

## Precalculus 2: Trigonometry

MTHH044059

Credits: 0.5 units / 5 hours | NCAA Approved

### Course Description

A thorough treatment of trigonometric concepts and applications are presented in this course. Students study proofs of trigonometric identities, solutions of right and oblique triangles, solutions of trigonometric equations and functions, vector applications, and polar coordinates. The textbook is recommended but optional. A graphing calculator is required for this course. The calculator listed with the course materials and its Guidebook may be purchased from ISHS. ISHS, however, will not provide specific instructions in calculator use.

**NOTE:** To complete this course entirely online (without Mail Processing), students will need access to a scanner. Specific instructions on how to submit projects electronically are given in the online course management system.

### Course Objectives

When you have completed the materials in this course, you should be able to:

1. Apply sets, absolute value, the distance formula, and the Pythagorean Theorem.
2. Locate points on the real number line and the rectangular coordinate plane.
3. Recognize functions and their domains and ranges, and graph functions and relations.
4. Convert angles from degree to radian measure and vice versa, and use coterminal angles.
5. Define the six trigonometric functions and their relationships to each other.
6. Apply the concepts of rounding, significant digits, and approximate data.
7. Use the calculator and tables to evaluate trigonometric functions and angles.
8. Use reference angles to find trigonometric functions, and apply trigonometric functions to solve right triangles.
9. Recall the trigonometric values for  $0^\circ$ ,  $30^\circ$ ,  $45^\circ$ ,  $60^\circ$ ,  $90^\circ$ , and their multiples.
10. Solve applied problems using the line of sight, angle of elevation, angle of depression, bearing, and other practical settings.
11. Simplify or prove trigonometric expressions by using trigonometric identities.
12. Use the formulas for the sine, cosine, and tangent of the sum and difference of two angles, and for twice and angle and half an angle.
13. Use sine and cosine product and sum formulas.
14. Sketch graphs of the six trigonometric functions, and find periods and amplitudes.
15. Solve trigonometric equations and check for extraneous solutions.
16. Find, graph, evaluate, and solve inverse trigonometric functions.
17. Solve problems involving logarithmic and exponential expressions.
18. Find missing parts and areas of oblique triangles.
19. Solve problems using vectors.
20. Apply operations on complex numbers, sketch graphs of polar equations, and convert numbers and equations from rectangular to polar system and vice versa.

## Course Outline

### Unit 1 - Introductory Concepts

- Lesson 1 - Sets, Lines, and Coordinates
- Lesson 2 - Distance in a Plane, Functions, Angles
- Lesson 3 - The Trigonometric Ratios and Functions

### UNIT 2 - Approximate Values and Right Triangles

- Lesson 4 - Finding and Using Approximate Values of the Functions
- Lesson 5 - Reference Angles, Right Triangles, and Special Angles
- Lesson 6 - Solving, Applying Right Triangles

### Unit 3 - Trigonometric Identities

- Lesson 7 - Introduction to Trigonometric Identities
- Lesson 8 - Functions of Two Angles
- Lesson 9 - Half-Angle Identities, Products and Sums

### Unit 4 - Trigonometric Graphs and Equations

- Lesson 10 - Graphing the Trigonometric Functions
- Lesson 11 - Solving Trigonometric Equations
- Lesson 12 - Inverse Functions and Trigonometric Equations

### Unit 5 - Logarithms and Oblique Triangles

- Lesson 13 - Logarithms
- Lesson 14 - Calculating and Solving Logarithmic Equations
- Lesson 15 - Solving Oblique Triangles

### Unit 6- Vectors, Complex Numbers, Polar Coordinates

- Lesson 16 - Vectors and Vector Applications
- Lesson 17 - Complex Numbers and Operations
- Lesson 18 - Polar Coordinates and Equations

## Required Materials

(available through Follett virtual bookstore at <http://highschool.nebraska.bkstr.com>)

TI-83+ Graphing Calculator