Walter Payton College Prep

AP Calculus AB Course Outline

Textbook: Calculus from Graphical, Numerical, and Symbolic Points of View (Ostebee & Zorn)

For more information of the College Board's AP Calculus AB learning objectives see the College Board website: https://apstudent.collegeboard.org/apcourse/ap-calculus-ab

Chapter 1 - Functions and Derivatives - the Graphical View

- The Idea of a Derivative
- Evaluating limits (not at infinity)
- Estimating Derivatives (average rate of change, instantaneous rate of change)
- Geometry of Derivatives
- Second Derivatives
- Position, Velocity, Acceleration

Chapter 2 - Evaluating Derivatives Symbolically

- Limit definition of derivative
- Derivatives of Power functions and Polynomials
- Using derivatives and Anti-derivatives
    - Stationary points
    - Absolute and relative extrema
    - Points of inflection
- Derivatives of exponential and logarithmic functions
- Derivatives of trigonometric functions

Chapter 3 - New Derivatives from Old

- Product and Quotient Rules
- Chain Rule
- Implicit Functions and Implicit Differentiation
- Inverse Functions and Inverse Trig Functions
- Finding Derivatives and Practicing Anti-derivatives (Guess and Check)

Chapter 4 - Using the Derivative

- Slope Fields
- Limits, Infinity, and L'Hoptial
- Optimization
- Related Rates
- Why Continuity Matters
- The Mean Value Theorem (MVT)

Chapter 5 - The Integral

- The Integral as a Signed Area
- The Area Function
- The Fundamental Theorem of Calculus
- Finding Anti-derivatives with Substitution

- Approximating Sums: The Integral as a Limit

Chapter 6 - Using the Integral

- Measurement and the Definite Integral
- Finding Volumes by Integration
- Work Problems
- Separating Variables: Differential Equations

Chapter 7 - Anti-differentiation Techniques

- Trigonometric Antiderivatives