CHAPTER

8

Trigonometry of Acute Triangles

Vocabulary

sine law
cosine law

Curriculum Expectations

Trigonometry

Solving Problems Involving the Trigonometry of Acute Triangles

By the end of this chapter, students will

TR3.01 explore the development of the sine law within acute triangles (e.g., use dynamic geometry software to determine that the ratio of the side lengths equals the ratio of the sines of the opposite angles; follow the algebraic development of the sine law and identify the application of solving systems of equations [student reproduction of the development of the formula is not required]);

TR3.02 explore the development of the cosine law within acute triangles (e.g., use dynamic geometry software to verify the cosine law; follow the algebraic development of the cosine law and identify its relationship to the Pythagorean theorem and the cosine ratio [student reproduction of the development of the formula is not required]);

TR3.03 determine the measures of sides and angles in acute triangles, using the sine law and the cosine law (***Sample problem:*** In triangle ABC, ∠A = 35°, ∠B = 65°, and AC = 18 cm. Determine BC. Check your result using dynamic geometry software.);

TR3.04 solve problems involving the measures of sides and angles in acute triangles.

Chapter Problem

The Chapter Problem is introduced in the Chapter 8 Opener. Have students discuss where and how trigonometry may be applied in aeronautics (flying). Have students complete the Chapter Problem revisits that occur throughout the chapter. These questions are designed to help students move toward the Chapter 8 Problem Wrap-Up on page 431.

Alternatively, only assign the Chapter Problem when students have completed the chapter. The Chapter Problem is a summative assessment.

Chapter 8 Planning Chart

Section Suggested Timing	Student Text Pages	Teacher's Resource Blackline Masters	Assessment	Tools
Chapter 8 Opener • 10 min	392–393			
Get Ready • 80 min	394–395	• BLM 8–1 Get Ready	• BLM 8–2 Get Ready Self-Assessment Checklist	**Tools** • ruler
8.1 The Sine Law • 80 min	396–404	• G–4 Protractor • T–4 *The Geometer's Sketchpad*® 3 • T–5 *The Geometer's Sketchpad*® 4 • BLM 8–3 The Sine Law and *The Geometer's Sketchpad*® • BLM 8–4 Section 8.1 Practice Master	• A–7 Thinking General Scoring Rubric	**Tools** • ruler • protractor **Technology Tools** • computer • *The Geometer's Sketchpad*®
8.2 The Cosine Law • 80 min	405–411	• G–2 Placemat • G–4 Protractor • T–4 *The Geometer's Sketchpad*® 3 • T–5 *The Geometer's Sketchpad*® 4 • BLM 8–5 The Cosine Law and *The Geometer's Sketchpad*® • BLM 8–6 Section 8.2 Practice Master	• BLM 8–7 Section 8.2 Achievement Check Rubric • A–22 Report Checklist	**Tools** • ruler • protractor **Technology Tools** • computer • *The Geometer's Sketchpad*®
8.3 Find Angles Using the Cosine Law • 80 min	412–419	• G–4 Protractor • T–4 *The Geometer's Sketchpad*® 3 • T–5 *The Geometer's Sketchpad*® 4 • T–7 The Computer Algebra System (CAS) on the TI-89 Calculator • BLM 8–8 Section 8.3 Practice Master	• BLM 8–9 Section 8.3 Achievement Check Rubric	**Tools** • protractor • ruler **Technology Tools** • TI-89 calculator • computer • *The Geometer's Sketchpad*®
Use Technology: Program a Graphing Calculator • 40–80 min	420–421			**Technology Tools** • graphing calculator
Use Technology: Program a TI-89 Calculator • 40–80 min	422–423	• T–7 The Computer Algebra System (CAS) on the TI-89 Calculator		**Technology Tools** • TI-89 calculator
8.4 Solve Problems Using Trigonometry • 80 min	424–429	• G–4 Protractor • BLM 8–10 Section 8.4 Practice Master	• A–5 Problem Solving Checklist • A–18 My Progress as a Problem Solver • A–22 Report Checklist	**Tools** • protractor • ruler **Technology Tools** • Internet access
Chapter 8 Review • 80 min	430–431	• BLM 8–11 Chapter 8 Review		**Tools** • ruler • protractor
Chapter 8 Problem Wrap-Up • 15–20 min	431	• G–4 Protractor • T–4 *The Geometer's Sketchpad*® 3 • T–5 *The Geometer's Sketchpad*® 4	• BLM 8–12 Chapter 8 Problem Wrap-Up Rubric	**Tools** • protractor • ruler **Technology Tools** • computer • *The Geometer's Sketchpad*® • Internet access

Section Suggested Timing	Student Text Pages	Teacher's Resource Blackline Masters	Assessment	Tools
Chapter 8 Practice Test • 80 min	432–433		• BLM 8–13 Chapter 8 Practice Test • BLM 8–14 Chapter 8 Test • BLM 8–15 Chapter 8 Practice Test Achievement Check Rubric	**Tools** • ruler • protractor
Chapters 7 and 8 Review • 80 min	434–435		• A–14 Self-Assessment Recording Sheet • A–15 Self-Assessment Checklist	
Task: Solar Lights • 10 min	436	• G–1 Grid Paper • G–4 Protractor • T–4 *The Geometer's Sketchpad*® 3 • T–5 *The Geometer's Sketchpad*® 4	• BLM 8–16 Task: Solar Lights Rubric	**Tools** • grid paper • ruler • protractor • compasses **Technology Tools** • computer • *The Geometer's Sketchpad*®
Task: Lighting the Park • 25–35 min	436	• G–1 Grid Paper • G–4 Protractor • T–4 *The Geometer's Sketchpad*® 3 • T–5 *The Geometer's Sketchpad*® 4	• BLM 8–17 Task: Lighting the Park Rubric	**Tools** • grid paper • ruler • protractor • compasses **Technology Tools** • computer • *The Geometer's Sketchpad*®
Task: Trigonometry Using *The Geometer's Sketchpad*® • 25–35 min	437	• T–4 *The Geometer's Sketchpad*® 3 • T–5 *The Geometer's Sketchpad*® 4 • BLM 8–19 BLM Answers	• BLM 8–18 Task: Trigonometry Using *The Geometer's Sketchpad*® Rubric	**Technology Tools** • computer • *The Geometer's Sketchpad*®
Course Review • 120 min	438–447	• G–1 Grid Paper • G–3 Coordinate Grids • T–4 *The Geometer's Sketchpad*® 3 • T–5 *The Geometer's Sketchpad*® 4	• A–14 Self-Assessment Recording Sheet • A–15 Self-Assessment Checklist	**Tools** • grid paper **Technology Tools** • graphing calculator • *The Geometer's Sketchpad*® • computer • Cabri® Jr.

Chapter 8 Blackline Masters Checklist

	BLM	Title	Purpose
Get Ready			
	BLM 8–1	Get Ready	Practice
	BLM 8–2	Get Ready Self-Assessment Checklist	Student Self-Assessment
8.1 The Sine Law			
	G–4	Protractor	Student Support
	T–4	*The Geometer's Sketchpad*® 3	Technology
	T–5	*The Geometer's Sketchpad*® 4	Technology
	BLM 8–3	The Sine Law and *The Geometer's Sketchpad*®	Student Support
	BLM 8–4	Section 8.1 Practice Master	Practice
	A–7	Thinking General Scoring Rubric	Assessment
8.2 The Cosine Law			
	G–2	Placemat	Student Support
	G–4	Protractor	Student Support
	T–4	*The Geometer's Sketchpad*® 3	Technology
	T–5	*The Geometer's Sketchpad*® 4	Technology
	BLM 8–5	The Cosine Law and *The Geometer's Sketchpad*®	Student Support
	BLM 8–6	Section 8.2 Practice Master	Practice
	BLM 8–7	Section 8.2 Achievement Check Rubric	Assessment
	A–22	Report Checklist	Assessment
8.3 Find Angles Using the Cosine Law			
	G–4	Protractor	Student Support
	T–4	*The Geometer's Sketchpad*® 3	Technology
	T–5	*The Geometer's Sketchpad*® 4	Technology
	T–7	The Computer Algebra System (CAS) on the TI-89 Calculator	Technology
	BLM 8–8	Section 8.3 Practice Master	Practice
	BLM 8–9	Section 8.3 Achievement Check Rubric	Assessment
Use Technology: Program a Graphing Calculator			
Use Technology: Program a TI-89 Calculator			
	T–7	The Computer Algebra System (CAS) on the TI-89 Calculator	Technology
8.4 Solve Problems Using Trigonometry			
	G–4	Protractor	Student Support
	BLM 8–10	Section 8.4 Practice Master	Practice
	A–5	Problem Solving Checklist	Assessment
	A–18	My Progress as a Problem Solver	Student Self-Assessment
	A–22	Report Checklist	Assessment
Chapter 8 Review			
	BLM 8–11	Chapter 8 Review	Practice

	BLM	Title	Purpose
Chapter 8 Problem Wrap-Up			
	G–4	Protractor	Student Support
	T–4	*The Geometer's Sketchpad®* 3	Technology
	T–5	*The Geometer's Sketchpad®* 4	Technology
	BLM 8–12	Chapter 8 Problem Wrap-Up Rubric	Summative Assessment
Chapter 8 Practice Test			
	BLM 8–13	Chapter 8 Practice Test	Diagnostic Assessment
	BLM 8–14	Chapter 8 Test	Summative Assessment
	BLM 8–15	Chapter 8 Practice Test Achievement Check Rubric	Assessment
Chapters 7 and 8 Review			
	A–14	Self-Assessment Recording Sheet	Student Self-Assessment
	A–15	Self-Assessment Checklist	Student Self-Assessment
Task: Solar Lights			
	G–1	Grid Paper	Student Support
	G–4	Protractor	Student Support
	T–4	*The Geometer's Sketchpad®* 3	Technology
	T–5	*The Geometer's Sketchpad®* 4	Technology
	BLM 8–16	Task: Solar Lights Rubric	Assessment
Task: Lighting the Park			
	G–1	Grid Paper	Student Support
	G–4	Protractor	Student Support
	T–4	*The Geometer's Sketchpad®* 3	Technology
	T–5	*The Geometer's Sketchpad®* 4	Technology
	BLM 8–17	Task: Lighting the Park Rubric	Assessment
Task: Trigonometry Using *The Geometer's Sketchpad®*			
	T–4	*The Geometer's Sketchpad®* 3	Technology
	T–5	*The Geometer's Sketchpad®* 4	Technology
	BLM 8–18	Task: Trigonometry Using *The Geometer's Sketchpad®* Rubric	Assessment
	BLM 8–19	BLM Answers	Answers
Course Review			
	G–1	Grid Paper	Student Support
	G–3	Coordinate Grids	Student Support
	T–4	*The Geometer's Sketchpad®* 3	Technology
	T–5	*The Geometer's Sketchpad®* 4	Technology
	A–14	Self-Assessment Recording Sheet	Student Self-Assessment
	A–15	Self-Assessment Checklist	Student Self-Assessment

Get Ready

TI-Navigator™

Go to **www.mcgrawhill.ca/books/ principles10** and follow the links to the file for this section.

Common Errors

• Calculator outputs do not make sense.

R_x Ensure that calculator is set to degree mode.

• Some students may incorrectly solve for variables appearing in the denominator of a rational expression (e.g., solve for u in the equation $\cos 38° = \dfrac{5.8}{u}$ by dividing both sides by 5.8)

R_x Encourage students to multiply both sides of equations involving rational expressions by a quantity that will eliminate denominators, before attempting to solve for the variable quantity.

• Some students may be uncertain about which trigonometric ratio to apply in a given problem.

R_x Encourage students to use the SOH CAH TOA mnemonic to remember how the primary trigonometric ratios are defined, and to identify which ratio applies for a given situation.

Accommodations

Perceptual—Encourage students to show small sequential steps when they are rearranging formulas to isolate a variable.

Motor—Let students work with a partner who will key in the calculator strokes when using the primary trigonometric ratios.

Memory—Allow students to use cue cards or formula sheets with the primary trigonometric ratios when working through the questions.

Teaching Suggestions

• Some students may benefit from working through the Get Ready exercises in pairs. The content is largely based on material from the previous chapter, and so should be reasonably fresh in students' minds. Encourage students to refer to their work in the previous chapter, as needed.

Assessment

Assess student readiness to proceed by informal observation as students are working on the exercises. A formal test would be inappropriate since this material is not part of the grade 10 curriculum for this chapter. Student self-assessment is also an effective technique; students can place a check mark beside topics in the Get Ready that they feel confident of having the necessary skills. Use **BLM 8–2 Get Ready Self-Assessment Checklist** as a self-assessment for students. Remedial action can be taken in small groups or with a whole class skill review.