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Math Connects

Course 1

Noteables[™]
Interactive Study Notebook
with **FOLDABLES**[®]

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Math Connects: Concepts, Skills, and Problem Solving, Course 1
Noteables™: Interactive Study Notebook with Foldables®

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Organizing Your Foldables

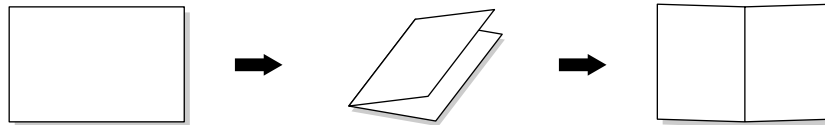


Make this Foldable to help you organize and store your chapter Foldables. Begin with one sheet of 11" × 17" paper.

STEP 1

Fold

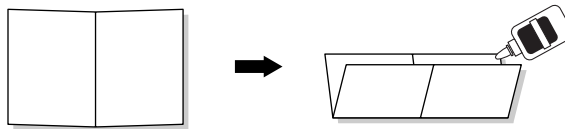
Fold the paper in half lengthwise. Then unfold.



STEP 2

Fold and Glue

Fold the paper in half widthwise and glue all of the edges.



STEP 3

Glue and Label

Glue the left, right, and bottom edges of the Foldable to the inside back cover of your Noteables notebook.



Reading and Taking Notes As you read and study each chapter, record notes in your chapter Foldable. Then store your chapter Foldables inside this Foldable organizer.

Using Your Noteables™ with FOLDABLES® Interactive Study Notebook

This note-taking guide is designed to help you succeed in *Math Connects, Course 1*. Each chapter includes:

CHAPTER 1
Number Patterns and Functions

FOLDABLES Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin of this Interactive Study Notebook to help you in taking notes.

Begin with five sheets of $8\frac{1}{2}'' \times 11''$ paper.

STEP 1 Stack the pages, placing the sheets of paper $\frac{3}{4}$ inch apart.

STEP 2 Roll up bottom edges. All tabs should be the same size.

STEP 3 Crease and staple along the fold.

STEP 4 Label the tabs the topics from the chapter.

NOTE-TAKING TIP: When you take notes, listen or read for main ideas. Then record those ideas in a simplified form for future reference.

Math Connects, Course 1 1

The Chapter Opener contains instructions and illustrations on how to make a Foldable that will help you to organize your notes.

A Note-Taking Tip provides a helpful hint you can use when taking notes.

The Build Your Vocabulary table allows you to write definitions and examples of important vocabulary terms together in one convenient place.

CHAPTER 1
BUILD YOUR VOCABULARY

This is an alphabetical list of new vocabulary terms you will learn in Chapter 1. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
algebra [AL-juh-bruh]			
algebraic [AL-juh-BRAY-ihk] expression			
area			
base			
composite [com-PAH-zit] number			
cubed			
defining the variable			
equals sign			
equation [ih-KWAY-zuhhn]			
evaluate			

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Within each chapter, Build Your Vocabulary boxes will remind you to fill in this table.

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1-5 Algebra: Variables and Expressions

MAIN IDEA
Evaluate algebraic expressions.

BUILD YOUR VOCABULARY (pages 2-3)
Algebra is a language of
A variable is a , usually a letter, used to represent a number.
Algebraic expressions are combinations of , , and at least one
To evaluate an algebraic expression means to find the of the expression. You can find the value after you replace the variables with

EXAMPLES Evaluate Algebraic Expressions
Evaluate $20 + c$ if $c = 5$.
 $20 + c = 20 + \square$ Replace \square with \square .
 $= \square$
Evaluate $p - q$ if $p = 14$ and $q = 13$.
 $p - q = \square - \square$ Replace p with \square and q with \square .
 $= \square$
Evaluate $2x + 3$ if $x = 4$.
 $2x + 3 = \square + \square$ Replace \square with \square .
 $= \square$

FOLDABLES
ORGANIZE IT
On the Lesson 1-5 tab, explain variable and algebraic expression. Then explain what steps you take before evaluating an algebraic expression.

Math Connects, Course 1

Foldables feature reminds you to take notes in your Foldable.

Lessons cover the content of the lessons in your textbook. As your teacher discusses each example, follow along and complete the fill-in boxes. Take notes as appropriate.

Check Your Progress Exercises allow you to solve similar exercises on your own.

1-5

REMEMBER IT
In algebra, the symbol \cdot can be used to represent multiplication.
 $3 \cdot 4 = 3 \times 4$
A number and a letter, or two letters can be written together without a multiplication symbol.
 $2t = 2 \times t$ $st = s \times t$

Check Your Progress
a. Evaluate $m + 9$ if $m = 25$.

b. Evaluate $x - y$ if $x = 22$ and $y = 17$.

c. Evaluate $7 + 3w$ if $w = 6$.

EXAMPLE
TEST EXAMPLE The amount of money Sabrina will need to pay for orders using a \$2 coupon can be represented by . is the cost of each .
Solve the Item
 $5x - 2 = \square$ Replace \square with \square .
 $= \square$
 $= \square$
The amount of Sabrina's purchase is . The answer is .

HOMework ASSIGNMENT
Page(s): _____
Exercises: _____

Check Your Progress **MULTIPLE CHOICE** Find the value of the expression $5 \cdot 3 + 4g$ if $g = 2$.
F 11 G 19 H 23 J 38

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Examples parallel the examples in your textbook.

CHAPTER 1 BRINGING IT ALL TOGETHER

STUDY GUIDE

FOLDABLES Use your Chapter 1 Foldable to help you study for your chapter test.
VOCABULARY PUZZLEMAKER To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 1, go to glencoe.com
BUILD YOUR VOCABULARY You can use your complete Vocabulary Builder (pages 2-3) to help you solve the puzzle.

1-1 A Plan for Problem Solving
1. Amy has 10 round beads to use for a necklace. She is also going to use 3 cubes, 2 ovals, and 5 cylinders. How many beads will she use in the necklace?
2. Complete the pattern.
3, 7, 11, 15, ,

1-2 Prime Factors
Complete each sentence. Write *prime*, *composite*, or *neither* and then tell why.
3. 9 is because
4. 1 is because
5. 13 is because
6. Find the prime factorization of 20.

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Bringing It All Together Study Guide reviews the main ideas and key concepts from each lesson.

NOTE-TAKING TIPS

Your notes are a reminder of what you learned in class. Taking good notes can help you succeed in mathematics. The following tips will help you take better classroom notes.

- Before class, ask what your teacher will be discussing in class. Review mentally what you already know about the concept.
- Be an active listener. Focus on what your teacher is saying. Listen for important concepts. Pay attention to words, examples, and/or diagrams your teacher emphasizes.
- Write your notes as clear and concise as possible. The following symbols and abbreviations may be helpful in your note-taking.

Word or Phrase	Symbol or Abbreviation	Word or Phrase	Symbol or Abbreviation
for example	e.g.	not equal	\neq
such as	i.e.	approximately	\approx
with	w/	therefore	\therefore
without	w/o	versus	vs
and	+	angle	\angle

- Use a symbol such as a star (★) or an asterisk (*) to emphasize important concepts. Place a question mark (?) next to anything that you do not understand.
- Ask questions and participate in class discussion.
- Draw and label pictures or diagrams to help clarify a concept.
- When working out an example, write what you are doing to solve the problem next to each step. Be sure to use your own words.
- Review your notes as soon as possible after class. During this time, organize and summarize new concepts and clarify misunderstandings.

Note-Taking Don'ts

- **Don't** write every word. Concentrate on the main ideas and concepts.
- **Don't** use someone else's notes as they may not make sense.
- **Don't** doodle. It distracts you from listening actively.
- **Don't** lose focus or you will become lost in your note-taking.

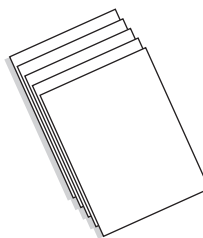
Number Patterns and Functions

FOLDABLES

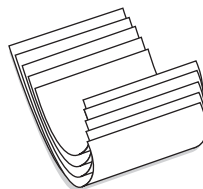
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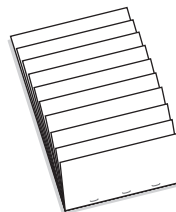
STEP 1 **Stack** the pages, placing the sheets of paper $\frac{3}{4}$ inch apart.



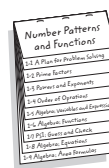
STEP 2 **Roll** up bottom edges. All tabs should be the same size.



STEP 3 **Crease** and staple along the fold.



STEP 4 **Label** the tabs the topics from the chapter.



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algebra [AL-juh-bruh]			
algebraic [AL-juh-BRAY-ihk] expression			
area			
base			
composite [com-PAH-zit] number			
cubed			
defining the variable			
equals sign			
equation [ih-KWAY-zhuhn]			
evaluate			

Vocabulary Term	Found on Page	Definition	Description or Example
exponent [ex-SPOH-nuhnt]			
factor			
formula [FOR-myuh-luh]			
function			
function rule			
function table			
numerical expression			
order of operations			
power			
prime factorization			
prime number			
solution			
solve			
squared			
variable [VAIR-ee-uh-buhl]			

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A Plan for Problem Solving

EXAMPLES Use the Problem-Solving Plan

MAIN IDEA

- Solve problems using the four-step plan.

1 MONEY After shopping at the mall, you came home with \$3. You spent \$4 on candy, \$8 on a movie, and \$5 on arcade games. How much money did you start with?

UNDERSTAND You know the amount of money that was spent on each item at the mall as well as the amount of money left over. You need to find how much money you started with.

PLAN To find the total amount of money that was started with, the amount spent on each item at the mall along with the amount left over.

SOLVE

You started with .

CHECK

The answer seems . To check it, all of the money spent at the mall and confirm that \$3 is left over.

Check Your Progress HOCKEY During the regular season, David scored 18 more goals than Bobby. Bobby scored 14 goals. How many goals did David score during the regular season?

REMEMBER IT



Remember to check the reasonableness of your answer by comparing it to your estimate.

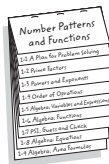
1 COOKING Based on the the information in the table, how many cups of cooked rice and how many servings will 4 cups of dry rice provide?

Dry Rice (cups)	Cooked Rice (cups)	Servings
1	2	8
2	4	16
3	6	24
4	?	?

FOLDABLES

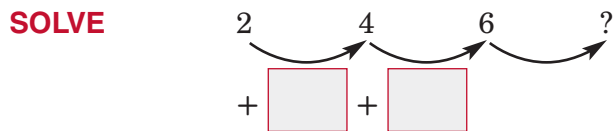
ORGANIZE IT

On the Lesson 1-1 tab, list the steps of the four-step plan for problem solving. Then explain each step in your own words.



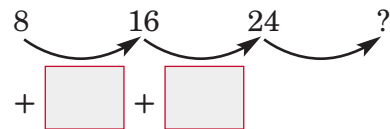
UNDERSTAND You know the cups of cooked rice and the number of servings for 1, 2, and 3 cups of dry rice. You need to find the cups of cooked rice and the number of servings for 4 cups of dry rice.

PLAN Since an exact answer is needed and the question contains a pattern, use mental math.



The pattern shows an increase of \square cups of cooked rice for each additional cup of dry rice.

So, for 4 cups of dry rice you would get \square cups of cooked rice.



The pattern shows an increase of \square servings for each additional cup of dry rice.

So, for 4 cups of dry rice you would get \square servings of cooked rice.

CHECK Since $8 - 2 = 6$ and $32 - 8 = 24$, the answer is correct.

Check Your Progress EXERCISE Based on the information in the table, determine how many minutes per day will be spent working out during week 5.

Week	Minutes Per Day
1	10
2	15
3	21
4	28
5	?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Find the prime factorization of a composite number.

BUILD YOUR VOCABULARY (pages 2–3)

When two or more numbers are , each number is called a **factor** of the product.

A whole number that has exactly two unique factors, and the number , is a **prime number**.

A number greater than 1 with two factors is a **composite number**.

EXAMPLES Identify Prime and Composite Numbers

Tell whether each number is *prime*, *composite*, or *neither*.

1 13

The factors of 13 are .

Since there are two factors, 1 and the number itself, 13 is a number.

1 20

The factors of 20 are .

Since 20 has two factors, it is a number.

Check Your Progress

Tell whether each number is *prime*, *composite*, or *neither*.

a. 35

b. 41

WRITE IT

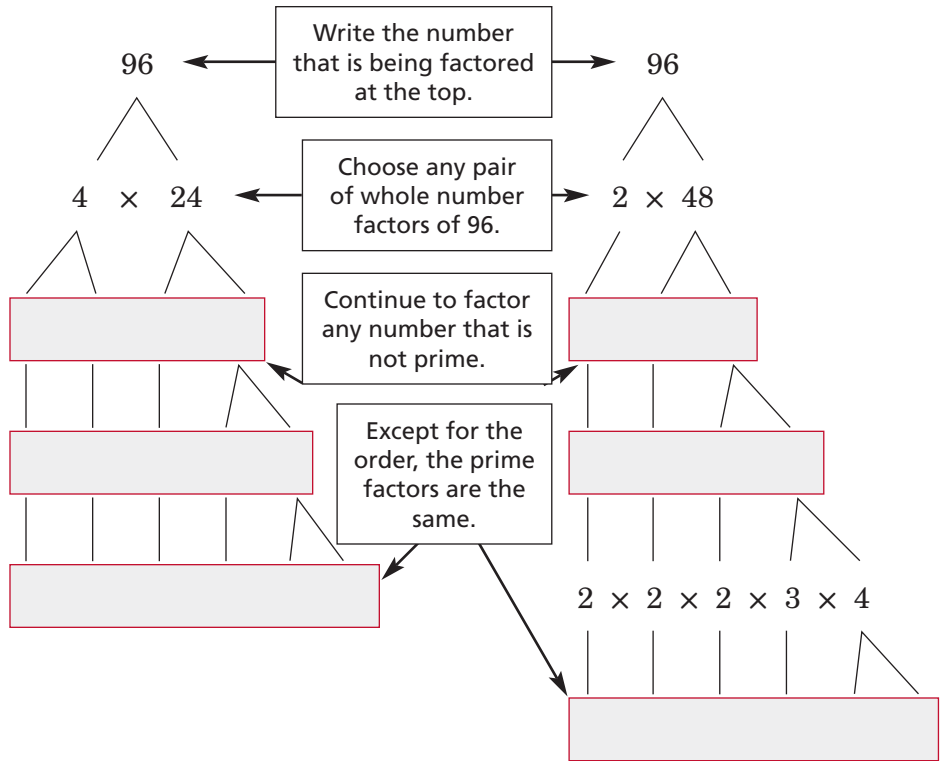
Explain why zero is neither prime nor composite. Give examples that show why.

BUILD YOUR VOCABULARY (pages 2-3)

Every number can be expressed as a of numbers. This is called a **prime factorization** of the number.

EXAMPLE Find Prime Factorization

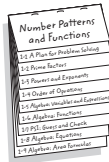
1 Find the prime factorization of 96.



FOLDABLES

ORGANIZE IT

On the Lesson 1-2 tab, list examples of prime and composite numbers. Then show how to find the prime factorization of a few of the composite numbers.



Check Your Progress

Find the prime factorization of 72.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Use powers and exponents in expressions.

BUILD YOUR VOCABULARY (pages 2–3)

A product of factors can be written using an exponent and a base.

$$\boxed{} \longrightarrow 2^5 \longleftarrow \boxed{}$$

Numbers expressed using are called powers. Three to the second power or three squared is 3×3 , or . Ten to the third power or ten cubed is $10 \times 10 \times 10$, or .

EXAMPLES Write Powers and Products

- 1 Write $5 \times 5 \times 5 \times 5$ using an exponent.

The base is . Since is a factor times, the exponent is . $5 \times 5 \times 5 \times 5 = \boxed{}$

- 1 Write 8^3 as a product of the same factor. Then find the value.

The base is . The exponent is . So, is a factor times. $8^3 = \boxed{}$ or

Check Your Progress

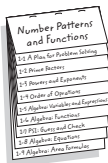
- a. Write $4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4$ using an exponent.

- b. Write 6^4 as a product of the same factor. Then find the value.

FOLDABLES

ORGANIZE IT

On the Lesson 1-3 tab, write a power. Then write the power as a product of primes. Label all the parts.



WRITE IT

Explain what 3^1 means.

EXAMPLE

- 3 ELEVATIONS** The highest point in Utah is King's Peak. It stands just a bit higher than 4^6 meters. What is this elevation?

Write 4^6 as a . Then find the of the product.

$$4^6 = \text{$$

$$= \text{$$

So, the elevation of King's Peak is about .

Check Your Progress

SWIMMING POOL The length of a new swimming pool being built at the community recreation center is listed as 2^6 feet. What is the length of the new pool?

EXAMPLES**Prime Factorization Using Exponents**

Write the prime factorization of each number using exponents.

- 4** 108

$$108 = \text{$$

Write the prime factorization.

$$= \text{$$

Write products of identical factors using exponents.

- 5** 80

$$80 = \text{$$

Write the prime factorization.

$$= \text{$$

Write products of identical factors using exponents.

Check Your Progress

Write the prime factorization of each number using exponents.

- a. 144

- b. 162

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Find the value of expressions using the order of operations.

BUILD YOUR VOCABULARY (pages 2–3)

A **numerical expression** is a combination of and .

The **order of operations** tells which operation to perform first so that everyone gets the same .

EXAMPLES Use Order of Operations

Find the value of each expression.

1 $30 - 10 + 9$

$$30 - 10 + 9 = 20 + \boxed{}$$

Subtract from first.

$$= \boxed{}$$

Add and .

2 $4 + (10 - 3)$

$$4 + (10 - 3) = \boxed{}$$

Subtract 3 from 10.

$$= \boxed{}$$

Add and .

KEY CONCEPT**Order of Operations**

- Simplify the expressions inside grouping symbols, like parentheses.
- Find the value of all powers.
- Multiply and divide in order from left to right.
- Add and subtract in order from left to right.

Check Your Progress Find the value of each expression.

a. $21 - 6 + 9$

b. $6 + (8 - 4)$

WRITE IT

Why is it important to have an order of operations when evaluating expressions?

REVIEW IT

Show 4 cubed as a power and then as a product of factors. What is the value of the number?
(Lesson 1-3)

EXAMPLES Parentheses and Exponents

Find the value of each expression.

3 $90 \div 3 + (3 - 2) - 20$

$$90 \div 3 + (3 - 2) - 20$$

$$= 90 \div 3 + \boxed{} - 20$$
 Subtract $\boxed{}$ from $\boxed{}$.

$$= \boxed{} - 20$$
 Divide $\boxed{}$ by $\boxed{}$.

$$= \boxed{}$$
 Add $\boxed{}$ and $\boxed{}$.

$$= \boxed{}$$
 Subtract $\boxed{}$ from $\boxed{}$.

4 $4^3 + 5 \times 2 - 1$

$$4^3 + 5 \times 2 - 1$$

$$= \boxed{} + 5 \times 2 - 1$$
 Find $\boxed{}$.

$$= \boxed{} - 1$$
 Multiply $\boxed{}$ and $\boxed{}$.

$$= \boxed{}$$
 Add $\boxed{}$ and $\boxed{}$.

$$= \boxed{}$$
 Subtract $\boxed{}$ from $\boxed{}$.

Check Your Progress Find the value of each expression.

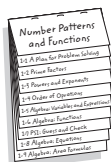
a. $85 \div 5 + 14 \times (12 - 8)$

b. $4 \times 2^4 + 7$

FOLDABLES

ORGANIZE IT

On the Lesson 1-4 tab, write the order of operations for evaluating expressions. Use your own examples to show how the rules are applied.



EXAMPLE

- 5 MONEY** Trina, her two parents, and her grandmother eat lunch at a diner. Each person orders a soda, a sandwich, fries, and dessert. Write an expression for the total cost of the meal. Then find the total cost.

Cost of Lunch at a Diner				
Item	soda	sandwich	fries	desserts
Cost	\$1	\$5	\$2	\$3

To find the total cost, write an expression and then find its value using the order of operations.

	cost of 4 sodas	plus	cost of 4 sandwiches	plus	cost of 4 fries	plus	cost of 4 desserts
Words ▼		+		+		+	
Expression							

$$4 \times \$1 + 4 \times \$5 + 4 \times \$2 + 4 \times \$3$$

$$= \boxed{} 4 \times \$5 + 4 \times \$2 + 4 \times \$3$$

$$= \boxed{} 4 \times \$2 + 4 \times \$3$$

$$= \boxed{} 4 \times \$3$$

$$= \boxed{}$$

$$= \boxed{}$$

The total cost of the meal is $\boxed{}$.

Check Your Progress

CLOTHING Maris is shopping at a new clothing store. T-shirts are priced at \$9 each, jeans are priced at \$17 per pair, and sweaters are priced at \$14. Maris buys 4 T-shirts, 2 pairs of jeans, and 3 sweaters. Write an expression for the total cost of her purchases. Then find the total cost.

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Evaluate algebraic expressions.

BUILD YOUR VOCABULARY (pages 2–3)

Algebra is a language of .

A **variable** is a , usually a letter, used to represent a number.

Algebraic expressions are combinations of , , and at least one .

To **evaluate** an algebraic expression means to find the of the expression. You can find the value after you replace the variables with .

EXAMPLES Evaluate Algebraic Expressions

1 Evaluate $20 + c$ if $c = 5$.

$$20 + c = 20 + \boxed{} \quad \text{Replace } \boxed{} \text{ with } \boxed{}.$$

$$= \boxed{} \quad \boxed{}$$

2 Evaluate $p - q$ if $p = 14$ and $q = 13$.

$$p - q = \boxed{} - \boxed{} \quad \text{Replace } p \text{ with } \boxed{} \text{ and } q \text{ with } \boxed{}.$$

$$= \boxed{} \quad \boxed{}$$

3 Evaluate $2x + 3$ if $x = 4$.

$$2x + 3 = \boxed{} \quad \text{Replace } \boxed{} \text{ with } \boxed{}.$$

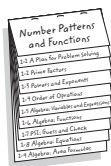
$$= \boxed{}$$

$$= \boxed{}$$

FOLDABLES

ORGANIZE IT

On the Lesson 1-5 tab, explain variable and algebraic expression. Then explain what steps you take before evaluating an algebraic expression.



REMEMBER IT

In algebra, the symbol \cdot can be used to represent multiplication.

$$3 \cdot 4 = 3 \times 4$$

A number and a letter, or two letters can be written together without a multiplication symbol.

$$2t = 2 \times t \quad st = s \times t$$

Check Your Progress

a. Evaluate $m + 9$ if $m = 25$.

b. Evaluate $x - y$ if $x = 22$ and $y = 17$.

c. Evaluate $7 + 3w$ if $w = 6$.

EXAMPLE

TEST EXAMPLE The amount of money Sabrina will need to pay for 5 binders using a \$2 coupon can be represented by the expression $5x - 2$, where x is the cost of each binder. Find the amount of her purchase if each binder is \$4.

A \$2

B \$18

C \$20

D \$40

Read the Item

You need to find the value of the expression given $x = \$4$.

Solve the Item

$$5x - 2 = \boxed{}$$

$$= \boxed{}$$

$$= \boxed{}$$

Replace $\boxed{}$ with $\boxed{}$.

$\boxed{}$

$\boxed{}$

The amount of Sabrina's purchase is $\boxed{}$. The answer is $\boxed{}$.

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Check Your Progress

MULTIPLE CHOICE Find the value of the expression $5 \cdot 3 + 4g$ if $g = 2$.

F 11

G 19

H 23

J 38

MAIN IDEA

- Complete function tables and find function rules.

BUILD YOUR VOCABULARY (pages 2–3)

A **function** is a relation in which each element of the input is paired with element of the output according to a rule.

A **function table** organizes the input, and output of a function.

A **function rule** describes the relationship between each and of a function.

EXAMPLE Complete a Function Table**1** Complete the function table.

The function rule is $x + 6$.

Add to each input.

Input (x)	Output ($x + 6$)
0	■
1	■
2	■



Input (x)	Output ($x + 6$)
0	<input type="text"/>
1	<input type="text"/>
2	<input type="text"/>

REMEMBER IT

Parentheses can be used to show multiplication. For example, another way to write 3×4 is $3(4)$.

**Check Your Progress**

Complete the function table below.

Input (x)	Output ($x + 2$)
0	<input type="text"/>
1	<input type="text"/>
2	<input type="text"/>

EXAMPLE Find the Rule for a Function Table

1 Find the rule for the function table.

The output is less than the input.

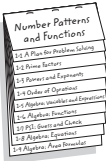
The function rule is .

Input (x)	Output (y)
10	7
8	5
5	2

FOLDABLES

ORGANIZE IT

Under the Foldable tab for Lesson 1–6, record what you learn about functions and function tables. Include an explanation of the terms *input*, *output*, *function*, and *function rule*.



Check Your Progress Find the rule for the function table.

Input (x)	Output (y)
9	36
10	40
11	44

BUILD YOUR VOCABULARY (pages 2–3)

When you choose a variable to represent the input, it is called **defining the variable**.

EXAMPLE

3 MONEY Nina has a new job. She spends \$2 every day on coffee. Define a variable. Then write a function rule that relates the total amount of money Nina spends on coffee to the number of days at work.

Words

▼

Variable

▼

Equation

\$2 for each day

Let x represent the number of days.

The function rule is .

Check Your Progress **MOVIE RENTAL** A video store rents movies for \$4 each. Define a variable. Then write a function rule that relates the total charge to the number of movies rented.

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Problem-Solving Investigation: Guess and Check

MAIN IDEA

- Solve problems by using the guess and check strategy.

EXAMPLE

Hal is younger than Randi. Each of their ages is a different prime number. The total of their ages is 91. How old are Hal and Randi?

UNDERSTAND You know that is younger than . Each of their ages is a different number, and the total of their ages is . You need to find what their ages are.

PLAN Make a guess until you find an answer that makes sense for the problem.

SOLVE

Hal	Prime Number?	Randi	Prime Number?	Total (Hal + Randi)
11	yes	80	<input type="text"/>	91
7	<input type="text"/>	84	no	91
5	yes	<input type="text"/>	no	91
2	yes	89	yes	<input type="text"/>

So, Hal is years old, and Randi is years old.

CHECK Hal's age is less than Randi's age. Both 2 and 89 are prime numbers, and $2 + 89 = 91$. So, the answer is correct.

Check Your Progress

MONEY Leah has 5 bills and 3 coins in her pocket. If she has a total of \$27.31 in her pocket, what kinds of bills and coins does she have?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Solve equations by using mental math and the guess and check strategy.

BUILD YOUR VOCABULARY (pages 2–3)

An **equation** is a sentence that contains an **equals sign**, =.

When you replace a variable with a value that results in a sentence, you **solve** the equation.

The value for the is the **solution** of the equation.

EXAMPLE Find the Solution of an Equation

1 Is 5, 6, or 7 the solution of the equation $4 + b = 10$?

Value of b	$4 + b \stackrel{?}{=} 10$	Are Both Sides Equal?
<input type="text"/>	$4 + \text{} = 10$ $\text{} \neq 10$	<input type="text"/>
<input type="text"/>	$4 + \text{} = 10$ $\text{} = 10$	<input type="text"/>
<input type="text"/>	$4 + \text{} = 10$ $\text{} \neq 10$	<input type="text"/>

The solution of $4 + b = 10$ is .

Check Your Progress Is 9, 10, or 11 the solution of the equation $24 - d = 13$?

EXAMPLE Solve an Equation Mentally**1** Solve $16 = 4s$ mentally.

$16 = 4s$

THINK 16 equals 4 times what number?

$16 = 4 \cdot \square$

You know that $16 = 4 \cdot \square$.

$16 = \square$

The solution is \square .**Check Your Progress** Solve $5p = 30$ mentally.**EXAMPLE****2 ANIMALS** On average, a cat lives 12 years. This is 13 years fewer than the average life span of a horse. Solve the equation $h - 13 = 12$ to find the average life span of a horse.Use the *guess and check* strategy.**Try 24.**

$h - 13 = 12$

$\square - 13 \stackrel{?}{=} 12$

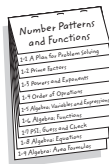
Try 25.

$h - 13 = 12$

$\square - 13 \stackrel{?}{=} 12$

The solution is \square . So, the average life span of a horse is 25 years.**Check Your Progress** **AGE** Samantha is 9 years old. This is seven years younger than her sister Dinah's age. Solve the equation $d - 7 = 9$ to find Dinah's age.**FOLDABLES****ORGANIZE IT**

On the Lesson 1-8 tab, write an example of an algebraic equation that can be solved using mental math and an example of an algebraic equation that can be solved using guess and check.

**HOMEWORK ASSIGNMENT**

Page(s): _____

Exercises: _____

MAIN IDEA

- Find the areas of rectangles and squares.

BUILD YOUR VOCABULARY (pages 2–3)

The area of a figure is the number of needed to cover a .

A **formula** is an that shows a among certain quantities.

KEY CONCEPT**Area of a Rectangle**

The area A of a rectangle is the product of the length ℓ and width w .

EXAMPLE Find the Area of a Rectangle

- 1 Find the area of a rectangle with length 15 feet and width 10 feet.

$$A = \ell w$$

Area of a rectangle

$$A = \text{$$

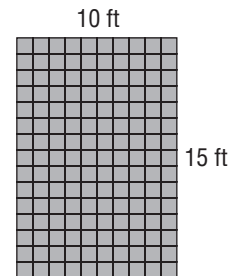
Replace ℓ with

and w with .

$$A = \text{$$

Multiply.

The area is square feet.

**Check Your Progress**

Find the area of a rectangle with length 9 meters and width 13 meters.

EXAMPLE Find the Area of a Square

1 Find the area of a square with side length 7 inches.

$A = s^2$ Area of a square

$A = \square$ Replace s with \square .

$A = \square$ Multiply.

The area is \square square inches.

Check Your Progress Find the area of a square with side length 11 inches.

EXAMPLE

5 SPORTS The outdoor Olympic swimming pool in Volos, Greece, measures 50 meters long and 25 meters wide. What is the area of the pool?

The length is 50 meters, and the width is 25 meters.

$A = \ell w$ Area of a rectangle

$A = \square$ Replace ℓ with \square and w with \square .

$A = \square$ Multiply.

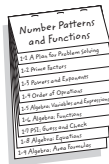
The area of the pool is \square .

Check Your Progress **GARDENS** Bill's garden is 18 feet long and 12 feet wide. What is the area of his garden?

FOLDABLES

ORGANIZE IT

Write the formula for the area of a rectangle on the Lesson 1-8 tab. Then draw a diagram to describe area.



HOMEWORK ASSIGNMENT

Page(s):

Exercises:

BRINGING IT ALL TOGETHER**STUDY GUIDE**

FOLDABLES	VOCABULARY PUZZLEMAKER	BUILD YOUR VOCABULARY
Use your Chapter 1 Foldable to help you study for your chapter test.	To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 1, go to glencoe.com	You can use your completed Vocabulary Builder (pages 2–3) to help you solve the puzzle.

1-1

A Plan for Problem Solving

1. Amy has 10 round beads to use for a necklace. She is also going to use 3 cubes, 2 ovals, and 5 cylinders. How many beads will she use in the necklace?

2. Complete the pattern.
3, 7, 11, 15, ■, ■

1-2

Prime Factors

Complete each sentence. Write *prime*, *composite*, or *neither* and then tell why.

3. 9 is because .

4. 1 is because .

5. 13 is because .

6. Find the prime factorization of 20.

1-3

Powers and Exponents

7. Find the value of
- 2^5
- .

$$2^5 = \boxed{}$$

Write 2^5 as a product.

$$= \boxed{}$$

Find the value.

8. Write the prime factorization of 36 using exponents.

1-4

Order of Operations

9. The steps for finding the value of a numerical expression are listed below. Number the steps in the correct order.

Find the value of all powers.

Add and subtract in order from left to right.

Simplify the expressions inside grouping symbols.

Multiply and divide in order from left to right.

10. Using the order of operations, explain how you would find the value of
- $(7 + 5) \div 2^2 + 8$
- .

1-5

Algebra: Variables and Expressions

11. Describe in words each step for evaluating

$$2r^2 + 3 \cdot 5 \text{ if } r = 4.$$

$$2r^2 + 3 \cdot 5 = 2 \cdot 4^2 + 3 \cdot 5$$

$$= 2 \cdot 16 + 3 \cdot 5$$

$$= 32 + 3 \cdot 5$$

$$= 32 + 15$$

$$= 47$$

1-6

Algebra: Functions

12. Find the function rule for the function table.

Input (x)	Output (y)
0	0
5	45
10	90

The function rule is .

1-7

Problem-Solving Investigation: Guess and Check

Solve. Use the *guess and check* strategy.

13. **NUMBERS** The sum of two numbers is 23 and their product is 120. Find the numbers.

1-8

Algebra: Equations

14. Use guess and check to solve the equation $t + 62 = 83$.

Since + 60 = 80, the solution should be about .

Try 20.

$$t + 62 = 83$$

$$\text{} + 62 \stackrel{?}{=} 83$$

$$\text{} \neq 83$$

Try 21.

$$t + 62 = 83$$

$$\text{} + 62 \stackrel{?}{=} 83$$

$$\text{} = 83$$

The solution is .

1-9

Algebra: Area Formulas

15. Find the area of a rectangle that is 14 inches long and 6 inches wide.

$$A = \text{$$

$$A = \text{$$

ARE YOU READY FOR THE CHAPTER TEST?

Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 1.

Check the one that applies. Suggestions to help you study are given with each item.

- I completed the review of all or most lessons without using my notes or asking for help.
- You are probably ready for the Chapter Test.
 - You may want to take the Chapter 1 Practice Test on page 73 of your textbook as a final check.
- I used my Foldables or Study Notebook to complete the review of all or most lessons.
- You should complete the Chapter 1 Study Guide and Review on pages 68–72 of your textbook.
 - If you are unsure of any concepts or skills, refer back to the specific lesson(s).
 - You may also want to take the Chapter 1 Practice Test on page 73.
- I asked for help from someone else to complete the review of all or most lessons.
- You should review the examples and concepts in your Study Notebook and Chapter 1 Foldable.
 - Then complete the Chapter 1 Study Guide and Review on pages 68–72 of your textbook.
 - If you are unsure of any concepts or skills, refer back to the specific lesson(s).
 - You may also want to take the Chapter 1 Practice Test on page 73.

Student Signature

Parent/Guardian Signature

Teacher Signature

Statistics and Graphs

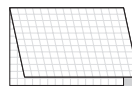
FOLDABLES

Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin of this Interactive Study Notebook to help you in taking notes.

Begin with five sheets of graph paper.

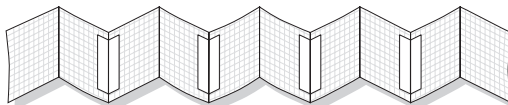
STEP 1

Fold each sheet of graph paper in half along the width.



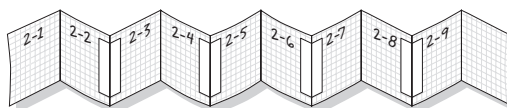
STEP 2

Unfold each sheet and tape to form one long piece.



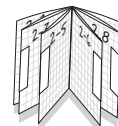
STEP 3

Label the pages with the lesson numbers as shown.



STEP 4

Refold the pages to form a journal.



NOTE-TAKING TIP: As you learn different methods of displaying statistics, use the notes you have taken on each method to help you compare and contrast the different methods.

BUILD YOUR VOCABULARY

This is an alphabetical list of new vocabulary terms you will learn in Chapter 2. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
average			
bar graph			
data			
frequency			
graph			
horizontal axis			
integers			
interval			
key			
leaves			
line graph			
line plot			

(continued on the next page)

Vocabulary Term	Found on Page	Definition	Description or Example
mean			
measures of central tendency			
median			
mode			
negative numbers			
opposites			
outlier			
positive numbers			
range			
scale			
stem-and-leaf plot			
stem			
vertical axis			

Problem-Solving Investigation: Make a Table

EXAMPLE

MAIN IDEA

- Solve problems by making a table.

EYE COLOR Make a frequency table of the data. How many more students have brown eyes than green eyes?

blue gray brown green brown
brown gray blue gray

UNDERSTAND You need to find the number of students who have brown eyes and the number of students who have green eyes. Then find the difference.

PLAN Make a frequency table of the data.

SOLVE Draw a table with three columns as shown. In the first column, list each eye color. Then complete the table by indicating the frequency or number of times each color occurs.

Eye Color		
Color	Tally	Frequency
blue		2
gray		3
brown		3
green		1

students have brown eyes and has green eyes. So, $3 - 1$ or more students have brown eyes than green eyes.

CHECK Go back to the data. There should be 3 students who have brown eyes and 1 student who has green eyes. So, an answer of students is correct.

Check Your Progress

MARKETING Make a frequency table of the data. How many more people responded yes than no?

Opinion				
Y	Y	N	Y	Y
N	N	Y	Y	N
Y	N	N	Y	Y
N	N	Y	Y	Y

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Display and analyze data using bar graphs and line graphs.

BUILD YOUR VOCABULARY (pages 27–28)

A **graph** is a visual way to display data.

A **bar graph** uses bars to quantities.

The **scale** of a graph is written on the **vertical axis** of a bar or line graph.

The scale is separated into equal parts called **intervals**.

The are written on the **horizontal axis** of a bar or line graph.

The **frequency** is the number of times an item occurs.

A **line graph** is used to show how a set of data

over a period of .

EXAMPLE Analyze a Bar Graph

- 1 ANIMALS** Make a bar graph of the data. Compare the time it takes for a rabbit to be born to the time it takes for a camel to be born.

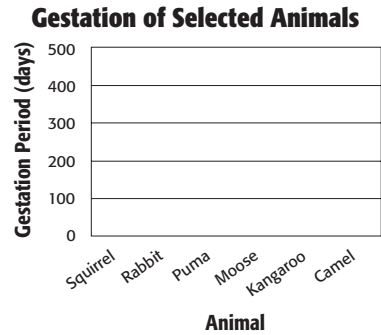
Gestation of Selected Animals	
Animal	Gestation Period (days)
squirrel	44
rabbit	31
puma	90
moose	240
kangaroo	36
camel	406

Source: *The World Almanac*

Step 1 Decide on a scale and . The data include numbers from 31 to 406. So, a scale from to and an interval of is reasonable.

Step 2 Label the horizontal and vertical axes.

Step 3 Draw bars for each animal. The height of each bar shows the gestation period for each animal.



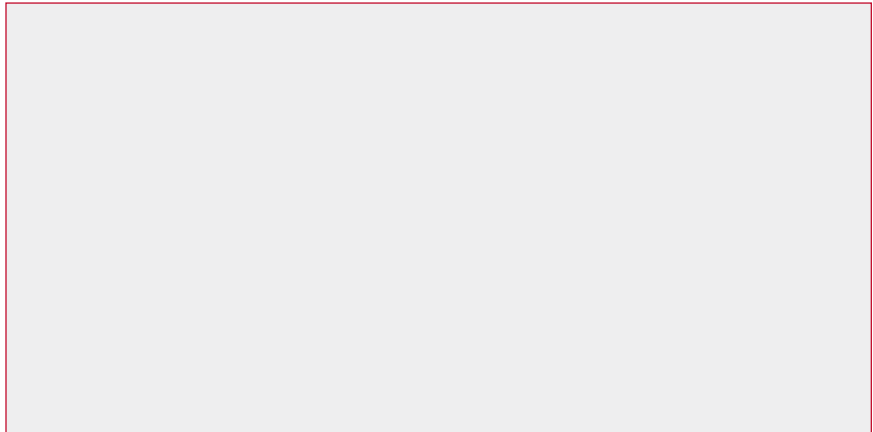
Step 4 Label the graph with a .

It takes about times as many days for a camel to be born as it does for a rabbit to be born.

Check Your Progress

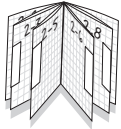
RESTAURANT Make a bar graph of the data. Compare the number of customers at the restaurant on Monday to the number of customers on Saturday.

Customers at Sam's Chili	
Day	Number of Customers
Sunday	120
Monday	50
Tuesday	62
Wednesday	71
Thursday	84
Friday	112
Saturday	150



EXAMPLE Analyze a Line Graph**FOLDABLES****ORGANIZE IT**

Under Lesson 2-2 of your journal, write some ways bar and line graphs are alike and ways they are different. Think about how each kind of graph is constructed.



1 WATER USE Make a line graph of the data at the right. Then describe the change from 1960 to 1995.

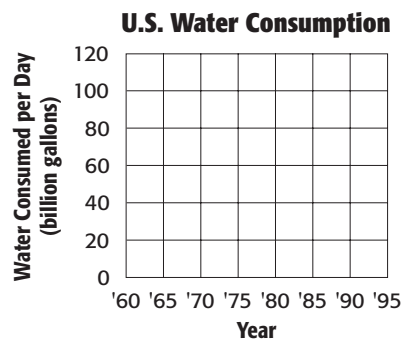
U.S. Water Consumption	
Year	Daily Usage (billion gallons)
1960	61
1965	77
1970	87
1975	96
1980	100
1985	92
1990	94
1995	100

Source: U.S. Census Bureau

Step 1 Decide on the .
The data include numbers from 61 to 100. The scale is and the interval is .

Step 2 Label the horizontal and vertical axes.

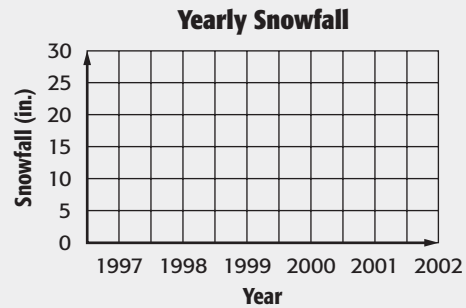
Step 3 Draw and the points for each year.
Each point shows the billions of gallons of water consumed per day.



Step 4 Label the graph with a .
Water consumption increased from 1960 to 1995, with a slight dip in use between 1980 and 1995.

Check Your Progress **SNOWFALL** Make a line graph of the data below. Then describe the change from 1997 to 2002.

Yearly Snowfall	
Year	Total Snowfall (inches)
1997	23
1998	20
1999	18
2000	18
2001	17
2002	24



HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

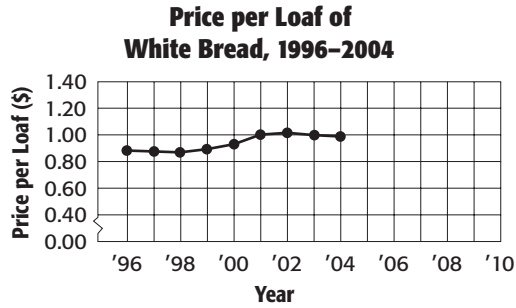
Interpret Line Graphs

EXAMPLES Make Predictions

MAIN IDEA

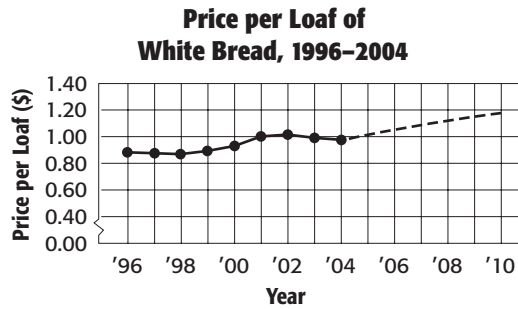
- Interpret line graphs.

1 FOOD PRICES The average retail price for a loaf of white bread for the years 1996–2004 is shown in the graph below. Predict the price of a loaf of white bread in 2010.



Source: U.S. Bureau of Labor Statistics

Continue the graph with a dotted line in the same direction until you reach a vertical position of .



Source: U.S. Bureau of Labor Statistics

Notice that the increase has been fairly steady all along.

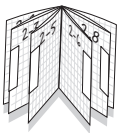
By the graph, you can that the price of a loaf of white bread in 2010 will be about

.

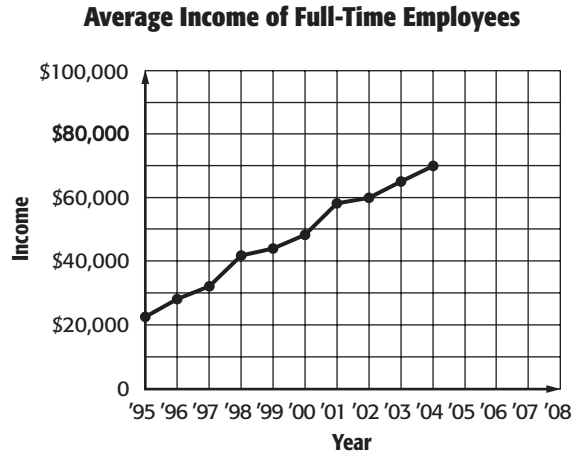
FOLDABLES

ORGANIZE IT

Under Lesson 2-3 of your journal, write a paragraph explaining how line graphs can be used to make predictions.



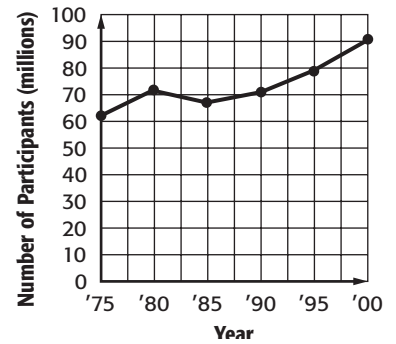
Check Your Progress **INCOME** The average income for full-time employees of a large corporation for the years 1995–2004 is shown in the graph below. Predict the average income in 2008.



1 BOWLING The graph shows the number of participants in bowling from 1975 to 2000. What does the graph tell you about the popularity of bowling?

The popularity of bowling in the mid-nineteen eighties, but it has since in popularity.

Bowling Participants, 1975–2000

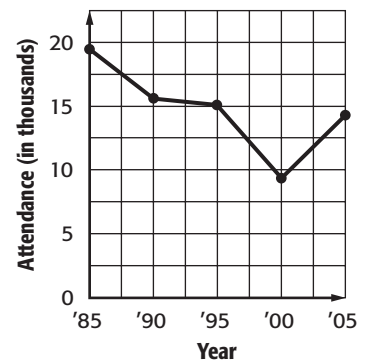


Source: U.S. Census Bureau

Check Your Progress

COUNTY FAIR The graph shows the attendance at a county fair from 1985 to 2005. What does the graph tell you about the popularity of the fair?

County Fair Attendance



HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Display and analyze data using a stem-and-leaf plot.

BUILD YOUR VOCABULARY (pages 27–28)

In a **stem-and-leaf plot**, the data is ordered from to and is organized by place value.

The **stems** of the plot are the written to the left of the vertical line.

The **leaves** of the plot are the digits written to the of the vertical line.

The **key** explains the stems and .

EXAMPLE Construct a Stem-and-Leaf Plot

- 1 WEATHER** Make a stem-and-leaf plot for the data in the table.

Average July Highs (°F) for Selected European Cities

69	72	71	73	76	70
81	67	78	89	74	75
74	66	79	73	88	77

Step 1 Order the data from to .

Step 2 Draw a vertical line and write the tens digits from least to greatest to the left of the line. These digits form the . Since the least value is and the greatest value is , the stems are .

Step 3 Write the digits in order to the of the line with the corresponding stem. The units digits form the .

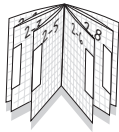
WRITE IT

When is a stem-and-leaf plot an especially useful way to display data?

FOLDABLES

ORGANIZE IT

Under Lesson 2-4 in your journal, explain how to construct a stem-and-leaf plot. Include an example using your own data. Label the parts of the plot.



Step 4 Include a that explains the stems and leaves.

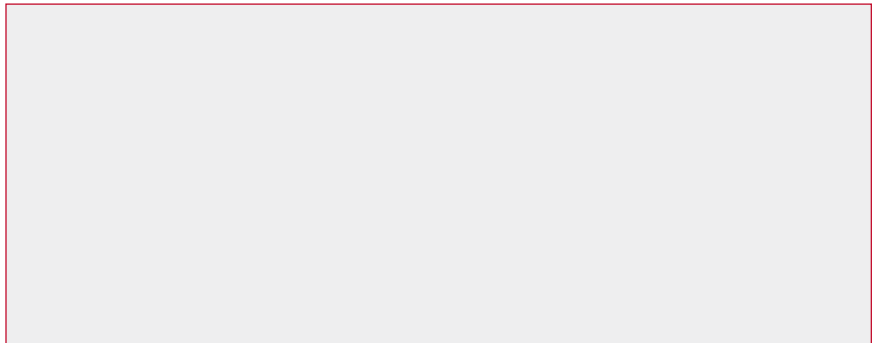
Average July Highs

Stem	Leaf
6	6 7 9
7	0 1 2 3 3 4 4 5 6 7 8 9
8	1 8 9 7 8 = 78

Check Your Progress

DRIVING Make a stem-and-leaf plot for the data in the table.

Speeds of Cars Driving on the Highway (miles per hour)								
65	72	69	58	81	66	61	74	78
70	66	59	74	78	71	68	65	66



EXAMPLE Analyze Plots

1 FOOTBALL The following stem-and-leaf plot shows the total points scored in 39 recent Super Bowls. Write a few sentences analyzing the data.

		Total points								
Stem	Leaf									
2	1 2 3 7 9									
3	0 1 3 7 7 7 8 9 9									
4	1 3 4 4 5 6 7 7 7									
5	0 2 3 4 5 6 6 9									
6	1 5 6 9									
7	5								5 3 = 53	

(continued on the next page)

The point total is and the highest is .

Most of the combined scores are in the ; higher and lower point totals are more unusual.

Check Your Progress

HOTEL RATES The following stem-and-leaf plot shows nightly hotel rates for a sample of hotels in a large metropolitan area. Write a few sentences that analyze the data.

Hotel Rates	
Stem	Leaf
6	2 4 8
7	1 4 5 5 8 9
8	3 3 4 6 7 9 9 9
9	1 3 4 5 8 3 = \$83

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

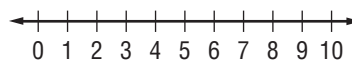
EXAMPLE Display Data in a Line Plot**MAIN IDEA**

- Display, analyze, and interpret data using line plots.

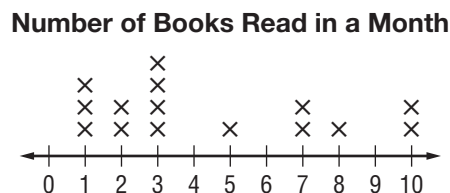
1 BOOKS Make a line plot of the data below.

Number of Books Read in a Month				
1	3	2	1	3
10	1	7	3	10
5	7	2	8	3

Step 1 Draw a line. The smallest value is book and the largest value is books. So, you can use a scale of . Other scales could also be used.



Step 2 Put an X above the number that represents each number of books read. Add a .

**EXAMPLES** Analyze a Line Plot**1** How many students read 10 books?

Locate 10 on the number line and count the number of X's above it. There are students who read books.

3 What is the difference between the greatest and least number of books represented in the line plot?

The least number of books read is . The greatest number of books read is .

$$10 - 1 = 9$$

to find the difference.

The difference is books.

- 4 If the line plot shows the number of books that members of a book club read in one month, write one or two sentences to analyze the data.

Sample answer: Most book club members read between and books.

Check Your Progress

- a. Make a line plot of the data below.

Number of Raffle Tickets Sold			
15	8	10	12
6	12	9	15
8	10	12	13
10	15	6	10

- b. How many students sold 10 raffle tickets?

- c. What is the difference between the greatest and least number of raffle tickets represented in the line plot?

- d. If the line plot shows the number of raffle tickets that students in Miss Ferguson's class sold in one week, write one or two sentences that analyze the data.

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Find the mean of a data set.

BUILD YOUR VOCABULARY (pages 27-28)

The mean, or average, of a set of data is the of the data the number of pieces of data.

EXAMPLES Find Mean

1 VOTES The picture graph shows the current number of electoral votes for selected states. Find the mean number of electoral votes for these four states.

Electoral Votes	✓ = 1 vote
TN	✓✓✓✓✓✓✓✓✓✓
KY	✓✓✓✓✓✓✓✓
VA	✓✓✓✓✓✓✓✓✓✓✓✓
SC	✓✓✓✓✓✓✓✓

Source: FEC

Write and simplify an expression.

$$\text{mean} = \frac{11 + 8 + 13 + 8}{4}$$

←

←

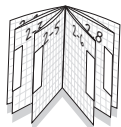
$$= \text{ or }$$

Each state has a mean or of electoral votes.

FOLDABLES

ORGANIZE IT

Under Lesson 2-6 in your Foldable, explain what a measure of central tendency is and explain how to compute the mean of a set of data.



Check Your Progress

PRACTICE The number of days per week that members of the middle school band practice their instrument is shown in the table. Find the mean.

Days of Practice					
6	7	5	5	3	6
5	1	4	6	7	5

BUILD YOUR VOCABULARY (pages 27–28)

An **outlier** is a value that is much or much than the other values in a set of data.

EXAMPLE Determine How Outliers Affect Mean

- 1 BASKETBALL** Identify the outlier in the data. Then find the mean with and without the outlier. Describe how the outlier affects the mean of the data.

Points per Game			
92	102	88	76
78	44	98	101
100	77	108	86

Compared to the other values, 44 is extremely . So, it is an outlier.

mean with outlier

$$= \frac{92 + 102 + 88 + 76 + 78 + 44 + 98 + 101 + 100 + 77 + 108 + 86}{12}$$

$$= \frac{1,050}{12} \text{ or } \input{type="text"}$$

mean without outlier

$$= \frac{92 + 102 + 88 + 76 + 78 + 98 + 101 + 100 + 77 + 108 + 86}{11}$$

$$= \frac{1,006}{11} \text{ or about } 91.5$$

The outlier lowers the mean of the data by points.

Check Your Progress

EXAM SCORES Identify the outlier in the data. Then find the mean of the exam scores with and without the outlier. Describe how the outlier affects the mean of the data.

Exam Scores			
84	75	93	82
84	36	79	91

WRITE IT

Write a general statement that tells how any outlier might affect the mean of a set of data.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Find and interpret the median, mode, and range of a set of data.

BUILD YOUR VOCABULARY (pages 27–28)

The mean, median, and mode are called **measures of central tendency**.

The **median** is the middle number of ordered data. The **mode** is the number that occurs most often.

EXAMPLE Find the Median and the Mode

- 1 NUTRITION** The table shows the Calorie content of various vegetables. Find the median and the mode of the data.

Number of Calories in Selected Vegetables (per serving)		
15	35	50
31	5	25
85	25	20
55	15	40

Source: *The World Almanac*

To find the median, order the data from .

median: 5, 15, 15, 20, 25, 25, 31, 35, 40, 50, 55, 85

$$\frac{\text{[]}}{\text{[]}} = \text{[]} \text{ or } \text{[]}$$

mode: 5, 15, 15, 20, 25, 25, 31, 35, 40, 50, 55, 85

The median is . There are two modes, and .

REMEMBER IT

When there is an even number of data values, the median is the mean of the two middle numbers.

**Check Your Progress**

COLLEGE The table shows the ages of students at a local college. Find the median and the mode of the data.

Student Age			
20	21	19	35
19	20	19	18
24	19	18	23

BUILD YOUR VOCABULARY (pages 27–28)

The **range** of a set of data is the between the and the values of the set.

EXAMPLE Find the Range

- 1 TEMPERATURE** The high temperatures for Las Vegas last week were 65° , 68° , 72° , 65° , 80° , 55° , and 65° . Find the range of the data. Then write a sentence that describes how the data vary.

The highest temperature is . The lowest temperature is . So, the range is – or 25° . The range is relatively small, so the data are fairly close in value.

Check Your Progress

GYMS The number of people attending a gym class Monday through Saturday were 25, 74, 48, 32, 61, and 54. Find the range of the data. Then write a sentence that describes how the data vary.

EXAMPLE

- 3 TEST EXAMPLE** The table shows the number of hot dogs eaten by each contestant at a hot dog eating contest. Which statement is supported by the data in the table?

Number of Hot Dogs Eaten				
22	19	29	32	20
49	23	37	22	22
15	29	18	10	25

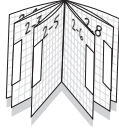
Source: Nathan's Famous

- A** If the number of hot dogs eaten were distributed equally among all the contestants, each player would have eaten 39 hot dogs.
- B** Half the contestants ate more than 20 hot dogs and half ate less than 20 hot dogs.
- C** Most of the contestants ate 22 hot dogs.
- D** The range of the numbers of hot dogs eaten is not very spread out.

FOLDABLES

ORGANIZE IT

Under Lesson 2-7 in your Foldable, explain median, mode, and range are and how to find them.



Read the Item

The answer choices refer to the mean, median, mode, and range.

Solve the Item Find the mean, median, mode, and range.

mean:

$$\frac{22 + 19 + 29 + 32 + 20 + 49 + 23 + 37 + 22 + 22 + 15 + 29 + 18 + 10 + 25}{15}$$

$$= \boxed{} \text{ or } \boxed{}$$

median:

$$10, 15, 18, 19, 20, 22, 22, 22, 23, 25, 29, 29, 32, 37, 49 = \boxed{}$$

$$\text{mode: } \boxed{} \quad \text{range: } \boxed{} - \boxed{} = \boxed{}$$

Determine which measure is referred to in each answer choice.

Choice A refers to the mean, but the correct mean is $\boxed{}$, not 39.

Choice B refers to the median, but the correct median is $\boxed{}$, not 20.

Choice C refers to the mode, which is $\boxed{}$.

Choice D refers to the range, but the range of $\boxed{}$ is spread out.

The correct answer is $\boxed{}$.

Check Your Progress

MULTIPLE CHOICE Which statement is supported by the data in the table?

Average Annual Precipitation (days) in Selected Southwestern U.S. Cities			
59	32	72	26
36	36	52	52
90	43	63	

- F** Half the cities have more than 50 days of precipitation and half have less than 50 days of precipitation.
- G** If the number of days of precipitation were distributed equally among all the cities, each city would have 51 days of precipitation.
- H** The range of the numbers of days of precipitation is not very spread out.
- J** Most of the cities have 36 days of precipitation.

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Selecting an Appropriate Display

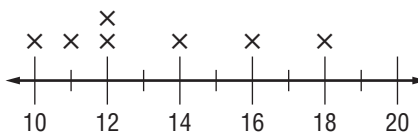
EXAMPLE Find the Range

MAIN IDEA

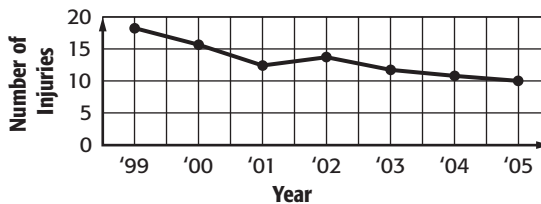
- Select an appropriate display for a set of data.

1 FOOTBALL Which display allows you to see whether or not the number of injuries has steadily declined since 1999?

Number of Injuries on the Football Team



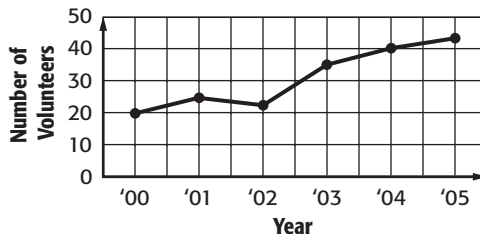
Football Team Injuries, 1999-2005



The shows the change in the number of injuries from year to year, with some decline in the number of injuries.

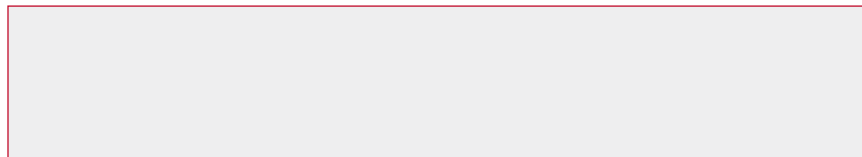
Check Your Progress **VOLUNTEERS** Which display allows you to see whether the number of parent volunteers has increased since 2000?

Parent Volunteers, 2000-2005



Parent Volunteers

Stem	Leaf
1	8
2	3 5
3	5
4	0 4 2 3 = 23



EXAMPLES

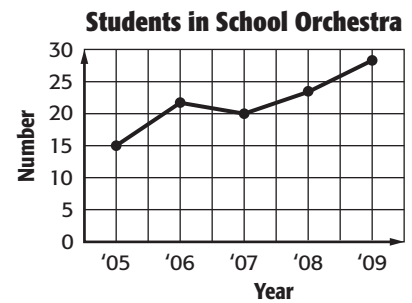
- 1 Select an appropriate type of display to compare the number of students over the years.

Since the table shows change over a period of time, a would be best.

Students in School Orchestra	
Year	Number
2005	15
2006	22
2007	20
2008	23
2009	28

- 3 Make the appropriate display of the data.

Step 1 Draw and label and axes.
Add a .



Step 2 Draw a to represent the number of students for each year. Connect the points.

Check Your Progress

PETS The table shows the number of students who chose each animal as their favorite pet. Select and make an appropriate type of display to compare the number of responses for each animal.

Favorite Pets	
Animal	Number of Students
dog	38
cat	36
fish	12
bird	8
other	20

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Use integers to represent real-world data.

BUILD YOUR VOCABULARY (pages 27–28)

Data that are less than zero are represented by **negative numbers**. Data that are greater than zero are represented by **positive numbers**.

Opposites are numbers that are the distance from zero in opposite directions.

Positive whole numbers, their opposites, and are called **integers**.

EXAMPLES Use Integers to Represent Data

Write an integer to represent each piece of data.

- 1 GROWTH** A height increase of 3 inches.

An *increase* represents a number.

The integer is .

- 1 GOLF** A golfer is seven shots below par.

The word *below* represents a number.

The integer is .

Check Your Progress Write an integer to represent each piece of data.

a. 12 degrees above zero

b. loss of 8 yards.

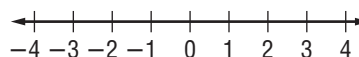
WRITE IT

Write a sentence about another real-life situation when you would use a negative number.

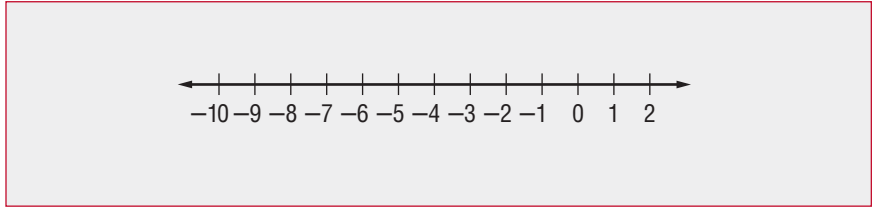
EXAMPLE Graph an Integer on a Number Line

- 1** Graph -2 on a number line.

Draw a number line. Then draw a dot at the location that represents .



Check Your Progress Graph -5 on a number line.



EXAMPLE

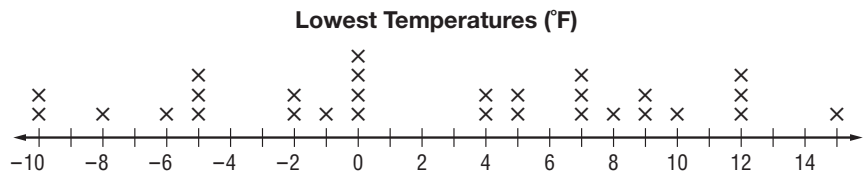
4 WEATHER The table shows the lowest temperatures in some cities and towns. Make a line plot of the data.

Lowest Temperatures (°F)				
-1	0	9	-5	13
15	12	-8	7	-10
5	0	7	-6	5
-10	-5	0	10	12
4	-2	-2	8	12
0	7	4	-5	9

Draw a number line.

would be plotted farthest to the left and farthest to the right.

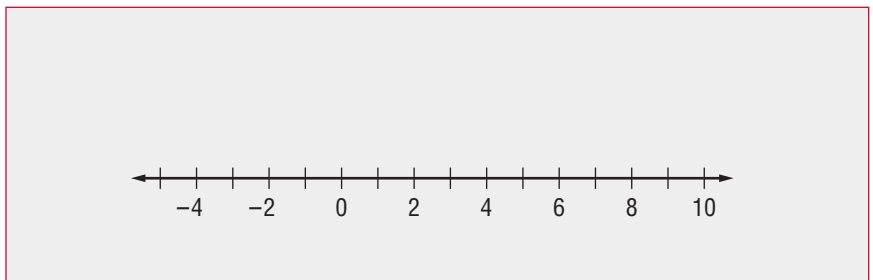
So you can use a scale of to . Put an \times above the number that represents each temperature in the table.



Check Your Progress

VIDEO GAMES The table shows Carter's score each time he played a video game. Make a line plot of the data.

Video Game Scores			
-4	-1	10	5
8	2	-2	4
10	-4	2	10
-2	10	8	-2



HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

STUDY GUIDE**FOLDABLES**

Use your **Chapter 2 Foldable** to help you study for your chapter test.

**VOCABULARY
PUZZLEMAKER**

To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 2, go to:

glencoe.com

**BUILD YOUR
VOCABULARY**

You can use your completed **Vocabulary Builder** (pages 27–28) to help you solve the puzzle.

2-1

Problem-Solving Investigation: Make a Table

1. Complete the frequency table.

Length of Park Trails		
Miles	Tally	Frequency
1–3		<input type="text"/>
<input type="text"/>		<input type="text"/>
<input type="text"/>	<input type="text"/>	3

2-2

Bar Graphs and Line Graphs

Complete each sentence.

2. A bar graph is used to .

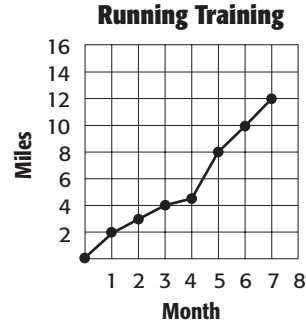
3. A line graph is used to show how a set of data

.

2-3

Interpret Line Graphs

- Extend the graph to show how to predict the number of miles a day Sam likely will be able to run in the eighth month.
- How many miles do you predict Sam will run in the eighth month?



2-4

Stem-and-Leaf Plots

- In a stem-and-leaf plot, the data are ordered from and is organized by .

- Make a stem-and-leaf plot of the set of data on the number of pages read: 23, 42, 28, 45, 42, 30.

Pages Read

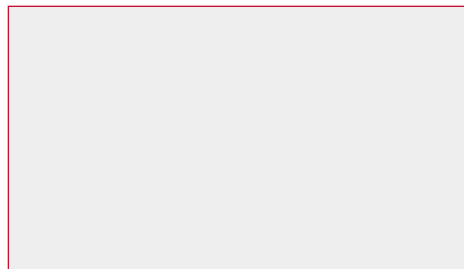
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

2-5

Line Plots

- MONEY** The table below shows the amount of money Jessica saved each week for the past several weeks. Make a line plot of the data.

Amount Saved (\$)				
15	10	25	18	25
10	15	10	15	10



2-6

Mean

- The mean of a set of data is the of the data the number of .

Use the following data to find the means: 11, 12, 31, 9, 12.

10. mean = $\frac{\text{[]}}{\text{[]}}$ = [] or []

11. mean = $\frac{\text{[]}}{\text{[]}}$ = [] or []

2-7

Median, Mode, and Range

Use the following data on the number of miles ran to complete the sentences below: 6, 8, 9, 10, 14, 14, 15.

12. [] is the median because it is the [] number of the ordered data.

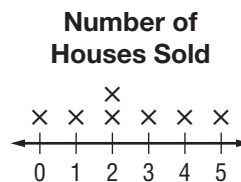
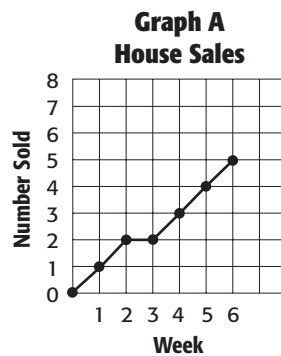
13. [] is the mode because it is the number that occurs [].

14. [] is the range because it is the difference between the [] and the [] values of the set.

2-8

Selecting an Appropriate Display

15. SALES Which display allows you to see whether or not the number of houses sold has steadily increased from Week 1 to Week 6?



Write the type of display described below.

16. shows how many times each number occurs in the data

17. shows the number of items in specific categories

18. shows change over a period of time

19. lists all individual numerical data in a condensed form

2-9

Integers and Graphing

Write an integer to represent each piece of data.

20. Marcos withdrew \$40 from his savings account.

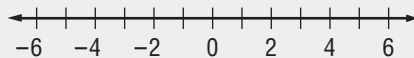
21. The temperature increased 5 degrees.

Graph each integer on a number line.

22. 0

23. 6

24. -3



Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 2.

ARE YOU READY FOR THE CHAPTER TEST?

Check the one that applies. Suggestions to help you study are given with each item.

I completed the review of all or most lessons without using my notes or asking for help.

- You are probably ready for the Chapter Test.
- You may want to take the Chapter 2 Practice Test on page 131 of your textbook as a final check.

I used my Foldables or Study Notebook to complete the review of all or most lessons.

- You should complete the Chapter 2 Study Guide and Review on pages 126–130 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may want to take the Chapter 2 Practice Test on page 131 of your textbook.

I asked for help from someone else to complete the review of all or most lessons.

- You should review the examples and concepts in your Study Notebook and Chapter 2 Foldables.
- Then complete the Chapter 2 Study Guide and Review on pages 126–130 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 2 Practice Test on page 131.

Student Signature

Parent/Guardian Signature

Teacher Signature

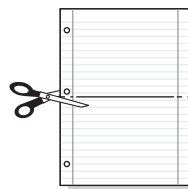
Operations with Decimals



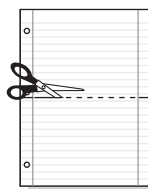
Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin of this Interactive Study Notebook to help you in taking notes.

Begin with two sheets of notebook paper.

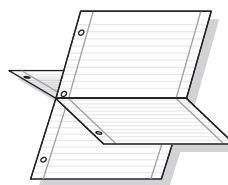
STEP 1 **Fold** one sheet in half. Cut along fold from edges to margin.



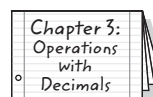
STEP 2 **Fold** the other sheet in half. Cut along fold between margins.



STEP 3 **Insert** first sheet through second sheet and along folds.



STEP 4 **Label** each side of each page with a lesson number and title.



NOTE-TAKING TIP: When you take notes, define new terms and write about the new concepts you are learning in your own words. Write your own examples that use the new terms and concepts.

BUILD YOUR VOCABULARY

This is an alphabetical list of new vocabulary terms you will learn in Chapter 3. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
clustering			
decimal			
equivalent [ih-KWIVH-uh-luhnt] decimals			
expanded form			
front-end estimation			
inequality			
standard form			

MAIN IDEA

- Represent decimals in word form, standard form, and expanded form.

BUILD YOUR VOCABULARY (page 56)

Numbers that have digits in the place and beyond are called **decimals**.

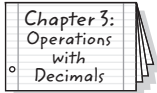
Standard form is the usual way to write a .

Expanded form is a of the products of each digit and its .

FOLDABLES

ORGANIZE IT

Under Lesson 3-1 of your Foldable, write what you know about decimals and what you would like to know.



EXAMPLE Write a Decimal in Word Form

- 1 Write 102.056 in word form.

Place-Value Chart

1000	100	10	1	0.1	0.01	0.001	0.0001
thousands	hundreds	tens	ones	tenths	hundredths	thousandths	ten-thousandths
0	1	0	2	0	5	6	0

The last digit, 6, is in the thousandths place.

one hundred two

and

fifty-six thousandths

102.056 is one two and thousandths.

Check Your Progress

Write 230.108 in word form.

EXAMPLE Standard Form and Expanded Form**REMEMBER IT**

When you read aloud a decimal, use the word and for the decimal point. For example, read 62.043 as *sixty-two* and *forty-three thousandths*.

1 Write *seventy-six and one hundred three thousandths* in standard form and in expanded form.

Place-Value Chart

1000	100	10	1	0.1	0.01	0.001	0.0001
thousands	hundreds	tens	ones	tenths	hundredths	thousandths	ten-thousandths
0	0	7	6	1	0	3	0

Standard form: 76.103

Expanded form: $(\square \times 10) + (\square \times 1) + (\square \times 0.1)$
 $+ (\square \times 0.01) + (\square \times 0.001)$

Check Your Progress

Write *fifty-nine and sixty-two thousandths* in standard form and in expanded form.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Compare and order decimals.

BUILD YOUR VOCABULARY (page 56)

An **inequality** is a mathematical sentence indicating that two quantities are not .

EXAMPLE Compare Decimals

- 1 BASEBALL** The table below lists the final winning percents for several American League baseball teams in a recent year. Use $>$ or $<$ to compare New York's percent with Cleveland's percent.

Team	Percent Standing
New York	0.594
Boston	0.509
Cleveland	0.562
Detroit	0.407

METHOD 1 Use place value.

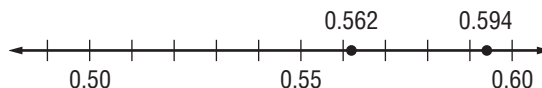
First, line up the decimal points.

New York: 0.594
Cleveland: 0.562

Then, starting at the left, find the first place the digits differ. Compare the digits.

Since $9 > 6$, $0.594 > 0.562$.

METHOD 2 Use a number line.

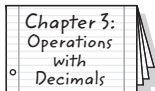


Numbers to the right are greater than numbers to the left.

Since 0.594 is to the right of 0.562, $0.594 > 0.562$.

FOLDABLES**ORGANIZE IT**

Under Lesson 3-2 of your Foldable, describe two ways to compare decimals. Be sure to include examples.



Check Your Progress **EXAMS** In Mr. Smith’s math class, 29.65% of the students earned a grade of “A” at the end of the semester. In Mrs. Dempsey’s class, 29.85% of the students earned a grade of “A” at the end of the semester. Use $>$ or $<$ to compare the percent in Mr. Smith’s class with the percent in Mrs. Dempsey’s class.

BUILD YOUR VOCABULARY (page 56)

Decimals that name are called equivalent decimals.

EXAMPLE Order Decimals

1 Order 25, 25.1, 24.36, and 25.03 from least to greatest.

REMEMBER IT



To check the reasonableness of the order of the numbers, you can use a number line.

First, line up the decimal points.

25	→	25.00
25.1	→	25.10
24.36	→	24.36
25.03	→	25.03

Next, annex zeros so that all numbers have the same final place value.

Finally, compare and order using place value.

The order from least to greatest is 24.36, , 25.03, and .

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Check Your Progress Order 71, 71.04, 70.89, and 71.4 from least to greatest.

MAIN IDEA

- Round decimals.

KEY CONCEPT

Rounding Decimals To round a decimal, first underline the digit to be rounded. Then look at the digit to the right of the place being rounded.

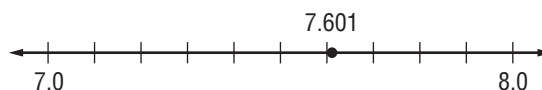
- If the digit is 4 or less, the underlined digit remains the same.
- If the digit is 5 or greater, add 1 to the underlined digit.
- After rounding, drop all digits after the underlined digit.

EXAMPLE Round Decimals**1 Round 7.601 to the nearest whole number.**

Underline the digit to be rounded. In this case, the ones place.

7.601

Then look at the digit to the right. Since 6 is greater than 5, add one to the underlined digit.



On the number line, 7.601 is closer to 8.0 than .

To the nearest whole number, 7.601 rounds to .

Check Your Progress

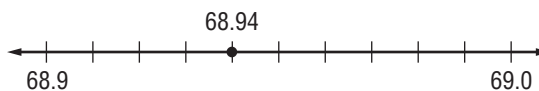
Round 4.321 to the nearest whole number.

1 Round 68.94 to the nearest tenth.

Underline the digit to be rounded. In this case, the digit is in the tenths place.

68.94

Then look at the digit to the right. Since 4 is less than 5, the digit 9 stays the same.



On the number line, 68.94 is closer to than 69.0.

To the nearest tenth, 68.94 rounds to .

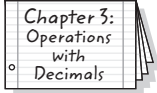
Check Your Progress

Round 125.38 to the nearest tenth.

FOLDABLES

ORGANIZE IT

Under Lesson 3-3 of your Foldable, explain how to round \$125.657 to the nearest cent.



EXAMPLE

3 BEANS A can of black beans costs \$0.0726 per ounce. To the nearest cent, how much does an ounce of black beans cost?

There are cents in a dollar. So, rounding to the nearest cent means to round to the nearest .

Underline the digit in the hundredths place.

0.0726

Then look at the digit to the right. Since 2 is less than 5, the digit 7 stays the same.

To the nearest cent, an ounce of beans costs .

Check Your Progress

CEREAL The price per ounce for a box of cereal is shown as \$0.1275 on the tag in the grocery store. How much is this to the nearest cent?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Estimating Sums and Differences

EXAMPLES Use Estimation to Solve Problems

MAIN IDEA

- Estimate sums and differences of decimals.

POPULATION The table below shows the population of the American colonies in 1770.

Colony	Population (thousands)	Colony	Population (thousands)
Connecticut	183.9	New York	162.9
Delaware	35.5	North Carolina	197.2
Georgia	23.4	Pennsylvania	240.1
Maryland	202.6	Rhode Island	58.2
Massachusetts	235.3	South Carolina	124.2
New Hampshire	62.4	Virginia	447.0
New Jersey	117.4		

Source: *The World Almanac*

1 Estimate the total population of North Carolina and South Carolina.

Round each number to the nearest hundred for easier adding.

$$\begin{array}{r}
 197.2 \longrightarrow \boxed{} \\
 + 124.2 \longrightarrow + \boxed{} \\
 \hline
 \boxed{}
 \end{array}
 \qquad
 \begin{array}{l}
 197.2 \text{ rounds to } \boxed{}. \\
 124.2 \text{ rounds to } \boxed{}.
 \end{array}$$

There were about $\boxed{}$ thousand people in North Carolina and South Carolina.

2 Estimate how many more people lived in Rhode Island than in Georgia in 1770.

Round each number to the nearest ten for easier subtracting.

$$\begin{array}{r}
 58.2 \longrightarrow \boxed{} \\
 + 23.4 \longrightarrow - \boxed{} \\
 \hline
 40
 \end{array}
 \qquad
 \begin{array}{l}
 58.2 \text{ rounds to } \boxed{}. \\
 23.4 \text{ rounds to } \boxed{}.
 \end{array}$$

There were about 40 thousand more people.

Check Your Progress Refer to the table that shows the population of the American colonies in 1770.

- a. Estimate the total number of people in Pennsylvania and New Jersey in 1770.

- b. Estimate how many more people were in Massachusetts than in Connecticut.

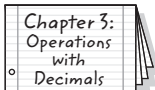
BUILD YOUR VOCABULARY (page 56)

Clustering is an estimation method in which a group of numbers that are in value are to the same number.

FOLDABLES

ORGANIZE IT

Under Lesson 3-4 of your Foldable, describe a situation in which you estimated a decimal sum or difference.



EXAMPLE

- TEST EXAMPLE** Sid feeds a vitamin-water solution to his guinea pigs. The table shows the amount of solution the guinea pigs drank over a period of four days this week. Which is the closest to the amount of solution the guinea pigs drank?

Amount of Vitamin-Water Solution Guinea Pigs Drink Each Day	
Day	Amount (ounces)
Monday	21.8
Tuesday	19.1
Wednesday	18.9
Thursday	22.0

- A 40 ounces B 60 ounces C 80 ounces D 100 ounces

Read the Item

The addends are clustered around . Round each decimal to .

- 21.8 → 20
- 19.1 → 20
- 18.9 → 20
- 22.0 → 20

Solve the Item

Multiplication is repeated addition. So, a good estimate is 4×20 , or . The answer is .

WRITE IT

When should you use clustering to estimate?

Check Your Progress

MULTIPLE CHOICE During the month of February, Jonathon spent \$14.78 on gasoline the first week, \$15.35 on gasoline during the second week, \$15.94 on gasoline during the third week, and \$14.07 on gasoline during the fourth week. Which is closest to the total amount Jonathon spent on gasoline during February?

- F** \$35
- G** \$50
- H** \$60
- J** \$100

BUILD YOUR VOCABULARY (page 56)

When you use front-end estimation, you the values of the digits in the front place.

EXAMPLE Use Front-End Estimation

1 Estimate $14.8 + 55.9$ using front-end estimation.

Add the digits.

$$\begin{array}{r} 14.8 \longrightarrow 10.0 \\ + 55.9 \longrightarrow + 50.0 \\ \hline \end{array}$$

Using front-end estimation, $14.8 + 55.9$ is about .

Check Your Progress

Estimate $32.7 + 65.1$ using front-end estimation.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

EXAMPLES Add and Subtract Decimals**MAIN IDEA**

- Add and subtract decimals.

REVIEW IT

Explain how to estimate the sum of two decimals using rounding. (Lesson 3-4)

1 Find the sum of 75.6 and 21.3.

Estimate $75.6 + 21.3 \approx 76 + \square$ or \square

75.6 Line up the decimal points.

+ 21.3

\square

Add as with whole numbers.

The sum of 75.6 and 21.3 is \square .

Compare the answer to the estimate. The answer is reasonable.

2 Find $10.756 - 6.238$.

Estimate $10.756 - 6.238 \approx \square - 6$ or \square

10.756 Line up the decimal points.

- 6.238

\square

Subtract as with \square numbers.

So, $10.756 - 6.238 = \square$.

Check for Reasonableness: $4.518 \approx 5$ ✓

Check Your Progress

a. Find the sum of 34.6 and 53.2.

b. Find $24.758 - 18.315$.

EXAMPLE Annex Zeros**WRITE IT**

Explain in your own words how to find the difference between a whole number and a decimal.

3 Find $8 - 1.74$.

Estimate $8 - 1.74 \approx$ $-$ or

$$\begin{array}{r} 8.00 \\ - 1.74 \\ \hline \end{array}$$

Annex zeros so that both numbers have the same place value.

So, $8 - 1.74 =$. Check for Reasonableness: $6.26 \approx 6$ ✓

Check Your Progress Find $9 - 3.28$.
EXAMPLE

4 **WORLD RECORDS** The table shows the diameters of three of the largest food items ever created. What is the difference, in meters, between the world's largest pizza and the largest pancake?

Largest Food Items		
Food	Country	Diameter (meters)
pizza	South Africa	37.4
pecan pie	United States	15.24
pancake	United Kingdom	15.01

Source: Guinness World Records

Estimate $37.4 - 15.01 \approx$ $-$ or

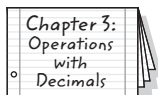
$$\begin{array}{r} 37.40 \\ - 15.01 \\ \hline \end{array}$$

Line up the decimal points. Annex a zero.

Subtract as with whole numbers.

FOLDABLES**ORGANIZE IT**

Under Lesson 3-5 of your Foldable, write a few sentences explaining how adding and subtracting decimals is like adding and subtracting whole numbers.



The largest pizza is meters larger than the largest pancake.

Check for Reasonableness: $22.39 \approx 22$ ✓

Check Your Progress

MOVIES The local movie theater sells an average of 65.8 tickets on Thursdays and an average of 288.9 tickets on Saturdays. How many more tickets are sold on Saturdays?

REVIEW IT

What is an algebraic expression? How do you evaluate an algebraic expression? (Lesson 1-5)

EXAMPLE Evaluate an Expression

5 ALGEBRA Evaluate $a - b$ if $a = 10.75$ and $b = 4.8$.

$a - b = 10.75 - 4.8$ Replace a with 10.75 and b with 4.8.

Estimate $10.75 - 4.8 \approx$ - or

10.75	Line up the <input style="width: 150px; height: 20px;" type="text"/> .
- 4.80	Annex a <input style="width: 50px; height: 20px;" type="text"/> .
<input style="width: 50px; height: 20px;" type="text"/>	Subtract as with <input style="width: 50px; height: 20px;" type="text"/> numbers.

The value is . Check for Reasonableness: $5.95 \approx 6$ ✓

Check Your Progress

ALGEBRA Evaluate $m + n$ if $m = 40.62$ and $n = 29.51$.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

EXAMPLES Multiply Decimals

MAIN IDEA

- Estimate and find the product of decimals and whole numbers.

1 Find 18.9×4 .

METHOD 1 Use estimation.

Round 18.9 to .

$18.9 \times 4 \rightarrow$ $\times 4$ or

$$\begin{array}{r} 33 \\ 18.9 \\ \times 4 \\ \hline \end{array}$$

Since the estimate is , place the decimal point after the .

1 Find 0.56×7 .

METHOD 2 Count decimal places.

0.56 \leftarrow decimal places

Count decimal places from the right.

EXAMPLES Annex Zeros in the Product

1 Find 3×0.016 .

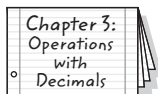
0.016 \leftarrow decimal places

Annex a zero on the left of 48 to make decimal places.

FOLDABLES™

ORGANIZE IT

Under Lesson 3-6 of your Foldable, write how to estimate the product of a whole number and a decimal. Include at least one example in which you must annex a zero in the product.



4 ALGEBRA Evaluate $5g$ if $g = 0.0091$.

$5g = 5 \times$ Replace g with .

$$\begin{array}{r} 0.0091 \\ \times \quad 5 \\ \hline \end{array}$$

← decimal places

Annex a zero to make decimals.

Check Your Progress

a. Find 12.6×8 .

b. Find 0.83×4 .

c. Find 4×0.023 .

d. Evaluate $3x$ if

$$x = 0.0062.$$

EXAMPLE Multiply by 10, 100, or 1,000

5 MENTAL MATH Find 3.25×100 .

Move the decimal point to the right the same number of zeros that are in 100, or places.

$$3.25 \times 100 = 3.25 \text{ or } \text{$$

Check Your Progress **MENTAL MATH** Find $2.4 \times 1,000$.

**HOMEWORK
ASSIGNMENT**

Page(s):

Exercises:

EXAMPLES Multiply Decimals**MAIN IDEA**

- Multiply decimals by decimals.

1 Find 8.3×2.9 .

Estimate $8.3 \times 2.9 \rightarrow$ \times or

$$\begin{array}{r} 8.3 \\ \times 2.9 \\ \hline 747 \\ 166 \\ \hline \end{array}$$

\leftarrow decimal places

The product is . Compared to the estimate, the product is reasonable.

2 Find 0.12×5.3 .

Estimate $0.12 \times 5.3 \rightarrow$ \times or

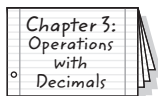
$$\begin{array}{r} 0.12 \\ \times 5.3 \\ \hline 36 \\ 60 \\ \hline \end{array}$$

\leftarrow decimal places

The product is . Compared to the estimate, the product is reasonable.

FOLDABLES™**ORGANIZE IT**

Under Lesson 3-7 of your Foldable, outline the steps for multiplying decimals.

**EXAMPLE** Evaluate an Expression**1** ALGEBRA Evaluate $6.8r$ if $r = 0.92$.

$6.8r = 6.8 \times$ Replace r with .

$$\begin{array}{r} 0.92 \\ \times 6.8 \\ \hline 736 \\ 552 \\ \hline \end{array}$$

\leftarrow decimal places

REMEMBER IT

There are several ways to show multiplication. The expression $6.8r$ means $6.8 \times r$.



WRITE IT

How would you find the number of decimal places for the product of a number with two decimal places and a number with three decimal places?

Check Your Progress Multiply.

a. 3.8×2.3

b. 0.31×2.9

c. Evaluate $2.9w$ if $w = 0.046$.

EXAMPLE

MONEY Carmen earns \$4.60 an hour working part-time as a painter's assistant. She worked a total of 15.75 hours one week. How much money did Carmen earn?

Estimate $15.75 \times 4.6 \rightarrow$ \times or

15.75	←	two decimal places
$\times 4.60$	←	two decimal places
94500		
6300		
72.4500	←	

The product has four decimal places. You can drop the two zeros at the end because $72.4500 = 72.45$.

Carmen earned .

Check Your Progress MONEY Susan earns \$5.80 an hour working at a local video store. She worked a total of 28.25 hours one week. How much money did she earn?

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

Dividing Decimals by Whole Numbers

MAIN IDEA

- Divide decimals by whole numbers.

EXAMPLE Divide a Decimal by a 1-Digit Number

1 Find $45.9 \div 3$.

Estimate $\div 3 =$

Place the decimal point directly above the decimal point in the dividend.

$$\begin{array}{r} 3 \overline{)45.9} \\ -3 \\ \hline 15 \\ -15 \\ \hline 09 \\ -9 \\ \hline 0 \end{array}$$

$45.9 \div 3 =$. Compared to the estimate, the quotient is reasonable.

EXAMPLE Divide a Decimal by a 2-Digit Number

1 Find $8.69 \div 22$.

Estimate $10 \div 20 = 0.5$

Place the decimal point.

$22 \overline{)8.690}$

Annex a zero and continue dividing.

209

110

0

$8.69 \div 22 =$. Compared to the estimate, the quotient is reasonable.

Check Your Progress Divide.

a. $50.8 \div 4$

b. $8.64 \div 24$

ORGANIZE IT

Under Lesson 3-7 of your Foldable, describe where to place the decimal point when dividing a decimal by a whole number.

Chapter 3:
Operations
with
Decimals

EXAMPLE

3 TEST EXAMPLE During a science experiment, Nita measured the mass of four unknown samples. Her data table is shown below.

Sample 1	6.23 g
Sample 2	5.81 g
Sample 3	5.93 g
Sample 4	6.47 g

What is the mean mass in grams of the four samples?

Read the Item

To find the mean mass of the four samples, add to find the total mass then divide the sum by 4.

Solve the Item

$$6.23 + 5.81 + 5.93 + 6.47 = \boxed{}$$

Place the decimal point.

$$\begin{array}{r} 4 \overline{)24.44} \\ \underline{-24} \\ 04 \\ \underline{-04} \\ 04 \\ \underline{-04} \\ 0 \end{array}$$

Fill in the Grid

			6	.	1	1
0	0	0	0		0	0
1	1	1	1		●	●
2	2	2	2		2	2
3	3	3	3		3	3
4	4	4	4		4	4
5	5	5	5		5	5
6	6	6	●		6	6
7	7	7	7		7	7
8	8	8	8		8	8
9	9	9	9		9	9

The mean mass of the four samples is grams.

Check Your Progress **GRIDDED RESPONSE**

Mrs. Lindley's class is having a pizza party. The total cost of the pizzas is to be divided equally among 15 people. If the cost is \$45.60, find the cost each person will pay in dollars.

				.		
0	0	0	0		0	0
1	1	1	1		1	1
2	2	2	2		2	2
3	3	3	3		3	3
4	4	4	4		4	4
5	5	5	5		5	5
6	6	6	6		6	6
7	7	7	7		7	7
8	8	8	8		8	8
9	9	9	9		9	9

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

EXAMPLE Divide by Decimals**MAIN IDEA**

- Divide decimals by decimals.

1 Find $59.4 \div 3.6$.Estimate \div = Multiply by to make a whole number.

$$\begin{array}{r} 3.6 \overline{)59.4} \end{array}$$

Multiply by the same number, .

$$\begin{array}{r} \overline{)594.0} \\ 36 \overline{)594.0} \end{array}$$

Place the decimal point.

Divide as with whole numbers.

$$\begin{array}{r} \overline{)594.0} \\ - \\ \hline 234 \end{array}$$

$$\begin{array}{r} \overline{)594.0} \\ - \\ \hline 180 \end{array}$$

Annex a zero to continue.

$$\begin{array}{r} \overline{)594.0} \\ - \\ \hline \end{array}$$

59.4 divided by 3.6 is . Compare to the estimate.**Check** $\times 3.6 = 59.4$ **REMEMBER IT**

You can check the solution to a division problem by multiplying the quotient by the divisor.

Check Your ProgressFind $72.9 \div 5.4$.

EXAMPLES Zeros in the Quotient and Dividend

1 Find $8.1 \div 0.054$.

$$0.054 \overline{)8.100}$$

Multiply each decimal by .

Place the decimal point.

$$54 \overline{)8100.}$$

$$\begin{array}{r} - \\ \hline \end{array}$$

$$270$$

$$\begin{array}{r} - \\ \hline \end{array}$$

$$00$$

Write a zero in the ones place of the quotient because $0 \div 54 =$.

So, $8.1 \div 0.054 =$.

Check $\times 0.054 = 8.1$

2 Find $0.052 \div 1.3$.

$$1.3 \overline{)0.052}$$

Multiply each decimal by .

Place the decimal point.

$$13 \overline{)0.52}$$

$$-0$$

$$05$$

$$-00$$

$$52$$

$$-52$$

$$0$$

13 does not go into 5, so write a in the tenths place.

So, $0.052 \div 1.3$ is .

Check $\times 1.3 = 0.052$

Check Your Progress Divide.

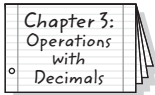
a. $81.9 \div 0.63$

b. $0.072 \div 1.2$

FOLDABLES

ORGANIZE IT

Under Lesson 3-9 of your Foldable, compare and contrast dividing a decimal by a decimal and dividing a decimal by a whole number.



REMEMBER IT

When you are rounding to the nearest tenth, you can stop dividing when there is a digit in the hundredths place.

EXAMPLE Round Quotients

STOCK Leon bought a stock at \$42.88 per share. If he spent \$786.85, how many shares did he buy? Round to the nearest tenth.

Find $\$786.85 \div \42.88 .

Multiply the divisor and the dividend by .

$$\begin{array}{r}
 \overline{)786.85} \longrightarrow 4288 \overline{)78685.00} \\
 \underline{ } \\
 35805 \\
 \underline{ } \\
 15010 \\
 \underline{ } \\
 21460 \\
 \underline{ } \\
 20
 \end{array}$$

To the nearest tenth, $786.85 \div 42.88 = \text{}$. So, Leon was able to buy about shares.

Check Your Progress

STOCK Kyle bought a stock at \$23.35 per share. If he spent \$771.28, how many shares did he buy? Round to the nearest tenth.

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Problem-Solving Investigation: Reasonable Answers

MAIN IDEA

- Determine reasonable answers to solve problems.

EXAMPLE Determine a Reasonable Answer

BIRDS The table below shows the wingspans of some North American birds of prey. What is the wingspan of the Peregrine falcon in feet?

Birds of Prey	Wingspan (in.)
Bald Eagle	54
Peregrine Falcon	40
Great Horned Owl	55
Barn Owl	44

UNDERSTAND You know the length in inches. You need to find a reasonable length in .

PLAN 12 inches equals foot. So, estimate the quotient of 40 and 12 to find a reasonable length.

SOLVE $40 \div 12 \rightarrow$ \div or

A reasonable length is .

CHECK Since $40 \div 12$ or $\frac{40}{12} = \frac{10}{3}$ and $\frac{10}{3} = 3\frac{1}{3}$,

the answer of is reasonable.


Check Your Progress **FISH** A sailfish can swim 68 miles per hour. Which is a more reasonable estimate for the number of miles a sailfish could travel in 15 minutes: 17 or 25? Explain your reasoning.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

STUDY GUIDE

	VOCABULARY PUZZLEMAKER	BUILD YOUR VOCABULARY
Use your Chapter 3 Foldable to help you study for your chapter test.	To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 3, go to: glencoe.com	You can use your completed Vocabulary Builder (page 56) to help you solve the puzzle.

3-1

Representing Decimals

1. *Three hundred fifty-two and two tenths* is a number written in .
2. Write *forty-six and nine hundredths* in standard form and in expanded form.

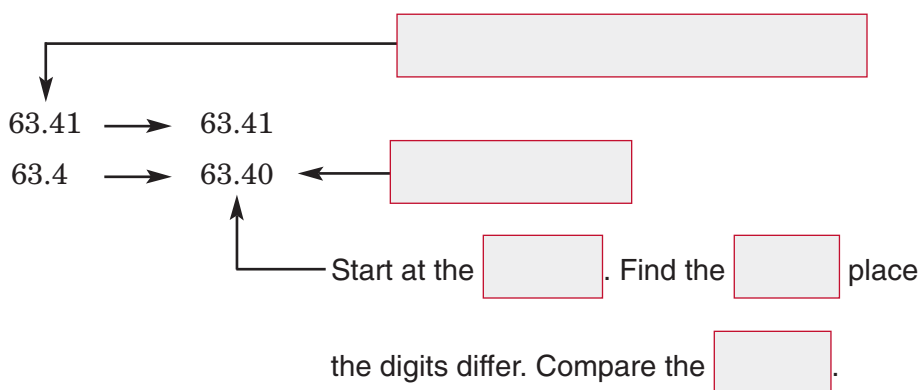
Standard Form:

Expanded Form: $(\text{ } \times 10) + (\text{ } \times 1) + (\text{ } \times 0.1)$
 $+ (\text{ } \times 0.01)$

3-2

Comparing and Ordering Decimals

3. Describe each step to compare 63.41 and 63.4. Then write $>$ or $<$.

So, 63.41 63.4.

3-3

Rounding Decimals

Complete each sentence describing how to round a decimal.

4. First, underline to be rounded.
5. Then, look at the digit to the of the place being rounded.
6. If the digit is 4 or less, the underlined digit .
7. If the digit is 5 or greater, add to the underlined digit.

Round each decimal to the indicated place-value position.

8. 0.3045; thousandths
9. 26.1345; hundredths

3-4

Estimating Sums and Differences

10. Below is a difference estimated by rounding to the nearest tens. Describe in words each step shown.

$54.3 \rightarrow 50$	
$\underline{-28.7} \rightarrow \underline{-30}$	
<input style="width: 40px; height: 25px;" type="text"/>	Subtract <input style="width: 20px; height: 20px;" type="text"/> from <input style="width: 20px; height: 20px;" type="text"/>
	mentally and add 0 since both
	numbers are rounded to the <input style="width: 40px; height: 20px;" type="text"/> .

11. Below is a difference estimated by using front-end estimation. Describe in words the step shown.

$68.5 \rightarrow 60.0$
$\underline{-34.9} \rightarrow \underline{-30.0}$
$\quad\quad\quad 30.0$

12. Below is a sum estimated by using clustering. Describe in words each step shown.

83.20	→	80	
80.14	→	80	
79.55	→	80	
+ 80.09	→	+ 80	

3-5

Adding and Subtracting Decimals

13. Explain how to find $35.6 - 4.2$.

Add or subtract.

14. $57.1 + 21.89$

15. $48 - 12.36$

16. $75 - 0.104$

17. Evaluate $a + b$ if $a = 3.968$ and $b = 56.47$.

3-6

Multiplying Decimals by Whole Numbers

Multiply.

18. 9×4.3

19. 14×25.01

20. 7×0.004

21. What does it mean to annex zeros in the product? Why is it sometimes necessary to do this?

3-7

Multiplying Decimals

Match each product with an answer on the right. An answer may be used more than once.

22. 50.4×0.6

a. 302.4

23. 5.04×60

b. 30.24

24. 0.504×0.6

c. 0.3024

25. **JELLYBEANS** What is the cost of 1.2 pounds of jellybeans if each pound costs \$2.05 per pound?

3-8

Dividing Decimals by Whole Numbers

Complete each division problem.

26.
$$\begin{array}{r} \square \\ 8 \overline{)240.8} \\ \underline{\square} \\ 00 \\ \underline{-0} \\ \square \\ \underline{\square} \\ \square \\ \underline{\square} \\ \square \end{array}$$

27.
$$\begin{array}{r} \square \\ 25 \overline{)8.75} \\ \underline{-75} \\ \square \\ \underline{-125} \\ \square \end{array}$$

28. **HAMSTERS** Find the mean of the following weights of hamsters, rounded to the nearest tenth: 20.3 oz., 21.2 oz., 24.6 oz., 0.9 oz., 22.7 oz.

3-9

Dividing by Decimals

Divide.

29. $1.2 \overline{)84.54}$

30. $58.36 \overline{)145.9}$

31. $7.2 \overline{)48.96}$

3-10

Problem-Solving Investigation: Reasonable Answers

Determine a reasonable answer.

32. **BOOKS** Katie has three books in her backpack. Which is a reasonable estimate for the mass of the three books in Katie's backpack: 60 grams or 6 kilograms? Explain your reasoning.

Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 3.

ARE YOU READY FOR THE CHAPTER TEST?

Check the one that applies. Suggestions to help you study are given with each item.

I completed the review of all or most lessons without using my notes or asking for help.

- You are probably ready for the Chapter Test.
- You may want to take the Chapter 3 Practice Test on page 191 of your textbook as a final check.

I used my Foldables or Study Notebook to complete the review of all or most lessons.

- You should complete the Chapter 3 Study Guide and Review on pages 186–190 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may want to take the Chapter 3 Practice Test on page 191.

I asked for help from someone else to complete the review of all or most lessons.

- You should review the examples and concepts in your Study Notebook and Chapter 3 Foldables.
- Then complete the Chapter 3 Study Guide and Review on pages 186–190 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 3 Practice Test on page 191.

Student Signature

Parent/Guardian Signature

Teacher Signature

Fractions and Decimals



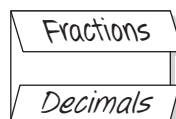
Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin of this Interactive Study Notebook to help you in taking notes.

Begin with one sheet of $8\frac{1}{2}$ " \times 11" paper.

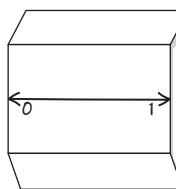
STEP 1 **Fold** top of paper down and bottom of paper up as shown.



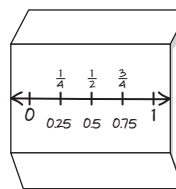
STEP 2 **Label** the top fold Fractions and the bottom fold Decimals.



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



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



NOTE-TAKING TIP: As you read the chapter, take notes about specific examples in your daily life involving fractions and decimals. For example, you might write about how decimals help you keep track of money.

BUILD YOUR VOCABULARY

This is an alphabetical list of new vocabulary terms you will learn in Chapter 4. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
common factor			
common multiples			
coordinate plane			
equivalent fractions			
graph			
greatest common factor (GFC)			
improper fraction			
least common denominator (LCD)			
least common multiple (LCM)			

Vocabulary Term	Found on Page	Definition	Description or Example
mixed numbers			
multiple			
ordered pair			
origin			
proper fraction			
rational number			
simplest form			
Venn diagram			
x -axis			
x -coordinate			
y -axis			
y -coordinate			

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MAIN IDEA

- Find the greatest common factor of two or more numbers.

BUILD YOUR VOCABULARY (pages 86–87)

Venn diagrams use overlapping circles to show

elements. Factors that are shared by

or more numbers are called **common factors**.

The of the common factors of two or more numbers is the **greatest common factor (GCF)** of the numbers.

EXAMPLE Find the GCF by Listing Factors**1** Find the GCF of 36 and 48.

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

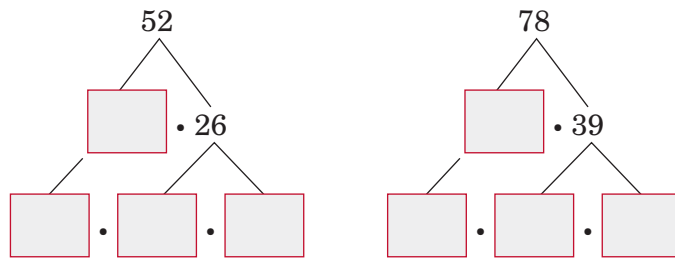
36: $1 \times 36, 2 \times 18, 3 \times 12, 4 \times 9, 6 \times 6$
 $\rightarrow 1, 2, 3, 4, 6, 9, 12, 18, 36$

48: $1 \times 48, 2 \times 24, 3 \times 16, 4 \times 12, 6 \times 8$
 $\rightarrow 1, 2, 3, 4, 6, 8, 12, 16, 24, 48$

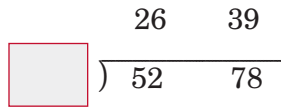
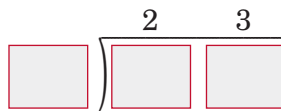
The common factors are and the
 greatest of these is .

So, the greatest common factor or GCF of 36 and 48 is .

Check Your Progress Find the GCF of 45 and 75.

EXAMPLE Find the GCF by Using Prime Factors**1** Find the GCF of 52 and 78.**METHOD 1** Write the prime factorization.

2 and 13 are common factors.

METHOD 2 Divide by prime numbers.

Divide both 52 and 78 by 2.
 Then divide the quotients by 13.

Using either method, the common prime factors are

 and . So, the GCF of 52 and 78 is

 × or .
Check Your Progress Find the GCF of 64 and 80.**REMEMBER IT** 

Prime factorization is writing a composite number as a product of prime numbers.

EXAMPLES

WRITE IT

Why is the greatest common factor of two prime numbers always 1?

- 3 SALES** Anna sells bags of different kinds of cookies. She made \$27 selling bags of peanut butter cookies, \$18 from chocolate chip cookies, and \$45 selling bags of oatmeal cookies. Each bag of cookies costs the same amount. What is the most that Anna could charge for each bag of cookies?

factors of 18:

factors of 27:

factors of 45:

List all the factors of each number. Then find the GCF.

The GCF of 18, 27, and 45 is . So, the most she could charge for each bag is .

- 4** How many bags could Anna have sold if each bag costs \$9?

Anna has a total of $\$27 + \$18 + \$45$ or . So, the number of bags sold is $\$90 \div \9 or bags.

Check Your Progress

CANDY Sarah made boxes of different kinds of candy for a school fund raiser. She made \$24 selling boxes of hard candy, \$40 from taffy, and \$64 from chocolates. Each box of candy costs the same amount.

- a. What is the most that Sarah could charge for each box of candy?

- b. How many boxes could Sarah have sold if each box costs \$8?

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Express fractions in simplest form.

BUILD YOUR VOCABULARY (pages 86–87)

Equivalent fractions are fractions that have the

EXAMPLES Write Equivalent Fractions

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

$$1 \quad \frac{6}{13} = \frac{\blacksquare}{52}$$

Since $13 \times 4 = 52$, multiply the numerator and denominator by 4.

$$\frac{6}{13} = \frac{\blacksquare}{52}, \text{ so } \frac{6}{13} = \frac{\blacksquare}{52}.$$

$\begin{array}{c} \times 4 \\ \curvearrowright \\ \frac{6}{13} = \frac{\blacksquare}{52} \\ \curvearrowleft \\ \times 4 \end{array}$

$$1 \quad \frac{24}{40} = \frac{3}{\blacksquare}$$

Since $24 \div 8 = 3$, divide the numerator and denominator by 8.

$$\frac{24}{40} = \frac{3}{\blacksquare}, \text{ so } \frac{24}{40} = \frac{3}{\blacksquare}.$$

$\begin{array}{c} \div 8 \\ \curvearrowright \\ \frac{24}{40} = \frac{3}{\blacksquare} \\ \curvearrowleft \\ \div 8 \end{array}$

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

a. $\frac{5}{9} = \frac{\blacksquare}{54}$

b. $\frac{48}{60} = \frac{4}{\blacksquare}$

WRITE IT

Is it possible to simplify a fraction if the numerator is a prime number? Explain.

BUILD YOUR VOCABULARY (pages 86–87)

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

EXAMPLE Write Fractions in Simplest Form

3 Write $\frac{14}{42}$ in simplest form.

KEY CONCEPT

Simplest Form To write a fraction in simplest form, you can 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.

METHOD 1 Divide by common factors.

A common factor of 14 and 42 is 2. A common factor of 7 and 21 is 7.

$$\frac{14}{42} = \frac{7}{21} = \frac{\boxed{}}{\boxed{}}$$

$\begin{array}{ccc} \div 2 & \div 7 & \\ \curvearrowright & \curvearrowright & \\ \div 2 & \div 7 & \end{array}$

Since 1 and 3 have no common factor greater than 1, the fraction $\frac{\boxed{}}{\boxed{}}$ is in simplest form.

METHOD 2 Divide by the GCF.

factors of 14: $\boxed{}$

factors of 42: $\boxed{}$

The GCF of 14 and 42 is $\boxed{}$.

$$\frac{14}{42} = \frac{\boxed{}}{\boxed{}}$$

$\begin{array}{ccc} \div 14 & & \\ \curvearrowright & & \\ \div 14 & & \end{array}$

Divide the numerator and

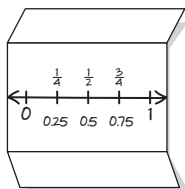
denominator by the GCF, $\boxed{}$.

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

Check Your Progress Write $\frac{21}{35}$ in simplest form.

FOLDABLES**ORGANIZE IT**

Under the fractions tab of your Foldable, summarize how to express fractions in their simplest forms.



EXAMPLE

4 GYMNASTICS Lin practices gymnastics 16 hours each week. There are 168 hours in a week. Express the fraction $\frac{16}{168}$ in simplest form.

The GCF of 16 and 168 is .

$\frac{\overset{2}{\cancel{16}}}{\underset{21}{\cancel{168}}} = \frac{\text{}}{\text{}}$ Mentally divide both the and by 8.

So, Lin practices gymnastics for or 2 out of every 21 hours of the week.

Check Your Progress **TRANSPORTATION** There are 244 students at Longfellow Elementary School. Of those students, 168 ride a school bus to get to school. Express the fraction $\frac{168}{244}$ in simplest form.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Write mixed numbers as improper fractions and vice versa.

BUILD YOUR VOCABULARY (pages 86–87)

A **mixed number** indicates the sum of a

and a .

A **proper fraction** is a fraction in which the numerator is

the denominator.

An **improper fraction** is a fraction in which the numerator is

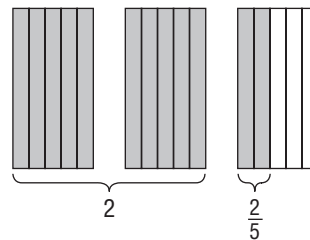
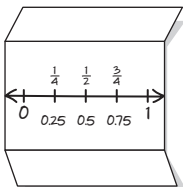
or equal to the denominator.

EXAMPLE Mixed Numbers as Improper Fractions

- 1 ASTRONOMY** If a spaceship lifts off the Moon, it must travel at a speed of $2\frac{2}{5}$ kilometers per second in order to escape the pull of the Moon's gravity. Write this speed as an improper fraction.

FOLDABLES**ORGANIZE IT**

Summarize how mixed numbers can be written as improper fractions and improper fractions can be written as mixed numbers under the fraction tab of your Foldable.



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

Multiply the whole number and denominator. Then add the numerator.

REMEMBER IT

Improper fractions that are equal to 1, such as $\frac{1}{1}$ and $\frac{9}{9}$, cannot be written as mixed numbers.

Check Your Progress

EXERCISE As part of a regular exercise program, Max walks $2\frac{3}{8}$ miles each morning. Write this distance as an improper fraction.

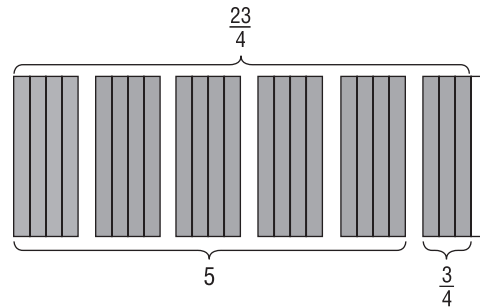
EXAMPLE**Improper Fractions as Mixed Numbers**

1 Write $\frac{23}{4}$ as a mixed number.

Divide 23 by 4.

$$\begin{array}{r} \square \frac{3}{4} \\ 4 \overline{)23} \\ \underline{-20} \\ 3 \end{array}$$

Use the remainder as the numerator and the divisor as the denominator of the fraction.



So, $\frac{23}{4} = \square$.

Check Your Progress

Write $\frac{23}{3}$ as a mixed number.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

Problem-Solving Investigation: Make an Organized List

EXAMPLE

MAIN IDEA

- Solve problems by making an organized list.

BOTANY Marcus is planning an experiment to determine the best growing conditions for a certain type of plant. The plants will be kept in high, medium, or low sunlight. They will be given either a large, medium, or small amount of water. How many plants should Marcus buy in order to test each possible combination of growing conditions?

UNDERSTAND You know there are different amounts of sunlight and different amounts of water. You need to know the number of possible combinations of these growing conditions.

PLAN Make a list of all the different possible combinations. Use HS for high sun, MS for medium sun, LS for low sun, LW for large water, MW for medium water, and SW for small water.

SOLVE

There are different combinations of growing conditions.

CHECK

Check the answer by seeing if each condition is accounted for three times in the list of combinations.

Check Your Progress

GYM BAGS The basketball cheerleaders are ordering new gym bags. They can choose from two styles in either blue or black with white, yellow, or gold lettering. How many different bags are there?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Find the least common multiple of two or more numbers.

BUILD YOUR VOCABULARY (pages 86–87)

A **multiple** of a number is the of the number and any .

Multiples of two or more are **common multiples**.

The number other than 0 that is a multiple of two or more whole numbers is the **least common multiple (LCM)** of the numbers.

EXAMPLE Identify Common Multiples**1** Identify the first three common multiples of 3 and 9.

First, list the multiples of each number.

multiples of 3:

multiples of 9:

Notice that 9, 18, and 27 are multiples common to both 3 and 9. So, the first 3 common multiples of 3 and 9 are

Check Your Progress

Identify the first three common multiples of 2 and 7.

REVIEW IT

Why is the number 1 neither prime nor composite? (Lesson 1-2)

EXAMPLE Find the LCM**1 Find the LCM of 8 and 18.**

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

$$8 = 2 \times 2 \times 2$$

$$18 = 2 \times 3 \times 3$$

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

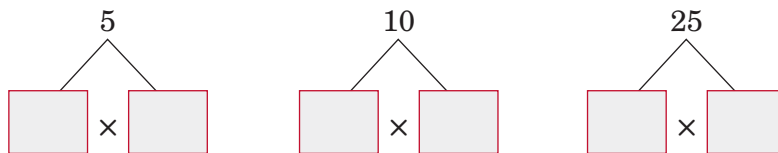
$$\square \times \square \times \square \times \square \times \square \text{ or } 72.$$

Check Your Progress

Find the LCM of 9 and 21.

EXAMPLE**5 MONEY** Liam, Eva, and Brady each have the same amount of money. Liam has only nickels, Eva has only dimes, and Brady has only quarters. What is the least amount of money that each of them could have?

Find the LCM using prime factors.



The least amount of money that each of them could have is

$$\square \times \square \times \square \text{ or } \square.$$

Check Your Progress

CANDY Michael, Logan, and Diego each have bags of candy that have the same total weight. Michael's bag has candy bars that each weigh 4 ounces, Logan's bag has candy bars that each weigh 6 ounces, and Diego's bag has candy bars that each weigh 9 ounces. What is the least total weight that each of them could have?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Compare and order fractions.

BUILD YOUR VOCABULARY (pages 86–87)

The least common denominator (LCD) of two

is the of the denominators.

KEY CONCEPT**Compare Two Fractions**

To compare two fractions,

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

EXAMPLES Compare Fractions and Mixed Numbers

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

1 $\frac{8}{21} \bullet \frac{3}{7}$

Step 1 Find the LCD; that is, the LCM of the denominators.

multiples of 7:

multiples of 21:

The LCM of 21 and 7 is . So, the LCD is .

Step 2 Write an equivalent fraction with a denominator of

for each fraction.

$$\frac{3}{7} = \frac{\boxed{}}{\boxed{}}$$

$\xrightarrow{\times 3}$
 $\xleftarrow{\times 3}$

$$\frac{8}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$$

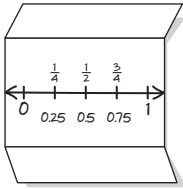
$\xrightarrow{\times 1}$
 $\xleftarrow{\times 1}$

Step 3 $\frac{8}{21} \boxed{} \frac{9}{21}$ since $8 < 9$. So, $\frac{8}{21} \boxed{} \frac{3}{7}$.

FOLDABLES

ORGANIZE IT

Summarize ways you can order fractions under the fractions tab of your Foldable. Include some examples.

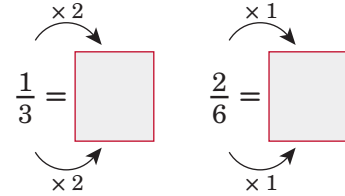


1 $2\frac{1}{3} \bullet 2\frac{2}{6}$

Since the whole numbers are the same, compare $\frac{1}{3}$ and $\frac{2}{6}$.

Step 1 The LCM of the denominators, 3 and 6, is 6. So, the LCD is .

Step 2 Write an equivalent fraction with a denominator of 6 for each fraction.



Step 3 $\frac{2}{6}$ $\frac{2}{6}$, since $2 = 2$. So, $2\frac{1}{3}$ $2\frac{2}{6}$.

Check Your Progress

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

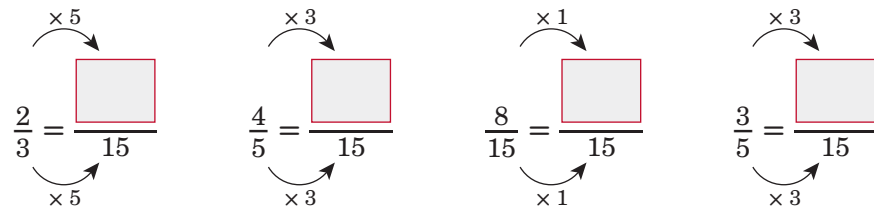
a. $\frac{13}{18} \bullet \frac{5}{6}$

b. $4\frac{3}{4} \bullet 4\frac{2}{5}$

EXAMPLE Order Fractions

1 Order the fractions $\frac{2}{3}$, $\frac{4}{5}$, $\frac{8}{15}$, and $\frac{3}{5}$ from least to greatest.

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



Since $\frac{8}{15} < \frac{9}{15} < \frac{10}{15} < \frac{12}{15}$, the order of the original fractions

from least to greatest is .

Check Your Progress

Order the fractions $\frac{5}{6}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{11}{12}$ from least to greatest.

EXAMPLE

1 TEST EXAMPLE According to the table, how is most land in the United States used?

- A as arable land
- B as permanent pastures
- C as forests and woodlands
- D B and C are equal

Read the Item You need to compare the fractions.

Land Use in the United States	
arable (cropland)	$\frac{19}{100}$
permanent pastures	$\frac{1}{4}$
forests and woodland	$\frac{3}{10}$
other	$\frac{13}{50}$

Source: CIA World Fact Book

Solve the Item Rewrite the fractions with the LCD, 100.

$$\frac{19}{100} = \frac{\boxed{}}{100} \quad \frac{1}{4} = \frac{\boxed{}}{100} \quad \frac{3}{10} = \frac{\boxed{}}{100} \quad \frac{13}{50} = \frac{\boxed{}}{100}$$

$\begin{matrix} \times 1 & \times 25 & \times 10 & \times 2 \\ \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright \\ \times 1 & \times 25 & \times 10 & \times 2 \end{matrix}$

So, $\boxed{}$ is the greatest fraction, and the answer is $\boxed{}$.

Check Your Progress

MULTIPLE CHOICE According to the survey data, what did most people say should be done with the length of the school year?

- F lengthen the school year
- G shorten the school year
- H keep the length the same
- J cannot tell from the data

How long should the school year be?	
lengthen the school year	$\frac{9}{25}$
shorten the school year	$\frac{7}{20}$
keep the length the same	$\frac{29}{100}$

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Writing Decimals as Fractions

MAIN IDEA

- Write decimals as fractions or mixed numbers in simplest form.

BUILD YOUR VOCABULARY (pages 86–87)

Any number that can be written as a is a rational number.

KEY CONCEPT

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

- Identify the place value of the last decimal place.
- 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 0.4

The place-value chart shows that the place value of the last decimal place is .

Place-Value Chart

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

. So, 0.4 means .

$$0.4 = \frac{\quad}{\quad}$$

Say *four tenths*.

$$= \frac{\quad}{\quad}$$

Simplify. Divide the numerator and denominator by the GCF, .

1 0.38

$$0.38 = \frac{\quad}{\quad}$$

Say *thirty-eight hundredths*.

$$= \frac{\quad}{\quad}$$

Simplify. Divide by the GCF, .

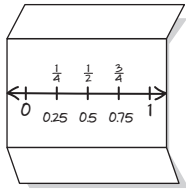
1,000	100	10	1	0.1	0.01	0.001	0.0001
thousands	hundreds	tens	ones	tenths	hundredths	thousandths	ten-thousandths
○	○	○	○	3	8	○	○

3 0.264

FOLDABLES

ORGANIZE IT

Use the space under the Decimals tab of your Foldable to summarize how to write a decimal as a fraction.



Place-Value Chart

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	2	6	4	0

0.264 =

Say *two hundred sixty-four*

=

Simplify. Divide by the GCF, .

EXAMPLE Write Decimals as Mixed Numbers

4 **RAINFALL** In 1955, Hurricane Diane moved through New England and produced one of the region's heaviest rainfalls in history. In a 24-hour period, 18.15 inches of rain were recorded in one area. Express this amount as a mixed number in simplest form.

18.15 = 18 $\frac{15}{100}$

Say *eighteen and fifteen hundredths*.

= 18

Simplify.

REMEMBER IT



In a decimal, the digits to the left of the decimal point represent whole numbers. The digits to the right of the decimal point represent fractions.

Check Your Progress

Write each decimal as a fraction in simplest form.

a. 0.8

b. 0.64

c. 0.824

d. 23.56

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Write fractions as decimals.

EXAMPLES Write Fractions as Decimals

Write each fraction as a decimal.

1 $\frac{7}{10}$

Since the denominator is 10, write $\frac{7}{10}$ as a decimal.

$\frac{7}{10} = \square$

Read 0.7 as *seven tenths*.

2 $\frac{1}{4}$

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

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

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

$$= \square$$

Read 0.25 as *twenty-five hundredths*.

3 $\frac{3}{8}$

METHOD 1 Use paper and pencil.

Place the decimal point directly above the decimal point after 3.

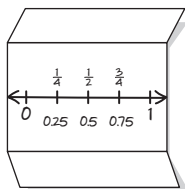
$$\begin{array}{r} \square \\ 8 \overline{) 3.000} \\ \underline{- 24} \\ 60 \\ \underline{- 56} \\ 40 \\ \underline{- 40} \\ 0 \end{array}$$

To divide 3 by 8, place a decimal point after 3 and annex as many zeros as necessary to complete the division.

FOLDABLES

ORGANIZE IT

Summarize the process for writing a fraction as a decimal under the Fractions tab of your Foldable.

**METHOD 2** Use a calculator.

$3 \div 8 \text{ ENTER } 0.375$

Therefore, $\frac{3}{8} = \square$

Check Your Progress Write each fraction as a decimal.

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

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

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

EXAMPLE Mixed Numbers as Decimals

- 4 BEVERAGES** At a meeting, people drank 25 bottles of water. The water came in packs of 8. This makes $3\frac{1}{8}$ eight-packs. Write this number as a decimal.

$$3\frac{1}{8} = \boxed{} + \boxed{}$$

Definition of a mixed number.

$$= 3 + 1 \div 8 \text{ ENTER}$$

Use a calculator to write $\frac{1}{8}$ as a decimal.

$$= \boxed{} + \boxed{} \text{ or } \boxed{}$$

Read 3.125 as *three and one hundred twenty-five thousandths*.

People at the meeting drank eight-packs of bottled water.

Check Use a calculator. $3 \text{ + } 1 \div 8 \text{ ENTER } 3.125 \checkmark$

Check Your Progress **PAPER** Lilly's school used $5\frac{4}{25}$

boxes of paper copying newsletters to be distributed to each student in the school. Write this number as a decimal.

**HOMEWORK
ASSIGNMENT**

Page(s):

Exercises:

MAIN IDEA

- Use ordered pairs to locate points and organize data.

BUILD YOUR VOCABULARY (pages 86–87)

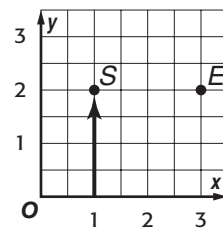
The **coordinate plane** is formed when two intersect at their zero points. This point is called the **origin**.

The number line is the **x-axis** and the number line is the **y-axis**.

Ordered pairs name points on the coordinate plane. The number in an ordered pair is the **x-coordinate**, and the number is the **y-coordinate**.

EXAMPLE Name Points Using Ordered Pairs**1** Write the ordered pair that names point *S*.

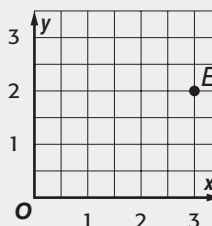
Step 1 Start at the origin. Move right along the until you are under point *S*. The **x-coordinate** of the ordered pair is .



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

So, point *S* is named by the ordered pair .

Check Your Progress Write the ordered pair that names point *E*.

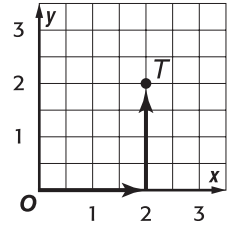


BUILD YOUR VOCABULARY (pages 86–87)

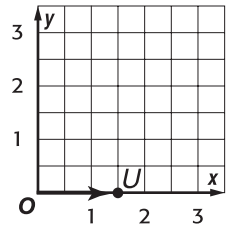
To **graph** a point means to place a dot at the point named by an .

EXAMPLES Graphing Ordered Pairs**1** Graph the point $T(2, 2)$.

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

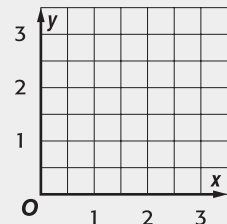
**2** Graph the point $U(1\frac{1}{2}, 0)$.

- Start at the origin.
- The value $1\frac{1}{2}$ is halfway between and . So on the x -axis, move halfway between and .
- Move units on the y -axis.
- Draw a dot and label the dot .



Check Your Progress Graph and label each point on a coordinate plane.

- $F(0, 1)$
- $G(2, 2\frac{1}{2})$
- $H(3, 1.5)$



EXAMPLES

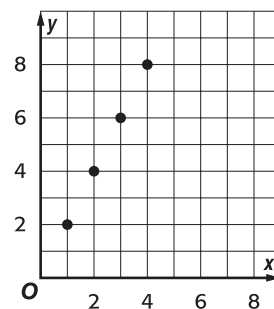
- 4 PETS** Amelia feeds her dog, Buster, 2 cups of food each day. Amelia made this table to show how much food Buster eats for 1, 2, 3, and 4 days. List this information as ordered pairs (days, food).

Days	Food (cups)
1	2
2	4
3	6
4	8

The ordered pairs are

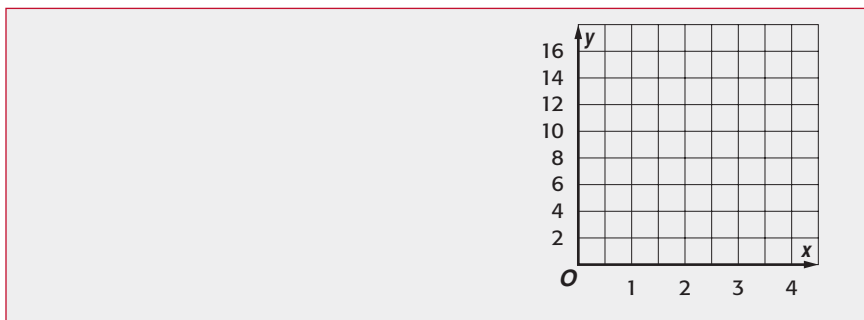
- 5** Graph the ordered pairs in Example 3. Then describe the graph.

The points


Check Your Progress TABLES

Jordan is planning to have a party. The table shows the number of guests he can invite if he sets up 1, 2, 3, and 4 tables. List this information as ordered pairs (tables, guests). Graph the ordered pairs. Then describe the graph.

Tables	Guests
1	4
2	8
3	12
4	16


HOMEWORK ASSIGNMENT

Page(s):

Exercises:

STUDY GUIDE

FOLDABLES

Use your **Chapter 4 Foldable** to help you study for your chapter test.

VOCABULARY
PUZZLEMAKER

To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 4, go to:

glencoe.com

BUILD YOUR
VOCABULARY

You can use your completed **Vocabulary Builder** (pages 86–87) to help you solve the puzzle.

4-1

Greatest Common Factor

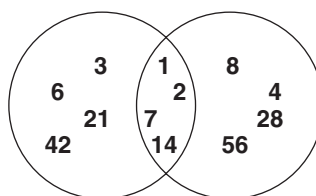
For Exercises 1–2, use the Venn diagram.

1. Identify the common factors of 42 and 56.

2. What is the greatest common factor of 42 and 56?

Factors of 42

Factors of 56



Find the GCF of each set of numbers.

3. 24, 80

4. 52, 78

5. 30, 36, 54

4-2

Simplifying Fractions

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

6. $\frac{2}{3} = \frac{\blacksquare}{9}$

7. $\frac{5}{12} = \frac{\blacksquare}{48}$

8. $\frac{7}{9} = \frac{\blacksquare}{27}$

Match each fraction to its equivalent fraction in simplest form.

9. $\frac{9}{21}$ <input type="text"/>	10. $\frac{12}{15}$ <input type="text"/>	<table border="0"> <tr> <td>a. $\frac{4}{5}$</td> <td>e. $\frac{2}{3}$</td> </tr> <tr> <td>b. $\frac{5}{7}$</td> <td>f. $\frac{1}{9}$</td> </tr> <tr> <td>c. $\frac{2}{9}$</td> <td>g. $\frac{7}{8}$</td> </tr> <tr> <td>d. $\frac{3}{7}$</td> <td></td> </tr> </table>	a. $\frac{4}{5}$	e. $\frac{2}{3}$	b. $\frac{5}{7}$	f. $\frac{1}{9}$	c. $\frac{2}{9}$	g. $\frac{7}{8}$	d. $\frac{3}{7}$	
a. $\frac{4}{5}$	e. $\frac{2}{3}$									
b. $\frac{5}{7}$	f. $\frac{1}{9}$									
c. $\frac{2}{9}$	g. $\frac{7}{8}$									
d. $\frac{3}{7}$										
11. $\frac{12}{18}$ <input type="text"/>	12. $\frac{10}{90}$ <input type="text"/>									
13. $\frac{14}{16}$ <input type="text"/>	14. $\frac{15}{21}$ <input type="text"/>									

4-3

Mixed Numbers and Improper Fractions

Underline the correct term to complete each sentence.

15. The number $1\frac{7}{8}$ is (a mixed number/an improper fraction).
 16. The number $\frac{13}{5}$ is (a mixed number/an improper fraction).

Write each mixed number as an improper fraction.

17. $3\frac{5}{6}$	18. $9\frac{2}{7}$	19. $4\frac{5}{8}$
<input type="text"/>	<input type="text"/>	<input type="text"/>

4-4

Problem-Solving Investigation: Make an Organized List

Solve. Use the *make an organized list* strategy.

20. **BOOKS** Reymundo has three books in a series. In how many ways can he arrange these books on his bookshelf?

4-5

Least Common Multiple

Complete.

21. Numbers that are multiples of both 4 and 8 are

of 4 and 8.

22. The least number that is a multiple of both 4 and 8 is the

of 4 and 8.

4-6

Comparing and Ordering Fractions

Write $<$, $>$, or $=$ to make a true sentence.

23. $\frac{2}{5}$ $\frac{6}{15}$

24. $\frac{1}{3}$ $\frac{4}{9}$

25. $\frac{5}{8}$ $\frac{4}{7}$

26. How is LCM related to LCD?

4-7

Writing Decimals as Fractions

Match each decimal to the equivalent fraction in simplest form.

27. 0.5

28. 3.08

29. 0.35

30. 3.25

31. 0.72

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

e. $\frac{7}{20}$

b. $3\frac{1}{4}$

f. $3\frac{2}{25}$

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

g. $\frac{18}{25}$

32. The decimal 0.6 is written as a fraction $\frac{6}{10}$. Why is the denominator of the fraction 10?

4-8

Writing Fractions as Decimals

Write each fraction or mixed number as a decimal.

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

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

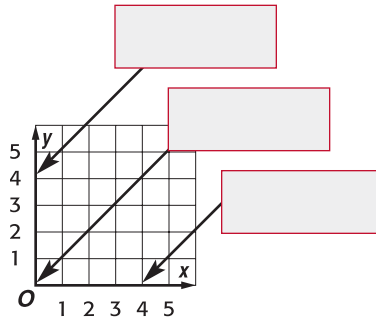
35. $2\frac{7}{40}$

36. Ms. Huang's class asked students about their favorite kind of pizza. Pepperoni was the favorite of $\frac{3}{8}$ of the students. Write this fraction as a decimal.

4-9

Algebra: Ordered Pairs and Functions

37. Label the coordinate plane.



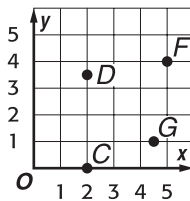
Use the coordinate plane to name the ordered pair for each point.

38. C

39. D

40. F

41. G



42. Describe how to graph point $S(10, 4)$.

ARE YOU READY FOR THE CHAPTER TEST?

Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 4.

Check the one that applies. Suggestions to help you study are given with each term.

I completed the review of all or most lessons without using my notes or asking for help.

- You are probably ready for the Chapter Test.
- You may want to take the Chapter 4 Practice Test on page 243 of your textbook as a final check.

I used my Foldables or Study Notebook to complete the review of all or most lessons.

- You should complete the Chapter 4 Study Guide and Review on pages 238–242 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 4 Practice Test on page 243.

I asked for help from someone else to complete the review of all or most lessons.

- You should review the examples and concepts in your Study Notebook and Chapter 4 Foldable.
- Then complete the Chapter 4 Study Guide and Review on pages 238–242 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 4 Practice Test on page 243.

Student Signature

Parent/Guardian Signature

Teacher Signature

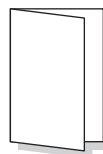
Operations with Fractions



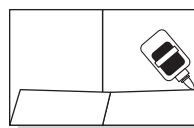
Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin this Interactive Study Notebook to help you in taking notes.

Begin with two sheets of $8\frac{1}{2}$ " \times 11" paper, four index cards, and glue.

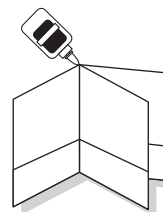
STEP 1 **Fold** one sheet in half widthwise.



STEP 2 **Open** and fold the bottom to form a pocket. Glue edges.



STEP 3 **Repeat** Steps 1 and 2. Glue the back of one piece to the front of the other to form a booklet.



STEP 4 **Label** each left-hand pocket *What I Know* and each right-hand pocket *What I Need to Know*. Place an index card in each pocket.



NOTE-TAKING TIP: As you read the chapter, write examples of new concepts on note cards. As you learn the material on the note cards, you will have proof of how much you have learned.

BUILD YOUR VOCABULARY

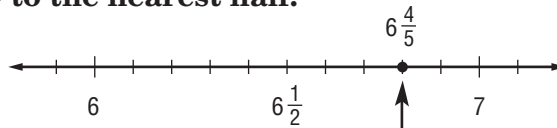
This is an alphabetical list of new vocabulary terms you will learn in Chapter 5. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
compatible numbers			
like fractions			
reciprocal			
unlike fractions			

Rounding Fractions and Mixed Numbers

EXAMPLE Round to the Nearest Half

1 Round $6\frac{4}{5}$ to the nearest half.



$6\frac{4}{5}$ is closer to than to $6\frac{1}{2}$.

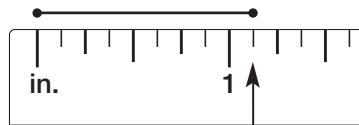
The numerator of $\frac{4}{5}$ is almost as large as the denominator.

So, $6\frac{4}{5}$ rounds to .

Check Your Progress Round $3\frac{9}{11}$ to the nearest half.

EXAMPLE Measure to the Nearest Half

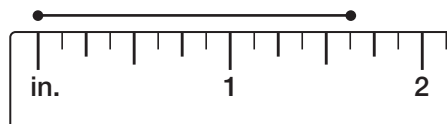
1 Find the length of the line segment to the nearest half inch.



$1\frac{1}{8}$ is closer to 1 than to $1\frac{1}{2}$.

To the nearest half inch, the line segment is .

Check Your Progress Find the length of the segment to the nearest half inch.



MAIN IDEA

- Round fractions and mixed numbers.

REVIEW IT

Compare and contrast rounding decimals and rounding fractions. (Lesson 3-3).

EXAMPLE

3 DECORATING There is a $4\frac{3}{4}$ -foot gap between the entertainment center and a wall in a family's living room. Should the family purchase a 5-foot wide bookshelf or a $4\frac{1}{2}$ -foot wide bookshelf? Explain your reasoning.

$4\frac{3}{4}$ is less than . So, a wide bookshelf would be too large. Five feet is greater than $4\frac{3}{4}$ feet. So, in order for the bookshelf to fit, the family should round $4\frac{3}{4}$ down and buy the wide bookshelf.

WRITE IT

Write a rule for rounding fractions to the nearest $\frac{1}{4}$.

Check Your Progress

COOKING Phyllis has a recipe that calls for $3\frac{7}{8}$ cups of spaghetti sauce. Should she purchase a 4-cup jar of spaghetti sauce or a $3\frac{1}{2}$ -cup jar of spaghetti sauce for the recipe? Explain your reasoning.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Solve problems by acting them out.

EXAMPLE

PIES Darnell and Ayana bought $8\frac{1}{4}$ pounds of peaches. Each pie requires $1\frac{1}{3}$ pounds of peaches. How many pies can Darnell and Ayana make?

UNDERSTAND You know they have pounds of peaches and each pie requires pounds. You need to determine how many pies they can make.

PLAN Using a scale, find or create something that weighs approximately $1\frac{1}{3}$ pounds. Keep adding $1\frac{1}{3}$ -pound items to the scale until the total weight is as close to $8\frac{1}{4}$ pounds as possible without going over.

SOLVE $1\frac{1}{3} + 1\frac{1}{3} + 1\frac{1}{3} + 1\frac{1}{3} + 1\frac{1}{3} + 1\frac{1}{3} =$ lb.
Six $1\frac{1}{3}$ -pound items weigh lb.
Seven $1\frac{1}{3}$ -pound items would weigh more than $8\frac{1}{4}$ pounds, so they have enough peaches to make pies.

CHECK Seven $1\frac{1}{3}$ -pound items would weigh $8 + 1\frac{1}{3}$ or pounds. Since they only have lb. of peaches, they do not have enough to make 7 pies.

Check Your Progress **LEMONADE** Isabel plans to fill a pitcher that holds $7\frac{2}{3}$ cups with lemonade. Each glass she will use to serve the lemonade holds $1\frac{2}{5}$ cups. How many guests can she serve lemonade to if each guest has one glass full?

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

Adding and Subtracting Fractions with Like Denominators

MAIN IDEA

- Add and subtract fractions with like denominators.

BUILD YOUR VOCABULARY (page 115)

Fractions with the same are called like fractions.

KEY CONCEPTS

Adding Like Fractions To add fractions with the same denominators, add the numerators. Use the same denominator in the sum.

Subtracting Like Fractions To subtract fractions with the same denominators, subtract the numerators. Use the same denominator in the difference.

EXAMPLE Add Like Fractions

- 1 Find the sum of $\frac{3}{10}$ and $\frac{9}{10}$.

Estimate + =

$$\frac{3}{10} + \frac{9}{10} = \frac{\text{ } \quad \text{ }}{10}$$

Add the numerators.

$$= \text{ } \quad \text{ }$$

Simplify.

$$= \text{ } \quad \text{ or } \quad \text{ } \quad \text{ }$$

Write the improper fraction as a mixed number.

EXAMPLE Subtract Like Fractions

- 1 Find $\frac{10}{12} - \frac{1}{12}$. Write in simplest form.

$$\frac{10}{12} - \frac{1}{12} = \frac{\text{ } \quad \text{ }}{12}$$

Subtract the numerators.

$$= \text{ } \quad \text{ or } \quad \text{ } \quad \text{ }$$

Simplify.

Check Your Progress Add or subtract. Write in simplest form.

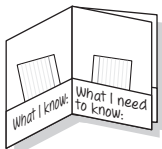
a. $\frac{3}{8} + \frac{7}{8}$

b. $\frac{17}{18} - \frac{5}{18}$

FOLDABLES

ORGANIZE IT

Use the note cards in your Foldable to record what you learn about adding and subtracting fractions with like denominators. As you learn the concepts, move the note cards from the *Need to Know* pocket to the *Know* pocket in your Foldable.



EXAMPLE

- 3 SWIMMING** During swimming practice at the lap pool, Darcy swam $\frac{21}{25}$ of a mile, and Rene swam $\frac{16}{25}$ of a mile. How much farther did Darcy swim than Rene?

$$\frac{21}{25} - \frac{16}{25} = \frac{\boxed{}}{25} \quad \text{Subtract the numerators.}$$

$$= \boxed{} \text{ or } \boxed{} \quad \text{Simplify.}$$

Darcy swam $\boxed{}$ mile more than Rene.

Check *21 twenty-fifths minus 16 twenty-fifths equals 5 twenty-fifths. ✓*

Check Your Progress **SEWING** One pattern for a skirt

required $\frac{15}{16}$ yards of fabric for the lining and a second pattern required $\frac{11}{16}$ yards of fabric for the lining. How much more fabric was required for the first pattern?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Adding and Subtracting Fractions with Unlike Denominators

MAIN IDEA

- Add and subtract fractions with unlike denominators.

BUILD YOUR VOCABULARY (page 115)

Unlike fractions are fractions with denominators.

EXAMPLE Add Unlike Fractions

1 Find $\frac{3}{4} + \frac{1}{5}$.

The least common denominator of $\frac{3}{4}$ and $\frac{1}{5}$ is .

Write the problem.	Rename using the LCD, 20.	Add the fractions.
--------------------	---------------------------	--------------------

$\frac{3}{4}$	→	$\frac{3 \times \boxed{}}{4 \times \boxed{}} =$	$\boxed{}$	→	$\boxed{}$
$+$	$\frac{1}{5}$	→	$+$	$\frac{1 \times \boxed{}}{5 \times \boxed{}} =$	$+$
		$\boxed{}$	$+$	$\boxed{}$	$\boxed{}$
		$\boxed{}$		$\boxed{}$	$\boxed{}$

EXAMPLE Subtract Unlike Fractions

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

The least common denominator of $\frac{3}{5}$ and $\frac{1}{6}$ is .

Write the problem.	Rename using the LCD, 30.	Subtract the fractions.
--------------------	---------------------------	-------------------------

$\frac{3}{5}$	→	$\frac{3 \times \boxed{}}{5 \times \boxed{}} =$	$\boxed{}$	→	$\boxed{}$
$-$	$\frac{1}{6}$	→	$-$	$\frac{1 \times \boxed{}}{6 \times \boxed{}} =$	$-$
		$\boxed{}$	$-$	$\boxed{}$	$\boxed{}$
		$\boxed{}$		$\boxed{}$	$\boxed{}$

REVIEW IT

Name two methods to find the least common multiple of two numbers. (Lesson 4-5)

Check Your Progress Add or subtract. Write in simplest form.

a. $\frac{1}{4} + \frac{2}{3}$

b. $\frac{5}{6} - \frac{3}{8}$

EXAMPLE

3 PET ADOPTION Use the table to find the fraction of adopted dogs in one town that are either golden retrievers or mixed breed.

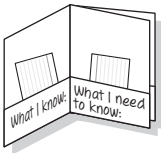
Find $\frac{7}{25} + \frac{2}{5}$.

The least common denominator of $\frac{7}{25}$ and $\frac{2}{5}$ is .

Adopted Dogs	
Breed	Fraction
German Shepherd	$\frac{3}{20}$
Golden Retriever	$\frac{7}{25}$
Jack Russell Terrier	$\frac{1}{20}$
Poodle	$\frac{3}{25}$
Mixed breed	$\frac{2}{5}$

FOLDABLES ORGANIZE IT

Record what you learn about adding and subtracting fractions with unlike denominators on the note cards in your foldable. As you learn the concepts, move the note cards from the Need to Know pocket to the Know pocket in your Foldable.



Write the problem.

Rename using the LCD, 25.

Add the fractions.

$$\begin{array}{rclclcl}
\frac{7}{25} & \rightarrow & \frac{7 \times \square}{25 \times \square} = \frac{\square}{\square} & \rightarrow & \frac{7}{25} \\
+ \frac{2}{5} & \rightarrow & + \frac{2 \times \square}{5 \times \square} = + \frac{\square}{\square} & \rightarrow & + \frac{\square}{\square} \\
\hline
& & & & \square
\end{array}$$

So, of the adopted dogs, are either Golden Retrievers or mixed breed.

Check Your Progress

ICE CREAM Use the table to find the fraction of the orders that are for either vanilla or chocolate ice cream.

Ice Cream Orders	
Flavor	Fraction
Chocolate	$\frac{1}{6}$
Chocolate chip	$\frac{5}{18}$
Cookie dough	$\frac{5}{36}$
Strawberry	$\frac{7}{36}$
Vanilla	$\frac{2}{9}$

REMEMBER IT

The first step in evaluating an algebraic expression is replacing the variables in the expression with numbers.

EXAMPLE Evaluate an Expression with Fractions

1 ALGEBRA Evaluate $p - q$ if $p = \frac{5}{6}$ and $q = \frac{1}{2}$.

$$p - q = \boxed{} - \boxed{}$$

$$p = \boxed{}, q = \boxed{}$$

$$= \frac{5}{6} - \frac{1 \times \boxed{}}{2 \times \boxed{}}$$

Rename $\frac{1}{2}$ using the LCD, 6.

$$= \frac{5}{6} - \boxed{}$$

Simplify.

$$= \boxed{} \text{ or } \boxed{}$$

Subtract. Write in simplest form.

Check Your Progress

ALGEBRA Evaluate $m - n$ if $m = \frac{7}{8}$ and $n = \frac{2}{3}$.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

Adding and Subtracting Mixed Numbers

MAIN IDEA

- Add and subtract mixed numbers.

KEY CONCEPT

Adding and Subtracting Mixed Numbers To add or subtract mixed numbers, first add or subtract the fractions. Then add or subtract the whole numbers. Rename and simplify if necessary.

EXAMPLES

 Add or Subtract Mixed Numbers

1 Find $6\frac{7}{8} - 3\frac{1}{8}$. Estimate - =

Subtract the fractions.

$$\begin{array}{r} 6\frac{7}{8} \\ - 3\frac{1}{8} \\ \hline \end{array}$$

Subtract the whole numbers.

$$\begin{array}{r} 6\frac{7}{8} \\ - 3\frac{1}{8} \\ \hline \end{array}$$

or

Check for Reasonableness $3\frac{3}{4} \approx 4$ ✓

1 Find $3\frac{1}{5} + 5\frac{3}{4}$. Estimate + =

Write the problem.

$$\begin{array}{r} 3\frac{1}{5} \\ + 5\frac{3}{4} \\ \hline \end{array}$$

Rename the fractions using the LCD, 20.

$$\begin{array}{r} 3 \frac{\boxed{}}{\boxed{}} \\ + 5 \frac{\boxed{}}{\boxed{}} \\ \hline \end{array}$$

Add the fractions. Then add the whole numbers.

$$\begin{array}{r} \boxed{} \\ + \boxed{} \\ \hline \boxed{} \end{array}$$

Check for Reasonableness $8\frac{19}{20} \approx 9$ ✓

Check Your Progress

Add or subtract. Write in simplest form.

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

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

EXAMPLES Rename Numbers to Subtract**REMEMBER IT**

Use estimation to check the reasonableness of your answers.



3 Find $11 - 5\frac{5}{6}$.

Estimate - =

$$\begin{array}{r} 11 \longrightarrow \boxed{} \\ - 5\frac{5}{6} \longrightarrow \boxed{-5\frac{5}{6}} \\ \hline \boxed{} \end{array}$$

Rename 11 as .

Subtract.

Check for Reasonableness $5\frac{1}{6} \approx 5$ ✓

4 Find $12\frac{3}{4} - 5\frac{1}{6}$.

Estimate - =

$$\begin{array}{r} 12\frac{3}{4} \longrightarrow \boxed{} \\ - 5\frac{1}{6} \longrightarrow \boxed{-5\frac{1}{6}} \\ \hline \boxed{} \end{array}$$

Rename $\frac{3}{4}$ and $\frac{1}{6}$ using their LCD, .

Subtract.

Check for Reasonableness $7\frac{7}{12} \approx 8$ ✓

Check Your Progress

a. Find $8 - 5\frac{5}{8}$.

b. Find $11\frac{5}{6} - 7\frac{1}{4}$.

EXAMPLE

5 TEST EXAMPLE Alice ran $10\frac{1}{5}$ miles on Monday. On Wednesday, she ran $9\frac{3}{4}$ miles. How many miles did Alice run on both days?

A $1\frac{11}{20}$ miles

C $19\frac{19}{20}$ miles

B $19\frac{11}{20}$ miles

D $20\frac{19}{20}$ miles

Read the Item

You need to find the distance Alice ran on both days.

Solve the Item

First use the LCD to rename the fractions. Then add.

Alice ran .

The answer is .

$$\begin{array}{r}
 10\frac{1}{5} \longrightarrow 10 \boxed{} \\
 + 9\frac{3}{4} \longrightarrow + 9 \boxed{} \\
 \hline
 \boxed{}
 \end{array}$$

Check Your Progress

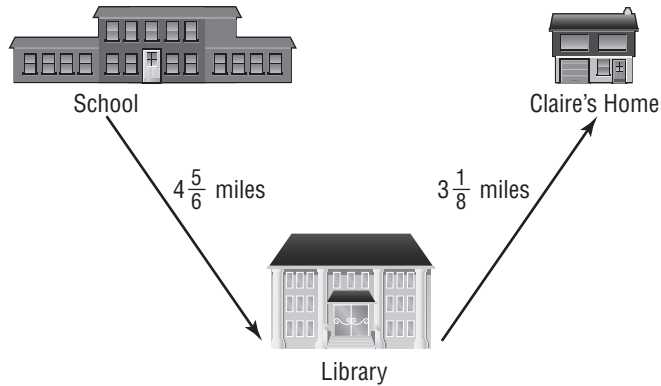
MULTIPLE CHOICE How far will Claire travel if she rides a bus from school to the library and then home?

F $7\frac{6}{14}$ miles

H $7\frac{11}{12}$ miles

G $7\frac{23}{24}$ miles

J $7\frac{17}{18}$ miles



HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Estimate products of fractions using compatible numbers and rounding.

BUILD YOUR VOCABULARY (page 115)

Compatible numbers are numbers that are easy to

EXAMPLES Estimate Using Compatible Numbers

1 Estimate $\frac{1}{5} \times 28$.

Find a multiple of 5 close to 28.

$$\frac{1}{5} \times 28 \longrightarrow \frac{1}{5} \times 30 \quad \text{30 and 5 are compatible numbers since } 30 \div 5 = 6.$$

$$\frac{1}{5} \times 30 = \square \quad 30 \div 5 = \square$$

So, $\frac{1}{5} \times 28$ is *about* \square .

2 Estimate $\frac{3}{4} \times 17$.

Estimate $\frac{1}{4} \times 17$ first.

$$\frac{1}{4} \times 17 \longrightarrow \frac{1}{4} \times 16 \quad \text{Use 16 since 16 and 4 are compatible numbers.}$$

$$\frac{1}{4} \times 16 = \square \quad 16 \div 4 = \square$$

If $\frac{1}{4}$ of 16 is \square , then $\frac{3}{4}$ of 16 is $\square \times \square$ or \square .

So, $\frac{3}{4} \times 17$ is *about* \square .

Check Your Progress Estimate each product.

a. $\frac{1}{4} \times 35$

b. $\frac{3}{7} \times 22$

WRITE IT

Which method would you use to estimate $\frac{1}{6} \times 19$, compatible numbers or rounding? Explain.

REMEMBER IT

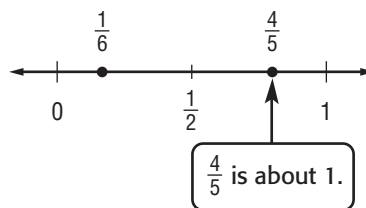
Placing fractions on a number line can help you round the fractions to estimate.

EXAMPLE Estimate by Rounding to 0, $\frac{1}{2}$, or 1**3** Estimate $\frac{4}{5} \times \frac{1}{6}$.

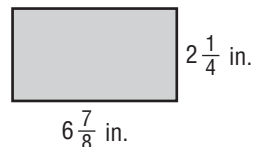
$$\frac{4}{5} \times \frac{1}{6} \rightarrow \square \times \frac{1}{6}$$

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

So, $\frac{4}{5} \times \frac{1}{6}$ is about \square .

**Check Your Progress** Estimate $\frac{1}{9} \times \frac{7}{8}$.
EXAMPLE Estimate With Mixed Numbers**4** **MEASUREMENT** Estimate the area of the rectangle.

Round each mixed number to the nearest whole number.

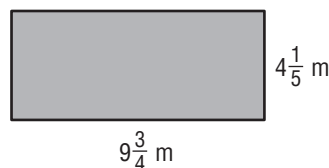


Round $6\frac{7}{8}$ to \square .

$$2\frac{1}{4} \times 6\frac{7}{8} \rightarrow \square \times \square = 14$$

Round $2\frac{1}{4}$ to \square .

So, the area is about \square square inches.

Check Your Progress **MEASUREMENT** Estimate the area of the rectangle.**HOMEWORK ASSIGNMENT**

Page(s):

Exercises:

Multiplying Fractions

MAIN IDEA

- Multiply fractions.

EXAMPLE Multiply Fractions

1 Find $\frac{1}{5} \times \frac{1}{6}$.

$$\frac{1}{5} \times \frac{1}{6} = \frac{\boxed{}}{\boxed{}}$$

$$= \boxed{}$$

Multiply the numerators.

Multiply the denominators.

Simplify.

EXAMPLE Multiply Fractions and Whole Numbers

1 Find $\frac{5}{8} \times 7$.

Estimate $\frac{1}{2} \times 8 = \boxed{}$

$$\frac{5}{8} \times 7 = \frac{5}{8} \times \frac{\boxed{}}{\boxed{}}$$

Write 7 as $\boxed{}$.

$$= \frac{\boxed{}}{\boxed{}}$$

Multiply.

$$= \boxed{} \text{ or } \boxed{}$$

Simplify. Compare to the estimate.

KEY CONCEPT

Multiplying Fractions
To multiply fractions, multiply the numerators and multiply the denominators.

Check Your Progress

Multiply. Write in the simplest form.

a. $\frac{1}{3} \times \frac{1}{9}$

b. $\frac{4}{9} \times 8$

EXAMPLE Simplify Before Multiplying

3 Find $\frac{3}{7} \times \frac{2}{9}$.

Estimate $\frac{1}{2} \times \frac{2}{9} = \square$

The numerator 3 and the denominator 9 have a common factor. Divide both the numerator and denominator by \square .

$$\frac{3}{7} \times \frac{2}{9} = \frac{\cancel{3} \times 2}{7 \times \cancel{9}_3}$$

$$= \square$$

Simplify. Compare to the estimate.

Check Your Progress Find $\frac{3}{8} \times \frac{4}{5}$.
EXAMPLE Evaluate Expressions

4 **ALGEBRA** Evaluate pq if $p = \frac{3}{4}$ and $q = \frac{8}{9}$.

$$pq = \square \times \square$$

Replace p with \square and q with \square .

$$= \frac{\square \times \square}{\square \times \square}$$

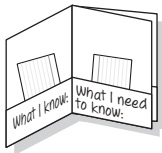
The GCF of 3 and 9 is 3. The GCF of 4 and 8 is 4. Divide both the numerator and the denominator by 3 and then by 4.

$$= \square$$

Simplify.

Check Your Progress Evaluate xy if $x = \frac{3}{4}$ and $y = \frac{4}{9}$.
FOLDABLES**ORGANIZE IT**

Record what you learn about multiplying fractions on the note cards in your Foldable. As you learn the concepts, move the note cards from the Need to Know pocket to the Know pocket in your Foldable.

**HOMEWORK ASSIGNMENT**

Page(s):

Exercises:

Multiplying Mixed Numbers

MAIN IDEA

- Multiply mixed numbers.

EXAMPLE Multiply a Fraction and a Mixed Number

1 Find $\frac{1}{3} \times 6\frac{3}{7}$.

Estimate Use compatible numbers $\rightarrow \frac{1}{3} \times \square = \square$

$$\frac{1}{3} \times 6\frac{3}{7} = \frac{1}{3} \times \square$$

Write $6\frac{3}{7}$ as \square .

$$= \frac{1 \times \overset{15}{\cancel{45}}}{\underset{1}{\cancel{3}} \times 7}$$

Divide 45 and 3 by their GCF, 3.

$$= \square \text{ or } \square$$

Simplify. Compare to the estimate.

Check Your Progress Find $\frac{1}{4} \times 4\frac{2}{5}$.

KEY CONCEPT

Multiplying Mixed Numbers To multiply mixed numbers, write the mixed numbers as improper fractions and then multiply as with fractions.

EXAMPLE Multiply Mixed Numbers

1 **DISTANCES** Belinda lives $1\frac{1}{2}$ times farther from school than Jamie does. If Jamie lives $4\frac{1}{5}$ miles from school, how far from school does Belinda live?

Jamie lives $4\frac{1}{5}$ miles from school. Multiply $4\frac{1}{5}$ by $1\frac{1}{2}$.

$$4\frac{1}{5} \times 1\frac{1}{2} = \square \times \square$$

First, write mixed numbers as improper fractions.

$$= \frac{\square}{\square}$$

Then, multiply the numerators and the denominators.

$$= \square \text{ or } \square$$

Simplify.

Belinda lives \square miles from school.

Check Your Progress **WEIGHT** A bag of marbles weighs $3\frac{1}{4}$ times as much as a bag of pretzels. If the bag of pretzels weighs $1\frac{1}{3}$ pounds, how much does the bag of marbles weigh?

EXAMPLE Evaluate Expressions

1 ALGEBRA If $r = 3\frac{3}{4}$ and $s = 2\frac{4}{5}$, what is the value of rs ?

$rs = \square \times \square$

Replace r with \square and

s with \square .

$= \frac{\square}{\square} \times \frac{\square}{\square}$

Divide the numerator and denominator by \square and by \square .

$= \square$ or \square

Simplify.

Check Your Progress **ALGEBRA** If $m = 2\frac{5}{8}$ and $n = 4\frac{4}{7}$, what is the value of nm ?

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Divide fractions.

BUILD YOUR VOCABULARY (page 115)

Any two numbers whose product is are called reciprocals.

EXAMPLES Find Reciprocals

- 1 Find the reciprocal of 7.

Since $7 \times$ = 1, the reciprocal of 7 is .

- 1 Find the reciprocal of $\frac{3}{8}$.

Since $\frac{3}{8} \times$ = 1, the reciprocal of $\frac{3}{8}$ is .

Check Your Progress

Find the reciprocal of each number.

a. 4

b. $\frac{5}{7}$

EXAMPLES Divide by a Fraction

- 1 Find $\frac{1}{3} \div \frac{5}{6}$.

$\frac{1}{3} \div \frac{5}{6} = \frac{1}{3} \times$ Multiply by the reciprocal, .

$= \frac{1 \times 6}{3 \times 5}$ Divide 6 and 3 by the GCF, .

$=$ Multiply numerators.
Multiply denominators.

KEY CONCEPT

Dividing Fractions To divide by a fraction, multiply by its reciprocal.

4 Find $5 \div \frac{1}{6}$.

$$5 \div \frac{1}{6} = \frac{5}{1} \times \boxed{} \quad \text{Multiply by the reciprocal of } \frac{1}{6}.$$

$$= \boxed{} \text{ or } \boxed{} \quad \text{Simplify.}$$

Check Your Progress

Divide. Write in simplest form.

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

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

EXAMPLE Divide by a Whole Number

5 **RACE** A relay race is $\frac{3}{4}$ of a mile long. There are 4 runners in the race. What portion of a mile will each runner run?

Divide $\frac{3}{4}$ into 4 equal parts.

$$\frac{3}{4} \div 4 = \frac{3}{4} \times \boxed{} \quad \text{Multiply by the reciprocal.}$$

$$= \boxed{} \quad \text{Simplify.}$$

Each runner will run of a mile.

Check Your Progress

CRAFTS For a project, Becki needs to cut $\frac{1}{2}$ of a poster board into 5 equal-size pieces. What part of the original poster board is each piece?

**HOMEWORK
ASSIGNMENT**

Page(s):

Exercises:

5-10 Dividing Mixed Numbers

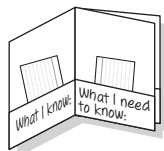
MAIN IDEA

- Divide mixed numbers.

FOLDABLES

ORGANIZE IT

Record what you learn about expressing mixed numbers as improper fractions before dividing on the note cards in your Foldable. As you learn the concepts, move the note cards from the Need to Know pocket to the Know pocket in your Foldable.



EXAMPLE Divide by a Mixed Number

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

Estimate $6 \div 3 = 2$

$$6\frac{1}{4} \div 2\frac{1}{2} = \boxed{} \div \boxed{}$$

Write mixed numbers as improper fractions.

$$= \boxed{} \times \boxed{}$$

Multiply by the reciprocal.

$$= \frac{\cancel{25}^5}{\cancel{4}_2} \times \frac{\cancel{2}^1}{\cancel{8}_1}$$

Divide by the GCFs.

$$= \boxed{} \text{ or } \boxed{}$$

Simplify.

Check for Reasonableness $2\frac{1}{2} \approx 2$

EXAMPLE Evaluate Expressions

1 ALGEBRA Find $f \div g$ if $f = 2\frac{5}{8}$ and $g = \frac{2}{3}$.

$$f \div g = \boxed{} \div \boxed{}$$

Replace f with $2\frac{5}{8}$ and g with $\frac{2}{3}$.

$$= \boxed{} \div \boxed{}$$

Write the mixed number as an improper fraction.

$$= \boxed{} \times \boxed{}$$

Multiply by the reciprocal.

$$= \boxed{} \text{ or } \boxed{}$$

Simplify.

Check Your Progress

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

b. ALGEBRA Find $a \div b$ if $a = 3\frac{3}{4}$ and $b = \frac{5}{8}$.

EXAMPLE

3 ADVENTURE RACING A team took $3\frac{3}{4}$ days to complete 180 miles of an adventure race consisting of hiking, biking, and river rafting. How many miles did they average each day?

Estimate $180 \div 4 = 45$

$$180 \div 3\frac{3}{4} = 180 \div \boxed{}$$

Write the mixed number as an improper fraction.

$$= \frac{180}{1} \times \boxed{}$$

Multiply by the reciprocal.

$$= \frac{\overset{12}{\cancel{180}}}{1} \times \frac{4}{\underset{1}{\cancel{15}}}$$

Divide 180 and 15 by the GCF, 15.

$$= \boxed{} \text{ or } \boxed{}$$

Simplify. Compare to the estimate.

So, the team averaged $\boxed{}$ miles each day.

REMEMBER IT

Be sure you express your answers with the correct units.

Check Your Progress


DRIVING Mario took $4\frac{1}{3}$ days to travel a distance of 260 miles. How many miles did he average each day?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

STUDY GUIDE

	VOCABULARY PUZZLEMAKER	BUILD YOUR VOCABULARY
Use your Chapter 5 Foldable to help you study for your chapter test.	To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 5, go to: glencoe.com	You can use your completed Vocabulary Builder (page 115) to help you solve the puzzle.

5-1

Rounding Fractions and Mixed Numbers

Round each number to the nearest half.

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

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

3. $\frac{17}{20}$

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

5. $\frac{23}{50}$

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

7. Give an example of when it is better to round up even if the rules say to round down.

5-2

Problem-Solving Investigation: Act It Out

Solve. Use the *act it out* strategy.

8. **RACQUETBALL** Three friends would like to play racquetball. How many 2-person teams can be formed?

5-3

Adding and Subtracting Fractions with Like Denominators

Match each verbal sentence with the number sentence you would write to answer the question. An answer may be used more than once.

9. How much is $\frac{4}{7}$ cup and $\frac{2}{7}$ cup?

10. How much wider is a stick that is $\frac{4}{7}$ in. wide than a stick that is $\frac{2}{7}$ in. wide?

11. Find the difference between $\frac{4}{7}$ and $\frac{2}{7}$.

12. What is the sum of $\frac{4}{7}$ and $\frac{2}{7}$?

a.	$\frac{4}{7} + \frac{2}{7} = \frac{6}{7}$
b.	$\frac{4}{7} - \frac{2}{7} = \frac{2}{7}$

5-4

Adding and Subtracting Fractions with Unlike Denominators

13. Describe how to evaluate $m - n$ if $m = \frac{5}{6}$ and $n = \frac{2}{9}$.

$m - n = \frac{5}{6} - \frac{2}{9}$	<input type="text"/>
$= \frac{5 \times 3}{6 \times 3} - \frac{2 \times 2}{9 \times 2}$	<input type="text"/>
$= \frac{15}{18} - \frac{4}{18}$	<input type="text"/>
$= \frac{11}{18}$	<input type="text"/>

14. What does it mean to rename a fraction?

15. What is the LCD of $\frac{1}{6}$ and $\frac{1}{4}$?

5-5

Adding and Subtracting Mixed Numbers

Match each sum or difference to the correct mixed number.

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

17. $5\frac{1}{4} + 2\frac{1}{8}$

18. $3\frac{1}{2} + 6\frac{1}{5}$

19. $10 - 3\frac{2}{3}$

20. $12\frac{1}{2} + 3\frac{1}{6}$

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

d. $9\frac{7}{10}$

b. $12\frac{3}{10}$

e. $9\frac{1}{3}$

c. $7\frac{3}{8}$

f. $6\frac{11}{12}$

21. **HEIGHT** Kenneth is $56\frac{1}{2}$ inches tall.
His sister is $44\frac{5}{8}$ inches tall. How much taller is Kenneth than his sister?

5-6

Estimating Products of Fractions

Estimate each product using the method given. Show how you found your estimate.

22. $\frac{6}{8} \times 17$, compatible numbers

23. $\frac{4}{6} \times \frac{4}{5}$, rounding

5-7

Multiplying Fractions

Multiply. Write in simplest form.

24. $\frac{2}{5} \times \frac{3}{4}$

25. $\frac{1}{2} \times 5$

26. **SALES** A sixth-grade class is selling 345 tickets to the school play. One-fifth of the tickets were sold on Monday. How many tickets were sold on Monday?

27. **ALGEBRA** Evaluate rs if $r = \frac{1}{2}$ and $s = \frac{2}{3}$.

5-8

Multiplying Mixed Numbers

28. $\frac{4}{7} \times 5\frac{5}{6}$

29. $1\frac{3}{5} \times 2\frac{1}{4}$

30. **RECIPES** Emily wanted to divide a recipe for lemonade in half for a party. The recipe called for $1\frac{3}{4}$ cups of lemon juice. How much lemon juice did Emily need?

5-9

Dividing Fractions

Find the reciprocal of each number.

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

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

33. 6

34. Describe in words each step shown for finding $\frac{2}{3} \div \frac{5}{6}$.

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

$$= \frac{2}{3} \times \frac{6}{5}$$

$$= \frac{2 \times \cancel{6}^2}{\cancel{3}_1 \times 5}$$

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

5-10

Dividing Mixed Numbers

35. Describe what is happening at each step below.

Find the value of $a \div b$ if $a = 5\frac{5}{8}$ and $b = 2\frac{1}{4}$.

$$a \div b = 5\frac{5}{8} \div 2\frac{1}{4}$$

$$= \frac{45}{8} \div \frac{9}{4}$$

$$= \frac{45}{8} \times \frac{4}{9}$$

$$= \frac{\cancel{45}^5}{\cancel{8}_2} \times \frac{\cancel{4}^1}{\cancel{9}_3}$$

$$= \frac{5}{2} \text{ or } 2\frac{1}{2}$$

Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 5.

ARE YOU READY FOR THE CHAPTER TEST?

Check the one that applies. Suggestions to help you study are given with each item.

I completed the review of all or most lessons without using my notes or asking for help.

- You are probably ready for the Chapter Test.
- You may want to take the Chapter 5 Practice Test on page 307 of your textbook as a final check.

I used my Foldables or Study Notebook to complete the review of all or most lessons.

- You should complete the Chapter 5 Study Guide and Review on pages 302–306 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may want to take the Chapter 5 Practice Test on page 307.

I asked for help from someone else to complete the review of all or most lessons.

- You should review the examples and concepts in your Study Notebook and Chapter 5 Foldable.
- Then complete the Chapter 5 Study Guide and Review on pages 302–306 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 5 Practice Test on page 307.

Student Signature

Parent/Guardian Signature

Teacher Signature

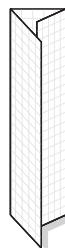
Ratio, Proportion, and Functions



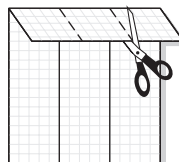
Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin this Interactive Study Notebook to help you in taking notes.

Begin with a sheet of graph paper.

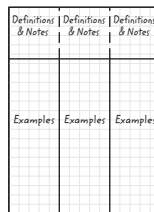
STEP 1 **Fold** one sheet of grid paper in thirds lengthwise.



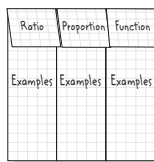
STEP 2 **Unfold** lengthwise and fold one fourth down widthwise. Cut to make three tabs as shown.



STEP 3 **Unfold** the tabs. Label the paper as shown.



STEP 4 **Refold** the tabs and label as shown.



NOTE-TAKING TIP: Making a chart can help you in comparing mathematical concepts. First, determine what will be compared. Then decide what standards will be used for comparisons. Finally, use what is known to find similarities and differences.

BUILD YOUR VOCABULARY

This is an alphabetical list of new vocabulary terms you will learn in Chapter 6. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
arithmetic sequence			
equivalent ratio			
proportion			
proportional			
rate			

Vocabulary Term	Found on Page	Definition	Description or Example
ratio			
ratio table			
scaling			
sequence			
term			
unit rate			

MAIN IDEA

- Express ratios and rates in fraction form.

BUILD YOUR VOCABULARY (pages 144–145)

A **ratio** is a comparison of two quantities by division.

EXAMPLE Write a Ratio in Simplest Form

- 1 RECREATION** A store has 10 unicycles and 4 scooters. Write the ratio in simplest form that compares the number of scooters to the number of unicycles. Then explain its meaning.

$$\frac{\text{scooters}}{\text{unicycles}} \longrightarrow \boxed{} = \boxed{}$$

The ratio of scooters to unicycles is $\boxed{}$, $\boxed{}$, or $\boxed{}$.

For every $\boxed{}$ scooters, there are $\boxed{}$ unicycles.

Check Your Progress

FRUIT Kim has 8 apples and 6 oranges. Write the ratio in simplest form that compares the number of oranges to the number of apples. Then explain its meaning.

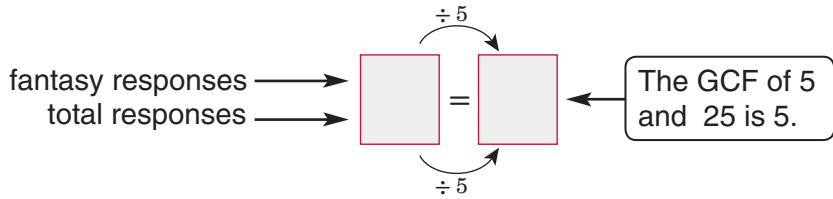
EXAMPLE Use Ratios to Compare Parts to a Whole

- 1 BOOKS** Several students were asked to name their favorite kind of book. Write the ratio that compares the number of students who chose fantasy books to the total number of students who responded.

Favorite Book	
Subject	Number of Responses
Sports	7
History	9
Mystery	4
Fantasy	5

Five students preferred fantasy out of a total of

$\boxed{} + \boxed{} + \boxed{} + \boxed{}$ or $\boxed{}$ responses.



The ratio of the number of students who chose fantasy to the total number of responses is \square .

Check Your Progress

SPORTS Students have the balls listed in the table available to use during recess. What is the ratio of basketballs to the total number of balls?

\square

Ball	Number
Volleyball	2
Tennis	5
Basketball	6
Soccer	3

BUILD YOUR VOCABULARY (pages 144–145)

A rate is a ratio comparing two quantities with different kinds of units.

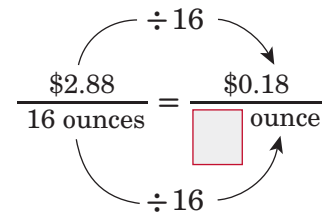
A **unit rate** has a denominator of 1.

EXAMPLE Find a Unit Rate

FOOD Find the cost per ounce of a 16-ounce jar of salsa that costs \$2.88.

Write the rate that compares the cost to the number of ounces.

Then divide to find the unit rate.



So, the cost per ounce of the salsa is \square .

Check Your Progress

TEMPERATURE The outside temperature rises 32 degrees in four hours. Find the temperature increase for one hour.

\square

FOLDABLES

ORGANIZE IT

Write the definition of *ratio* under the first tab of your Foldable. Include notes on finding ratios and unit rates. Be sure to write a few examples of ratios.

Ratio	Proportion	Function
Examples	Examples	Examples

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Use ratio tables to represent and solve problems involving equivalent ratios.

BUILD YOUR VOCABULARY (pages 144–145)

A **ratio table** contains columns that are filled with pairs of numbers that have the same .

Equivalent ratios express the same relationship between two quantities.

EXAMPLE Equivalent Ratios of Larger Quantities

- 1 BEANS** A recipe calls for 5 cups of water for each cup of pinto beans. Use the ratio table to find how many cups of water should be used for 4 cups of pinto beans.

Cups of Beans	1			4
Cups of Water	5			■

METHOD 1 Find a pattern and extend it.

For 2 cups of beans, you would need a total of $5 + 5$ or 10 cups of water.

Cups of Beans	1	<input type="text"/>	<input type="text"/>	4
Cups of Water	5	<input type="text"/>	<input type="text"/>	<input type="text"/>

$\overset{+1}{\curvearrowright}$ $\overset{+1}{\curvearrowright}$ $\overset{+1}{\curvearrowright}$
 $\underset{+5}{\curvearrowleft}$ $\underset{+5}{\curvearrowleft}$ $\underset{+5}{\curvearrowleft}$

Continue this pattern until you reach 4 cups.

METHOD 2 Multiply each quantity by the same number.

Cups of Beans	1	4
Cups of Water	5	<input type="text"/>

$\overset{\times 4}{\curvearrowright}$
 $\underset{\times 4}{\curvearrowleft}$

Since $1 \times 4 = 4$, multiply each quantity by 4.

So, you would need of water for 4 cups of beans.

Check Your Progress **PUNCH** A recipe for punch calls for 3 cups of juice for every cup of soda. Use the ratio table to find how many cups of juice should be used for 5 cups of soda.

Cups of Soda	1				5
Cups of Juice	3				

EXAMPLE **Equivalent Ratios of Smaller Quantities**

1 SPIDERS Texas has over 900 species of spiders. Use the ratio table to find how many legs a spider has.

Number of Spiders	4	<input type="text"/>	1
Number of Legs	32	<input type="text"/>	<input type="text"/>

$\overset{\div 2}{\curvearrowright}$ $\overset{\div 2}{\curvearrowright}$
 $\underset{\div 2}{\curvearrowleft}$ $\underset{\div 2}{\curvearrowleft}$

Divide each quantity by one or more common factors until you reach a quantity of 1 spider.

So, a spider has legs.

Check Your Progress **WINDOWS** Each apartment in Jarome's apartment building has the same number of windows. Use the ratio table to find how many windows each apartment in the building has.

Number of Apartments	8	4		1
Number of Windows	32			

BUILD YOUR VOCABULARY (pages 144–145)

or two related quantities by the same number is called **scaling**.

EXAMPLE Use Scaling

- 3 CLOTHING** Coco used 12 yards of fabric to make 9 blouses. Use the ratio table to find the number of blouses she could make with 20 yards of fabric.

Yards of Fabric	12		20
Number of Blouses	9		■

There is no whole number by which you can multiply 12 to get 20. So, scale back to 4 and then scale forward to 20.

Yards of Fabric	12	<input type="text"/>	20
Number of Blouses	9	<input type="text"/>	<input type="text"/>

$\overset{\div 3}{\curvearrowright}$ $\overset{\times 5}{\curvearrowright}$
 $\underset{\div 3}{\curvearrowleft}$ $\underset{\times 5}{\curvearrowleft}$

Divide each quantity by a common factor, 3.

Then, since $4 \times 5 = 20$, multiply each quantity by 5.

So, Coco could make with 20 yards of fabric.

- Check Your Progress** **PAINT** Mrs. Wallace ordered 8 bottles of paint for 18 students. Use the ratio table to find the number of bottles of paint she would need to order for 27 students.

Number of Students	18		27
Bottles of Paint	8		<input type="text"/>

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Determine if two ratios are proportional.

BUILD YOUR VOCABULARY (pages 144–145)

Two quantities are **proportional** if they have a constant ratio or rate.

A **proportion** is an equation stating that two ratios or rates are equivalent.

EXAMPLES Use Unit Rates

Determine if the quantities in the pair of ratios or rates are proportional. Explain your reasoning and express each proportional relationship as a proportion.

1 20 rolls for \$5; 48 rolls for \$12

Write each rate as a fraction. Then find its unit rate.

$$\frac{\$5}{20 \text{ rolls}} = \boxed{}$$

$\div 5$ (top arrow) and $\div 5$ (bottom arrow)

$$\frac{\$12}{48 \text{ rolls}} = \boxed{}$$

$\div 12$ (top arrow) and $\div 12$ (bottom arrow)

Since the rates have the same unit rate, they are equivalent. The cost is proportional to the number of rolls.

So, $\boxed{} = \boxed{}$.

2 42 people on 7 teams; 64 people on 8 teams

$$\frac{42 \text{ people}}{7 \text{ teams}} = \boxed{}$$

$\div 7$ (top arrow) and $\div 7$ (bottom arrow)

$$\frac{64 \text{ people}}{8 \text{ teams}} = \boxed{}$$

$\div 8$ (top arrow) and $\div 8$ (bottom arrow)

Since the rates do not have the same unit rate, they are not equivalent. So, the number of people is $\boxed{}$ to the number of teams.

- FOOD** You can buy 3 medium pizzas at The Pizza Place for \$18 or 5 medium pizzas for \$30. Are these selling rates proportional? Explain your reasoning.

$$\frac{\$18}{3 \text{ pizzas}} = \boxed{}$$

$\overset{\div 3}{\curvearrowright}$
 $\underset{\div 3}{\curvearrowleft}$

$$\frac{\$30}{5 \text{ pizzas}} = \boxed{}$$

$\overset{\div 5}{\curvearrowright}$
 $\underset{\div 5}{\curvearrowleft}$

Since the unit rates are the same, $\boxed{}$, the rates are equivalent. So, the selling rates are proportional.

Check Your Progress Determine if the quantities in the pair of ratios or rates are proportional. Explain your reasoning and express each proportional relationship as a proportion.

- a. 18 cookies for \$6; 24 cookies for \$8

- b. 16 students with 8 teachers; 30 students with 10 teachers

- c. **FOOD** At a farmer's market, one farmer is selling 6 pumpkins for \$12. Another farmer is selling his pumpkins 10 for \$20. Are these selling rates proportional? Explain your reasoning.

EXAMPLES Use Equivalent Fractions

Determine if the quantities in the pair of ratios or rates are proportional. Explain your reasoning.

- 4** 5 laps swum in 8 minutes; 11 laps swum in 16 minutes

Write each ratio as a fraction.

$$\frac{5 \text{ laps}}{8 \text{ minutes}} \stackrel{\times 2 \frac{1}{5}}{=} \frac{11 \text{ laps}}{16 \text{ minutes}}$$

× 2

The numerator and the denominator are not multiplied by the same number. So, the fractions are not equivalent.

Since \neq , the number of laps swum is not proportional to the number of minutes.

- 5** 8 corrals with 56 horses; 4 corrals with 28 horses

$$\frac{8 \text{ corrals}}{56 \text{ horses}} \stackrel{\square}{=} \frac{4 \text{ corrals}}{28 \text{ horses}}$$

The numerator and the denominator are divided by the same number. So, the fractions are equivalent.

Since = , the number of corrals is proportional to the number of horses.

Check Your Progress Determine if the quantities in the pair of ratios or rates are proportional. Explain your reasoning.

- a. 2 classes taken in 5 hours; 8 classes taken in 15 hours

- b. 10 cages with 25 birds; 2 cages with 5 birds

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

EXAMPLES Solve Using Equivalent Fractions**MAIN IDEA**

- Solve proportions.

Solve each proportion.

$$1 \quad \frac{4}{5} = \frac{28}{x}$$

Find a value for x so the fractions are equivalent.

$$\begin{array}{c} \times 7 \\ \curvearrowright \\ \frac{4}{5} = \frac{28}{x} \\ \curvearrowleft \\ \times 7 \end{array}$$

Since $4 \times 7 = 28$, multiply the numerator and denominator by 7.

$$\frac{4}{5} = \boxed{}$$

$$\text{Since } 5 \times 7 = 35, x = \boxed{}.$$

$$2 \quad \frac{b}{5} = \frac{16}{20}$$

$$\begin{array}{c} \times 4 \\ \curvearrowright \\ \frac{b}{5} = \frac{16}{20} \\ \curvearrowleft \\ \times 4 \end{array}$$

Since $5 \times 4 = 20$, multiply the numerator and denominator by 4.

$$\boxed{} = \frac{16}{20}$$

$$\text{Since } 4 \times 4 = 16, b = \boxed{}.$$

$$3 \quad \frac{19}{38} = \frac{n}{22}$$

$$\div 2 \left(\frac{19}{38} = \frac{n}{22} \right) \div 2$$

Since $38 \div 2 = 19$, divide each denominator by 2.

$$\frac{19}{38} = \boxed{}$$

THINK What is 22 divided by 2?

$$\text{So, } n = \boxed{}.$$

Check Your Progress

Solve each proportion.

$$a. \quad \frac{3}{8} = \frac{9}{x}$$

$$b. \quad \frac{18}{24} = \frac{m}{4}$$

$$c. \quad \frac{12}{48} = \frac{f}{28}$$

FOLDABLES

ORGANIZE IT

Write the definition of *proportion* in your own words under the Proportion tab in your Foldable. then write a few examples and show how to find their solutions.

Ratio	Proportion	Function
Examples	Examples	Examples

EXAMPLE Make Predictions in Proportional Situations

SPORTS Out of the 40 students in a gym class, 12 rate soccer as their favorite sport. Based on this result, predict how many of the 4,200 students in the community would rate soccer as their favorite sport.

Write and solve a proportion. Let s represent the number of students who can be expected to rate soccer as their favorite sport.

Class		Community
soccer as favorite sport → $\frac{\boxed{}}{40}$	=	$\frac{s}{\boxed{}}$ ← soccer as favorite sport
total students →	=	← total students

$$\frac{12}{40} = \frac{s}{4,200}$$

Since $40 \times 105 = 4,200$, multiply the numerator and denominator by 105.

$$\frac{12}{40} = \boxed{}$$

Of the students in the community, about $\boxed{}$ can be expected to rate soccer as their favorite sport.

Check Your Progress

BUSINESS Out of 50 people in one department of a large corporation, 35 stated that they enjoy their job. Based on this result, how many of the 2,400 employees of this corporation can be expected to say that they enjoy their job?

EXAMPLE Solve Using Unit Rates

- 5 WAGES** Cedric earned \$184 for 8 hours of work. At this rate, how much will he earn for 15 hours of work?

Step 1 Set up the proportion. Let d represent the dollar amount Cedric will earn for 15 hours of work.

$$\boxed{} = \boxed{}$$

Step 2 Find the unit rate.

$$\frac{\$184}{8 \text{ hours}} = \boxed{}$$

$\xrightarrow{\div 8}$
 $\xleftarrow{\div 8}$

Find an equivalent fraction with a denominator of 1.

Step 3 Rewrite the proportion using the unit rate and solve using equivalent fractions.

$$\frac{\$184}{8 \text{ hours}} = \boxed{} = \boxed{}$$

$\xrightarrow{\div 8}$ $\xrightarrow{\times 15}$
 $\xleftarrow{\div 8}$ $\xleftarrow{\times 15}$

So, the value of d is $\boxed{}$. At the given rate, Cedric will earn $\boxed{}$ for 15 hours of work.

Check Your Progress **DOGS** Marci walked 24 dogs in 6 days. At this rate, how many dogs will she walk in 14 days?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Problem-Solving Investigation: Look for a Pattern

EXAMPLE

MAIN IDEA

- Solve problems by looking for a pattern.

Solve. Use the *look for a pattern* strategy.

BAND One marching band formation calls for 12 band members in the front row. Each row in the formation has 3 more members than the row in front of it. Make a list of the members in each of the first 8 rows.

UNDERSTAND You know there are band members in the front row, and each row has more members than the row in front of it. You need to find how many band members are in each of the first rows.

PLAN Start with 12 members in the front row and use pattern of adding 3 for each row.

SOLVE

1: 12	5: <input type="text"/> + 3 = <input type="text"/>
2: $12 + 3 =$ <input type="text"/>	6: <input type="text"/> + 3 = <input type="text"/>
3: <input type="text"/> + 3 = <input type="text"/>	7: <input type="text"/> + 3 = <input type="text"/>
4: <input type="text"/> + 3 = <input type="text"/>	8: <input type="text"/> + 3 = <input type="text"/>

The number of band members in the first 8 rows is

CHECK Check the pattern of adding 3 by starting with the eighth row and subtracting 3 for each previous row.

Check Your Progress **WEIGHTS** Josiah lifts weights every day. If he lifts 20 pounds on the bench press on the first day and adds 2 pounds each day, how many days will it take him to lift 50 pounds?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Extend and describe arithmetic sequences using algebraic expressions.

BUILD YOUR VOCABULARY (pages 144–145)

A **sequence** is a list of numbers in a specific order. Each number in the list is called a **term** of the sequence.

A sequence is an **arithmetic sequence** if each term can be found by adding the same number to the previous term.

EXAMPLE Describe Sequences

- 1 Use words and symbols to describe the value of each term as a function of its position. Then find the value of the tenth term in the sequence.

Position	1	2	3	4	n
Value of Term	7	14	21	28	■

Notice that the value of each term is its position number. So, the value of the term in position n is .

Position	Multiply by 7	Value of Term
1	$1 \times 7 =$	7
2	$2 \times 7 =$	14
3	$3 \times 7 =$	21
4	$4 \times 7 =$	28
n	$n \times 7 =$	$7n$

Now find the value of the tenth term.

$$7n = 7 \cdot \text{}$$

Replace n with .

$$= \text{}$$

Multiply.

The value of the tenth term in the sequence is .

Check Your Progress Use words and symbols to describe the value of each term as a function of its position. Then find the value of the tenth term in the sequence.

Position	1	2	3	4	n
Value of Term	9	18	27	36	■

EXAMPLE Make a Table

1 TIME There are 60 seconds in 1 minute. Make a table and write an algebraic expression relating the number of seconds to the number of minutes. Then find how many seconds it takes Shaila to walk to school if it takes her 9 minutes.

Notice that the number of minutes times 60 gives the number of seconds. So, to find how long it takes Shaila to walk to school, use the expression

$$\square \cdot$$

$$60n = 60 \cdot \square \quad \text{Replace } n \text{ with } \square.$$

$$= \square \quad \text{Multiply.}$$

Minutes	Seconds
1	<input type="text"/>
2	<input type="text"/>
3	<input type="text"/>
4	<input type="text"/>
n	<input type="text"/>

So, it takes Shaila to walk to school.

Check Your Progress **TIME** There are 24 hours in 1 day. Make a table and write an algebraic expression relating the number of hours to the number of days. Then find how many hours Hayden has to finish his science project if he has exactly 6 days.

EXAMPLE

3 TEST EXAMPLE The table shows the number of plants in a garden, based on the number of rows. Which expression was used to find the number of plants in n rows?

- A $n + 3$ C $3n$
 B $n - 3$ D $3n + 1$

Number of Rows	Number of Plants
1	4
2	7
3	10
4	13
n	■

Read the Item To find the expression, determine the function.

Solve the Item Notice that the values 4, 7, 10, 13, ...

increase by , so the rule contains $3n$. Therefore, choices

and can be eliminated.

If the rule were simply $3n$, then the value for position 1 would be 3×1 or 3. But this value is 4. So, choice can be eliminated.

This leaves choice . Test a few values.

Row 1: $3n + 1 = 3(1) + 1 =$

Row 3: $3n + 1 = 3(3) + 1 =$

So, the answer is .

Check Your Progress

MULTIPLE CHOICE The table shows the number of students allowed to go on a field trip based on the number of adults accompanying them. Which expression was used to find the number of students for n adults?

- F $n - 1$ H $n + 5$
 G $5n - 1$ J $5n$

Number of Adults	Number of Students
1	4
2	9
3	14
4	19
n	■

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Write an equation to describe a proportional situation.

EXAMPLE Write an Equation for a Function

- Write an equation to represent the function displayed in the table.

Input, x	1	2	3	4	5
Output, y	9	18	27	36	45

Examine how the value of each input and output changes. Each output y is equal to the input x . So, the equation that represents the function is .

Check Your Progress

Write an equation to represent the function displayed in the table.

Input, x	1	2	3	4	5
Output, y	11	22	33	44	55

EXAMPLES

BOOKS Javier sells handmade notebooks. He charges \$25 for each book.

- Make a table to show the relationship between the number of books sold b and the total amount Javier earns t .

The total earned (output) is equal to the number of books sold (input).

Books Sold, b	Multiply by 25	Total Earned (\$), t
1	1×25	<input type="text"/>
2	2×25	<input type="text"/>
3	3×25	<input type="text"/>
4	4×25	<input type="text"/>

- 3 Write an equation to find the total amount earned t for selling b books.

Study the table from Example 2.

Words
▼
Variable
▼
Equation

Total earned equals \$25 times the number of books sold.

Let represent the total earned and represent the number of books sold.

$$t = \text{$$

- 4 How much will Javier earn if he sells 7 books?

$$t = \text{$$

Write the equation.

$$t = \text{ or$$

Replace b with . Multiply.

Javier will earn for selling 7 notebooks.

Check Your Progress BABYSITTING Jenna babysits on the weekends. She charges \$8 for each hour.

- a. Make a table to show the relationship between the number of hours Jenna babysits h and the total amount she earns t .

--

- b. Write an equation to find the total amount earned t for h hours of babysitting.

- c. How much will Jenna earn if she babysits for 14 hours?

EXAMPLE

5 DOG GROOMING The table shows the amount that a kennel charges for grooming a dog. Write a sentence and an equation to describe the data. Then find the total cost of grooming 11 dogs.

Dogs Groomed, d	Total Cost (\$), t
1	12
2	24
3	36
4	48

The cost of grooming is per dog. The total cost t is \$12 times the number of dogs d . Therefore, $t =$. Use this equation to find the total cost t of grooming 11 dogs.

$t =$ Write the equation.

$t =$ or Replace d with . Multiply.

The total cost of grooming 11 dogs is .

Check Your Progress

CARS The table shows the amount that a rental car company charges to rent a car per day. Write a sentence and an equation to describe the data. Then find the total cost of renting a car for 9 days.

Days, d	Total Cost (\$), t
1	32
2	64
3	96
4	128

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

BRINGING IT ALL TOGETHER**STUDY GUIDE****FOLDABLES**

Use your **Chapter 6 Foldable** to help you study for your chapter test.

**VOCABULARY
PUZZLEMAKER**

To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 6, go to:

glencoe.com

**BUILD YOUR
VOCABULARY**

You can use your completed **Vocabulary Builder** (pages 144–145) to help you solve the puzzle.

6-1

Ratios and Rates

Write each ratio as a fraction in simplest form.

1. 7 red T-shirts out of 28 T-shirts

2. 10 sixth graders of 25 students

Write each rate as a unit rate.

3. 240 miles in 6 hours

4. 6 drinks for \$9.00

6-2

Ratio Tables

5. **INVITATIONS** Juana is writing invitations to her birthday party. She wrote 24 invitations in 60 minutes. If she wrote at a constant rate, use the ratio table to determine the number of invitations she wrote in 5 minutes.

Number of Invitations	24		<input type="text"/>
Time (min)	60		5

6. The table in Exercise 5 is called a ratio table. Explain why.

6-3

Proportions

Determine if the quantities in each pair of ratios or rates are proportional. Explain your reasoning and express each proportional relationship as a proportion.

7. 10 computers for 5 students; 30 computers for 15 students

8. 24 songs on 2 CDs; 48 songs on 3 CDs

6-4

Algebra: Solving Proportions

9. **WALKING** David walked 6 blocks in 18 minutes. At this rate, how many minutes would it take him to walk 24 blocks?

Solve each proportion.

10. $\frac{r}{12} = \frac{4}{24}$

11. $\frac{36}{6} = \frac{k}{54}$

12. $\frac{1}{5} = \frac{8}{m}$

6-5

Problem-Solving Investigation: Look for a Pattern

Solve. Use the *look for a pattern* strategy.

13. **NUMBER SENSE** Find the next two numbers in the following pattern: 9, 16, 25, 36, ...

6-6

Sequences and Expressions

Use words and symbols to describe the value of each term as a function of its position. Then find the value of the eighth term in the sequence.

14.

Position	1	2	3	4	n
Value of Term	15	30	45	60	■

15.

Position	4	5	6	7	n
Value of Term	20	21	22	23	■

6-7

Proportions and Equations

SPEED SKATING Matthew can speed skate an average of 12 meters per second.

16. Make a table to show the relationship between the total distance d that Matthew can skate in s seconds.

17. Write an equation to find the total distance d that Matthew can travel in s seconds.

18. How many meters can Matthew travel in 45 seconds?

ARE YOU READY FOR THE CHAPTER TEST?

Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 6.

Check the one that applies. Suggestions to help you study are given with each item.

I completed the review of all or most lessons without using my notes or asking for help.

- You are probably ready for the Chapter Test.
- You may want to take the Chapter 6 Practice Test on page 359 of your textbook as a final check.

I used my Foldables or Study Notebook to complete the review of all or most lessons.

- You should complete the Chapter 6 Study Guide and Review on pages 355–358 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may want to take the Chapter 6 Practice Test on page 359.

I asked for help from someone else to complete the review of all or most lessons.

- You should review the examples and concepts in your Study Notebook and Chapter 6 Foldable.
- Then complete the Chapter 6 Study Guide and Review on pages 355–358 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 6 Practice Test on page 359.

Student Signature

Parent/Guardian Signature

Teacher Signature

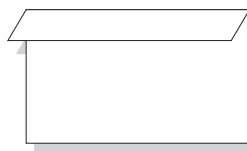
Percent and Probability



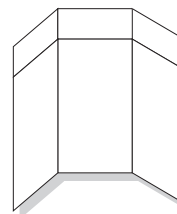
Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin this Interactive Study Notebook to help you in taking notes.

Begin with one sheet of 11" × 17" paper.

STEP 1 **Fold** a 2" tab along the long side of the paper.



STEP 2 **Unfold** and cut the paper and fold in thirds widthwise.



STEP 3 **Draw** lines along the folds and label the head of each column as shown. Label the front of the folded table with the chapter title.

Fraction	Percent	Decimal
$\frac{1}{2}$	→ 50%	→ 0.5



NOTE-TAKING TIP: It is helpful to ask questions about a topic before you study it. Before you begin each lesson, look quickly through the lesson and write one question about the material. As you read, record the answer to your questions.

BUILD YOUR VOCABULARY

This is an alphabetical list of new vocabulary terms you will learn in Chapter 7. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
complementary events			
circle graph			
experimental probability			
Fundamental Counting Principle			
outcomes			
percent			
population			
probability			

(continued on the next page)

Vocabulary Term	Found on Page	Definition	Description or Example
random			
sample			
sample space			
simple event			
survey [sir-vay]			
theoretical probability [thee-uh-REHT-uh-kuhl]			
tree diagram			

BUILD YOUR VOCABULARY (pages 169–170)**MAIN IDEA**

- Express percents as fractions and fractions as percents.

A percent is a ratio that compares a number to

KEY CONCEPT

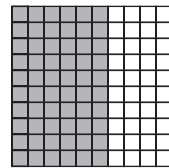
Percent to Fraction To write a percent as a fraction, write the percent as a fraction with a denominator of 100. Then simplify.

EXAMPLES Write a Percent as a Fraction**1** Write 60% as a fraction in simplest form.

60% means out of .

$$60\% = \frac{60}{\text{input}}$$

Definition of percent.



$$60\% = \text{input}$$

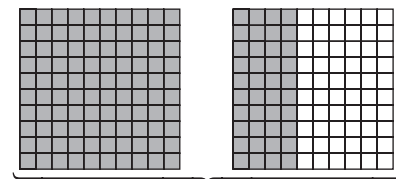
$$= \frac{\text{input}}{\text{input}} \text{ or } \text{input}$$

Simplify. Divide the numerator and denominator by the GCF, .

2 Write 140% as a mixed number in simplest form.

140% means

for every .



$$140\% = 1\frac{2}{5}$$

$$140\% = \frac{140}{\text{input}}$$

Definition of percent

$$= 1\frac{40}{\text{input}}$$

Write as a mixed number. Divide the numerator and denominator by the

GCF, .

$$= \text{input}$$

Check Your Progress Write each percent as a fraction or mixed number in simplest form.

a. 30%

b. 180%

EXAMPLE

LUNCH Use the table. What fraction of the class members preferred spaghetti for the school lunch?

School Lunch Choices	
Lunch	Percent
pizza	30
spaghetti	25
hamburger	20
chicken strips	15
soup	10

The table shows that of the class members preferred spaghetti.

$$\frac{\text{input}}{100} = \frac{\text{input}}{100} \quad \text{Definition of percent}$$

$$= \frac{\text{input}}{\text{input}} \quad \text{Simplify.}$$

So, of the class members preferred spaghetti for the school lunch.

Check Your Progress

ICE CREAM Use the table. What fraction of the students chose chocolate as their favorite flavor?

Students' Favorite Ice Cream Flavor	
Flavor	Percent
vanilla	37
chocolate	28
chocolate chip	20
strawberry	8
other	7

FOLDABLES**ORGANIZE IT**

Include some examples of percents written as fractions and fractions written as percents in your Foldable chart.

Fraction	Percent	Decimal
$\frac{1}{2}$	→ 50%	→ 0.5

EXAMPLES Write a Fraction as a Percent

- 4 Write $\frac{7}{10}$ as a percent.

$$\frac{7}{10} = \frac{n}{\square}$$

Write a proportion.

$$\frac{7}{10} = \frac{\square}{\square}$$

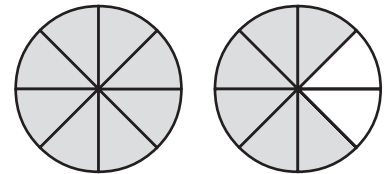
$\xrightarrow{\times 10}$
 $\xleftarrow{\times 10}$

Since $10 \times 10 = 100$, multiply 7 by 10 to find n .

So, $\frac{7}{10} = \frac{\square}{\square}$ or $\frac{\square}{\square}$.

- 5 Write a percent to represent the shaded portion of the model.

The portion shaded is $1\frac{6}{8}$ or $\frac{\square}{\square}$.



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

Write $1\frac{3}{4}$ as an improper fraction.

$$\frac{7}{4} = \frac{n}{100}$$

Write a proportion.

$$\frac{7}{4} = \frac{\square}{\square}$$

$\xrightarrow{\times 25}$
 $\xleftarrow{\times 25}$

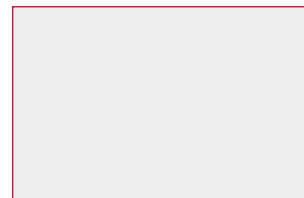
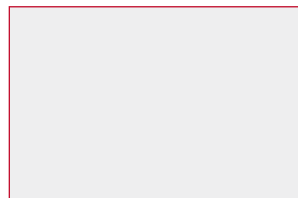
Since $4 \times 25 = 100$, multiply 7 by 25 to find n .

So, $\frac{175}{100}$ or $\frac{\square}{\square}$ of the model is shaded.

Check Your Progress

Write each fraction or shaded portion of each model as a percent.

a. $\frac{4}{10}$

**HOMEWORK ASSIGNMENT**

Page(s): _____

Exercises: _____

MAIN IDEA

- Sketch and analyze circle graphs.

BUILD YOUR VOCABULARY (pages 169–170)

A circle graph is used to data that are parts of a whole.

EXAMPLE Sketch Circle Graphs

- 1 ENTERTAINMENT** The table shows how many hours a group of teenagers spent playing video games in one week. Sketch a circle graph to display the data. Remember to label each section of the graph and give the graph a title.

Time Spent Playing Video Games	
Time (h)	Percent
0–1	35
1–2	10
2–3	25
3 or more	30

- Write a fraction to represent each percent.

$$35\% = \frac{35}{100} \text{ or } \boxed{}$$

$$10\% = \frac{10}{100} \text{ or } \boxed{}$$

$$25\% = \frac{25}{100} \text{ or } \boxed{}$$

$$30\% = \frac{30}{100} \text{ or } \boxed{}$$

- Since $10\% = \boxed{}$, mark

of the circle for

“1–2 hours.” Since

$30\% = \boxed{}$, mark a section

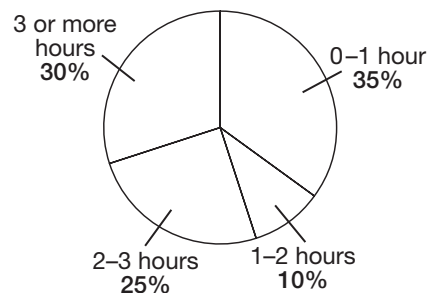
3 times as big as the section

for “1–2 hours” for “3 or more hours.” Since $25\% = \boxed{}$,

mark of the circle for “2–3 hours.” The remaining

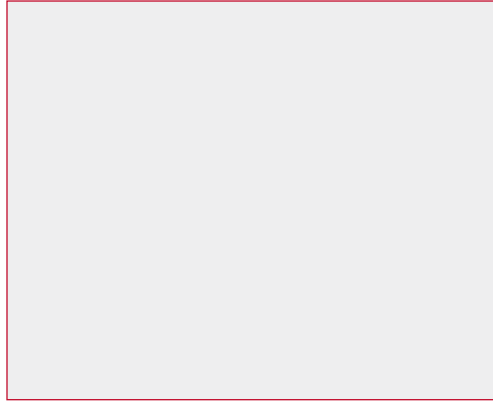
portion of the circle should be about 35% or of the circle for “0–1 hour.”

Time Spent Playing Video Games



Check Your Progress SPORTS

The table shows students' choices for favorite sport. Sketch a circle graph to display the data.



Favorite Sport	
Sport	Percent
Baseball	30
Tennis	19
Soccer	9
Hockey	10
Basketball	12
Football	20

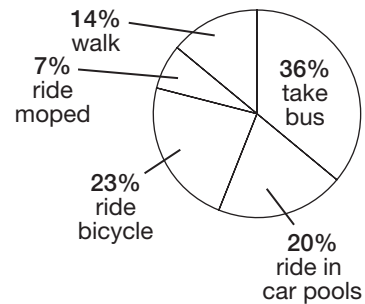
EXAMPLES Analyze Circle Graphs

TRANSPORTATION The circle graph shows which method of transportation students use to get to Martin Luther King, Jr., Middle School.

REMEMBER IT

When you read and interpret a circle graph, it is helpful to remember that the percents of all the sections add up to 100%.

**Method of Transportation
Used by Students to
Arrive at School**

**1** Which method of transportation do most students use?

The largest section of the graph is the section that represents . So, the method of transportation most students use is the .

- 3 Which two methods of transportation are used by the least amount of students?

The smallest sections of the graph are the sections that represent . So,

are the two methods of transportation used by the least amount of students.

FOLDABLES

ORGANIZE IT

In your Foldable, write the similarities and differences among circle graphs, bar graphs, and line graphs. Think about how each kind of graph is constructed.

Fraction	Percent	Decimal
$\frac{1}{2}$	→ 50%	→ 0.5

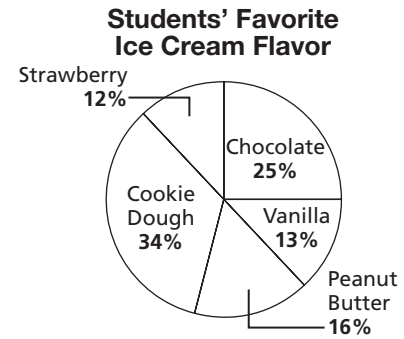
- 4 How does the number of students who ride mopeds to school compare to the number of students who take the bus?

The percent of students who ride a moped is and the percent of students who ride the bus is .

The number of students who take the bus is about times the number of students who ride a moped.

Check Your Progress

ICE CREAM The circle graph shows which flavor of ice cream students consider their favorite.



- a. Which flavor of ice cream do most students prefer?

- b. Which two flavors are the least favorite among these students?

- c. How does the number of students who prefer peanut butter ice cream compare to the number of students who prefer cookie dough ice cream?

HOMWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Express percents as decimals and decimals as percents.

KEY CONCEPT

Percent as Decimal To write a percent as a decimal, rewrite the percent as a fraction with a denominator of 100. Then write the fraction as a decimal.

EXAMPLES Write a Percent as a Decimal

Write each percent as a decimal.

1 **86%**

$$86\% = \frac{86}{\square}$$

$$= \square$$

Rewrite the percent as a fraction with a denominator of \square .

Write 86 hundredths as a decimal.

1 **1%**

$$1\% = \frac{1}{\square}$$

$$= \square$$

Rewrite the percent as a fraction with a denominator of \square .

Write 1 hundredth as a decimal.

3 **110%**

$$110\% = \frac{110}{\square}$$

$$= \square$$

Rewrite the percent as a fraction with a denominator of \square .

Write as a mixed number.

$$= \square \text{ or } \square$$

Write 1 and 10 hundredths.

Check Your Progress

Write each percent as a decimal.

a. 34%

b. 4%

c. 154%

EXAMPLES Write a Decimal as a Percent

Write each decimal as a percent.

KEY CONCEPTS

Decimal as Percent To write a decimal as a percent, write the decimal as a fraction whose denominator is 100. Then write the fraction as a percent.

4 0.44

$$0.44 = \frac{44}{\square}$$

$$= \square$$

Write 44 hundredths as a fraction.

Write the fraction as a percent.

5 1.81

$$1.81 = 1 \frac{81}{\square}$$

$$= \square$$

$$= \square$$

Write 1 and 81 hundredths as a mixed number.

Write the mixed number as an improper fraction.

Write the fraction as a percent.

Check Your Progress

Write each decimal as a percent.

a. 0.82

b. 1.68

EXAMPLE**6 CULTURE** In 2000, about 0.32 of Texas' population was Hispanic. Write 0.32 as a percent.

$$0.32 = \square$$

$$= \square$$

Write 32 hundredths as a fraction.

Write the fraction as a percent.

Check Your Progress**GASES** The atmosphere is composed of gases. About 0.78 of the atmosphere is nitrogen. Write 0.78 as a percent.
HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Find and interpret the probability of a simple event.

FOLDABLES

Write the definition of probability in your Foldable.

BUILD YOUR VOCABULARY (pages 169–170)

An **outcome** is a possible of an experiment.

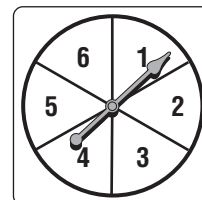
A **simple event** is one or a collection of outcomes.

Probability is the that some event will occur.

Outcomes occur at **random** if each outcome is likely to occur.

EXAMPLES Find Probability

There are six equally likely outcomes on the spinner shown.



1 Find the probability of landing on 1.

$$P(1) = \frac{\text{number of } \boxed{} \text{ outcomes}}{\text{number of } \boxed{} \text{ outcomes}}$$

$$= \boxed{}$$

The probability of landing on 1 is .

Find the probability of landing on 2 or 4.

$$P(2 \text{ or } 4) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

$$= \boxed{} \text{ or } \boxed{} \quad \text{Simplify.}$$

The probability of landing on 2 or 4 is .

BUILD YOUR VOCABULARY (pages 169–170)

Complementary events are two events in which either one or the other must happen, but they cannot happen at the same time. The sum of the probability of an event and its complement is or .

EXAMPLE Find Probability of the Complement

- 3** Use the spinner from Example 1. Find the probability of *not* landing on 6.

The probability of *not* landing on 6 and the probability of landing on 6 are . So, the sum of the probabilities is .

$$P(6) + P(\text{not } 6) = 1$$

$$\text{} + P(\text{not } 6) = 1 \quad \text{Replace } P(6) \text{ with } \text{}.$$

$$\frac{1}{6} + \text{} = 1 \quad \text{THINK } \frac{1}{6} \text{ plus what number equals } 1?$$

So, the probability of *not* landing on 6 is .

Check Your Progress A number cube is rolled.

- a. Find the probability of rolling a 4.

- b. Find the probability of rolling a number greater than 3.

- c. Find the probability of *not* rolling an even number.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

EXAMPLE

SPORTS A sportscaster predicted that the Tigers had a 75% chance of winning tonight. Describe the complement of this event and find its probability.

The complement of winning is *not* winning. The sum of the probabilities is .

$$P(\text{win}) + P(\text{not win}) = \text{}$$

$$\text{} + P(\text{not win}) = \text{}$$

Replace $P(\text{win})$ with .

$$75\% + \text{} = 100\%$$

THINK 75% plus what number equals 100%?

So, the probability that the Tigers will *not* win tonight is .

Check Your Progress

SLEEPOVER Celia guesses the probability that her parents will allow her to sleep over her best friend's house tonight is 55%. What is the probability that Celia will *not* be allowed to sleep over?

MAIN IDEA

- Construct sample spaces using tree diagrams or lists.

BUILD YOUR VOCABULARY (pages 169–170)

The set of all possible outcomes is called the **sample space**.

A **tree diagram** is a diagram that shows all possible outcomes of an event.

EXAMPLE Use a List to Find Sample Space

- 1 VACATION** While on vacation, Carlos can go snorkeling, boating, and paragliding. In how many ways can Carlos do the three activities? Make an organized list to show the sample space.

Make an organized list. Use S for snorkeling, B for boating, and P for paragliding.

There are Carlos can do the three activities.

Check Your Progress STUDENT COUNCIL

Ken, Betsy, Sally, and David are seated in a row at the head table at a student council meeting. In how many ways can the four students be seated? Make an organized list to show the sample space.

EXAMPLE Use a Tree Diagram to Find a Sample Space

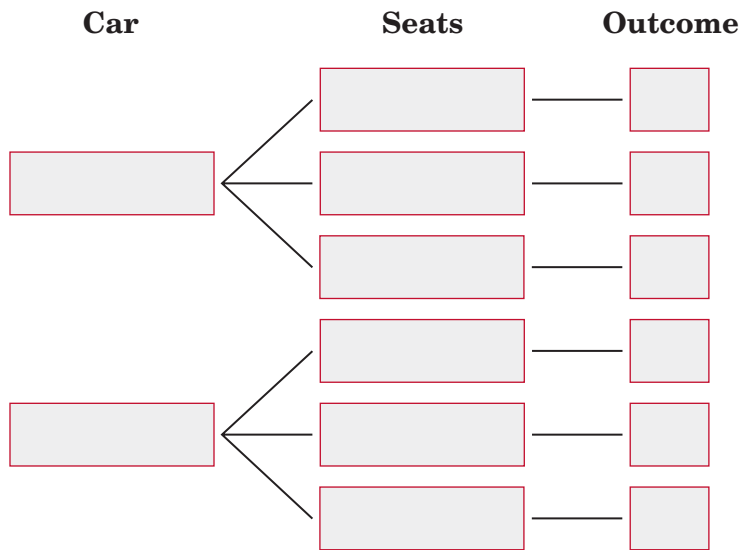
- 1** A car can be purchased with either two doors or four doors. You may also choose leather, fabric, or vinyl seats. Use a tree diagram to find all the buying options.

List each choice for the number of doors. Then pair each choice for the number of doors with each choice for the types of seats.

FOLDABLES**ORGANIZE IT**

In your Foldable, tell how a tree diagram is used to show a sample space.

Fraction	Percent	Decimal
$\frac{1}{2}$	→ 50%	→ 0.5



There are [] possible buying options.

REMEMBER IT

Outcomes are all the possible results of a probability event.

Check Your Progress

A pair of sneakers can be purchased with either laces or Velcro. You may also choose white, gray, or black sneakers. Use a tree diagram to find how many different sneakers are possible.

BUILD YOUR VOCABULARY (pages 169–170)

The **Fundamental Counting Principle** states that if there are outcomes for the first choice and outcomes for a second choice, then the total number of possible outcomes is $m \times n$.

EXAMPLE Use Fundamental Counting Principle

3 FLOWERS Chloe wants to buy a bouquet of flowers in a vase. The flower shop has roses, daffodils, and tulips, and has four different vases from which to choose. Use the Fundamental Counting Principle to find the total number of possible outcomes of a bouquet made up of two types of flowers in a vase.

number of outcomes for flower choice	•	number of outcomes for vase choice	=	total number of outcomes
$\underbrace{\hspace{4em}}$		$\underbrace{\hspace{4em}}$		$\underbrace{\hspace{4em}}$
<input type="text"/>	•	<input type="text"/>	=	<input type="text"/>

There are different outcomes.

Check Your Progress **PASTA** A restaurant offers a pasta bar where customers can choose from fettucine, linguine, and macaroni for their pasta choice, and three types of sauce. Use the Fundamental Counting Principle to find the total number of outcomes of a pasta dish with one type of pasta and one sauce.

**HOMEWORK
ASSIGNMENT**

Page(s): _____

Exercises: _____

MAIN IDEA

- Predict the actions of a larger group using a sample.

BUILD YOUR VOCABULARY (pages 169–170)

A **survey** is a question or set of questions designed to collect data about a specific group of people.

The **population** is the being studied in a survey.

A **sample** is a randomly selected group that is surveyed to represent a whole .

EXAMPLES Make Predictions Using Proportions

Julia asked every sixth person in the school cafeteria to name the kind of activity he or she would like to do for the school's spring outing.

Spring Outing	
Activity	Students
amusement park	15
baseball game	10
water park	10
art museum	5

1 What is the probability that a student will prefer an amusement park?

$$P(\text{amusement park}) = \frac{\text{number of students that prefer an amusement park}}{\text{number of students surveyed}}$$

$$= \text{$$

So, the probability that a student will prefer an amusement park is .

REVIEW IT

Use mental math to solve the proportion

$$\frac{1}{10} = \frac{x}{100}$$

(Lesson 6-4).

- 1 There are 408 students at Julia's school. Predict how many students prefer going to an amusement park.

Let a represent the number of students who prefer an amusement park.

$$\frac{\square}{\square} = \frac{a}{408}$$

Write a proportion.

$$\frac{\square}{\square} = \frac{a}{408}$$

Simplify $\frac{15}{40}$ by dividing the numerator and denominator by the GCF, 5.

$$\frac{3}{8} = \frac{a}{408}$$

$\begin{array}{c} \times 51 \\ \curvearrowright \\ \times 51 \end{array}$

Since $8 \times 51 = 408$, multiply 3 by 51 to find a .

$$\frac{3}{8} = \square \quad a = \square$$

Of the 408 students, about \square will prefer going to an amusement park.

Check Your Progress

HOCKEY Kyle asked every third hockey player in his league what type of snack they prefer to have after a hockey game.

Post Game Snack	
Snack	Students
fruit	12
chips	18
cookies	10

- a. What is the probability that a hockey player will prefer cookies for their snack?

- b. There are 128 hockey players in Kyle's league. Predict how many of the hockey players prefer cookies for their snack after a game.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

Problem-Solving Investigation: Solve a Simpler Problem

EXAMPLE

MAIN IDEA

- Solve problems by solving a simpler problem.

Solve. Use the *solve a simpler problem* strategy.

BAKE SALE Elmwood Middle School received 620 contributions for its bake sale. If 40% of the contributions were cookies, how many cookies did the school receive?

UNDERSTAND You know the school received contributions, and of them were cookies. You need to find the number of cookies the school received.

PLAN Solve a simpler problem by finding 10% of the number of contributions and then use the result to find 40% of the number of contributions.

SOLVE Since $10\% = \frac{10}{100}$ or $\frac{1}{10}$, 1 out of every 10 contributions was cookies.

$$620 \div 10 = \text{$$

Since there are four 10% in 40%, multiply 62 by 4. $62 \times 4 = \text{$

So, the school received cookies.

CHECK You know that $40\% = \frac{40}{100}$ or $\frac{2}{5}$. Since $\frac{2}{5}$ of 620 is 248, the answer is reasonable.

Check Your Progress

TALENT SHOW A total of 310 people attended a talent show at Jefferson Middle School. If 70% of those who attended were adults, how many adults attended the talent show?

MAIN IDEA

- Estimate the percent of a number.

EXAMPLES Estimate the Percent of a Number

1 Estimate 49% of 302.

49% is close to or .

Round 302 to .

of is . $\frac{1}{2}$ or *half* means to divide by 2.

So, 49% of 302 is about .

1 Estimate 80% of 1,605.

80% is .

Round 1,605 to since it is divisible by 10.

$\frac{1}{10}$ of 1,600 is . $\frac{1}{10}$ or 1 *tenth* means divide by 10.

So, $\frac{8}{10}$ of 1,600 is 8×160 or .

Thus, 80% of 1,605 is about .

KEY CONCEPTS

Percent-Fraction
Equivalents

$20\% = \frac{1}{5}$	$66\frac{2}{3}\% = \frac{2}{3}$
$25\% = \frac{1}{4}$	$70\% = \frac{7}{10}$
$30\% = \frac{3}{10}$	$75\% = \frac{3}{4}$
$33\frac{1}{3}\% = \frac{1}{3}$	$80\% = \frac{4}{5}$
$40\% = \frac{2}{5}$	$90\% = \frac{9}{10}$
$50\% = \frac{1}{2}$	$100\% = 1$
$60\% = \frac{3}{5}$	

Check Your Progress Estimate each percent.

a. 26% of 122

b. 40% of 1,207

EXAMPLE

1 MONEY A CD that originally cost \$11.90 is on sale for 30% off. If you have \$7, would you have enough money to buy the CD?

To determine whether you have enough money to buy the CD, you need to estimate 70% of .

METHOD 1 Use a proportion.

70% \approx 75% or and \$11.90 \approx .

$\frac{3}{4} = \frac{x}{12}$ Write the proportion.

$\frac{3}{4} = \frac{x}{12}$ Since $4 \times 3 = 12$, multiply 3 by 3.

$x =$

METHOD 2 Use mental math.

70% = and \$11.90 \approx .

$\frac{7}{10}$ of 12 is 8.4 or .

Since is more than \$7, you would not have enough money.

Check Your Progress

MONEY A poster that originally cost \$14.90 is on sale for 40% off. If you have \$10, would you have enough to buy the poster?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

EXAMPLE

3 TEST EXAMPLE Claire surveyed her classmates about their favorite vacation city in the United States. Predict the number of students out of 234 who would prefer New York City.

- A 20 C 110
B 60 D 240

Favorite City	Percent of Students
Los Angeles	23%
New York City	26%
Miami	33%
Boston	18%

Read the Item

You need to estimate the number of students out of 234 who would prefer New York City. 26% of the students chose New York City.

Solve the Item

26% is about 25% or . Round 234 to .

$\frac{1}{4}$ of 240 is .

So, about would prefer New York City.

The answer is .


Check Your Progress**MULTIPLE CHOICE**

Monica surveyed her basketball team about their favorite type of restaurant. Predict the number of students out of 318 who would prefer an Italian restaurant.

- F 32 H 120
G 50 J 200

Type of Restaurant	Percent of Students
Fast Food	8
Italian	12
Asian	33
Mexican	23
Steakhouse	24

STUDY GUIDE

	VOCABULARY PUZZLEMAKER	BUILD YOUR VOCABULARY
Use your Chapter 7 Foldable to help you study for your chapter test.	To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 7, go to: glencoe.com	You can use your completed Vocabulary Builder (pages 169–170) to help you solve the puzzle.

7-1

Percents and Fractions

Match each percent to the equivalent fraction in simplest form.

1. 75%

2. 82%

a. $\frac{41}{50}$

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

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

3. 24%

4. 55%

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

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

5. **SURVEYS** Felicia surveyed her class about their favorite kind of movies. Two fifths of the students said they liked comedies best. Write this fraction as a percent.

7-2

Circle Graphs

Complete each sentence.

6. A circle graph is used to

7. The percentages of the sections of a circle graph always add

up to .

8. In a circle graph, you can identify the greatest and least values

of a set of data by .

9. The interior of the circle graph represents a .

7-3

Percents and Decimals

Write each percent as a decimal.

10. 53% 11. 125% 12. 2%

13. Describe in words each step shown for writing 0.99 as a percent.

$$0.99 = \frac{99}{100} \quad \text{_____}$$

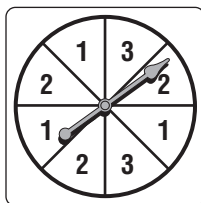
$$= 99\% \quad \text{_____}$$

7-4

Probability

Use the spinner for Exercises 14–20. Match each outcome to its theoretical probability. Answers may be used more than once.

14. spinning a 1
15. spinning a 3
16. spinning a 1 or a 2
17. spinning a 0
18. spinning a number
19. not spinning a 1
20. spinning a 2



- | | |
|------------------|------------------|
| a. 1 | e. $\frac{1}{4}$ |
| b. $\frac{5}{8}$ | f. $\frac{3}{4}$ |
| c. 0 | g. $\frac{3}{8}$ |
| d. $\frac{1}{2}$ | h. $\frac{1}{6}$ |

21. Write in words how you would read the expression $P(\text{event})$.

22. There is an 85% chance that it will rain tomorrow. Describe the complement of this event and find its probability.

7-5

Sample Spaces

Jessica is getting dressed for school. She can choose pink pants or red pants, a white shirt or a cream shirt, and tan shoes or black shoes.

23. Use a tree diagram to find how many possible outfits she can wear.

24. What is the probability she will choose pink pants, a white shirt, and tan shoes?

7-6

Making Predictions

25. Write the three characteristics of a good sample.

26. The table shows the results of a survey. Predict how many students out of 364 would prefer to have a talent show for a school assembly.

School Assembly	
Science Fair	6
Poetry Reading	5
Talent Show	17

7-7

Problem-Solving Investigation: Solve a Simpler Problem

Solve. Use the *solve a simpler problem* strategy.

27. **AMUSEMENT PARKS** An amusement park offers a discount of 20% to students. Admission tickets are \$40. About how much money would students pay with the discount?

28. **CARS** On average, 15 cars pass over Wilson Bridge every hour. At this rate, how many cars pass over Wilson Bridge in one week?

7-8

Estimating with Percents

Write the fraction for each percent.

29. $20\% =$ 30. $30\% =$ 31. $50\% =$

32. $100\% =$ 33. $33\frac{1}{3}\% =$ 34. $66\frac{2}{3}\% =$

Estimate each percent.

35. 23% of 90

36. 47% of 18

37. 61% of 29

ARE YOU READY FOR THE CHAPTER TEST?

Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 7.

Check the one that applies. Suggestions to help you study are given with each item.

I completed the review of all or most lessons without using my notes or asking for help.

- You are probably ready for the Chapter Test.
- You may want to take the Chapter 7 Practice Test on page 411 of your textbook as a final check.

I used my Foldables or Study Notebook to complete the review of all or most lessons.

- You should complete the Chapter 7 Study Guide and Review on pages 406–410 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may want to take the Chapter 7 Practice Test on page 411 of your textbook.

I asked for help from someone else to complete the review of all or most lessons.

- You should review the examples and concepts in your Study Notebook and Chapter 7 Foldables.
- Then complete the Chapter 7 Study Guide and Review on pages 406–410 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 7 Practice Test on page 411 of your textbook.

Student Signature

Parent/Guardian Signature

Teacher Signature

Systems of Measurement

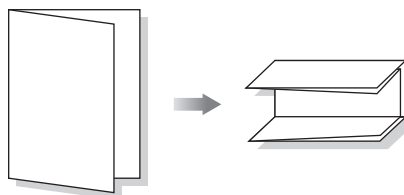


Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin this Interactive Study Notebook to help you in taking notes.

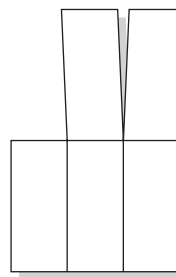
Begin with a sheet of 11" × 17" paper.

STEP 1

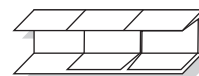
Fold the paper in half along the length. Then fold in thirds along the width.


STEP 2

Unfold and Cut along the two top folds to make three strips. Cut off the first strip.


STEP 3

Refold the two top strips down and fold the entire booklet in thirds along the length.


STEP 4

Unfold and draw lines along the folds. Label as shown.

Measurement	Length	Mass & Capacity
Metric		
Customary		



NOTE-TAKING TIP: When you take notes, be sure to record vocabulary words and definitions. In addition, record examples and complete computations.

BUILD YOUR VOCABULARY

This is an alphabetical list of new vocabulary terms you will learn in Chapter 8. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
capacity			
Celsius ($^{\circ}\text{C}$)			
centimeter			
cup			
degree			
elapsed time			
Fahrenheit ($^{\circ}\text{F}$)			
fluid ounce			
foot			
gallon			
gram			
inch			
kilogram			
kilometer			
liter			
mass			
meter			

(continued on the next page)

Vocabulary Term	Found on Page	Definition	Description or Example
metric system			
mile			
milligram			
milliliter			
millimeter			
ounce			
pint			
pound			
quart			
temperature			
ton			
yard			

MAIN IDEA

- Change units of length and measure length in the customary system.

KEY CONCEPT**Customary Units of Length**

1 inch (in.)
width of a quarter

1 foot (ft) = 12 in.
length of a large adult foot

1 yard (yd) = 3 ft
length from nose to fingertip

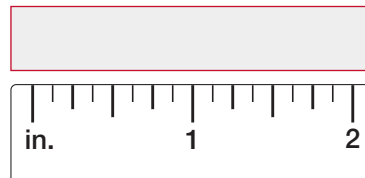
1 mile (mi) = 1,760 yd
10 city blocks

FOLDABLES Include these units under the Customary Length tab in your Foldable.

EXAMPLE Draw a Line Segment

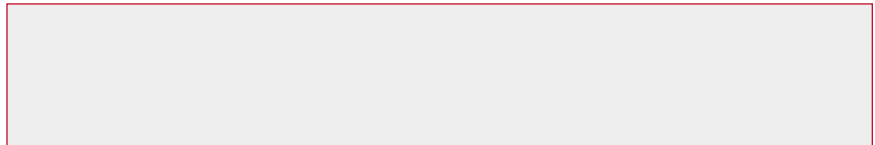
- 1 Draw a line segment measuring $1\frac{5}{8}$ inches.

Draw a line segment from to .

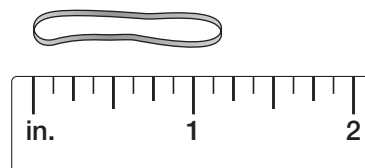
**Check Your Progress**

Draw a line segment measuring

$2\frac{3}{4}$ inches.

**EXAMPLE Measure Length**

- 1 **RUBBER BANDS** Measure the length of the rubber band to the nearest half, fourth, or eighth inch.

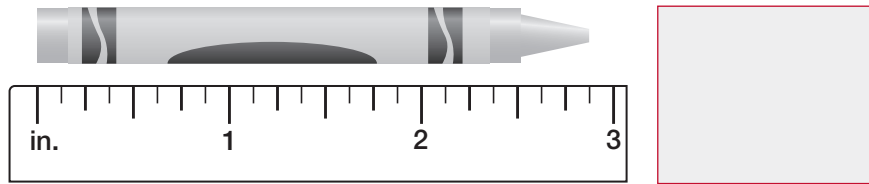


The rubber band is between inches and inches.

It is closer to inches.

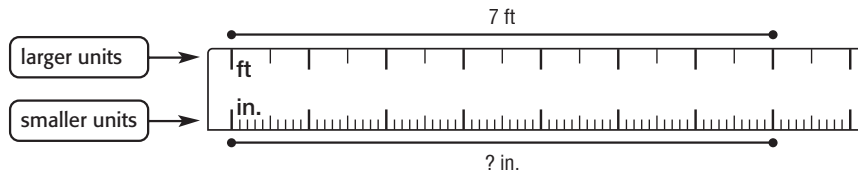
The length of the rubber band is about inches.

Check Your Progress **CRAYONS** Measure the length of the crayon to the nearest half, fourth, or eighth inch.



EXAMPLE Change Larger Units to Smaller Units

3 Complete $7 \text{ ft} = \square \text{ in.}$



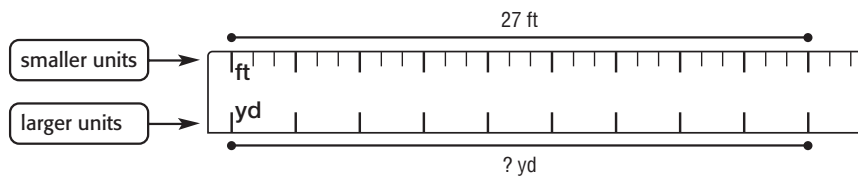
Since 1 foot = 12 inches, by .

$$7 \times \square = \square$$

So, 7 feet = inches.

EXAMPLE Change Smaller Units to Larger Units

4 Complete $27 \text{ ft} = \square \text{ yd.}$



Since 3 feet = 1 yard, by .

$$27 \div \square = 9$$

So, 27 feet = yards.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

Check Your Progress Complete.

a. $5 \text{ ft} = \square \text{ in.}$

b. $33 \text{ ft} = \square \text{ yd.}$

BUILD YOUR VOCABULARY (pages 197–198)

Capacity is the amount that can be held in a container.

MAIN IDEA

- Change units of capacity and weight in the customary system.

EXAMPLES Change Units of Capacity

Complete.

1 $5 \text{ qt} = \blacksquare \text{ pt}$

$5 \times \square = \square$

So, 5 quarts = \square pints.

You are changing a larger unit to a smaller unit.

Since 1 quart = \square pints,Multiply 5 by \square .

1 $80 \text{ fl oz} = \blacksquare \text{ pt}$

First, find the number of cups in 80 fluid ounces. Since 8 fluid ounces = \square cup, divide 80 by 8.

$80 \div \square = \square$

So, 80 fluid ounces = \square cups.

Next, find the number of pints in 10 cups.

Since 2 cups = \square pint, divide 10 by 2.

$10 \div \square = \square$

So, 80 fluid ounces = \square pints.**Check Your Progress** Complete.

a. $3 \text{ qt} = \blacksquare \text{ pt}$

b. $96 \text{ fl oz} = \blacksquare \text{ pt}$

KEY CONCEPT**Customary Units of Capacity**

1 fluid ounce (fl oz)

1 cup (c) = 8 fl oz

1 pint (pt) = 2 c

1 quart (qt) = 2 pt

1 gallon (gal) = 4 qt

Customary Units of Weight

1 ounce (oz)

1 pound (lb) = 16 oz

1 ton (T) = 2,000 lb

FOLDABLES Include these units in your notes.

EXAMPLES Change Units of Weight

- 3 ELEPHANTS** An adult male elephant weighs 11,000 pounds. How many tons is this?

$$11,000 \text{ lb} = \blacksquare \text{ T}$$

THINK pounds

= ton

$$11,000 \div \text{} = \text{}$$

Divide to change pounds to tons.

So, 11,000 pounds = tons.

- 4 BANQUETS** How many people at a banquet can be served 4 ounces of carrots from 8 pounds of carrots?

First, find the total number of ounces in 8 pounds.

$$8 \times \text{} = \text{}$$

Multiply by to change pounds to ounces.

$$\text{} \text{ oz} \div 4 \text{ oz} = \text{}$$

Next, find how many sets of 4 ounces are in ounces.

So, people can be served 4 ounces of carrots.

Check Your Progress

- c. BOULDER** A boulder in a national park is estimated to weigh 4,000 pounds. How many tons is this?

- d. CHOCOLATE** How many 4-ounce bags of chocolate candy can be made with 7 pounds of chocolate candy?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Use metric units of length.

BUILD YOUR VOCABULARY (pages 197–198)

A meter (m) is the unit of in the metric system.

The metric system is a system of and measures.

KEY CONCEPT**Metric Units of Length**

1 millimeter (mm)
thickness of a dime

1 centimeter (cm)
half the width of a penny

1 meter (m)
width of a doorway

1 kilometer (km)
six city blocks

FOLDABLES Be sure to write these units under the Metric Length tab.

EXAMPLES Use Metric Units of Length

Write the metric unit of length you would use to measure each of the following.

1 width of a classroom

The width of a classroom is than the width of a doorway, but much than the length of six city blocks. So, the is an appropriate unit of measure.

2 the height of a drinking fountain

The of a drinking fountain is close to the of a doorway. So, the is an appropriate unit of measure.

3 distance from the East Coast to the West Coast

The distance from the East Coast is much than six city blocks. So, the is an appropriate unit of measure.

REMEMBER IT

One centimeter is about the width of your index finger.

4 width of a wide-tip marker

The width of a wide-tip marker is close to the width of a penny. So, the is an appropriate unit of measure.

Check Your Progress Write the metric unit of length you would use to measure each of the following.

a. length of a toothpick

b. distance from your home to your school

c. length of a flashlight

d. length of a minivan

EXAMPLE Estimate and Measure Length

5 PECANS Estimate the metric length of the pecan. Then measure to find the actual length.



The length of the pecan appears to be the width of a penny.

So, the pecan is about . Use a ruler

to measure the actual length of the pecan. The pecan is

long.

Check Your Progress **GEOMETRY** Estimate the length of the line segment shown below. Then measure to find the actual length.



HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Use metric units of mass and capacity.

KEY CONCEPT**Metric Units of Mass**

1 milligram (mg)
grain of salt

1 gram (g)
small paper clip

1 kilogram (kg)
six medium apples

Metric Units of Capacity

1 milliliter (mL)
eyedropper

1 liter (L)
small pitcher

FOLDABLES Be sure to include these metric units of mass and capacity in your Foldable.

BUILD YOUR VOCABULARY (pages 197–198)

The mass of an object is the amount of material it contains.

EXAMPLE Use Metric Units of Mass

Write the metric unit of mass that you would use to measure the following. Then estimate the mass.

1 push pin

A pushpin has a mass than one small paper clip, but than six apples. The is the appropriate unit.

Estimate A pushpin is a little than a paper clip.

One estimate for the mass of a pushpin is .

EXAMPLE Use Metric Units of Capacity

Write the metric unit of capacity that you would use to measure the following. Then estimate the capacity.

1 the fruit juice in a punch bowl

A punch bowl has a capacity about the as a small pitcher. So, the is the appropriate unit. One estimate for the fruit juice in a punch bowl is .

Check Your Progress

Write the metric unit of mass or capacity that you would use to measure each of the following. Then estimate the mass or capacity.

a. pencil

b. bicycle

c. small cup of juice

d. large pitcher of milk

EXAMPLE**Compare Metric Units**

BATS A biologist weighed several different types of bats. The table shows her results. Is the total mass of the bats more or less than one kilogram?

Type of Bat	Mass (g)
Spotted Bat	18
Evening Bat	9
Hoary Bat	34
Free-tailed Bat	15
Northern Yellow Bat	31

Find the total mass.

$$\boxed{} \text{ g} + \boxed{} \text{ g} + \boxed{} \text{ g} + \boxed{} \text{ g} + \boxed{} \text{ g} = \boxed{} \text{ g}$$

Since 1 kilogram = $\boxed{}$ grams and 107 grams is less than 1,000 grams, the total mass of the bats is $\boxed{}$ one kilogram.

Check Your Progress

PUPPIES A veterinarian weighed four puppies from the same litter. The table shows his results. Is the total mass of the puppies more or less than one kilogram?

Puppy	Mass (g)
Max	625
Dotty	810
Sam	790
Molly	575

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

Problem-Solving Investigation: Use Benchmarks

EXAMPLE

MAIN IDEA

- Solve problems using benchmarks.

Solve. Use a benchmark.

COOKIES You need 200 grams of flour to make cookies, but all you have is a balance. It doesn't have any calibrations to show mass. You do have a package of rice that you know is 794 grams. How can you measure the flour?

UNDERSTAND You need to measure grams of flour using a balance and a package of rice that is grams.

PLAN A benchmark is a measurement by which other items can be measured. Since the package of rice is about 800 grams and you need to measure 200 grams, divide the rice into equal portions. Each portion will be about grams. Use one portion of the rice to measure an amount of flour with the same mass.

SOLVE Balance one portion of the rice and a cup of flour. Since you know one portion of rice is about 200 grams, adjust until the two are balanced.

CHECK Since $800 \div 4 =$, you know that each of the four portions of rice is about grams. By balancing one portion of rice with the flour, you know the rice and flour are equal. Therefore, you have 200 grams of flour for the cookies.

Check Your Progress **Solve. Use a benchmark.**

COOKING You need $2\frac{1}{4}$ cups of water for a casserole, but all you have is an empty 8-ounce soup can. Describe a way you can measure the water.

HOMWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Changing Metric Units

EXAMPLES Change Metric Units

MAIN IDEA

- Change units within the metric system.

Complete.

1 ■ mm = 489 cm

Since 1 centimeter = millimeters, by .

$$489 \times \text{} = \text{}$$

So, mm = 489 cm.

1 147 g = ■ kg

Since grams = 1 kilogram, 147 by .

$$147 \div \text{} = \text{}$$

So, 147 g = kg.

Check Your Progress Complete.

a. ■ mm = 173 cm

b. 256 g = ■ kg

REMEMBER IT

King Henry died Monday drinking chocolate milk. You can use this mnemonic, or memory aid, to remember the order of prefixes in the metric system: *kilo-*, *hecto-*, *deca-*, meters, *deci-*, *centi-*, *milli-*. Try writing your own mnemonic for the order of the prefixes.

EXAMPLE

3 TRAINING Use the table to determine the total number of kilometers Brady swam during three days of practice for a 200-meter race.

Practices	
Day	Distance (m)
Monday	300
Tuesday	420
Wednesday	580

First, find the total number of Brady swam.

$$300 + 420 + 580 = \text{ meters}$$

Change 1,300 meters to .

$$1,300 \div 1,000 = \text{ kilometers}$$

Brady swam kilometers during the three days of practice.

Check Your Progress

HIKING Use the table to determine the total number of kilometers Suhele hiked during three days of camping.

Hiking	
Day	Distance (m)
Friday	50
Saturday	900
Sunday	850

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Add and subtract measures of time.

KEY CONCEPT

Units of Time

1 **second** (s)
time needed to say 1,001

1 **minute** (min) = 60
seconds
time for 2 average TV
commercials

1 **hour** (h) = 60 minutes
time for 2 weekly TV
sitcoms

EXAMPLE Add Units of Time

- 1 Find the sum of 3 h 15 min 52 s and 1 h 42 min 11 s.

Estimate $3\text{ h } 15\text{ min } 52\text{ s} + 1\text{ h } 42\text{ min} \approx$

h + h or 5 h.

3 h	15 min	52 s	Add seconds first, then minutes,
+ 1 h	42 min	11 s	and finally hours.

h min s 63 seconds is greater than
60 seconds or minute.

$4\text{ h } 57\text{ min } (1\text{ min } 3\text{ s})$ Rename 63 seconds.

4 h min 3 s Add minutes.

Check for Reasonableness $4\text{ h } 58\text{ min } 3\text{ s} \approx 5\text{ h} \checkmark$

EXAMPLE

- 1 **MARATHONS** The table shows the times of the winners of the men's and women's races at the 2007 Boston Marathon. How much faster was Cheruiyot's time than Grigoyeva's time?

Race	Runner	Time
Men's	Cheruiyot	2 h 14 min 13 s
Women's	Grigoyeva	2 h 29 min 18 s

Estimate $2\text{ h } 29\text{ min } 18\text{ s} - 2\text{ h } 14\text{ min } 13\text{ s} \approx$

min - min or min

2 h 29 min	18 s	Subtract the seconds first,
- 2 h 14 min	13 s	then minutes, and finally
		the hours.

min s

Cheruiyot's time was minutes seconds faster than
Grigoyeva's time. $15\text{ min } 5\text{ s} \approx 15\text{ min} \checkmark$

REVIEW IT

How is renaming when you subtract hours and minutes similar to renaming when you subtract mixed numbers? (Lesson 5-5)

Check Your Progress

- a. Find the sum of 2 h 18 min 37 s and 5 h 31 min 11 s.

- b. Jeremy ran a local marathon in 2 hours 53 minutes 47 seconds. His best friend Sam ran the same marathon in 2 hours 38 minutes 55 seconds. How much faster did Sam run?

BUILD YOUR VOCABULARY (pages 197–198)

Elapsed time is how much time has passed from beginning to end.

EXAMPLE Elapsed Time

- MOVIES** A movie begins at 2:45 P.M. and ends at 4:22 P.M. How long is the movie?

You need to find out how much time has elapsed.

2:45 P.M. to 3:00 P.M.

is minutes.

3:00 P.M. to 4:22 P.M.

is hour minutes.

$$\begin{array}{r} + \quad 1 \text{ h} \quad 15 \text{ min} \\ \quad \quad \quad 22 \text{ min} \\ \hline \end{array}$$

h min

The length of the movie is hour minutes.

Check Your Progress

- BUSES** A bus leaves the station at 6:45 A.M. If it arrives at its destination at 8:10 A.M., how long was its trip?

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

Measures of Temperature

MAIN IDEA

- Choose and estimate reasonable temperatures.

BUILD YOUR VOCABULARY (pages 197–198)

Temperature is the measure of or of an object or environment. Temperature is measured in degrees. In the system, temperature is measured in degrees Celsius ($^{\circ}\text{C}$). In the system, temperature is measured in degrees Fahrenheit ($^{\circ}\text{F}$).

EXAMPLES Choose Reasonable Temperatures

Choose the more reasonable temperature for each.

1 hot water in a bathtub: 62°F or 102°F

Normal body temperature is , so hot water in a bathtub would be warmer than your body temperature. So, is a more reasonable temperature.

1 ice cream: 16°C or -2°C

On the Celsius scale, water freezes at and ice cream needs to be kept frozen. So, would be too warm for the temperature of ice cream. The more reasonable temperature is .

Check Your Progress Choose the more reasonable temperature for each.

a. inside a restaurant: 22°C or 40°C

b. cold glass of lemonade: 50°F or 70°F

EXAMPLES Give Reasonable Temperatures

Give a reasonable estimate of the temperature in degrees Fahrenheit and degrees Celsius for each situation.

1 inside a freezer

The temperature inside a freezer should be colder than room temperature and also cold enough for water to .

So, a reasonable temperature is °F and °C.

4 water in a Florida lake

Water in a Florida lake would be warm but not .

So, a reasonable temperature is °F and °C.

Check Your Progress

Give a reasonable estimate of the temperature in degrees Fahrenheit and degrees Celsius for each situation.

a. water skiing

b. snow sledding

HOMWORK ASSIGNMENT

Page(s):

Exercises:

STUDY GUIDE**FOLDABLES**

Use your **Chapter 8 Foldable** to help you study for your chapter test.

**VOCABULARY
PUZZLEMAKER**

To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 8, go to

glencoe.com

**BUILD YOUR
VOCABULARY**

You can use your completed **Vocabulary Builder** (pages 197–198) to help you solve the puzzle.

8-1**Length in the Customary System**

Underline the correct term to complete each sentence.

- To change from smaller to larger units of length, (divide, multiply).
- The (meter, mile) is a common unit of length in the customary system.

Complete.

3. 24 in = ft 4. 9 ft = yd 5. 5 ft = in

6. Draw a line segment measuring $3\frac{3}{4}$ inches.

8-2**Capacity and Weight in the Customary System**

7. Order pint, gallon, cup, fluid ounce, and quart from the smallest to largest

Complete.

8. 4 c = pt 9. 2 c = fl oz 10. 1 gal = qt

11. 6,000 lb = T 12. 64 oz = lb 13. 5 lb = oz

8-3

Length in the Metric System

Match each of the following with the metric unit of length you would use to measure it. Answers may be used more than once.

14. pencil 15. distance from Paris to Rome 16. width of a basketball court 17. cover of a book 18. width of a thin wire

- a. meter
- b. millimeter
- c. inch
- d. kilometer
- e. centimeter

8-4

Mass and Capacity in the Metric System

Match each of the following with the metric unit of mass or capacity you would use to measure it. Answers may be used more than once.

19. bottle of food coloring 20. bottle of orange juice 21. sixth grader 22. silver dollar 23. vitamin tablet

- a. liter
- b. kilogram
- c. ounce
- d. milligram
- e. gram
- f. milliliter

8-5

Problem-Solving Investigation: Use Benchmarks

24. **WALKING** Sophia would like to walk 2 miles every day around her neighborhood. She knows that 1 mile is about 10 blocks. Describe a way she could estimate the distance she should walk.

8-6

Changing Metric Units

Underline the correct term to complete each sentence.

- 25. One thousand grams is equivalent to (one kilogram, one milligram).
- 26. One hundred meters is equivalent to (one hectometer, one centimeter).
- 27. One hundredth of a meter is equivalent to (one hectometer, one centimeter).

Complete.

- 28. $525\text{ g} = \square\text{ kg}$ 29. $258\text{ cm} = \square\text{ m}$ 30. $1\text{ m} = \square\text{ km}$
- 31. $3,000\text{ mg} = \square\text{ g}$ 32. $74\text{ L} = \square\text{ mL}$ 33. $260\text{ cL} = \square\text{ L}$

8-7

Measures of Time

Match each sum or difference to the correct answer.

- 34. $2\text{ h } 36\text{ min } 9\text{ s} + 1\text{ h } 28\text{ min } 16\text{ s}$
 - 35. $6\text{ h } 35\text{ min } 18\text{ s} + 2\text{ h } 12\text{ min } 43\text{ s}$
 - 36. $9\text{ h } 13\text{ min } 35\text{ s} - 4\text{ h } 26\text{ min } 17\text{ s}$
- a. 4 h 4 min 25 s
 - b. 8 h 48 min 1 s
 - c. 4 h 47 min 18 s
 - d. 59 min 51 s

- 37. **HOMEWORK** Destyne started her homework at 3:50 P.M. She finished her homework at 5:25 P.M. How long did it take Destyne to do her homework?

8-8

Measures of Temperature

Underline the more reasonable temperature for each.

- 38. eggs boiling on the stove: 75°C or 100°C
- 39. healthy boy: 98.8°F or 101°F
- 40. frozen pizza: 32°C or -15°C
- 41. inside the mall: 50°F or 71°F

ARE YOU READY FOR THE CHAPTER TEST?

Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 8.

Check the one that applies. Suggestions to help you study are given with each item.

- I completed the review of all or most lessons without using my notes or asking for help.
- You are probably ready for the Chapter Test.
 - You may want to take the Chapter 8 Practice Test on page 465 of your textbook as a final check.

- I used my Foldables or Study Notebook to complete the review of all or most lessons.
- You should complete the Chapter 8 Study Guide and Review on pages 461–464 of your textbook.
 - If you are unsure of any concepts or skills, refer back to the specific lesson(s).
 - You may want to take the Chapter 8 Practice Test on page 465.

- I asked for help from someone else to complete the review of all or most lessons.
- You should review the examples and concepts in your Study Notebook and Chapter 8 Foldables.
 - Then complete the Chapter 8 Study Guide and Review on pages 461–464 of your textbook.
 - If you are unsure of any concepts or skills, refer back to the specific lesson(s).
 - You may also want to take the Chapter 8 Practice Test on page 465.

Student Signature

Parent/Guardian Signature

Teacher Signature

Geometry: Angles and Polygons

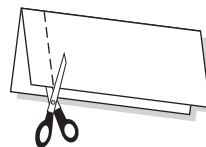


Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin this Interactive Study Notebook to help you in taking notes.

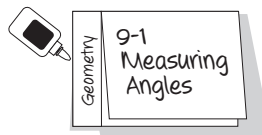
Begin with seven half-sheets of notebook paper.

STEP 1

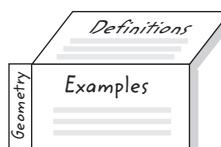
Fold a sheet in half lengthwise. Then cut a 1" tab along the left edge through one thickness.


STEP 2

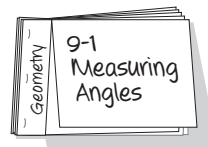
Glue the 1" tab down. Write the word *Geometry* on this tab and the lesson and title on the front tab.


STEP 3

Write *Definitions* and *Examples* under the tab


STEP 4

Repeat Steps 1–3 for each lesson using the remaining paper. Staple them to form a booklet.



NOTE-TAKING TIP: Outlining can help you understand and remember complicated information. As you read a lesson, take notes on the material. Include definitions, concepts, and examples. After you finish each lesson, make an outline of what you learned.

BUILD YOUR VOCABULARY

This is an alphabetical list of new vocabulary terms you will learn in Chapter 9. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
acute angle [uh-KYOOT]			
acute triangle			
angle			
complementary angles			
congruent angles [kuhn-GROO-uhnt]			
congruent figures			
congruent segments			
corresponding sides			
degree [dih-GREE]			
equilateral triangle [e-kwuh-LA-tuh-rul]			
isosceles [eye-SAH-suh-LEEZ]			
line segment			
obtuse angle [ahb-TOOS]			

(continued on the next page)

Vocabulary Term	Found on Page	Definition	Description or Example
obtuse triangle			
parallelogram			
quadrilateral [KWAH-druh-LA-tuh-ruhl]			
rectangle			
rhombus [RAHM-buhs]			
right angle			
right triangle			
scalene triangle [SKAY-leen]			
side			
similar figures			
square			
straight angle			
supplementary angles			
trapezoid			
triangle			
vertex			
vertical angles			

MAIN IDEA

- Measure and classify angles.

BUILD YOUR VOCABULARY (pages 219–220)

Angles have sides that share a

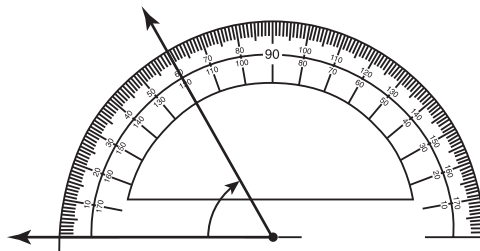
called the **vertex**.

The **degree** is the most common unit of measure for .

EXAMPLES Measure Angles

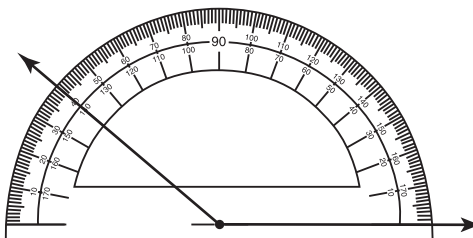
Use a protractor to find the measure of each angle.

1



Align the of the protractor with the vertex of the angle. The angle measures .

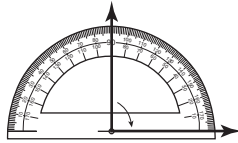
2



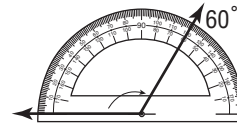
The angle measures .

Check Your Progress Use a protractor to find the measure of each angle.

a.



b.



BUILD YOUR VOCABULARY (pages 219–220)

A **right angle** has a measure of exactly .

An **acute angle** has a measure of less than .

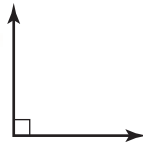
An **obtuse angle** has a measure between and .

A **straight angle** has a measure of exactly .

EXAMPLES Classify Angles

Classify each angle as *acute*, *obtuse*, *right*, or *straight*.

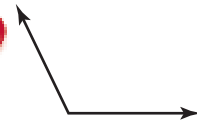
3



The angle is .

So, it is a angle.

4



The angle is larger than a angle, but smaller than a angle.

So, it is an angle.

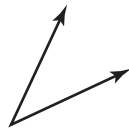
HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Check Your Progress Classify each angle as *acute*, *obtuse*, *right*, or *straight*.

a.



b.



MAIN IDEA

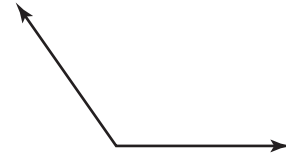
- Estimate measures of angles and draw angles.

REMEMBER IT

When you check your answers for reasonableness, keep in mind that a right angle measures 90° and that half of a right angle measures 45° .

EXAMPLE Estimate Angle Measure

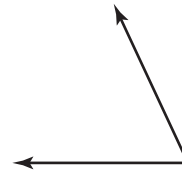
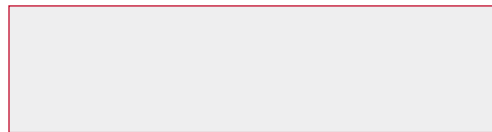
- Estimate the measure of the angle.



The angle is greater than and less than

. So, a reasonable estimate is about .

Check Your Progress Estimate the measure of the angle.

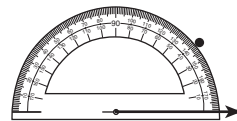
**EXAMPLE** Draw an Angle

- Use a protractor and a straightedge to draw a 39° angle.

Step 1 Draw one side of the angle. Then mark the and draw an arrow.



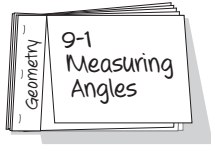
Step 2 Place the of the protractor on the vertex. Align the mark labeled on the protractor with the line. Find on the correct scale and make a dot.



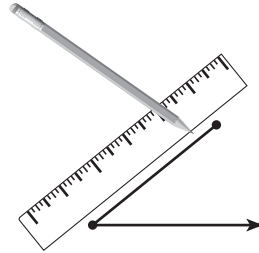
(continued on the next page)

FOLDABLES**ORGANIZE IT**

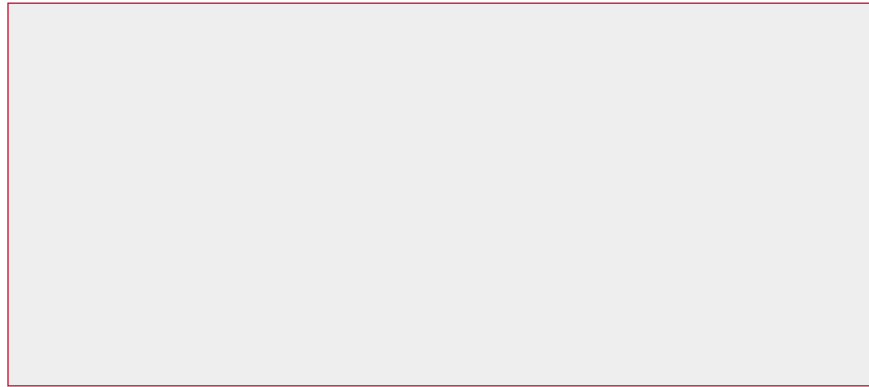
On the Lesson 9-2 section of your Foldable, write information on estimating angle measures and drawing angles. Include some of your own examples.



Step 3 Remove the protractor and use a to draw the side that connects the and the dot.



Check Your Progress Use a protractor and a straightedge to draw a 64° angle.

**HOMEWORK ASSIGNMENT**

Page(s):

Exercises:

MAIN IDEA

- Classify and apply angle relationships.

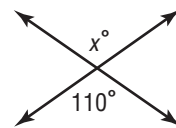
BUILD YOUR VOCABULARY (pages 219–220)

When two lines intersect, they form two pairs of opposite angles called .

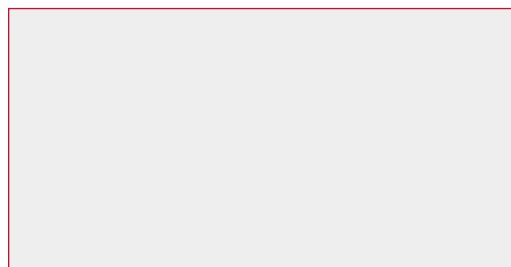
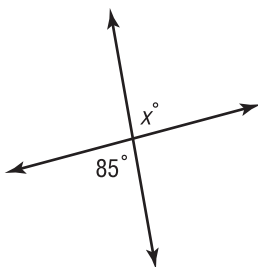
Angles with the same measure are **congruent angles**.

EXAMPLE Find a Missing Angle Measure**1** Find the value of x in the figure.

The angle labeled x° and the angle labeled 110° are angles. Therefore, they are congruent. So, the value of x is .

**Check Your Progress**

Find the value of x in the figure.

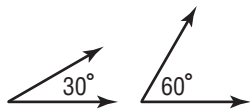
**BUILD YOUR VOCABULARY** (pages 219–220)

Two angles are **supplementary** if the sum of their measures is .

Two angles are **complementary** if the sum of their measures is .

EXAMPLE Classify Pairs of Angles

1 Classify the pair of angles as *complementary*, *supplementary*, or *neither*.

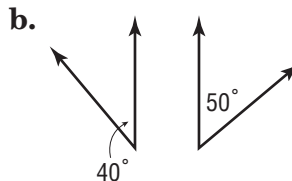


$$30^\circ + 60^\circ = \square$$

Since the sum of their measures is \square , the angles are \square .

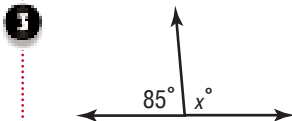
Check Your Progress Classify each pair of angles as *complementary*, *supplementary*, or *neither*.





EXAMPLE Find Missing Angle Measures

Find the value of x in each figure.



Since the angles form a straight line, they are

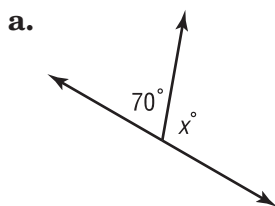
$$85^\circ + x^\circ = 180^\circ$$

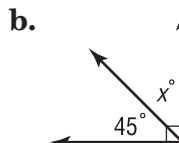
Definition of supplementary angles.

$$85^\circ + \square = 180^\circ$$

So, the value of x is \square .

Check Your Progress Find the value of x in each figure.





HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Classify triangles and find missing angle measures in triangles.

BUILD YOUR VOCABULARY (pages 219–220)

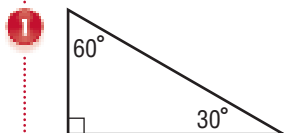
A triangle with all angles is called an **acute triangle**.

A triangle with is called a **right triangle**.

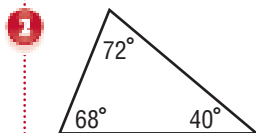
A triangle with one angle is called an **obtuse triangle**.

EXAMPLES Classify a Triangle by Its Angles

Classify each triangle as *acute*, *right*, or *obtuse*.



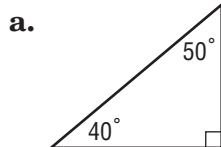
The 90° angle is a right angle. So, the triangle is a triangle.

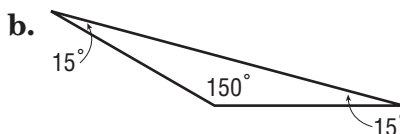


All the angles are . So, the triangle is an triangle.

Check Your Progress

Classify each triangle as *acute*, *right*, or *obtuse*.





KEY CONCEPT**Sum of Angle Measures in a Triangle**

The sum of the measures of the angles in a triangle is 180° .

EXAMPLE Find Angle Measures

PARK A city park is in the shape of a triangle. Find the value of x in the triangle.

The three angles marked are the angles of a triangle. Since the sum of the angle measures in a triangle is

$$\boxed{}, x^\circ + 36^\circ + 36^\circ = 180^\circ.$$

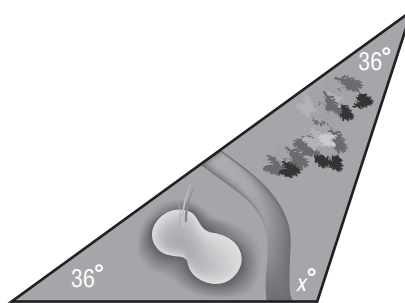
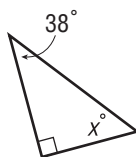
Use mental math to solve the equation.

$$x + 36 + 36 = 180 \quad \text{Write the equation.}$$

$$x + \boxed{} = 180 \quad \text{Add 36 and 36. **THINK** What measure added to 72 equals 180?}$$

$$\boxed{} + 72 = 180 \quad \text{You know that } \boxed{} + 72 = 180.$$

So, the value of x is $\boxed{}$.

**Check Your Progress** Find the value of x .**BUILD YOUR VOCABULARY** (pages 219–220)

Each $\boxed{}$ of a triangle is a **line segment**.

Line segments that have the same $\boxed{}$ are called **congruent segments**.

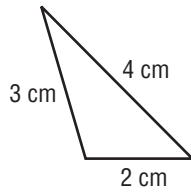
A **scalene triangle** has $\boxed{}$ congruent sides.

An **isosceles triangle** has $\boxed{}$ congruent sides.

An **equilateral triangle** has $\boxed{}$ congruent sides.

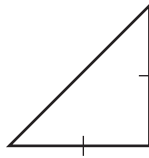
EXAMPLES Classify a Triangle by Its SidesClassify each triangle as *scalene*, *isosceles*, or *equilateral*.

4



None of the sides are congruent. So, the triangle is a triangle.

5

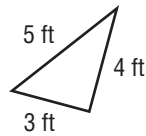


Only of the sides are congruent.

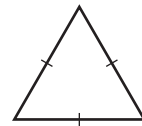
So, the triangle is an triangle.

Check Your ProgressClassify each triangle as *scalene*, *isosceles*, or *equilateral*.

a.



b.



**HOMEWORK
ASSIGNMENT**

Page(s): _____

Exercises: _____

MAIN IDEA

- Classify quadrilaterals and find missing angle measures in quadrilaterals.

KEY CONCEPT

Angles of a Quadrilateral

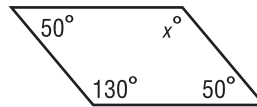
The sum of the measure of the angles of a quadrilateral is 360° .

BUILD YOUR VOCABULARY (pages 219–220)

A quadrilateral has sides and angles.

EXAMPLE Find Angle Measures

- 1 Find the value of x in the quadrilateral shown.



Since the sum of the angle measures in a quadrilateral is 360° ,
 $x + 50 + 130 + 50 = 360$.

$$x + 50 + 130 + 50 = 360 \quad \text{Write the equation.}$$

$$x + \text{} = 360 \quad \text{Add 50, 130, and 50.}$$

THINK What measure added to 230 equals 360?

$$\text{} + 230 = 360 \quad \text{You know that + 230 = 360.}$$

So, the value of x is .

Check Your Progress Find the value of x in the quadrilateral shown.

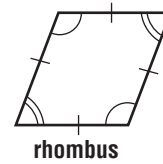
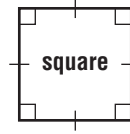
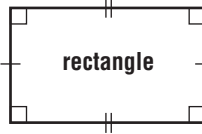
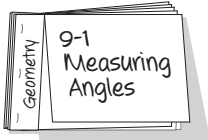


BUILD YOUR VOCABULARY (pages 219–220)

FOLDABLES

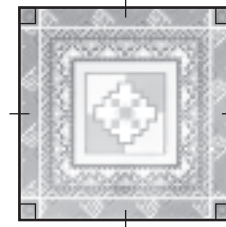
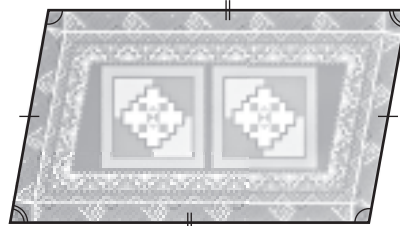
ORGANIZE IT

On the Lesson 9-5 section of your Foldable, include the triangle and quadrilateral shown at the right. Be sure to list the characteristics of each figure.



EXAMPLE Classify Quadrilaterals

1 RUGS Classify the quadrilateral of each rug below.



The first rug is a . The second rug is a .

Check Your Progress

Classify the quadrilateral below.



HOMEWORK ASSIGNMENT

Page(s):

Exercises:

Problem-Solving Investigation: Draw a Diagram

EXAMPLE Use the Draw a Diagram Strategy

MAIN IDEA

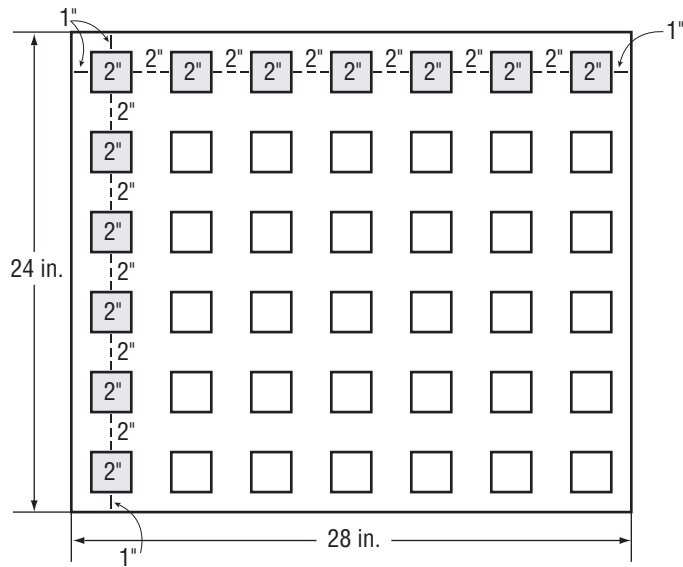
- Solve problems by drawing a diagram.

FOOD Biscuits will be made using square biscuit cutters that are 2 inches long and 2 inches wide. The biscuits will be placed 2 inches apart on a baking sheet, and 1 inch from the edge. How many biscuits will fit on a baking sheet that is 24 inches by 28 inches?

UNDERSTAND You know all the dimensions. You need to find how many biscuits will fit on a baking sheet.

PLAN Draw a diagram.

SOLVE



The diagram shows that biscuits will fit on a baking sheet.

CHECK Make sure the dimensions meet the requirements. The length of the pan is 28 inches and the width is 24 inches. So, the answer is correct.

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Check Your Progress

DISTANCE The dentist lives one third of the way between Nina's house and the school. If Nina lives 5 miles from the dentist, how many miles does she live from the school?

BUILD YOUR VOCABULARY (pages 219–220)

MAIN IDEA

- Identify similar and congruent figures.

Figures that have the same but not necessarily the same size are called **similar figures**.

Figures that have the same and are **congruent figures**.

EXAMPLES Identify Similar and Congruent Figures

Tell whether each pair of figures is *similar*, *congruent*, or *neither*.

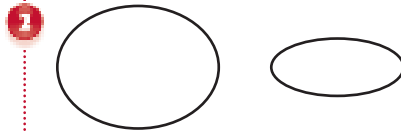
WRITE IT

Are all equilateral triangles similar, congruent, both, or neither? Explain.



The figures have the same shape but not the same size.

They are .



The figures have neither the same nor .

Check Your Progress Tell whether each pair of figures is *similar*, *congruent*, or *neither*.

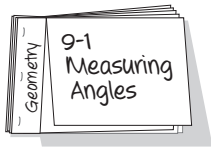




FOLDABLES

ORGANIZE IT

In the Lesson 9-7 section of your Foldable, take notes about similar and congruent figures and corresponding parts. Include some of your own examples.

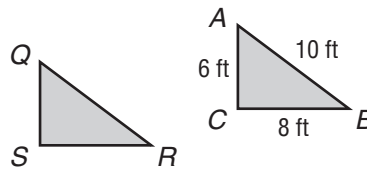


BUILD YOUR VOCABULARY (pages 219–220)

The sides of figures that “match” are called **corresponding sides**.

EXAMPLE Identify Corresponding Sides

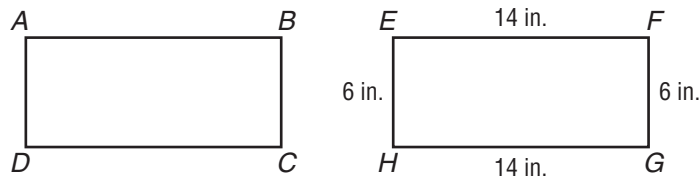
SKATEBOARDING RAMPS The two ramps shown are congruent.



1 What side of triangle QRS corresponds with \overline{AC} ?

Corresponding sides represent the same side of congruent figures. So, \overline{QS} corresponds to .

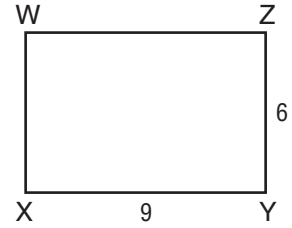
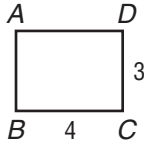
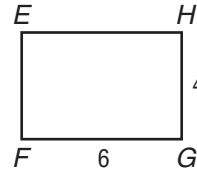
Check Your Progress The two floor tiles shown are congruent.



What side of rectangle $ABCD$ corresponds with \overline{FG} on rectangle $EFGH$?

EXAMPLE Identify Similar Figures

1 Which rectangle below is similar to rectangle *EFGH*?



Examine the ratios of corresponding sides to see if they have a constant ratio.

Rectangle *ADCB*

Rectangle *MPON*

Rectangle *WXYZ*

$$\frac{HG}{DC} = \boxed{}$$

$$\frac{HG}{PO} = \boxed{}$$

$$\frac{HG}{ZY} = \boxed{}$$

$$\frac{GF}{CB} = \frac{6}{4} \text{ or } \boxed{}$$

$$\frac{GF}{ON} = \frac{6}{10} \text{ or } \boxed{}$$

$$\frac{GF}{YX} = \frac{6}{9} \text{ or } \boxed{}$$

Not similar

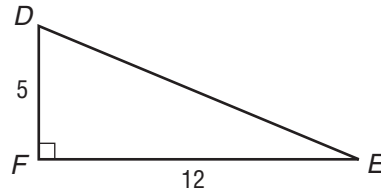
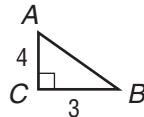
Not similar

Similar

So, rectangle is similar to rectangle *EFGH*.

Check Your Progress

State whether triangle *DEF* is similar to triangle *ABC*.



HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

BRINGING IT ALL TOGETHER**STUDY GUIDE****FOLDABLES**

Use your **Chapter 9 Foldable** to help you study for your chapter test.

**VOCABULARY
PUZZLEMAKER**

To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 9, go to:

glencoe.com

**BUILD YOUR
VOCABULARY**

You can use your completed **Vocabulary Builder** (pages 219–220) to help you solve the puzzle.

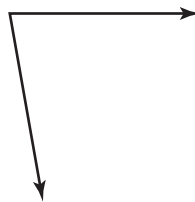
9-1

Measuring Angles

Write whether each angle is *acute*, *obtuse*, *right*, or *straight*.

1. 18° 2. 180° 3. 163° 4. 90°

5. Use a protractor to find the measure of the angle. Then classify the angle as *acute*, *obtuse*, *right*, or *straight*.

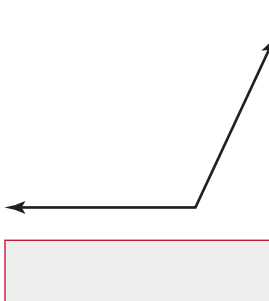


9-2

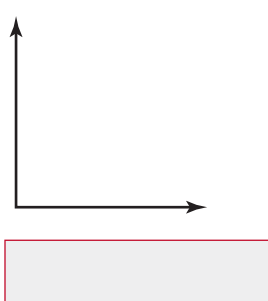
Estimating and Drawing Angles

Estimate the measure of each angle.

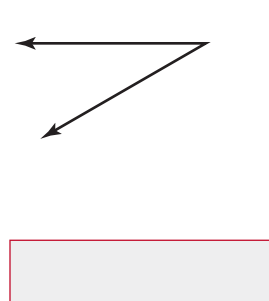
6.



7.



8.

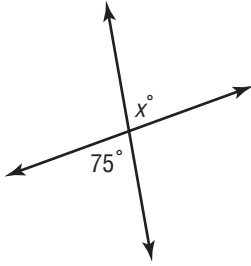


9-3

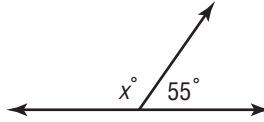
Angle Relationships

Find the value of x in each figure.

9.

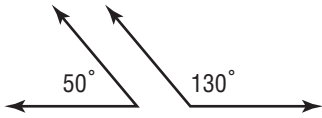


10.

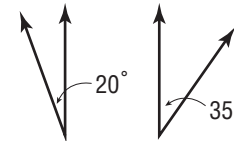


Classify each pair of angles as *complementary*, *supplementary*, or *neither*.

11.



12.

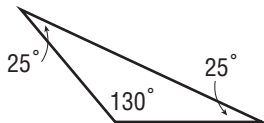


9-4

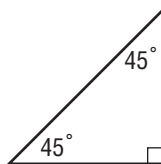
Triangles

Classify each triangle as *acute*, *right*, or *obtuse*.

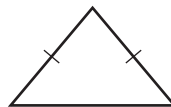
13.



14.



15. Classify the triangle shown as *scalene*, *isosceles*, or *equilateral*.



9-5

Quadrilaterals

Match characteristics to each kind of figure. Answers may be used more than once.

16. rectangle

17. square

18. parallelogram

19. rhombus

20. trapezoid

- a. All angles are congruent.
- b. Opposite sides are congruent.
- c. All angles are right angles.
- d. All sides are congruent.
- e. Opposite angles are congruent.
- f. Exactly one pair of opposite sides parallel.

9-6

Problem-Solving Investigation: Draw a Diagram

Solve. Use the *draw a diagram* strategy.

21. **DECORATING** Tanya is decorating her square dining room for a party. She would like to hang three streamers from the center of the ceiling to each wall. If she also hangs one streamer from the center to each corner of the room, how many streamers does she need?

9-7

Similar and Congruent Figures

22. Tell whether each characteristic is true for congruent and similar figures. Write *congruent*, *similar*, or *both*.

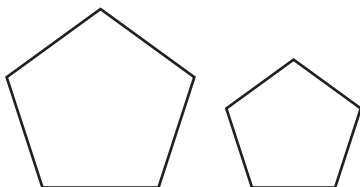
a. have the same shape

b. may or may not have the same size

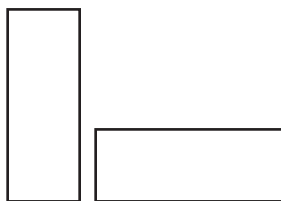
c. must have the same size

Tell whether each pair of figures is congruent, similar or neither.

23.



24.



ARE YOU READY FOR THE CHAPTER TEST?

Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 9.

Check the one that applies. Suggestions to help you study are given with each item.

I completed the review of all or most lessons without using my notes or asking for help.

- You are probably ready for the Chapter Test.
- You may want to take the Chapter 9 Practice Test on page 515 of your textbook as a final check.

I used my Foldables or Study Notebook to complete the review of all or most lessons.

- You should complete the Chapter 9 Study Guide and Review on pages 509–514 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may want to take the Chapter 9 Practice Test on page 515.

I asked for help from someone else to complete the review of all or most lessons.

- You should review the examples and concepts in your Study Notebook and Chapter 9 Foldables.
- Then complete the Chapter 9 Study Guide and Review on pages 509–514 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 9 Practice Test on page 515.

Student Signature

Parent/Guardian Signature

Teacher Signature

Measurement: Area, Perimeter, and Volume



Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin of this Interactive Study Notebook to help you in taking notes.

Begin with a sheet of 11" × 17" paper and six index cards.

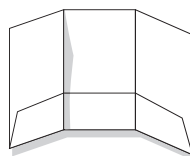
STEP 1

Fold lengthwise about 3" from the bottom.



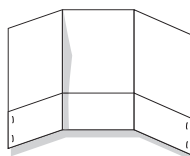
STEP 2

Fold the paper in thirds.



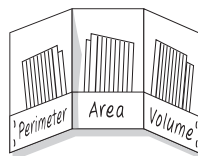
STEP 3

Open and staple the edges on either side to form three pockets.



STEP 4

Label the pockets as shown. Place two index cards in each pocket.



NOTE-TAKING TIP: As you read a chapter, take notes, define terms, record concepts, and sketch examples in tabular form. Then you can use the table to compare and contrast the new material.

BUILD YOUR VOCABULARY

This is an alphabetical list of new vocabulary terms you will learn in Chapter 10. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
base			
center			
chord			
circle			
circumference [suhr-KUHM-fuh-ruhns]			
cubic units			
diameter [deye-A-muh-tuhr]			

Vocabulary Term	Found on Page	Definition	Description or Example
height			
perimeter [puh-RIH-muh-tuhr]			
radius			
rectangular prism			
surface area			
volume [VAHL-yoom]			

MAIN IDEA

- Find the perimeters of squares and rectangles.

KEY CONCEPT

Perimeter of a Square
The perimeter P of a square is four times the measure of any of its sides s .

BUILD YOUR VOCABULARY (pages 241–242)

The around any closed figure is called its **perimeter**.

EXAMPLE Perimeter of a Square

- 1 ARCHITECTURE** The base of the Eiffel Tower is shaped like a square with 125-meter sides. What is the perimeter of the base?

$$P = \text{} s \quad \text{Perimeter of a square}$$

$$P = \text{} (125) \quad \text{Replace } s \text{ with } 125.$$

$$P = \text{} \quad \text{Multiply.}$$

The perimeter of the base of the Eiffel Tower is

.

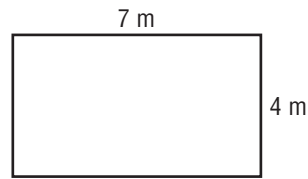
Check Your Progress

A new discount store is being built with its base in the shape of a square with 75-foot sides. What is the perimeter of the base?

EXAMPLE Perimeter of a Rectangle**KEY CONCEPT****Perimeter of a Rectangle**

The perimeter P of a rectangle is the sum of the lengths and widths. It is also two times the length, plus two times the width w .

1 Find the perimeter of the rectangle.



$$P = 2\ell + 2w$$

Write the formula.

$$P = 2(\square) + 2(\square)$$

Replace ℓ with \square and w with \square .

$$P = \square + \square$$

Multiply.

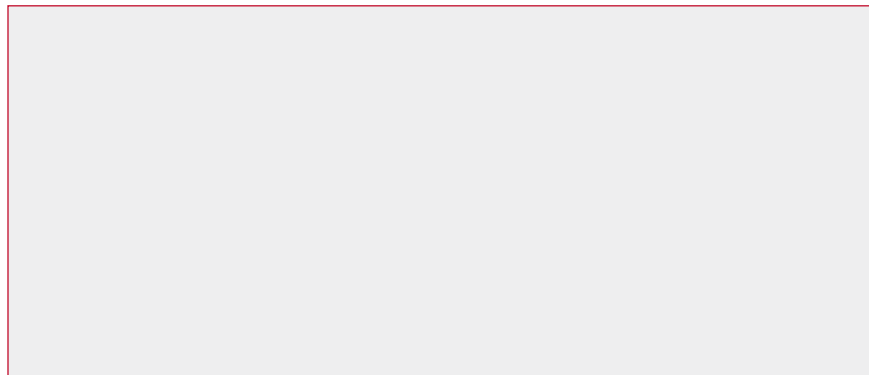
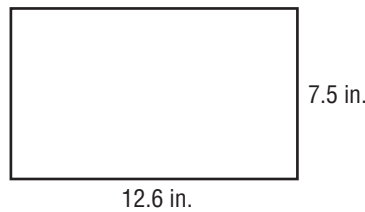
$$P = \square$$

Add.

The perimeter is \square meters.

Check Your Progress

Find the perimeter of the rectangle.

**HOMEWORK ASSIGNMENT**

Page(s): _____

Exercises: _____

MAIN IDEA

- Estimate and find the circumference of circles.

KEY CONCEPT**Radius and Diameter**

The diameter d of a circle is twice its radius r . The radius r of a circle is half of its diameter d .

BUILD YOUR VOCABULARY (pages 241–242)

A **circle** is the set of all in a plane that are the same distance from a called the **center**.

A **chord** is any segment with both on the circle.

The **diameter** is the distance a circle through its center.

The **radius** is the distance from the to any point on a circle.

The **circumference** is the distance a circle.

EXAMPLE Find the Radius

- 1 The diameter of a circle is 48 centimeters. Find the radius.

$r =$ Write the formula.

$r =$ Replace d with 48.

$r =$ Divide.

The radius is centimeters.

Check Your Progress The radius of a circle is 22 centimeters. Find the diameter.

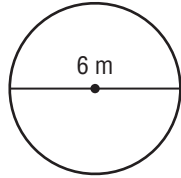
EXAMPLES Estimate the Circumference

KEY CONCEPT

Circumference The circumference of a circle is equal to π times twice its radius.

Estimate the circumference of each circle.

1



$$C = \square$$

Circumference of a circle

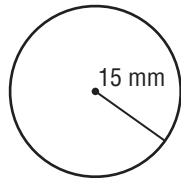
$$C \approx \square \cdot \square$$

Replace π with \square and d with \square .

$$C \approx \square \text{ m}$$

Multiply.

2



$$C = \square$$

Circumference of a circle

$$C \approx \square \cdot \square \cdot \square$$

Replace π with \square and r with \square .

$$C \approx \square \text{ mm}$$

Multiply.

Check Your Progress

Estimate the circumference of each circle.

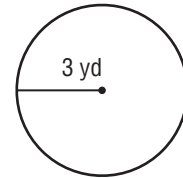
a. diameter = 4 yd

b. radius = 12 in.



EXAMPLE Use a Calculator to Find Circumference

4 Use a calculator to find the circumference of the circle. Round to the nearest tenth.



$$C = \square$$

Circumference of a circle

$$C = \square \cdot \square \cdot \square$$

Replace r with 3.

2 \times π \times 16 ENTER 18.8495559215

The circumference is about \square yards.

Check Your Progress

Use a calculator to find the circumference of a circle with a diameter of 24 centimeters. Round to the nearest tenth.

EXAMPLE

5 TEST EXAMPLE Anna knows the diameter of a basketball hoop but would like to find the circumference. Which method can she use to find the circumference of the basketball hoop?

- A Divide the diameter by π .
- B Multiply the radius by π .
- C Multiply the diameter by 2, and then multiply by π .
- D Multiply the diameter by π .

Read the Item

You need to determine the method used to find the circumference of the basketball hoop. You know the

of the basketball hoop.

Solve the Item

Use the formula for the circumference of a circle $C =$.

The formula states that the circumference of a circle is equal to

. So, the answer is .

Check Your Progress

MULTIPLE CHOICE A standard baseball has a circumference of 9 inches. Which method can be used to find the radius of the baseball?

- F Divide the circumference by π and then multiply by 2.
- G Divide the circumference by π and then divide by 2.
- H Multiply the circumference by π and then multiply by 2.
- J Multiply the circumference by π and then divide by 2.

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

BUILD YOUR VOCABULARY (pages 241–242)

MAIN IDEA

- Find the areas of parallelograms.

The **base** of a parallelogram can be any one of its .

The shortest distance from the base to the side is the **height** of a parallelogram.

KEY CONCEPT

Area of a Parallelogram
The area A of a parallelogram is the product of any base b and its height h .

FOLDABLES Write the formula for the area of a parallelogram on your Foldable.

EXAMPLES Find Areas of Parallelograms

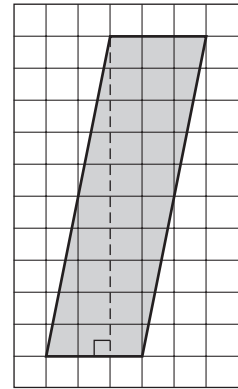
Find the area of each parallelogram.

1 $A = \text{[]} \cdot \text{[]}$ Area of parallelogram

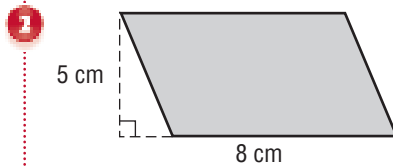
$A = \text{[]} \cdot \text{[]}$ Replace b with

and h with .

$A = \text{[]}$ Multiply.



The area is square units or .



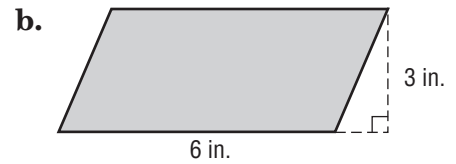
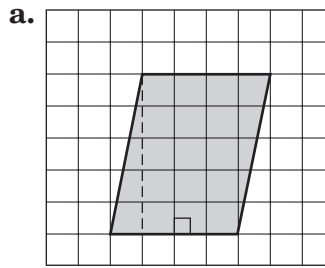
$A = \text{[]} \cdot \text{[]}$ Area of parallelogram

$A = \text{[]} \times \text{[]}$ Replace b with and h with .

$A = \text{[]}$ Multiply.

The area is square centimeters or .

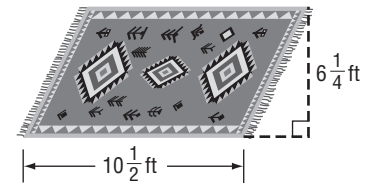
Check Your Progress Find the area of each parallelogram.



EXAMPLE

INTERIOR DESIGN Find the area of the floor that the rug will cover.

The area rug is a parallelogram, so use the formula $A = bh$.



$$A = \square \cdot \square$$

Area of parallelogram

$$A = (\square) (\square)$$

Replace b with \square and h

with \square .

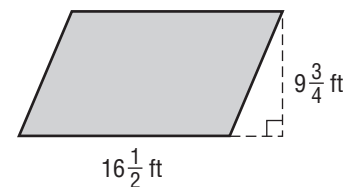
$$A = \square \text{ or } \square$$

$$10\frac{1}{2} = \frac{21}{2}, 6\frac{1}{4} = \frac{25}{4}$$

The area rug will cover \square square feet.

Check Your Progress **ART**

Find the area of the mural that John needs to paint.



REVIEW IT

Write the mixed numbers $10\frac{1}{2}$ and $6\frac{1}{4}$ as decimals. (Lesson 4-8)

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Find the areas of triangles.

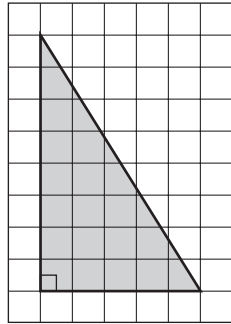
KEY CONCEPT

Area of a Triangle The area A of a triangle is one half the product of the base b and its height h .

EXAMPLES Find the Area of a Triangle

Find the area of each triangle.

1



By counting, you find that the measure of the base is units and the height is units.

$$A = \frac{bh}{2}$$

Area of a triangle

$$A = \frac{\text{ } \times \text{ }}{2}$$

Replace b with and h with .

$$A = \frac{\text{ }}{2}$$

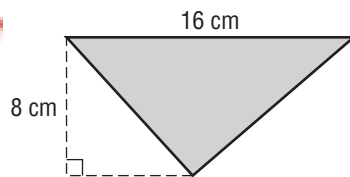
Simplify the numerator.

$$A = \text{ }$$

Divide.

The area of the triangle is .

1



$$A = \frac{bh}{2}$$

Area of a triangle

$$A = \frac{\text{ } \times \text{ }}{2}$$

Replace b with and h with .

$$A = \frac{\text{ }}{2}$$

Simplify the numerator.

$$A = \text{ }$$

Divide.

The area of the triangle is .

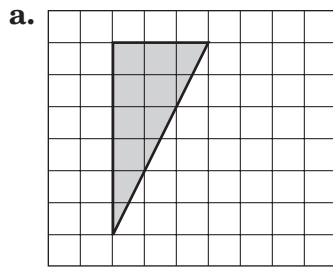
FOLDABLES

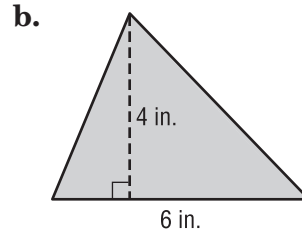
ORGANIZE IT

Write the formula for the area of a triangle on your Foldable.

Check Your Progress

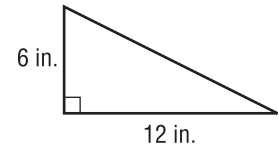
Find the area of each triangle.





EXAMPLE

BANNER Ari cut out a banner in the shape of a triangle. What is the area of the banner?



$A =$

Area of a triangle

$A =$

Replace b with and h with .

$A =$

Simplify the numerator.

$A =$

Divide.

The area of the banner is square inches.

Check Your Progress

Rachael decides to purchase a triangular pennant to hang on her bedroom wall as a souvenir of the baseball game she attended. If the base of the pennant is 9 inches and the height is 25 inches, how many square inches of her wall will be covered by the pennant? Round to the nearest tenth.

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Problem-Solving Investigation: Make a Model

EXAMPLE Use the Make a Model Strategy

MAIN IDEA

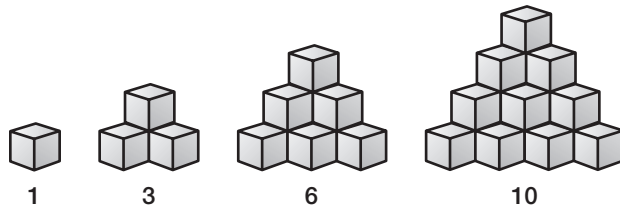
- Solve problems by making a model.

SOUP CANS Soup cans in a grocery store display are arranged in the shape of a triangle. The top row has one can, and each row below it has one more can than the previous row. How many rows are there in the display if 28 cans are used?

UNDERSTAND You need to know how many rows are in the display. There is can in the top row and each row below it has can than the previous row. You have used cans.

PLAN Make a model using blocks to find the number of rows in the display.

SOLVE Begin with 30 blocks. Place one block to represent the one can in the top row. For the next row, place two blocks under the first block. For each consecutive row, continue adding one block to the amount of blocks in the previous row.



By continuing this pattern, $1 + 2 + 3 + 4 + 5 + 6 + 7$ or soup cans will be needed to make rows.

CHECK $28 - 7 - 6 - 5 - 4 - 3 - 2 - 1$ leaves no extra soup cans.

Check Your Progress **CHAIRS** Sandy is setting up chairs for the school band concert. If she places 5 chairs in the front row and each row behind the front row has two more chairs than the previous row, how many rows of chairs will be needed to seat 147 people?

HOMWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Find the volume of rectangular prisms.

KEY CONCEPT

Volume of a Rectangular Prism The volume V of a rectangular prism is the product of its length ℓ , width w , and height h .

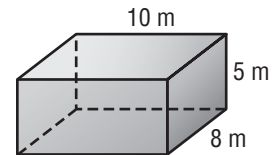
FOLDABLES Be sure to write the formula for the volume of a rectangular prism, $V = Bh$, in your Foldable.

BUILD YOUR VOCABULARY (pages 241–242)

The bases of a rectangular prism are congruent . The amount of inside a three-dimensional figure is the **volume** of the figure. Volume is measured in **cubic units**.

EXAMPLE Find the Volume of a Rectangular Prism

- Find the volume of the rectangular prism.



METHOD 1 Use $V = \ell wh$.

$$V = \ell wh$$

$$V = \boxed{} \times \boxed{} \times \boxed{}$$

$$V = \boxed{}$$

Volume of a rectangular prism

Replace ℓ with , w with , h with .

Multiply.

METHOD 2 Use $V = Bh$.

B , or the area of the base, is \times or square meters.

$$V = Bh$$

$$V = \boxed{} \times \boxed{}$$

$$V = \boxed{}$$

The volume is .

Volume of a rectangular prism

Replace B with and h with .

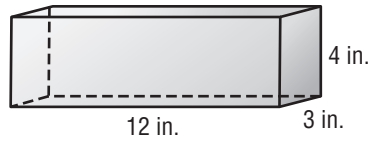
Multiply.

WRITE IT

In your own words, explain the difference between a two-dimensional figure and a three-dimensional figure.

Check Your Progress

Find the volume of the rectangular prism.



EXAMPLE Use Volume to Solve a Problem

1 STORAGE A closet is 6.2 feet long, 2.8 feet wide, and 8.1 feet high. Find the amount of space contained within the closet for storage.

Estimate $6 \times 3 \times 8 = 144$

Find the volume.

$$V = lwh$$

Volume of a rectangular prism

$$V = \square \times \square \times \square$$

Replace l with \square , w with

\square , and h with \square .

$$V = \square$$

Multiply.

The amount of space in the closet for storage is

Check Your Progress

A box provided by a mover for packing is 4.5 feet long, 2.5 feet wide, and 5.5 feet high. Find the volume of the box.

HOMWORK ASSIGNMENT

Page(s):

Exercises:

Surface Area of Rectangular Prisms

BUILD YOUR VOCABULARY (pages 241–242)

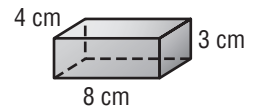
MAIN IDEA

- Find the surface areas of rectangular prisms.

The of the areas of all the of a prism is called the **surface area** of the prism.

EXAMPLE Find the Surface Area of a Rectangular Prism

- Find the surface area of the rectangular prism.

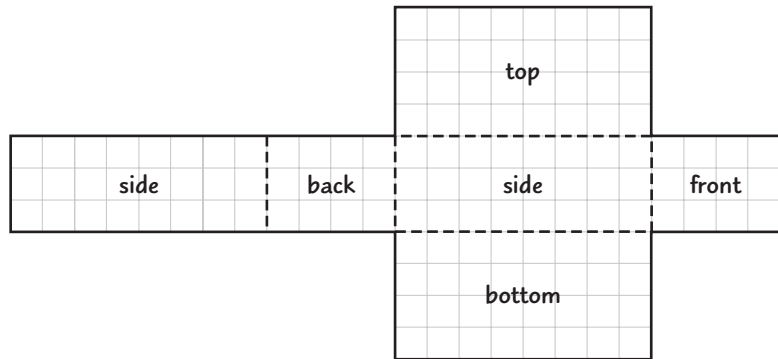


Find the area of each face.

KEY CONCEPT

Surface Area of a Rectangular Prism The surface area S of a rectangular prism with length l , width w , and height h is the sum of the areas of the faces.

FOLDABLES Include the formula for finding the surface area of a rectangular prism on your Foldable.



top and bottom

$$2(lw) = 2(\text{ } \times \text{ }) = \text{ }$$

front and back

$$2(lh) = 2(\text{ } \times \text{ }) = \text{ }$$

two sides

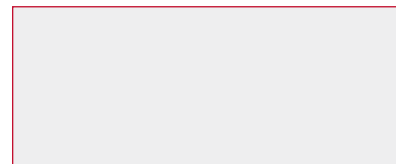
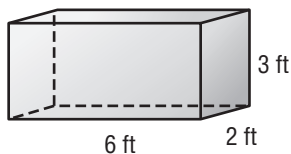
$$2(wh) = 2(\text{ } \times \text{ }) = \text{ }$$

Add to find the surface area.

The surface area is + + or square centimeters.

Check Your Progress

Find the surface area of the rectangular prism.



EXAMPLE

1 PACKAGING A box measures 13 inches long, 7 inches wide, and 4 inches deep. What is the surface area of the box?

REMEMBER IT



According to the order of operations, first you simplify within parentheses, then you multiply, and finally you add from left to right.

$$S = 2lw + 2lh + 2wh$$

Surface area of a prism

$$\ell = \square, w = \square, h = \square.$$

$$S = 2(\square \times \square) + 2(\square \times \square) + 2(\square \times \square)$$

$$S = 2(\square) + 2(\square) + 2(\square) \quad \text{Simplify within parentheses.}$$

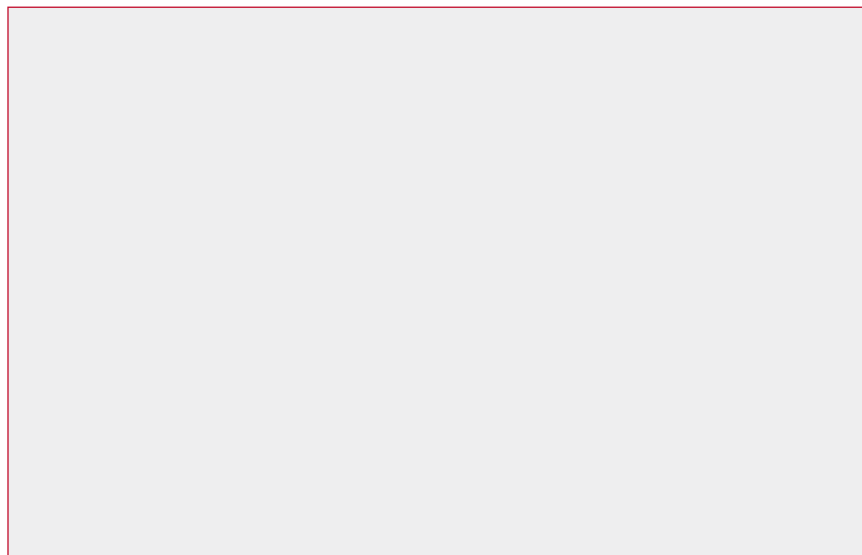
$$S = \square + \square + \square \quad \text{Multiply.}$$

$$S = \square \quad \text{Add.}$$

The surface area of the box is .

Check Your Progress

A box measures 9 inches long, 5 inches wide, and 12 inches deep. What is the surface area of the box?



HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

STUDY GUIDE**FOLDABLES**

Use your **Chapter 10 Foldable** to help you study for your chapter test.

**VOCABULARY
PUZZLEMAKER**

To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 10, go to:

glencoe.com

**BUILD YOUR
VOCABULARY**

You can use your completed **Vocabulary Builder** (pages 241–242) to help you solve the puzzle.

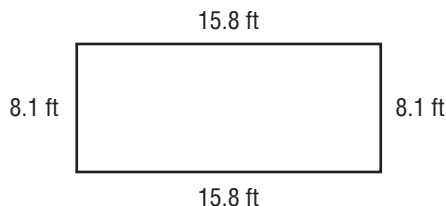
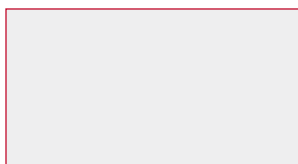
10-1**Perimeter**

Complete.

1. The formula for the perimeter of a rectangle is .

2. The formula for the perimeter of a square is .

3. Find the perimeter of a rectangle.

**10-2****Circles and Circumference**

Underline the correct term to complete each sentence.

- The distance around a circle is called the (perimeter, circumference).
- The distance from the center of a circle to any point on the circle is called the (radius, diameter).
- The circumference of a circle is equal to π times its (diameter, radius).
- Use a calculator to find the circumference of a circle with a diameter of 15 meters. Round to the nearest tenth if necessary.

10-3

Area of Parallelograms

Match the area to the description of each parallelogram.

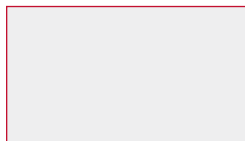
8. base 7 cm; height 3.5 cm

9. base 6.5 cm; height 2 cm

10. base 5.5 cm; height 2.5 cm

11. base 4.75 cm; height 2 cm

12. A carpet in the shape of a parallelogram has a base of 3.75 m and a height of 2.25 m. Estimate the area of the floor that the carpet will cover.



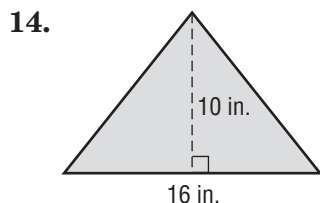
- a. 13 cm^2
- b. 9.5 cm^2
- c. 8.75 cm^2
- d. 24.5 cm^2
- e. 13.75 cm^2

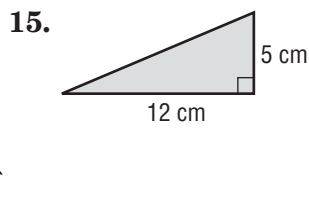
10-4

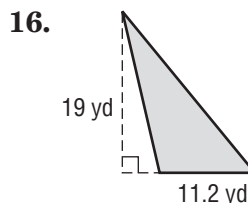
Area of Triangles

13. Write in words the formula for the area of a triangle.

Find the area of each triangle.







10-5

Problem-Solving Investigation: Make a Model

Solve. Use the *make a model* strategy.

17. **MUSIC** Mrs. Chase's 64 music students are having a concert. The students are standing on a set of risers that are four rows high. She has arranged the students so that there are 10 students in the front row and each row thereafter has four more students. How many students are in the top row?

10-6

Volume of Rectangular Prisms

Explain what each of the following formulas mean.

18. $V = lwh$

19. $V = Bh$

Find the volume of each rectangular prism.

20. length, 8 in., width, 5 in., height, 2 in.

21. length, 7 cm, width, 4 cm, height, 2 cm

22. length, 2 ft, width, 3 ft, height, 2 ft

10-7

Surface Area of Rectangular Prisms

Find the surface area of each rectangular prism.

23. $\ell = 6$ ft, $w = 5$ ft, $h = 1.5$ ft

24. $\ell = 10$ cm, $w = 6$ cm, $h = 8$ cm

25. $\ell = 7$ m, $w = 4$ m, $h = 1$ m

26. Shira has 120 tiles that are each 1 in. square. She wants to cover the outside of a rectangular box completely with the tiles. Give the dimensions of a box that she could cover completely with tiles. (There may be some tiles left over.)

Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 10.

ARE YOU READY FOR THE CHAPTER TEST?

Check the one that applies. Suggestions to help you study are given with each item.

I completed the review of all or most lessons without using my notes or asking for help.

- You are probably ready for the Chapter Test.
- You may want to take the Chapter 10 Practice Test on page 565 of your textbook as a final check.

I used my Foldable or Study Notebook to complete the review of all or most lessons.

- You should complete the Chapter 10 Study Guide and Review on pages 561–564 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 10 Practice Test on page 565.

I asked for help from someone else to complete the review of all or most lessons.

- You should review the examples and concepts in your Study Notebook and Chapter 10 Foldable.
- Then complete the Chapter 10 Study Guide and Review on pages 561–564 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 10 Practice Test on page 565.

Student Signature

Parent/Guardian Signature

Teacher Signature

Integers and Transformations

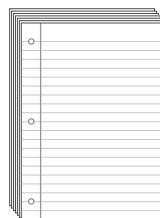


Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin of this Interactive Study Notebook to help you in taking notes.

Begin with eleven sheets of notebook paper.

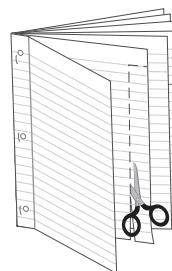
STEP 1

Staple the eleven sheets together to form a booklet.



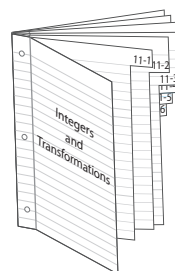
STEP 2

Cut a tab on the second page the width of the white space. On the third page, make the tab 2 lines longer, and so on.



STEP 3

Write the chapter title on the cover and label each tab with the lesson number.



NOTE-TAKING TIP: Annotations are notes taken in the margins of books we own to organize the text. As you read the chapter, take annotations about multiplying and dividing decimals under the tabs of your Foldable.

BUILD YOUR VOCABULARY

This is an alphabetical list of new vocabulary terms you will learn in Chapter 11. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
angle of rotation			
image			
quadrant			
reflection			
rotation			
rotational symmetry			
transformation			
translation			

MAIN IDEA

- Compare and order integers.

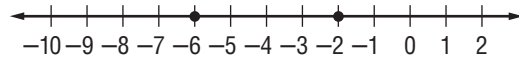
REMEMBER IT

On a number line, the number to the left is always less than the number to the right.

**EXAMPLE Compare Integers**

- 1 Replace \bullet with $<$ or $>$ to make $-2 \bullet -6$ a true sentence.

Graph -2 and -6 on a number line. Then compare.



Since -2 is to the of -6 , -2 -6 .

Check Your Progress

Replace \bullet with $<$ or $>$ to make $-7 \bullet -3$ a true sentence.

EXAMPLE Order Integers

- 1 Order 18 , 0 , -10 , and 12 from greatest to least.

Graph the numbers on a number line.



The order from greatest to least is .

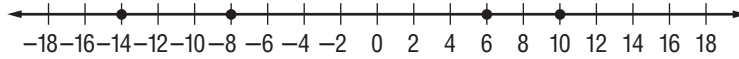
Check Your Progress

Order 20 , -4 , -20 , and 5 from greatest to least.

EXAMPLE

3 WEATHER The average daily low temperatures in four northern towns are 6, -14 , 10, and -8 degrees Fahrenheit. Order the temperatures from least to greatest.

First, graph each integer. Then, write the integers as they appear on the number line from to .



The order from the least to greatest is .

Check Your Progress

GOLF The final scores for four golfers competing in a tournament are 2, -5 , 4, and -1 . Order the scores from least to greatest.

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

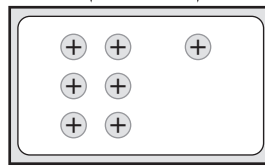
EXAMPLES Add Integers with Same Sign

MAIN IDEA
 • Add integers.

1 Find $+6 + (+1)$.

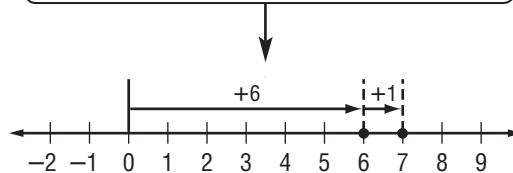
METHOD 1 Use counters.

Add positive counters and positive counter to the mat.



METHOD 2 Use a number line.

Start at 0. Move 6 units to the to show $+6$. From there, move 1 unit right to show $+1$.

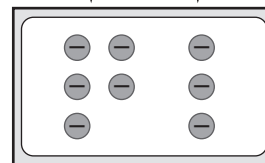


So, $+6 + (+1) =$.

1 Find $-5 + (-3)$.

METHOD 1 Use counters.

Add 5 negative counters and 3 counters to the mat.

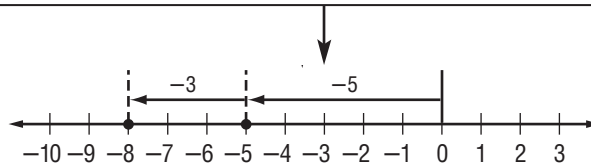


WRITE IT

Write the following equation in words:
 $-4 + (-3) = -7$.

METHOD 2 Use a number line.

Start at 0. Move 5 units to the to show -5 .
 From there, move 3 units to show -3 .



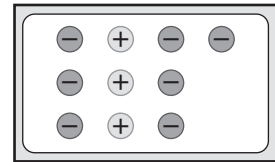
So, $-5 + (-3) =$.

EXAMPLE Add Integers with Different Signs

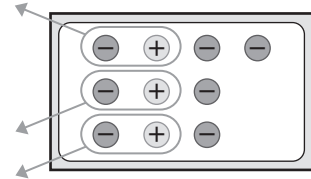
3 Find $-7 + 3$.

METHOD 1 Use counters.

Place negative counters.
 and positive counters
 on the mat.

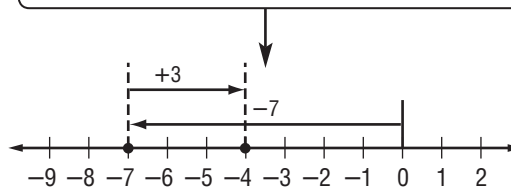


Next, remove as
 many
 as possible.



METHOD 2 Use a number line.

Start at 0. Move 7 units to the to show -7 . From there,
 move 3 units to show $+3$.

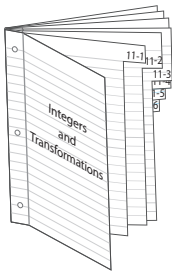


So, $-7 + 3 =$.

FOLDABLES

ORGANIZE IT

Write about what you learn about adding integers with different signs under the Lesson 11-2 tab of your Foldable. Be sure to include examples.



KEY CONCEPT

Adding Integers The sum of two positive integers is always positive.

The sum of two negative integers is always negative.

The sum of a positive integer and a negative integer is sometimes positive, sometimes negative, and sometimes zero.

Check Your Progress

Add. Use counters or a number line if necessary.

a. $+4 + (+2)$

b. $-2 + (-5)$

c. $-9 + 7$

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Subtracting Integers

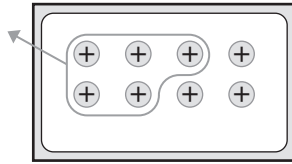
EXAMPLE Subtract Positive Integers

MAIN IDEA

- Subtract integers.

1 Find $8 - 5$.

METHOD 1 Use counters.



Place positive counters on the mat to show $+8$. Then, remove positive counters.

METHOD 2 Add the opposite.

$$8 - 5 = 8 + (\text{input}) \quad \text{To subtract 5, add input.}$$

$$= \text{input}$$

$$\text{So, } 8 - 5 = \text{input}.$$

KEY CONCEPT

Subtracting Integers To subtract an integer, add its opposite.

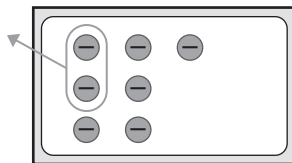
Check Your Progress Find $9 - 2$.



EXAMPLE Subtract Negative Integers

1 Find $-7 - (-2)$.

METHOD 1 Use counters.



Place 7 counters on the mat to show -7 . Then, remove 2 counters.

WRITE IT

Think about the number line. How is subtracting negative integers similar to adding positive integers?

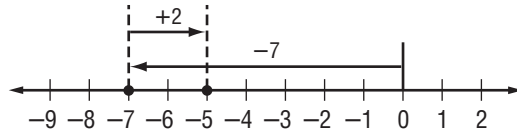
METHOD 2 Add the opposite.

$$-7 - (-2) = -7 + \square \quad \text{To subtract } -2, \text{ add } \square.$$

$$= \square$$

So, $-7 - (-2) = \square$.

Check Use a number line to find $-7 + 2$.

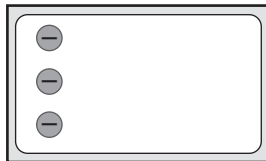


Check Your Progress Find $-8 - (-5)$.

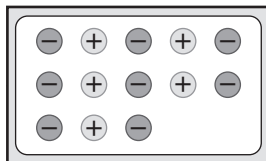
EXAMPLE Subtract Integers Using Zero Pairs

1 Find $-3 - 5$.

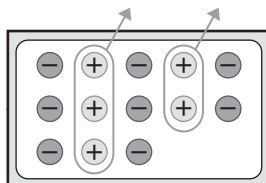
METHOD 1 Use counters.



Place 3 negative counters on the mat to show \square .



Since there are no positive counters, add 5 \square .

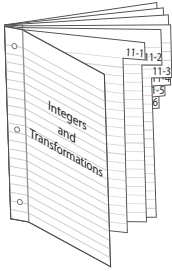


Now remove \square positive counters.

FOLDABLES

ORGANIZE IT

Under the Lesson 11-3 tab of your Foldable, write what you learn about subtracting positive integers, subtracting negative integers, and subtracting integers using zero pairs. Include examples.



METHOD 2 Add the opposite.

$$-3 - 5 = -3 + (\quad) \quad \text{To subtract 5, add } \quad.$$

$$= \quad$$

$$\text{So, } -3 - 5 = \quad.$$

Check Your Progress Find $-6 - 1$.

EXAMPLE

- 4 SEA LEVEL** Parts of Death Valley in California are below sea level. A hiker starts at an elevation of 12 feet above sea level. Then she hikes to an elevation that is 8 feet below sea level. What is the difference between the two elevations?

Subtract 8 feet below sea level from 12 feet above sea level.

$$12 - (-8) = 12 + \quad \quad \text{To subtract } -8, \text{ add } \quad.$$

$$= \quad \quad \text{Simplify.}$$

The difference between the two elevations is \quad feet.

Check Your Progress WEATHER Yesterday's low temperature was 5°F . If today's low temperature is expected to be -3°F , what is the difference between these two temperatures?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Multiply integers.

KEY CONCEPT

Multiplying Integers The product of two integers with different signs is negative.

The product of two integers with the same sign is positive.

EXAMPLES Multiply Integers with Different Signs**Multiply.**

1 $9 \times (-6)$

$9 \times (-6) = \square$

The integers have different signs.

The product is \square .

2 -5×7

$-5 \times 7 = \square$

The integers have different signs.

The product is \square .**Check Your Progress** Multiply.

a. $4 \times (-7)$

b. -8×3

EXAMPLES Multiply Integers with Same Signs**Multiply.**

3 7×9

$7 \times 9 = \square$

The integers have the same sign.

The product is \square .

4 $-4 \times (-8)$

$-4 \times (-8) = \square$

The integers have the same sign.

The product is \square .**Check Your Progress** Multiply.

a. 5×4

b. $-2 \times (-7)$

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

Problem-Solving Investigation: Work Backward

MAIN IDEA

- Solve problems by working backward.

EXAMPLE Use the Work Backward Strategy

Jackie bought 3 identical shirts in different colors. Including the \$3.24 sales tax, she paid a total of \$57.24. What was the cost of each shirt before the tax was added?

UNDERSTAND You know that the 3 identical shirts cost , including in sales tax.

You need to find the cost of each shirt before the sales tax.

PLAN Start with the total cost and subtract the sales tax.

SOLVE

\$57.24	→	Cost of the three shirts with tax.
- \$ 3.24	→	Sales tax
<input style="width: 100px; height: 20px;" type="text"/>		

Since the 3 shirts cost before sales tax and each shirt is the same, each shirt costs

÷ or .

CHECK Start with the cost of each shirt before sales tax, \$18. Multiply \$18 by the number of shirts,

× or . Finally, add the \$3.24

in sales tax to the cost of the shirts,

+ or .

Check Your Progress

POPCORN David is selling gourmet-flavored popcorn. The first week, he sold 3 cheddar cheese popcorn tins, 11 caramel popcorn tins, and 7 butter popcorn tins. If he has 12 popcorn tins left, how many tins did he have to start?

HOMWORK ASSIGNMENT

Page(s): _____

Exercises: _____

EXAMPLES Divide Integers**MAIN IDEA**

- Divide integers.

KEY CONCEPT

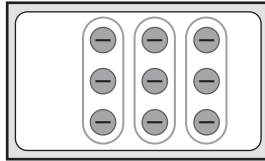
Dividing Integers The quotient of two integers with different signs is negative.

The quotient of two integers with the same sign is positive.

Divide.

$$1 \quad -9 \div 3$$

Separate negative counters into equal-size groups.

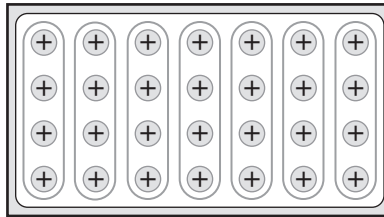


There are 3 groups of 3 negative counters.

So, $-9 \div 3 =$.

$$1 \quad 28 \div 7$$

Separate positive counters into equal-size groups.



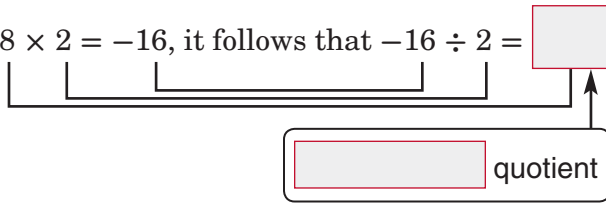
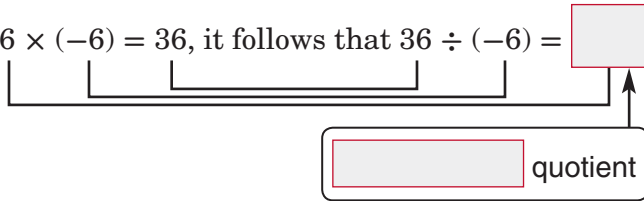
There are 7 groups of 4 positive counters.

So, $28 \div 7 =$.

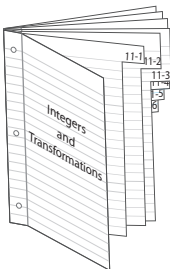
Check Your Progress**Divide. Use counters if necessary.**

a. $-16 \div 4$

b. $24 \div 8$

EXAMPLES Divide Integers**3** Find $-16 \div 2$.Since $-8 \times 2 = -16$, it follows that $-16 \div 2 = \square$.**4** Find $36 \div (-6)$.Since $-6 \times (-6) = 36$, it follows that $36 \div (-6) = \square$.**5** Find $-30 \div (-5)$.Since $6 \times (-5) = -30$, it follows that $-30 \div (-5) = \square$.**FOLDABLES****ORGANIZE IT**

Under the Lesson 11-6 tab of your Foldable, record what you learn about dividing integers. Include two of your own examples and find the quotients.

**Check Your Progress** Divide. Work backward if necessary.**a.** $-36 \div 9$

b. $14 \div (-2)$

c. $-42 \div (-6)$

EXAMPLE

6 TEST EXAMPLE A scuba diver descended a total of 56 feet below the surface of the ocean in 4 minutes. If the diver descended at a constant rate, which integer gives the feet descended each minute?

A -14

C 7

B -7

D 14

Read the Item

You need to find the feet per minute the diver descended. Represent the total number of feet below the surface of the ocean using .

Solve the Item

Since $-56 \div 4 =$, the answer is .

Check Your Progress

MULTIPLE CHOICE Roberto missed a total of 6 points on a science quiz. If he missed the same number of points on each of 3 problems, which integer represents the number of points missed for each problem?

F 6

H -2

G 2

J -6

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

BUILD YOUR VOCABULARY (page 262)

MAIN IDEA

- Locate and graph ordered pairs on a coordinate plane.

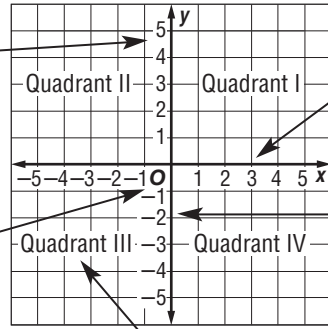
The coordinate system, or coordinate plane, is a grid used to locate points.

The vertical number line is the y -axis.

The horizontal number line is the x -axis.

The origin is at $(0, 0)$. This is the point where the number lines intersect at their zero points.

Numbers below and to the left of zero are negative.



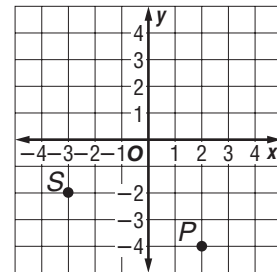
The x -axis and y -axis separate the coordinate system into four regions called **quadrants**.

EXAMPLES Identify Ordered Pairs

Identify the ordered pair that names each point. Then identify its quadrant.

1 point P

Step 1 Start at the . Move on the x -axis to find the x -coordinate of point P , which is .



Step 2 Move down the y -axis to find the y -coordinate, which is .

Point P is named by .

Point P is in the quadrant.

1 point S

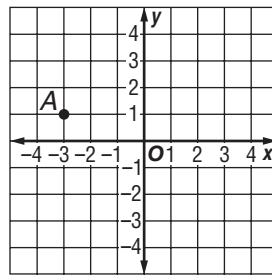
Step 1 Start at the origin. Move left on the x -axis to find the x -coordinate of point S, which is .

Step 2 Move down the y -axis to find the y -coordinate, which is . Point S is named by .

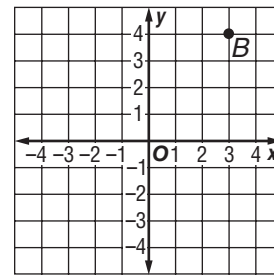
Point S is in the quadrant.

Check Your Progress Write the ordered pair that names each point. Then identify its quadrant.

a. point A



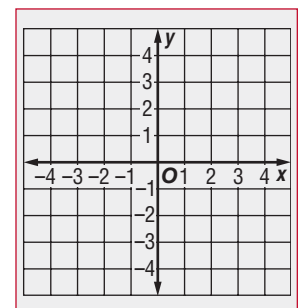
b. point B



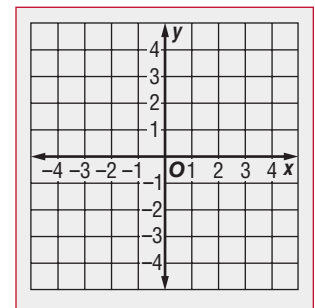
EXAMPLE Graph Ordered Pairs

1 Graph point A at $(-4, 3)$.

Start at the . The x -coordinate is . So, move 4 units to the . Next, since the y -coordinate is 3, move units . Draw a dot.



Check Your Progress Graph point C at $(2, -4)$.



HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Graph translations on a coordinate plane.

BUILD YOUR VOCABULARY (page 262)

A transformation is a of a geometric figure. The resulting figure is called an **image**.

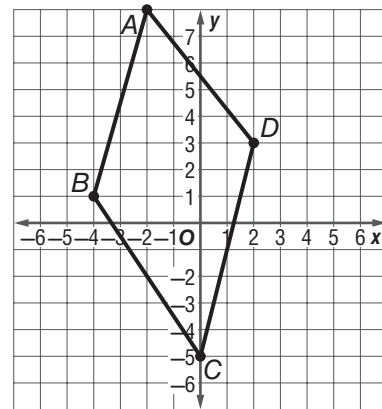
Sliding a figure without it is a **translation**.

EXAMPLE Graph a Translation

- Translate quadrilateral $ABCD$ 5 units to the right. Graph quadrilateral $A'B'C'D'$.

Move each vertex of the quadrilateral units right.

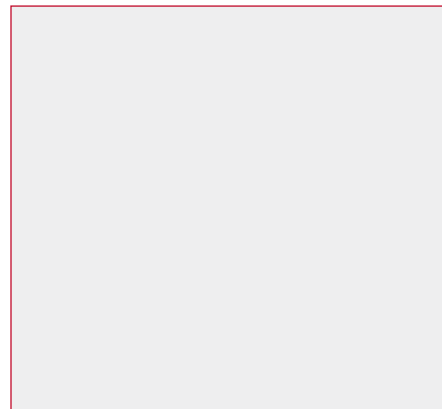
Label the new vertices A' , B' , C' , and D' .



Connect the new vertices to draw the quadrilateral. The coordinates of the new quadrilateral are A' ,

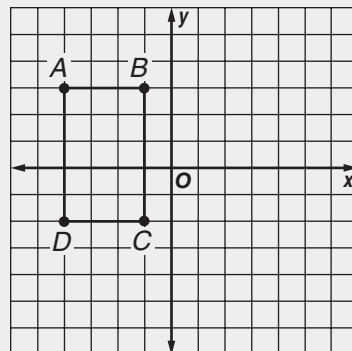
B' , C' ,

and D' .



Check Your Progress

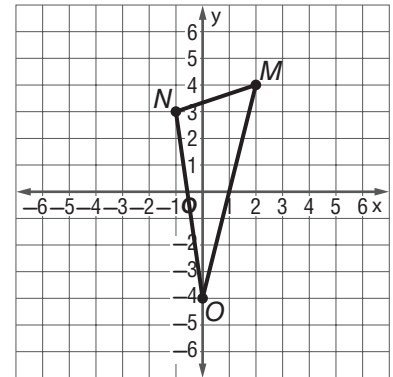
Translate square $ABCD$ 6 units to the right. Graph rectangle $A'B'C'D'$.



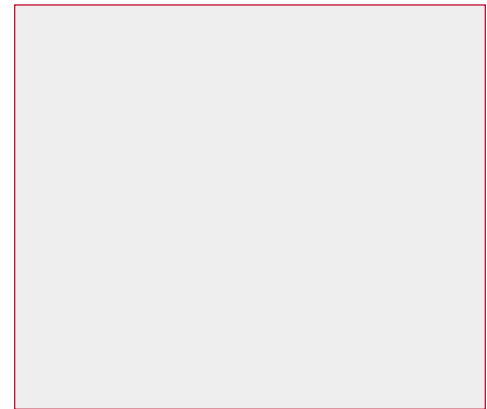
EXAMPLE Graph a Translation

1 Translate triangle MNO 3 units to the right and 2 units down. Graph triangle $M'N'O'$.

Move each vertex of the triangle units right and units down. Label the new vertices M' , N' , and O' .



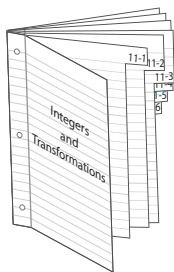
Connect the new vertices to draw the triangle. The coordinates of the new triangle are M' , N' , and O' .



FOLDABLES

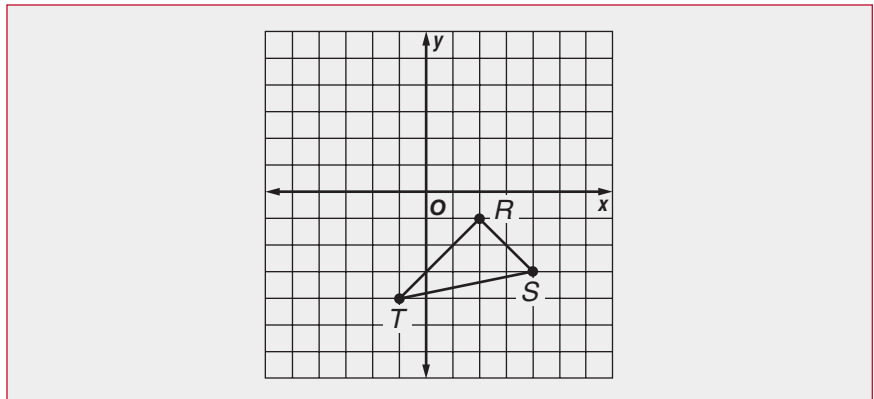
ORGANIZE IT

Under the Lesson 11-8 tab of your Foldable, record what you learn about translating figures. Include an example of a translation.



Check Your Progress

Translate triangle RST 4 units to the left and 3 units up. Graph triangle $R'S'T'$.



EXAMPLE Find Coordinates of a Translation

3 A rug had corners at ordered pairs $(2, 4)$, $(-1, 5)$, and $(-4, -6)$. What will be the new ordered pairs if the rug is moved 3 units to the right and 4 units down?

The vertices of the rug after the translation can be found by

3 to the x -coordinates and

4 from the y -coordinates.

Original Coordinates	$(x + 3, y - 4)$	New Coordinates
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

The new coordinates are , , and .

Check Your Progress

Teresa is moving the desk in her office 3 units right and 2 units down. If the desk had original coordinates at $A(-2, 5)$, $B(3, 5)$, $C(3, 1)$, and $D(-2, 1)$, find the new vertices of the desk after the translation.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Graph reflections on a coordinate plane.

BUILD YOUR VOCABULARY (page 262)

A **reflection** is the mirror image that is created when a figure is over a line.

EXAMPLE Reflect a Figure Over the x -Axis

- Triangle ABC has vertices $A(2, 4)$, $B(0, 7)$, and $C(-2, 2)$. Graph the figure and its reflected image over the x -axis. Then find the coordinates of the reflected image.

Graph triangle ABC on a coordinate plane. Then count the number of units between each vertex and the x -axis.

A is units from the axis.

B is units from the axis.

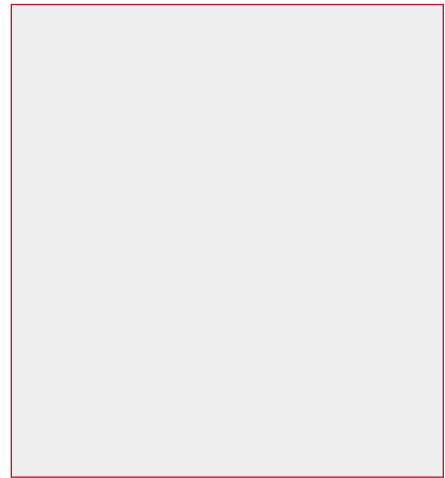
C is units from the axis.

Make a point for each vertex the same distance away from

the but on the opposite side and connect the new

points to form the image of triangle $A'B'C'$. The coordinates are

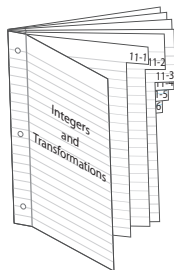
A' , B' , and C' .



FOLDABLES

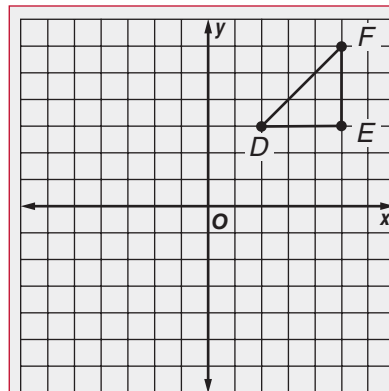
ORGANIZE IT

Under the Lesson 11-9 tab of your Foldable, record what you learn about reflecting figures. Include an example of a reflection over the x -axis and a reflection over the y -axis.



Check Your Progress

$\triangle DEF$ has vertices as shown. Graph its reflected image over the x -axis. Then find the coordinates of the reflected image.



EXAMPLE Reflect a Figure Over the y -Axis

1 Quadrilateral $RSTV$ has vertices $R(2, 3)$, $S(-1, 5)$, $T(-3, 0)$ and $V(3, -4)$. Graph the figure and its reflected image over the y -axis. Then find the coordinates of the reflected image.

R is units from the axis.

S is units from the axis.

T is units from the axis.

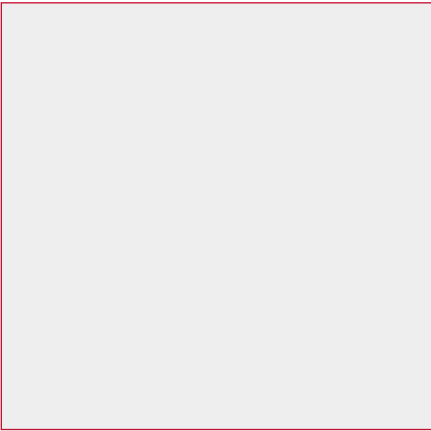
V is units from the axis.

Make a point for each vertex the same distance away from the on the opposite

side of the and connect the new points to form the image of quadrilateral $R'S'T'V'$.

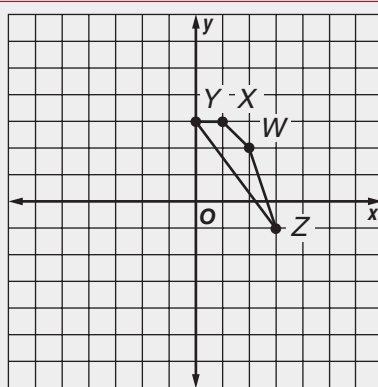
The coordinates are R' , S' ,

T' and V' .



Check Your Progress

Quadrilateral $WXTZ$ has vertices as shown. Graph its reflected image over the y -axis. Then find the coordinates of the reflected image.



HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

11-10 Rotations

MAIN IDEA

- Graph rotations on a coordinate plane.

BUILD YOUR VOCABULARY (page 262)

A rotation occurs when a figure is rotated around a

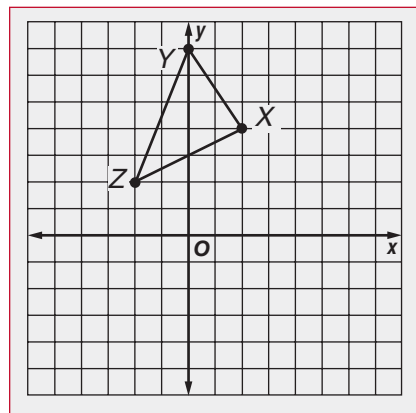
EXAMPLE Rotate a Figure Clockwise

- Triangle XYZ has vertices $X(2, 4)$, $Y(0, 7)$, and $Z(-2, 2)$. Graph the figure and its image after a clockwise rotation of 90° around the origin. Then find the coordinates of the rotated image.

Graph triangle XYZ on a coordinate plane.

Sketch segment \overline{ZO} connecting point Z to the .

Sketch another segment $\overline{Z'O}$ so that the angle between points Z , O , and Z' measures and the segment is congruent to \overline{ZO} .



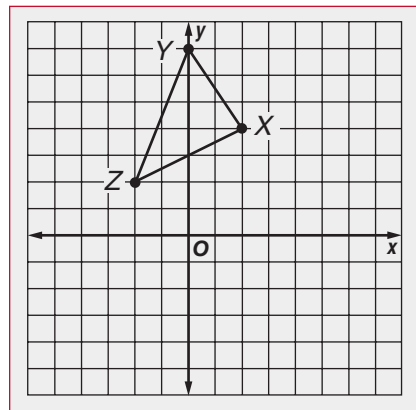
Similarly, draw segments for points X and Y . Then connect the vertices to form triangle $X'Y'Z'$.

The coordinates are

X' ,

Y' ,

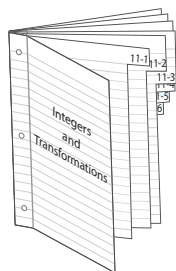
and Z' .



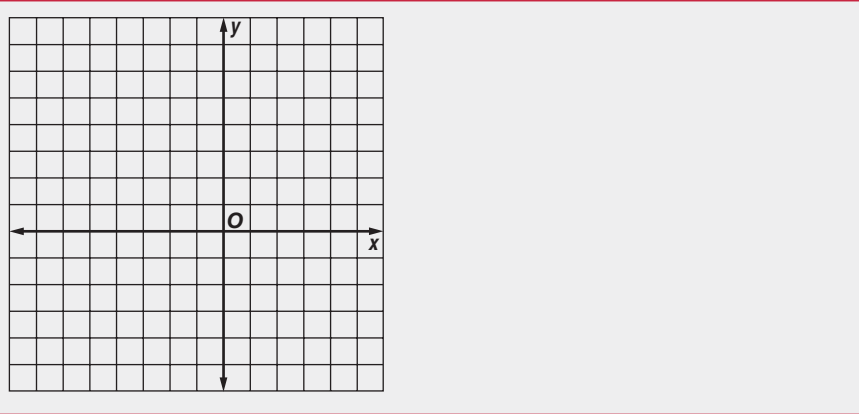
FOLDABLES

ORGANIZE IT

Under the Lesson 11-10 tab of your Foldable, record what you learn about rotating figures. Include an example of a clockwise rotation and a counterclockwise rotation.



Check Your Progress Triangle XYZ has vertices $X(2, 4)$, $Y(0, 7)$, and $Z(-2, 2)$. Graph the figure and its image after a counterclockwise rotation of 90° around the origin. Then find the coordinates of the rotated image.



BUILD YOUR VOCABULARY (page 262)

A figure has **rotational symmetry** if the figure can be rotated about its center by a certain number of degrees and still look like the original.

The **angle of rotation** is the degree measure of the angle through which the figure is rotated.

EXAMPLE Determine Rotational Symmetry

1 Determine whether the letter has rotational symmetry. Write *yes* or *no*. If *yes*, name the angle of rotation.

Since the letter cannot be rotated and still look like it does in its original position, the

letter have rotational symmetry.



Check Your Progress Determine whether the letter has rotational symmetry. Write *yes* or *no*. If *yes*, name the angle of rotation.



HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

STUDY GUIDE

FOLDABLES

Use your Chapter 11 Foldable to help you study for your chapter test.

VOCABULARY
PUZZLEMAKER

To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 11, go to:

glencoe.com

BUILD YOUR
VOCABULARY

You can use your completed Vocabulary Builder (pages 262) to help you solve the puzzle.

11-1

Ordering Integers

Write $<$ or $>$ to make a true sentence.

1. $9 \square -1$ 2. $-5 \square 5$ 3. $0 \square -3$ 4. $-8 \square -10$

5. **GAMES** The table shows the results of a board game after the first round. Arrange the players from least to greatest score.

Name	Score
David	-10
Maria	0
Sophie	20
Michael	-15

11-2

Adding Integers

Add. Use counters or a number line if necessary.

6. $+3 + (-8) \square$ 7. $-9 + (-4) \square$
 8. $-7 + (+9) \square$ 9. $-5 + (-1) \square$

10. **MONEY** Malcolm opened a savings account with a deposit of \$9 in January. He withdrew \$4 in February. What was the final amount in his account? \square

11-3

Subtracting Integers

Subtract. Use counters if necessary.

11. $5 - (-2)$

12. $-6 - 3$

13. $-4 - (-4)$

14. $+8 - 2$

15. **DIVING** Ben dove 12 feet below the surface of the ocean. Then he descended another 5 feet. What was his final depth below the surface?

16. Draw a picture to show how you would use counters to find $-4 - (-2) = -2$.

11-4

Multiplying Integers

Complete.

17. The product of two integers with the same sign is .

18. The product of two integers with different signs is .

Multiply.

19. 6×7

20. -4×8

21. $9 \times (-3)$

22. $-3 \times (-2)$

23. 5×4

24. $-7 \times (-9)$

25. **ALTITUDE** A hot air balloon descends at a rate of 5 feet per second. Where is the balloon in relation to its original altitude after 8 seconds?

11-5

Problem-Solving Investigation: Work Backward**Solve.** Use the *work backward* strategy.

26. **NUMBERS** A number is multiplied by 3. Then 1 is added to the result. After subtracting 90, the result is 1. What is the number?

11-6

Dividing Integers**Complete.**

27. The quotient of two integers is positive if the integers have

.

28. The quotient of two integers is negative if the integers have

.

Write whether the quotient of each pair of integers will be positive or negative. Then divide.

29. $-28 \div 14$

30. $-25 \div (-5)$

31. $33 \div (-11)$

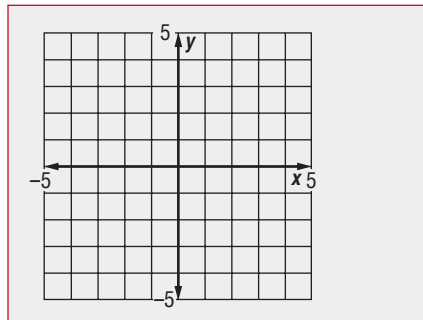
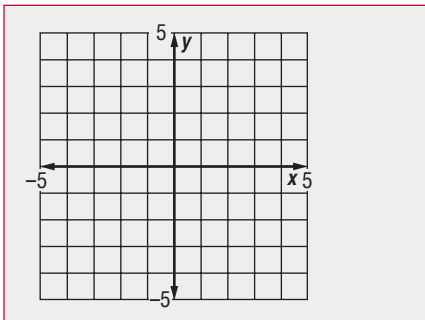
32. $-36 \div (-12)$

11-7

The Coordinate Plane**Graph and label each point on a coordinate plane.**

33. point
- $B(4, -2)$

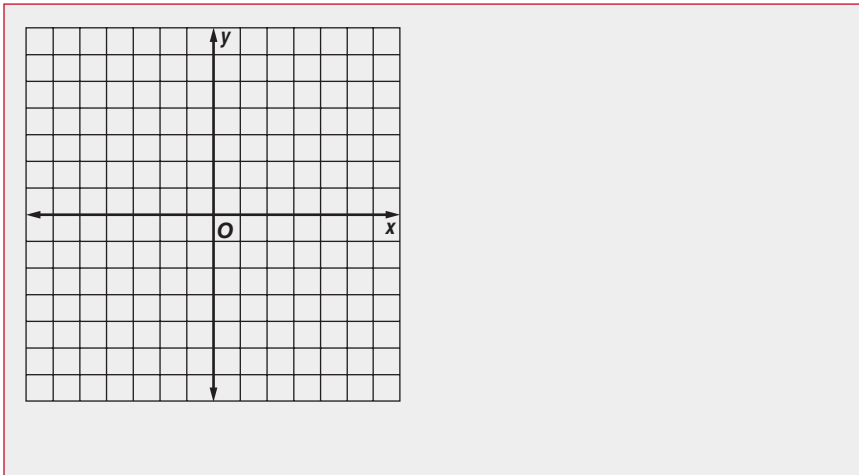
34. point
- $S(-3, -1)$



11-8

Translations

35. Triangle ABC has vertices $A(-4, -4)$, $B(0, -3)$, $C(2, -5)$. Graph the figure and its image after a translation of 4 units right and 2 units up.



11-9

Reflections

Quadrilateral $RSTV$ has vertices $R(2, 1)$, $S(2, 5)$, $T(4, 6)$, and $V(5, 3)$.

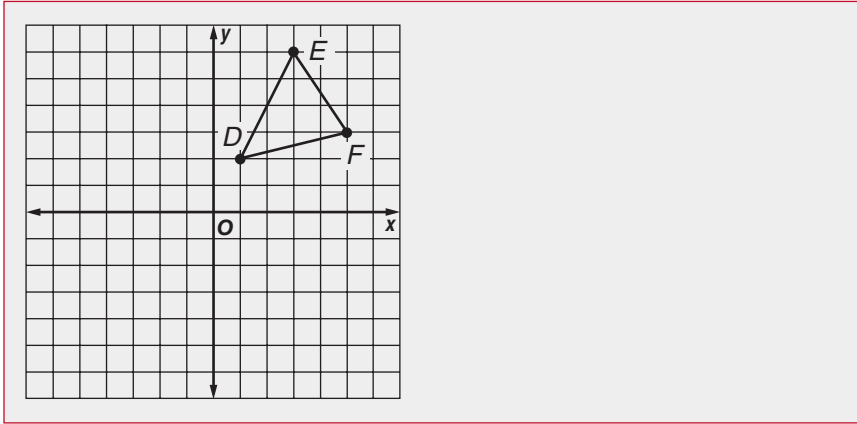
36. Find the coordinates after a reflection over the x -axis.

37. Find the coordinates after a reflection over the y -axis.

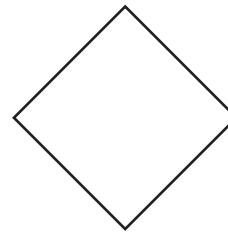
11-10

Rotations

38. Triangle DEF is shown below. Graph its image after a clockwise rotation of 90° about the origin.



39. The figure has rotational symmetry. Name the angle(s) of rotation.



Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 11.

ARE YOU READY FOR THE CHAPTER TEST?

Check the one that applies. Suggestions to help you study are given with each item.

I completed the review of all or most lessons without using my notes or asking for help.

- You are probably ready for the Chapter Test.
- You may want to take the Chapter 11 Practice Test on page 625 of your textbook as a final check.

I used my Foldables or Study Notebook to complete the review of all or most lessons.

- You should complete the Chapter 11 Study Guide and Review on pages 620–624 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may want to take the Chapter 11 Practice Test on page 625 of your textbook.

I asked for help from someone else to complete the review of all or most lessons.

- You should review the examples and concepts in your Study Notebook and Chapter 11 Foldables.
- Then complete the Chapter 11 Study Guide and Review on pages 620–624 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 11 Practice Test on page 625 of your textbook.

Student Signature

Parent/Guardian Signature

Teacher Signature

Algebra: Properties and Equations

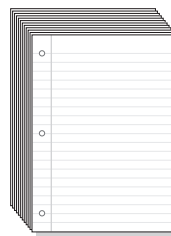


Use the instructions below to make a Foldable to help you organize your notes as you study the chapter. You will see Foldable reminders in the margin this Interactive Study Notebook to help you in taking notes.

Begin with eleven sheets of notebook paper.

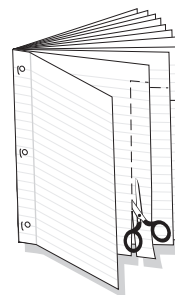
STEP 1

Staple the eleven sheets together to form a booklet.



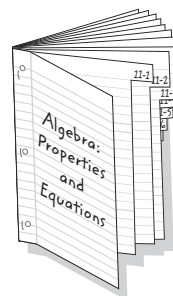
STEP 2

Cut a tab on the second page the width of the white space. On the third page, make the tab 2 lines longer, and so on.



STEP 3

Write the chapter title on the cover and label each tab with the lesson number.



NOTE-TAKING TIP: When taking notes, it is useful to include an explanation of how to solve the problems you write.

BUILD YOUR VOCABULARY

This is an alphabetical list of new vocabulary terms you will learn in Chapter 12. As you complete the study notes for the chapter, you will see Build Your Vocabulary reminders to complete each term's definition or description on these pages. Remember to add the textbook page number in the second column for reference when you study.

Vocabulary Term	Found on Page	Definition	Description or Example
Addition Property of Equality			
coefficient			
inverse operations			
quadrants			
zero pair			

BUILD YOUR VOCABULARY (page 292)

MAIN IDEA

- Use the Distributive Property to compute multiplication problems mentally and to rewrite algebraic expressions.

The **Distributive Property** combines and multiplication to compute multiplication involving parentheses.

KEY CONCEPT

The Distributive Property
To multiply a sum by a number, multiply each addend by the number outside the parentheses.

$$a(b + c) = ab + ac$$

$$(b + c)a = ba + ca$$

EXAMPLE Use the Distributive Property

- 1 Find 8×64 mentally using the Distributive Property.

$$\begin{aligned} 8 \times 64 &= 8(\text{ } + \text{ }) && \text{Write 64 as } \text{ } + \text{ } \\ &= 8\text{ } + 8\text{ } && \text{Distributive Property} \\ &= \text{ } + \text{ } && \text{Multiply 8 and 60 mentally.} \\ &= \text{ } && \text{Add.} \end{aligned}$$

Check Your Progress Find 7×56 mentally using the Distributive Property.

EXAMPLE Apply the Distributive Property

- 1 Su is baking cookies and cupcakes. The cookies use 2 cups of sugar per batch and the cupcakes use 3 cups of sugar per batch. How many total cups of sugar are needed if she is making 5 batches of each?

METHOD 1 Multiply. Then add.

$$\begin{aligned} \underbrace{5(2)} + \underbrace{5(3)} &= \text{ } + \text{ } \text{ or } \text{ } \text{ cups} \\ \uparrow \qquad \qquad \uparrow & \text{ amount of sugar needed for cupcakes} \\ \uparrow \qquad \qquad \uparrow & \text{ amount of sugar needed for cookies} \end{aligned}$$

METHOD 2 Add. Then multiply.

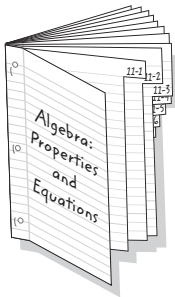
$$\begin{aligned} 5(\underbrace{2 + 3}) &= \text{ } \text{ or } \text{ } \text{ cups} \\ \uparrow & \text{ amount of sugar needed for one batch} \\ & \text{ of cookies and one batch of cupcakes} \end{aligned}$$

Using either method, Su needs cups of sugar.

FOLDABLES

ORGANIZE IT

Under the Lesson 12-1 tab of your Foldable, record what you learn about the Distributive Property. Describe how you can use the Distributive Property to multiply mentally.



Check Your Progress

A package of pencils costs \$2.00 each and a package of pens costs \$4.00 each. How much will Robert spend if he buys 3 packages of each?

EXAMPLES Rewrite Algebraic Expressions

Use the Distributive Property to rewrite each algebraic expression.

3 $4(x - 3)$

$$4(x - 3) = 4[x + (-3)]$$

Rewrite $x - 3$ as $x + (-3)$.

$$= \square(x) + \square(-3) \quad \text{Distributive Property}$$

$$= \square + \square \quad \text{Multiply.}$$

$$= 4x - 12$$

Rewrite $4x + (-12)$ as $4x - 12$.

4 $5(x + 6)$

$$5(x + 6) = \square(x) + \square(6) \quad \text{Distributive Property}$$

$$= \square + \square \quad \text{Multiply.}$$

Check Your Progress

Use the Distributive Property to rewrite each algebraic expression.

a. $3(x - 3)$

b. $6(x + 4)$

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

MAIN IDEA

- Use the Commutative and Associative Properties to simplify expressions.

KEY CONCEPT**Commutative Property**

$$a + b = b + a$$

$$a \cdot b = b \cdot a$$

Associative Property

$$(a + b) + c = a + (b + c)$$

$$(a \cdot b) \cdot c = a \cdot (b \cdot c)$$

BUILD YOUR VOCABULARY (page 292)

Equivalent expressions have the value.

The **Commutative Property** states that the in which numbers are added or multiplied does not change the or .

The **Associative Property** states that the way in which numbers are when they are added or multiplied does not change the or .

EXAMPLES Use Properties to Simplify Expressions**1** Simplify the expression $4 + (6 + x)$.

$$\begin{aligned} 4 + (6 + x) &= (\text{ } + \text{ }) + \text{ } && \text{Associative Property} \\ &= \text{ } + \text{ } && \text{Add 4 and 6.} \end{aligned}$$

2 Simplify the expression $(12 + x) + 15 = 15$.

$$\begin{aligned} (12 + x) + 15 &= (\text{ } + \text{ }) + \text{ } && \text{Commutative Property} \\ &= x + (\text{ } + \text{ }) && \text{Associative Property} \\ &= x + \text{ } && \text{Add 12 and 15.} \end{aligned}$$

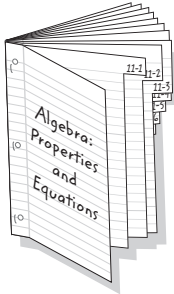
3 Simplify the expression $3(5x)$.

$$\begin{aligned} 3(5x) &= 3 \cdot (5 \cdot x) && \text{Parentheses indicate multiplication.} \\ &= (\text{ } \cdot \text{ }) \cdot \text{ } && \text{Associative Property} \\ &= \text{ } && \text{Multiply 3 and 5.} \end{aligned}$$

FOLDABLES

ORGANIZE IT

Under the Lesson 12-2 tab of your Foldable, record what you learn about the Commutative and Associative Properties. Include examples for addition and multiplication.


Check Your Progress Simplify each expression.

a. $3 + (5 + x)$

b. $(11 + x) + 8$

c. $4(7x)$

BUILD YOUR VOCABULARY (page 292)

Like terms contain the same , such as x , $2x$, and $3x$.

EXAMPLE Use Models to Simplify Expressions

1 Simplify the expression $6x + 3 + 2x$.

Use six x -tiles to model , three 1-tiles to model , and two x -tiles to model .

$$\begin{array}{|c|} \hline x \\ \hline \end{array} \begin{array}{|c|} \hline x \\ \hline \end{array} \begin{array}{|c|} \hline x \\ \hline \end{array} \begin{array}{|c|} \hline x \\ \hline \end{array} \begin{array}{|c|} \hline x \\ \hline \end{array} \begin{array}{|c|} \hline x \\ \hline \end{array} + \begin{array}{|c|} \hline 1 \\ \hline \end{array} \begin{array}{|c|} \hline 1 \\ \hline \end{array} + \begin{array}{|c|} \hline x \\ \hline \end{array} \begin{array}{|c|} \hline x \\ \hline \end{array}$$

The like terms are and because the x -tiles have the same shape. There are eight x -tiles and three 1-tiles.

So, $6x + 3 + 2x = \text{input type="text"} + \text{input type="text"}.$

Check Your Progress Simplify the expression

$5x + 4 + 2x.$

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

- Solve addition equations.

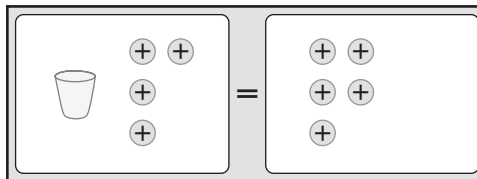
BUILD YOUR VOCABULARY (page 292)

Inverse operations are operations that *undo* each other, such as addition and subtraction.

EXAMPLE Solve an Equation by Subtracting

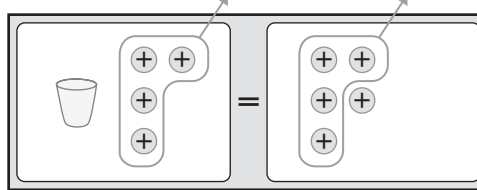
1 Solve $x + 4 = 5$.

METHOD 1 Use models.



Model the equation.

$$x + 4 = 5$$



Remove 4 counters from each side.

$$x + 4 - \square = 5 - \square$$

$$x = \square$$

METHOD 2 Use symbols.

$$x + 4 = 5$$

Write the equation.

$$x + 4 = 5$$

$$\begin{array}{r} - \square \\ \hline x = \square \end{array}$$

Subtract 4 from each side to “undo” the addition of 4 on the left.

$$5 - \square = \square$$

The solution is \square .

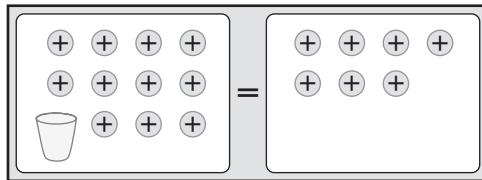
EXAMPLE Solve an Equation by Using Zero Pairs

KEY CONCEPT

Subtraction Property of Equality If you subtract the same number from each side of an equation, the two sides remain equal.

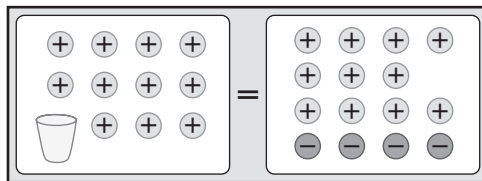
1 Solve $x + 11 = 7$. Check your solution.

METHOD 1 Use models.



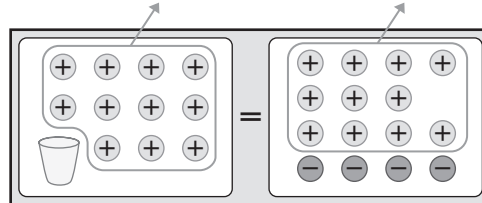
Model the equation.

$$x + 11 = 7$$



Add 4 zero pairs to the right side of the mat so there are 11 positive counters on the right.

$$x + 11 = 7$$



Remove 11 positive counters from each side.

$$x + 11 - \square = 7 - \square$$

$$x = \square$$

METHOD 2 Use symbols.

$$x + 11 = 7$$

Write the equation.

$$x + 11 = 7$$

Subtract 11 from each side to undo $x + 11$.

$$-\square = -\square$$

Subtract 11 from each side.

$$x = \square$$

$$7 - \square = \square$$

The solution is \square .

Check $-4 + 11 = 7 \checkmark$

Check Your Progress

Solve each equation. Use models if necessary.

a. $m + 9 = 3$

b. $x + 7 = 13$

BUILD YOUR VOCABULARY (page 292)

The **Subtraction Property of Equality** can be used to solve an equation by the same number from each side of the equation.

EXAMPLE

3 PENNSYLVANIA The width of Pennsylvania (from north to south) is 280 miles. This is 120 miles more than the length of the state (from east to west). Write and solve an addition equation to find the length of Pennsylvania.

Words

length plus 120 miles is 280 miles

VariableLet x represent the length of Pennsylvania.**Equation**

$$\square + \square = \square$$

$$x + 120 = 280$$

Write the equation.

$$\begin{array}{r} -120 = -120 \\ \hline \end{array}$$

Subtract 120 from each side.

$$x = \square$$

$$280 - 120 = \square$$

So, the width of Pennsylvania is miles.**Check Your Progress**

INTERNET Steve was on the Internet for 40 minutes last night. This was 15 more minutes than Beth spent on the Internet the same night. Write and solve an addition equation to find the amount of time Beth spent on the Internet last night.

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

Solving Subtraction Equations

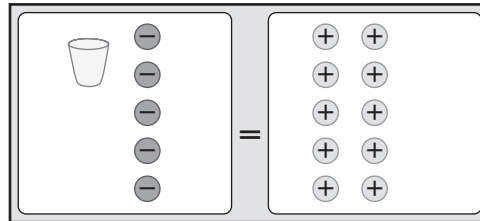
EXAMPLE Solve an Equation by Adding

MAIN IDEA

- Solve subtraction equations.

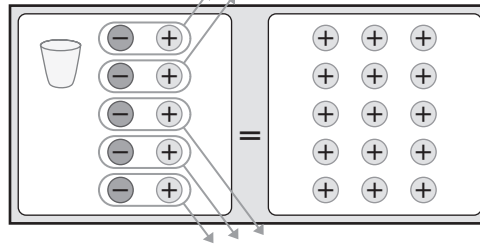
1 Solve $x - 5 = 10$.

METHOD 1 Use models.



Model the equation.

$$x - 5 = 10$$



Add 5 positive counters to each side of the mat. Remove the zero pairs.

$$x - 5 + \square = 10 + \square$$

$$x = \square$$

KEY CONCEPT

Addition Property of Equality If you add the same number to each side of an equation, the two sides remain equal.

METHOD 2 Use symbols.

$$x - 5 = 10$$

Write the equation.

$$x - 5 = 10$$

Add 5 to each side to undo the subtraction of 5 on the left.

$$+ \square = + \square$$

Add \square to each side.

$$x = \square$$

Simplify.

The solution is \square .

Check Your Progress Solve $w - 3 = 9$.

BUILD YOUR VOCABULARY (page 292)

The **Addition Property of Equality** can be used to solve an equation by the same number to each side of the equation.

EXAMPLE Solve a Subtraction Equation

1 Solve $x - 5 = -1$. Check your solution.

$$x - 5 = -1 \quad \text{Write the equation.}$$

$$+ \boxed{} = + \boxed{} \quad \text{Add } \boxed{} \text{ to each side.}$$

$$x = \boxed{} \quad \text{Simplify.}$$

The solution is . **Check** $4 - 5 = -1 \checkmark$

Check Your Progress Solve $d - 8 = -5$. Check your solution.

EXAMPLE

3 WEATHER The difference between the record high and low temperatures in Oregon is 173°F . The record low temperature is -54°F . What is the record high temperature in degrees Fahrenheit?

You need to find the record high temperature. Write and solve an equation. Let x represent the high temperature.

$$x - (-54) = 173 \quad \text{Write the equation.}$$

$$x + \boxed{} = 173 \quad \text{Definition of subtraction}$$

$$- \boxed{} = - \boxed{} \quad \text{Subtract } \boxed{} \text{ from each side.}$$

$$x = \boxed{} \quad \text{Simplify.}$$

The record high temperature is .

Check Your Progress **AGES** The difference between the age of Julie's mother and Julie's age is 27 years. Julie's age is 6. What is the age of Julie's mother?

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

MAIN IDEA

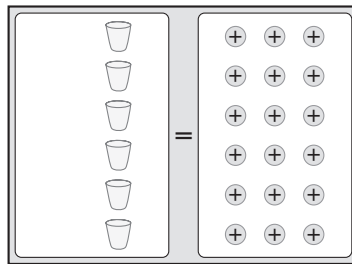
- Solve multiplication equations.

BUILD YOUR VOCABULARY (page 269)

The **coefficient** of a variable is the number by which the variable is multiplied.

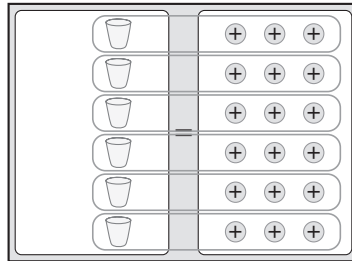
EXAMPLE Solve a Multiplication Equation

1 Solve $6x = 18$. Check your solution.



$$6x = 18$$

Model the equation.



Divide the 18 counters equally into groups.

There are in each group.

$$\frac{6x}{\square} = \frac{18}{\square}$$

$$x = \square$$

Check $6x = 18$

$$6(\square) \stackrel{?}{=} 18$$

$$18 = 18$$

Write the original equation.

Replace x with .

This sentence is true. ✓

The solution is .

Check Your Progress

Solve $4y = 20$. Use models if necessary.

EXAMPLE Solve a Multiplication Equation

1 Solve $-5b = 15$.

$$-5b = 15$$

$$\frac{-5b}{\square} = \frac{15}{\square}$$

Write the equation.

Divide each side by \square .

$$b = \square$$

$$-5 \div (-5) = \square \text{ and } 1b = b$$

The solution is \square . Check this solution.

Check Your Progress

Solve $-3t = 21$. Check your solution.

REVIEW IT

Why is it useful to divide a negative coefficient by a negative integer in solving Example 2? (Lesson 11-6)

EXAMPLE

1 **GEOMETRY** The area of a rectangle is 144 square inches, and the width is 4 inches. Write an equation to find the length of the rectangle and use it to solve the problem.

Use the formula area = length \times width.



$$A = w\ell$$

Write the equation.

$$144 = 4\ell$$

Replace w with 4.

$$\frac{144}{\square} = \frac{4\ell}{\square}$$

Divide each side by \square .

$$\square = \ell$$

Simplify.

The length of the rectangle is \square .

Check Your Progress

GEOMETRY The area of a rectangle is 126 square feet and the width is 7 feet. Write an equation to find the length of the rectangle and use it to solve the problem.

HOMEWORK ASSIGNMENT

Page(s):

Exercises:

Problem-Solving Investigation: Choose the Best Method of Computation

EXAMPLE Choose the Best Method of Computation

MAIN IDEA

- Solve problems by choosing the best method of computation.

MONEY The 11 members of the volleyball team are selling candy bars to raise money for new uniforms. They have 2 weeks to raise \$500. The team makes \$0.97 for each candy bar sold. If each member sells 26 each week, will they be able to raise enough money in two weeks? Explain.

UNDERSTAND You know that each of the 11 team members will sell candy bars each week and make on each one. You need to determine whether the team will make in 2 weeks.

PLAN Since an exact answer is needed and several calculations are required, use a to find the total amount the team will earn.

SOLVE $11 \text{ members} \times 2 \text{ weeks} \times \$0.97 \text{ per candy bar} \times 26 \text{ candy bars each} = \text{}$; yes, the team will raise \$500 in 2 weeks.

CHECK Go back and review the data and your multiplication to be sure you get a total of \$554.84. Since $11 \times 2 \times 0.97 \times 26 = \554.84 , and $\$554.84 > \500 , the answer is correct.


Check Your Progress **COOKIES** Rosita made cookies for a bake sale. She sold 36 cookies on Friday, 54 cookies on Saturday, and 68 cookies on Sunday. Her family ate 9 cookies after the bake sale was over, and she had 25 cookies left. How many cookies did Rosita make for the bake sale?

HOMEWORK ASSIGNMENT

Page(s): _____

Exercises: _____

STUDY GUIDE

	VOCABULARY PUZZLEMAKER	BUILD YOUR VOCABULARY
Use your Chapter 12 Foldable to help you study for your chapter test.	To make a crossword puzzle, word search, or jumble puzzle of the vocabulary words in Chapter 12, go to: glencoe.com	You can use your completed Vocabulary Builder (page 292) to help you solve the puzzle.

12-1

The Distributive Property

Find each product mentally.

1. 5×32

2. 3×24

3. 6×55

4. 7×43

Use the Distributive Property to rewrite each algebraic expression.

5. $2(x - 6)$

6. $3(x + 2)$

7. $5(x + 9)$

8. $7(x - 8)$

9. **CANDLES** Votive candles come in packages of 6 and tealight candles come in packages of 8. If Mariana buys 3 packages of each, how many candles will she have?

12-2

Simplifying Algebraic Expressions

Simplify each expression.

10. $2 + (5 + x)$

11. $4 + (6 + x)$

12. $(8 + x) + 3$

13. $(10 + x) + 7$

14. $4(9x)$

15. $7(6x)$

16. Simplify the expression $3x + 5 + 4x$.

12-3

Solving Addition Equations

17. $m + (-5) = 7$

18. $6 + y = -6$

19. **RECYCLING** Andrew and Jacob are collecting aluminum cans to recycle. Andrew has 56 cans. This is 18 more cans than Jacob has. Write and solve an addition equation to find how many aluminum cans Jacob has.

12-4

Solving Subtraction Equations

Match the method of solving with the correct equation.

20. $m - 7 = 7$

21. $r - 9 = -6$

22. $7 = s - 3$

23. $-2 = p - 6$

24. $x - 2 = 1$

- a. Subtract 3 from each side.
- b. Add 2 to each side.
- c. Add 6 to each side.
- d. Add 3 to each side.
- e. Add 9 to each side.
- f. Add 1 to each side.

12-5

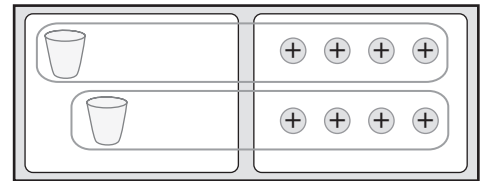
Solving Multiplication Equations

25. Use the model to solve the equation $2x = 8$.

$2x = 8$

=

$x =$



Solve each equation.

26. $27 = 3s$

27. $-6n = 48$

28. $-12j = -36$

12-6

Problem-Solving Investigation: Choose the Best Method of Computation

Solve. Choose the best method of computation. Explain your reasoning.

29. **FOOD** A small bag of potato chips weighs about 0.85 ounce. What is the weight of 12 bags of potato chips?

Math Online

Visit glencoe.com to access your textbook, more examples, self-check quizzes, and practice tests to help you study the concepts in Chapter 12.

ARE YOU READY FOR THE CHAPTER TEST?

Check the one that applies. Suggestions to help you study are given with each item.

I completed the review of all or most lessons without using my notes or asking for help.

- You are probably ready for the Chapter Test.
- You may want to take the Chapter 12 Practice Test on page 667 of your textbook as a final check.

I used my Foldables or Study Notebook to complete the review of all or most lessons.

- You should complete the Chapter 12 Study Guide and Review on pages 663–666 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may want to take the Chapter 12 Practice Test on page 667.

I asked for help from someone else to complete the review of all or most lessons.

- You should review the examples and concepts in your Study Notebook and Chapter 12 Foldable.
- Then complete the Chapter 12 Study Guide and Review on pages 663–666 of your textbook.
- If you are unsure of any concepts or skills, refer back to the specific lesson(s).
- You may also want to take the Chapter 12 Practice Test on page 667.

Student Signature

Parent/Guardian Signature

Teacher Signature