

AP CALCULUS AB SYLLABUS

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COURSE OVERVIEW

For many students in my class, Calculus AB is just the beginning of further study in higher mathematics. It is my goal that these students succeed in future mathematics courses because of a strong foundation and understanding, not because of memorization of rules.

COURSE OUTLINE

I. Functions, Graphs, and Limits

- Finding Limits Graphically and Numerically
- Evaluating Limits Analytically
- Continuity and One-Sided Limits
- Infinite Limits
- Intermediate Value Theorem (IVT)

II. Derivatives

Differentiation

- Basic Differentiation Rules and Rates of Change
- The Product and Quotient Rules and Higher-Order Derivatives
- The Chain Rule
- Implicit Differentiation
- Related Rates

Applications of Differentiation

- Extrema on an Interval
- Rolles's Theorem and the Mean Value Theorem (MVT)
- Increasing and Decreasing Functions and the First Derivative Test
- Concavity and the Second Derivative Test
- Limits at Infinity
- Curve Sketching
- Optimization Problems
- Newton's Method
- Differentials
- Business and Economics Applications
- Slope Fields

III. Integrals

Integration

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

Logarithmic, Exponential, and Other Transcendental Functions

- The Natural Logarithmic Function: Differentiation & Integration
- Inverse Functions
- Exponential Functions: Differentiation and Integration
- Bases Other than e and Applications
- Differential Equations: Growth & Decay; Separation of Variables
- Inverse Trigonometric Functions: Differentiation & Integration

Applications of Integration

- Area of a Region between Two Curves
- Volume of Solids: The Disc/Washer Method/Cross Sections

CALCULATOR USE

Students are required to use a graphing calculator and TI-83/84 calculators. Students are required to perform the following tasks on the graphing calculator:

- Graph a function and its derivatives within an arbitrary viewing window
- Find roots of functions
- Finding Intersections of functions
- Numerically calculate the derivative of a function
- Numerically calculate the value of a definite integral

Graphing calculators are used regularly to help solve problems, experiment, interpret results, and support conclusions.

TEXTBOOK

Each student has a copy of the primary textbook for this course which is:

- Larson, Edwards, "Calculus of a Single Variable, AP Edition", 9th Ed., 2010
- Student Solutions Guide
- Barron's AP Calculus, 12th Ed.
- Mr. White's Newton Guide

Assessment

Students will have weekly Quizzes or a Test of learned material. Take Home Tests and AP style Testing. Homework is due daily.

All students are required to take a midterm exam. If the student satisfies the grade and attendance policy, then the student may exempt the second semester exam.

Extra Help

Help is provided after School, please advise me in advance so that I can meet you in room 906.