| AP Calculus BC | |
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| **Unit** | **Concepts and Skills** |
| **Unit 1: Limits and Continuity** | 1.1 Introducing Calculus: Can Change Occur at an Instant?<br>1.2 Defining limits and Using Limit Notation<br>1.3 Estimating Limit Values from Graphs<br>1.4 Estimating Limit Values from Tables<br>1.5 Determining Limits Using Algebraic Properties of Limits<br>1.6 Determining Limits Using Algebraic Manipulation<br>1.7 Selecting Procedures for Determining Limits<br>1.8 Determining Limits Using the Squeeze Theorem<br>1.9 Connecting Multiple Representations of Limits<br>1.10 Exploring Types of Discontinuities<br>1.11 Defining Continuity at a Point<br>1.12 Confirming Continuity Over an Interval<br>1.13 Removing Discontinuities<br>1.14 Connecting Infinite Limits and Vertical Asymptotes<br>1.15 Connecting Limits at Infinity and Horizontal Asymptotes<br>1.16 Working with the Intermediate Value Theorem |
| **Unit 2: Differentiation Basics** | 2.1 Defining Average and Instantaneous Rates of Change at a Point<br>2.2 Defining the Derivative of a Function and Using Derivative Notation<br>2.3 Estimating Derivatives of a Function at a Point<br>2.4 Connecting Differentiability and Continuity<br>2.5 Applying the Power Rule |

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| | 2.6 Derivative Rules: Constant, Sum, Difference, and Constant Multiple<br>2.7 Derivatives of cosx, sinx, $e^x$, and lnx<br>2.8 The Product Rule<br>2.9 The Quotient Rule<br>2.10 Finding Derivatives of Tangent, Cotangent, Secant, and Secant Functions |
| **Unit 3: Differentiation- Composite, Implicit, and Inverse Functions + Related Rates** | 3.1 The Chain Rule<br>3.2 Implicit Differentiation<br>4.4 Introduction to Related Rates<br>4.5 Solving Related Rates Problems<br>3.3 Differentiating Inverse Functions<br>3.4 Differentiating Inverse Trigonometric Functions<br>3.5 Selecting Procedures for Calculating Derivatives<br>3.6 Calculating Higher-Order Derivatives |
| **Unit 4: Contextual Applications of Differentiation** | 4.1 Interpreting the Meaning of the Derivative in Context<br>4.2 Straight-Line Motion: Connecting Position, Velocity, and Acceleration<br>4.3 Rates of Change in Applied Contexts Other Than Motion<br>~~4.4 Introduction to Related Rates~~<br>~~4.5 Solving Related Rates Problems~~<br>4.6 Approximating Values of a Function Using Local Linearity and Linearization<br>4.7 Using L'Hopital's rule for Determining Limits of Indeterminate Forms |
| **Unit 5: Analytical Applications of Differentiation** | 5.1 Using the Mean Value Theorem<br>5.2 Extreme Value Theorem, Global Versus Local Extrema, and Critical Points |

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| | 5.3 Determining Intervals on Which a Function is Increasing or Decreasing<br>5.4 Using the First Derivative Test to Determine Relative (Local) Extrema<br>5.5 Using the Candidates Test to Determine Absolute (Global) Extrema<br>5.6 Determining Concavity of Functions Over Their Domains<br>5.7 Using the Second Derivative Test to Determine Extrema<br>5.8 Sketching Graphs of Functions and Their Derivatives<br>5.9 Connecting a Function, Its First Derivative, and Its Second Derivative<br>5.10 Introduction to Optimization Problems<br>5.11 Solving Optimization Problems<br>5.12 Exploring Behaviors of Implicit Relations |
| **Unit 6A: Integration and Accumulation of Change** | 6.1 Exploring Accumulation of Change<br>6.2 Approximating Areas with Riemann Sums<br>6.3 Riemann Sums, Summation Notation, and Definite Integral Notation<br>6.4 The Fundamental Theorem of Calculus and Accumulation Functions<br>6.5 Interpreting the Behavior of Accumulation Functions Involving Area<br>6.6 Applying Properties of Definite Integrals<br>6.7 The Fundamental Theorem of Calculus and Definite Integrals<br>6.8 Finding Antiderivatives and Indefinite Integrals: Basic Rules and Notation |
| **Unit 6B Advanced Techniques of Differentiation** | 6.9 Integrating Using Substitution<br>6.10 Integrating Functions Using Long Division and Completing the Square<br>6.11 Integrating Using Integration by Parts<br>6.12 Using Linear Partial Fractions |

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| | 6.13 Evaluating Improper Integrals<br>6.14 Selecting Techniques for Antidifferentiation |
| **Unit 7: Differential Equations** | 7.1 Modeling Situations with Differential Equations<br>7.2 Verifying Solutions for Differential Equations<br>7.3 Sketching Slope Fields<br>7.4 Reasoning Using Slope Fields<br>7.5 Approximating Solutions Using Euler's Method<br>7.6 Finding General Solutions Using Separation of Variables<br>7.7 Finding Particular Solutions Using Initial Conditions and Separation of Variables<br>7.8 Exponential Models with Differential Equations<br>7.9 Logistic Models with Differential Equations |
| **Unit 8: Applications of Integration** | 8.1 Finding the Average Value of a Function on an Interval<br>8.2 Connecting Position, Velocity, and Acceleration of Functions Using Integrals<br>8.3 Using Accumulation Functions and Definite Integrals in Applied Contexts<br>8.4 Finding the Area Between Curves Expressed as Functions of x<br>8.5 Finding the Area Between Curves Expressed as Functions of y<br>8.6 Finding the Area Between Curves that Intersect at More than Two Points<br>8.7 Volumes with Cross Sections: Squares and Rectangles<br>8.8 Volumes with Cross Sections: Triangles and Semicircles<br>8.9 Volume with Disc Method: Revolving Around the x- or y-Axis<br>8.10 Volume with Disc Method: Revolving Around Other Axes<br>8.11 Volume with Washer Method: Revolving Around the x-or y-Axis<br>8.12 Volume with Washer Method: Revolving Around Other Axes |

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| | 8.13 The Arc Length of a Smooth, Planar Curve and Distance Traveled |
| **Unit 9: Parametric Equations, Polar Coordinates, and Vector Valued Functions** | 9.1 Defining and Differentiating Parametric Equations<br>9.2 Second Derivatives of Parametric Equations<br>9.3 Finding Arc Lengths of Curves Given by Parametric Equations<br>9.4 Defining and Differentiating Vector-Valued Functions<br>9.5 Integrating Vector-Valued Functions<br>9.6 Solving Motion Problems Using Parametric and Vector-Valued Functions<br>9.7 Defining Polar Coordinates and Differentiating in Polar Form<br>9.8 Find the Area of a Polar Region or the Area Bounded by a Single Polar Curve<br>9.9 Finding the Area of the Region Bounded by Two Polar Curves |
| **Unit 10: Infinite Sequences and Series** | 10.1 Defining Convergent and Divergent Infinite Series<br>10.2 Working with Geometric Series<br>10.3 The nth Term Test for Divergence<br>10.4 Integral Test for Convergence<br>10.5 Harmonic Series and p-Series<br>10.6 Comparison Tests for Convergence<br>10.7 Alternating Series Tests for Convergence<br>10.8 Ratio Test for Convergence<br>10.9 Determining Absolute or Conditional Convergence<br>10.10 Alternating Series Error Bound<br>10.11 Finding Taylor Polynomial Approximations of Functions<br>10.12 Lagrange Error Bound<br>10.13 Radius and Interval of Convergence of Power Series<br>10.14 Finding Taylor or Maclaurin Series for a Function<br>10.15 Representing Functions as Power Series |