

Unit 1 – Limits and Continuity

- 1.1 – Introducing Calculus: Can Change Occur at an Instant?
- 1.2 – Defining Limits and Using Limit Notation
- 1.3 – Estimating Limit Values from Graphs
- 1.4 – Estimating Limit Values from Tables
- 1.5 – Determining Limits Using Algebraic Properties of Limits
- 1.6 – Determining Limits Using Algebraic Manipulation
- 1.7 – Selecting Procedures for Determining Limits
- 1.8 – Determining Limits Using the Squeeze Theorem (Sandwich Theorem)
- 1.9 – Connecting Multiple Representations of Limits
- 1.10 – Exploring Types of Discontinuities
- 1.11 – Defining Continuity at a Point
- 1.12 – Confirming Continuity over an Interval
- 1.13 – Removing Discontinuities
- 1.14 – Connecting Infinite Limits and Vertical Asymptotes
- 1.15 – Connecting Limits at Infinity and Horizontal Asymptotes
- 1.16 – Working with the Intermediate Value Theorem (IVT)

Unit 2 – Differentiation: Definition and Basic Derivative Rules

- 2.1 – Defining Average and Instantaneous Rate of Change at a Point
- 2.2 – Defining the Derivative of a Function and Using Derivative Notation
- 2.3 – Estimating Derivatives of a Function at a Point
- 2.4 – Connecting Differentiability and Continuity: Determining When Derivatives Do and Do Not Exist
- 2.5 – Applying the Power Rule
- 2.6 – Derivative Rules: Constant, Sum, Difference, and Constant Multiple
- 2.7 – Derivatives of  $\cos x$ ,  $\sin x$ ,  $e^x$ , and  $\ln x$
- 2.8 – The Product Rule
- 2.9 – The Quotient Rule
- 2.10 – Finding the Derivatives of Tangent, Cotangent, Secant, and/or Cosecant Functions

Unit 3 – Differentiation: Composite, Implicit, and Inverse Functions

- 3.1 – The Chain Rule
- 3.2 – Implicit Differentiation
- 3.3 – Differentiating Inverse Functions
- 3.4 – Differentiating Inverse Trigonometric Functions
- 3.5 – Selecting Procedures for Calculating Derivatives
- 3.6 – Calculating Higher-Order Derivatives

Unit 4 – Contextual Applications of Differentiation

- 4.1 – Interpreting the Meaning of the Derivative in Context
- 4.2 – Straight-Line Motion: Connecting Position, Velocity, and Acceleration
- 4.3 – Rates of Change in Applied Contexts Other Than Motion
- 4.4 – Introduction to Related Rates
- 4.5 – Solving Related Rates Problems
- 4.6 – Approximating Values of a Function Using Local Linearity and Linearization

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4.7 – Using L'Hospital's Rule for Determining Limits of Indeterminate Forms

Unit 5 – Analytical Applications of Differentiation

5.1 – Using the Mean Value Theorem

5.2 – Extreme Value Theorem, Global versus Local Extrema, and Critical Points

5.3 – Determining Intervals of Which a Function Is Increasing or Decreasing

5.4 – Use the First Derivative Test to Determine Relative (Local) Extrema

5.5 – Using the Candidates Test to Determine Absolute (Global) Extrema

5.6 – Determining Concavity of Functions over Their Domains

5.7 – Using the Second Derivative Test to Determine Extrema

5.8 – Sketching Graphs of Functions and Their Derivatives

5.9 – Connecting a Function, Its First Derivative, and Its Second Derivative

5.10 – Introduction to Optimization Problems

5.11 – Solving Optimization Problems

5.12 – Exploring Behaviors of Implicit Relations

Unit 6 – Integration and Accumulation of Change

6.1 – Exploring Accumulations of Change

6.2 – Approximating Areas with Riemann Sums

6.3 – Riemann Sums, Summation Notation, and Definite Integral Notation

6.4 – The Fundamental Theorem of Calculus and Accumulation Functions

6.5 – Interpreting the Behavior of Accumulation Functions Involving Area

6.6 – ~~Applying Properties of Definite Integrals~~

6.7 – The Fundamental Theorem of Calculus and Definite Integrals

6.8 – Finding Antiderivatives and Indefinite Integrals (Basic Rules and Notation)

6.9 – ~~Integrating Using Substitution~~

6.10 – ~~Integrating Functions Using Long Division and Completing the Square~~

6.11(BC) – ~~Integrating Using Integration by Parts~~

6.12(BC) – ~~Using Linear Partial Fractions~~

6.13(BC) – ~~Evaluating Improper Integrals~~

6.14 – ~~Selecting Techniques for Antidifferentiation~~

Unit 7 – Differential Equations

7.1 – ~~Modeling Situations with Differential Equations~~

7.2 – ~~Verify Solutions for Differential Equations~~

7.3 – ~~Sketching Slope Fields~~

7.4 – ~~Reasoning Using Slope Fields~~

7.5(BC) – ~~Approximating Solutions Using Euler's Method~~

7.6 – Finding General Solutions Using Separation of Variables

7.7 – Finding Particular Solutions Using Initial Conditions and Separation of Variables

7.8 – ~~Exponential Models with Differential Equations~~

7.9(BC) – ~~Logistic Models with Differential Equations~~

Unit 8 – Application of Integration

8.1 – ~~Finding the Average Value of a Function on the Interval~~

8.2 – ~~Connecting Position, Velocity, and Acceleration of Functions Using Integrals~~

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- ~~8.3 – Using Accumulation Functions and Definite Integrals in Applied Contexts~~
- ~~8.4 – Finding the Area Between Curves Expressed as Functions of  $x$~~
- ~~8.5 – Finding the Area Between Curves Expressed as Functions of  $y$~~
- ~~8.6 – Finding the Area Between Curves That Intersect at More Than Two Points~~
- ~~8.7 – Volumes with Cross Sections (Squares and Rectangles)~~
- ~~8.8 – Volumes with Cross Sections (Triangles and Semicircles)~~
- ~~8.9 – Volume with Disc Method (Revolving Around the  $x$ - or  $y$ -Axis)~~
- ~~8.10 – Volume with Disc Method (Revolving Around Other Axes)~~
- ~~8.11 – Volume with Washer Method (Revolving Around the  $x$ - or  $y$ -Axis)~~
- ~~8.12 – Volume with Washer Method (Revolving Around Other Axes)~~
- ~~8.13(BC) – The Arc Length of a Smooth, Planar Curve and Distance Traveled~~