AP Calculus AB Course Outline

Unit I Preparation for Calculus

1. Algebra
2. Functions and Their Graphs
3. Trigonometry
4. Conic Sections
5. A preview of Calculus

Unit II Limits and Their Properties

1. Finding Limits Graphically and Numerically
2. Evaluating Limits Analytically
3. Continuity and One-Sided Limits
4. Limits to Infinity

Unit III Differentiation

1. Derivatives and the Tangent Line
2. Basic Differentiation Rules and Rates of Change
3. The Product and Quotient Rule
4. Higher Order Derivatives
5. The Chain Rule
6. Implicit Differentiation

Unit IV Applications of Differentiation

1. Related Rates
2. Extrema on an Interval
3. Rolle's Theorem and the Mean Value Theorem
4. Increasing and Decreasing Functions (The First Derivative Test)
5. Concavity of a Function (The Second Derivative Test)
6. Sketching the Graph of a Function Using Derivatives
7. Optimization Problems
8. Newton's Method
9. Differentials
10. L'Hopital's Rule

Unit V Integration

1. Antiderivatives and Indefinite Integration
2. Area Under a Curve
3. The Fundamental Theorem of Calculus (Part 1)
4. The Fundamental Theorem of Calculus (Part 2)
5. Integration by Substitution

Unit VI Logarithmic, Exponential and Inverse Trigonometric Functions

1. The Natural Logarithmic Function and Differentiation
2. The Natural Logarithmic Function and Integration
3. Exponential Functions; Differentiation and Integration
4. Differential Equations; Separation of Variables
5. Inverse Trigonometric Functions and Differentiation
6. Inverse Trigonometric Functions and Integration

Unit VII Applications of Integration

1. Area of a Region Between two Curves
2. Volume of a Solid of Revolution; The Disk Method
3. Volume of a Solid of Revolution; The Shell Method
4. Arc Length and Surface of Revolution
5. Work
6. Moments, Centers of Mass, and Centroids
7. Fluid Pressure and Fluid Force

Unit VIII Other Integration Techniques (As time permits after the AP Exam)

1. Basic Integration Rules
2. Integration by Parts
3. Trigonometric Integrals
4. Trigonometric Substitution
5. Partial Fractions