MATH-088: SUPPORT FOR CALCULUS I

Effective Term
Fall 2026

BOT Approval Date
12/11/2025

Discipline
MATH - Mathematics

Course Number
088

Course Title
Support for Calculus I

Short Title
Support for Calc I

Credit Status (CB 04)
D - Credit - Degree applicable

Units

Lab Units
1.00

Total Units
1.00

Hours

Lab Contact Hours
48-54

Out of Class Hours Lab
0.00

Total Contact Hours
48 - 54

Total Out of Class Hours
0 - 0

Total Student Learning Hours
48 - 54

Is this an existing Extensive Lab?
No

Do you want to propose this for Extensive Lab?
Yes

Distance Education
No

Catalog Description
This course covers topics necessary to be successful in Calculus I. It covers core prerequisite skills from trigonometry and algebra. Topics include polynomial, rational, exponential, logarithmic, and trigonometric functions and their graphs.

Requisites

Corequisite(s)

Corequisite(s) (must be taken simultaneously)
MATH-C2210

Codes

TOP Code (CB 03)
1702.00 - Mathematics Skills

CIP Code
27.0101 - Mathematics, General.

Repeatability Code
No

Grading Option
P/NP only

Minimum Qualifications

Minimum Qualifications	And/Or
Mathematics (Masters Required)	End

Learning Objectives

Learning Objectives

Learning Objective
1. Formulate strategies to address effective learning skills such as note-taking, time management, studying, and test-taking.
2. Evaluate numerical expressions with or without technology.
3. Simplify expression of various types such as complex fractions, exponential, logarithmic, rational, and radical expressions.
4. Solve equations and inequalities in one variable of various types such as linear, quadratic, polynomial, rational, exponential, logarithmic, radical, and trigonometric.
5. Distinguish and graph functions of various types including functions defined piecewise.
6. Evaluate the trigonometric functions using the unit circle and right triangles.
7. Manipulate and simplify a trigonometric expression using the trigonometric identities.
8. Develop and graph all trigonometric functions and understand their basic properties.
9. Research and discuss contributions to mathematics and STEM field by underrepresented and multicultural groups.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. Students will produce the simplified version of a complex fraction.
2. Students will derive all the trigonometric functions given a triangle with an angle and all sides of the triangle.
3. Students will develop a conceptual understanding of the relationship between a function and its graph.

Content

Course Lab Content

1. Affective learning skills
   a. Study skills
      i. Organization and time management
      ii. Test preparation
      iii. Test-taking skills
   b. Self-assessment
      i. Using feedback to improve work
      ii. Analyzing and correcting errors on a test
   c. Additional resources
      i. Peer study groups
      ii. Computer resources
      iii. Lab resources
      iv. Tutoring resources
2. Simplifying expressions
   a. Exponential expressions with laws of exponents
   b. Complex fractions and radicals
   c. Rationalizing denominators with radicals
   d. Laws of logarithms and change of base formula
3. Solving equations and inequalities
   a. Linear and absolute value
   b. Quadratic
      i. Solving by factoring
      ii. Completing the square
      iii. Quadratic formula
   c. Polynomial
      i. Factoring
      ii. Non-factorable polynomials
   d. Rational
   e. Radical
   f. Exponential
   g. Logarithmic
4. Functions (linear, absolute value, quadratic, polynomial, rational, radical, exponential, and, logarithmic)
   a. Domain and range
   b. Finding x and y intercepts
   c. Asymptotes
   d. End-behavior.
   e. Function notation and evaluation of a function
   f. Evaluation of a function with or without a calculator
   g. Graphing including transformations
   h. One-to-one property and inverse function
   i. Symmetry
5. Trigonometry
   a. Degree and radians measures
   b. Right triangle approach and unit circle approach
   c. Pythagorean theorem and identities
   d. Graphing trigonometric and inverse trigonometric functions
   e. Properties of trigonometric and inverse trigonometric functions
   f. Evaluating and simplifying trigonometric expressions
   g. Solving trigonometric equations
6. Contributions to mathematics and STEM field by underrepresented groups based on

a. Socioeconomics
b. Ethnicity and cultural background
c. Gender identity

7. Optional topics
a. Summation notation
b. Sequences and series

Methods of Instruction

Method

In-class Exercises

Integration

In class exercises will be completed individually and in group settings. Exercises will be used to practice expressing mathematical information visually, symbolically and numerically. An example of this would be graphing the basic trigonometric functions including x and y intercepts, maximum and minimum values, and their domain. Students will then apply changes in period, phase, and amplitude to generate new graphs.

Method

Discussion

Integration

In discussions, students will use mathematical models in practical and meaningful ways to solve real world applications that are culturally relevant. Discussions will foster collaboration and a deeper understanding of the material such as using exponential functions to model population growth for a country of their choice.

Method

Lecture

Integration

Instructors will lecture to present algebraic terminology and demonstrate how to solve absolute value, quadratic, and rational inequalities as well as exponential and logarithmic equations. Lectures will support the infusion of student feedback and interaction with the instructor.

Method

Activity

Integration

Students will work in groups of 3 to 4 people to help each other determine the appropriate trigonometric identities to simplify trigonometric expressions. This will reinforce students' ability to be resourceful and strengthen study skills.

Methods of Evaluation

Method

Class Participation

Integration

Class participation in the form of in-class activities may be used by the instructor to determine whether students are comprehending the material and to evaluate the students' ability to apply their knowledge of the learning objectives. For example, before introducing antiderivatives, students will discuss the rules of differentiation and explore how to reverse them. The instructor will then review their work, ensure they understand the process, and provide feedback to reinforce learning.

Method

Class Work

Integration

Students will receive a worksheet as part of the classwork, designed to assess their ability to evaluate and simplify functions. After completing the exercise, the instructor will provide the answer as well as supporting work, the student will then grade and correct their own work. This will be followed by a reflection to ensure they fully understand the content. Classwork will be evaluated based on correct and complete work.

Method

Group Projects

Integration

The instructor may use a group or individual project(s) to provide targeted feedback to enhance the students' understanding of learning objectives. For instance, students might be tasked with solving trigonometric proofs, where they must clearly demonstrate all trigonometric identities used from start to finish. They will then present their solutions and explain each step of the process. The class will then ask questions and discuss the trigonometric identities usage in calculus parent course. To evaluate, instructor will write a summary commending their efforts and providing any necessary corrections. Projects will be evaluated based on correct and complete work.

Method

Quizzes

Integration

Quizzes may be given to evaluate a students' proficiency in solving various types of single-variable equations. Each problem will be graded based on its completeness and accuracy, using a point scale.

Method

Class Participation

Integration

Class participation in the form of group discussions will be used to evaluate students understanding and appreciation of underrepresented and multicultural groups that have contributed to the field of mathematics. The instructor will evaluate the discussion based on context and depth of the discussion.

Assignments

Assignment Type

Writing

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

1. List all basic trigonometric identities.
2. Simplify tan(arcsec(2/x)) by using either trigonometric identities or by constructing a triangle.

Assignment Type
Writing

In-class and/or outside of class
In-class

Formative or Summative
Summative

Assignment
1. Create a library of graphs of basic functions (linear, absolute value, quadratic, power, polynomial, reciprocal, rational, exponential, radical, logarithmic, sine, cosine, tangent, cotangent, secant, cosecant, arcsine, arccosine, arctangent, arccotangent, arcsecant, arccosecant) and list their properties such as domain, range, intercepts, asymptotes, continuity, monotonicity, one-to-one property, symmetry etc.
2. Share the summaries with the class by creating posters or their digital equivalent.
3. Create a summary of the effects of linear transformations on the graphs of functions.
4. Summarize how the graphs of functions can be used to solve equations and inequalities in one variable of all types.

Assignment Type
Writing

In-class and/or outside of class
In-class

Formative or Summative
Formative

Assignment
Simplify difference quotients (f(a+h)-f(a))/h for a variety of f(x) functions and different values of a:
1. Simplify (sqrt(4+h)-2)/h
2. Simplify (1/(3+h)-1/3)/h
3. Simplify (sin(pi/4+h)-sin(pi/4))/h
4. Simplify ((1+h)^2-1)/h

Assignment Type
Writing

In-class and/or outside of class
In-class

Formative or Summative
Formative

Assignment
1. Consider the following functions: h(t) = \sqrt{3t + 5}, k(s) = \ln(2s + 1).
2. Write the following compositions hok=h(k) and koh=k(h) and compare them. Clearly identify the independent variable in each composition. Are the two compositions the same?
3. Can you find two distinct functions f and g, whose compositions fog, gof are the same?
4. Consider the following functions: m(x) = (x^2 + 1)^3, n(x) = e{x^2}, p(x) = \frac{1}{x^2 + 4}
5. Write each of them as a composition of two functions f(x) and g(x). Clearly identify the inner and outer functions in each composition.
6. Share your solutions and discuss any challenges you faced with the class.

Assignment Type
Reading

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

To understand and appreciate the contributions of diverse mathematicians and cultures to the field of mathematics, while applying precalculus concepts to real-world problems, please do the following:
1. Explore the website, https://www.biography.com/famous-mathematicians, and choose a mathematician from a historically underrepresented group (e.g., women, people of color, LGBTQ+ individuals), read their biography, and highlight their contributions to mathematics.
2. Share with the class how their work has influenced modern mathematical practices and any challenges they faced due to their identity.

Course Materials

Textbooks

Cohen, David; Lee, Theodore B. ; Sklar, David (2017). Precalculus, 7th Cengage. ISBN: 13: 9781305663107
Stewart, J., et al. (2021). Calculus: Single Variable Calculus Early Transcendentals. 9th ed.: Cengage. ISBN: 13: 9780357022269
Hass, J., et al. (2023). Thomas' Calculus: Early Transcendentals. 15th ed.: Pearson. ISBN:13: 9780137728657

Open Educational Resources

Abramson, J. P. (2021). Precalculus 2E. OpenStax. ISBN 978-1-951693-39-8 - Web Version updated on Jun 16, 2025.
Strang, G (2022), Calculus Volume 1. OpenStax. ISBN-13: 978-1-947172-13-5

Class Size Information

Class Size

30

Class Size Category

C - Remedial or advanced math 30

Diversity and Inclusion

Course Design and Materials: Course will incorporate diverse perspectives, authors, and examples that reflect a variety of cultures, identities, and lived experiences. Instructional materials will be reviewed regularly to ensure representation, inclusivity, and alignment with equity-minded practices across disciplines.

Inclusive Learning Environment: Instructors will establish classroom norms and policies that promote respect, civil discourse, and belonging in both online and face-to-face classes. Clear expectations for communication and engagement will support a learning space where all students feel valued and heard.

Accessible Instruction: Course content will be delivered using accessible design. Materials will follow accessibility guidelines within the CMS, including captioned media, readable document formats, and multiple means of engagement to support diverse learning.

Equitable Teaching Practices: Instructors will use transparent and grading criteria, varied assessment methods, and timely feedback to promote fairness and student success. Opportunities for revision, reflection, and multiple demonstrations of learning may be incorporated when appropriate to the discipline.

Culturally Responsive Pedagogies: Instructional strategies will encourage critical thinking about diverse perspectives and systems of power relevant to the course content. Faculty will foster opportunities for students to connect course material to real-world contexts.

Ongoing Reflection and Improvement: Faculty will engage in continuous professional development related to IDEAA principles and reflect on course practices using metacognition to identify opportunities for increased equity, inclusion, and accessibility.

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

The content highlights and discusses the contributions of mathematicians from underrepresented groups such as women, people of color, and people from different cultures. Assignments include readings and discussions around the contributions of underrepresented groups to mathematics, while the method of evaluation will provide an opportunity for the instructor to ensure students appreciate diversity in mathematics. The objectives include research on culturally relevant content and accentuate diversity and inclusion.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

We have incorporated a variety of assignments that include formative, summative, reading, and writing. The methods of evaluation have also been designed to allow for a variety of assessments such as quizzes, discussions, and group work. Also, an OER textbook is included which promotes equity by significantly lowering the cost of taking the course and removing additional barriers for learners.

Interactions

Explain how the course will incorporate student-to-student interaction.

Students will interact with each other through in-class discussions on different topics. Students will answer each other's questions and share their diverse perspectives as well as relevant outside information related to the course. Group activities may be used to develop a deeper understanding of topics and provide opportunities for collaboration while centering student voices. For example, students could work together in a group to compare and contrast different methods of simplifying trigonometric expressions to ensure their understanding.

Explain how the course will incorporate instructor-to-student interaction.

The instructor will introduce the course material, explain concepts and relationships between concepts, and demonstrate the techniques for solving problems. Instructor will grade the assignments according to the rubric and provide timely feedback on all assessments. For example, the instructor can moderate the discussion involving different ways to evaluate numerical expressions using the order of operations.

Explain how the course will incorporate student-to-content interaction.

Students will interact with accessible materials such as the textbooks, written lecture materials or transcripts of lectures, illustrative images, charts and graphs, video or audio lectures. In-class activities will allow students to practice content material such as the graphical, numerical, and algebraic approaches to determining extrema of quadratic functions.

Explain how the course will incorporate student-to-self interaction (metacognitive).

This course incorporates metacognition by encouraging students to actively monitor and modify their thought processes. For example, after learning the properties of exponents students will reflect on the proper way of applying each rule and will be encouraged to develop their own preferred strategy.

Key: 3156