

Chapter 6: Extending Skills with Trigonometry

Chapter Overview Chart

SUGGESTED TIMING				
Functions and Relations: 9 h to 12 h				
Functions: 12 h to 15 h				
Section	Timing (min)		Materials/ Technology	Expectations
	Functions and Relations	Functions		
6.1 Extending Trigonometry Skills with Oblique Triangles	75	120		TF1.02
6.2 Solving Trigonometry Problems in Two and Three Dimensions	150	120		TF1.02
6.3 <i>Skill Builder</i> : Using Special Triangles to Determine Exact Values	75	75	GP, ruler	TF2.04 TF2.03
6.4 <i>Exploration</i> : Investigating Identical Expressions	50	50	TI-83 Plus or GS	TF2.07
6.5 <i>Skill Builder</i> : Trigonometric Identities	150	150	TI-83 Plus or GS	TF2.05 TF2.07
6.6 <i>Skill Builder</i> : Solving Quadratic Trigonometric Equations	120	75	TI-83 Plus or GS	TF2.06 TF2.07
BLM = Blackline Masters CBR/L = Calculator-Based Ranger/Laboratory GSP = <i>The Geometer's Sketchpad</i> * Suggested Timing includes time for preview, additional activities, review and assessment.				
GP = Graph Paper GS = Graphing Software GC = Graphing Calculator SC = Scientific Calculator SS = Spreadsheet Software TI-83 Plus = TI-83 Plus Calculator				
Check Your Understanding: Answers, p. 6-33 The Chapter Problem Questions and Answers, p. 6-35 Challenge 1 – Solution Guide and Rubric, p. 6-45 Challenge 2 – Solution Guide and Rubric, p. 6-49 Chapter 6 Test and Solutions, p. 6-52				

Specific Expectations Addressed in the Chapter

The following expectations are common to both the Functions and Relations course and the Functions course.

- TF1.02 solve problems in two and three dimensions involving right triangles and oblique triangles, using the primary trigonometric ratios, the cosine law, and the sine law including the ambiguous case)
- TF2.03 represent π , in applications, radian measure in exact form as an expression involving π and in approximate form as a real number.
- TF2.04 determine the exact values of sine, cosine and tangent of the special angles $0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}$, and their multiples less than or equal to 2π .
- TF2.05 prove simple identities, using the Pythagorean identity, $\sin^2 x + \cos^2 x = 1$, and the quotient relation, $\tan x = \frac{\sin x}{\cos x}$
- TF2.06 solve linear and quadratic trigonometric equations on the interval $0 \leq x \leq 2\pi$

What “big ideas” should students develop in this chapter?

Students who have successfully completed the work of this chapter and who understand the essential concepts and procedures will know the following:

- Many real life situations in two and three dimensions can be modelled using triangles and trigonometry.
- When working with right triangles the primary trigonometric ratios must be used, while the sine law and cosine law can be used with oblique triangles.
- A scientific or graphing calculator gives a close approximation of a trigonometric ratio for a given angle (in degrees or radians). Use special triangles if an exact value must be determined.
- An identity is an equation with an infinite number of solutions. Trigonometric expressions can be proven to be identities by showing that both sides of the expression are equivalent.

What do students already know about the work of the chapter?

In the grade 10 course (academic), students have

- developed the primary trigonometric ratios, using the properties of similar triangles
- defined the formulas for the sine, the cosine, and the tangent of angles, using the ratios of sides in right triangles
- determined the measures of the sides and angles in right triangles, using the primary trigonometric ratios
- solved problems involving the measures of sides and angles in right triangles (e.g., in surveying, navigation)
- determined the height of an inaccessible object in the environment around the school, using the trigonometry of right triangles
- determined, through investigation, the relationships between the angles and sides in acute triangles (e.g., the largest angle is opposite the longest side; the ratio of side lengths is equal to the ratio of the sines of the opposite angles), using dynamic geometry software
- calculated the measures of sides and angles in acute triangles, using the sine law and cosine law
- described the conditions under which the sine law or the cosine law should be used in a problem
- solved problems involving the measures of sides and angles in acute triangles
- described and investigated the application of trigonometry in science or industry
- solved quadratic equations by factoring and by using graphing calculators or graphing software
- solved quadratic equations, using the quadratic formula