

MATH 160 – PRECALCULUS – SYLLABUS

Department of Mathematics
Millersville University

Description

For students preparing to take Calculus I (MATH 161) who need additional background. Covers topics in which beginning calculus students are often deficient: elementary functions, curve sketching, theory of equations, inequalities, trigonometry and analytic geometry. No credit toward a math major. (4.0 credits)

This course may be taken for general education credit (G2) and satisfies the Foundations for Lifelong Learning Mathematics Requirement.

Prerequisites

Two years of high school algebra, one year of high school geometry and trigonometry, and math placement testing/evaluation before registration; or a grade of C- or better in MATH 101.

Course Objectives

Upon successfully completing MATH 160 students will demonstrate that they:

- can correctly use mathematical notation and terminology,
- understand the properties of algebraic, trigonometric, logarithmic, and exponential functions, and can use this understanding to solve applied problems,
- can use a graphing calculator appropriately to experiment and to confirm mathematical hypotheses.

Assessment

Assessment of student achievement of the course objectives will vary from one instructor to another. Typical assessment will be made through work in class, homework, and examinations administered in a traditional face-to-face classroom environment, in an online environment, or in a hybrid of face-to-face and online assessments.

Use of Technology

Students are required to have access to a graphing calculator, preferably one supported by the department (the TI 83/83+, 84, or 86). Instructors will ensure that students have learned how to use the calculator to graph functions. Calculator instruction should conform to the department's policies, which state:

- Graphical and numerical evidence should be presented as an aid to conjecture and comprehension. They should not as a substitute for rigorous proof, nor should they replace the acquisition of appropriate symbolic manipulation skills.
- Students should understand the limitations of technology (for example, by seeing situations in which graphical or numerical evidence is unreliable or inconclusive).

In MATH 160, the instructor will demonstrate, and students will learn to use calculators to investigate the graphs of functions. Instructors should use their discretion in deciding how they teach this skill.

Topics

Topics may be covered in a different order than listed below at the instructor's discretion, providing all the topics are covered during the course. However, instructors should plan to begin trigonometry no earlier than the 10th week of the term, to accommodate students who are concurrently enrolled in Math 110.

1. Midpoint Formula, Distance Formula, and Equation of Circle Graphs, Lines, and Functions
 - a) Functions
 - b) Transformations of functions
 - c) Composite functions
 - d) Inverse functions
 - e) Variation (recommended if time permits)
2. Polynomials and Rational Functions
 - a) Quadratic functions
 - b) Polynomial functions of higher degree (Note: Instructors are not required to cover synthetic division)
 - c) Complex numbers
 - d) Roots of polynomial functions
 - e) Rational functions
 - f) Nonlinear inequalities
3. Exponential Functions and Logarithms
 - a) Exponential functions
 - b) Logarithmic functions
 - c) Properties of logarithms
 - d) Exponential and logarithmic equations
 - e) Applications of exponential and logarithmic functions
4. Trigonometry
 - a) Radian and degree measure
 - b) Trigonometric functions and the unit circle
 - c) Right triangle trigonometry
 - d) Trigonometric functions of arbitrary angles
 - e) Graphs of trigonometric functions

- f) Inverse trigonometric functions
 - g) Applications of trigonometric functions
 - h) Trigonometric identities
 - i) Solving trigonometric equations
 - j) Sum and difference formulas
 - k) Multiple-angle formulas (Note: Instructors are not required to cover product-to-sum formulas)
5. Conics (recommended if time permits)
- a) Parabolas
 - b) Ellipses
 - c) Hyperbolas

Recently Used Textbooks

- Larson, Ronald, Precalculus: A Concise Course (3rd edition). Boston, MA: Houghton Mifflin Company, 2014.