

Instructor: Barbara West
Program: Mathematics
Course: Trigonometry
Unit: Trigonometric Functions
Lesson Title: Trigonometric Functions of Special Angles

Terminal Objective: Students will be able to define the six trigonometric functions, identify places where they can be employed, and correctly apply the trigonometric functions. Students will demonstrate this knowledge by correctly solving an electrical application problem and communicating their results to peers.

Enabling Objectives:

1. Students will learn the six trigonometric functions as related to the sides of a right triangle. (Specifically the 30° - 60° - 90° triangle and the 45° - 45° - 90° triangle)
2. Students will discuss and assess a conduit bending problem using appropriate mathematical and technological vocabulary.
3. Students will correctly apply trigonometric function to a conduit bending exercise in order to produce an appropriate and feasible solution. Students will demonstrate their understanding of the solution to the problem by performing the bending exercise.
4. Students will communicate their conclusions clearly and concisely to their peer groups.

PA Related Academic Standards:

Reading, Writing, Speaking, and Listening Standards

#1.1.11 F.

#1.1.11 G.

#1.2.11 A.

#1.4.11 B.

#1.5.11 A.

#1.5.11 B.

#1.5.11 C.

#1.6.11 A.

#1.6.11 D.

#1.6.11 E.

Mathematics Standards

#2.2.11 A.

#2.3.11 C.

#2.4.11 E.

#2.5.11 A.

#2.5.11 B.

#2.5.11 C.

#2.5.11D.

2.10.11 B.

Introduction:

1. Recall previous definitions of trigonometric functions using the unit circle.
2. Triangles are present in many technical fields and can be very useful in solving real-world problems.
3. Students will define, discuss, and apply the six trigonometric functions.
4. Students will observe demonstration, write the trigonometric relationships and the pneumatic device SOH-CAH-TOA.

5. Students will be evaluated based upon the accuracy of their mathematical calculations and conduit bending.
6. Students will answer the question: How do we apply trigonometry to conduit bending?

Main Content:

1. Terms and Definitions
 - A. Define the six trigonometric functions
 - B. Define the 30° - 60° - 90° triangle and the 45° - 45° - 90° triangle
2. Example
 - A. Uses one of the special triangles
 - B. Employs all six trigonometric functions
3. Describe a conduit bending exercise that will use a trigonometric function to find the hypotenuse of a right triangle.
 - A. Conduit benders construct 30° or 45° offsets
 - B. Reduce waste materials by making exact calculations
4. Group(4 or fewer students) discussions of possible solutions
 - A. Use correct vocabulary and appropriate language
5. Group calculation of solution.
 - A. Show appropriate work
 - B. Check for accuracy
 - C. Assess for reasonableness of solution
6. Group implementation of solution.
 - A. Bend conduit according to solution
 - B. Verify results by measuring lengths and angles
7. Group presentation of solution.
 - A. Explain solution to peers
 - B. Use appropriate terminology

Summary:

1. Review
 - A. Right Triangle Definitions of Trigonometric Functions
 - B. Application to conduit bending
2. Questions
 - A. What is conduit?
 - B. What are the right triangle definitions of the six trigonometric functions?
 - C. What other applications of the trigonometric functions can you think of?

Materials Needed:

1. 30° and 45° conduit benders
2. Conduit
3. Particle board
4. Protractors
5. Meter sticks