AP Calculus AB 1
MTHH071057
Credits: 0.5 units / 5 hours | NCAA Approved

Course Description

In this course students will gain experience in the use of calculus methods and learn to apply these methods to real-world problems. In this first semester course, students will become acquainted with derivatives, limits, approximations, applications, and modeling. Students will work with functions that are represented graphically, numerically, analytically, and verbally, and will learn to understand the connections between these representations. This course will focus on functions and function notation, inequalities, exponential and logarithmic functions, transformation of functions, trigonometric, power, polynomial, and rational functions, algebraic techniques for finding limits, one-sided and infinite limits, and continuity. This is the first semester of the AP Calculus AB series that will prepare students to take the AP Calculus AB exam. This course has been approved by College Board. A graphing calculator is required.

Prerequisites: two years of Algebra, one year of Geometry, and one year of Pre-Calculus prior to enrolling in this course.

Course Assessments

3 Unit Evaluations, 3 Projects, 3 Progress Tests, 3 Teacher Connect Activities

Course Objectives

When you have completed the materials in this course, you should be able to:
1. Describe various types of functions and be able to differentiate between them.
2. Understand polar coordinates and their graphs.
3. Work with parametric equations and conic sections.
4. Define and find a limit.
5. Know the difference between a one-sided and infinite limit.
6. Apply continuity to a point and a closed or open interval.
7. Understand and use the differentiation rules.
8. Find the derivative of various functions.
9. Use differentiability of various functions.
10. See how derivatives apply to real-life problems.
11. Solve problems using the first and second derivative test.

Course Outline

Unit 1: Limits & Their Properties

Teacher Connect 1

Lesson 1: A Preview of Calculus

Lesson 2: Finding Limits Graphically and Numerically

Lesson 3: Evaluating Limits Analytically

Lesson 4: Continuity and One-Sided Limits

Lesson 5: Infinite Limits

Unit 1 Evaluation

Project 1

Progress Test 1

Unit 2: Differentiation

Lesson 6: The Derivative and the Tangent Line Problem

Lesson 7: Basic Differentiation Rules and Rates of Change

Lesson 8: Product and Quotient Rules and Higher Order Derivatives

Lesson 9: The Chain Rule

Lesson 10: Implicit Differentiation

Lesson 11: Related Rates

Unit 2 Evaluation

Teacher Connect 2

Project 2

Progress Test 2

Unit 3: Applications of Differentiation

Lesson 12: Extrema on an Interval

Lesson 13: Rolle's Theorem and the Mean Value Theorem

Lesson 14: Increasing and Decreasing Functions and the First Derivative Test

Lesson 15: Concavity and the Second Derivative Test

Lesson 16: Limits at Infinity

Lesson 17: A Summary of Curve Sketching

Lesson 18: Optimization Problems

Lesson 19: Newton's Method

Lesson 20: Differentials

Unit 3 Evaluation

Teacher Connect 3

Project 3

Progress Test 3

Required Textbook and Materials
(available through Follett virtual bookstore at http://highschool.nebraska.bkstr.com)

Textbook: *Calculus (AP ® Edition)*, *10th ed.* by Larson and Edwards. National Geographic/Cengage Learning. ISBN: 9781285060309

TI-83+ Graphing Calculator or similar