Use your calculator and the percents in Problem 1 to find the percent of 55 by multiplying 55 by each decimal.

Example: 55 ∗ 0.65

5. 18% of 55 = _____

6. 60% of 55 = _____

7. 89% of 55 = _____

8. 7.5% of 55 = _____

9. Write the calculator key sequence that you used.

_____

Sometimes you know a percent and how much it's worth, but you don't know what the ONE is. Use a unit percent strategy first to find 1%, and then multiply by 100 to get 100%.

Example: 60 million is 37% of what number?

60 ÷ 37 = 1.6216216

1.6216216 ∗ 100 = 162.16216

Using the fix function 1.6216216 ∗ 100 = 162 (rounded to the nearest whole number)

37% of 162 million is 59.94 million, or 60 million (rounded to the nearest ten million).

Use your calculator and unit percents to solve the following problems.

10. 42% of _____ = 18

11. 87% of _____ = 65

12. 63% of _____ = 28 million

Name Date Time

LESSON 8•11

Charting Changes in Consumption

Many times the information that interests you has to be located in data displays with much more data than you need. Use the information on *Student Reference Book,* page 363 to complete the table below.

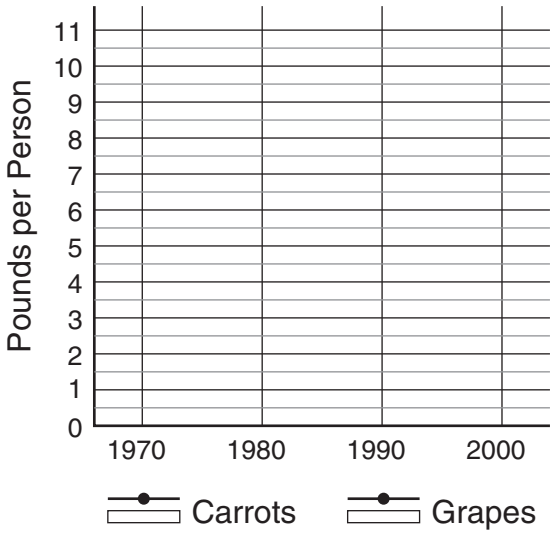
SRB 363

1. _____
(title)

Foods	1970	1980	1990	2000
Carrots				
Grapes				

Line graphs can make it easier to compare changes in data over time. Use the data from your table in Problem 1 to make a line graph of the pounds of carrots and grapes eaten per person, per year in the United States. Use one color for the carrots data and a different color for the grapes data. Indicate your choices by coloring in the boxes of the graph key.

2. _____
title



3. What is one conclusion you could draw from the data in your line graph?

_____

_____

STUDY LINK 8•12

Mixed-Number Review

SRB 62 63

Fill in the missing numbers.

1. $4\frac{1}{4} = 3\frac{\square}{4}$

2. $\frac{\square}{5} = 3\frac{7}{5}$

Solve. Write your answers in simplest form.

3. $1\frac{3}{5} + 2\frac{1}{5} =$ _____

4. $3\frac{3}{8} - 1\frac{5}{8} =$ _____

5. $7\frac{4}{9} - 5\frac{8}{9} =$ _____

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

7. $5\frac{2}{3} + 2\frac{3}{4} =$ _____

8. $4 - 1\frac{3}{4} =$ _____

9. $3 * 3\frac{3}{4} =$ _____

10. $4\frac{2}{3} * \frac{6}{7} =$ _____

11. _____ $= 2\frac{1}{2} * 1\frac{4}{5}$

12. $\frac{3}{10} * 8\frac{1}{3} =$ _____

Common Denominator Division

Here is one way to divide fractions and to divide whole or mixed numbers by fractions.

Step 1 Rename the numbers using a common denominator.

Step 2 Divide the numerators.

Solve. Show your work.

13. $5 \div \frac{2}{3} =$ _____

14. $\frac{4}{7} \div \frac{3}{5} =$ _____

15. $4\frac{1}{8} \div \frac{3}{4} =$ _____

16. $6\frac{2}{3} \div \frac{7}{9} =$ _____

Number Sense 2.4; Number Sense 2.5

LESSON 8•12

Exploring the Meaning of the Reciprocal

Lamont and Maribel have to divide fractions. Lamont doesn't want to use common denominators. He thinks using the reciprocal is faster, but he's not sure what a reciprocal is. Maribel looks it up on the Internet and finds this: One number is the **reciprocal** of another number if their product is 1.

Example 1:	**Example 2:**
$3 * ? = 1$	$\frac{1}{2} * ? = 1$
$3 * \frac{1}{3} = \frac{3}{3} = 1$	$\frac{1}{2} * 2 = \frac{2}{2} = 1$
$\frac{1}{3}$ is the reciprocal of 3	2 is the reciprocal of $\frac{1}{2}$
3 is the reciprocal of $\frac{1}{3}$	$\frac{1}{2}$ is the reciprocal of 2

1. Find the reciprocals.

a. 6 _____ **b.** $\frac{1}{7}$ _____ **c.** 20 _____ **d.** $\frac{1}{9}$ _____

2. What do you think would be the reciprocal of $\frac{5}{6}$? _____

Reciprocals on a Calculator

On all scientific calculators, you can find a reciprocal of a number by raising the number to the -1 power.

3. Write each number in standard notation as a decimal and a fraction.

a. 8^{-1} _____, _____ **b.** 5^{-2} _____, _____ **c.** 2^{-3} _____, _____

4. Write the key sequence you could use to find the reciprocal of 36.

_____

5. Write the key sequence you could use to find the reciprocal of $\frac{3}{7}$.

_____

6. What pattern do you see for the reciprocal of a fraction?

_____

_____

_____

Name Date Time

STUDY LINK 8•13

Unit 9: Family Letter

Coordinates, Area, Volume, and Capacity

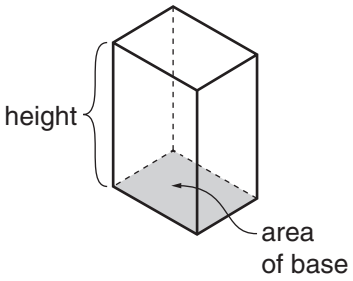
In the beginning of this unit, your child will practice naming and locating ordered number pairs on a coordinate grid. Whole numbers, fractions, and negative numbers will be used as coordinates. Your child will play the game *Hidden Treasure,* which provides additional practice with coordinates. You might want to challenge your child to a round.

In previous grades, your child studied the perimeters (distances around) and the areas (amounts of surface) of geometric figures. *Fourth Grade Everyday Mathematics* developed and applied formulas for the areas of rectangles, parallelograms, and triangles. In this unit, your child will review these formulas and explore new area topics, including the rectangle method for finding areas of regular and irregular shapes.

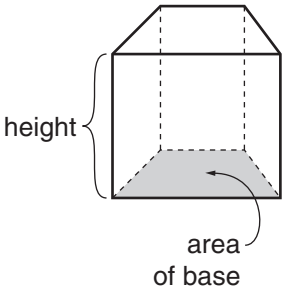
Students will also examine how mathematical transformations change the area, perimeter, and angle measurements of a figure. These transformations resemble changes and motions in the physical world. In some transformations, figures are enlarged in one or two dimensions; in other transformations, figures are translated (slid) or reflected (flipped over).

In the Earth's Water Surface exploration, students locate places on Earth with latitude and longitude. Then they use latitude and longitude in a sampling experiment that enables them to estimate, without measuring, the percent of Earth's surface that is covered by water. In the School's Land Area exploration, students use actual measurements and scale drawings to estimate their school's land area.

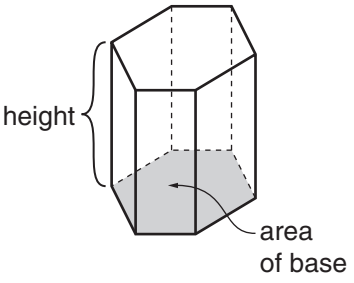
The unit concludes with a look at volume (the amount of space an object takes up) and capacity (the amount of material a container can hold). Students develop a formula for the volume of a prism (volume = area of the base ∗ the height). They observe the metric equivalents 1 liter = 1,000 milliliters = 1,000 cubic centimeters, and they practice making conversions between U.S. customary measures (1 gallon = 4 quarts, and so on).



Rectangular prism



Trapezoidal prism



Hexagonal prism

Please keep this Family Letter for reference as your child works through Unit 9.

Vocabulary

Important terms in Unit 9:

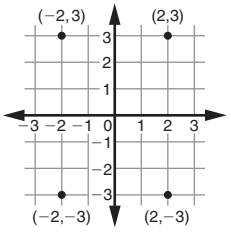
area The amount of surface inside a 2-dimensional figure. Area is measured in square units, such as square inches (in^2) and square centimeters (cm^2).

axis of a coordinate grid Either of the two number lines that intersect to form a coordinate grid.

capacity The amount of space occupied by a *3-dimensional* shape. Same as *volume.* The amount a container can hold. Capacity is often measured in units such as *quarts, gallons, cups,* or *liters.*

coordinate A number used to locate a point on a number line, or one of two numbers used to locate a point on a coordinate grid.

coordinate grid A reference frame for locating points in a plane using ordered number pairs, or coordinates.



Rectangular coordinate grid

formula A general rule for finding the value of something. A formula is usually an equation with quantities represented by letter *variables*. For example, the formula for the area of a rectangle may be written as $A = \ell * w$, where A represents the area of the rectangle, ℓ represents the length, and w represents the width.

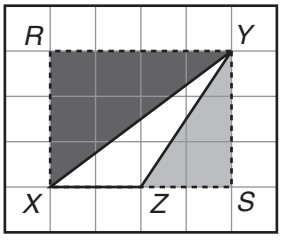
latitude A measure, in degrees, of the distance of a place north or south of the equator.

longitude A measure, in degrees, of how far east or west of the prime meridian a place is.

ordered number pair Two numbers that are used to locate a point on a *coordinate grid.* The first number gives the position along the horizontal axis; the second number gives the position along the vertical axis. Ordered number pairs are usually written inside parentheses: (2,3).

perpendicular Two lines or two planes that intersect at right angles. Line segments or rays that lie on perpendicular lines are perpendicular to each other. The symbol $\perp$ means *is perpendicular to.*

rectangle method A method for finding area in which one or more rectangles are drawn around a figure or parts of a figure.



To find the area of triangle *XYZ,* first draw rectangle *XRYS* through its vertices. Then subtract the areas of the two shaded triangles from the area of rectangle *XRYS.*

transformation Something done to a geometric figure that produces a new figure. Common transformations are translations (slides), reflections (flips), and rotations (turns).

volume The amount of space occupied by a 3-dimensional shape. Same as *capacity.* The amount a container can hold. Volume is usually measured in cubic units, such as cubic centimeters (cm^3), cubic inches (in^3), or cubic feet (ft^3).

Do-Anytime Activities

To work with your child on concepts taught in this unit, try these interesting and rewarding activities:

1. Find an atlas or map that uses letter-number pairs to locate places. For example, an atlas might say that Chattanooga, Tennessee, is located at D-9. Use the letter-number pairs to locate places you have visited or would like to visit.
2. Estimate the area of a room in your home. Use a tape measure or ruler to measure the room's length and width, and multiply to find the area. Make a simple sketch of the room, including the length, the width, and the area. If you can, find the area of other rooms or of your entire home.

Building Skills through Games

In Unit 9, your child will develop his or her understanding of coordinates and coordinate grids by playing the following games. For detailed instructions, see the *Student Reference Book.*

Frac-Tac-Toe See *Student Reference Book,* pages 309–311. Two players use a set of number cards 0–10 (4 of each), a gameboard, counters, and a calculator to play one of many versions. Students practice converting between fractions, decimals, and percents.

Hidden Treasure See *Student Reference Book,* page 319. This game for 2 players provides practice using coordinates and coordinate grids. It also offers the opportunity for players to develop good search strategies. Each player will need a pencil and two 1-quadrant playing grids with axes labeled from 0 to 10.

Polygon Capture See *Student Reference Book,* page 328. This game involves two to four players. Materials include polygon pieces and property cards. Players strengthen skills with identifying attributes of polygons. Players may also use 4-quadrant grids with axes labeled from −7 to 7. Practice is extended to coordinates and grids that include negative numbers.

As You Help Your Child with Homework

As your child brings assignments home, you might want to go over the instructions together, clarifying them as necessary. The answers listed below will guide you through some of the Study Links in this unit.

Study Link 9•1

2. Rectangular prism

3. a. (11,7) **4.** 13,297

5. 872.355 **6.** $10\frac{2}{8}$, or $10\frac{1}{4}$

Study Link 9•2

1. Sample answers: (8,16); (0,5); (16,5)

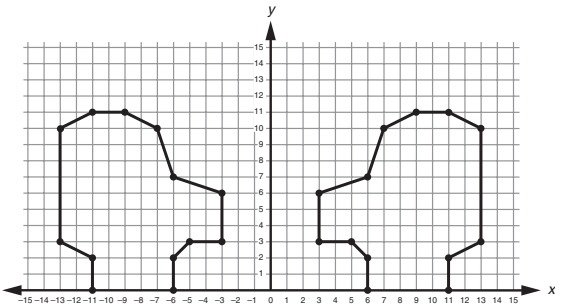
2. isosceles **4.** quadrangle

6. 28.71 **8.** $\frac{11}{8}$, or $1\frac{3}{8}$

Study Link 9•3

2. The first number

3.



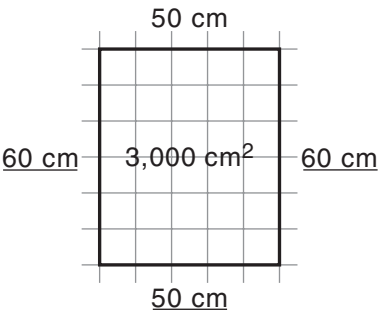
4. 26,320 **6.** $\frac{14}{24}$, or $\frac{7}{12}$

Study Link 9•4

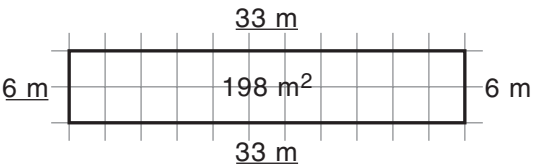
1. 150 sq ft; 12 hr 30 min **2.** 114 square feet

3. 80 yd^2 **4.** 33 ft^2

5.



6.



Study Link 9•5

1. 4 cm^2 **2.** 6 cm^2 **3.** 16 cm^2

4. 10 cm^2 **5.** 15 cm^2 **6.** 4 cm^2

Study Link 9•6

1. 4.5 cm^2; $\frac{1}{2} * 3 * 3 = 4.5$

2. 7.5 cm^2; $\frac{1}{2} * 5 * 3 = 7.5$

3. 3 cm^2; $\frac{1}{2} * 2 * 3 = 3$

4. 24 cm^2; $6 * 4 = 24$

5. 12 cm^2; $4 * 3 = 12$

6. 8 cm^2; $4 * 2 = 8$

Study Link 9•7

1. yd^2 **2.** cm^2 **3.** cm^2

4. in^2 **5.** ft^2

6. $A = \frac{1}{2} * 20 * 13$; 130 ft^2 **7.** $A = 8 * 2$; 16 cm^2

8. $A = \frac{1}{2} * 22 * 7$; 77 yd^2 **9.** $A = 8 * 9\frac{1}{2}$; 76 m^2

Study Link 9•8

1. 15 cm^2; 15 cm^3; 45 cm^3 **2.** 8 cm^2; 8 cm^3; 16 cm^3

3. 9 cm^2; 9 cm^3; 27 cm^3 **4.** 14 cm^2; 14 cm^3; 56 cm^3

5. $\frac{3}{40}$ **6.** 960 **7.** 3,840

Study Link 9•9

1. 72 cm^3 **2.** 144 cm^3 **3.** 70 in^3

4. 162 cm^3 **5.** 45 in^3 **6.** 140 m^3

7. 4 **8.** −245 **9.** 160

Study Link 9•10

2. $A = \frac{1}{2} * 7 * 6$; 21 cm^2 **3.** $A = 8 * 6$; 48 in^2