Trigonometry

2

General Outcome

Develop trigonometric reasoning.

Specific Outcomes

T1 Demonstrate an understanding of angles in standard position [0° to 360°].

T2 Solve problems, using the three primary trigonometric ratios for angles from 0° to 360° in standard position.

T3 Solve problems, using the cosine law and sine law, including the ambiguous case.

By the end of this chapter, students will be able to:

Section	Understanding Concepts, Skills, and Processes
2.1	✓ sketch an angle from 0° to 360° in standard position and determine its reference angle
	✓ determine the quadrant in which an angle in standard position terminates
	✓ determine the distance from the origin to a point (x, y) on the terminal arm of an angle
	✓ determine the exact values of sine, cosine, and tangent ratios of a given angle with the reference angle of 30°, 45°, or 60°
	✓ solve problems involving trigonometric ratios
2.2	✓ determine the distance from the origin to a point (x, y) on the terminal arm of an angle
	✓ determine the value of sin θ, cos θ, or tan θ for any point (x, y) on the terminal arm of angle θ
	✓ determine the value of sin θ, cos θ, or tan θ, where θ = 0°, 90°, 180°, 270°, or 360°
	✓ solve, for all values of θ, in an equation involving sine, cosine, and tangent
	✓ solve problems involving trigonometric ratios
2.3	✓ use the primary trigonometric ratios to solve problems involving triangles that are not right triangles
	✓ recognize when to use the sine law to solve a given problem
	✓ sketch diagrams to represent problems involving the sine law
	✓ explain a proof of the sine law
	✓ solve problems using the sine law
	✓ solve problems involving the ambiguous case of the sine law
2.4	✓ sketch diagrams and solve problems using the cosine law
	✓ recognize when to use the cosine law to solve a given problem
	✓ explain the steps in the given proof of the cosine law

Assessment	Supporting Learning
Assessment *as* Learning	
Use the Before column of **BLM 2–1 Chapter 2 Self-Assessment** to provide students with the big picture for this chapter and help them identify what they already know, understand, and can do. You may wish to have students keep this master in their math portfolio and refer to it during the chapter.	• During work on the chapter, have students keep track of what they need to work on. They can check off each item as they develop the skill or process at an appropriate level.
Assessment *for* Learning	
Method 1: Use the introduction on page 72 in *Pre-Calculus 11* to activate students' prior knowledge about the skills and processes that will be covered in this chapter. **Method 2:** Have students develop a journal entry to explain what they personally know about the primary trigonometric ratios—tangent, sine, and cosine—and how to use the ratios to solve triangles for unknown sides and angles.	• Have students use their list of what they need to work on to keep track of the skills and processes that need attention. They can check off each item as they develop the skill or process at an appropriate level. • Students who require activation of prerequisite skills may wish to complete **BLM 2–2 Chapter 2 Prerequisite Skills**. This material is on the Teacher CD of this Teacher's Resource and mounted on the www.mhrprecalc11.ca book site.
Assessment *as* Learning	
As students work on each section in Chapter 2, have them keep track of any problems they are having.	• As students complete each section, have them review the list of items they need to work on and check off any that have been handled. • Encourage students to write definitions for the Key Terms in their own words, including reminder tips that may be helpful for review throughout the chapter. • Encourage students to write examples of their own in their notebook or math portfolio. Students should have an example for each method that is covered in the chapter.
Assessment *for* Learning	
BLM 2–3 Chapter 2 Warm-Up This reproducible master includes a warm-up to be used at the beginning of each section. Each warm-up provides a review of prerequisite skills needed for the section.	• As students complete questions, note which skills they are retaining and which ones may need additional reinforcement. • Use the warm-up to provide additional opportunities for students to demonstrate their readiness for the chapter material. • Have students share their strategies for completing mathematics calculations.

Chapter 2 Planning Chart

Section/Suggested Timing	Prerequisite Skills	Materials/Technology	Teacher's Resource Blackline Masters	Exercise Guide	Assessment *as* Learning	Assessment *for* Learning	Assessment *of* Learning
Chapter Opener • 30–40 min (TR page 55)	Students should be familiar with • right triangles • right angles		BLM 2–1 Chapter 2 Self-Assessment BLM 2–2 Chapter 2 Prerequisite Skills BLM U1–1 Unit 1 Project Checklist				
2.1 Angles in Standard Position • 100–120 min (TR page 57)	Students should be familiar with • Pythagorean Theorem • primary trigonometric ratios • using technology to determine trigonometric ratios	• centimetre grid paper • ruler • protractor	Master 2 Centimetre Grid Paper BLM 2–3 Chapter 2 Warm-Up BLM 2–4 Section 2.1 Extra Practice	**Essential:** #1–11, 14, 16, 17, 23–25 **Typical:** #2, 4–7, 9, 10, two of 12–15, 16, 18, 23–25 **Extension/Enrichment:** #7, 9, 16, 19–25	TR pages 59, 64	TR pages 61, 62, 64	
2.2 Trigonometric Ratios of Any Angle • 100–120 min (TR page 65)	Students should be familiar with • angles in standard position • reference angles • exact values of trigonometric ratios • primary trigonometric ratios • inequalities	• centimetre grid paper • ruler • protractor	Master 2 Centimetre Grid Paper BLM 2–3 Chapter 2 Warm-Up BLM 2–5 Section 2.2 Extra Practice TM 2–1 How to Do Page 99 #30 Using the *Geometer's Sketchpad®* TM 2–2 How to Do Page 99 #30 Using *GeoGebra*	**Essential:** #1–11, one of 12–14, 19, 26–28 **Typical:** #2–9, one of 12–14, 15, 16, 19, 26–29 **Extension/Enrichment:** #4, 6, 7–9, one of 15–18, 19–21, 29	TR pages 66, 72	TR pages 69, 72	
2.3 The Sine Law • 100–120 min (TR page 73)	Students should be familiar with • primary trigonometric ratios • solving right triangles • solving equations	• ruler • protractor	BLM 2–3 Chapter 2 Warm-Up BLM 2–6 Section 2.3 #27 Concept Map BLM 2–7 Section 2.3 Extra Practice	**Essential:** #1–11, 14, 16, 18, 24, 25, 27 **Typical:** #1a), c), 2a), 3b), 4a), b), 5a), c), e), 6a), c), e), 7, 8a), 10 or 11, two of 12–16, two of 17–19, 21, 24, 25, 27, 28 **Extension/Enrichment:** # 4, 7, 8, 11, 17, 21–28	TR pages 74, 80	TR pages 77, 80	
2.4 The Cosine Law • 100–120 min (TR page 81)	Students should be familiar with • primary trigonometric ratios • sine law • solving equations	• ruler • protractor • compass	BLM 2–3 Chapter 2 Warm-Up BLM 2–8 Section 2.4 Extra Practice	**Essential:** #1a), c), 2a), 3a), b), 4a), c), e), 5, 7–9, 12–14, 18, 24, 30–32 **Typical:** #3, 4b), d), two of 5–10, 15, two of 18, 19, and 23, 30–32 **Extension/Enrichment:** #3, 4b), d), 5, 6, 10, 14, 16, 24, 25, 28–32	TR pages 82, 87	TR pages 83, 84, 87	
Chapter 2 Review • 60–90 min (TR page 88)		• centimetre grid paper • ruler • protractor	Master 2 Centimetre Grid Paper BLM 2–4 Section 2.1 Extra Practice BLM 2–5 Section 2.2 Extra Practice BLM 2–7 Section 2.3 Extra Practice BLM 2–8 Section 2.4 Extra Practice	Have students do at least one question related to any concept, skill, or process that has been giving them trouble.		TR page 88	
Chapter 2 Practice Test • 30–45 min (TR page 89)		• centimetre grid paper • ruler • protractor	Master 2 Centimetre Grid Paper BLM 2–9 Chapter 2 Test	Provide students with the number of questions they can comfortably do in one class. Choose at least one question for each concept, skill, or process. **Minimum:** #1–6, 8–10, 12, 14	TR page 89		TR page 89 BLM 2–9 Chapter 2 Test
Unit 1 Project • 60–90 min (TR page 90)			BLM U1–1 Unit 1 Project Checklist BLM U1–2 Chapter 2 Task Map			TR page 90	
Unit 1 Project Wrap-Up • 60–90 min plus individual time (TR page 91)			Master 1 Project Rubric BLM U1–1 Unit 1 Project Checklist BLM U1–3 Unit 1 Project Rubric				TR page 92 Master 1 Project Rubric
Unit 1 Cumulative Review and Test • 60–90 min (TR page 93)		• 0.5 centimetre grid paper • centimetre grid paper • ruler • protractor	Master 2 Centimetre Grid Paper Master 3 0.5 Centimetre Grid Paper BLM U1–4 Unit 1 Test BLM 2–10 Chapter 2 BLM Answers	Have students do at least one question related to any concept, skill, or process that has been giving them trouble.		TR page 93	TR page 93