

MATH 0027 - TRIGONOMETRY

Catalog Description

Formerly known as MATH 8

Prerequisite: Completion of MATH D or MATH G with grade of "C" or better, or placement by matriculation assessment process

Hours: 72 lecture

Description: Fundamentals of trigonometry. Topics include review of algebraic functions, definitions of trigonometric and circular functions, graphs, identities and applications. Other material includes solving trigonometric equations, solving triangles using the Laws of Sines and Cosines, parametric equations, vectors, polar coordinates and graphs, polar representations of complex numbers and conic sections. (CSU)

Course Student Learning Outcomes

- CSLO #1: Solve trigonometric equations and triangles by manipulating trigonometric expressions and identities, vectors, and polar representations of complex numbers.
- CSLO #2: Interpret and construct graphs of trigonometric functions, conic sections, parametric equations, and vectors utilizing rectangular and polar coordinates.
- CSLO #3: Translate, model, and solve applied problems utilizing trigonometric functions and vectors.
- CSLO #4: Logically present clear, complete, accurate, and sufficiently detailed solutions to communicate reasoning and demonstrate the method of solving problems.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

72

Outside of Class Hours

144

Total Student Learning Hours

216

Course Objectives

Upon completion of this course, the student will be able to:

1. Analyze basic algebraic functions by graphing, evaluating, composing and finding inverses;
2. Evaluate the six trigonometric functions of special angles and their inverses;
3. Graph basic trigonometric functions and their transformations and have the ability to identify extreme values, zeros, period, asymptotes and transformations;
4. Verify trigonometric identities using valid substitutions and algebraic manipulations;
5. Generate solutions to trigonometric equations including the use of trigonometric identities;

6. Solve right and oblique triangles and related applications;
7. Use polar coordinate system to graph polar equations and evaluate roots and powers of complex numbers;
8. Perform basic operations on vectors including the dot product and solve simple applied problems using vectors;
9. Analyze and graph conic sections in rectangular and polar form;
10. Sketch parametric curves and convert parametric equations into rectangular form.

General Education Information

- Approved College Associate Degree GE Applicability
 - AA/AS - Comm & Analyt Thinking
 - AA/AS - Mathematical Skills
- CSU GE Applicability (Recommended-requires CSU approval)
 - CSUGE - B4 Math/Quantitative Reasoning
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Classroom Discussions
 - Example: Discuss a real world application of the ambiguous case of the Law of Sines. Grade based on participation.
- Problem Solving Examinations
 - Example: Find the n th roots of a complex number. This problem is graded based on the clarity, completeness, and correctness of the method used and of the roots found.
- Projects
 - Example: This project is used to examine how a microwave works by investigating the sine wave. The microwave's metal walls only reflect waves with amplitude that will fit in the oven. Use cheese to estimate actual wavelength of the microwave radiation used. The wavelength can be used to find the frequency by using the speed of light. Students can verify the frequency and wavelength given on the microwave. They can also discuss the relevance of the peaks, valleys and the nodes. <https://www.youtube.com/watch?v=kp33Zpr00Ck> Rubric grading.
- Skill Demonstrations
 - Example: Solve trigonometric equations using identities and algebraic manipulation. This question is graded based on the clarity, completeness, and correctness of the method used and of the solutions found.

Repeatable

No

Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. In a lecture format, the instructor will draw triangular figures, write charts with numerical patterns, reference to circular diagrams, and use "hands-on" manipulatives to help students evaluate six trigonometric functions of special angles. (Objective 2)

- Instructor provides a lecture on the Law of Sines or Cosines. The instructor then divides students into small groups and introduces a collaborative learning activity using the Law of Sines or the Law of Cosines. Students will focus on how to solve a triangular model with missing distances and angles. Students will practice reading scenarios, drawing appropriate diagrams, and developing a solution with peers. (Objectives 5 & 6)
- Following an instructor lecture on algebra, students will recognize, manipulate, and compare equations in rectangular form that represent conic sections. (Objective 9)

- Classic Textbook?: No
- OER Link:
- OER:

Other materials and-or supplies required of students that contribute to the cost of the course.

Distance Learning

- In a video lecture, the instructor will draw triangular figures, write charts with numerical patterns, reference to circular diagrams, and use manipulatives to demonstrate and help students evaluate six trigonometric functions of special angles. (Objective 2)
- Instructor provides a video lecture on the Law of Sines or Cosines. The instructor then divides students into small virtual groups and introduces a discussion topic about the Law of Sines or the Law of Cosines. Groups will collaborate on making a post focusing on how to solve a triangular model with missing distances and angles. Students will then peer review the posts. (Objectives 5 & 6)
- Following an instructor video lecture on algebra, students will recognize, manipulate, and compare equations in rectangular form that represent conic sections. (Objective 9)

Typical Out of Class Assignments

Reading Assignments

- Find and read about a real life example that represents periodic behavior and be prepared to discuss in class.
- Read article on construction of the pyramids showing the use of trigonometry, and be prepared to discuss in class.

Writing, Problem Solving or Performance

- After reading simple harmonic motion, create and draw sine and cosine waves to model objects in simple harmonic motion.
- Solve application problems in class such as finding missing forces on an object in static equilibrium using the concept of vectors.

Other (Term projects, research papers, portfolios, etc.)

Required Materials

- Trigonometry
 - Author: Young
 - Publisher: Wiley
 - Publication Date: 2017
 - Text Edition: 4th
 - Classic Textbook?: No
 - OER Link:
 - OER:
- Trigonometry
 - Author: Larson
 - Publisher: Cengage
 - Publication Date: 2018
 - Text Edition: 10th