

Advanced Placement® ** Calculus AB

COURSE DESCRIPTION:

This is a college level course that prepares students for the Advanced Placement exam in May. This course introduces limits, differentiation, and integration of functions. Students will find and evaluate finite and infinite limits graphically, numerically, and analytically. They will find derivatives using a variety of methods including The Chain Rule and Implicit Differentiation. They will use the First Derivative Test and The Second Derivative Test to analyze and sketch functions. Each unit contains exam preparation content for the AP Calculus AB exam.

COURSE OBJECTIVES:

After completing the course, students will be able to:

- Understand the concepts presented in an introductory college biology course
- Acquire investigative and laboratory skills needed in the study of biology
- Promote interest in the study of the biological sciences and appreciation for the place of science in modern society
- Equip and prepare students for the Advanced Placement Biology examination

PREREQUISITES:

Knowledge of algebra, geometry, trigonometry, analytic geometry, and elementary functions

COURSE LENGTH:

Two semesters

REQUIRED TEXT:

Calculus, Eighth Edition, Houghton Mifflin, 2006 (included in the course)

REQUIRED MATERIALS:

Graphing calculator

COURSE OUTLINE:

Overview

Limits and Their Properties

- Limits and Their Properties: Introduction
- Linear Models and Rates of Change
- Functions, Graphs of Functions, and Finding Models to Data
- Finding Limits Graphically, Numerically, and Analytically
- Continuity, One-Sided Limits, and Infinite Limits

Differentiation

- Differentiation: Introduction
- The Derivative
- Differentiation
- Implicit Differentiation

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Advanced Placement® ** Calculus AB (continued)

COURSE OUTLINE (continued):

Applications of Differentiation

- Applications of Differentiation: Introduction
- Extreme and The Mean Value Theorem
- Derivative Tests, Limits, and Graphs
- Optimization, Newton's Method, and Differentials

Semester 1 Exam

Integration

- Integration: Introduction
- Antiderivatives and Indefinite Integration
- Area, Riemann Sums, and Definite Integrals
- The Fundamental Theorem of Calculus
- Integration by Substitution and Numerical Integration

Logarithmic, Exponential, and other Transcendental Functions

- Logarithmic, Exponential, and other Transcendental Functions: Introduction
- The Natural Logarithmic Function
- Inverse Functions and Exponential Functions
- Inverse Trigonometric Functions
- Hyperbolic Functions

Differential Equations

- Differential Equations: Introduction
- Slope Fields, Euler's Method, and Growth and Decay
- Separation of Variables and First Order Linear Differential Equations

Applications of Integration

- Applications of Integration: Introduction
- Area of a Region Between Two Curves
- Volumes, Arc Lengths, and Surfaces
- Work, Moments, and Fluids

Semester 2 Exam

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