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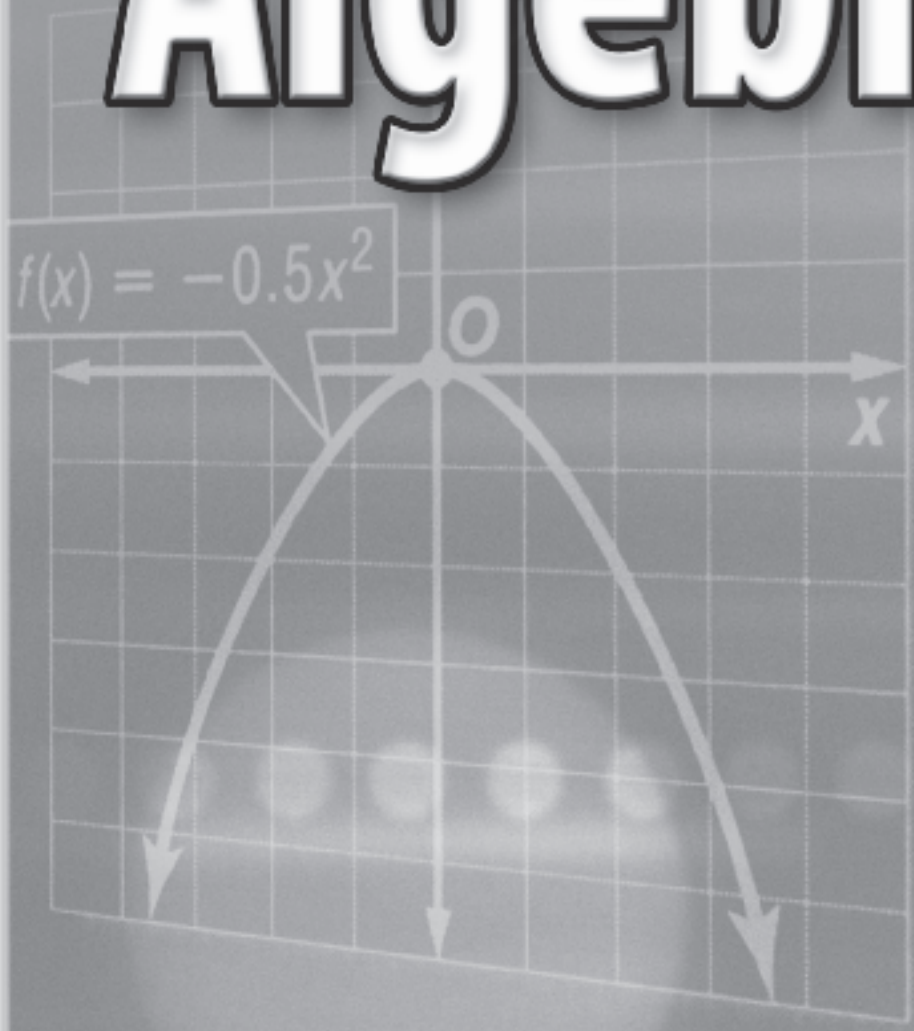
Study Notebook

Algebra 2



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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 emphasis 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.

NAME _____ DATE _____ PERIOD _____

CHAPTER 1

Equations and Inequalities

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Equations and Inequalities
	• Real numbers include rational and irrational numbers.
	• The Symmetric Property states that for any real number a, $a = a$.
	• Substitution is one way to check if the solution for an equation is correct.
	• $\|y\|$ means the absolute value of y.
	• The graph of a compound inequality with "and" is union of the solution set of the two inequalities.

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **When you take notes, it may be helpful to sit as close as possible to the front of the class.**
  There are fewer distractions and it is easier to hear.
- **If your instructor points out definitions or procedures from your text, write a reference page in your notes.**
  You can then write these referenced items in their proper place in your notes after class.

NAME _____ DATE _____ PERIOD _____

CHAPTER 1

Equations and Inequalities

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on expressions and formulas, one fact might be that a formula is a mathematical sentence that expresses the relationship between certain qualities. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
1-1 Expressions and Formulas	
1-2 Properties of Real Numbers	
1-3 Solving Equations	
1-4 Solving Absolute Value Equations	
1-5 Solving Inequalities	
1-6 Solving Compound and Absolute Value Inequalities	

NAME _____ DATE _____ PERIOD _____

1-1 Expressions and Formulas

What You'll Learn

Skim the lesson. Write two things you already know about expressions and formulas.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Identify the four *grouping symbols* used in the following expression. *(Prerequisite Skill)*

_____ ▶

_____ ▶

_____ ▶

_____ ▶

$$\left(\frac{3\sqrt{3 \cdot 6 - 2}}{5(2-3)}\right)^2$$

New Vocabulary Write the correct term beside each definition.

_____ ▶ letters used to represent unknown quantities

_____ ▶ expressions that contain at least one variable

_____ ▶ a mathematical sentence that expresses the relationship between certain quantities

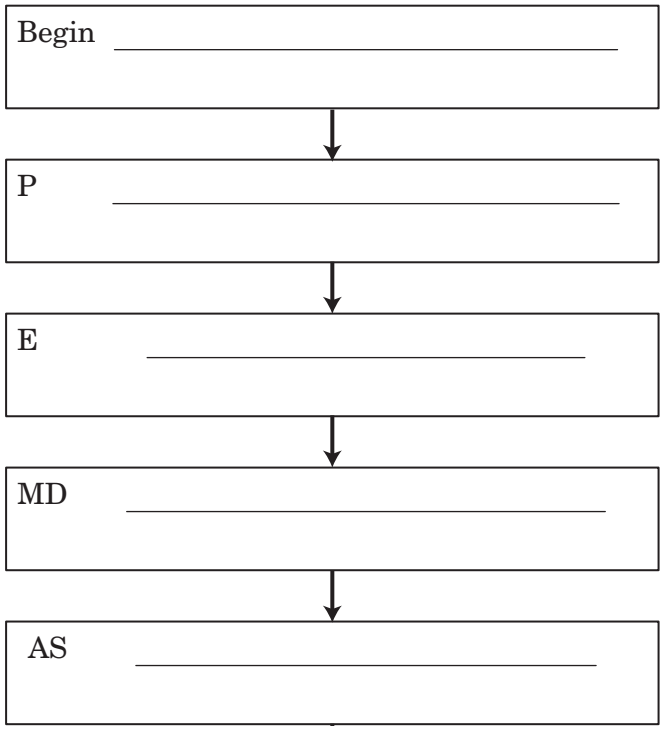
_____ ▶ a set of rules which outline the order in which calculations must be performed in a mathematical expression

Vocabulary Link Putting on socks and then shoes is an example of a real life situation in which following a prescribed *order of operations* is crucial to a successful outcome. Describe two other such situations.

_____

_____

Main Idea	Details
Order of Operations pp. 5–6	**Write a title for each step and complete the operations in order for the expression $3x - 4(y + 2)^2$ when $x = -2$ and $y = 3$.**



Formulas p. 6	**Calculate the amount of medicine to give an eight-year-old child if the adult dosage is 1500 milligrams. Use the formula $d = 0.08aD$ where d is the child's dosage, a is the child's age, and D is the adult dosage.**

Helping You Remember

Think of a phrase or sentence to help you remember the order or operations.

_____

_____

NAME _____ DATE _____ PERIOD _____

1-2 Properties of Real Numbers

What You'll Learn

Skim the Examples for Lesson 1-2. Predict two things you think you will learn about the properties of real numbers.

1. _____

2. _____

Active Vocabulary

New Vocabulary Match the term with its definition by drawing a line to connect the two.

integers	numbers that can be expressed as a ratio of two integers; the decimal form either terminates or repeats
real numbers	numbers used for counting {1, 2, 3, . . . }
natural numbers	the set of numbers which represent all points on a number line
rational numbers	numbers than cannot be expressed as a ratio of two integers; the decimal form neither terminates, nor repeats
whole numbers	the counting numbers plus zero {0, 1, 2, 3, . . . }
irrational numbers	the whole numbers and their opposites

Vocabulary Link Explain each of the mathematical representations of properties in your own words.

1. $a + b = b + a$ _____

2. $(a \cdot b) \cdot c = a \cdot (b \cdot c)$ _____

3. $a + (-a) = 0$ _____

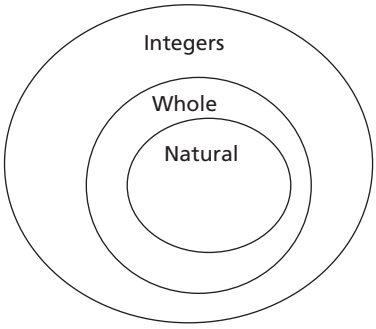
Lesson 1-2

Main Idea	Details

Real Numbers
p. 11

Write each of the following numbers into the appropriate location in the Venn diagram.
$\left\{\sqrt{2}, 4, 0, \frac{2}{3}, 1000, \pi, 2.25, -22, 2.\overline{6541}\right\}$

Real Numbers

Rational Numbers	Irrational Numbers
	

Properties of Real Numbers
pp. 12–13

State the property represented in each equation.

1. $6.72 + (-6.72) = 0$ _____

2. $3b + 2b = (3 + 2)b$ _____

3. $-3(2 \cdot 5) = (-3 \cdot 2)5$ _____

4. $5 \cdot a = a \cdot 5$ _____

5. $\frac{6}{11} \cdot \frac{11}{6} = 1$ _____

Helping You Remember

How can the words *commuter, association,* and *distribution* help you remember the difference between the commutative, associative and distributive properties?

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

1-3 Solving Equations

What You'll Learn

Scan the text in Lesson 1-3. Write two facts you learned about equations as you scanned the text.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Define the following terms from this lesson.

open sentence ▶ _____

_____

equation ▶ _____

_____

solution ▶ _____

_____

Vocabulary Link *Properties of Equality* can be explained in non-mathematical terms. For each description, name the *Property of Equality* that is described.

The word "little" means the same as the word "small". Therefore, when I read the word "small" I can replace it with the word "little."

_____

The word "little" means the same as the word "small." The word "small" means the same as the word "tiny." Therefore, the word "little" means the same as the word "tiny."

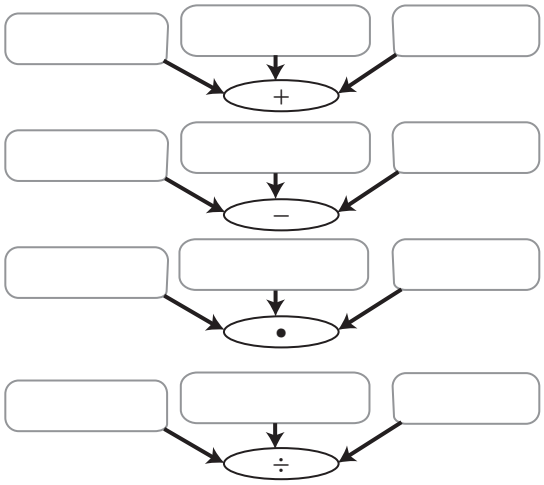
_____

Lesson 1-3

Main Idea	Details

Verbal Expressions and Algebraic Expressions
p. 18

List verbal expressions that would translate into each operation.



Properties of Equality
pp. 19–21

Solve the equation using the steps listed as a guide.

Equation	Step
$2(q - 3) + 5q = 8(q - 1)$	Original equation
	Distributive Property
	Simplify.
	Addition Property of Equality
	Addition Property of Equality
	Division Property of Equality
	Check.

Helping You Remember

How can the words *reflection* and *symmetry* help you remember and distinguish between the reflexive and symmetric properties of equality? Think about how these words are used in geometry.

_____

_____

NAME _____ DATE _____ PERIOD _____

1-4 Solving Absolute Value Equations

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Describe the importance of grouping symbols to the order of operations. *(Lesson 1-1)*

_____

_____

_____

_____

New Vocabulary Fill in the blank with the correct term or phrase.

absolute value ▶ The _____ of a number from _____ on a number line.

empty set ▶ The term used to describe when an equation is _____ true and thus has no solution. The symbols used to denote the empty set are _____ and _____.

extraneous solution ▶ The term used to describe a solution to an _____ which is found when solving the equation but is determined to be invalid when _____ the solution in the original equation.

Main Idea	Details

Absolute Value Expressions
p. 27

Evaluate each expression given $u = -3$ and $v = 5$.

1. $|u - v|$

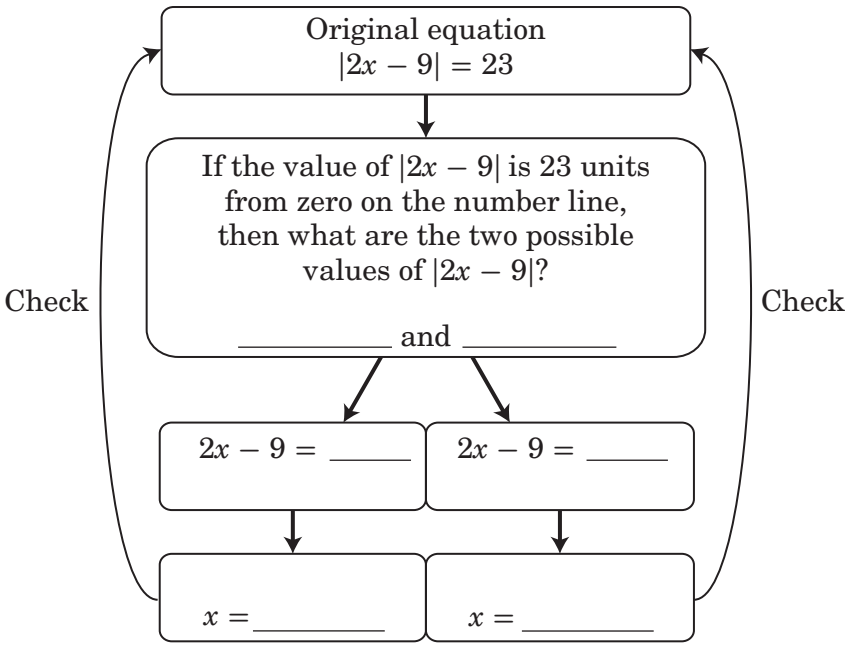
2. $3|u| - 4|v|$

3. $5 - |4u + 7| - v$

4. $\dfrac{|2u - 1|}{|v - 6|}$

Absolute Value Equations
pp. 28–29

Complete the diagram to solve the equation $|2x - 9| = 23$.



Helping You Remember

How can the number line model for absolute value, shown in your textbook help you remember that many absolute value equations have two solutions?

_____

_____

NAME _____ DATE _____ PERIOD _____

1-5 Solving Inequalities

What You'll Learn

Skim Lesson 1-5. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Write a word description for each inequality symbol and write a true mathematical sentence using the symbol. *(Prerequisite Skill)*

1. > _____ _____

2. < _____ _____

3. ≥ _____ _____

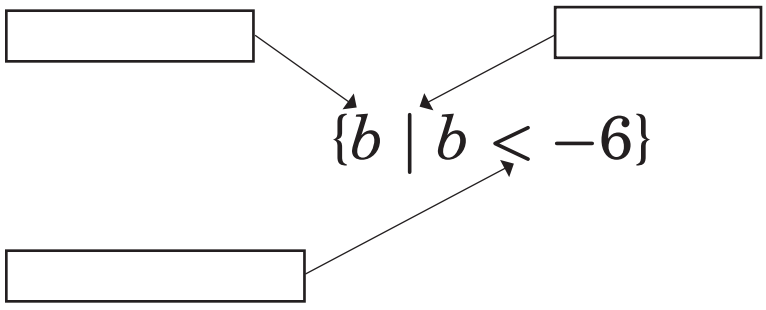
4. ≤ _____ _____

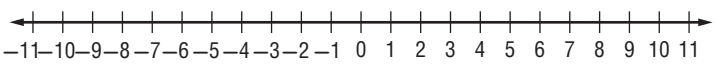
New Vocabulary Label the parts of the *set builder notation* below using the phrases given at the left. Show the set builder notation on the number line.

such that ▶

all numbers b ▶

b is less than −6 ▶





Main Idea	Details

One-Step Inequalities
pp. 33–35

Identify the reason for each step in solving the inequality. Graph the solution set on a number line.

$6x + 12 < 8x - 8$ _____

$6x + 12 - 12 < 8x - 8 - 12$ _____

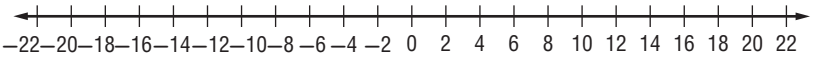
$6x < 8x - 20$ _____

$6x - 8x < 8x - 8x - 20$ _____

$-2x < -20$ _____

$\frac{-2x}{-2} < \frac{-20}{-2}$ _____

$x > 10$ _____



Multi-Step Inequalities
pp. 35–36

Describe the similarities and differences between solving an equation and solving an inequality.

Similarities	Differences

Helping You Remember

A common error in solving inequalities is forgetting to reverse the equality symbol when multiplying or dividing both sides of an inequality by a negative number. How could you explain this rule to a classmate who is having trouble remembering this rule?

_____

_____

NAME _____ DATE _____ PERIOD _____

1-6 Solving Compound and Absolute Value Inequalities

What You'll Learn

Scan Lesson 1-6. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the definition next to each term.

compound inequality ▶ _____

_____

union ▶ _____

_____

_____

intersection ▶ _____

_____

_____

_____

Vocabulary Link Shade the *intersection* of sets A and B in Diagram I. Shade the *union* of sets A and B in Diagram II.

Diagram I

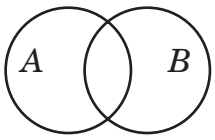
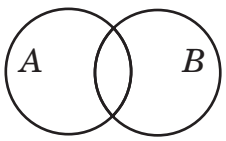


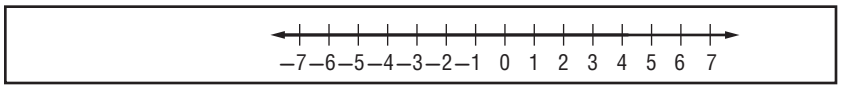
Diagram II



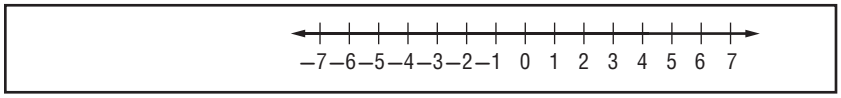
Main Idea	Details

Compound Inequalities
pp. 41–42

Write a compound inequality that says "x is greater than -3 and x is less than or equal to 4." Graph the inequality.



Write a compound inequality that says "x is less than 2 or x is greater than or equal to 6." Graph the inequality.



Absolute Value Inequalities
pp. 43–44

Complete the chart below for solving absolute value inequalities.

Step 1: Isolate the absolute value expression.

Step 2: Choose the correct form of the inequality.

$\lvert ax + b\rvert > c$	$\lvert ax + b\rvert \geq c$	$\lvert ax + b\rvert < c$	$\lvert ax + b\rvert \leq c$
Rewrite as $ax + b > c$ or $ax + b < -c$ and solve for x.			

Helping You Remember

Describe a way to remember whether an absolute value inequality should be translated into an *and* or an *or* compound inequality.

_____

_____

NAME _____ DATE _____ PERIOD _____

CHAPTER 1

Expressions and Formulas

Tie It Together

Complete each table concerning real numbers. Provide two important details in each graphic organizer concerning variables.

Real Numbers

Properties of

Property	Number Example
Commutative Property of Addition	$3 + 2 = 2 + 3$
	$(2 \bullet 5) \bullet 4 = 2 \bullet (5 \bullet 4)$
	$6 + (-6) = 0$
Closure Property of Multiplication	
	$6(2 + 5) = 12 + 30$

Sets of

Set	Examples
	$0.5, \frac{3}{8}, 7$
Irrationals	
	$0, 2, 7, -20$
Wholes	
	$1, 2, 3, \ldots$

Variables

Expressions

Formulas

Equations

Inequalities

Absolute Value Equations

Compound Inequalities

Absolute Value Inequalities

NAME _____ DATE _____ PERIOD _____

Equations and Inequalities

Before the Test

Now that you have read and worked through the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.

2. Write a **D** if you disagree with the statement.

Equations and Inequalities	After You Read
• Real numbers include rational and irrational numbers.	
• The Symmetric Property states that for any real number a, $a = a$.	
• Substitution is one way to check if the solution for an equation is correct.	
• $\lvert y \rvert$ means the absolute value of y.	
• The graph of a compound inequality with "and" is union of the solution set of the two inequalities.	

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 1.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 1 Study Guide and Review in the textbook.

☐ I took the Chapter 1 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

- Set goals and priorities before studying. Then study the most difficult material first and complete assignments that have due dates before others.

NAME _____ DATE _____ PERIOD _____

CHAPTER 2

Linear Relations and Functions

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Linear Relations and Functions
	• A relation is always a function, but a function is not always a relation.
	• Rate of change is the slope.
	• The slope-intercept form of a linear equation is used when there is an ordered pair and slope is given.
	• A line of regression is the change of y over the change of x.
	• In the graph of a linear inequality, the line is the boundary.

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **When you take notes, listen or read for main ideas.**
  Then record concepts, define terms, write statement in if-then form, and write paragraph proofs.
- **When taking notes, writing a paragraph that describes the concepts, the computational skills, and the graphics will help you to understand the math in the lesson.**

NAME _____ DATE _____ PERIOD _____

CHAPTER 2

Linear Relations and Functions

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on rate of change and slope, one fact might be that the slope of a line is the same as its rate of change. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
2-1 Relations and Functions	
2-2 Linear Relations and Functions	
2-3 Rate of Change and Slope	
2-4 Writing Linear Equations	
2-5 Scatter Plots and Lines of Regression	
2-6 Special Functions	
2-7 Parent Functions and Transformations	
2-8 Graphing Linear and Absolute Value Inequalities	

NAME _____ DATE _____ PERIOD _____

2-1 Relations and Functions

What You'll Learn

Scan Lesson 2-1. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the definition next to each term.

continuous function ▶ _____

_____

dependent variable ▶ _____

_____

discrete function ▶ _____

_____

function notation ▶ _____

_____

independent variable ▶ _____

_____

one-to-one function ▶ _____

_____

onto function ▶ _____

_____

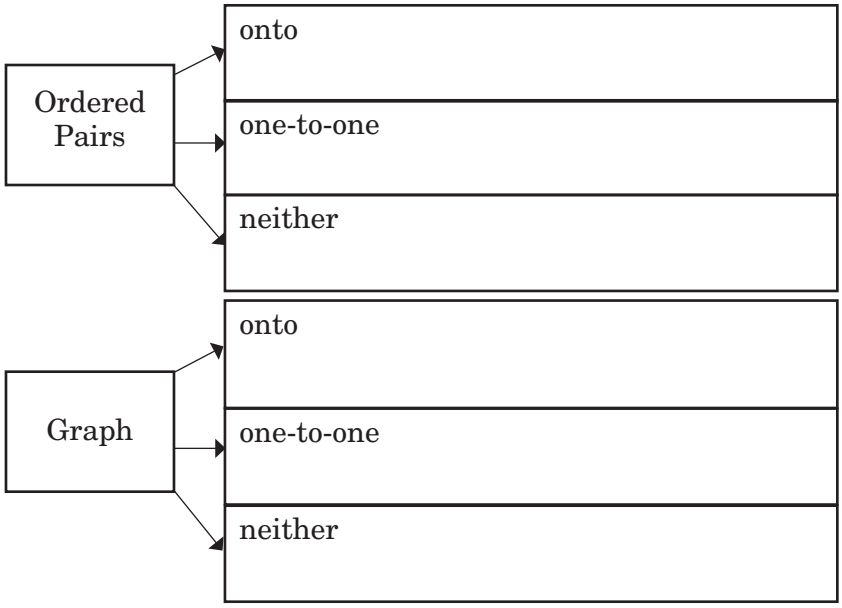
vertical line test ▶ _____

_____

Main Idea	Details

Relations and Functions
pp. 61–63

Describe a method of visual inspection for determining if a given relation is an onto function, a one-to-one function or neither.



Equations of Relations and Functions
pp. 63–64

Match each domain element to the correct range element by drawing a line between the two. Use the function $f(x) = 3x^2 + x - 5$.

Helping You Remember

Look up the words *dependent* and *independent* in a dictionary. How can these words help you distinguish between *independent* and *dependent* variables?

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

2-2 Linear Relations and Functions

What You'll Learn

Scan the text in Lesson 2-2. Write two facts you learned about linear functions and relations as you scanned the text.

1. _____

_____

2. _____

_____

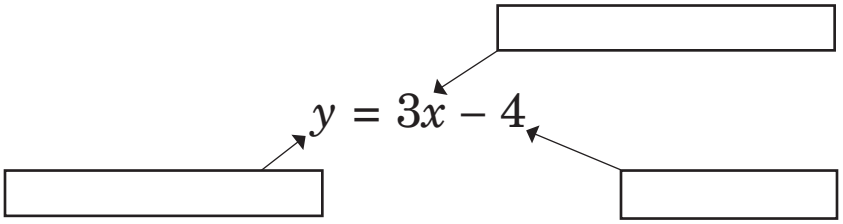
Active Vocabulary

Review Vocabulary Label the diagram using the words at the left. *(Lesson 2-1)*

independent variable ▶

dependent variable ▶

constant ▶



New Vocabulary Fill in each blank with the correct term or phrase.

linear relation ▶ a relation in which the graph of the relation is a _____

linear equation ▶ an equation with exponents no greater than _____, and which does not contain the operation of _____ of a constant by a variable

linear function ▶ a function whose _____ satisfy a linear function of the form $f(x) =$ ____ $x +$ ____

standard form ▶ form of a linear equation written as $Ax + By = C$ where A, B, C are _____ and have a greatest common factor of _____

y-intercept ▶ the _____ of the point at which a graph crosses the _____

x-intercept ▶ the _____ of the point at which a graph crosses the _____

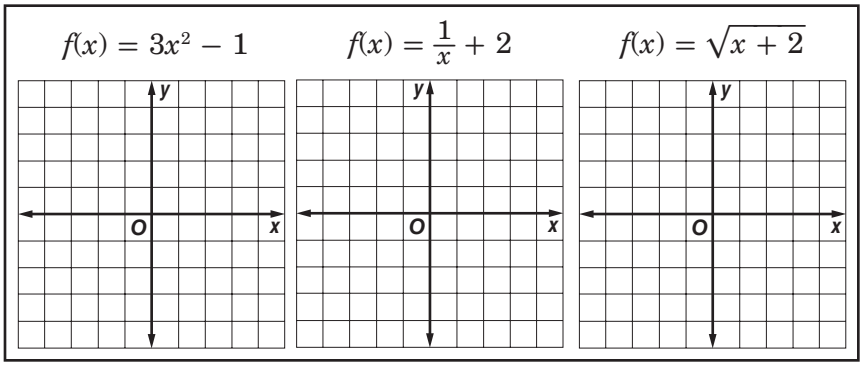
Lesson 2-2

Main Idea	Details

Linear Relations and Functions
pp. 69–70

Circle the characteristic of each function that makes it nonlinear. Sketch the graph of each function to show that it is nonlinear.

$f(x) = 3x^2 - 1$ $f(x) = \frac{1}{x} + 2$ $f(x) = \sqrt{x + 2}$



Standard Form
pp. 70–71

Compare and contrast finding the *x*-intercept and the *y*-intercept for an equation by filling in the chart below.

	Finding *x*-intercept	Finding *y*-intercept
What is the same?		
What is different?		

Helping You Remember

Your friend thinks that she should let $x = 0$ to find the *x-intercept*. How would you explain to her how to remember the correct method?

_____

_____

NAME _____ DATE _____ PERIOD _____

2-3 Rate of Change and Slope

What You'll Learn

Skim the lesson. Write two things you already know about rate of change and slope.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Write the definition of the word *ratio* and list three ways that a ratio can be expressed. By scanning ahead, how are ratios expressed in this lesson?

_____

_____

_____

_____

_____

New Vocabulary Write the definition next to each term.

rate of change ▶ _____

_____

slope ▶ _____

_____

_____

Lesson 2-3

Main Idea	Details

Rate of Change
pp. 76–77

Complete the tables so that Table A has a *rate of change* of 30 people per year and Table B has a *rate of change* of −3.2 inches per minute.

Table A

Year	People
0	
4	125
5	
8	

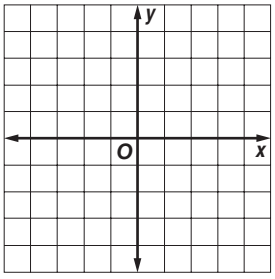
Table B

Minutes	Inches
1	
2	
4	38.6
7	

Slope
pp. 77–78

Use each of the indicated methods to calculate the slope of the line described.

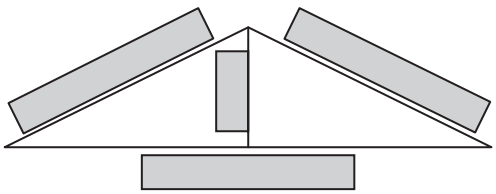
a line that passes through the points (−1, 4) and (3, −2)

Use (–1, 4) as (x_1, y_1) and (3, –2) as (x_2, y_2).	Use (3, –2) as (x_1, y_1) and (–1, 4) as (x_2, y_2).	Plot the points to determine $\frac{\text{rise}}{\text{run}}$. 

Did you get the same slope all three times?

Helping You Remember

Label the shaded boxes in the diagram as a pictorial reminder of *negative, positive, zero,* and *undefined* slope.



NAME _____ DATE _____ PERIOD _____

2-4 Writing Linear Equations

What You'll Learn

Skim the Examples for Lesson 2-4. Predict two things you think you will learn about writing linear equations.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Write the slope formula, and then write a verbal description of how to use the slope formula. *(Lesson 2-3)*

_____

_____

_____

_____

_____

New Vocabulary Label the equations with the correct terms.

point-slope form ▶

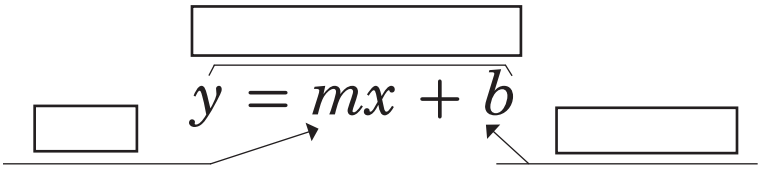
slope-intercept form ▶

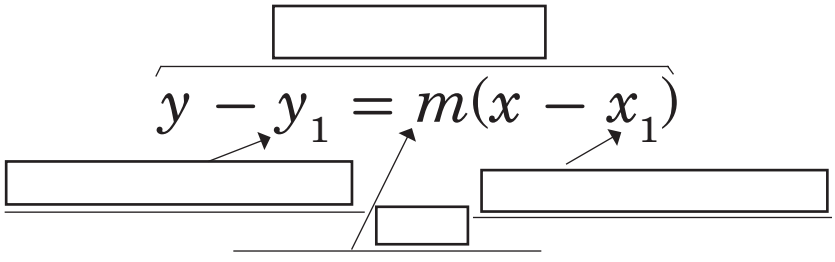
y-coordinate of point on the line ▶

slope ▶

y-intercept ▶

x-coordinate of point on the line ▶





Lesson 2-4

Main Idea	Details
Forms of Equations pp. 83–85	**The directions "Write the equation of the line given . . ." can take on many variations. List three situations when using the *Slope-Intercept Form* would be appropriate and two situations when using the *Point-Slope Form* would be appropriate.**

Slope Intercept Form

$y = mx + b$

_____

_____

_____

Point Slope Form

$y - y_1 = m(x - x_1)$

_____

_____

Parallel and Perpendicular Lines
pp. 85–86

Write an equation for each of the three following lines.

1. a line which has an x-intercept of 4 and a y-intercept of -2

2. a line parallel to the line in Exercise 1

3. a line perpendicular to the line in Exercise 1

Helping You Remember

How can you use the slope formula to remember the *point-slope form?*

_____

_____

NAME _____ DATE _____ PERIOD _____

2-5 Scatter Plots and Lines of Regression

What You'll Learn

Skim Lesson 2-5. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the correct term beside each definition.

_____ ▶ the equation for a line of best fit

_____ ▶ when a scatter plot resembles a line which falls from left to right

_____ ▶ a set of data which contains two variables

_____ ▶ a line which closely approximates the scatter plot for a set of data

_____ ▶ a set of bivariate data graphed as order pairs on a coordinate plane

_____ ▶ when a scatter plot resembles a line which rises from left to right

_____ ▶ a line of best-fit which is calculated mathematically so that the distance of all data points to the line of fit are minimized

_____ ▶ a measure of how well data are modeled by a line of best fit

Vocabulary Link Circle each word which would likely describe the given statistical relationship.

the number of absences and the final grades of seven students randomly selected from an algebra class

negative correlation | positive correlation | no correlation | weak correlation | strong correlation

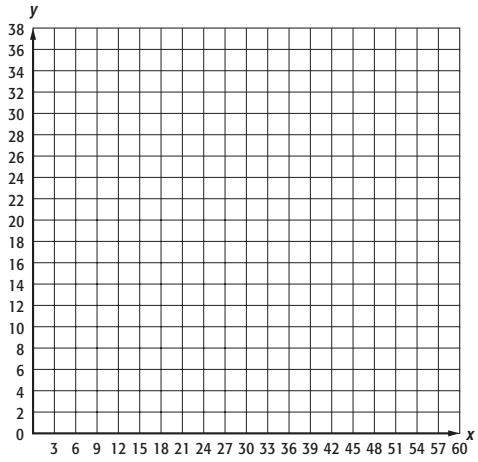
Main Idea	Details

Scatter Plots and Prediction Equations
pp. 92–93

Make a scatter plot and give a verbal description of the correlation. Determine a line of best fit for the data.

The table shows the number of sick days taken and the ages of seven random employees from a retail store.

Age	18	26	39	48	53	58
Days	16	12	9	5	6	2



Line of Best Fit

Lines of Regression
pp. 94–95

Make detailed notes about the keystrokes necessary to perform linear regression on your graphing calculator.

Making the Scatter Plot	**Performing Regression**	**Using Regression Line**

Helping You Remember

Look up the word *scatter* in a dictionary. How can its definition help you to remember the difference between a scatter plot and the graph of a linear equation?

_____

_____

NAME _____ DATE _____ PERIOD _____

2-6 Special Functions

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

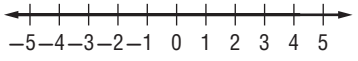
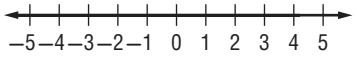
_____

2. _____

_____

Active Vocabulary

Review Vocabulary Graph each on a number line. *(Lesson 1-6)*

$\lvert x \rvert < 4$	all integers whose absolute value is greater than 2
	

New Vocabulary Write the definition next to each term.

step function ▶ _____

_____

greatest integer function ▶ _____

_____

piecewise-defined function ▶ _____

_____

absolute value function ▶ _____

_____

piecewise-linear function ▶ _____

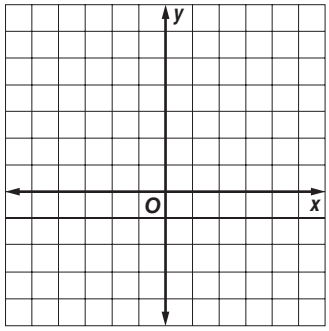
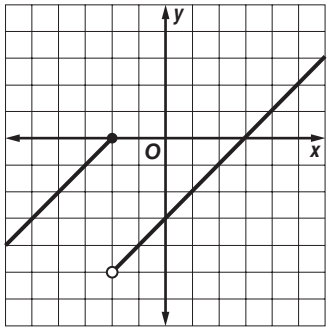
_____

Main Idea	Details

Piecewise-Defined Functions

pp. 101–102

Provide either the graph or the function notation for each *piecewise-defined function*. Identify the domain and range for each.

Function	Graph	Domain
$f(x) = \begin{cases} x + 2 \text{ if } x \geq 2 \\ -x + 4 \text{ if } x < 2 \end{cases}$		**Range**
$f(x) = \begin{cases} x + 2 \text{ if } x \leq -2 \\ x - 3 \text{ if } x > -2 \end{cases}$		**Domain** / **Range**

Step Functions and Absolute Value Functions

pp. 102–104

Evaluate each expression.

1. $[\![4.5]\!]$

2. $|\ [\![-8.2]\!]\ |$

3. $|\ [\![12.9]\!] - 15\ |$

4. $3|\ 15 - 7\ |$

Helping You Remember

Many students find the greatest integer function confusing. Explain how you can use a number line to find the value of this function for any real number.

_____

_____

NAME _____ DATE _____ PERIOD _____

2-7 Parent Functions and Transformations

What You'll Learn

Skim the Examples for Lesson 1-2. Predict two things you think you will learn about transformations.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the correct term beside each definition.

_____ ▶ the simplest graph in a family of similar graphs

_____ ▶ $f(x) = x$

_____ ▶ a group of graphs which display similar characteristics

_____ ▶ the straight line which an image is reflected over

_____ ▶ $f(x) = x^2$

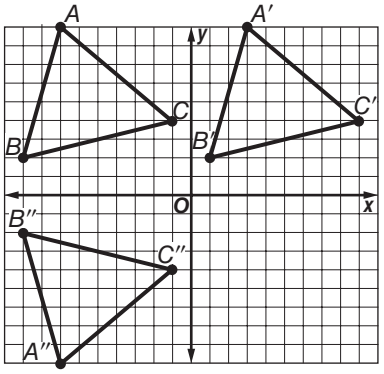
_____ ▶ movement of an image vertically or horizontally

_____ ▶ $f(x) = a$

_____ ▶ when an image is flipped over a straight line

_____ ▶ a transformation which shrinks or enlarges a figure

Review Vocabulary Write the name of each transformation.



$\triangle ABC \longrightarrow \triangle A'B'C'$

_____

$\triangle ABC \longrightarrow \triangle A''B''C''$

_____

Lesson 2-7

Main Idea **Details**

Parent Graphs
pp. 109–110

Complete the table below.

Function Name	Function Notation	General Shape	Domain and Range
Constant			
Absolute Value		"V" shape	
Quadratic		"U" shape	

Transformations
pp. 110–112

Compare and contrast the transformations for each pair of functions below by completing the chart.

Pair of Functions	How are the transformations the same?	How are the transformations different?
$f(x) = \|x\| + 4$ and $g(x) = \|x + 4\|$		
$f(x) = (3x)^2$ and $g(x) = 3x^2$		
$f(x) = -\|x\|$ and $g(x) = \|-x\|$		

Helping You Remember

Describe how grouping symbols affect translations and reflections.

_____

_____

NAME _____ DATE _____ PERIOD _____

2-8 Graphing Linear and Absolute Value Inequalities

What You'll Learn

Scan the text in Lesson 2-8. Write two facts you learned about graphing inequalities as you scanned the text.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Explain how the solution set for $3x - 4 = 8$ differs from the solution set of $3x - 4 > 8$ and the solution set of $3x - 4 \geq 8$.

_____

_____

_____

_____

_____

New Vocabulary Write the definition next to each term.

linear inequality ▶ _____

_____

boundary ▶ _____

_____

_____

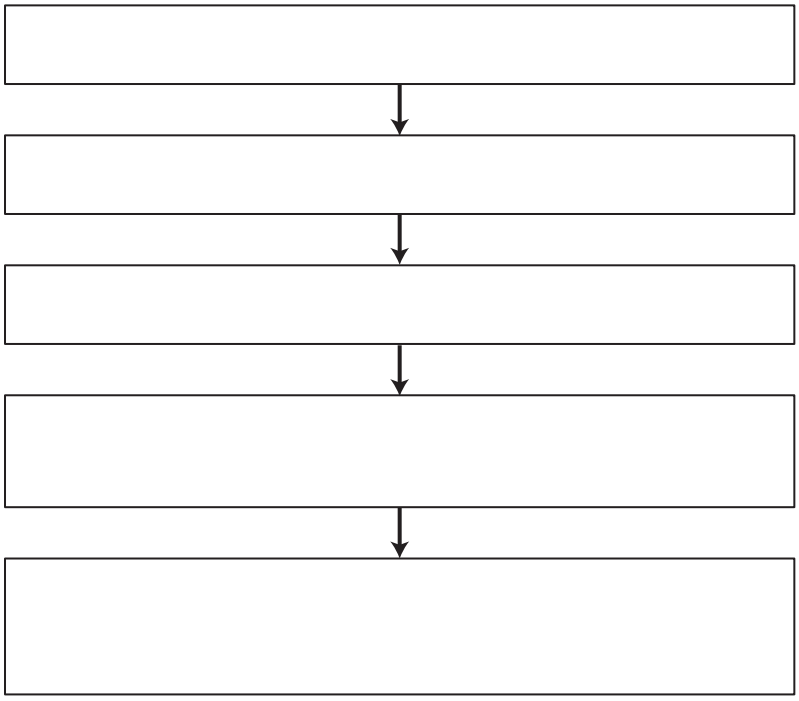
Lesson 2-8

Main Idea	Details

Graph Linear Inequalities

pp. 117–118

Sequence the steps for graphing a linear inequality by placing one step in each box.



Graph Absolute Value Inequalities

p. 118

Describe how the graphs of $y > |x + 2|$ and $y \leq |x + 2|$ are similar. How are they different?

Similarities	Differences

Helping You Remember

How can what you know about graphing inequalities on a number line help you graph inequalities in a coordinate plane?

_____

_____

_____

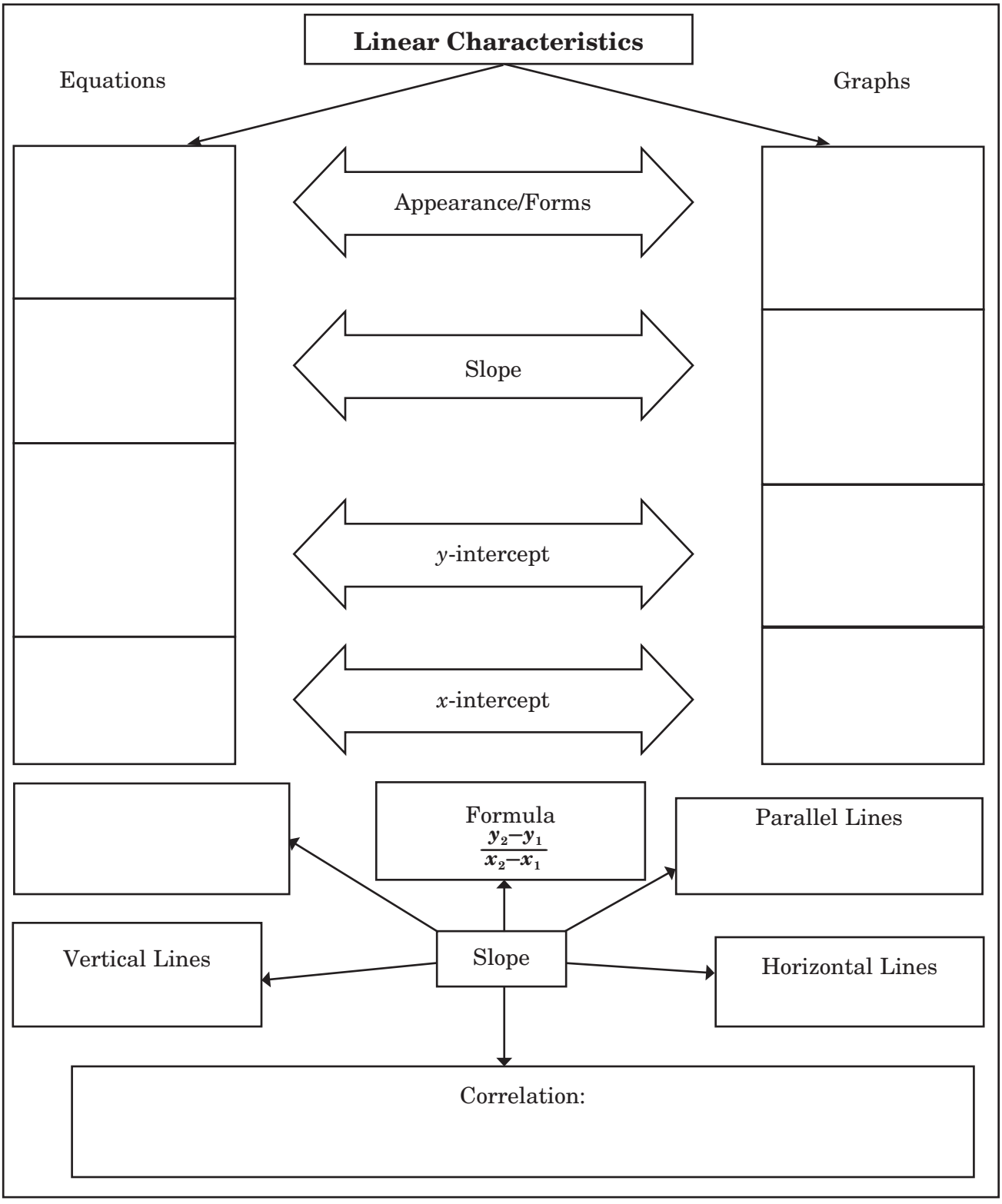
NAME _____ DATE _____ PERIOD _____

CHAPTER 2

Linear Relations and Functions

Tie It Together

Provide details in each graphic organizer.



NAME _____ DATE _____ PERIOD _____

CHAPTER 2 Linear Relations and Functions

Before the Test

Now that you have read and worked through the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Linear Relations and Functions	After You Read
• A relation is always a function, but a function is not always a relation.	
• Rate of change is the slope.	
• The slope-intercept form of a linear equation is used when there is an ordered pair and slope is given.	
• A line of regression is the change of y over the change of x.	
• In the graph of a linear inequality, the line is the boundary.	

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 2.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 2 Study Guide and Review in the textbook.

☐ I took the Chapter 2 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

Study Tips

- Review information daily to keep it fresh and to reduce the amount of last minute studying before test day. Look over the notes from class, readings, and corrected homework to review. If you have confusion about any concepts get them cleared up before test day.

NAME _____ DATE _____ PERIOD _____

CHAPTER 3

Systems of Equations and Inequalities

Before You Read

Before you read the chapter, think about what you know about systems of equations and inequalities. List three things you already know about them in the first column. Then list three things you would like to learn about them in the second column.

K What I know…	W What I want to find out…

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **Before each lesson, skim through the lesson and write any questions that come to mind in your notes.**

  As you work through the lesson, record the answer to your question.

- **When you take notes, always write clear and concise notes so they can be easily read when studying for a quiz or exam.**

NAME _____ DATE _____ PERIOD _____

CHAPTER 3

Systems of Equations and Inequalities

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on optimization with linear programming, one fact might be that to optimize means to seek the best price or amount to minimize costs or maximize profits. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
3-1 Solving Systems of Equations by Graphing	
3-2 Solving Systems of Equations Algebraically	
3-3 Solving Systems of Inequalities by Graphing	
3-4 Optimization with Linear Programming	
3-5 Systems of Equations in Three Variables	

NAME _____ DATE _____ PERIOD _____

3-1 Solving Systems of Equations by Graphing

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

2. _____

_____

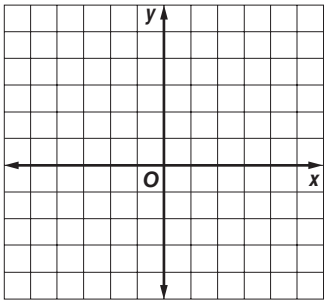
_____

Active Vocabulary

Review Vocabulary Make a table of values which satisfy the equation $x + y = 6$. Graph the equation using the table of values. *(Lesson 2-1)*

x					
y					

How many ordered pairs would satisfy the equation? Justify your answer.



New Vocabulary Match the term with its definition by drawing a line to connect the two.

consistent	a set of two or more equations that contain the same variables
inconsistent	a system of equations that has at least one solution
break-even point	a system of equations that has an infinite number of solutions
system of equations	in business applications, the point at which the income equals the cost
independent	a system of equations that has exactly one solution
dependent	a system of equations that has no solutions

Main Idea	Details

Solve Systems Using Tables and Graphs

pp. 135–136

Find the solution for the system of equations first by making a table of values and then by graphing.

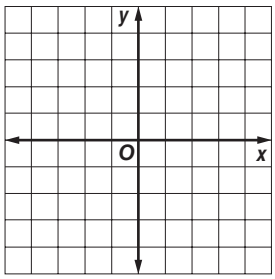
$x + y = 5 \quad \Rightarrow y =$ _____

$y - 3x = -3 \Rightarrow y =$ _____

x				
y				

x				
y				

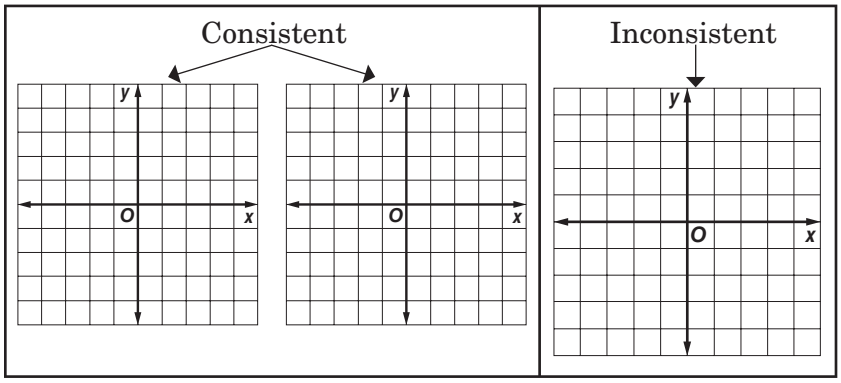
solution _____



Classify Systems of Equations

pp. 137–138

Sketch one or two systems of equations which satisfy each description.



Helping You Remember

Look up the words *consistent* and *inconsistent* in a dictionary. How can these words help you distinguish between consistent and inconsistent systems of equations?

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

3-2 Solving Systems of Equations Algebraically

What You'll Learn

Scan the text in Lesson 3-2. Write two facts you learned about solving systems of equations algebraically as you scanned the text.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Write the property of equality which is represented by each example. *(Lessons 1-2 and 1-3)*

$3x + 2y = 12$ is equivalent to $6x + 4y = 24$

_____

$-3x + 3x = 0$

_____

New Vocabulary Write the definition next to each term.

substitution method ▶ _____

_____

_____

_____

_____

elimination method ▶ _____

_____

_____

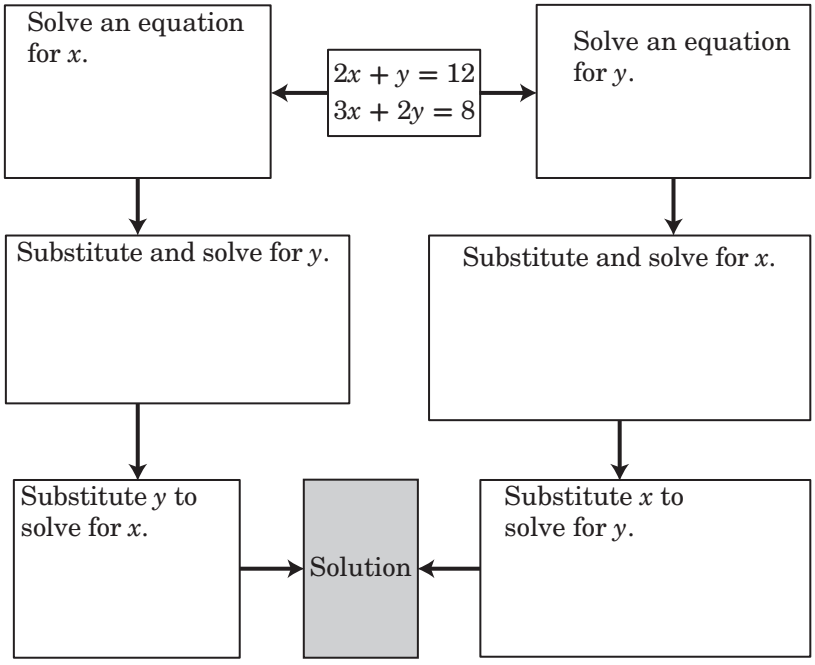
_____

Lesson 3-2

Main Idea	Details

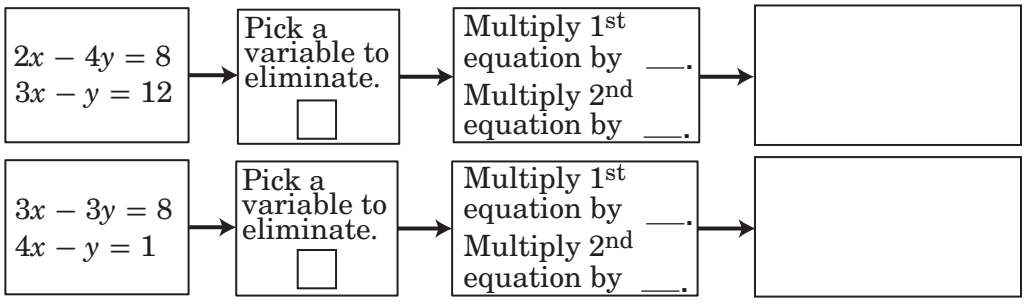
Substitution
pp. 143–144

Solve the system of equations twice using the *substitution method*. In the first column, solve for x initially. In the second, solve for y initially.



Elimination
pp. 144–146

Transform each system of equations such that a variable will be eliminated when the equations are added.



NAME _____ DATE _____ PERIOD _____

3-3 Solving Systems of Inequalities by Graphing

What You'll Learn

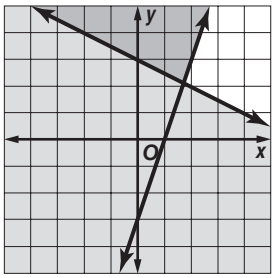
Scan Lesson 3-3. List two headings you would use to make an outline of this lesson.

1. _____

2. _____

Active Vocabulary

New Vocabulary Label the boundary lines and the solution region for the system of inequalities shown.

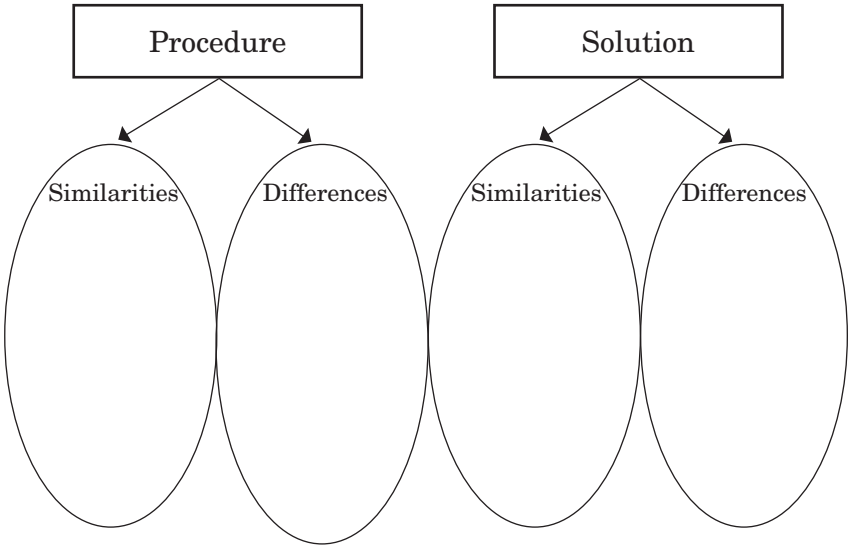


Main Idea

Details

Systems of Inequalities
pp. 151–152

Fill in the diagram below to compare and contrast solving a system of equations by graphing with solving a system of inequalities by graphing.



Lesson 3-3

Main Idea	Details
Finding Vertices of an Enclosed Region pp. 152–153	**Determine the three systems of equations that you would solve in order to determine the vertices of the triangle formed by the system of inequalities. For each system, select an appropriate method for solving and justify your selection.** $2y \leq x + 8$ $y + 2x > -5$ $y - 4x < -5$

System #1	System #2	System #3
Method?	Method?	Method?

Helping You Remember

When you graph the boundary lines for a system of inequalities, how can the inequality symbols help you remember whether to use a dashed or solid line?

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

3-4 Optimization with Linear Programming

What You'll Learn

Skim Lesson 3-4. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the correct term beside each definition.

_____ ▶ the region bounded by the constraints that are represented by the graphs of the inequalities

_____ ▶ to seek the price that will minimize costs and/or maximize profits

_____ ▶ the process of finding maximum or minimum values of a function given constraints

_____ ▶ a feasible region which is enclosed by constraints

_____ ▶ business limitations on production caused by various business variables

_____ ▶ a feasible region which is not completely enclosed by constraints

Vocabulary Link Evaluate the function $f(x) = -2x + 1$ for $x = -2, -1$ and 0. Evaluate the function $g(x, y) = 2x + 4y$ given $(x, y) = (3, 2), (4, -1)$ and $(5, 8)$.

$f(-2) =$ _____ $g(3, 2) =$ _____

$f(-1) =$ _____ $g(4, -1) =$ _____

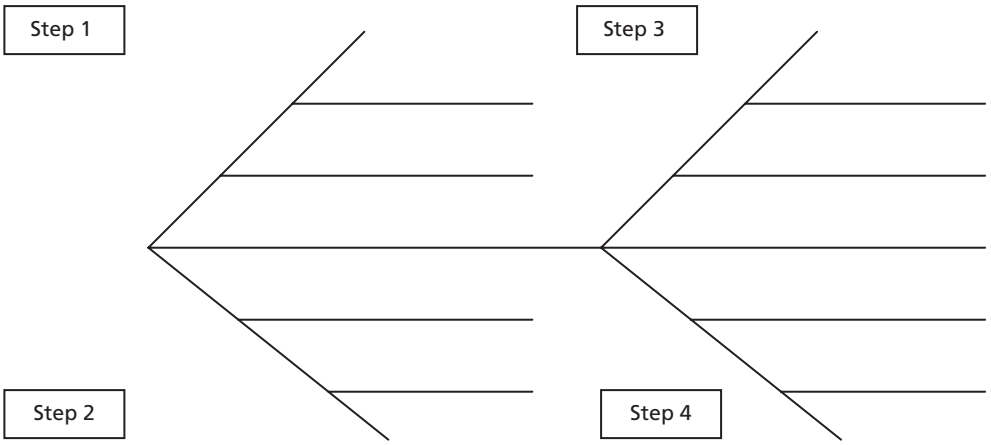
$f(0) =$ _____ $g(5, 8) =$ _____

Lesson 3-4

Main Idea	Details

Maximum and Minimum Values
pp. 160–161

Complete the chart below with the steps for completing a linear programming problem. Write the steps on the slanted lines and fill in details on the horizontal lines. Step 4 is for unbounded regions only.



Optimization
p. 162

Write a system of inequalities and an optimization function to represent the following business application. Describe how you would use the inequalities and the function to solve the problem.

At Burger Barn, a double contains 2 meat patties and 6 pickles, and a triple contains 3 meat patties and 3 pickles. At the end of a shift, only 24 meat patties and 48 pickles remain. If a double burger sells for $1.20 and a triple burger sells for $1.50, then how many of each should be made to maximize revenue?

Revenue Function	Description of Solution Process
System of Inequalities	

NAME _____ DATE _____ PERIOD _____

3-5 Systems of Equations in Three Variables

What You'll Learn

Skim the Examples for Lesson 3-5. Predict two things you think you will learn about systems of equations in three variables.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Fill in each blank with the correct term or phrase.

ordered triple ▶

The solution to a system of equations in _____ variables is written in the form of _____. The graphs of a system in three variables form a system of _____. Planes can intersect in a _____, in the same _____ or in a single _____.

Vocabulary Link Provide a real world example for each of the following situations. Look around your classroom for examples.

1. three planes which intersect in one point

_____

2. three planes which intersect in a line

_____

3. three planes which are parallel

_____

4. three planes which intersect in two lines

_____

Main Idea	Details

Systems in Three Variables
pp. 167–169

Solve the system of equations by completing the diagram.

$x - 2y + 4z = 3$
$x + 3y - 2z = 6$
$x - 4y + 3z = -5$

Pick the first variable to eliminate. ☐

Pick 2 equations and eliminate x.

Pick 2 equations and eliminate x.

Solve the system in 2 variables created above.

Substitute the two variables found above to find the third variable.

Real-World Problems
pp. 169–170

Write a word problem which could be identified by the following system of equations. Identify each variable.

$x + y + z = 13$; $0.05x + 0.10y + 0.25z = 1.75$; $y = 2x$

$x =$

$y =$

$z =$

Word Problem

NAME _____ DATE _____ PERIOD _____

CHAPTER 3

Systems of Equations and Inequalities

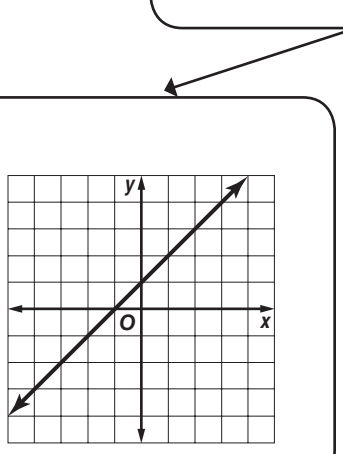
Tie It Together

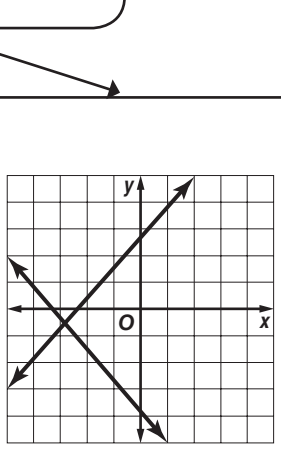
Fill in each graphic organizer paying attention to the depicted relationships between the organizers. Add details if space permits.

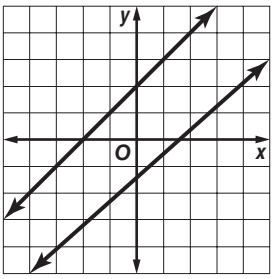
Types of Systems

Solution Methods

Solution Sets







NAME _____ DATE _____ PERIOD _____

CHAPTER 3

Systems of Equations and Inequalities

Before the Test

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column.

K What I know…	W What I want to find out…	L What I learned…

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 3.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 3 Study Guide and Review in the textbook.

☐ I took the Chapter 3 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

- If possible, rewrite your notes. Not only can you make them clearer and neater, rewriting them will help you remember the information.

NAME _____ DATE _____ PERIOD _____

CHAPTER 4 Matrices

Before You Read

Before you read the chapter, think about what you know about matrices. List three things you already know about them in the first column. Then list three things you would like to learn about them in the second column.

K What I know…	W What I want to find out…

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **A visual study guide like the Foldable shown above helps you organize what you know and remember what you have learned.**
  You can use them to review main ideas or keywords.
- **When you take notes, draw a visual (graph, diagram, picture, chart) that presents the information introduced in the lesson in a concise, easy-to-study format.**

NAME _____ DATE _____ PERIOD _____

CHAPTER 4

Matrices

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on transformations with matrices, one fact might be that a translation occurs when a figure is moved from one location to another without changing its size, shape, or orientation. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
4-1 Introduction to Matrices	
4-2 Operations with Matrices	
4-3 Multiplying Matrices	
4-4 Transformations with Matrices	
4-5 Determinants and Cramer's Rule	
4-6 Inverse Matrices and Systems of Equations	

NAME _____ DATE _____ PERIOD _____

4-1 Introduction to Matrices

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the term next to its definition.

_____ ▶ the number of rows and columns in a matrix, written as $m \times n$, where m is the number of rows and n is the number of columns

_____ ▶ a constant or variable in a matrix

_____ ▶ a matrix which has only one row

_____ ▶ a rectangular array of variables or constants in horizontal rows and columns

_____ ▶ a matrix which has the same number of rows as columns

_____ ▶ two matrices which has the same dimensions and which have equivalent corresponding elements

_____ ▶ a matrix which has only one column

_____ ▶ a matrix in which every element is zero

Main Idea	Details

Organize and Analyze Data
pp. 185–187

Use matrix A to answer the following questions.

$$A = \begin{bmatrix} 3 & 2 & -6 & 1 & 5 \\ 12 & 4 & -6 & 3 & 8 \\ 11 & 0 & 0.5 & 9 & -1 \\ -25 & \frac{3}{4} & -2 & 7 & 15 \end{bmatrix}$$

What are the dimensions of Matrix A? _____

What is the value of a_{31}?_____ of a_{43} ?_____

What is the value of a_{14}?_____ of a_{53} ?_____

What is the sum of the elements in column 3? _____

What is the average of the elements in row 2? _____

Provide an example matrix for each of the given descriptions.

Equivalent Square Matrices	Square Matrix With 4 Rows	Non-Equivalent Row Matrices

Helping You Remember

Some students have trouble remembering which number comes first in writing the dimensions of a matrix. Think of an easy way to remember this

_____

_____

NAME _____ DATE _____ PERIOD _____

4-2 Operations with Matrices

What You'll Learn

Skim Lesson 4-2. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the definition next to each term.

scalar ▶ _____

_____

scalar multiplication ▶ _____

_____

Vocabulary Link The table below records the distance between Chicago and other major cities on a map which uses a scale of 1 cm = 100 miles.

	St. Louis	Seattle	Atlanta	Cleve-land	Orlando
Actual Mileage					
Distance on Map	2.62	17.33	5.85	5.47	9.94

Describe how the distances between the cities on the map can be converted to the actual mileages between the cities. Complete the table to show the actual mileages between the cities.

_____

_____

_____

Lesson 4-2

Main Idea	Details

Add and Subtract Matrices
p. 193

Decide if matrix addition and subtraction are commutative using matrices $A = \begin{bmatrix} -3 & -2 \\ 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 9 & 6 \\ 0 & -7 \end{bmatrix}$.

Addition	Subtraction
Commutative? Yes or No	Commutative? Yes or No

Scalar Multiplication
pp. 194–195

Provide an example for each of the matrix properties listed in the table below.

Commutative Property of Addition	
Associative Property of Addition	
Left Scalar Distributive Property	
Right Scalar Distributive Property	

Helping You Remember

The mathematical term *scalar* is related to the word scale as used in a scale of miles on a map. How can this usage of the word scale help you remember the meaning of *scalar*?

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

4-3 Multiplying Matrices

What You'll Learn

Skim the lesson. Write two things you already know about multiplying matrices.

1. _____

_____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Write the dimension of each of the matrices shown below. *(Lesson 4-1)*

$A = \begin{bmatrix} 4 & -7 \\ 6 & 5 \\ 0 & 0.5 \end{bmatrix}$ Dimension of A: _____

$B = \begin{bmatrix} 4 \\ 2 \\ \frac{1}{2} \\ -7 \end{bmatrix}$ Dimension of B: _____

$C = \begin{bmatrix} 3 & 5 & 7 \\ -3 & 6 & 0 \end{bmatrix}$ Dimension of C: _____

$D = \begin{bmatrix} 3 & -1 & 0.75 & 6 \\ -5 & 2 & 8 & 1 \end{bmatrix}$ Dimension of D: _____

Circle the pairs of matrices in which the number of columns in the first matrix is equal to the number of rows in the second matrix.

A and B	A and C	A and D
B and C	B and D	C and D
B and A	C and A	D and A
C and B	D and B	D and C

Lesson 4-3

Main Idea	Details
Multiply Matrices pp. 200–202	**Multiply $B = \begin{bmatrix} 1 & 2 & 8 \\ 5 & -7 & 4 \end{bmatrix}$ by $A = \begin{bmatrix} 2 & 4 \\ -1 & 0 \\ 5 & 6 \end{bmatrix}$ to get matrix C.**
Multiplicative Properties pp. 202–204	**Explain why the matrices $A = \begin{bmatrix} 2 & 4 \\ 3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -\frac{1}{10} & \frac{2}{5} \\ \frac{3}{10} & -\frac{1}{5} \end{bmatrix}$ cannot be used as a counterexample for the Commutative Property of Multiplication.**

Multiply row 1 of B by column 1 of A to get C_{11}.

Multiply row 1 of B by column 2 of A to get C_{12}.

$C =$

Multiply row 2 of B by column 1 of A to get C_{21}.

Multiply row 2 of B by column 2 of A to get C_{22}.

Calculations

Explanation

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

4-4 Transformations with Matrices

What You'll Learn

Scan Lesson 4-4. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Match each function to a description of a transformation of the parent graph $f(x) = |x|$. *(Lesson 2-7)*

$f(x) = 3\|x\|$	a translation
$f(x) = \|x - 4\|$	a reflection
$f(x) = -\|x\|$	a dilation

New Vocabulary Write the correct term beside each definition.

_____ ▶ when a geometric figure is moved without changing its size, shape, or orientation

_____ ▶ a matrix in which each column represents the coordinates of a polygon drawn on a coordinate plane

_____ ▶ when a geometric figure is enlarged or reduced

_____ ▶ a geometric figure prior to undergoing a transformation

_____ ▶ when the points of geometric figure are mapped to new points across a line of symmetry

_____ ▶ a geometric figure which has undergone a transformation

_____ ▶ functions which map points of a preimage onto its image

_____ ▶ when points of a geometric figure are mapped to new points which are rotated about a center point

Main Idea	Details

Translations and Dilations
pp. 209–211

Complete the chart with detail about *translations* and *dilations*.

Trans-formation	Description of Transfor-mation	Matrix Operation Used	Example
Translation			
Dilation			

Reflections and Rotations
pp. 212–213

Describe the transformation that will occur if a *vertex matrix* is multiplied on the left by each of the following matrices.

$\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$ _____ $\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$ _____

Helping You Remember

Describe a way to remember which of the reflection matrices corresponds to a reflection over the x-axis.

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

4-5 Determinants and Cramer's Rule

What You'll Learn

Skim the Examples for Lesson 4-5. Predict two things you think you will learn about determinants and Cramer's Rule.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Solve each system of equations using either the *substitution* method or the *elimination method*. *(Lesson 3-2)*

$2x + y = 5$ $3x - 5y = -25$	$y = 2x + 5$ $x + 3y = 8$

New Vocabulary Fill in the blank with the correct term or phrase.

determinant ▶ Every _____ matrix has a determinant. Determinants can be used to calculate the _____ of a triangle. They can also be used to determine if a _____ of equations has a _____.

second-order determinant ▶ When the determinant of a _____ matrix is calculated, it is called a second-order determinant. The value of a second-order determinant is the _____ of the _____ of the two _____.

third-order determinant ▶ When the determinant of a _____ matrix is calculated, it is called a third-order determinant. The value of a third-order determinant is calculated using the _____ rule.

Cramer's Rule ▶ You can use Cramer's Rule to solve systems of _____. If the determinant of the _____ matrix is zero, then the system does not have a _____ solution.

Main Idea	Details

Determinants
pp. 220–222

Complete the following steps to find the area of triangle *ABC* with vertices *A*(–2, 5), *B*(4, 1) and *C*(0, 6).

Substitute the vertices of $\triangle ABC$ into the formula.

$$A = \frac{1}{2}\begin{vmatrix} a & b & 1 \\ c & d & 1 \\ e & f & 1 \end{vmatrix}$$

⇩

Apply the Diagonal Rule.

Sum of products 1st Diagonals ____ of 2nd Diagonals ____

$$\left(\frac{1}{2}\right)[\square - \square] = \square$$

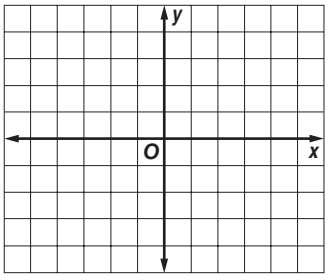
Simplify the formula.

Cramer's Rule
pp. 223–224

Use Cramer's Rule to show that the system of equations below does not have a unique solution. Graph the system of equations to show graphically that there is not a unique solution.

$3x - 4y = 12$; $-6x + 8y = -24$

Cramer's Rule



Helping You Remember

A good way to remember a complicated procedure is to break it down into steps. Write a list of steps for evaluation of a third-order determinant using the diagonal rule.

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

4-6 Inverse Matrices and Systems of Equations

What You'll Learn

Scan the text in Lesson 4-6. Write two facts you learned about inverse matrices and systems of equations as you scanned the text.

1. _____

_____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Given an example of each property. *(Lesson 1-2)*

1. Identity Property of Addition _____

2. Inverse Property of Multiplication _____

3. Inverse Property of Addition _____

New Vocabulary Label the following matrices and diagrams using the terms on the left.

identity matrix ▶

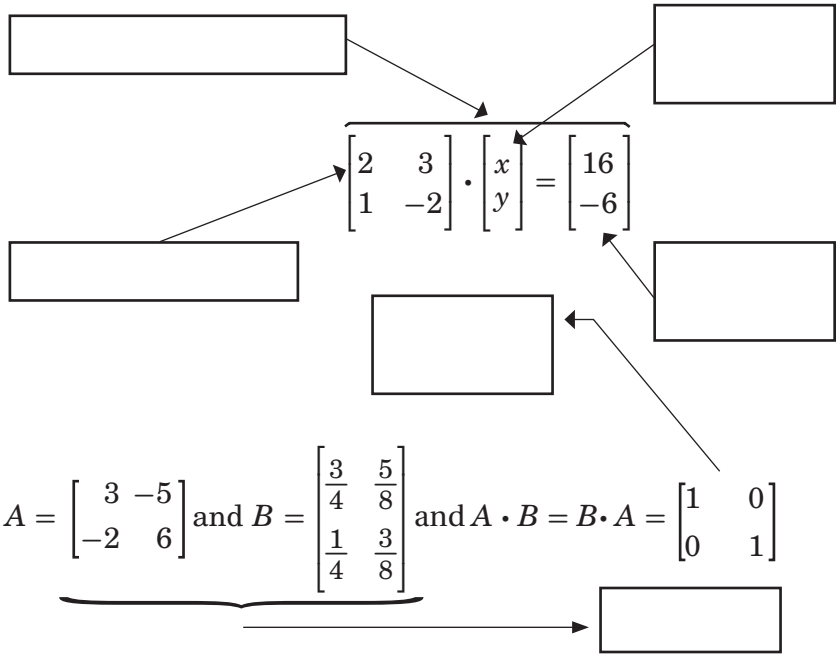
inverses ▶

matrix equation ▶

variable matrix ▶

constant matrix ▶

coefficient matrix ▶

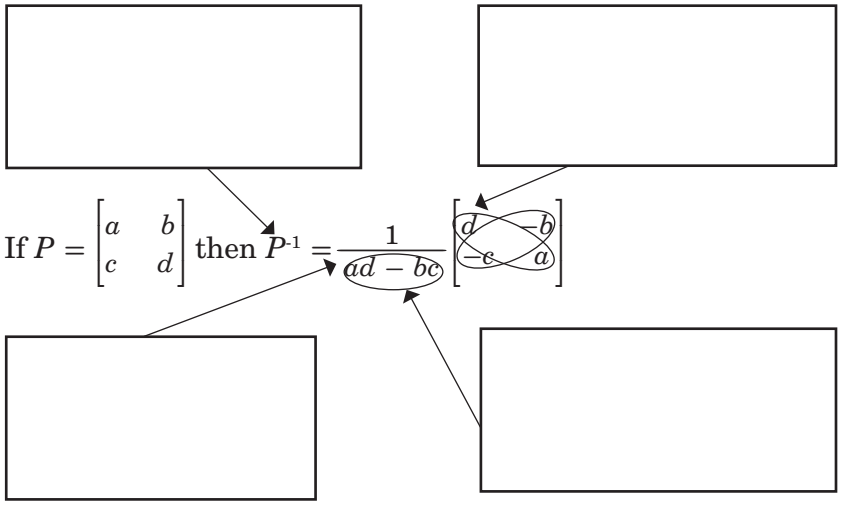


Main Idea	Details

Identity and Inverse Matrices

pp. 229–231

Fill in the empty boxes below to provide a verbal description of how to use the definition of an inverse.



Matrix Equations

pp. 231–232

Use a matrix equation and the elimination method to solve the system of equations below.

$$x - 3y = 25$$
$$3x + 2y = -2$$

Matrix Equation	Elimination Method

Helping You Remember

What advice would you give a classmate who is having trouble remembering how to find the *inverse* of a 2×2 matrix?

_____

_____

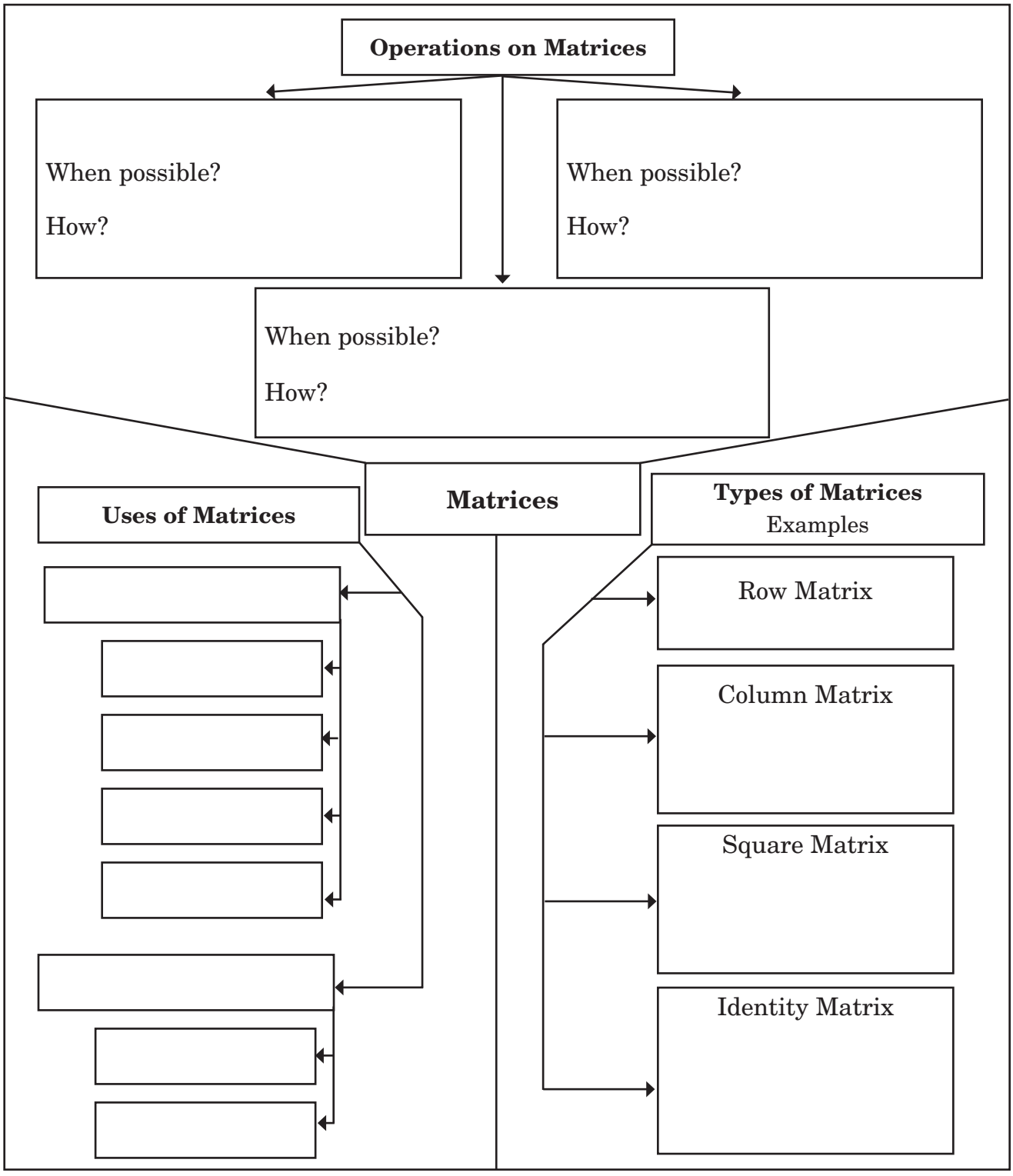
NAME _____ DATE _____ PERIOD _____

CHAPTER 4

Matrices

Tie It Together

Fill in each graphic organizer paying attention to the depicted relationships between the organizers.



NAME _____ DATE _____ PERIOD _____

CHAPTER 4 Matrices

Before the Test

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column.

K What I know…	W What I want to find out…	L What I learned…

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 4.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 4 Study Guide and Review in the textbook.

☐ I took the Chapter 4 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

- To prepare to take lecture notes, make a column to the left about 2 inches wide. Use this column to write additional information from your text, place question marks, and to summarize information.

NAME _____ DATE _____ PERIOD _____

CHAPTER 5

Quadratic Functions and Relations

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Quadratic Functions and Relations
	• The graph of a quadratic function is called the discriminate.
	• Quadratic equations can be solved by graphing, factoring, or using the Square Root Property.
	• Sometimes there are imaginary solutions to equations that have no real number solutions.
	• There are no real solutions when there are no x-intercepts in the graph of a quadratic.
	• In a quadratic function, $y = a(x - h)^2 + k$, the graph opens up when k is positive and down when k is negative.

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **In addition to writing important definitions in your notes, be sure to include your own examples of the concepts presented.**
- **Take notes in such a manner that someone who did not understand the topic will understand after reading what you have written.**

NAME _____ DATE _____ PERIOD _____

CHAPTER 5

Quadratic Functions and Relations

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on complex numbers, one fact might be that pure imaginary numbers are square roots of negative real numbers. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
5-1 Graphing Quadratic Functions	
5-2 Solving Quadratic Equations by Graphing	
5-3 Solving Quadratic Equations by Factoring	
5-4 Complex Numbers	
5-5 Completing the Square	
5-6 The Quadratic Formula and the Discriminant	
5-7 Transformations with Quadratic Functions	
5-8 Quadratic Inequalities	

NAME _____ DATE _____ PERIOD _____

5-1 Graphing Quadratic Functions

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Label each box with the terms at the left.

quadratic function ▶

quadratic term ▶

linear term ▶

constant term ▶

parabola ▶

axis of symmetry ▶

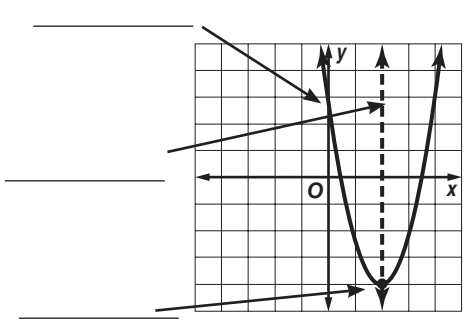
vertex ▶

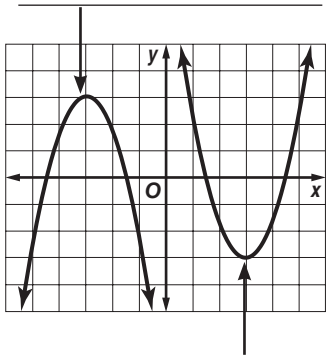
maximum value ▶

minimum value ▶

$$f(x) = 2x^2 + 2x - 4$$

_____



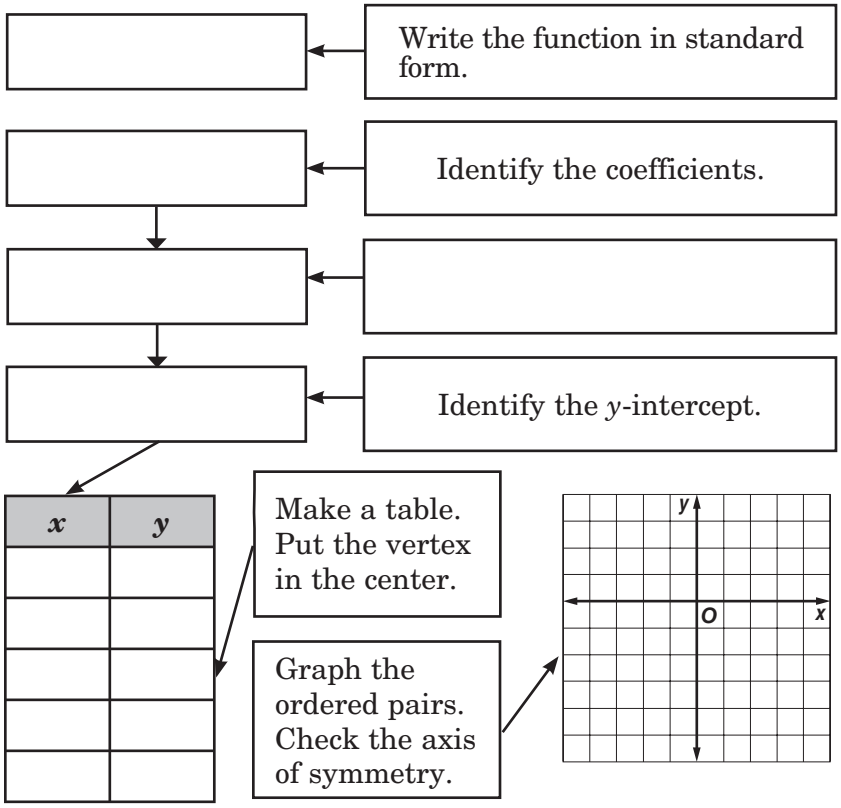


Main Idea	Details

Graph Quadratic Functions

pp. 249–251

Graph $f(x) = 2x^2 + 2 + 8x$. Fill in missing verbal and mathematical steps.



Maximum and Minimum Values

pp. 252–253

Find the domain and range for the function $f(x) = -2x^2 + 12x - 5$.

Find x-coordinate of vertex. _____	Domain = _____
Find y-coordinate of vertex. _____	Range = _____

Helping You Remember

How can you remember the way to use the x^2 term of a quadratic function to tell whether it has a maximum or a minimum value?

_____

_____

NAME _____ DATE _____ PERIOD _____

5-2 Solving Quadratic Equations by Graphing

What You'll Learn

Scan the text in Lesson 5-2. Write two facts you learned about solving quadratic equations by graphing as you scanned the text.

1. _____

_____

_____

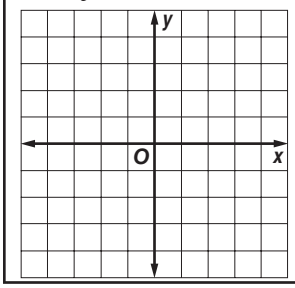
2. _____

_____

_____

Active Vocabulary

Review Vocabulary Graph the linear function and solve the related linear equation. *(Lesson 1–3)*

$y = 2x - 5$	$2x - 5 = 0$	How is the graph related to the solution of the equation?
		

New Vocabulary Write the correct term beside each definition.

_____ ▶ the solution of a quadratic equation

_____ ▶ quadratic functions that are set equal to zero

_____ ▶ the x-intercepts of the graph of a function

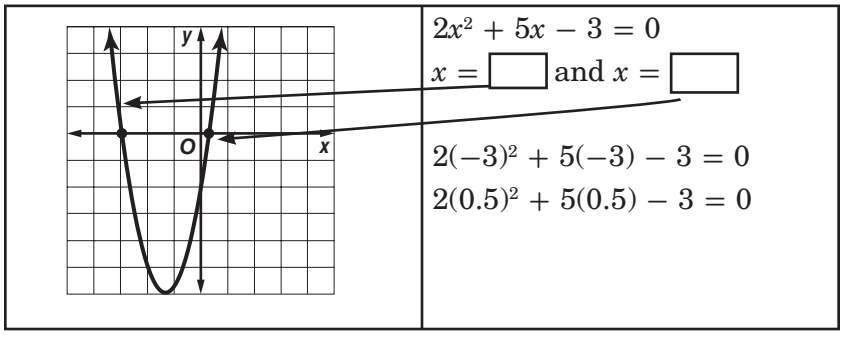
_____ ▶ $ax^2 + bx + c = 0$, where $a \neq 0$, and a, b, and c are integers

Lesson 5-2

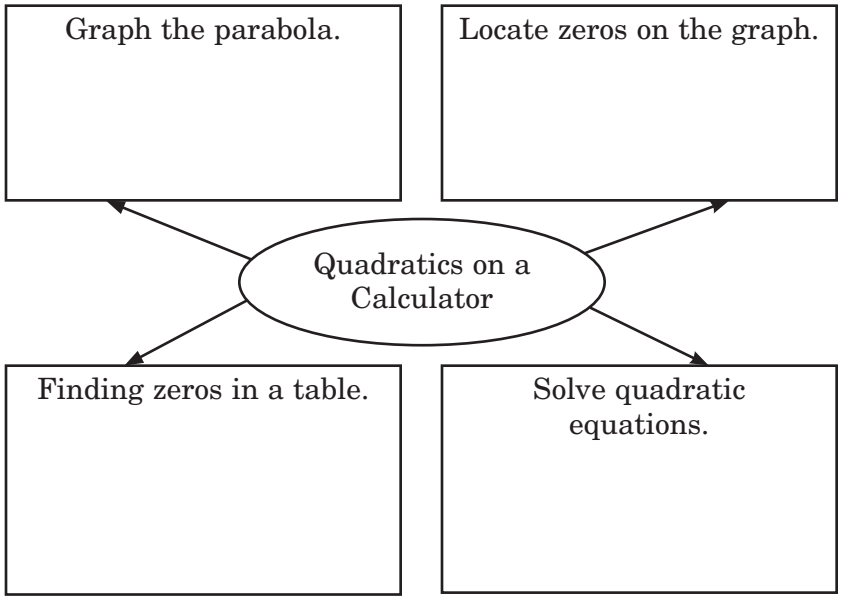
Main Idea	Details

Solve Quadratic Functions
pp. 259–261

Show that the zeros of the function $f(x) = 2x^2 + 5x - 3$ are the roots of the equation $2x^2 + 5x - 3 = 0$.



Estimate Solutions
pp. 261–262



Helping You Remember

Think of a memory aid that can help you recall what is meant by the zeros of a quadratic function.

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

5-3 Solving Quadratic Equations by Factoring

What You'll Learn

Scan Lesson 5-3. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Fill in each blank with the correct term or phrase.

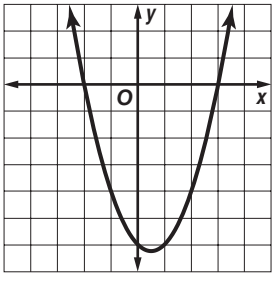
factored form ▶ A form of a quadratic equation written as $y =$ _____ where p and q represent the _____ of the _____ of the equation.

FOIL method ▶ A method for changing a quadratic equation from _____ form to _____ form. The foil method uses the _____ Property to multiply _____.

Vocabulary Link Make a table of values for $y = x^2 - x - 6$ and $y = (x - 3)(x + 2)$. Graph the equations.

x	−5	−2	0	3	5
y					

x	−5	−2	0	3	5
y					



What can you determine about the two equations?

_____

_____

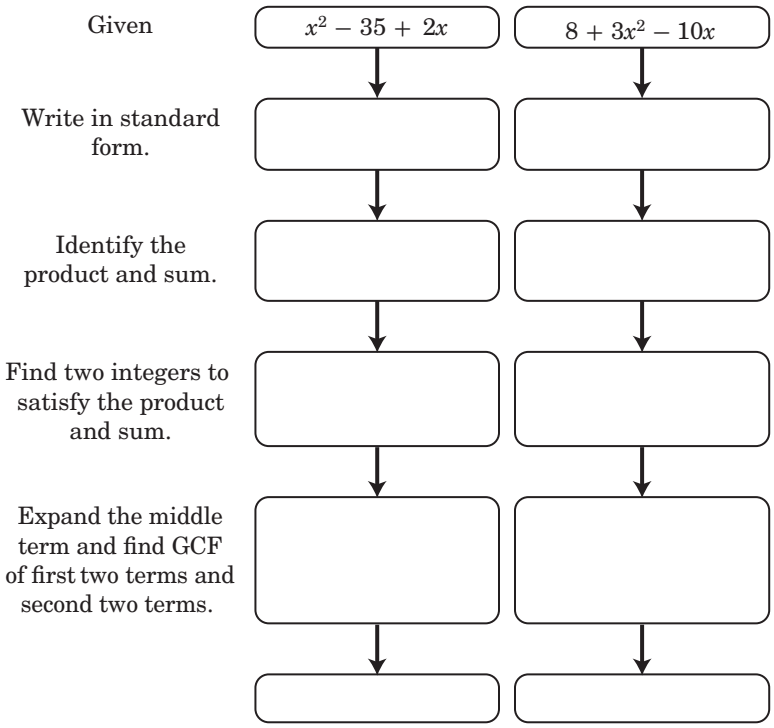
_____

Lesson 5-3

Main Idea	Details

Factored Form
p. 268

Factor each trinomial using the steps listed.



Solve Equations by Factoring
pp. 269–271

Explain the error made in the solution to the quadratic equation.

Solutions: $x^2 - 4x - 12 = 5$

$(x - 6)(x + 2) = 5$

$x - 6 = 5$ or $x + 2 = 5$

$x = 11$ $x = 3$

Error: _____

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5-4 Complex Numbers

What You'll Learn

Skim Lesson 5-4. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

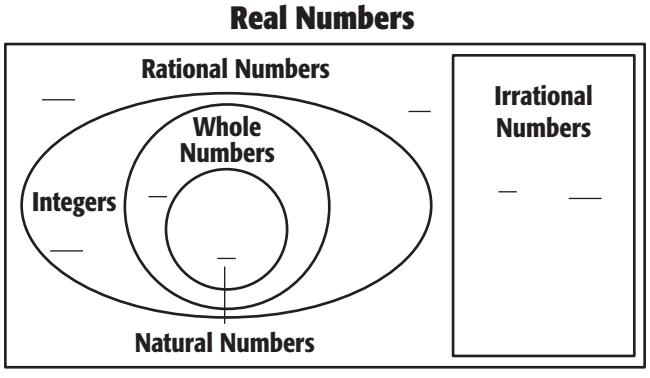
_____

2. _____

_____

Active Vocabulary

New Vocabulary Place each number in a box. All numbers should be used once: -4, 0, 5, $\frac{1}{2}$, π, $\sqrt{2}$, 0.5. *(Lesson 1-2)*



Vocabulary Link Match the term with its definition by drawing a line to connect the two.

square root property	square root of a negative real number
complex conjugates	$\boldsymbol{i}$, which is defined as $\boldsymbol{i}^2 = -1$
imaginary unit	a property which says that if $x^2 = a$, then $x = \pm\sqrt{a}$
pure imaginary number	any number which can be written in the form $a + bi$, where a and b are real numbers and $\boldsymbol{i}$ is the imaginary unit
complex number	two complex numbers of the form $a + b\boldsymbol{i}$ and $a - b\boldsymbol{i}$

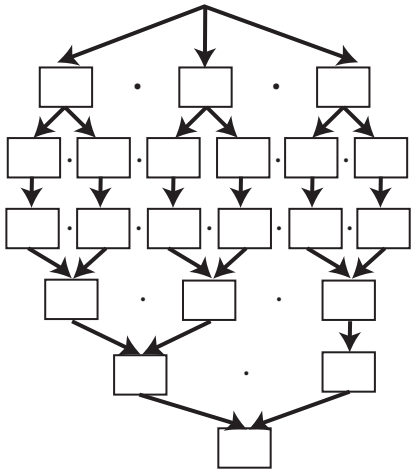
Lesson 5-4

Main Idea	Details

Pure Imaginary Numbers

pp. 276–277

Simplify the expression by completing each empty box.



Operations with Complex Numbers

pp. 277–279

Write each listed number under each category that applies.

$-7,\ 12i,\ 3 + 4i,\ \sqrt{-12},\ 0,\ 2 + i,\ i^5,\ \sqrt{5},\ \frac{2}{3},\ \frac{1}{2} + \frac{3}{2}i,\ -\frac{1}{3}i$

Complex	Real	Imaginary

Helping You Remember

How can you use what you know about the factors of a polynomial that is a difference of two squares to help you remember how to simplify fractions with imaginary numbers in the denominator?

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

5-5 Completing the Square

What You'll Learn

Skim the Examples for Lesson 5-5. Predict two things you think you will learn about completing the square.

1. _____

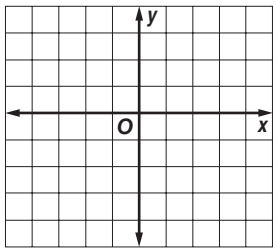
_____

2. _____

_____

Active Vocabulary

Review Vocabulary Solve the equation using each method. *(Lessons 5-2, 5-3, and 5-4)*

Factoring $x^2 - 9 = 0$	Graphing 
Square Root Property $x^2 - 9 = 0$	

Which method do you prefer. Explain your answer.

_____

_____

_____

New Vocabulary Fill in the blanks with the correct terms.

completing the square ▶ a method used to manipulate a _____ _____ so that one side is a perfect _____; Once one side is a perfect square, the _____ _____ Property can be used to solve the equation.

Main Idea	Details

Square Root Property
pp. 284–285

Solve each equation using the Square Root Property, if possible. If not possible, explain why.

$x^2 - 25 = 36$	$x^2 + 6x + 36 = 100$

Complete the Square
pp. 285–287

Solve the equation by completing the square.

$x^2 - 8x - 25 = 0$	Does $\left(-\frac{8}{2}\right)^2 = -25$? No.
_____	Add 25 to each side.
_____	$\left(-\frac{8}{2}\right)^2 = 16$. Add 16 to each side.
_____	Factor the left and simplify the right.
_____	Solve using the Square Root Property.
_____	Add 4 to each side.

Helping You Remember

How can you use the rules for squaring a binomial to help you remember the procedure for changing a binomial into a perfect square trinomial?

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

5-6 The Quadratic Formula and the Discriminant

What You'll Learn

Skim the lesson. Write two things you already know about the quadratic formula and the discriminant.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Complete the square to solve each equation. *(Lesson 5-5)*

$x^2 - 2x - 15 = 0$	$2x^2 - x - 3 = 0$

New Vocabulary Complete the *Quadratic Formula* and *discriminant* by filling in each box with the missing constant, variable or operation.

Quadratic Formula	Discriminant
$x = \frac{-b\square\sqrt{\square^2 - 4a\square}}{\square a}$	$b^2 \square 4\square\square$

Vocabulary Link Explain how the non-mathematical meaning of the word discriminate can help you to remember the mathematical meaning of this word.

_____

_____

_____

_____

Main Idea	Details

Quadratic Formula
pp. 292–295

Solve the quadratic equation by completing the square and by using the Quadratic Formula.

Completing the Square

$x^2 - 4x + 12 = 0$

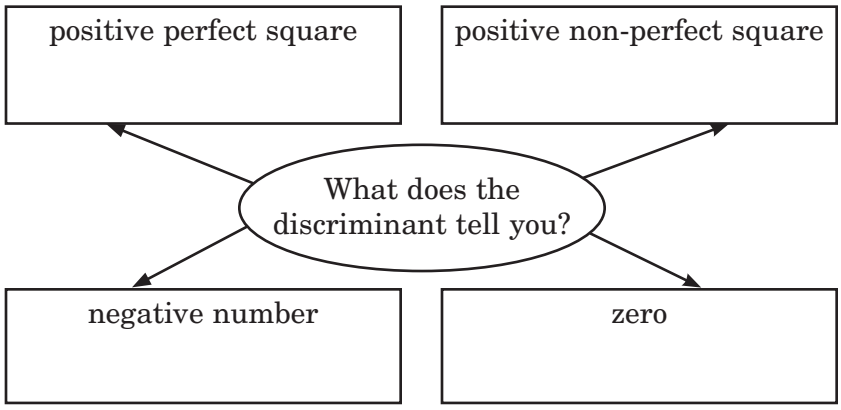
Quadratic Formula

$x^2 - 4x + 12 = 0$

$a =$ $b =$ $c =$

Roots and the Discriminant
pp. 295–297

Complete the chart about discriminants below in your own words.



Helping You Remember

Based on what you know about the discriminant, explain why it is not possible to have only one complex root.

_____

_____

NAME _____ DATE _____ PERIOD _____

5-7 Transformations with Quadratic Functions

What You'll Learn

Skim the Examples for Lesson 5-7. Predict two things you think you will learn about transformations with quadratic functions.

1. _____

_____

2. _____

_____

Active Vocabulary

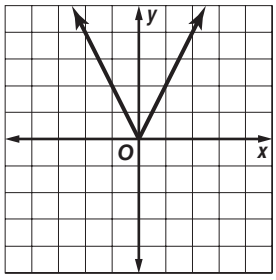
Review Vocabulary Label each graph with a function. *(Lesson 2-7)*

$f(x) = |x| - 4$ ▶

$f(x) = 2|x|$ ▶

$f(x) = |x|$ ▶

$f(x) = |x - 2|$ ▶



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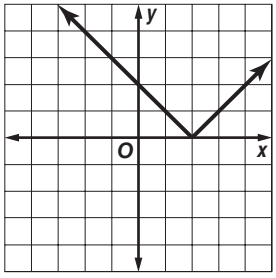

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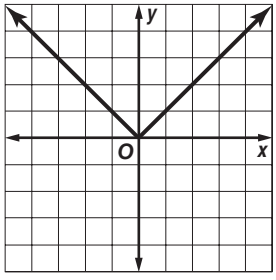

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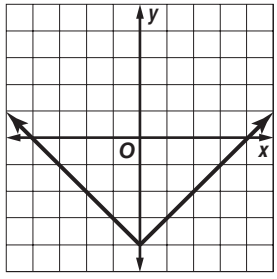


_____

New Vocabulary Write the definition next to the term.

vertex form ▶ _____

_____

_____

Lesson 5-7

Main Idea	Details

Write Quadratic Functions in Vertex Form

pp. 305–306

Write the equation of the parabola shown to the right.

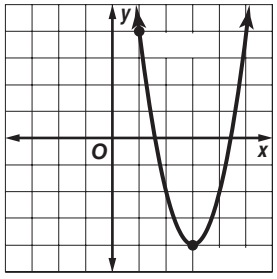
Vertex Form

$y = a(x - h)^2 + k$

Fill in known information.

$\square = a(\square - \square)^2 + \square$

Solve for a:



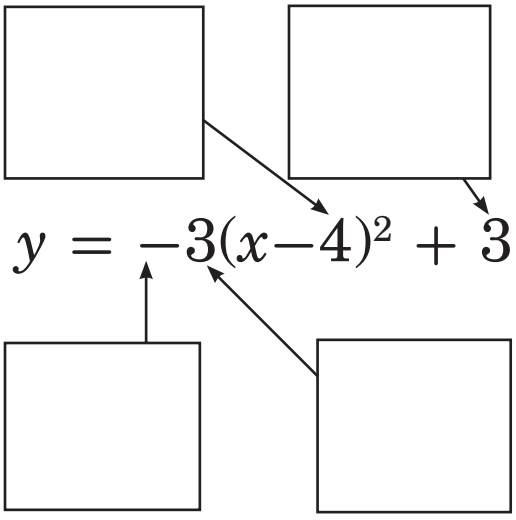
Write in vertex form.

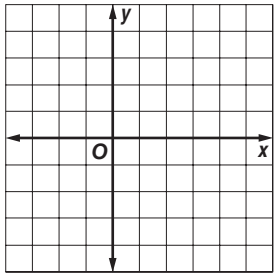
$y = 2(x - 3)^2 - 4$

Transformations of Quadratic Functions

pp. 306–307

Describe how each characteristic of the quadratic function affects the graph of the quadratic function. Graph the function.





Helping You Remember

How can you remember that $y = (x + 4)^2$ is a translation to the left and that $y = (x - 5)^2$ is a translation to the right?

NAME _____ DATE _____ PERIOD _____

5-8 Quadratic Inequalities

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

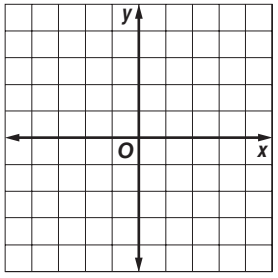
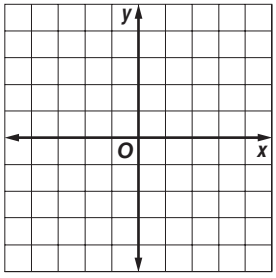
_____

2. _____

_____

Active Vocabulary

Review Vocabulary Graph the inequalities in two variables. *(Lesson 3-3)*

$y > -2x + 5$	$2y - 4x \leq 6$
	

quadratic inequalities ▶

New Vocabulary Fill in each blank with the correct term or phrase.

A quadratic inequality in two _____ can be graphed in the same way that you graph linear _____. A quadratic inequality in two variables that is graphed consists of a _____ and _____. A quadratic inequality in one variable can be solved using the _____ of the related _____ function. The solution set is given in _____ _____ notation.

Lesson 5-8

Main Idea	Details

Graph Quadratic Inequalities

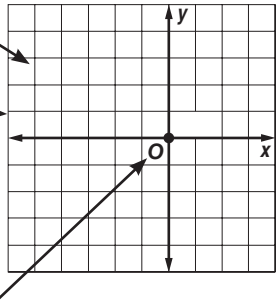
p. 312

Graph the quadratic inequality $y < x^2 + 6x + 7$. Use the boxes on the left to show and explain any work.

Decide if the line is dotted or shaded.

Graph the parabola by writing it in vertex form.

Test the point (0, 0) and shade accordingly.

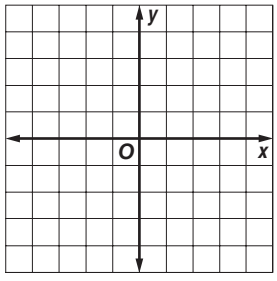


Solve Quadratic Inequalities

pp. 313–315

Graph the parabola $y = -(x - 2)^2 + 4$. Circle the sections of the parabola in which the y-value is greater than zero.

Write the x-values in this section of the parabola using set-builder notation.



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CHAPTER 5

Quadratic Functions and Relations

Tie It Together

Fill in the graphic organizer. Add details when possible.

Quadratic Equations – Solution Methods

Method	Graphing	Factoring	Square Root Property	Completing the Square	Quadratic Formula
Description					

Methods of Graphing

Possible Discriminant Values and Solution Details

Description of the Graph of $y = a(x - h)^2 + k$

Shape

Vertex

Axis of Symmetry

NAME _____ DATE _____ PERIOD _____

CHAPTER 5

Quadratic Functions and Relations

Before the Test

Now that you have read and worked through the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Quadratic Functions and Relations	After You Read
• The graph of a quadratic function is called a discriminate.	
• Quadratic equations can be solved by graphing, factoring, or using the Square Root Property.	
• Sometimes there are imaginary solutions to equations that have no real number solutions.	
• There are no real solutions when there are no x-intercepts in the graph of a quadratic.	
• In a quadratic function, $y = a(x - h)^2 + k$, the graph opens up when k is positive and down when k is negative.	

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 5.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 5 Study Guide and Review in the textbook.

☐ I took the Chapter 5 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

- When studying for tests create and use graphic organizers to show relationships between concepts.

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CHAPTER 6

Polynomials and Polynomial Functions

Before You Read

Before you read the chapter, think about what you know about polynomials and polynomial functions. List three things you already know about them in the first column. Then list three things you would like to learn about them in the second column.

K What I know…	W What I want to find out…

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **When you take notes, write a summary of the lesson, or write in your own words what the lesson was about.**
- **When taking notes, place a question mark next to anything you do not understand.**

  Then be sure to ask questions before any quizzes or tests.

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CHAPTER 6

Polynomials and Polynomial Functions

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on solving polynomial equations, one fact might be that when factoring a polynomial, always look for a common factor first. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
6-1 Operations with Polynomials	
6-2 Dividing Polynomials	
6-3 Polynomial Functions	
6-4 Analyzing Graphs of Polynomial Functions	
6-5 Solving Polynomial Equations	
6-6 The Remainder and Factor Theorems	
6-7 Roots and Zeros	
6-8 Rational Zero Theorem	

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6-1 Operations with Polynomials

What You'll Learn

Skim Lesson 6-1. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Evaluate each expression. *(Lesson 1-1)*

$3a^2b^4$, given $a = 3$, $b = 2$	$2^a \cdot 2^b \cdot 2^c$ given $a = 1$, $b = 2$, and $c = 3$
$\frac{2a^3b}{6a^2b}$, given $a = 2$, $b = 4$	$\frac{3^a \cdot 3^b}{3^{a-1} \cdot 3^{b-1}}$, given $a = 3$, $b = 1$

New Vocabulary Write the definition next to each term.

simplify ▶ _____

_____

degree of a polynomial ▶ _____

_____

Vocabulary Link Look up the prefixes *mono* and *poly* in the dictionary. Explain how their definitions apply to the terms *monomial* and *polynomial*.

_____

_____

_____

Main Idea	Details

Multiply and Divide Polynomials
pp. 333–334

Simplify each expression on the left using the given property. Use the definition of exponents on the right to check each property.

Product of Powers
$a^3b^4 \cdot a^2b =$ →

Quotient of Powers
$\frac{a^7b^3}{a^5b^4} =$ →

Product of a Powers Powers of a Product
$(a^3b)^3 =$ →

Powers of Quotient
$\left(\frac{a^3}{b^2}\right)^2 =$ →

Operations with Polynomials
pp. 335–336

Multiply the polynomials using the diagram as a guide.

$(2x^2 + 4x - 1)(x - 3)$

[ ] + [ ] + [ ]

= [ ]

= [ ]

Helping You Remember

You can always find the degree of a polynomial by remembering to look at the monomial with the greatest degree. Write two polynomials of degree 3, two polynomials of degree 2, and two polynomials of degree 1.

_____

NAME _____ DATE _____ PERIOD _____

6-2 Dividing Polynomials

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Find the quotient and the remainder in the left box. Show how to check your work using multiplication in the right box. *(Prerequisite Skill)*

Divide	Check
$6\overline{)735}$	

New Vocabulary Fill in the blanks with the correct term or phrase.

synthetic division ▶ A process for _____ a polynomial by a _____ that is simpler than _____ division. Instead of writing the entire polynomial for the division, only the _____ of each _____ is used.

Vocabulary Link If necessary, look up the word synthesizer as it pertains to music. Write a sentence that describes how a synthesizer is related to a real musical instrument.

_____

_____

_____

_____

Lesson 6-2

Main Idea	Details

Long Division
pp. 341–342

Use long division to find $(2x^2 - 5x - 3) \div (x - 4)$ in the left box. Use multiplication to check your work in the right box.

Divide	Check
$x - 4\overline{)2x^2 - 5x - 3}$	

Synthetic Division
pp. 342–344

Determine the quotient and remainder using synthetic division.

$x + 3\overline{)3x^3 + 2x^2 - 4x + 1}$

3

3

Quotient: _____ Remainder: _____

Helping You Remember

When you translate the numbers in the last row of a synthetic division into the quotient and remainder, what is an easy way to remember which exponents to use in writing the terms of the quotient?

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

6-3 Polynomial Functions

What You'll Learn

Scan Lesson 6-3. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Match the term with its definition by drawing a line to connect the two.

polynomial in one variable	the simplest polynomial functions of the form $f(x) = ax^b$ where a and b are real numbers
leading coefficient	a polynomial function of degree 5
polynomial function	the behavior of a graph as x approaches positive infinity or negative infinity
power function	a polynomial function of degree 4
end behavior	the coefficient of the first term of a polynomial written in standard form
quartic function	a continuous function that can be described by a polynomial equation in one variable
quintic function	an expression of the form $a_n x^n + a_{n-1}x^{n-1} + \ldots a_2x^2 + a_1x + a_0$, where $a_n \neq 0$, a_{n-1}, a_2, a_1, and a_0 are real numbers, and n is a nonnegative integer

Lesson 6-3

Main Idea	Details

Polynomial Functions
pp. 348–349

Provide a polynomial function in standard form for each of the following descriptions.

1. a cubic polynomial with a lead coefficient of 4

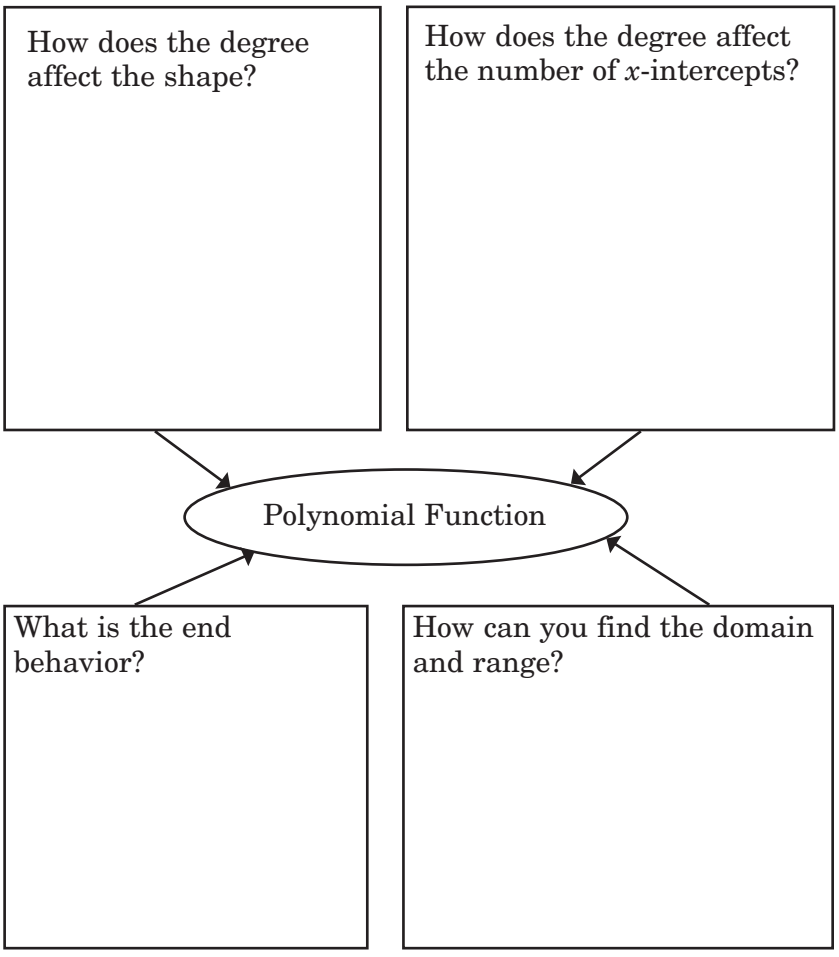
2. a quintic polynomial with 3 terms

3. a quartic power function

4. a quadratic polynomial without a linear term

Graphs of Polynomial Functions
p. 350

Complete the diagram with details about graphing polynomial functions.



NAME _____ DATE _____ PERIOD _____

6-4 Analyzing Graphs of Polynomial Functions

What You'll Learn

Skim the lesson. Write two things you already know about graphs of polynomial functions.

1. _____

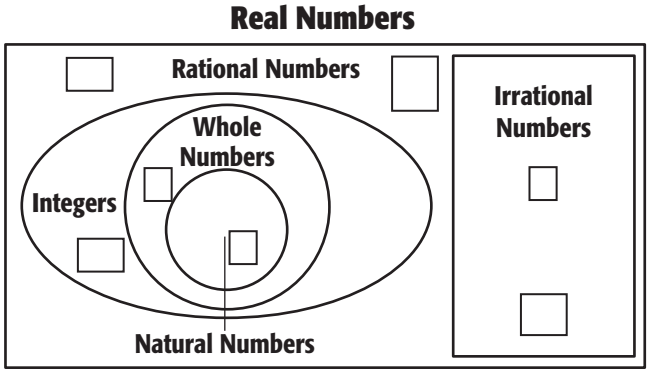
_____

2. _____

_____

Active Vocabulary

Review Vocabulary Place a different number in each box. *(Lesson 1-2)*



New Vocabulary Label the diagram with the terms listed at the left.

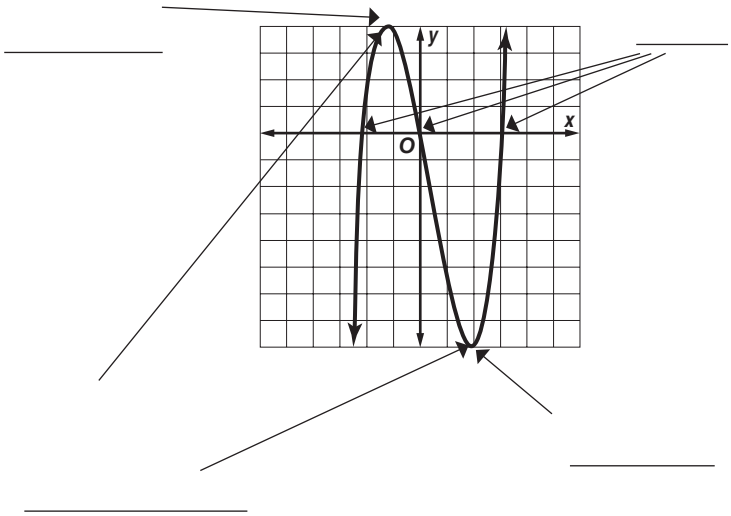
relative maximum ▶

relative minimum ▶

extrema ▶

turning points ▶

zeros ▶



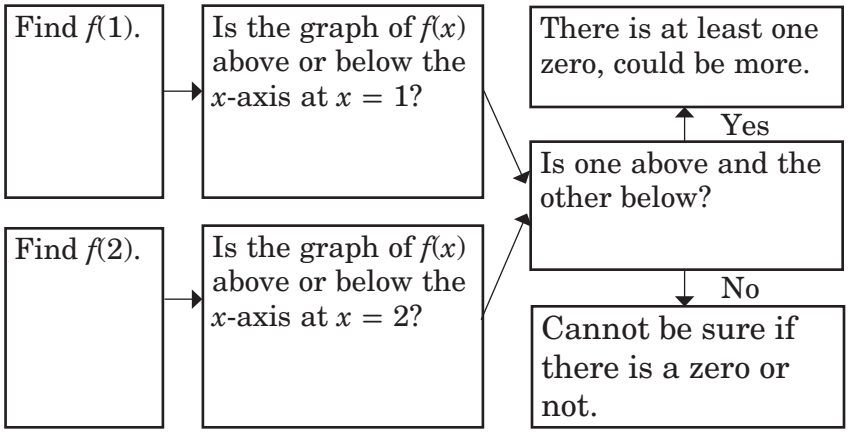
Lesson 6-4

Main Idea	Details

Graphs of Polynomial Functions

pp. 357–358

Determine if $f(x) = x^3 + x^2 - 4$ has at least one real zero between $x = 1$ and $x = 2$.

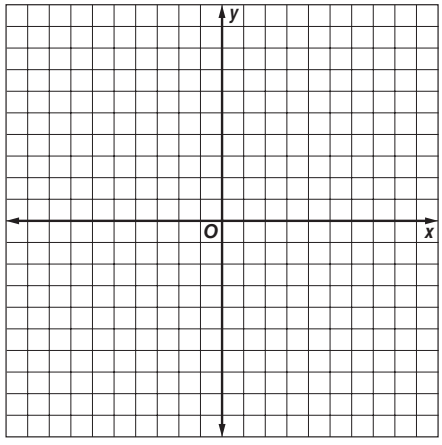


Maximum and Minimum Points

pp. 358–359

The graph of $f(x)$ is shown below. Answer the following questions based on the graph.

- Label each turning point as a maximum or a minimum and with the approximate ordered pair.
- What is the least possible degree of $f(x)$? _____



Helping You Remember

The origins of words can help you remember their meaning and to distinguish between similar words. Look up maximum and minimum in a dictionary and describe their origins (original language and meaning).

_____

_____

NAME _____ DATE _____ PERIOD _____

6-5 Solving Polynomial Equations

What You'll Learn

Scan the text in Lesson 6-5. Write two facts you learned about solving polynomial functions as you scanned the text.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Explain how to recognize and factor a difference of two squares polynomial. Provide two examples. *(Lesson 5-3)*

_____

_____

_____

_____

_____

_____

_____

Example 1:	Example 2:

New Vocabulary Write the correct term beside each definition.

_____ ▶ a polynomial in x rewritten in the form $au^2 + bu + c$

_____ ▶ a polynomial that cannot be factored

Main Idea	Details

Factor Polynomials
pp. 368–370

Factor using the formulas for the sum and difference of two cubes. Multiply to check the factors.

Factor: $c^3 - 64d^3$	Factor: $8x^3 - 1$

Solve Polynomial Equations
pp. 370–371

Solve $x^6 + 7x^3 = 8$.

	Set the equation equal to zero.
	Rewrite the equation so that the first term is squared, the second term is linear, and the third term is a constant.
	Determine "u" and rewrite the equation.
	Factor and use the Zero Product Property.
	Replace "u" and finish solving.

Helping You Remember

Some students have trouble remembering the correct signs in the formulas for the sum and difference of cubes. What is an easy way to remember the correct signs?

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

6-6 The Remainder and Factor Theorems

(Space for State Standard)

What You'll Learn

Skim the Examples for Lesson 6-6. Predict two things you think you will learn about the Remainder and Factor Theorems.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Find the quotient and remainder using long division and synthetic division. *(Lessons 6-3 and 6-5)*

$(x^2 + 10x + 16) \div (x + 8)$

Long Division	Synthetic Division
	Solve.

New Vocabulary Write the definition next to each term.

synthetic substitution ▶ _____

_____

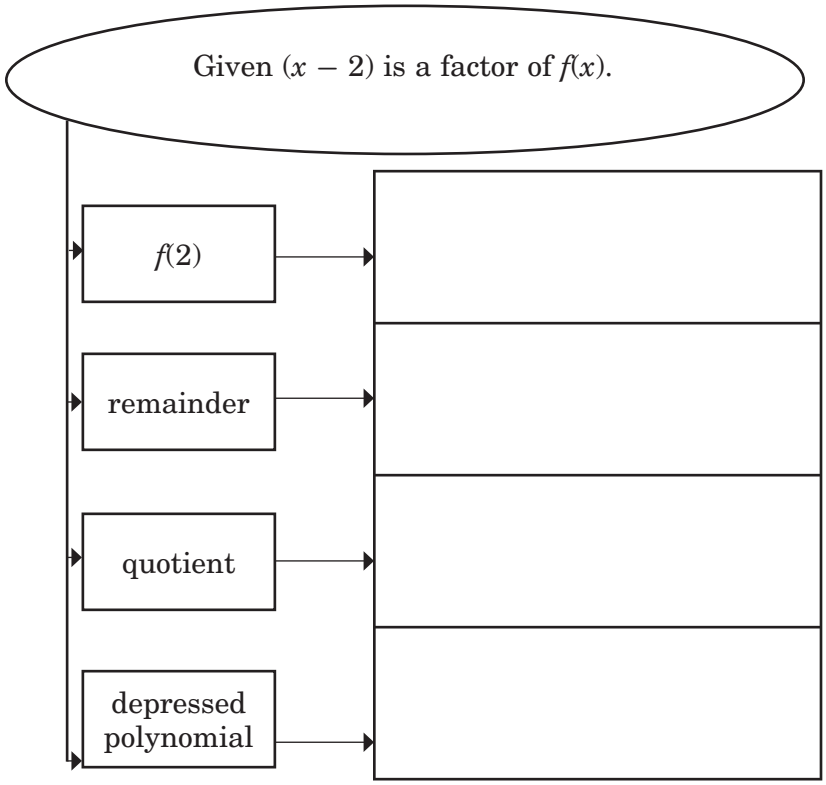
_____

depressed polynomial ▶ _____

_____

_____

Main Idea	Details
Synthetic Substitution pp. 377–378	**Use synthetic substitution to determine the value of $f(3)$, $f(-2)$ and $f(5)$ given $f(x) = 3x^3 - 4x^2 + 7x + 5$.**
	1. $f(3)$
	2. $f(-2)$
	3. $f(5)$
Factors of Polynomials p. 379	**Write a true statement using given and the provided vocabulary term.**



Helping You Remember

Think of a mnemonic for remembering the sentence, "Dividend equals quotient times divisor plus remainder."

_____

_____

NAME _____ DATE _____ PERIOD _____

6-7 Roots and Zeros

What You'll Learn

Scan Lesson 6-7. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Explain how you can use the graph of the function $f(x) = x^2 - 7x + 12$ to find the solutions to the equation $x^2 - 7x + 12 = 0$. *(Lesson 5-2)*

_____

_____

_____

_____

Vocabulary Link Look up and provide a definition for the terms fundamental, theorem, and algebra. Using these definitions, write a conjecture sentence about a Fundamental Theorem of Algebra.

fundamental ▶ _____

_____

theorem ▶ _____

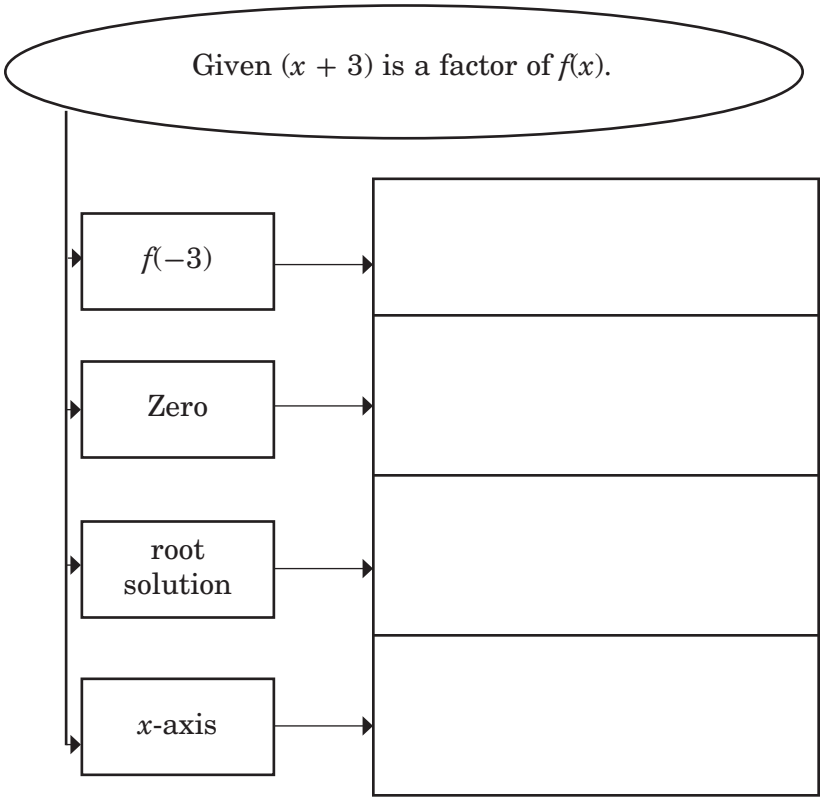
_____

algebra ▶ _____

_____

Lesson 6-7

Main Idea	Details
Synthetic Types of Roots pp. 383–385	**Write a true statement using the given and the provided vocabulary term.**



Find Zeros
pp. 385–387

Rewrite each false statement below so that it will be a true statement.

1. If $6 + 5i$ is a zero of a function, then $-6 + 5i$ is also a zero of the function.

2. If the function $f(x)$ has zeros of 3, -4, and $6i$, then the function of least degree in factored form might be: $f(x) = (x + 3)(x - 4)(x + 6i)(x - 6i)$.

3. The number of positive real zeros for $f(x) = x^4 + 3x^3 - 2x^2 + x - 4$ is 3.

NAME _____ DATE _____ PERIOD _____

6-8 Rational Zero Theorem

What You'll Learn

Scan Lesson 6-8. Predict two things you think you will learn about the Rational Zero theorem.

1. _____

_____

_____

2. _____

_____

_____

Active Vocabulary

Review Vocabulary Identify the parts of the polynomial function below. *(Lesson 6-3)*.

$6x^5 + 17x^4 - 8x^3 + 7x - 9$

The leading coefficient is _____.

The constant is _____.

The degree of the polynomial is _____.

New Vocabulary Fill in each blank to complete the Rational Zero Theorem.

Rational Zero Theorem ▶ If $P(x)$ is a polynomial function with integral coefficients, then every rational _____ of $P(x) = 0$ is of the form _____, a rational number in simplest form, where p is a factor of the _____ and q is a factor of the _____.

Lesson 6-8

Main Idea	Details

Identify Rational Zeros
p. 391

List all of the possible zeros of each function.

1. $3x^3 + 20x - 6$

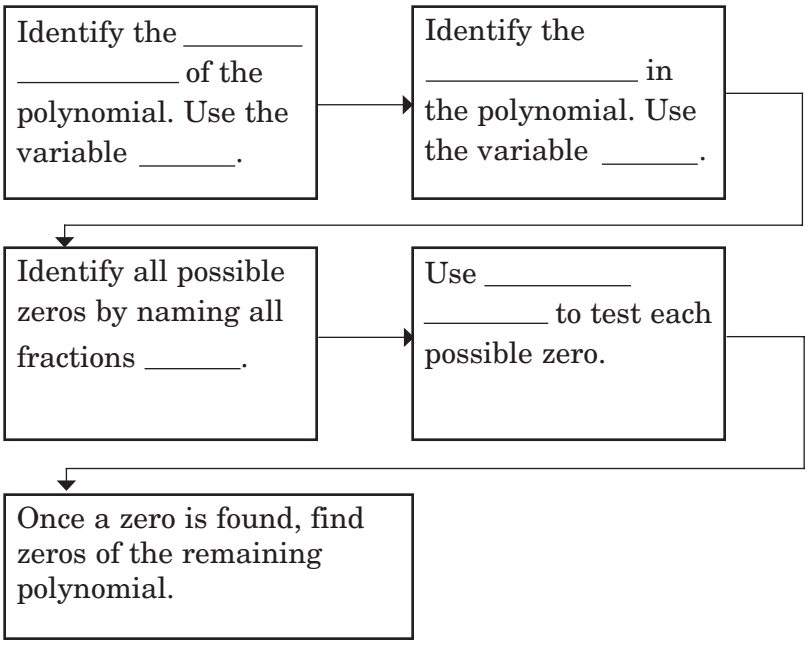
2. $8x^4 - 3x^3 - 2x^2 - 2x + 1$

3. $5x^7 + 9x^4 - 3x^2 - 2$

4. $x^7 - x^6 + x^5 + x^4 - x^3 + x^2 - x + 1$

Find Rational Zeros
pp. 392–393

Complete the graphic organizer to show the steps for finding rational zeros.



Helping You Remember

How can you use the linear equation $ax + b = 0$ to help you remember which numbers go in the numerator and which go in the denominator when listing the possible zeros of a polynomial function?

_____

_____

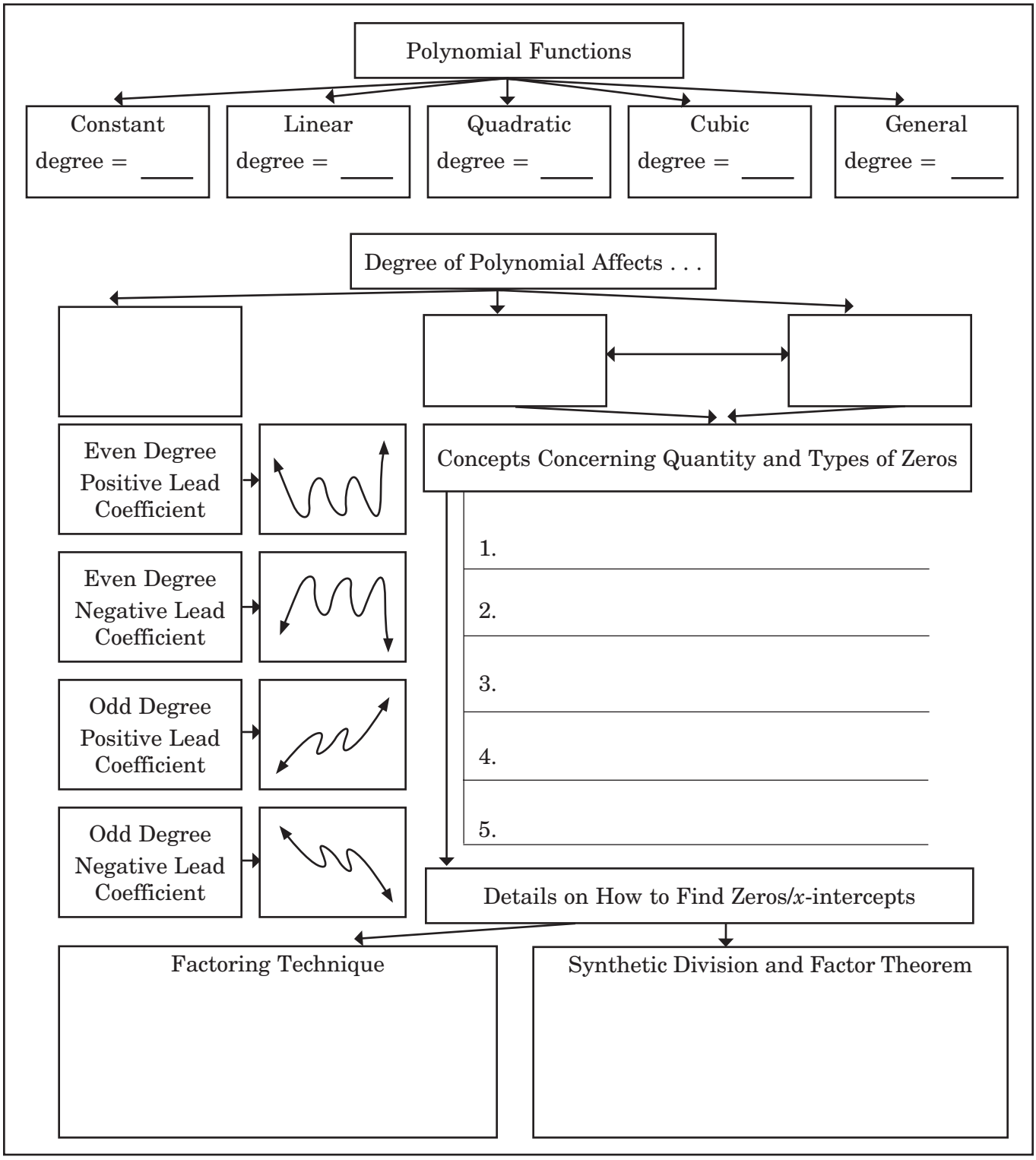
NAME _____ DATE _____ PERIOD _____

CHAPTER 6

Polynomials and Polynomial Functions

Tie It Together

Fill in the graphic organizer.



NAME _____ DATE _____ PERIOD _____

CHAPTER 6 Polynomials and Polynomial Functions

Before the Test

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column.

K What I know…	W What I want to find out…	L What I learned…

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 6.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 6 Study Guide and Review in the textbook.

☐ I took the Chapter 6 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

- While note-taking use abbreviations to use less time and room. Write neatly and place a question mark by any information that you do not understand.

NAME _____ DATE _____ PERIOD _____

CHAPTER 7

Inverses and Radical Functions and Relations

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Inverses and Radical Functions and Relations
	• An inverse relation is the set of ordered pairs when positive values become negative and negative values become positive.
	• A square root function is a type of radical function.
	• The graph of an inequality on a coordinate plane has a boundary and shaded region.
	• Operations like addition and subtraction can not be performed on radicals.
	• To undo an nth root, raise the radical expression to the nth power.

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **When you take notes in geometry, be sure to make comparisons among the different formulas and concepts.**

  For example, how are pyramids and cones similar? different? This will help you learn the material.

- **When you take notes, it is often a good idea to use symbols to emphasize important concepts.**

NAME _____ DATE _____ PERIOD _____

CHAPTER 7

Inverses and Radical Functions and Relations

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on solving radical equations and inequalities, one fact might be that you can solve a radical equation by raising each side of the equation to a power. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
7-1 Operations on Functions	
7-2 Inverse Functions and Relations	
7-3 Square Root Functions and Inequalities	
7-4 nth Roots	
7-5 Operations with Radical Expressions	
7-6 Rational Exponents	
7-7 Solving Radical Equations and Inequalities	

NAME _____ DATE _____ PERIOD _____

7-1 Operations on Functions

What You'll Learn

Scan the text in Lesson 7-1. Write two facts you learned about operations on functions as you scanned the text.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Write the set-builder notation for the intersection of set A and B. *(Lesson 1-5)*

$A = \{x \mid x > 8\}$ $B = \{x \mid -5 < x < 15\}$

New Vocabulary Fill in each blank with the correct term or phrase.

composition of functions ▶ a method used to _____ functions in which the

_____ of one function are used to

_____ a second function

Vocabulary Link How does the definition of a composite number relate to the definition of a composite function? How is it different than the definition of a composite function?

_____

_____

_____

_____

_____

Main Idea	Details

Arithmetic Operations
pp. 409–410

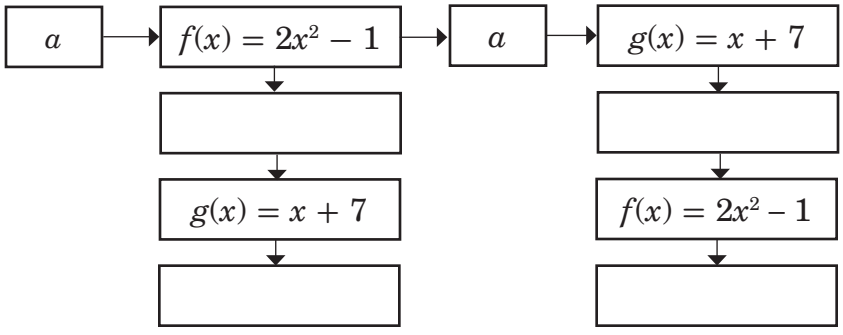
Given $f(x) = 3x^2 + 2$ and $g(x) = 3x - 1$, find each function.

$(f + g)(x)$	
$(f - g)(x)$	
$(f \cdot g)(x)$	
$\left(\frac{f}{g}\right)(x)$	

Composition of Functions
pp. 411–412

Find $[f \circ g](a)$ and $[g \circ f](a)$ for the pair of functions:
$f(x) = 2x^2 - 1$ and $g(x) = x + 7$.

$[g \circ f](a)$



$[f \circ g](a)$

Helping You Remember

Write three sentences that explain how to remember the correct order in which to apply the two original functions when evaluating a composite function. Use the word *closest* in the first sentence, the words *inside* and *outside* in the second, and the words *left* and *right* in the third.

_____

_____

NAME _____ DATE _____ PERIOD _____

7-2 Inverse Functions and Relations

What You'll Learn

Skim Lesson 7-2. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Solve each equation for the indicated variable. *(Lesson 1-3)*

$d = r \cdot t$ Solve for t.	$y = mx + b$ Solve for m.	$a^2 + b^2 = c^2$ Solve for a.

New Vocabulary Write the definition next to each term.

inverse relation ▶ _____

_____

inverse function ▶ _____

Vocabulary Link Inverses can be related to real-world situations. Explain how the function "reverse directions" is an inverse for the function "get driving directions" on an Internet-mapping program.

_____

_____

_____

_____

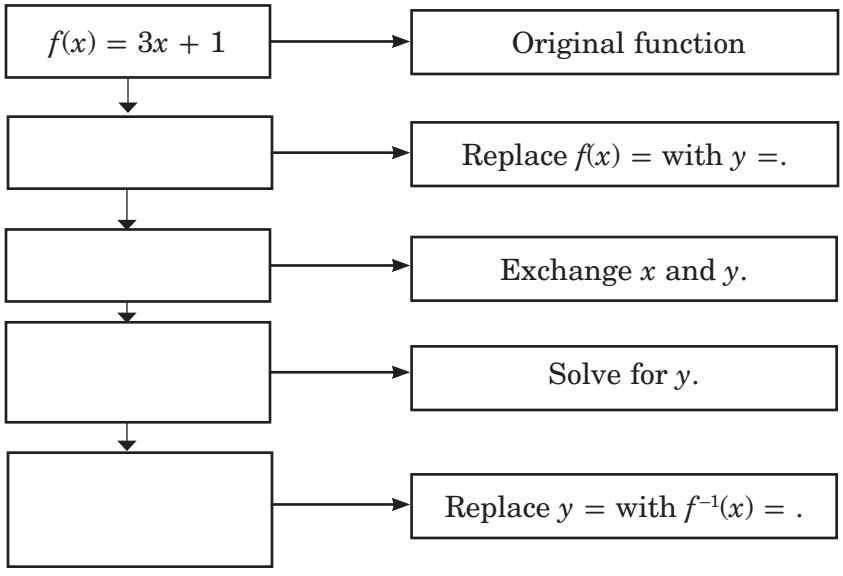
_____

Lesson 7-2

Main Idea	Details

Find Inverses
pp. 417–418

Find the inverse of $f(x) = 3x + 1$.



Verifying Inverses
p. 419

Determine if $f(x) = x^2 + 1$ and $g(x) = \sqrt{x - 1}$ are inverses.

Find $[f \circ g](x)$	Find $[g \circ f](x)$

Yes or No? Justify:

Helping You Remember

A good way to remember something new is to relate it to something you already know. How are the vertical and horizontal line tests related?

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

7-3 Square Root Functions and Inequalities

What You'll Learn

Skim the Examples for Lesson 7-3. Predict two things you think you will learn about square root functions and inequalities.

1. _____

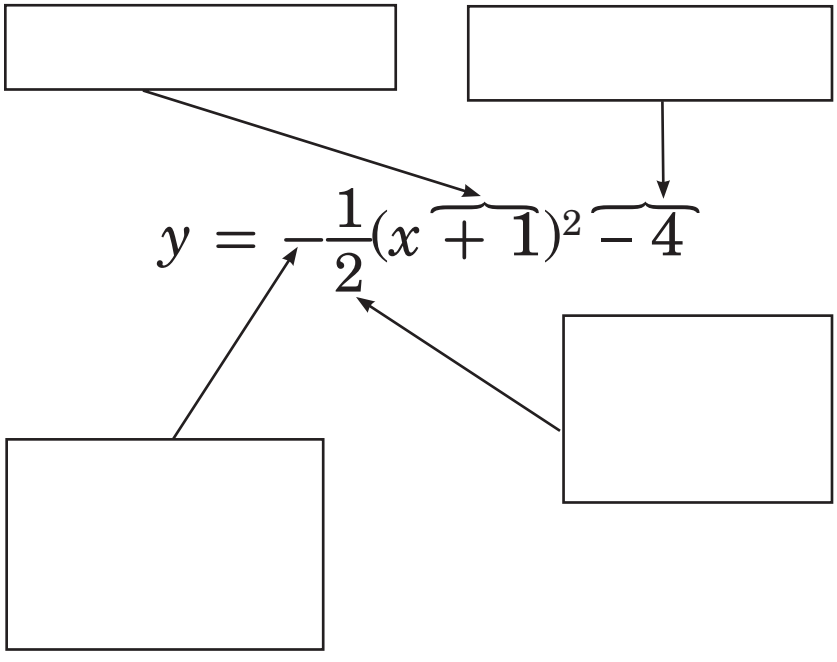
_____

2. _____

_____

Active Vocabulary

Review Vocabulary Describe how each component of this quadratic function transforms the graph of the parent quadratic function $y = x^2$. *(Lesson 5-7)*



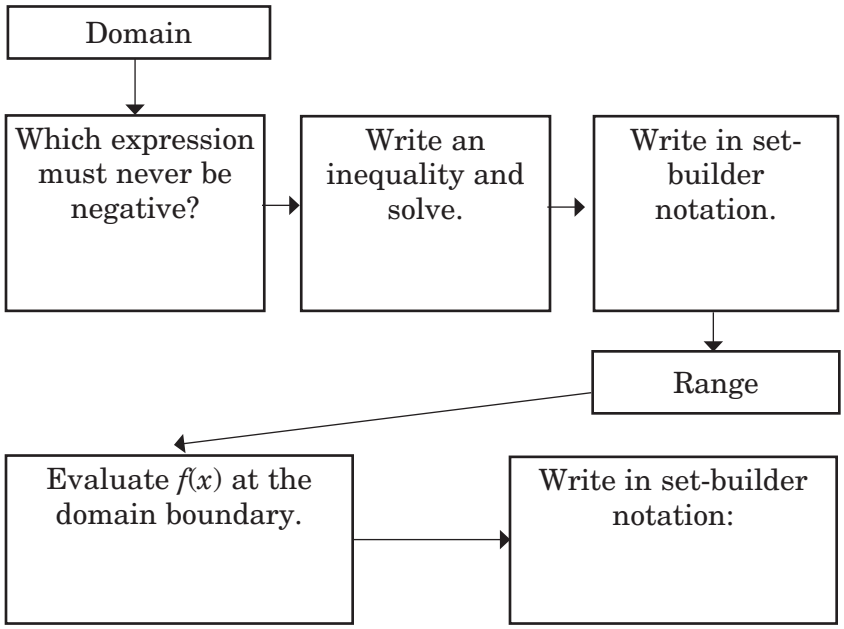
New Vocabulary Write the correct term beside each definition.

_____ ▶ an inequality involving square roots

_____ ▶ a function that contains the root of a variable

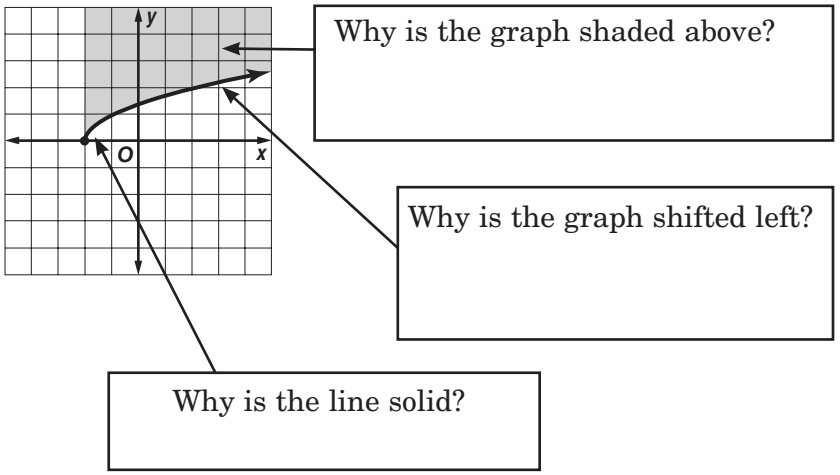
_____ ▶ a function that contains a square root of a variable

Main Idea	Details
Square Root Functions pp. 424–426	**Identify the domain and range for the function $f(x) = \sqrt{2x + 6} - 3$.**



Square Root Inequalities p. 426

The graph of $y \geq \sqrt{x + 2}$ is shown below. Justify each characteristic of the graph in the box provided.



NAME _____ DATE _____ PERIOD _____

7-4 *n*th Roots

What You'll Learn

Skim the lesson. Write two things you already know about *n*th roots.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Explain how the solutions to the equation $x^2 = 16$ differ from the solutions to the equation $x^2 = -16$. *(Lesson 5-6)*

_____

_____

_____

_____

_____

_____

New Vocabulary Label the diagram with the terms listed at the left.

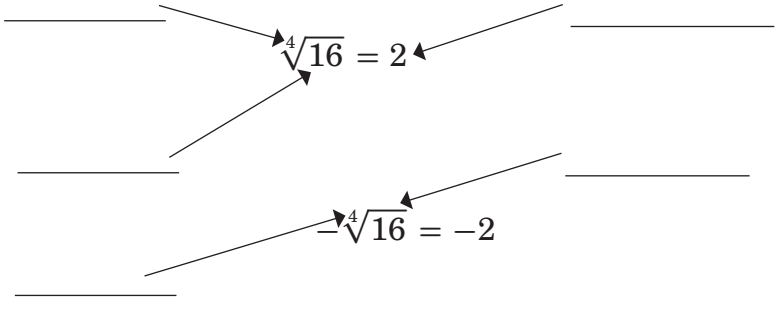
4th root ▶

radical sign ▶

index ▶

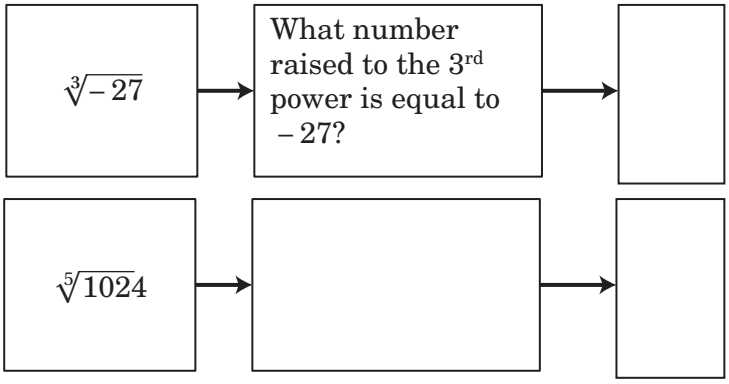
radicand ▶

principal root ▶



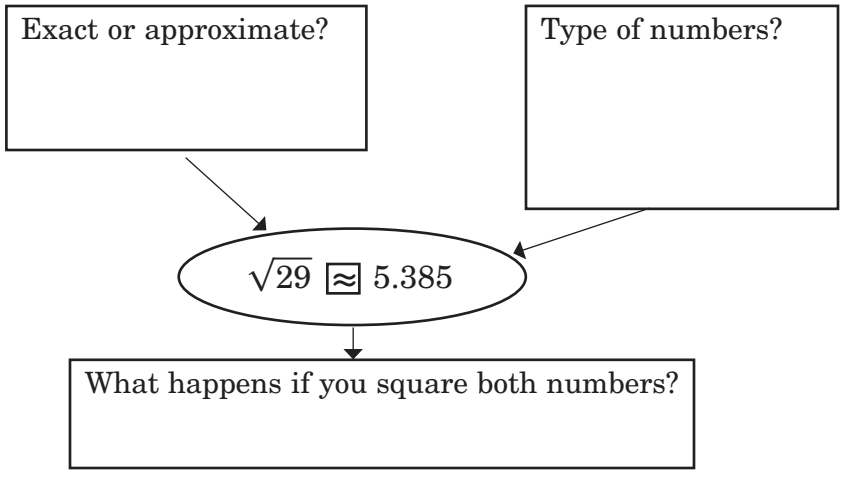
Lesson 7-4

Main Idea	Details
Simplify Radicals pp. 431–432	**Translate each radical expression to a verbal description and then simplify.**



Approximate Radicals with a Calculator
p. 433

Choose the correct symbol of equality to express the relationship between $\sqrt{29}$ and 5.385. Describe similarities and differences between the numbers.



Helping You Remember

What is an easy way to remember that a negative number has no real square roots but has one real cube root?

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

7-5 Operations with Radical Expressions

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Explain why the expressions below are not in simplified form. Simplify each expression. *(Lesson 5-4)*

Expression 1: $\frac{15}{-2i}$	Example 2: $\frac{-2i}{6-i}$

New Vocabulary Write the definition next to each term.

rationalizing the denominator ▶ _____

_____

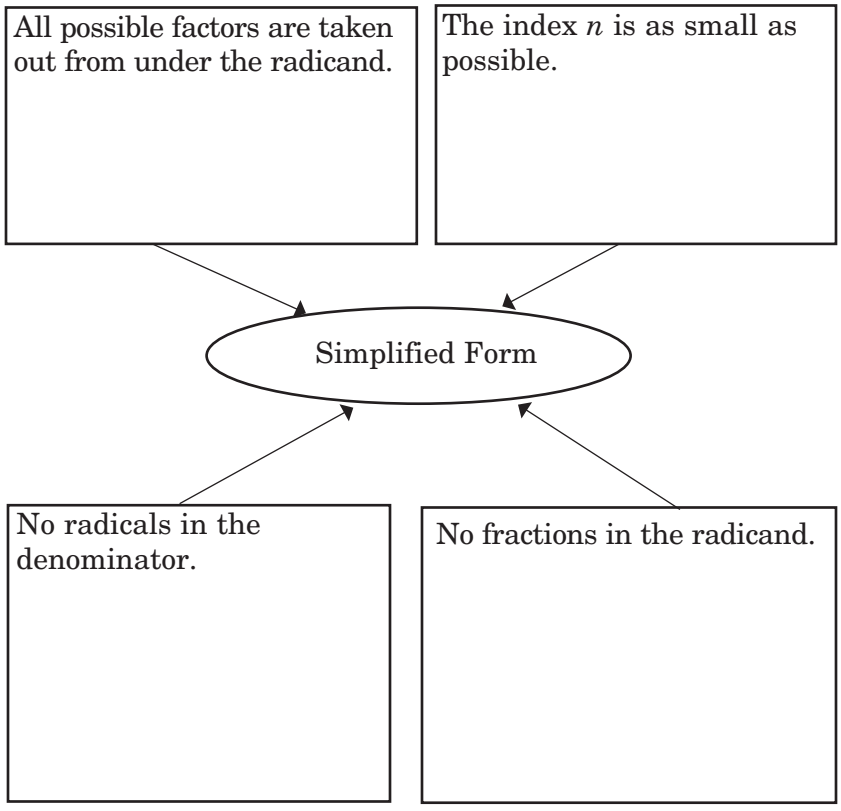
like radical expressions ▶ _____

_____

conjugate ▶ _____

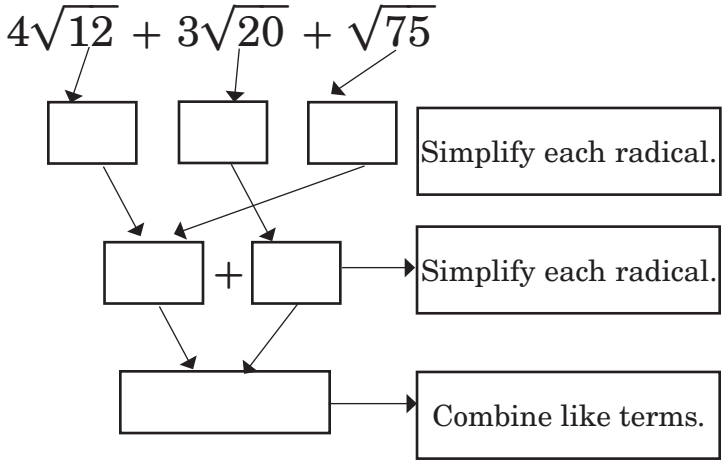
_____

Main Idea	Details
Simplify Radicals pp. 439–441	**Using your own words, list conditions that must be met for a radical expression to be simplified. Provide details concerning how to achieve each condition.**



Operations with Radicals
pp. 441–442

Add the radical expressions.



NAME _____ DATE _____ PERIOD _____

7-6 Rational Exponents

What You'll Learn

Scan the text in Lesson 7-6. Write two facts you learned about rational exponents as you scanned the text.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Write the definition for a rational number. Using the definition, explain why the numbers 0.25, –3, and 5 are all rational numbers. *(Lesson 1-2)*

_____

_____

_____

_____

Review Vocabulary Simplify each of the following expressions. *(Lesson 6-1)*

1. $(x^3)^2$ **2.** $x^3y^2 \cdot x^5y^{-5}$ **3.** $\frac{16a^3b^5}{8a^5b^{-2}}$

Vocabulary Link Using the terms *inverse functions* and *equivalent functions*, describe how the functions $f(x) = x^3$, $g(x) = x^{\frac{1}{3}}$, and $h(x) = \sqrt[3]{x}$ are related to each other.

_____

_____

_____

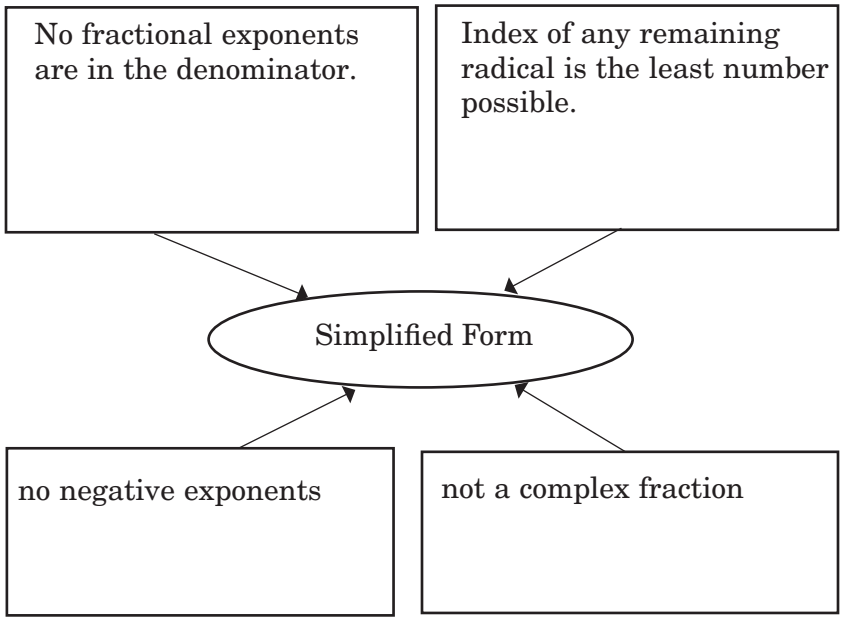
Main Idea	Details
Rational Exponents and Radicals pp. 446–447	**Draw a line to match the equivalent radical and exponential forms.**

$x^{\frac{3}{2}}$ $x^{\frac{8}{2}}$ $x^{\frac{2}{3}}$ $x^{\frac{1}{2}}$ $x^{\frac{3}{1}}$ $x^{\frac{1}{3}}$ $x^{\frac{2}{1}}$

$\sqrt[3]{x^9}$ $\sqrt{x^4}$ $\sqrt[3]{x^2}$ $\sqrt{x}$ $\sqrt{x^8}$ $\sqrt{x^3}$ $\sqrt[3]{x}$

Simplify Expressions
pp. 448–449

Write an example expression which would require simplification in order to meet the stated condition.



Helping You Remember

How can your knowledge of integer exponents help you remember which part of the fraction in a rational exponent gives the power and which part gives the root.

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

7-7 Solving Radical Equations and Inequalities

What You'll Learn

Scan Lesson 7-7. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Solve each equation using the Square Root Property. Complete the square, if necessary. *(Lesson 5-5)*

$x^2 - 16x + 64 = 81$	$x^2 + 7x - 8 = -20$

New Vocabulary Match the term with its definition by drawing a line to connect the two.

radical equation	a solution found when solving a radical equation which does not satisfy the original equation
extraneous solution	equations which include radical expressions
radical inequality	inequalities which include radical expressions

Vocabulary Link Look up the word extraneous in the dictionary. Use the word extraneous in a sentence along with the words *clue*, *crime,* and *suspect*.

_____

_____

_____

_____

Lesson 7-7

Main Idea	Details

Solve Radical Equations
pp. 453–455

Write the missing verbal and mathematical steps to solve the equation.

$\sqrt{x+2} - 2 = \sqrt{x}$ →	Given
→	Isolate the more complicated radical expression.
$\left(\sqrt{x+2}\right)^2 = (\sqrt{x}+2)^2$ →	
→	Isolate the remaining radical.
→	

Solve Radical Inequalities
pp. 455–456

Choose three x-values to test $-3 \leq x \leq 13$ as the solution set for the inequality $\sqrt{x+3} \leq 4$.

x-value #1	x-value #2	x-value #3	Is $-3 \leq x \leq 13$ part of the solution set? Yes No

Helping You Remember

How can you explain to a friend to check every proposed solution in the original radical equation?

_____

_____

_____

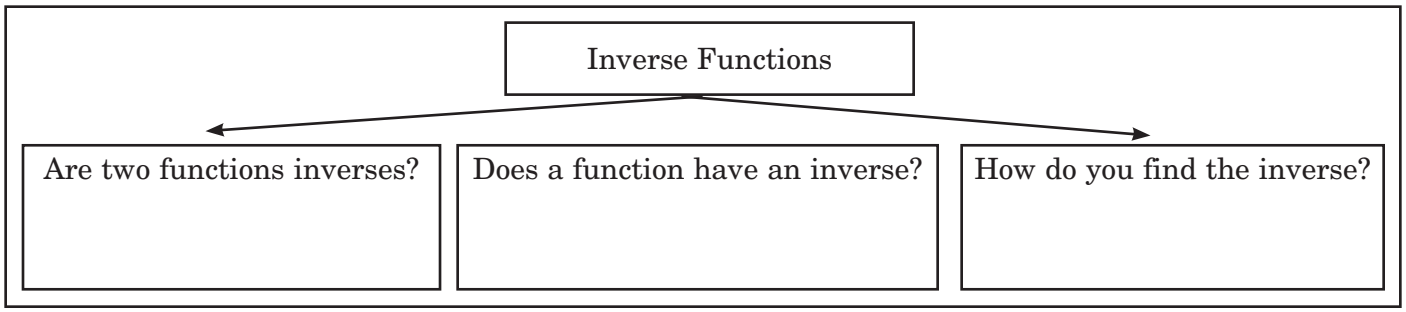
NAME _____ DATE _____ PERIOD _____

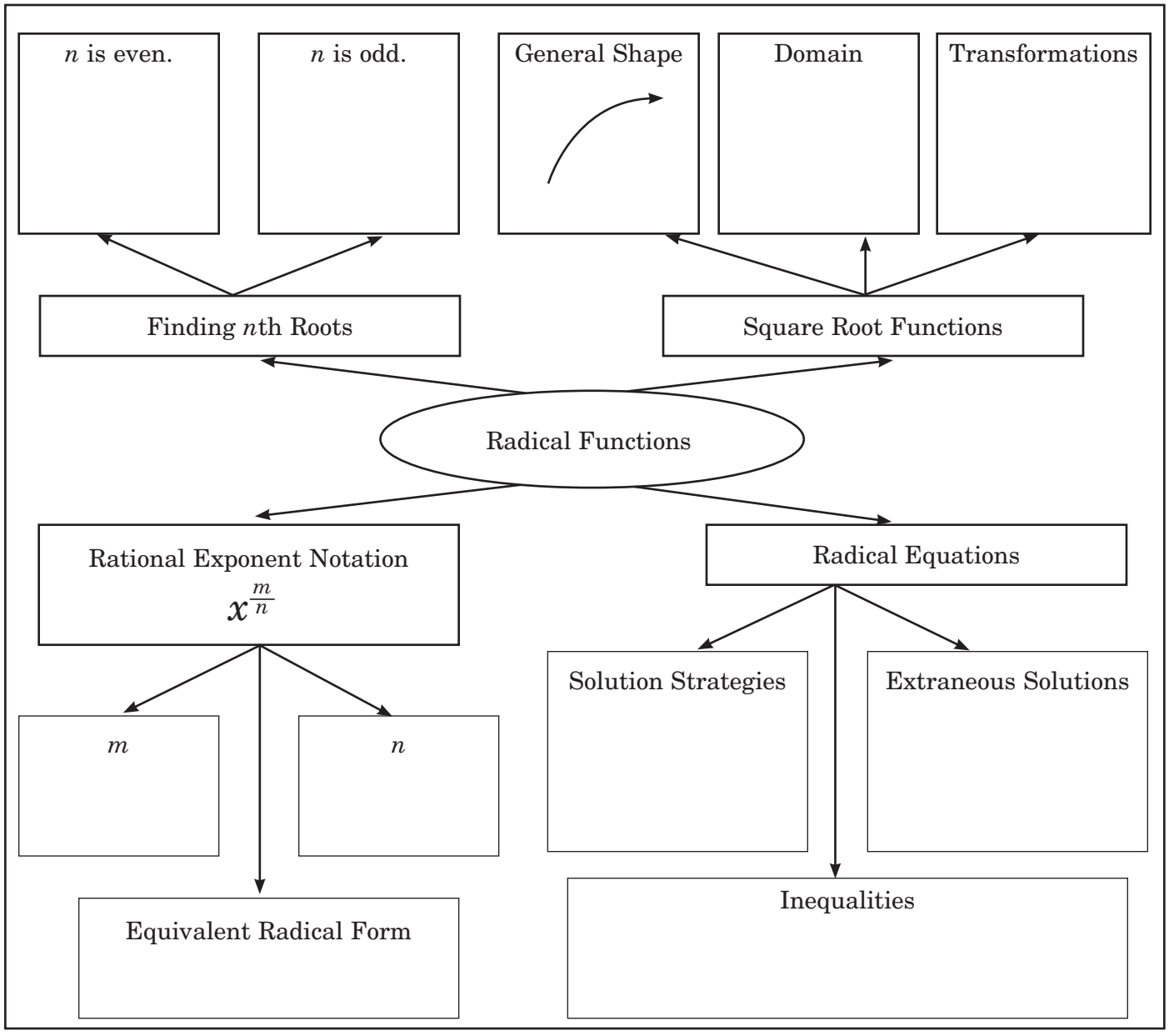
CHAPTER 7

Inverses and Radical Functions and Relations

Tie It Together

Fill in details in each graphic organizer.





NAME _____ DATE _____ PERIOD _____

CHAPTER 7

Inverses and Radical Functions and Relations

Before the Test

Now that you have read and worked through the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.

2. Write a **D** if you disagree with the statement.

Inverses and Radical Functions and Relations	After You Read
• An inverse relation is the set of ordered pairs when positive values become negative and negative values become positive.	
• A square root function is a type of radical function.	
• The graph of an inequality on a coordinate plane has a boundary and shaded region.	
• Operations like addition and subtraction can not be performed on radicals.	
• To undo an nth root, raise the radical expression to the nth power.	

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 7.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

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☐ I completed the Chapter 7 Study Guide and Review in the textbook.

☐ I took the Chapter 7 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

Study Tips

- Make up an invented sentence (acrostic) to remember lists or sequences. **P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally is one acronym for remembering the order of operations (**p**arentheses, **e**xponents, **m**ultiply and **d**ivide, **a**dd and **s**ubtract).

NAME _____ DATE _____ PERIOD _____

CHAPTER 8 Exponential and Logarithmic Functions and Relations

Before You Read

Before you read the chapter, think about what you know about exponential and logarithmic functions and relations. List three things you already know about them in the first column. Then list three things you would like to learn about them in the second column.

K What I know…	W What I want to find out…

Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **When taking notes, make annotations.**
  Annotations are usually notes taken in the margins of books you own to organize the text for review or study.
- **When taking notes, summarize the main ideas presented in the lesson.**
  Summaries are useful for condensing data and realizing what is important.

NAME _____ DATE _____ PERIOD _____

CHAPTER 8

Exponential and Logarithmic Functions and Relations

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on graphing exponential functions, one fact might be that an asymptote is a line that a graph of a function approaches, but never touches. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
8-1 Graphing Exponential Functions	
8-2 Solving Exponential Equations and Inequalities	
8-3 Logarithms and Logarithmic Functions	
8-4 Solving Logarithmic Equations and Inequalities	
8-5 Properties of Logarithms	
8-6 Common Logarithms	
8-7 Base e and Natural Logarithms	
8-8 Using Exponential and Logarithmic Functions	

NAME _____ DATE _____ PERIOD _____

8-1 Graphing Exponential Functions

What You'll Learn

Skim the lesson. Write two things you already know about graphing exponential functions.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary State the domain and range for each function. *(Lessons 5-1 and 7-7)*

$y = x + 1$	$y = x^2 + 1$	$y = \sqrt{x} + 1$
Domain:	Domain:	Domain:
Range:	Range:	Range:

New Vocabulary Write the correct term next to each definition.

_____ ▶ the base of the exponential expression, $1 + r$

_____ ▶ a function where the base is a constant and the exponent is the independent variable

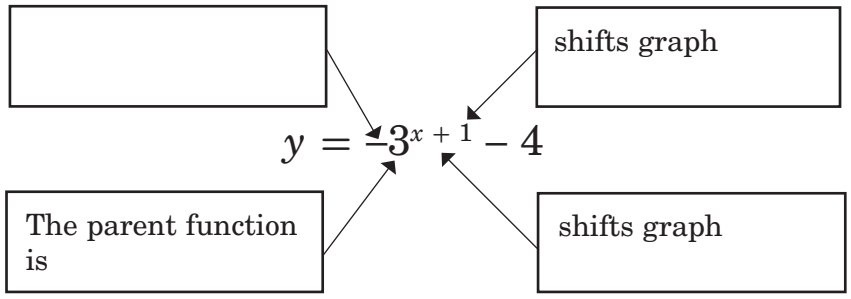
_____ ▶ a line that a graph of a function approaches, but never touches

_____ ▶ the base of the exponential expression, $1 - r$

_____ ▶ a function of the form $f(x) = b^x$, where $b > 1$

_____ ▶ a function of the form $f(x) = b^x$, where $0 < b < 1$

Main Idea	Details
Exponential Growth pp. 475–477	**Provide details about how each characteristic of the given exponential function affects the graph of the function.**



Exponential Decay
pp. 477–479

Compare and contrast an exponential growth function and an exponential decay function for each of the listed characteristics.

Value of b	End Behavior	Asymptote
y-intercept	Domain	Range

Helping You Remember

One way to remember that polynomial functions and exponential functions are different is to contrast the polynomial function $y = x^2$ and the exponential function $y = 2^x$. Tell at least three ways they are different.

_____

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

8-2 Solving Exponential Equations and Inequalities

What You'll Learn

Skim the Examples for Lesson 8-2. Predict two things you think you will learn about solving exponential equations and inequalities.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Provide an example of a linear equation that would be solved using the listed property of equality. *(Lesson 1-3)*

Addition Property of Equality	Subtraction Property of Equality
Division Property of Equality	Multiplication Property of Equality

New Vocabulary Write the definition next to each term.

exponential equation ▶ _____

_____

exponential inequality ▶ _____

_____

compound interest ▶ _____

_____

Lesson 8-2

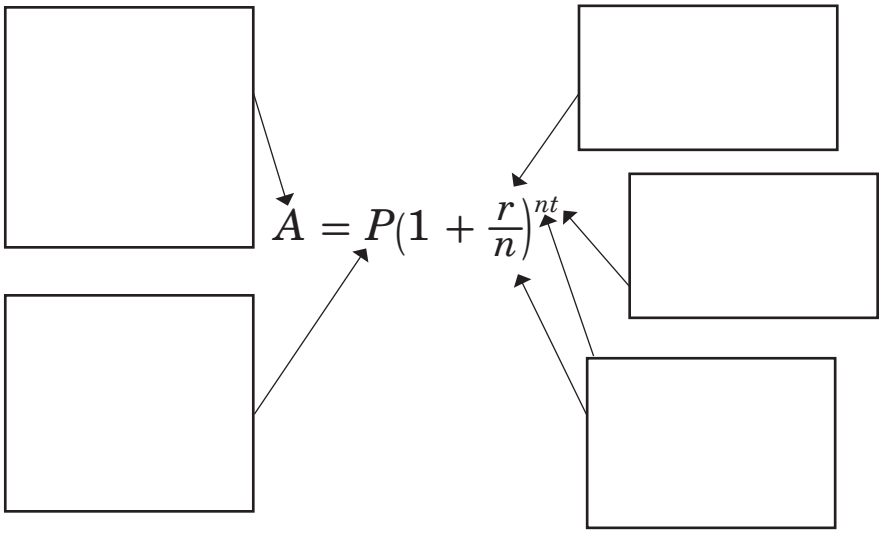
Main Idea	Details

Solve Exponential Equations

pp. 485–487

The compound interest formula is shown below. Describe each variable and identify its value in the real-world problem.

Natalie invests $2,500 in a savings account in which interest is compounded weekly. If after ten years she has $3,100 in the account, what is the annual rate of interest?



Solve Exponential Inequalities

p. 487

Fill in the missing verbal and mathematical steps to solve the exponential inequality.

$9^{x-8} > 27$	Given
	Rewrite to have same bases.
	Power of a Power
$2x - 16 > 3$	
	Solve for the unknown.

NAME _____ DATE _____ PERIOD _____

8-3 Logarithms and Logarithmic Functions

What You'll Learn

Scan the text in Lesson 8-3. Write two facts you learned about logarithms and logarithmic functions as you scanned the text.

1. _____

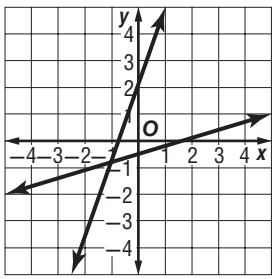
_____

2. _____

_____

Active Vocabulary

Review Vocabulary Determine the inverse for each representation of a function. *(Lesson 7-2)*

Ordered Pairs	
$f(x) = \{(-3, -7), (-1, -3), (0, -1), (1, 1), (2, 5)\}$	
$f^{-1}(x) = \{$ $\}$	
Function Notation	Graph
$f(x) = 3x + 1$	

New Vocabulary Fill in each blank with the correct term or phrase.

logarithm ▶ For $x = b^y$, the variable _____ is called the logarithm of _____. The notation for this logarithm is _____, which is read as y _____ log base _____ of _____.

logarithmic function ▶ The function _____, where b is not equal to _____; the graph of this function is the _____ graph of logarithmic functions.

Lesson 8-3

Main Idea	Details

Logarithmic Functions and Expressions

pp. 492–493

Evaluate the logarithmic expression by completing the diagrams.

Write in exponent form.

$\log_5 25 = y$

Think: What exponent must be put on 5 to get 25?

$\log_5 25$

$\log_5 25 =$ _____

Graphing Logarithmic Functions

pp. 493–495

Compare and contrast the graph of $y = 2^x$ with the graph of $y = \log_2 x$ for each of the listed characteristics.

Intercepts	End Behavior	Asymptotes
Domain	Range	

Helping You Remember

Using the words *base*, *exponent*, and *logarithm*, describe an easy way to remember and apply the part of the definition of logarithm that says, "$\log_b x = y$ if and only if $b^y = x$."

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

8-4 Solving Logarithmic Equations and Inequalities

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the definition next to each term.

logarithmic equation ▶ _____

_____

logarithmic inequality ▶ _____

_____

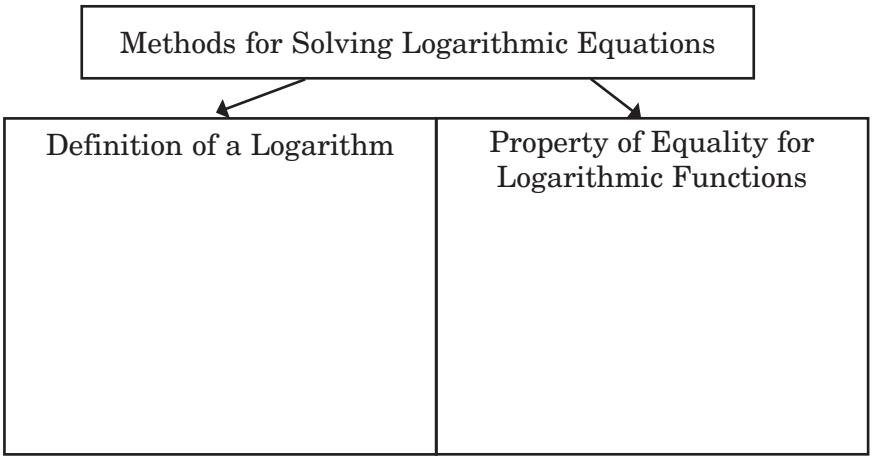
Main Idea

Solve Logarithmic Equations

pp. 502–503

Details

Provide an example for the two methods for solving logarithmic equations.



Lesson 8-4

Main Idea	Details
Solve Logarithmic Inequalities pp. 503–504	**Fill in the missing verbal and mathematical steps to solve the logarithmic inequality.**

$\log_5 (x - 4) > 2$ →	Given
	→ Property of Inequality for Logarithmic Functions
	→ Simplify and solve the inequality.
$x - 4 < 0$ $x < 4$ →	
	→ Write the final answer.

Helping You Remember

Explain the Property of Equality for Logarithmic Functions in your own words. How is this property used to solve equations?

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

8-5 Properties of Logarithms

What You'll Learn

Skim lesson 8-5. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

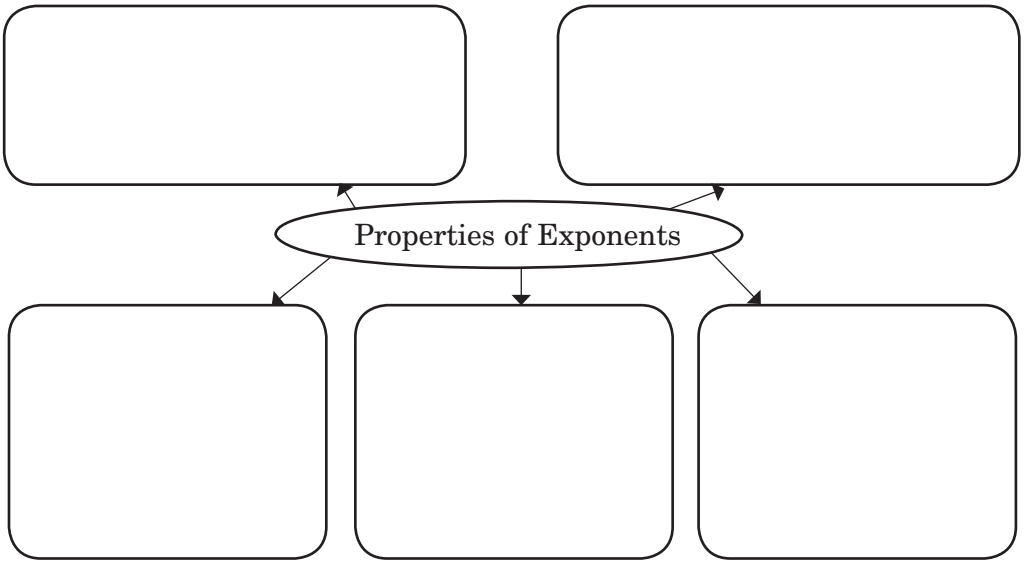
_____

2. _____

_____

Active Vocabulary

Review Vocabulary List the five properties of exponents learned in Chapter 6. Provide an example of each property. *(Lesson 6-1)*



Vocabulary Link Describe in your own words why the statement "A logarithm is an exponent" is true. What does this mean about the properties of logarithms that you will learn about?

_____

_____

_____

_____

Main Idea	Details

Properties of Logarithms
pp. 509–511

Give your own verbal description for each property of logarithms, then use the provided numerical example to verify the property.

Property	Verbal Description	Number Example
Product Property of Logarithms		
Quotient Property of Logarithms		
Power Property of Logarithms		

Solve Logarithmic Equations
p. 511

Solve the logarithmic equation.

$\log_3 x + \log_3 (x - 4) = \log_3 12$

$\log_3 x(x - 4) = \log_3 12$ ← Use a property of logarithms to combine the left side of the equation.

$x^2 - 4x = 12$
$x = 6$ or $x = -2$ ← Use the equality property of logarithms to write and solve a new equation.

$\log_3 -2$ is undefined, so $x = -2$ is extraneous.
$\log_3 6 + \log_3 2 = \log_3 12$ shows $x = 6$ is a solution. ← Check for extraneous solutions in the original equation.

NAME _____ DATE _____ PERIOD _____

8-6 Common Logarithms

What You'll Learn

Scan Lesson 8-6. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Fill in each blank with the correct term or phrase.

common logarithm ▶ A logarithm with a base of _____ that is used in many _____; often it is written without the _____ of 10, so $\log_{10} x =$ _____.

change of base formula ▶ A formula that allows you to write _____ logarithmic expressions that have _____ bases; for example, $\log_4 15 = \frac{\log_{10} \square}{\log_{10} \square}$

Vocabulary Link Pretend that the log button on your calculator is broken. Explain how you can still use your calculator to find the value of log 200. Find log 200 without using the log button.

_____

_____

_____

_____

_____

Lesson 8-6

Main Idea	Details

Common Logarithms
pp. 516–518

Answer each question concerning the solution of the exponential equation.

Do you have to use $\log_{10}$?

$3^x = 21$

Can each side be written with the same base?

$\log 3^x = \log 21$

$x \log 3 = \log 21$

$x = \frac{\log 21}{\log 3}$

Where do these decimals come from?

$x \approx \frac{1.32}{0.48}$

Why can you move the x to the front?

$x \approx 2.75$

Change of Base Formula
pp. 518–519

Use the change of base formula to evaluate each logarithmic expression.

$\log_5 100 = \frac{\log_{10} 100}{\log_{10} \square}$

$\approx \square$

$\log_6 50 = \frac{\log_{10} \square}{\log_{10} \square}$

$\approx \square$

$\log_2 64 = \frac{\log_{10} \square}{\log_{10} \square}$

$= \square$

$\log_4 150 = \frac{\square}{\square}$

$\approx \square$

Helping You Remember

Sometimes it is easier to remember a formula if you can state it in words. State the change of base formula in words.

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

8-7 Base e and Natural Logarithms

What You'll Learn

Scan the text in Lesson 8-7. Write two facts you learned about base e and natural logarithms as you scanned the text.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Evaluate each logarithmic expression. Do not use a calculator. *(Lessons 8-3, 8-5, and 8-6)*

1. $\log_5 125$

2. $\log_6 18 + \log_6 2$

3. $\log_5 150 - \log_5 6$

4. $\log_2 2^{125}$

5. $\log 25 + \log 4$

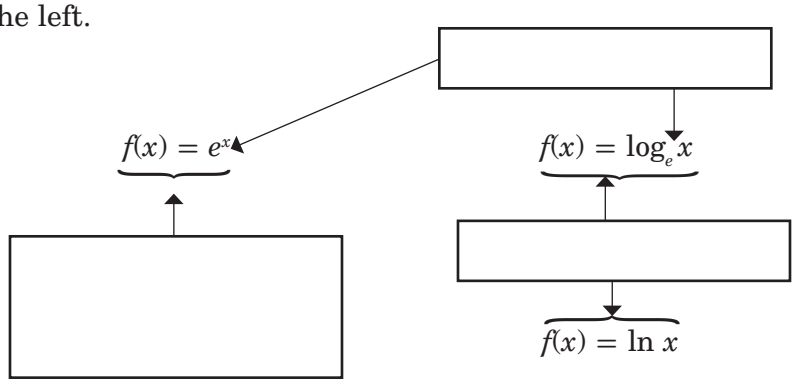
6. $\log 10^{-3}$

New Vocabulary Label the diagram with the terms listed at the left.

natural base, e ▶

natural base exponential function ▶

natural logarithm ▶



Lesson 8-7

Main Idea	Details

Base *e* and Natural Logarithms

pp. 525–526

Write each expression in another form, then use a calculator to evaluate. Check your answer by substituting into the original expression.

$e^x = 15$	$x =$		
$e^x = -22$			
$\ln x = 2$			
$\ln x = -5$			

Equations and Inequalities with *e* and ln

pp. 527–528

Describe each variable and identify its value from the real-world problem.

Ming-Na puts $600 in a savings account in which interest is compounded continuously. How much money will she have after 5 years if the annual interest rate is 4%?

$$A = Pe^{rt}$$

Helping You Remember

A good way to remember something is to explain it to someone else. Suppose that you are studying with a classmate who is puzzled when asked to evaluate $\ln e^3$. How would you explain an easy way to figure this out?

_____

_____

NAME _____ DATE _____ PERIOD _____

8-8 Using Exponential and Logarithmic Functions

What You'll Learn

Skim the Examples for Lesson 8-8. Predict two things you think you will learn about using exponential and logarithmic functions.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Solve each equation. *(Lessons 8-2, 8-3, and 8-6)*

$3^{4x} = 27$	$\log_2 (3x - 1) = 5$	$5^{x+8} = 20$

New Vocabulary Match the term with its definition by drawing a line to connect the two.

logistic growth model	the constant k in the exponential growth formula $f(x) = ae^{kt}$
rate of continuous decay	a model in which population growth has a limiting factor
rate of continuous growth	the constant k in the exponential growth formula $f(x) = ae^{-kt}$

Vocabulary Link Will the amount of carbon-14 contained in a fossil eventually reach zero? Explain your answer using the word *asymptote*.

_____

_____

_____

_____

Lesson 8-8

Main Idea	Details

Exponential Growth and Decay

pp. 533–535

Compare and contrast the exponential functions $f(x) = ae^{kt}$ and $f(x) = ae^{-kt}$.

	$f(x) = ae^{kt}$	$f(x) = ae^{-kt}$
Model Description		
Real-World Examples of Use		
Graph End Behavior		
Graph Asymptotic Behavior		

Logistic Growth

p. 536

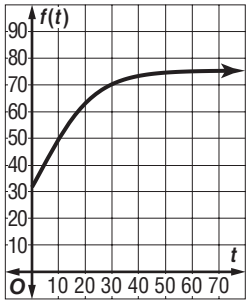
Use the graph of the function $f(t) = \frac{75}{1+1.3e^{-0.0985t}}$, which models the population of frogs in a pond after t years, where $t \geq 0$, to answer the questions.

What is the maximum population of frogs? _____

What is the number of frogs at time zero? _____

After how many years will the population of frogs be 70?

_____



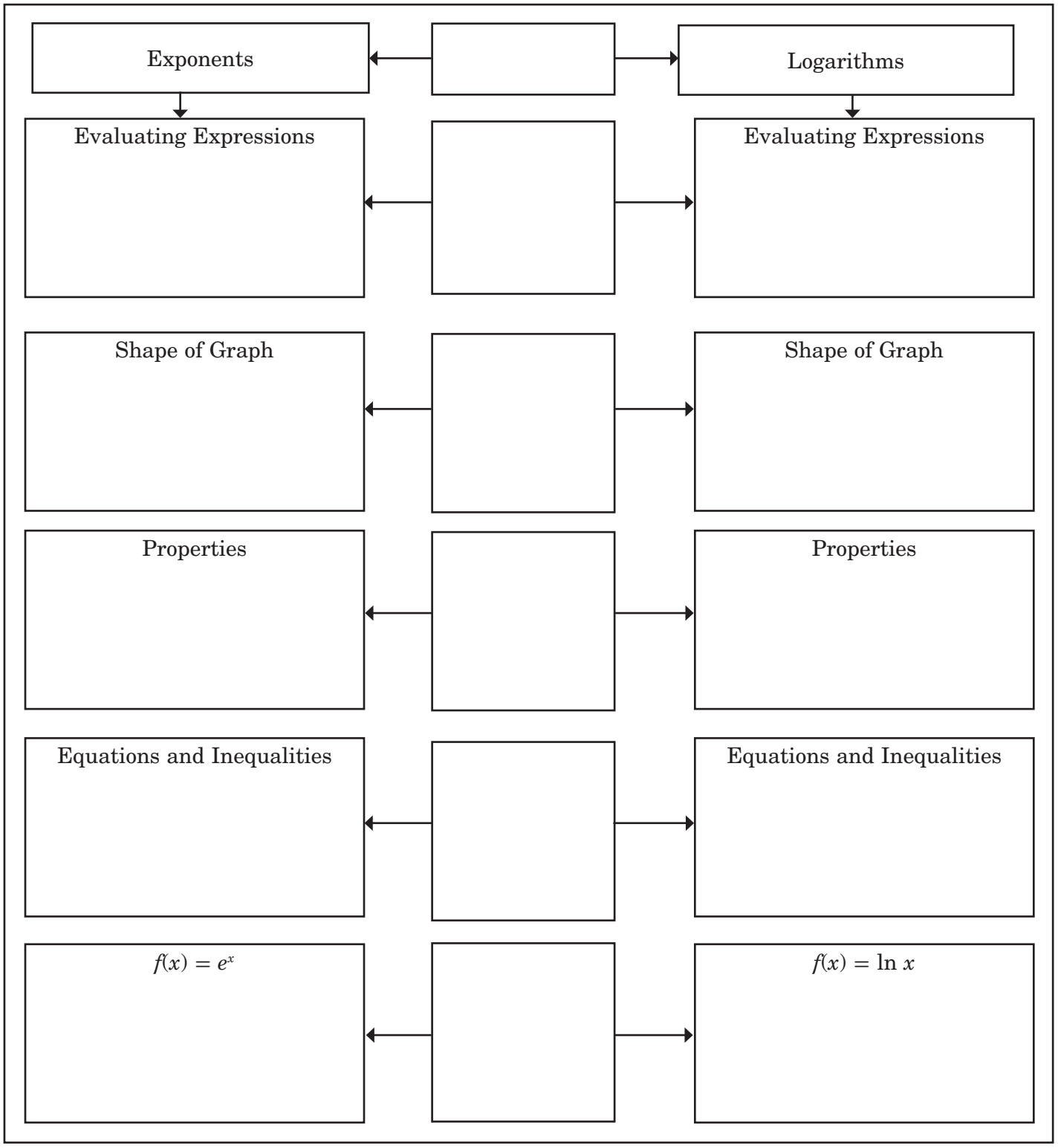
NAME _____ DATE _____ PERIOD _____

CHAPTER 8

Exponential and Logarithmic Functions and Relations

Tie It Together

Fill in each column with one or more details. Fill in the arrowed rectangles with a description of the relationship between the rectangular boxes.



NAME _____ DATE _____ PERIOD _____

CHAPTER 8 Exponential and Logarithmic Functions and Relations

Before the Test

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column.

K What I know…	W What I want to find out…	L What I learned…

Math Online Visit *glencoe.com* to access your vtextbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 8.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 8 Study Guide and Review in the textbook.

☐ I took the Chapter 8 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

Study Tips

- Complete reading assignments before class. Write down or circle any questions you may have about what was in the text.

NAME _____ DATE _____ PERIOD _____

CHAPTER 9

Rational Functions and Relations

Before You Read

Before you read the chapter, think about what you know about rational functions and relations. List three things you already know about them in the first column. Then list three things you would like to learn about them in the second column.

K What I know…	W What I want to find out…

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **When you take notes, write descriptive paragraphs about your learning experiences.**
- **When you take notes, you may wish to use a highlighting marker to emphasize important concepts.**

NAME _____ DATE _____ PERIOD _____

CHAPTER 9

Rational Functions and Relations

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on solving rational equations and inequalities, one fact might be that the method for finding the mean of a set of numbers in which some elements of the set carry more importance is called the weighted average. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
9-1 Multiplying and Dividing Rational Expressions	
9-2 Adding and Subtracting Rational Expressions	
9-3 Graphing Reciprocal Functions	
9-4 Graphing Rational Functions	
9-5 Variation Functions	
9-6 Solving Rational Equations and Inequalities	

NAME _____ DATE _____ PERIOD _____

9-1 Multiplying and Dividing Rational Expressions

What You'll Learn

Skim Lesson 9-1. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Write each expression as a product of its prime factors. *(Lesson 5-3)*

1260	$x^3 + 7x^2 + 12x$	$9x^2 - 81$

New Vocabulary Write the definition next to each term.

rational expression ▶ _____

_____

complex fraction ▶ _____

_____

Vocabulary Link Explain why the expression $3\frac{3}{4}$ is both a rational expression and a rational number.

_____

_____

_____

_____

Main Idea	Details

Simplify Rational Expressions

pp. 553–556

Check each step that is necessary when completing the specified problem.

	Simplify Rational Expressions	Multiply Rational Expressions	Divide Rational Expressions
Convert to Multiplication			
Multiply Numerators			
Multiply Denominators			
Factor Numerator			
Factor Denominator			
Eliminate Common Factors			
Simplify Remaining Factors			

Simplify Complex Fractions

pp. 556–557

Fill in the missing boxes for each complex fraction rewritten as a multiplication problem.

$$\frac{\frac{2x}{x^2-4}}{\frac{6}{x+2}} = \frac{\square}{\square} \div \frac{\square}{\square} = \frac{\square}{\square} \cdot \frac{\square}{\square}$$

$$\frac{\frac{\square}{\square}}{\frac{\square}{\square}} = \frac{\square}{\square} \div \frac{\square}{\square} = \frac{12}{x^2+8x+9} \cdot \frac{x+1}{14x}$$

NAME _____ DATE _____ PERIOD _____

9-2 Adding and Subtracting Rational Expressions

What You'll Learn

Scan the text in Lesson 9-2. Write two facts you learned about adding and subtracting rational expressions as you scanned the text.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Simplify each expression. *(Lessons 6-1, 6-2, and 9-1)*

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

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

3. $\frac{3x}{8} + \frac{5x}{8}$

4. $\frac{4x^2}{9xy} \cdot \frac{15x^3y^2}{10x}$

Vocabulary Link Explain the relationship between the terms *multiple, least common multiple, common denominator,* and *least common denominator* for any two whole numbers.

_____

_____

_____

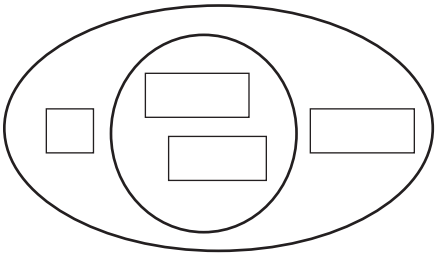
_____

_____

_____

Lesson 9-2

Main Idea	Details
LCM of Polynomials p. 562	**Write the factors for $x^2 - 9$ inside the inner circle. Write the factors for $x^3 + 6x^2 + 9x$ that are not already represented in the inner circle between the inner and the outer circles. Write the common denominator using each factor written inside the circles.**



Common Denominator:

Add and Subtract Rational Expressions pp. 563–564	**Transform the numerators so that the rational expressions have the common denominator shown.**

Compare $x(x - 4)$ to $4x(x - 4)$. Which factor is different? ____

$$\frac{x-3}{x(x-4)} + \frac{x}{4x}$$

Compare $4x$ to $4x(x - 4)$. Which factor is different? _____

$$\frac{\quad}{4x(x-4)} + \frac{\quad}{4x(x-4)}$$

Helping You Remember

Some students have trouble remembering whether a common denominator is needed to add and subtract rational expressions or to multiply and divide them. How can your knowledge of working with fractions in arithmetic help you remember this?

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

9-3 Graphing Reciprocal Functions

What You'll Learn

Skim the lesson. Write two things you already know about graphing reciprocal functions.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Fill in each blank with the correct term or phrase.

reciprocal function ▶ a function that has an equation of the form _____, where $a(x)$ is a _____ function and $a(x)$ _____ zero

hyperbola ▶ the name given to the graph of a _____ function

asymptote ▶ a line that the _____ of a _____ approaches

Vocabulary Link Complete the tables of values for the reciprocal function $f(x) = \frac{1}{x}$, then complete the boxes on the right.

x	$f(x)$
0	
0.001	
0.01	
0.1	
1	
10	
100	
1000	
10000	

x	$f(x)$
−1000	
−100	
−10	
−1	
−0.1	
−0.01	
−0.001	
−0.0001	
0	

As $x \to \infty$, $f(x) \to$ ☐.

As $x \to -\infty$, $f(x) \to$ ☐.

As $x \to 0^+$, $f(x) \to$ ☐.

As $x \to 0^-$, $f(x) \to$ ☐.

Lesson 9-3

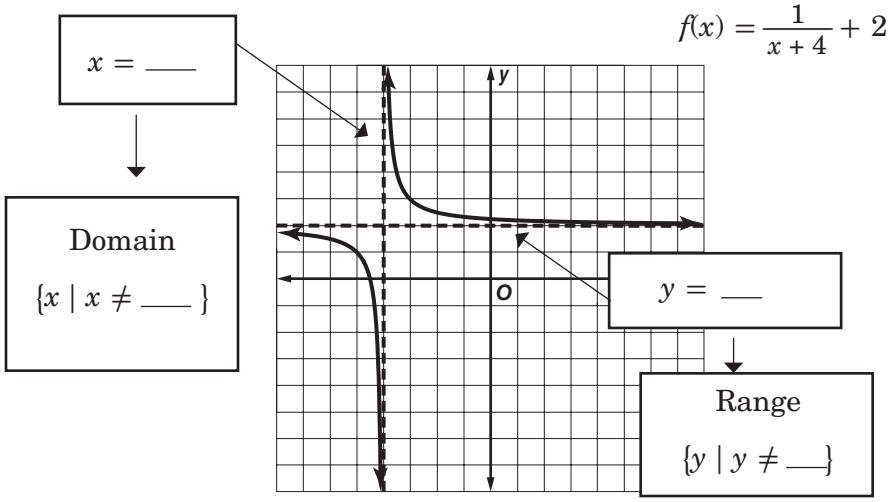
Main Idea	Details

Vertical and Horizontal Asymptotes

pp. 569–570

Sketch the vertical and horizontal asymptotes in the graph below. Write the equations of the asymptotes and then write the domain and range for the function.

$f(x) = \frac{1}{x+4} + 2$



Transformations of Reciprocal Functions

pp. 571–572

Compare and contrast the graphs of $f(x) = \frac{1}{x}$ to $g(x) = \frac{3}{x-2} - 5$ for each of the listed characteristics.

	Domain	Range	Vertical Asymptotes	Horizontal Asymptotes
$f(x)$				
$g(x)$				

Helping You Remember

Explain why the reciprocal function $f(x) = \frac{1}{x}$ has a domain and range of all nonzero real numbers. How can the domain and range help you remember what the graph looks like?

NAME _____ DATE _____ PERIOD _____

9-4 Graphing Rational Functions

What You'll Learn

Skim the Examples for Lesson 9-4. Predict two things you think you will learn about graphing rational functions.

1. _____

_____

2. _____

_____

Active Vocabulary

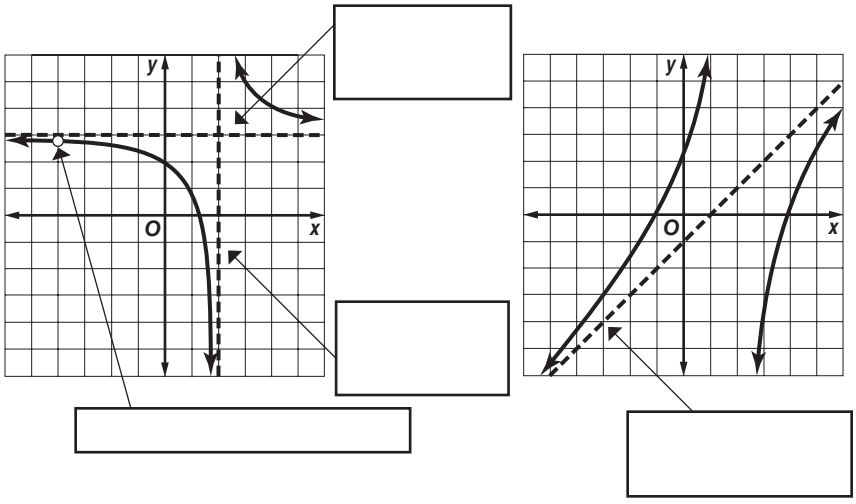
vertical asymptote ▶

horizontal asymptote ▶

oblique asymptote ▶

point discontinuity ▶

New Vocabulary Label the diagram with the terms listed at the left.



Vocabulary Link Look up the word *oblique* in the dictionary. Explain how the definitions pertaining to architecture and anatomy can help you remember the meaning of an *oblique asymptote*.

_____

_____

_____

_____

_____

Lesson 9-4

Main Idea	Details

Vertical and Horizontal Asymptotes
pp. 577–579

For the rational function $f(x) = \frac{n(x)}{d(x)}$, summarize the information that can be derived from each part of the function.

Numerator Alone	Denominator Alone
Numerator and Denominator Together	

Oblique Asymptotes and Point Discontinuity
pp. 579–581

How are vertical asymptotes and point discontinuities the same? How are they different?

NAME _____ DATE _____ PERIOD _____

9-5 Variation Functions

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

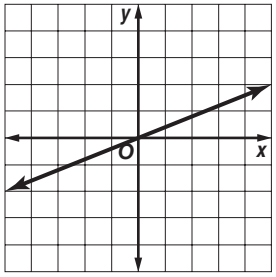
_____

2. _____

_____

Active Vocabulary

Review Vocabulary Write the equation of the graph shown. *(Lesson 2-4)*



What is the slope?

_____

What is the y-intercept?

_____

Write the equation in $y = mx + b$ form.

_____

New Vocabulary Write the correct term next to each definition.

_____ ▶ a variation in which one quantity varies directly as the product of two or more quantities

_____ ▶ a type of variation in which the product of two quantities, x and y, is equal to a constant k

_____ ▶ the constant k in a constant of variation

_____ ▶ a type of variation that can be expressed in the form $y = kx$

_____ ▶ a type of variation in which one quantity varies directly and/or inversely as two or more other quantities

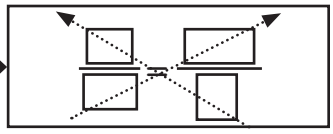
Main Idea	Details

Direct Variation and Joint Variation

pp. 586–587

Use the listed steps as a guide to solve the direct variation problem:

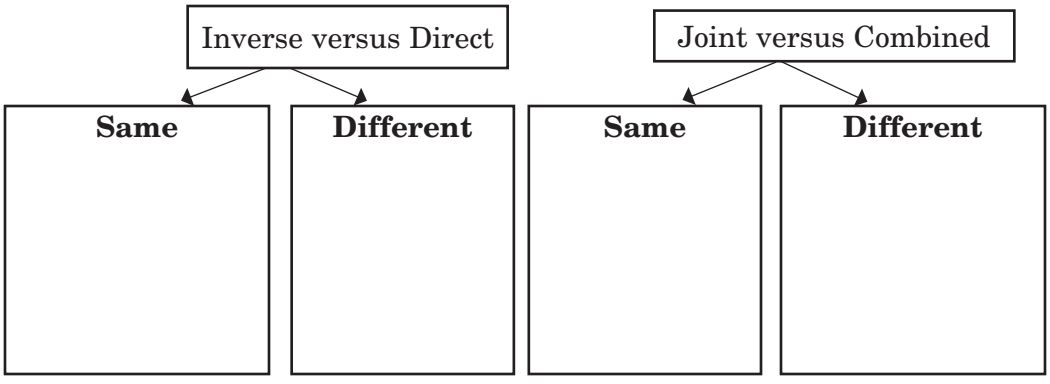
If y varies directly as x and y = 24 when x = −3, find x when y = −16.

Set up a proportion in the form $\frac{y_1}{x_1} = \frac{y_2}{x_2}$.	
Cross multiply to form an equation without fractions and simplify.	
Solve the equation for the unknown.	

Inverse Variation and Combined Variation

pp. 588–589

Compare and contrast joint variation versus combined variation and direct variation versus inverse variation by completing the diagram.



NAME _____ DATE _____ PERIOD _____

9-6 Solving Rational Equations and Inequalities

What You'll Learn

Scan Lesson 9-6. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Determine the LCM for each set of expressions. *(Lesson 9-2)*

1. 12 and 20

2. $15x$ and $24x^2$

3. $(x - 3)(x + 3)$ and $(x + 3)^2$

4. $x^2 + 9x + 18$ and $x^2 - 36$

New Vocabulary Match the term with its definition by drawing a line to connect the two.

rational inequality	an equation that contains one or more rational expressions
weighted average	an inequality that contains one or more rational expressions
rational equation	a method for finding the mean of a set of numbers in which some elements of the set carry more importance, or weight, than others

Vocabulary Link When you solved radical equations, you needed to watch out for extraneous solutions that would cause the expression under the radical to be negative. What extraneous solutions might occur when solving rational equations?

_____

_____

_____

Main Idea	Details

Solve Rational Equations
pp. 594–598

Solve $\frac{1}{x}+\frac{1}{x-3}=\frac{x-2}{x-3}$ by following the given steps.

Step 1: Find the LCD.

$\square$ $\frac{1}{x}+\frac{1}{x-3}=\frac{x-2}{x-3}$

_____

Step 2: Distribute the LCD.

$\square \cdot \frac{1}{x} + \square \cdot \frac{1}{x-3}$

$= \square \cdot \frac{x-2}{x-3}$

Step 3: Simplify.

Step 4: Solve for x and check for extraneous solutions.

Solve Rational Inequalities
p. 599

The equation $\frac{2}{3x}=\frac{1}{2x}+\frac{1}{24}$ has a solution of $x = 4$ and an excluded value of $x = 0$. Mark these values of x on the number line below and then test a sample value in each interval to determine the solution to the inequality $\frac{2}{3x}<\frac{1}{2x}+\frac{1}{24}$.

Sample 1 Sample 2 Sample 3

Solution

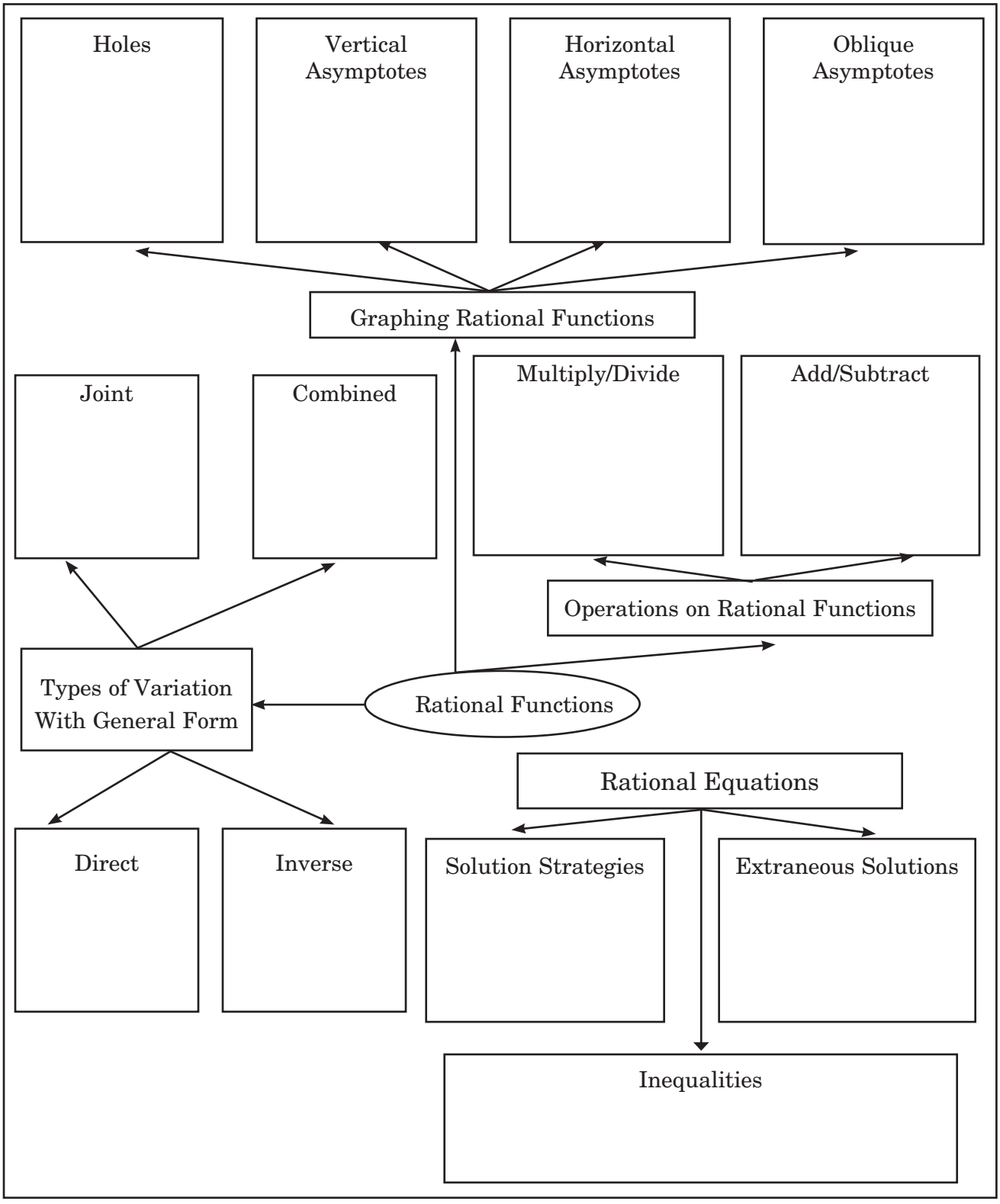
NAME _____ DATE _____ PERIOD _____

CHAPTER 9

Rational Functions and Relations

Tie It Together

Fill in the graphic organizer. Add details if space permits.



NAME _____ DATE _____ PERIOD _____

CHAPTER 9 Rational Functions and Relations

Before the Test

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column.

K What I know…	W What I want to find out…	L What I learned…

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 9.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 9 Study Guide and Review in the textbook.

☐ I took the Chapter 9 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

- Be an active listener in class. Take notes, circle or highlight information that your teacher stresses, and ask questions when ideas are unclear to you.

NAME _____ DATE _____ PERIOD _____

CHAPTER 10 Conic Sections

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Conic Sections
	• The shape of a parabola depends on the value of a in the equation.
	• An equation of a circle is $\frac{x^2}{a^2} = \frac{y^2}{b^2} = 1$.
	• A hyperbola has two axes of symmetry.
	• The equation of a vertical ellipse is $x^2 + y^2 = r^2$.
	• The cross section of a double cone will be a parabola, hyperbola, circle, or ellipse.

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **When you take notes, think about the order in which the concepts are being presented.**
  Write why you think the concepts were presented in this sequence.
- **When you take notes, preview the lesson and make generalizations about what you think you will learn.**
  Then compare that with what you actually learned after each lesson.

NAME _____ DATE _____ PERIOD _____

CHAPTER 10 Conic Sections

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on circles, one fact might be that the center of a circle is a given point in a plane that is equidistant from all points on the plane. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
10-1 Midpoint and Distance Formulas	
10-2 Parabolas	
10-3 Circles	
10-4 Ellipses	
10-5 Hyperbolas	
10-6 Identifying Conic Sections	
10-7 Solving Linear-Nonlinear Systems	

NAME _____ DATE _____ PERIOD _____

10-1 Midpoint and Distance Formulas

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

2. _____

_____

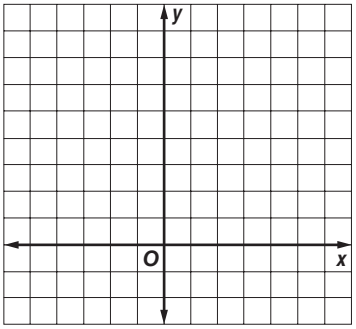
Active Vocabulary

Review Vocabulary Plot the points on the coordinate plane, then draw the triangle defined by the three points $A(-5, 8)$, $B(-5, -2)$, and $C(6, -2)$. Determine the length of the sides of the triangle. *(Lesson 2-4 and previous courses)*

Side AB: _____

Side BC: _____

Side AC:



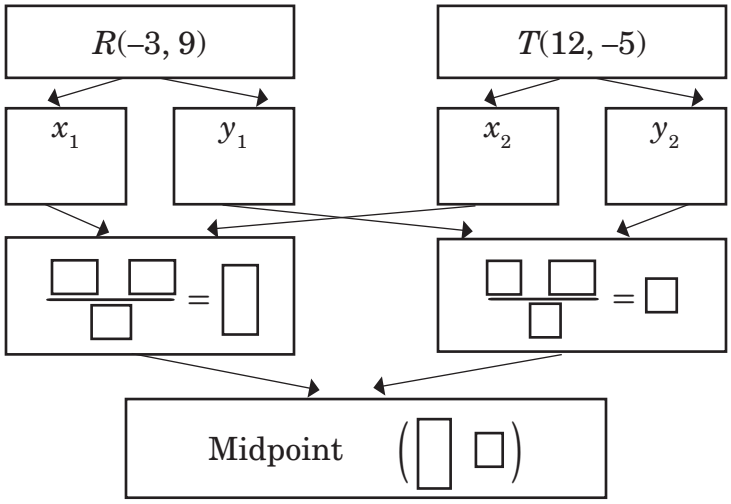
Determine the area and perimeter of the triangle.

Area	Perimeter

Determine the equations of the lines represented by segments $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$.

$\overline{AB}$	$\overline{BC}$	$\overline{AC}$

Main Idea	Details
The Midpoint Formula p. 617	**Find the coordinates of S and the midpoint of $\overline{RT}$.**



The Distance Formula
pp. 617–619

Sequence the steps for using the distance formula in the diagram below.

- Find the square root of the sum.
- Find the difference between the x-coordinates and square it.
- Find the difference between the y-coordinates and square it.
- Find the sum of the two squared distances.

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

NAME _____ DATE _____ PERIOD _____

10-2 Parabolas

What You'll Learn

Scan the text in Lesson 10-2. Write two facts you learned about parabolas as you scanned the text.

1. _____

_____

_____

2. _____

_____

_____

Active Vocabulary

New Vocabulary Write the definition next to each term.

parabola ▶ _____

_____

focus ▶ _____

_____

directrix ▶ _____

_____

latus rectum ▶ _____

_____

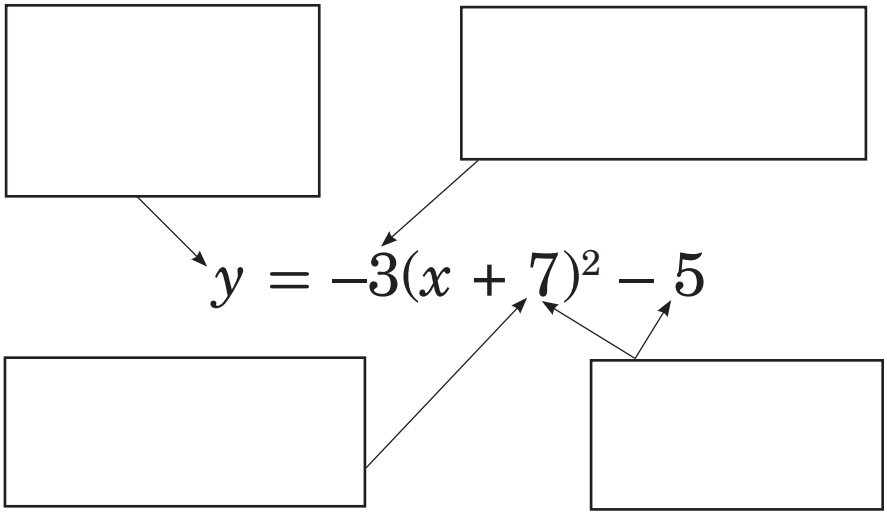
general form ▶ _____

standard form ▶ _____

_____

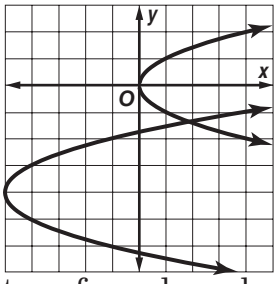
Lesson 10-2

Main Idea	Details
Equations of Parabolas pp. 623–624	**Describe the effect that each characteristic of the equation of the parabola has on its graph.**



Graph Parabolas pp. 624–626	**The graph of $x = y^2$ and of a transformation of this parent graph are shown. Write the equation of the transformed graph.**

parent graph



transformed graph

Equation of the Transformed Graph

Helping You Remember

How can you remember what the sign of a tells you about the direction in which a parabola opens?

_____

_____

NAME _____ DATE _____ PERIOD _____

10-3 Circles

What You'll Learn

Scan Lesson 10-3. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Use the distance formula to find the distance between the given pairs of points on the coordinate plane. *(Lesson 10-1)*

(1, 2) and (9, 11)	(1, 2) and (–7, –7)	(9, 11) and (–7, –7)

New Vocabulary Match the term with its definition by drawing a line to connect the two.

radius	the set of all points in a plane that are equidistant from a given point in the plane
circle	the point in the plane about which all of the points of a circle are equidistant
center	any segment whose endpoints are the center and a point on a circle

Lesson 10-3

Main Idea	Details

Equations of Circles
pp. 631–632

Write the equation of a circle that has a diameter with endpoints (–4, 9) and (6, –3).

Find the center of the circle using the midpoint formula.

Find the length of the radius using the center and an endpoint of the diameter.

Determine h, k, and r^2.

$h =$ ☐ $k =$ ☐ $r^2 =$ ☐

Write the equation of the circle.

☐ ☐ ☐

Graph Circles
p. 633

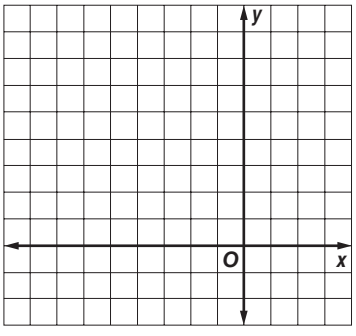
Graph the circle given by the equation $(x + 4)^2 + (y - 2)^2 = 16$.

Identify the center. _____

Identify the radius. _____

Use the center and radius to identify four points on the circle.

_____



NAME _____ DATE _____ PERIOD _____

10-4 Ellipses

What You'll Learn

Skim Lesson 10-4. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the correct term next to each definition.

_____ ▶ the endpoints of the major axis of an ellipse

_____ ▶ the set of all points in a plane such that the sum of the distances from two fixed points is constant

_____ ▶ the endpoints of the minor axis of an ellipse

_____ ▶ the midpoint of both the major axis and the minor axis of an ellipse

_____ ▶ the sum of the distances from the foci to any point on the ellipse

_____ ▶ the name given to the longer of the two axes of symmetry of an ellipse

_____ ▶ the name given to the fixed points of an ellipse such that the sum of the distances from these points is constant

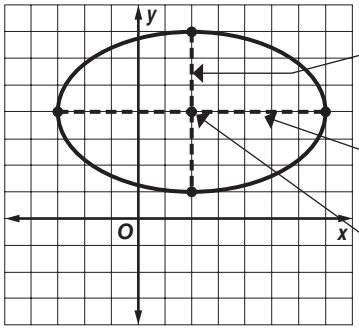
_____ ▶ the name given to the shorter of the two axes of symmetry of an ellipse

Main Idea	Details

Equations of Ellipses
pp. 639–642

Use the questions as a guide to write the equation of the ellipse shown in the graph.

Where is the center of the ellipse?	What is the length of the major axis?	What is the length of the minor axis?
$h =$ ☐ $k =$ ☐	$a^2 = \left(\frac{\square}{2}\right)^2 = 25$	$b^2 = \left(\frac{\square}{2}\right)^2 = 9$



Minor Axis

Major Axis

Center

Write the equation of the ellipse $\frac{(x - \square)^2}{\square} + \frac{(y - \square)^2}{\square} = 1$.

Graph Ellipses
pp. 642–643

Write the equation for the ellipse in standard form. Identify each characteristic of the ellipse.

$4(x-2)^2 + 9(y+3)^2 = 36$	Length of major axis:	Vertices
	Length of minor axis:	Co-vertices
	Center:	

Helping You Remember

How can you remember which term comes first and where to place a and b in the equation of an ellipse?

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

10-5 Hyperbolas

What You'll Learn

Skim the Examples for Lesson 10-5. Predict two things you think you will learn about hyperbolas.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Determine the asymptotes for the function $f(x) = \frac{x + 4}{x^2 - 10x + 9}$. *(Lesson 9-4)*

Oblique	Vertical	Horizontal

New Vocabulary Label the diagram with the terms listed at the left.

hyberbola ▶

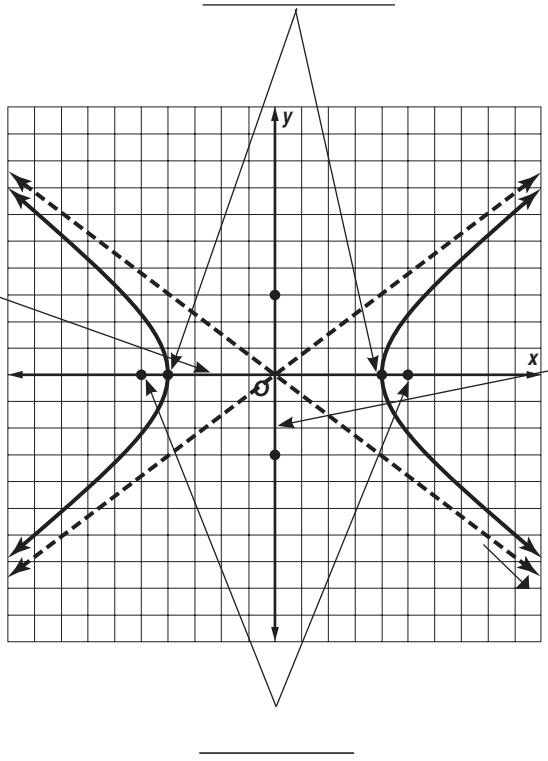
transverse axis ▶

conjugate axis ▶

foci ▶ _____ _____

vertices ▶

co-vertex ▶



_____ _____

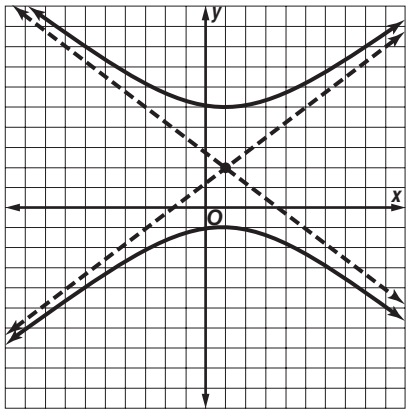
_____

Lesson 10-5

Main Idea	Details

Equations of Hyperbolas
pp. 648–649

Use the questions as a guide to write the equation of the hyperbola shown in the graph.



Where is the center of the hyperbola? (,) $h =$ $k =$	What is the distance between the vertex and the center? $a =$	What is the distance between the focus and the center? $c =$

$^2 + b^2 = ^2$, *so* $b =$

Write the equation of the hyperbola.

Graphs of Hyperbolas
pp. 650–651

Supply the missing information for

$$\frac{(y+3)^2}{9} - \frac{(x-2)^2}{25} = 1.$$

Center	Identify a, b and c.	Identify co-vertices.
Horizontal or Vertical	Identify vertices.	Identify foci.

NAME _____ DATE _____ PERIOD _____

10-6 Identifying Conic Sections

What You'll Learn

Skim the lesson. Write two things you already know about identifying conic sections.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Match each equation to its graph. *(Lessons 10-3, 10-4 and 10-5)*

1. $\frac{(y-2)^2}{25} - \frac{(x-3)^2}{16} = 1$

_____

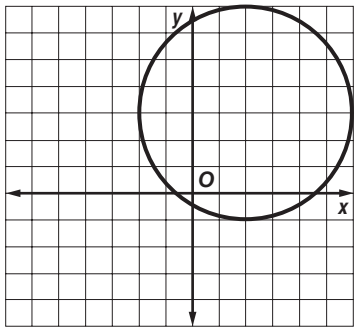
2. $\frac{(x-2)^2}{16} + \frac{(y-3)^2}{25} = 1$

_____

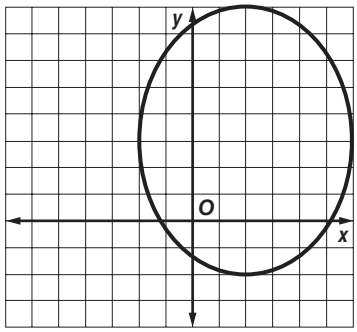
3. $(x-2)^2 + (y-3)^2 = 16$

_____

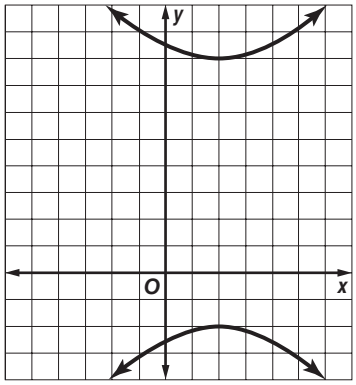
A.



B.



C.



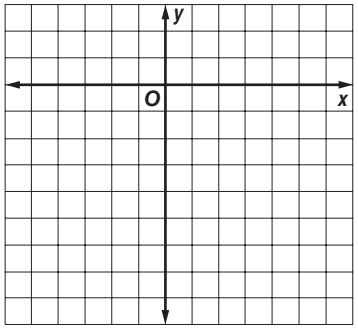
Main Idea	Details

Conics in Standard Form

p. 656

Write $x^2 - 6x + y^2 + 10y = -30$ in standard form and identify the type of conic section. Graph the conic section.

$x^2 - 6x + y^2 + 10y = -30$



Identify Conic Sections

p. 657

Complete the chart below. Include an example in each description.

Parabola

Ellipse

using the discriminate to identify a conic section

Circle

Hyperbola

NAME _____ DATE _____ PERIOD _____

10-7 Solving Linear-Nonlinear Systems

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

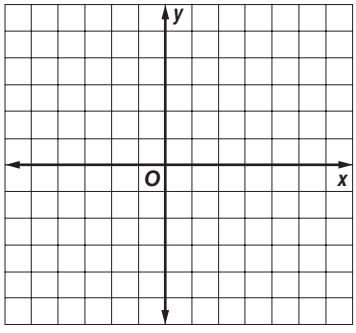
_____

2. _____

_____

Active Vocabulary

Review Vocabulary Provide an appropriate system of linear equations. *(Lessons 3-1 and 3-2)*

Show a system of linear equations that has a solution of (3, –1). Write the equations below the graph. 	Write a system of equations in standard form that is dependent. Write a system of equations in slope-intercept form that is inconsistent.

Vocabulary Link Explain how you could use a conic section and shading to show all locations on a map within a 100-mile radius of the city of Memphis, Tennessee.

_____

_____

_____

_____

Lesson 10-7

Main Idea	Details

Systems of Equations
pp. 662–663

Solve the system of equations. Fill in missing verbal and mathematical steps.

$x^2 + y^2 = 4$ $y = x - 2$	Given
	Substitute the second equation into the first.
$2x^2 - 4x = 0$ $2x(x - 2) = 0$ $x = 0, 2$	
$y = 0 - 2$ $y = -2$	
	Substitute the second value of x into the linear equation.
	Write the solutions as ordered pairs.

Systems of Inequalities
pp. 663–664

Explain what is meant by the intersection of the graphs of $x^2 + y^2 > 16$ and $y < -x^2 + 4$.

_____

_____

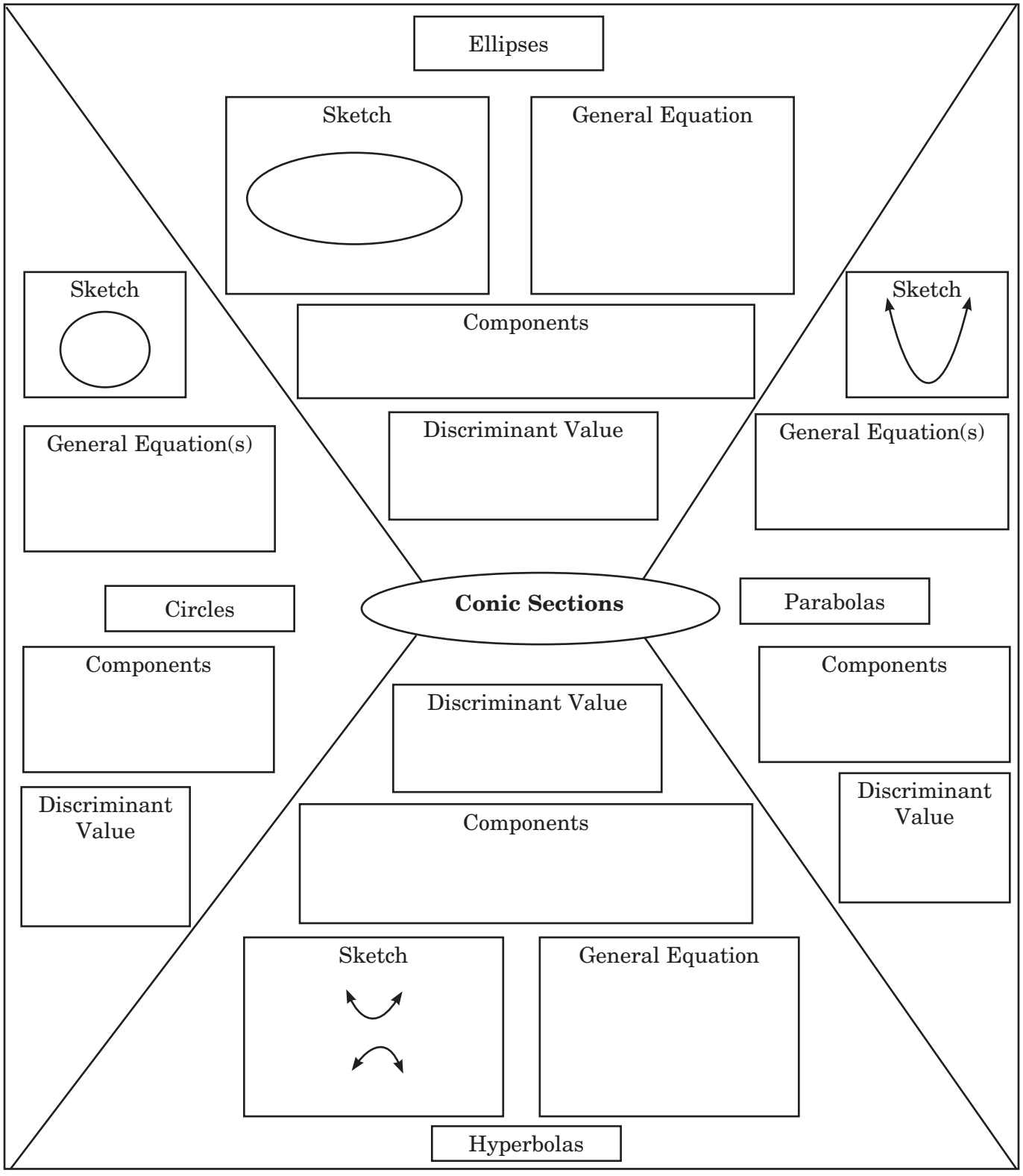
_____

NAME _____ DATE _____ PERIOD _____

CHAPTER 10 Conic Sections

Tie It Together

Fill in details in the graphic organizer.



NAME _____ DATE _____ PERIOD _____

CHAPTER 10 Conic Sections

Before the Test

Now that you have read and worked through the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Conic Sections	After You Read
• The shape of a parabola depends on the value of a in the equation.	
• An equation of a circle is $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.	
• A hyperbola has two axes of symmetry.	
• The equation of a vertical ellipse is $x^2 + y^2 = r^2$.	
• The cross section of a double cone will be a parabola, hyperbola, circle, or ellipse.	

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 10.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 10 Study Guide and Review in the textbook.

☐ I took the Chapter 10 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

Study Tips

- On handouts, homework, and workbooks that can be written in, underline and highlight significant information.

NAME _____ DATE _____ PERIOD _____

CHAPTER 11

Sequences and Series

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Sequences as Functions
	• Each term in a geometric sequence is separated by a common difference.
	• Geometric means is the terms between two nonconsecutive terms in a geometric sequence.
	• An infinite geometric series can be convergent or divergent.
	• A recursive formula for a sequence means that every term is determined by one or more previous terms.
	• The Binomial Theorem can be used to find terms of Fibonacci sequence.

FOLDABLES® Study Organizer

Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **Before each lesson, skim through the lesson and write any questions that come to mind in your notes.**
  As you work through the lesson, record the answer to your question.
- **Remember to always take notes on your own.**
  Don't use someone else's notes as they may not make sense.

NAME _____ DATE _____ PERIOD _____

CHAPTER 11

Sequences and Series

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on infinite geometric series, one fact might be that if a sequence goes to infinity, it continues without end. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
11-1 Sequences as Functions	
11-2 Arithmetic Sequences and Series	
11-3 Geometric Sequences and Series	
11-4 Infinite Geometric Series	
11-5 Recursion and Iteration	
11-6 The Binomial Theorem	
11-7 Proof by Mathematical Induction	

NAME _____ DATE _____ PERIOD _____

11-1 Sequences as Functions

What You'll Learn

Skim the lesson. Write two things you already know about sequences as functions.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Describe how the functions $y = 2x$ and $y = 2^x$ behave as $x \to \infty$. *(Lessons 2-2 and 8-1)*

_____

_____

_____

New Vocabulary Write the correct term beside each definition.

_____ ▶ a sequence which continues without end

_____ ▶ the name given to the constant value that is added to a term in an arithmetic sequence in order to find a successive term

_____ ▶ a set of numbers in a particular order or pattern

_____ ▶ a sequence in which each term is determined by multiplying a nonzero constant by the previous term

_____ ▶ the name given to each number in a sequence

_____ ▶ a sequence in which each term is determined by adding a constant value to the previous term

_____ ▶ the name given to the constant value that is multiplied by a term in an arithmetic sequence in order to find a successive term

_____ ▶ a sequence which contains a limited number of terms

Lesson 11-1

Main Idea	Details

Arithmetic Sequences
pp. 681–682

Determine the next three terms of the arithmetic sequence, graph the first seven terms of the sequence, then write the equation which represents the sequence.

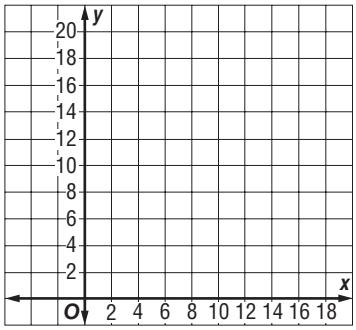
2, 5, 8, 11, . . .

Step 1: Determine the common difference.

Step 2: Use the common difference to find the next three terms.

Step 3: Write the sequence as ordered pairs.

Step 4: Write the equation of the sequence.



Geometric Sequences
pp. 683–684

Determine whether each sequence is geometric. Justify your answer.

1. 4, 8, 16, 32, …

_____

2. $-15, -5, -1, -\frac{1}{5}, -\frac{1}{15}, \ldots$

_____

NAME _____ DATE _____ PERIOD _____

11-2 Arithmetic Sequences and Series

What You'll Learn

Skim Lesson 11-2. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

_____

2. _____

_____

_____

Lesson 11-2

Active Vocabulary

New Vocabulary Write the definition next to each term.

arithmetic means ▶ _____

_____

series ▶ _____

_____

arithmetic series ▶ _____

_____

partial sum ▶ _____

_____

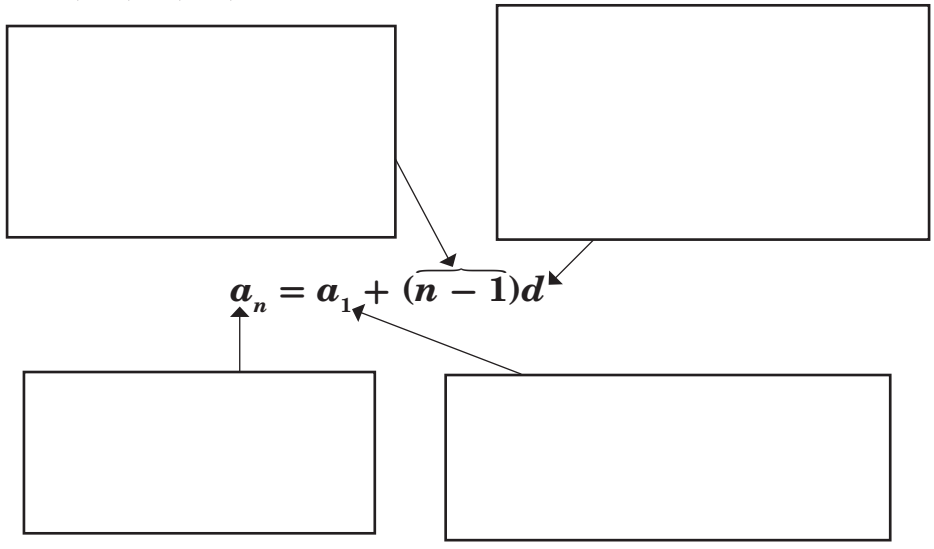
sigma notation ▶ _____

_____

Main Idea	Details

Arithmetic Sequences
pp. 688–689

Provide a description and details for each part of the *n*th term formula for an arithmetic sequence given that you want to find the 13th term of the sequence 18, 23, 28, 33, . . .



Arithmetic Series
pp. 690-691

Answer each question about the sigma notation shown.

$$\sum_{x=2}^{7} 3x + 1$$

1. What is the first value of x? _____

2. What is the last value of x? _____

3. How many terms will be summed? _____

4. What are the terms in the series?

_____

5. What is the sum of the series? _____

NAME _____ DATE _____ PERIOD _____

11-3 Geometric Sequences and Series

What You'll Learn

Scan the text in Lesson 11-3. Write two facts you learned about geometric sequences and series as you scanned the text.

1. _____

_____

_____

2. _____

_____

_____

Active Vocabulary

Review Vocabulary Identify each sequence as arithmetic, geometric, or neither. Explain your reasoning. *(Lesson 11-1)*

14, 11, 8, 5, 2, . . .	1, 4, 9, 16, 25, . . .	$\frac{1}{4}, \frac{3}{16}, \frac{9}{64}, \frac{27}{256}, \ldots$

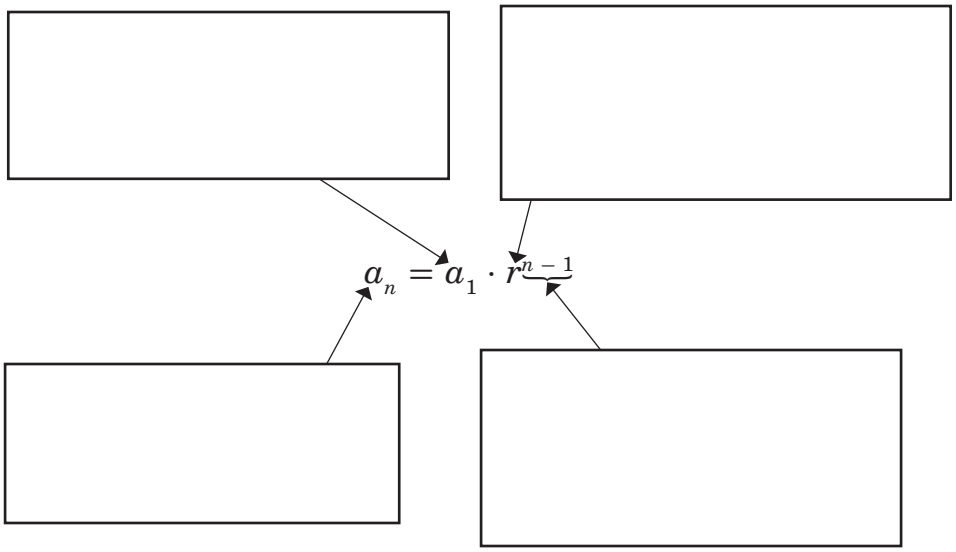
New Vocabulary Fill in each blank with the correct term or phrase.

geometric means ▶ the terms between two _____ terms in a _____ sequence; To find them, you need to know the _____ ratio, r. They are closely related to the _____ _____ of an arithmetic sequence.

geometric series ▶ the sum of the _____ of a geometric _____

Lesson 11-3

Main Idea	Details
Geometric Sequences pp. 696–697	**Provide a description and details for each part of the *n*th term formula for an arithmetic sequence given that you want to find the 10th term of the sequence 3, 9, 27, 81, ...**



Geometric Series p. 698–99	**Use the formula to find the sum of the geometric series given.**

$a_1 = 12$, $r = 2$, and $n = 5$

$$S_n = \frac{a_1 - a_1 r^n}{1 - r}$$

$$S_{\square} = \frac{\square - \square \cdot \square^{\square}}{1 - \square}$$

$$S_{\square} = \frac{\square - \square \cdot \square}{\square}$$

$$S_{\square} = \frac{\square - \square}{\square} = \square$$

Helping You Remember

Ri thinks that the formula $a_n = a_1 \cdot r^{n-1}$ should be $a_n = a_1 \cdot r^n$. How would you explain to him that he should use r^{n-1} rather than r^n in the formula?

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

11-4 Infinite Geometric Series

What You'll Learn

Skim the Examples for Lesson 11-4. Predict two things you think you will learn about infinite geometric series.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Describe the end behavior of the functions $f(x) = 2^x$ and $g(x) = 2^{-x}$ as $x \to \infty$. *(Lesson 6-4)*

$f(x) = 2^x$	$g(x) = 2^{-x}$

New Vocabulary Match the term with its definition by drawing a line to connect the two.

convergent series	an infinite geometric series that does not have a sum
divergent series	continuing without end
infinity	an infinite geometric series that has a sum

Vocabulary Link Look up the words *diverge* and *converge* in the dictionary. Use both words along with the words *road*, *train tracks*, *and crossed* in a sentence.

_____

_____

_____

_____

Lesson 11-4

Main Idea	Details

Infinite Geometric Series
pp. 705–707

Answer the questions pertaining to the sigma notation shown below.

$$\sum_{k=1}^{\infty} 12\left(\frac{1}{2}\right)^{k-1}$$

1. Is this a convergent or divergent series? How can you tell?

   _____

2. Is this an infinite or finite geometric series? How can you tell?

   _____

3. What is the first term of this series? _____

4. What is the common ratio? _____

5. What formula do you use to find the sum of an infinite series? _____

6. What is the sum? _____

Repeating Decimals
p. 707

Write the repeating decimal $0.\overline{38}$ as a fraction.

Step 1: Write as an infinite series of decimals.

_____

Step 2: Write as an infinite series of fractions.

_____

Step 3: Determine the value of r.

_____

Step 4: Use the sum formula.

_____

NAME _____ DATE _____ PERIOD _____

11-5 Recursion and Iteration

What You'll Learn

Scan lesson 11-5. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Find the value of each composition given $f(x) = x - 4$ and $g(x) = 2x^2 + 1$. *(Lesson 7-1)*

$f(g(2))$	$g(f(2))$	$g(f(g(3)))$

New Vocabulary Write the definition next to each term.

Fibonacci sequence ▶ _____

_____

recursive sequence ▶ _____

_____

explicit formula ▶ _____

_____

recursive formula ▶ _____

_____

iteration ▶ _____

_____

Main Idea	Details

Special Sequences
pp. 714–716

Provide details to explain how you would execute each step for writing a recursive formula for a given sequence.

Step	Details
Determine if the sequence is arithmetic or geometric. Determine the common ratio/difference.	
Select the appropriate formula.	
Substitute into the appropriate formula.	
Done	

Iteration
p. 716

Fill in each box to find the first three iterates x_1, x_2, and x_3 of $f(x) = 4x - 1$ for an initial value of $x_0 = -2$.

$x_1 = f(\square) = 4 \cdot \square - 1 = \square$

$x_2 = f(\square) = 4 \cdot \square - 1 = \square$

$x_3 = f(\square) = 4 \cdot \square - 1 = \square$

NAME _____ DATE _____ PERIOD _____

11-6 The Binomial Theorem

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

2. _____

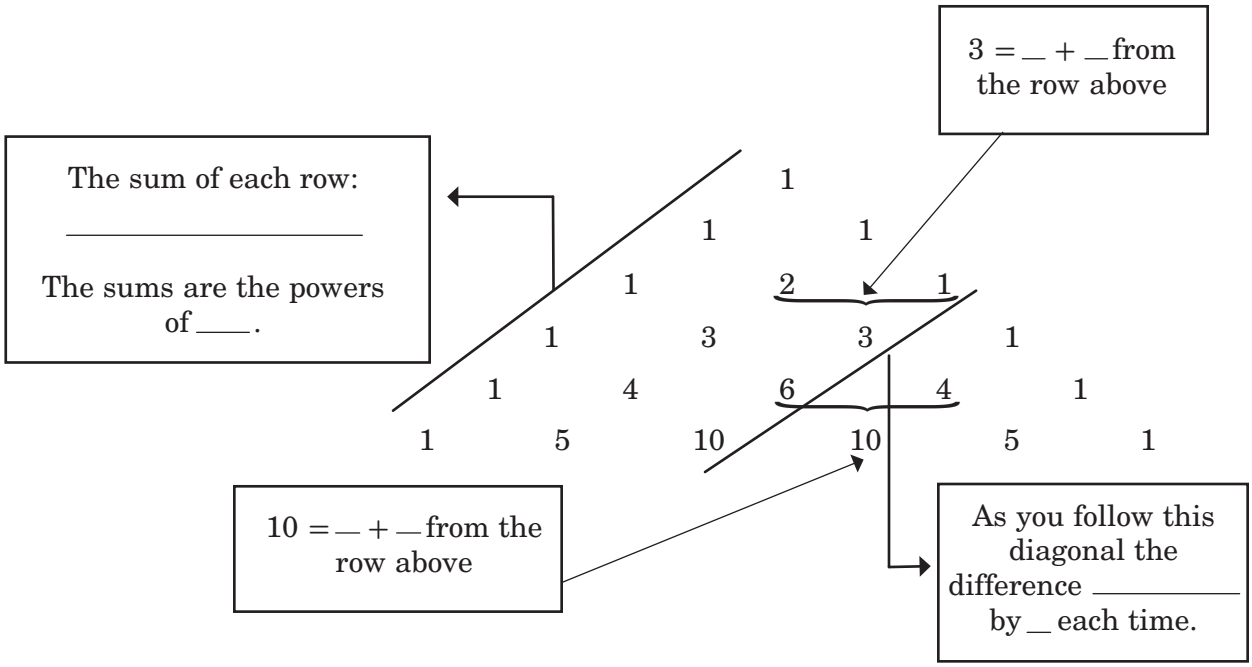
_____

Active Vocabulary

Review Vocabulary Expand the polynomial expressions $(2x + 1)^2$ and $(2x + 1)^4$. *(Lesson 6-1)*

$(2x + 1)^2$	$(2x + 1)^4$

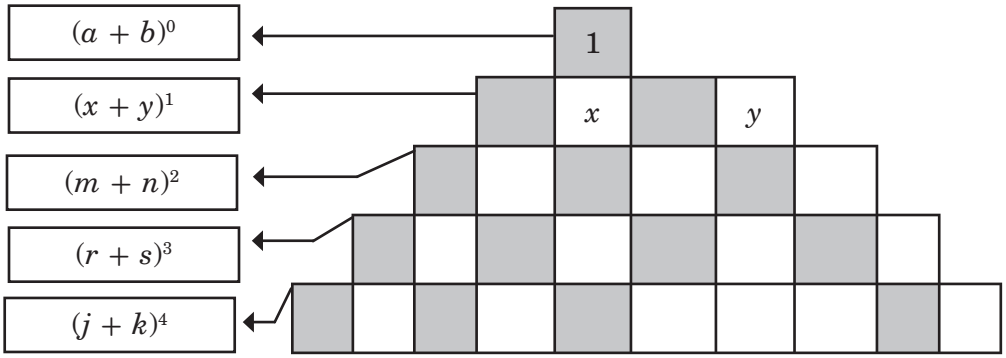
New Vocabulary Label the diagram by indicating the pattern observed in Pascal's triangle.



Main Idea	Details

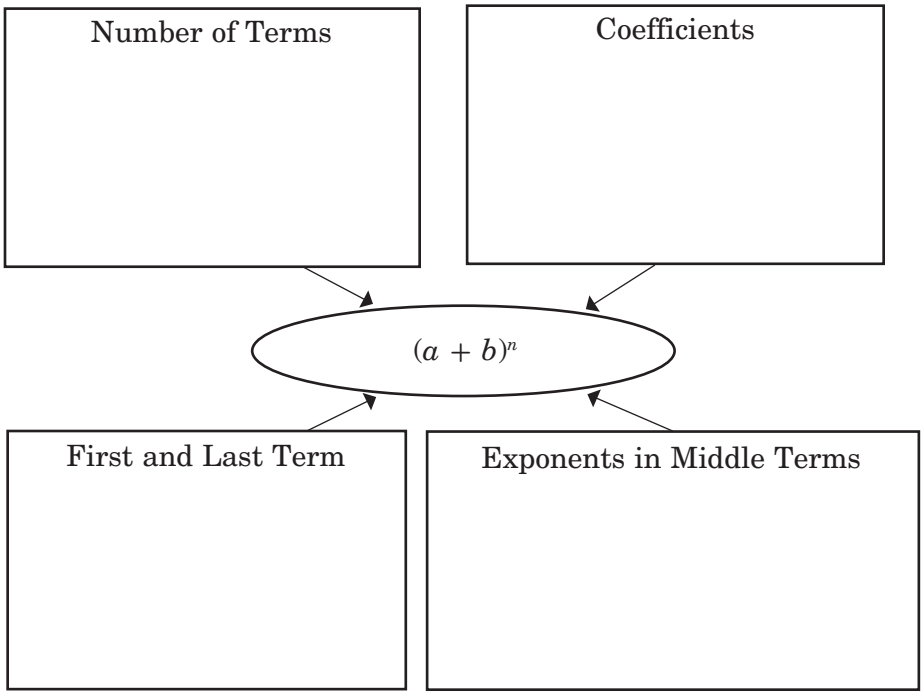
Pascal's Triangle
p. 721

Write out Pascal's Triangle in the shaded boxes. Use the non–shaded boxes to expand the binomial written to the left of the row.



The Binomial Theorem
pp. 721–723

Summarize in your own words the characteristics of binomial expansions in the diagram below.



NAME _____ DATE _____ PERIOD _____

11-7 Proof by Mathematical Induction

What You'll Learn

Scan Lesson 11-7. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Describe the main method of proof that you used in Geometry. What were the main components of the proofs? *(Geometry prerequisite skill)*

_____

_____

_____

_____

_____

New Vocabulary Fill in each blank with the correct term or phrase.

mathematical induction ▶ a method of _____ statements that involve _____ numbers; Step 1 is to "Show that the statement is _____ for $n = 1$." Step 2 is to "Assume that the statement is true for some _____ number _____." Step 3 is to "Show that the statement is true for _____."

induction hypothesis ▶ the step in mathematical _____ in which you _____ the statement to be _____ for some natural _____ k

Lesson 11-7

Main Idea	Details

Mathematical Induction
pp. 727–728

Complete the proof below.

Prove $1 + 2 + \ldots + n = \frac{n(n+1)}{2}$.	Given
	Show that the statement is true for $n = 1$.
$1 + 2 + 3 + \ldots + k = \frac{k(k+1)}{2}$	
	Show that the given statement is true for $n = k + 1$.

Counterexamples
p. 728

Check the statement $1 + 4 + 9 + \ldots + n^2 = \frac{n(n^2+1)}{2}$ for the values $n = 1$, $n = 2$ and $n = 3$. Determine whether each is an example or a counterexample of the statement.

$n = 1$	$n = 2$	$n = 3$

NAME _____ DATE _____ PERIOD _____

CHAPTER 11

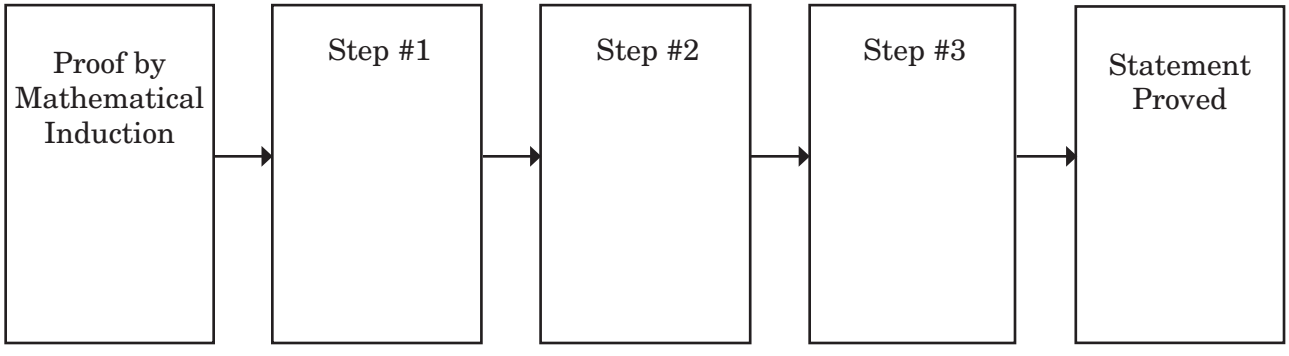
Sequences and Series

Tie It Together

Fill in details in each graphic organizer.

	Arithmetic	Geometric
Verbal Description		
Name Given to Constant Value		
Shape of Graph		
Formula for Finding nth term of a Sequence		
Formulas for Partial Sum of Series		
Formula for Sum of an Infinite Series		
Recursive Formulas for Sequences		

Binomial Theorem



NAME _____ DATE _____ PERIOD _____

CHAPTER 11 Sequences and Series

Before the Test

Now that you have read and worked through the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Sequences and Series	After You Read
• Each term in a geometric sequence is separated by a common difference.	
• Geometric means is the terms between two nonconsecutive terms in a geometric sequence.	
• An infinite geometric series can be convergent or divergent.	
• A recursive formula for a sequence means that every term is determined by one or more previous terms.	
• The Binomial Theorem can be used to find terms of Fibonacci sequence.	

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 11.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 11 Study Guide and Review in the textbook.

☐ I took the Chapter 11 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

- Use flash cards to study for tests by writing the concept on one side of the card and its definition on the other.

NAME _____ DATE _____ PERIOD _____

CHAPTER 12

Probability and Statistics

Before You Read

Before you read the chapter, think about what you know about probability and statistics. List three things you already know about probability and statistics in the first column. Then list three things you would like to learn about them in the second column.

K What I know…	W What I want to find out…

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **When you take notes, include personal experiences that relate to the lesson and ways in which what you have learned will be used in your daily life.**
- **When you take notes, write questions you have about the lessons in the margin of your notes.**

  Then include the answers to these questions as you work through the lesson.

NAME _____ DATE _____ PERIOD _____

CHAPTER 12

Probability and Statistics

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on conditional probability, one fact might be that a contingency table records data in which different possible situations result in different possible outcomes. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
12-1 Experiments, Surveys, and Observational Studies	
12-2 Statistical Analysis	
12-3 Conditional Probability	
12-4 Probability and Probability Distributions	
12-5 The Normal Distribution	
12-6 Hypothesis Testing	
12-7 Binomial Distributions	

NAME _____ DATE _____ PERIOD _____

12-1 Experiments, Surveys and Observational Studies

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

_____

2. _____

_____

_____

Active Vocabulary

New Vocabulary Write the correct term beside each definition.

_____ ▶ a survey whose design favors certain outcomes

_____ ▶ in an experiment, the people, animals or objects given the treatment

_____ ▶ a survey in which every member of a population is polled

_____ ▶ a study in which individuals are observed and no attempt is made to influence the results

_____ ▶ a group of people, animals, or objects being studied

_____ ▶ when two events are shown to be related

_____ ▶ when a sample is random and not based on any predetermined characteristics of the population

_____ ▶ a study in which something is intentionally done to people, animals, or objects and then the response is observed

_____ ▶ when one event is shown to be the direct cause of another event

_____ ▶ those given the placebo or false treatment in a study

_____ ▶ a portion of a population

_____ ▶ an instrument used to collect information

Main Idea	Details

Surveys, Studies, and Experiments

pp. 745–747

For each survey listed, provide a description of the population, a biased sample, and an unbiased sample.

Survey Purpose	Population	Biased Sample	Unbiased Sample
to determine if a levy for a school district is likely to pass or fail			
to determine the average number of minutes of television children at a preschool watch each day			

Distinguish Between Correlation and Causation

p. 747

Compare and contrast the terms correlation and causation.

Similarities	Differences

NAME _____ DATE _____ PERIOD _____

12-2 Statistical Analysis

What You'll Learn

Skim the Examples for Lesson 12-2. Predict two things you think you will learn about statistical analysis.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the definition next to each term.

univariate data ▶ _____

_____

measure of central tendency ▶ _____

_____

parameter ▶ _____

_____

statistic ▶ _____

_____

margin of sampling error ▶ _____

_____

measure of variation ▶ _____

_____

variance / standard deviation ▶ _____

_____

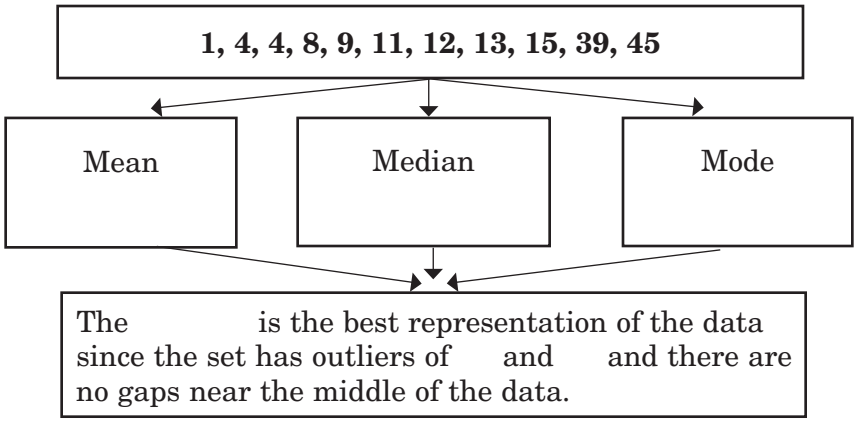
_____

Lesson 12-2

Main Idea	Details

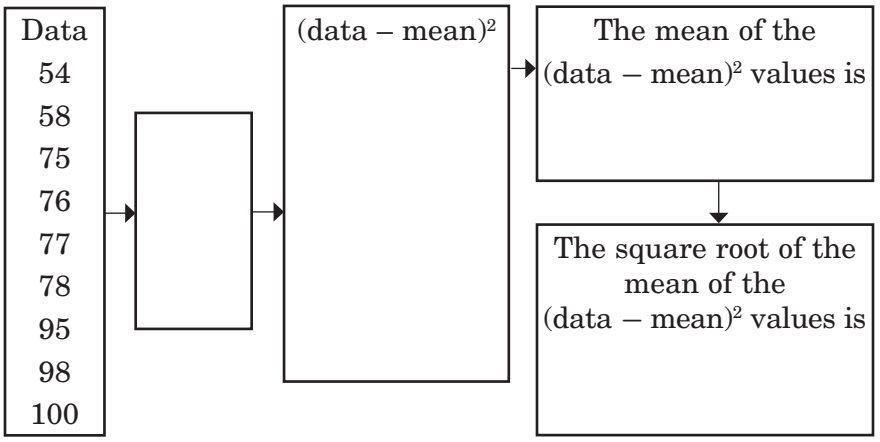
Measures of Central Tendency
pp. 752–753

Determine the mean, median, and mode of the set of data given. Determine which measure best represents the center of the data. Explain your reasoning.



Measures of Variation
pp. 754–755

Determine the standard deviation of the set of data given by completing each step in the diagram.



Helping You Remember

It is easier to remember a complicated procedure if you break it down into steps. Write the procedure for finding the standard deviation for a set of data in a series of brief, numbered steps.

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

12-3 Conditional Probability

What You'll Learn

Scan Lesson 12-3. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

Review Vocabulary Solve the probability problem. *(Lesson P-4)*

A bag contains 16 marbles. Four of the marbles are blue and 12 of the marbles are green. Two marbles are randomly pulled from the bag. What is the probability that both marbles are blue?

Compound Probability

New Vocabulary Fill in each blank with the correct term or phrase.

conditional probability ▶ the _____ of an _____ given that another event has already _____

contingency table ▶ a table used to record _____ in which different _____ situations result in _____ possible _____

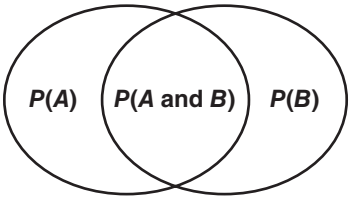
relative frequency ▶ values in a contingency _____ associated with each of the possible _____

Lesson 12-3

Main Idea	Details

Conditional Probability
p. 759

Define $P(B|A)$ in terms of the geometric areas shown in the Venn diagram.



$$P(B|A) = \frac{\text{area of } \square}{\text{area of } \square}$$

Contingency Tables
p. 759

Fill in the diagram to find the probability that a subject in the survey bought popcorn, given that the gender was female.

A survey at a ballpark shows this selection of snacks purchased.

	Snack		
Gender	Hot Dog	Popcorn	Peanuts
Male	12	21	19
Female	13	8	25

the number of females who bought popcorn

the total number of females

the total number of people in the survey

$$\frac{\square}{\square} = \frac{\square}{\square} \div \frac{\square}{\square} = \frac{\square}{\square}$$

Helping You Remember

A classmate is having trouble remembering the formula to use for conditional probability. What advice can you give to aid their memory?

NAME _____ DATE _____ PERIOD _____

12-4 Probability and Probability Distributions

What You'll Learn

Skim the lesson. Write two things you already know about probability and probability distributions.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the correct term next to each definition.

_____ ▶ a desired outcome

_____ ▶ a probability distribution which has a finite number of possible outcomes

_____ ▶ a function that maps the sample space to its probabilities

_____ ▶ any outcome that is not a success

_____ ▶ a distribution in which all of the probabilities are equal

_____ ▶ a graph or table which visually represents a probability distribution

_____ ▶ a ratio which measures the chances of an event occurring

_____ ▶ the set of all possible outcomes

_____ ▶ the weighted average of the values in a probability distribution

_____ ▶ probabilities that are based on assumptions of what is expected to happen

Main Idea	Details

Probability
pp. 764–766

Solve the probability problems below.
A box contains 24 transistors, 4 of which are defective. If 4 transistors are sold at random, find the following probabilities.

P(exactly 2 are defective)	P(none are defective)
P(all are defective)	P(at least 1 is defective)

Probability Distributions
pp. 766–767

Use the probability distribution to determine the expected number of deliveries per day.

Number of Arrangements	6	7	8	9	10
Probability	0.2	0.2	0.3	0.2	0.1

$E(x) = \square \cdot (\square) + \square \cdot (\square) + \square \cdot (\square) + \square \cdot (\square) + \square \cdot (\square)$

$E(x) = \square + \square + \square + \square + \square$

$E(x) = \square$

Helping You Remember

Recognizing a counterexample can help reinforce your understanding of a concept. Explain why recording the number of inches of rain each day would not be considered a discrete probability distribution.

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

12-5 The Normal Distribution

What You'll Learn

Scan the text in Lesson 12-5. Write two facts you learned about the normal distribution as you scanned the text.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Label each diagram with all terms listed at the left that apply.

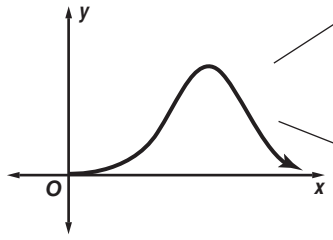
continuous probability distribution ▶

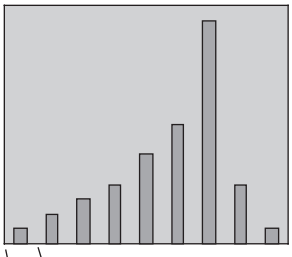
normal distribution ▶

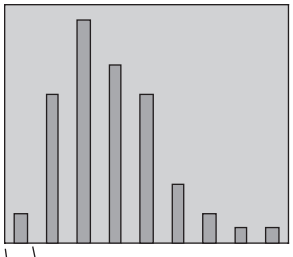
skewed distribution ▶

positively skewed distribution ▶

negatively skewed distribution ▶







_____

_____

_____

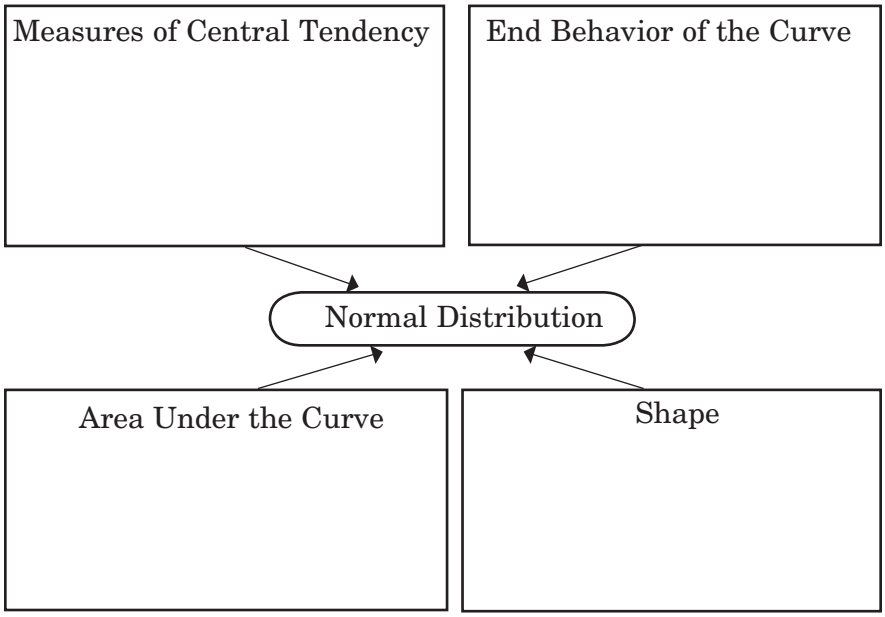
_____

Lesson 12-5

Main Idea	Details

Normal and Skewed Distributions
pp. 773–774

Describe the characteristics of a normal distribution in your own words.



The Empirical Rule
pp. 774–775

The amount of weekly allowance of 1500 high school juniors is normally distributed with a mean of $30 and a standard deviation of $6. About how many students receive an allowance greater than $42 per week?

How many standard deviations above the mean is $42?	What percentage of students can be found in this area of the curve?	What is the number of students in this area of the curve?

Helping You Remember

Many students have trouble remembering how to determine if a curve represents a distribution that is positively skewed or negatively skewed. What is an easy way to remember this?

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

12-6 Hypothesis Testing

What You'll Learn

Skim Lesson 12-6. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the definition next to each term.

inferential statistics ▶ _____

_____

_____

statistical inference ▶ _____

_____

confidence interval ▶ _____

_____

_____

hypothesis ▶ _____

_____

null hypothesis ▶ _____

_____

alternative hypothesis ▶ _____

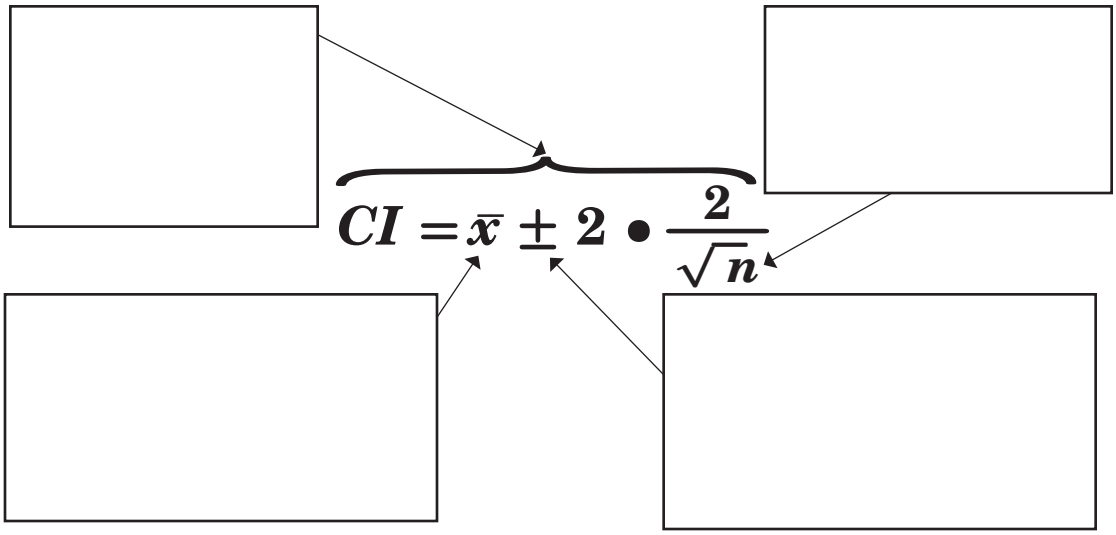
_____

Lesson 12-6

Main Idea	Details

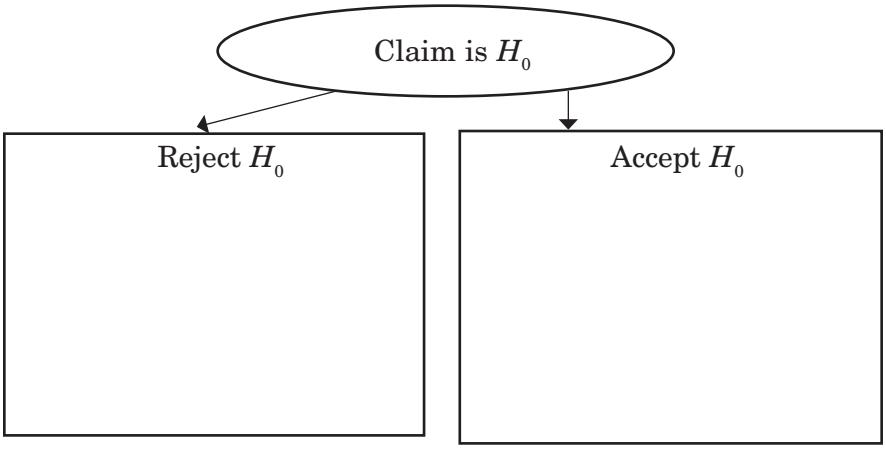
Confidence Interval
p. 780

Describe each identified part of the confidence interval formula below.



Hypothesis Testing
p. 781

Summarize the two possible outcomes of hypothesis testing.



Helping You Remember

It is easier to remember a complicated procedure if you break it down into steps. Write the procedure for hypothesis testing in a series of brief, numbered steps.

_____

_____

NAME _____ DATE _____ PERIOD _____

12-7 Binomial Distributions

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

_____

2. _____

_____

_____

Active Vocabulary

Review Vocabulary Compare and contrast a continuous probability distribution and a discrete probability distribution. *(Lessons 12-4 and 12-5)*

_____

_____

_____

_____

_____

_____

_____

New Vocabulary Match the term with its definition by drawing a line to connect the two.

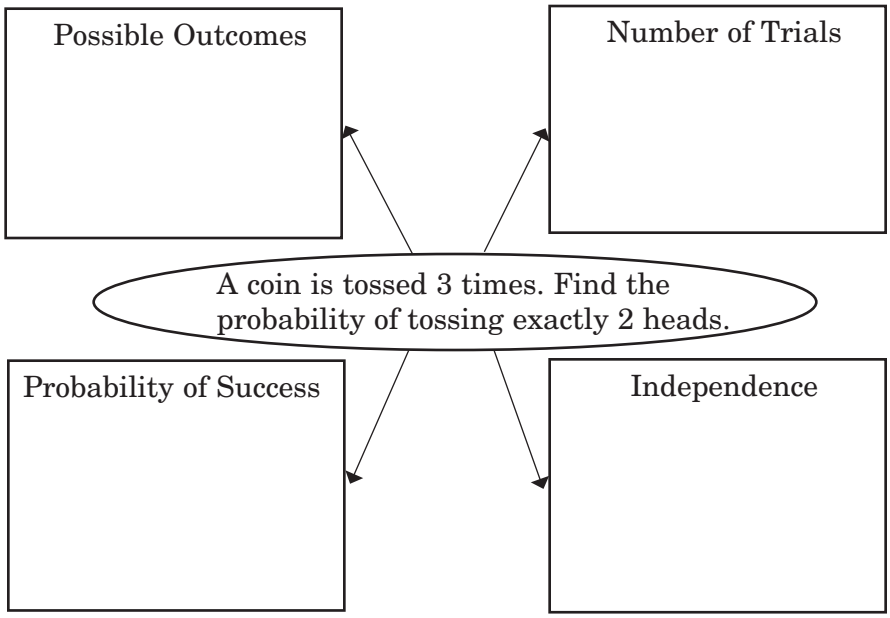
binomial experiment	estimated from observed simulations or experiments
experimental probability	a graph or table which shows the probabilities of the outcomes of a binomial experiment
binomial distribution	a random experiment with an outcome that is one of two simple events

Lesson 12-7

Main Idea	Details

Binomial Experiments
pp. 786–787

Justify why the described experiment is a binomial experiment based on the listed characteristics.



Binomial Distribution
pp. 787–789

Len randomly guesses the answers to all 6 multiple-choice questions on a test. Each question has 5 choices. Fill in the formula used to determine the probability that he will get at least 4 of the answers correct.

$$ {}_6C_4\left(\frac{\square}{\square}\right)^{\square}\left(\frac{\square}{\square}\right)^{\square} + {}_6C_5\left(\frac{\square}{\square}\right)^{\square}\left(\frac{\square}{\square}\right)^{\square} + {}_6C_6\left(\frac{\square}{\square}\right)^{\square}\left(\frac{\square}{\square}\right)^{\square} $$

Helping You Remember

Some students have trouble remembering how to calculate binomial probabilities. What is an easy way to remember which numbers to put into an expression like ${}_6C_4\left(\frac{1}{5}\right)^4\left(\frac{4}{5}\right)^2$?

_____

_____

_____

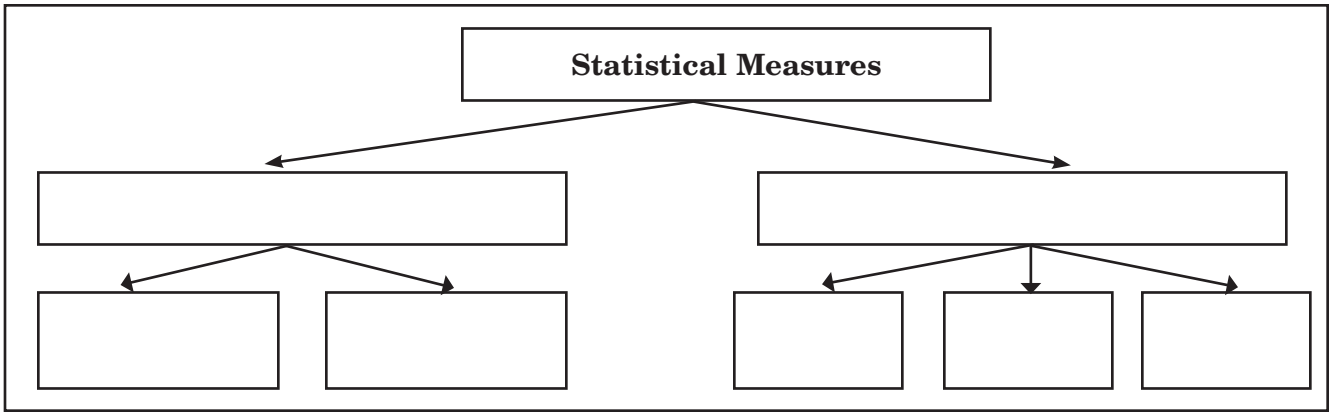
NAME _____ DATE _____ PERIOD _____

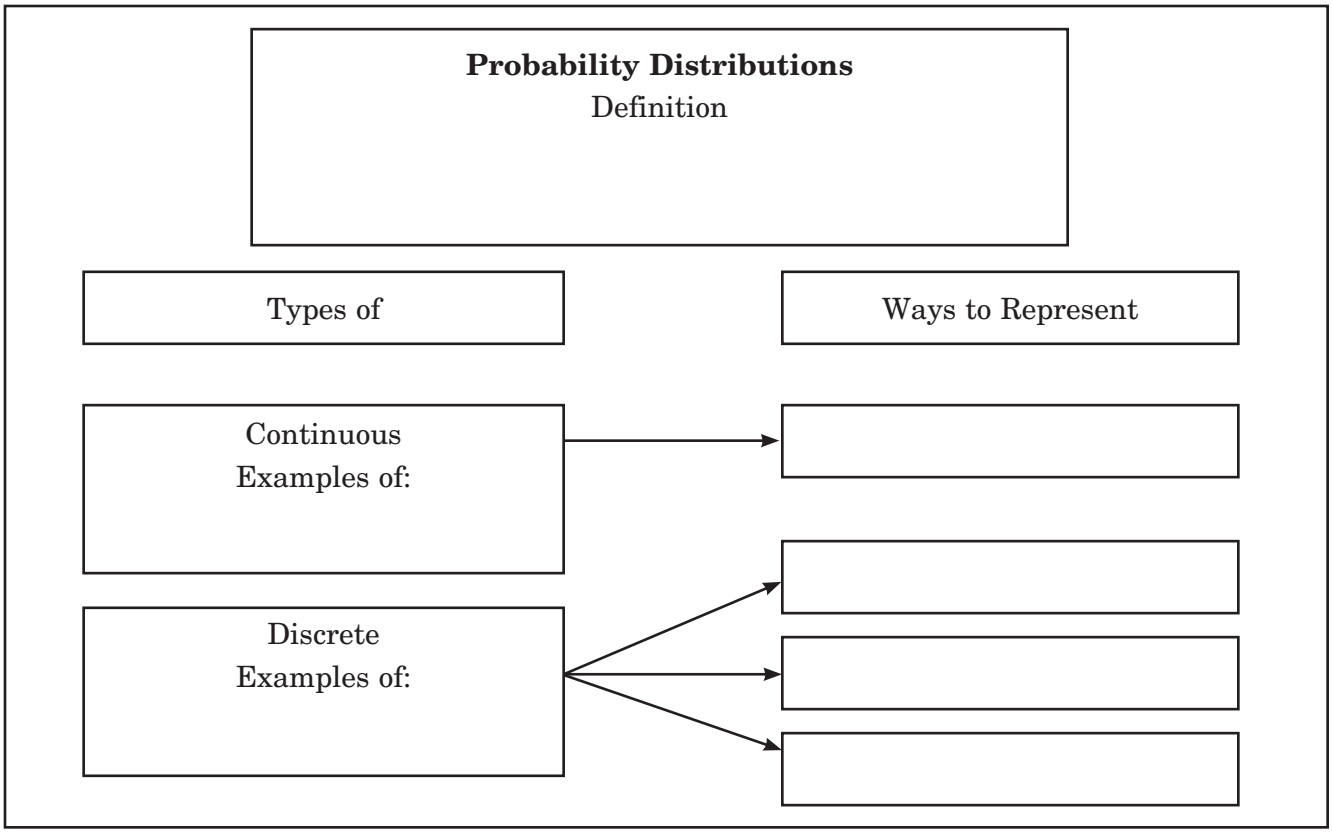
CHAPTER 12

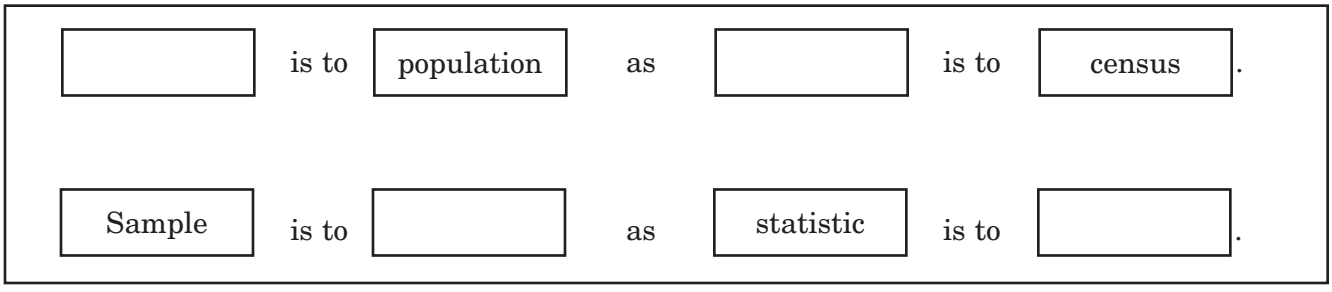
Probability and Statistics

Tie It Together

Fill in each graphic organizer. Add details if space permits.







NAME _____ DATE _____ PERIOD _____

CHAPTER 12

Probability and Statistics

Before the Test

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column.

K What I know…	W What I want to find out…	L What I learned…

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 12.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 12 Study Guide and Review in the textbook.

☐ I took the Chapter 12 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

- Designate a place to study at home that is free of clutter and distraction. Try to study at about the same time each afternoon or evening so that it is part of your routine.

NAME _____ DATE _____ PERIOD _____

CHAPTER 13 Trigonometric Functions

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Trigonometric Functions
	• A trigonometric ratio can be used to compared the sides of any triangle.
	• 2π radians $= 360^\circ$
	• The Law of Cosines can be used to solve a triangle.
	• A periodic function has x-values that repeat at regular intervals.
	• A horizontal translation of a periodic function is a phase shift.

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **When you take notes, look for written real-world examples in your everyday life.**

  Comment on how writers use statistics to prove or disprove points of view and discuss the ethical responsibilities writers have when using statistics.

- **When you take notes, include visuals.**

  Clearly label the visuals and write captions when needed.

NAME _____ DATE _____ PERIOD _____

CHAPTER 13

Trigonometric Functions

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on circular functions, one fact might be that a unit circle is a circle with a radius of 1 unit centered at the origin on the coordinate plane. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
13-1 Trigonometric Functions in Right Triangles	
13-2 Angles and Angle Measure	
13-3 Trigonometric Functions of General Angles	
13-4 Law of Sines	
13-5 Law of Cosines	
13-6 Circular Functions	
13-7 Graphing Trigonometric Functions	
13-8 Translations of Trigonometric Graphs	
13-9 Inverse Trigonometric Functions	

NAME _____ DATE _____ PERIOD _____

13-1 Trigonometric Functions in Right Triangles

What You'll Learn

Skim the lesson. Write two things you already know about trigonometric functions in right triangles.

1. _____

_____

_____

_____

2. _____

_____

_____

_____

Active Vocabulary

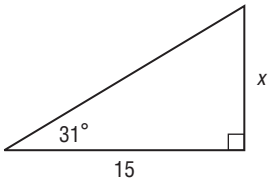
New Vocabulary Fill in each blank with the correct term or phrase.

reciprocal functions ▶ The cosecant, secant, and cotangent ratios are reciprocals of the _____, _____, and _____ ratios, respectively. These are called the reciprocal functions.

trigonometric function ▶ A trigonometric function has a rule given by a trigonometric _____.

trigonometric ratio ▶ A trigonometric ratio compares the _____ lengths of a _____ triangle.

trigonometry ▶ Trigonometry is the study of relationships among the _____ and _____ of a right triangle.

Main Idea	Details
Trigonometric Function for Acute Angles pp. 808–809	**Suppose θ is the measure of an acute angle of a right triangle. Complete each trigonometric ratio by labeling the appropriate sides: *opp*, *adj*, or *hyp*.** $\sin\theta =$ _____ $\csc\theta =$ _____ $\cos\theta =$ _____ $\sec\theta =$ _____ $\tan\theta =$ _____ $\cot\theta =$ _____
Use Trigonometric Functions pp. 810–812	**Use a trigonometric function to find the value of x. Round to the nearest whole number.** _____ 

Helping You Remember

In studying trigonometry, it is important for you to know the relationships between the lengths of the sides of a 30º-60º-90º triangle. If you remember just one fact about this triangle, you will always be able to figure out the lengths of all the sides. What fact can you use, and why is it enough?

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

13-2 Angles and Angle Measure

What You'll Learn

Skim Lesson 13-2. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

_____

_____

2. _____

_____

_____

_____

Lesson 13-2

Active Vocabulary

New Vocabulary Write the correct term next to each definition.

_____ ▶ two or more angles in standard position with the same terminal side

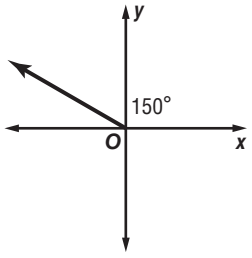
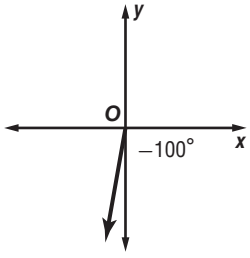
_____ ▶ the position of an angle if the vertex is at the origin and one ray is on the positive x-axis

_____ ▶ the measure of an angle in standard position with a terminal side that intercepts an arc with the same length as the radius of the circle

_____ ▶ the ray on the x-axis of an angle in standard position

_____ ▶ the ray that rotates about the center of an angle in standard position

_____ ▶ an angle that has its vertex at the center of the circle

Main Idea	Details
Angles in Standard Position pp. 817–818	**Model a positive angle and a negative angle by sketching them on the coordinate grids below. Include the angle measures.**  
Convert Between Degrees and Radians pp. 819–820	**Rewrite the degree measure in radians and the radian measure in degrees.** **1.** 50° **2.** $\frac{3\pi}{4}$ _____ _____

Helping You Remember

A good way to help you remember a mathematical concept is to connect it to something you already know. How can you use what you know about the circumference of a circle to remember how to convert between radian and degree measure?

_____

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

13-3 Trigonometric Functions of General Angles

What You'll Learn

Scan Lesson 13-3. List two headings you would use to make an outline of this lesson.

1. _____

_____

2. _____

_____

Active Vocabulary

New Vocabulary Write the definition next to each term.

quadrantal angle ▶ _____

_____

_____

reference angle ▶ _____

_____

_____

Vocabulary Link Recall the meaning of the word *quadrant*. Explain how this meaning makes sense in the context of a quadrantal angle.

_____

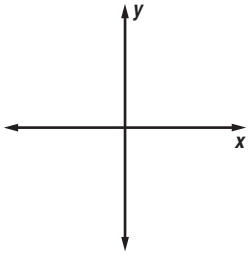
_____

_____

_____

_____

Lesson 13-3

Main Idea	Details
Trigonometric Functions of General Angles pp. 825–826	**The terminal side of θ in standard position contains the point at (–4, 0). Find the values of the six trigonometric functions of θ.** $\sin\theta =$ _____ $\csc\theta =$ _____ $\cos\theta =$ _____ $\sec\theta =$ _____ $\tan\theta =$ _____ $\cot\theta =$ _____
Trigonometric Functions with Reference Angles pp. 826–828	**The Key Concept chart on page 827 of the student book summarizes the signs of the six trigonometric functions in the four quadrants. Write the names of the trigonometric functions in each quadrant where they are positive.** 

Helping You Remember

A good way to remember a new concept is to explain it in your own words. Explain how to find the reference angles for an angle in standard position depending on which quadrant its terminal side lies in.

_____

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

13-4 Law of Sines

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

_____

2. _____

_____

_____

Active Vocabulary

Review Vocabulary Write the definition next to each term. *(Lesson 13-1)*

trigonometric ratio ▶ _____

_____

trigonometry ▶ _____

_____

New Vocabulary Fill in each blank with the correct term or phrase.

Law of Sines ▶ The Law of Sines shows the relationships between the _____ of a triangle and the sines of the angles _____ them.

solving a triangle ▶ Using given measures to find all unknown side lengths and _____ of a triangle is called solving a triangle.

Main Idea	Details

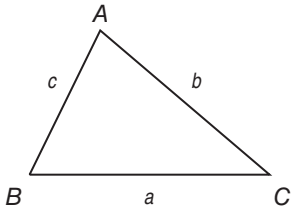
Find the Area of a Triangle

p. 832

Complete the formula below to illustrate the Law of Sines for $\triangle ABC$.

Law of Sines

If $\triangle ABC$ has lengths a, b, and c representing the length of the sides opposite the angles with measures A, B, and C, then:

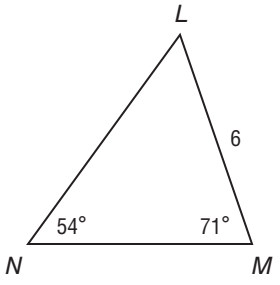


_____

Use the Law of Sines to Solve Triangles

pp. 833–835

Use the Law of Sines to solve for LN. Round to the nearest hundredth.



_____

Helping You Remember

Suppose that you are taking a quiz and cannot remember whether the formula for the area of a triangle is Area $= \frac{1}{2}ab \cos C$ or Area $= \frac{1}{2}ab \sin C$. How can you quickly remember which of these is correct?

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

13-5 Law of Cosines

What You'll Learn

Scan the text in Lesson 13-5. Write two facts that you learned about the Law of Cosines as you scanned the text.

1. _____

_____

_____

_____

_____

2. _____

_____

_____

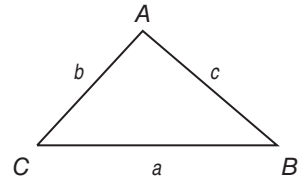
_____

_____

Active Vocabulary

New Vocabulary Label the diagram with the correct terms to illustrate the Law of Cosines.

Law of Cosines ▶



$a^2 =$ _____

$b^2 =$ _____

$c^2 =$ _____

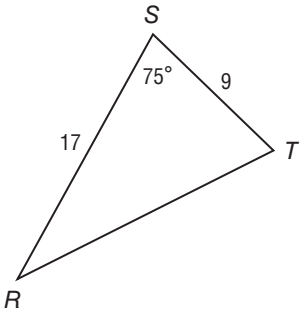
Lesson 13-5

Main Idea	Details

Use the Law of Cosines to Solve Triangles

pp. 841–842

Use the Law of Cosines to solve for *RT* to the nearest tenth.



_____

Choose a Method to Solve Triangles

pp. 842–843

Tell which method you would use to solve each oblique triangle with the given information. Write *Law of Sines* or *Law of Cosines*.

Solving Oblique Triangles	
Given	**Begin by Using**
two sides and an angle opposite one of them	
three sides	
two sides and their included angle	
two angles and any sides	

Helping You Remember

It is often easier to remember a complicated procedure if you can break it down into small steps. Describe in your own words how to use the Law of Cosines to find the length of one side of a triangle if you know the lengths of the other two sides and the measure of the included angle. Use numbered steps. (You may use mathematical terms, but do not use any mathematical symbols.)

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

13-6 Circular Functions

What You'll Learn

Skim the Examples for Lesson 13-6. Predict two things you think you will learn about circular functions.

1. _____

_____

_____

_____

2. _____

_____

_____

_____

Active Vocabulary

New Vocabulary Match the term with its definition by drawing a line to connect the two.

circular function	one complete pattern of a periodic function
cycle	a function that has y-values that repeat at regular intervals
period	a function that is defined using the unit circle
periodic function	a circle with a radius of one unit centered at the origin on the coordinate plane
unit circle	the horizontal length of one cycle of a periodic function

Vocabulary Link Describe how the revolutions of the pedals on a bicycle can be used as a model of a periodic function.

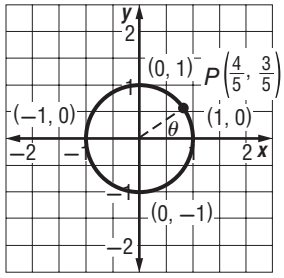
_____

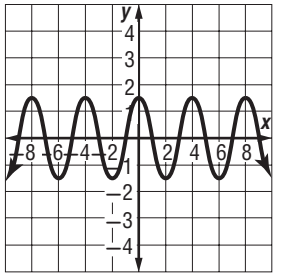
_____

_____

_____

Main Idea	Details
Circular Functions p. 848	**The terminal side of angle θ in standard position intersects the unit circle at $P\left(\frac{4}{5}, \frac{3}{5}\right)$. Find $\cos\theta$ and $\sin\theta$.** $\cos\theta =$ _____ $\sin\theta =$ _____
Periodic Functions pp. 849–850	**Identify the period of the function graphed below.** _____





Helping You Remember

What is an easy way to remember the periods of the sine and cosine functions in radian measure?

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

13-7 Graphing Trigonometric Functions

What You'll Learn

Scan the text in Lesson 13-7. Write two facts that you learned about graphing trigonometric functions as you scanned the text.

1. _____

_____

_____

_____

2. _____

_____

_____

_____

Lesson 13-7

Active Vocabulary

Review Vocabulary Write the definition next to each term *(Lesson 13-2)*

initial side ▶ _____

_____

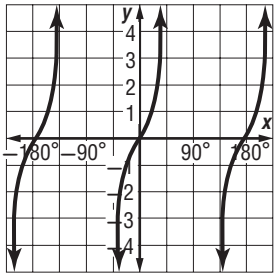
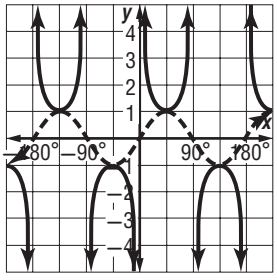
terminal side ▶ _____

_____

New Vocabulary Fill in each blank with the correct term or phrase.

amplitude ▶ The amplitude of the graph of a sine or cosine function equals half the difference between the _____ and _____ values of the function.

frequency ▶ Frequency is the number of _____ of a periodic function in a given unit of time.

Main Idea	Details
Sine, Cosine, and Tangent Functions pp. 855–858	**Sketch the parent function $y = \tan\theta$ on the coordinate grid below.** 
Graphs of Other Trigonometric Functions p. 858	**The function $y = \sin(2\theta)$ is graphed below as a dashed line. Identify the function graphed as a solid line.**  _____

Helping You Remember

What is an easy way to remember the periods of $y = a\sin b\theta$ and $y = a\cos b\theta$?

_____

_____

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

13-8 Translations of Trigonometric Graphs

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

_____

_____

2. _____

_____

_____

_____

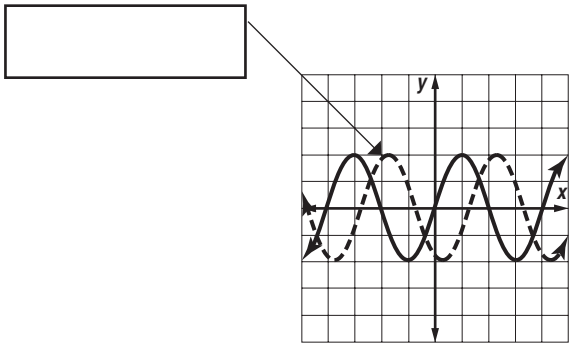
Active Vocabulary

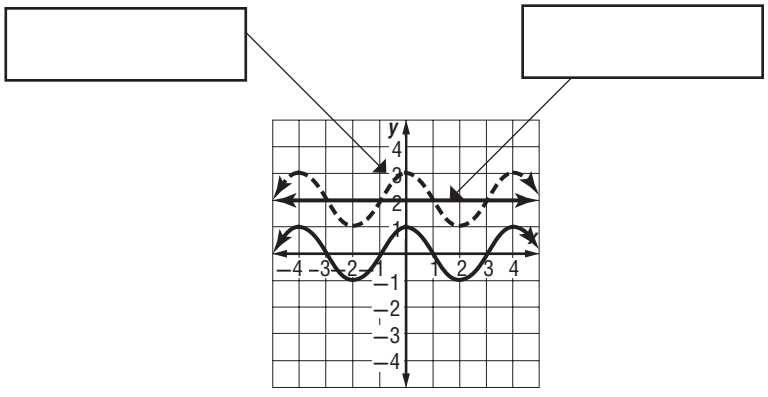
New Vocabulary Label the diagrams with the correct terms.

phase shift ▶

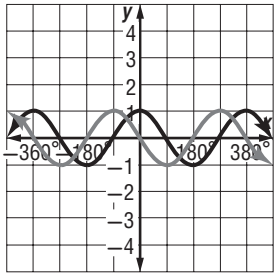
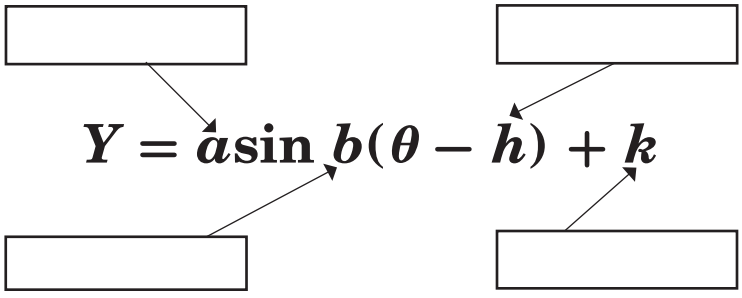
vertical shift ▶

midline ▶





Lesson 13-8

Main Idea	Details
Horizontal Translations p. 863	**The parent function $y = \cos\theta$ is graphed below. Graph the function $y = \cos(\theta + 90°)$ on the coordinate grid.** 
Vertical Translations pp. 864–866	**Label the general sine function shown below with the correct terms. Use *amplitude, period, phase shift,* and *vertical shift*.** 

Helping You Remember

Many students have trouble remembering which of the functions $y = \sin(\theta + \alpha)$ or $y = \sin(\theta - \alpha)$ represents a shift to the left or a shift to the right. Using $\alpha = 45°$, explain a good way to remember which is which.

NAME _____ DATE _____ PERIOD _____

13-9 Inverse Trigonometric Functions

What You'll Learn

Skim the lesson. Write two things you already know about inverse trigonometric functions.

1. _____

_____

_____

_____

2. _____

_____

_____

_____

Active Vocabulary

New Vocabulary Write the definition next to each term.

Arccosine function ▶ _____

_____

Arcsine function ▶ _____

_____

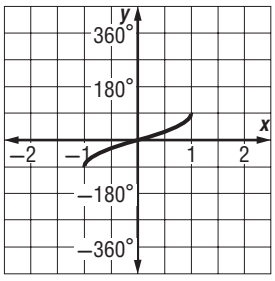
Arctangent function ▶ _____

_____

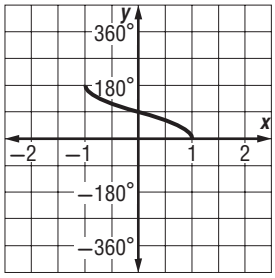
principal values ▶ _____

_____

Main Idea	Details
Inverse Trigonometric Functions pp. 871–872	**Identify the inverse trigonometric function shown in each graph.**



_____



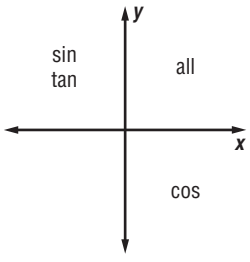
_____

Solve Equations by Using Inverses p. 873	**If $\sin\theta = 0.16$, find θ to the nearest tenth degree. Show your work.**

_____

Helping You Remember

What is a good way to remember the domains of the functions $y = \text{Sin } x$, $y = \text{Cos } x$, and $y = \text{Tan } x$, which are also the range of functions $y = \text{Arcsin } x$, $y = \text{Arccos } x$, and $y = \text{Arctan } x$? (You may want to draw a diagram.)



_____

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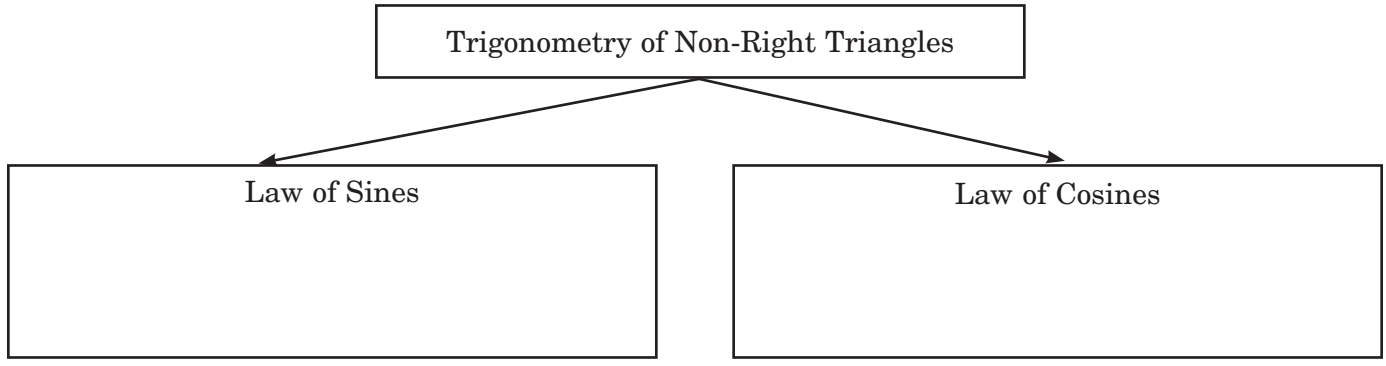
NAME _____ DATE _____ PERIOD _____

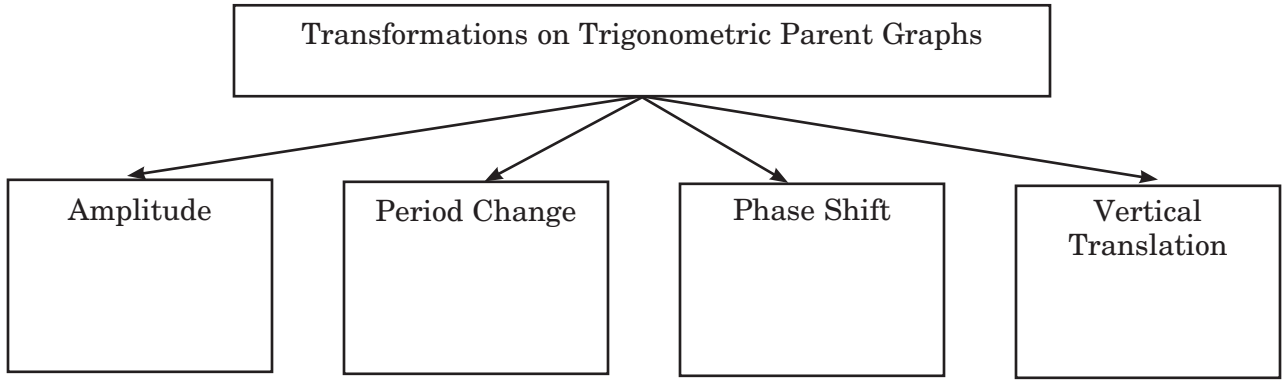
CHAPTER 13 Trigonometric Functions

Tie It Together

Fill in the graphic organizer. Add details if space permits.

Function	In a Right Triangle	In a Unit Circle	Maximum Value	Minimum Value	Domain Restrictions	Reciprocal Function
Sine						
Cosine						
Tangent						
Cosecant						
Secant						
Cotangent						





NAME _____ DATE _____ PERIOD _____

CHAPTER 13 Trigonometric Functions

Before the Test

Now that you have read and worked through the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Trigonometric Functions	After You Read
• A trigonometric ratio can be used to compared the sides of any triangle.	
• 2π radians = 360º	
• The Law of Cosines can be used to solve a triangle.	
• A periodic function has x-values that repeat at regular intervals.	
• A horizontal translation of a periodic function is a phase shift.	

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 13.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 13 Study Guide and Review in the textbook.

☐ I took the Chapter 13 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

- Use the SR3Q method of reading: **S**urvey, **Q**uestion, **R**ead, **R**ecite, and **R**eview. Survey the text by previewing the headings, boldface words, and examples; ask questions about what you survey, read with purpose, recite out loud the main points and concepts without looking at the text, and review your text notes or use the chapter review at the end of the chapter.

NAME _____ DATE _____ PERIOD _____

CHAPTER 14

Trigonometric Identities and Equations

Before You Read

Before you read the chapter, think about what you know about trigonometric identities and equations. List three things you already know about them in the first column. Then list three things you would like to learn about them in the second column.

K What I know…	W What I want to find out…

FOLDABLES® Study Organizer Construct the Foldable as directed at the beginning of this chapter.

Note Taking Tips

- **When you take notes, it may be helpful to sit as close as possible to the front of the class.**

  There are fewer distractions and it is easier to hear.

- **If your instructor points out definitions or procedures from your text, write a reference page in your notes.**

  You can then write these referenced items in their proper place in your notes after class.

NAME _____ DATE _____ PERIOD _____

CHAPTER 14

Trigonometric Identities and Equations

Key Points

Scan the pages in the chapter and write at least one specific fact concerning each lesson. For example, in the lesson on trigonometric identities, one fact might be that a trigonometric identity is an equation involving trigonometric functions that is true for all values for which every expression in the equation is defined. After completing the chapter, you can use this table to review for your chapter test.

Lesson	Fact
14-1 Trigonometric Identities	
14-2 Verifying Trigonometric Identities	
14-3 Sum and Difference of Angles Identities	
14-4 Double-Angle and Half-Angle Identities	
14-5 Solving Trigonometric Equations	

NAME _____ DATE _____ PERIOD _____

14-1 Trigonometric Identities

What You'll Learn

Scan the text under the *Now* heading. List two things you will learn about in the lesson.

1. _____

_____

_____

2. _____

_____

_____

Active Vocabulary

New Vocabulary Write the definition next to the term.

trigonometric identity ▶ _____

_____

_____

_____

Vocabulary Link Describe what the word *identity* means in the context of the real world. Explain how this meaning makes sense as the word is applied to mathematical identities.

_____

_____

_____

_____

_____

Main Idea	Details

Find Trigonometric Values
pp. 891–892

Complete each basic trigonometric identity below.

Quotient Identities:

1. $\tan\theta =$ _____ **2.** $\cot\theta =$ _____

Reciprocal Identities:

3. $\sin\theta =$ _____ **4.** $\cos\theta =$ _____

Pythagorean Identities:

5. $\tan^2\theta + 1 =$ _____ **6.** $\cot^2\theta + 1 =$ _____

Simplify Expressions
pp. 892–893

Simplify the expression $\sec\theta + \sec\theta\tan^2\theta$ by writing it in terms of $\sec\theta$. Show your work.

Helping You Remember

A good way to remember something new is to relate it to something you already know. How can you use the unit circle definitions of the sine and cosine that you learned in Chapter 13 to help you remember the Pythagorean Identity $\cos^2\theta + \sin^2\theta = 1$?

_____

_____

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_____

NAME _____ DATE _____ PERIOD _____

14-2 Verifying Trigonometric Identities

What You'll Learn

Skim Lesson 14-2. Predict two things that you expect to learn based on the headings and the Key Concept box.

1. _____

_____

_____

2. _____

_____

_____

_____

Active Vocabulary

Vocabulary Link The following statements are suggestions for verifying trigonometric identities. Fill in each blank with the correct term or phrase.

Substitute one or more basic trigonometric _____ to simplify the expression.

Factor or multiply as necessary. You may have to multiply both the numerator and _____ by the same trigonometric expression.

Write each side of the identity in terms of sine and _____ only. Then simplify each side as much as possible.

The properties of equality do not apply to identities as with equations. Do not perform operations to the quantities from each side of an _____ identity.

Lesson 14-2

Main Idea	Details
Transform One Side of an Equation pp. 898–899	**Verify that $\frac{\sec\theta}{\tan\theta + \cot\theta} = \sin\theta$ is an identity.**

Main Idea	Details
Transform Each Side of an Equation pp. 899–900	**Circle the correct answer.** $\frac{\sec\theta}{\csc\theta} =$ A $\frac{1}{\sin\theta}$ C $\frac{1}{\cos\theta}$ B $\cot\theta$ D $\tan\theta$

Helping You Remember

Many students have trouble knowing where to start in verifying a trignometric identity. What is a simple rule that you can remember that you can always use if you don't see a quicker approach?

_____

_____

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NAME _____ DATE _____ PERIOD _____

14-3 Sum and Difference of Angles Identities

What You'll Learn

Scan the text in Lesson 14-3. Write two facts you learned about sum and difference of angles identities as you scanned the text.

1. _____

_____

_____

_____

2. _____

_____

_____

_____

Active Vocabulary

Review Vocabulary Fill in each blank with the correct term or phrase. (*Lesson 14-1*)

trigonometric identity ▶ A trigonometric identity is an equation involving trigonometric _____ that is true for all values for which every expression in the equation is _____.

Vocabulary Link Fill in the blanks to complete each identity.

$\sin(A + B) =$ _____ A _____ B

$+$ _____ A _____ B

$\cos(A - B) =$ _____ A _____ B

$+$ _____ A _____ B

$$\tan(A + B) = \frac{\tan \_\_\_ + \tan \_\_\_}{\_\_\_ - \tan \_\_\_ \tan \_\_\_}$$

Lesson 14-3

Main Idea	Details
Sum and Difference Identities pp. 904–905	**Follow the steps below to find the exact value of cos 105°.** **Step 1:** Rewrite 105° as the sum of two more common angles. _____ ↓ **Step 2:** Apply an angle sum identity. _____ ↓ **Step 3:** Substitute the exact values and simplify. _____
Verify Trigonometric Identities p. 906	**Verify that $\sin(\theta - 90°)$ is an identity.**

Helping You Remember

Some students have trouble remembering which signs to use on the right-hand sides of the sum and difference of angles formulas. What is an easy way to remember this?

_____

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_____

NAME _____ DATE _____ PERIOD _____

14-4 Double-Angle and Half-Angle Identities

What You'll Learn

Skim the lesson. Write two things you already know about double-angle and half-angle identities.

1. _____

_____

_____

_____

2. _____

_____

_____

_____

_____

Active Vocabulary

Review Vocabulary Fill in the blanks to complete each identity. (*Lesson 14-3*)

$\sin(A - B) =$ _____ A _____

$B -$ _____ A _____ B

$\cos(A + B) =$ _____ A _____

$B -$ _____ A _____ B

$\tan(A - B) = \dfrac{\tan \_\_\_ - \tan \_\_\_}{\_\_\_ + \tan \_\_\_ \tan \_\_\_}$

Fill in the blanks to complete each identity.

$\sin 2A = 2$ _____ A _____ A

$\cos 2A =$ _____ $A -$ _____ A

Main Idea	Details
Double-Angle Identities pp. 911-912	**Find $\sin 2\theta$ if $\sin\theta = \frac{4}{5}$ and θ is between 0° and 90°.**
Half-Angle Identities pp. 912-914	**Follow the steps below to find the exact value of $\sin 15°$.**

Step 1: Rewrite 15° as the quotient of 30° and 2. _____

↓

Step 2: Apply a half angle identity. _____

↓

Step 3: Substitute the exact values and simplify. _____

Helping You Remember

There are many identities and formulas in mathematics, and they can be difficult to remember them all. How can you obtain all three of the identities for $\cos 2\theta$ by remembering only one of them and using a Pythagorean Identity?

_____

_____

_____

NAME _____ DATE _____ PERIOD _____

14-5 Solving Trigonometric Equations

What You'll Learn

Skim the Examples for Lesson 14-5. Predict two things you think you will learn about solving trigonometric equations.

1. _____

_____

_____

2. _____

_____

_____

Active Vocabulary

Review Vocabulary Match each type of identity with the correct formula. (*Lessons 14-3 and 14-4*)

sum of angles identity	$\cos 2\theta = 1 - 2\sin^2\theta$
difference of angles identity	$\sin(A + B) = \sin A\cos A + \cos A\sin B$
double-angle identity	$\tan\frac{\theta}{2} = \pm\frac{\sqrt{1} - \cos\theta}{1 + \cos\theta}$
half-angle identity	$\cos(A - B) = \cos A\cos B + \sin A\sin B$

New Vocabulary Write the definition next to the term.

trigonometric equation ▶ _____

_____

_____

Main Idea	Details
Solve Trigonometric Equations pp. 919–920	**Compare and contrast trigonometric identities with trigonometric equations.**

Similarities	Differences

Main Idea	Details
Extraneous Solutions pp. 921–922	**Solve the equation $\sin 2\theta = \cos \theta$ for $90° \leq \theta < 180°$. Show your work.**

_____

Helping You Remember

A good way to remember something is to explain it to someone else. How would you explain to a classmate the difference between verifying a trigonometric identity and solving a trigonometric equation?

_____

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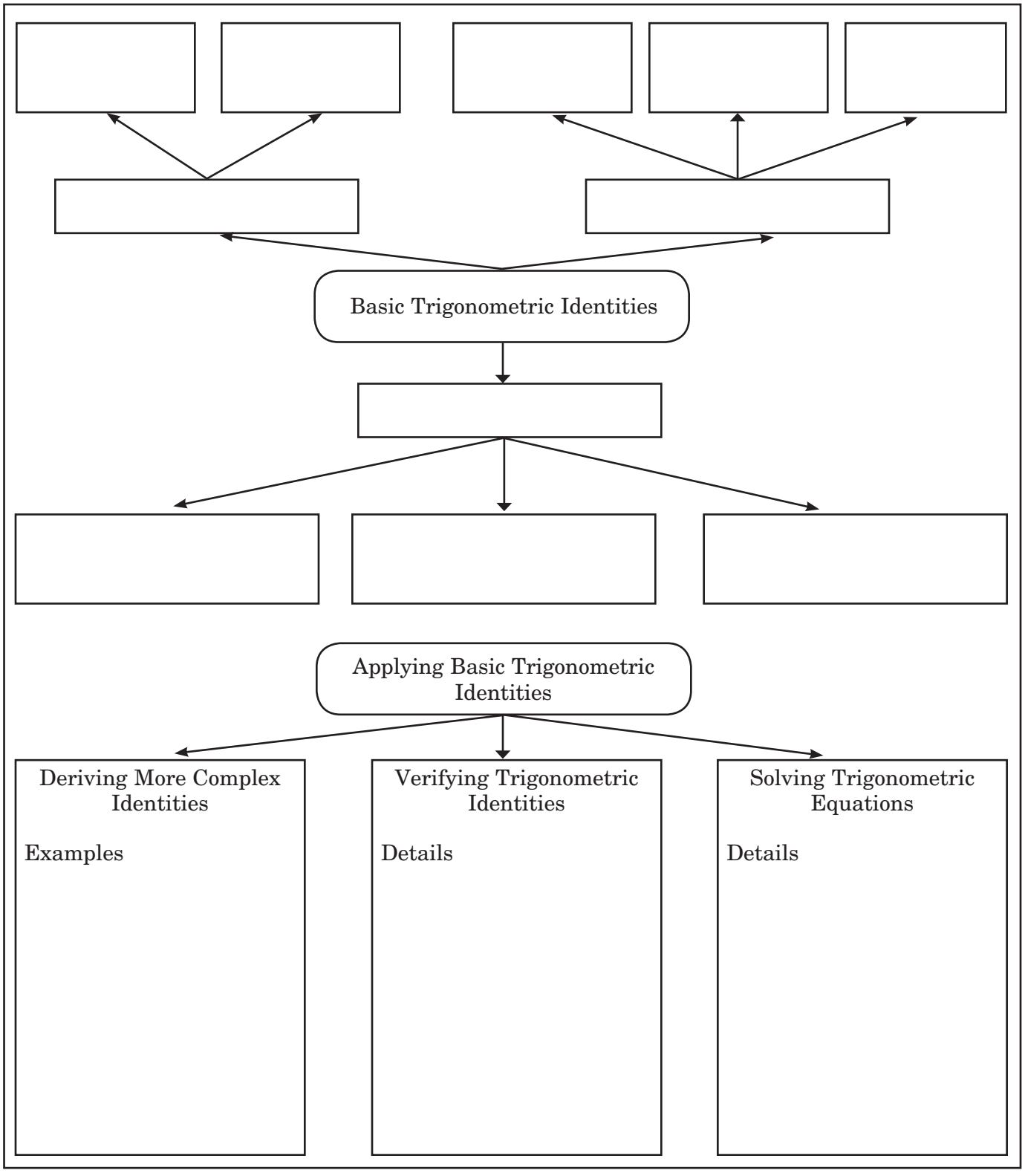
NAME _____ DATE _____ PERIOD _____

CHAPTER 14

Trigonometric Identities and Equations

Tie It Together

Fill in the graphic organizer.



NAME _____ DATE _____ PERIOD _____

CHAPTER 14 Trigonometric Identities and Equations

Before the Test

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column.

K What I know…	W What I want to find out…	L What I learned…

Math Online Visit *glencoe.com* to access your textbook, more examples, self-check quizzes, personal tutors, and practice tests to help you study for concepts in Chapter 14.

Are You Ready for the Chapter Test?

Use this checklist to help you study.

☐ I used my Foldable to complete the review of all or most lessons.

☐ I completed the Chapter 14 Study Guide and Review in the textbook.

☐ I took the Chapter 14 Practice Test in the textbook.

☐ I used the online resources for additional review options.

☐ I reviewed my homework assignments and made corrections to incorrect problems.

☐ I reviewed all vocabulary from the chapter and their definitions.

- On test day, look over the entire test to get an idea of its length and scope so that you can pace yourself. Answer what you know first, skipping over material you do not know. When finished, go back and check for errors. Do not change an answer unless you are certain you are correct.