

# MATH 0030S - JUST IN TIME SUPPORT FOR MATH 30 CALCULUS I

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## Catalog Description

Corequisite: Concurrent enrollment in Math 30

Hours: 18 lecture

Description: Just in time support covering the core prerequisite skills, competencies, and concepts from Calculus I. Intended for students who are concurrently enrolled in Math 30. Topics include competencies from College Algebra and Trigonometry that are needed to understand the basics of Calculus. (CSU)

## Course Student Learning Outcomes

- CSLO #1: Solve equations, including polynomial, absolute value, radical, rational, logarithmic, exponential, and trigonometric equations.
- CSLO #2: Graph functions, including polynomial, absolute value, radical, rational, logarithmic, exponential, and trigonometric functions and find any intercepts, extrema, periods, and/or asymptotes.
- CSLO #3: Evaluate the six trigonometric functions of special angles and their inverses.
- CSLO #4: Verify trigonometric identities using valid substitutions and algebraic manipulations.

## Effective Term

Fall 2022

## Course Type

Credit - Degree-applicable

## Contact Hours

18

## Outside of Class Hours

36

## Total Student Learning Hours

54

## Course Objectives

Students will be able to:

1. Solve equations, including polynomial, absolute value, radical, rational, logarithmic, exponential, and trigonometric equations.
2. Graph functions, including polynomial, absolute value, radical, rational, logarithmic, exponential, and trigonometric functions and find any intercepts, extrema, periods, and/or asymptotes.
3. Evaluate the six trigonometric functions of special angles and their inverses.
4. Verify trigonometric identities using valid substitutions and algebraic manipulations.

## General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

## Articulation Information

- CSU Transferable

## Methods of Evaluation

- Classroom Discussions
  - Example: 1. In class, small group collaborative learning activity - Students will be given several trigonometry expressions. They will investigate these expressions to determine which are equivalent and prove so using trigonometry identities. Feedback will be given based on notation used and steps shown. 2. After a mini lecture introducing a complex function, students will determine what the parent function is and will then recreate the complex function using functional composition showing all transformations. Feedback will be given based on how the transformations are used and in what order, and the clarity of notation used.
- Problem Solving Examinations
  - Example: 1. Find the real and complex roots of a given polynomial equation. This question is graded based on the clarity, appropriate mathematical vocabulary, and the correctness of the method used. 2. Graph a trigonometric function, identifying the period, intercepts, and location of the extrema. This question is graded based on the clarity, appropriate mathematical vocabulary, and the correctness of the method used.

## Repeatable

No

## Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. In class, small group collaborative learning activity - Students will compare rates of change at different locations on a given function. They will identify extrema, and then determine the rate of change on either side of the extrema and make predictions about how the rate of change changes as one gets closer to the extrema. (Objectives 1 & 2)
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 3 & 4).

Distance Learning

1. In small virtual groups students will compare rates of change at different locations on a given function. They will identify extrema, and then determine the rate of change on either side of the extrema and make predictions about how the rate of change changes as one gets closer to the extrema. (Objectives 1 & 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 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 3 & 4).

## Typical Out of Class Assignments

### Reading Assignments

- Using mathematical journals found in the library, research the Pythagorean Theorem and its relation to right triangles trigonometry and prepare a presentation about your findings to the class.
- After reading about Galileo's contribution to astronomy, investigate the projectile motion of an object thrown near the Earth's surface and its curved path under the force of gravity.

### Writing, Problem Solving or Performance

- Build a model of a rectangular playpen using a piece of string of fixed length that represents the perimeter of the playpen (ends tied together, forming a rectangle). Students will then measure the area for different rectangles (adjusting the corners of the playpen). Students will then make a prediction as to when the area will be maximized.
- Students will write about their understanding of the function called the difference quotient and how it relates to the value called the slope of a line.

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

### Required Materials

- Calculus: Early Transcendentals
  - Author: Briggs and Cochran
  - Publisher: Pearson
  - Publication Date: 2019
  - Text Edition: 3rd
  - Classic Textbook?: No
  - OER Link:
  - OER:
- Calculus: Volume I
  - Author: Strang and Herman
  - Publisher: OpenStax
  - Publication Date: 2017
  - Text Edition: 1st
  - Classic Textbook?: No
  - OER Link:
  - OER:

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