STUDENT HELP

YOUR BUILT-IN LEARNING SUPPORT

Your textbook contains many special elements to help you learn. It provides several study helps that may be new to you. For example, every chapter begins with a Study Guide.

Chapter Preview The Study Guide starts with a short description of what you will be learning.

Key Vocabulary This list highlights important new terms that will be introduced in the chapter as well as reviewing terms that you already know.

Skill Review These exercises review key skills that you'll apply in the chapter. They will help you identify any topics that you need to review.

Study Strategy The study strategies suggest ideas to help you better understand the math you are learning as well as help you prepare for tests.

CHAPTER 3

Study Guide

PREVIEW

What's the chapter about?

Chapter 3 is about **lines** and **angles**. In Chapter 3, you'll learn

- properties of parallel and perpendicular lines.
- six ways to prove that lines are parallel.
- how to write an equation of a line with given characteristics.

KEY VOCABULARY

▶ Review	▶ New		
• linear pair, p. 44	• parallel lines, p. 129	• transversal, p. 131	• consecutive interior angles, p. 131
• vertical angles, p. 44	• skew lines, p. 129	• alternate interior angles, p. 131	• flow proof, p. 136
• perpendicular lines, p. 79	• parallel planes, p. 129	• alternate exterior angles, p. 131	

PREPARE

Are you ready for the chapter?

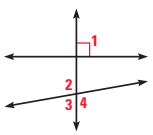
SKILL REVIEW Do these exercises to review key skills that you'll apply in this chapter. See the given **reference page** if there is something you don't understand.

USING ALGEBRA **Solve each equation.** (Skills Review, p. 789 and 790)

1. $47 + x = 180$ **2.** $135 = 3x - 6$ **3.** $m = \frac{5 - 7}{2 - (-6)}$

4. $\frac{1}{2} = -5\left(\frac{7}{2}\right) + b$ **5.** $5x + 9 = 6x - 11$ **6.** $2(x - 1) + 15 = 90$

Use the diagram. Write the reason that supports the statement. (Review pp. 44–46)



7. $m\angle 1 = 90°$

8. $\angle 2 \cong \angle 4$

9. $\angle 2$ and $\angle 3$ are supplementary.

Write the reason that supports the statement. (Review pp. 96–98)

10. If $m\angle A = 30°$ and $m\angle B = 30°$, then $\angle A \cong \angle B$.

11. If $x + 4 = 9$, then $x = 5$.

12. $3(x + 5) = 3x + 15$

STUDY STRATEGY

Here's a study strategy!

Write Sample Questions

Write at least six questions about topics in the chapter. Focus on the concepts that you found difficult. Include both short-answer questions and more involved ones. Then answer your questions.

128 Chapter 3

Also, in every lesson you will find a variety of Student Help notes.

STUDENT HELP

In the Book

Study Tip The study tips will help you avoid common errors.

Skills Review Here you can find where to review skills you've studied in earlier math classes.

Look Back Here are references to material in earlier lessons that may help you understand the lesson.

Extra Practice Your book contains more exercises to practice the skills you are learning.

Homework Help Here you can find suggestions about which Examples may help you solve Exercises.

On the Internet

Homework Help: These are places where you can find additional examples on the Web site, and additional suggestions for solving an exercise.

Keystroke Help These provide the exact keystroke sequences for many different kinds of calculators.

Software Help These provide the instructions for geometry software applications.

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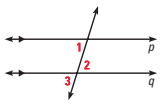
Study Tip
When you prove a theorem, the hypotheses of the theorem becomes the GIVEN, and the conclusion is what you must PROVE.

EXAMPLE 1 *Proving the Alternate Interior Angles Theorem*

Prove the Alternate Interior Angles Theorem.



SOLUTION

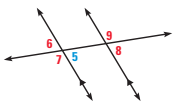
GIVEN ▶ $p \parallel q$

PROVE ▶ $\angle 1 \cong \angle 2$

Statements	Reasons
1. $p \parallel q$	1. Given
2. $\angle 1 \cong \angle 3$	2. Corresponding Angles Postulate
3. $\angle 3 \cong \angle 2$	3. Vertical Angles Theorem
4. $\angle 1 \cong \angle 2$	4. Transitive Property of Congruence

EXAMPLE 2 *Using Properties of Parallel Lines*

Given that $m\angle 5 = 65°$, find each measure. Tell which postulate or theorem you use.



a. $m\angle 6$ **b.** $m\angle 7$

c. $m\angle 8$ **d.** $m\angle 9$

SOLUTION

a. $m\angle 6 = m\angle 5 = 65°$ — Vertical Angles Theorem

b. $m\angle 7 = 180° - m\angle 5 = 115°$ — Linear Pair Postulate

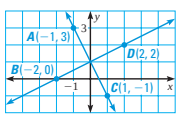
c. $m\angle 8 = m\angle 5 = 65°$ — Corresponding Angles Postulate

d. $m\angle 9 = m\angle 7 = 115°$ — Alternate Exterior Angles Theorem

GUIDED PRACTICE

Vocabulary Check ✓
Concept Check ✓
Skill Check ✓

1. Define *slope of a line*.
2. The slope of line m is $-\frac{1}{5}$. What is the slope of a line perpendicular to m?
3. In the coordinate plane shown at the right, is $\overleftrightarrow{AC}$ perpendicular to $\overleftrightarrow{BD}$? Explain.
4. Decide whether the lines with the equations $y = 2x - 1$ and $y = -2x + 1$ are perpendicular.
5. Decide whether the lines with the equations $5y - x = 15$ and $y + 5x = 2$ are perpendicular.
6. The line ℓ_1 has the equation $y = 3x$. The line ℓ_2 is perpendicular to ℓ_1 and passes through the point $P(0, 0)$. Write an equation of ℓ_2.



PRACTICE AND APPLICATIONS

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Extra Practice
to help you master skills is on p. 808.

SLOPES OF PERPENDICULAR LINES **The slopes of two lines are given. Are the lines perpendicular?**

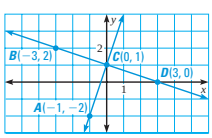
7. $m_1 = 2, m_2 = -\frac{1}{2}$
8. $m_1 = \frac{2}{3}, m_2 = \frac{3}{2}$
9. $m_1 = \frac{1}{4}, m_2 = -4$
10. $m_1 = \frac{5}{7}, m_2 = -\frac{7}{5}$
11. $m_1 = -\frac{1}{2}, m_2 = -\frac{1}{2}$
12. $m_1 = -1, m_2 = 1$

SLOPES OF PERPENDICULAR LINES **Lines *j* and *n* are perpendicular. The slope of line *j* is given. What is the slope of line *n*? Check your answer.**

13. 2
14. 5
15. -3
16. -7
17. $\frac{2}{3}$
18. $\frac{1}{5}$
19. $-\frac{1}{3}$
20. $-\frac{4}{3}$

IDENTIFYING PERPENDICULAR LINES **Find the slope of $\overleftrightarrow{AC}$ and $\overleftrightarrow{BD}$. Decide whether $\overleftrightarrow{AC}$ is perpendicular to $\overleftrightarrow{BD}$.**

21.



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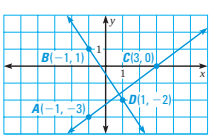

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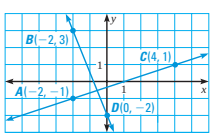

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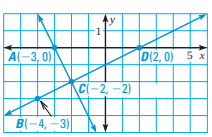

STUDENT HELP

HOMEWORK HELP

Example 1:	Exs. 7–20
Example 2:	Exs. 21–24, 33–37
Example 3:	Exs. 25–28, 47–50
Example 4:	Exs. 29–32
Example 5:	Exs. 38–41
Example 6:	Exs. 42–46