

Preface

Chapter 1 Precalculus Review

- 1.1 Real Numbers, Functions, and Graphs
- 1.2 Linear and Quadratic Functions
- 1.3 The Basic Classes of Functions
- 1.4 Trigonometric Functions
- 1.5 Technology: Calculators and Computers

Chapter 2 Limits

- 2.1 Limits, Rates of Change, and Tangent Lines
- 2.2 Limits: A Numerical and Graphical Approach
- 2.3 Basic Limit Laws
- 2.4 Limits and Continuity
- 2.5 Evaluating Limits Algebraically
- 2.6 Trigonometric Limits
- 2.7 Intermediate Value Theorem
- 2.8 The Formal Definition of a Limit

Chapter 3 Differentiation

- 3.1 Definition of the Derivative
- 3.2 The Derivative as a Function
- 3.3 Product and Quotient Rules
- 3.4 Rates of Change
- 3.5 Higher Derivatives
- 3.6 Trigonometric Functions
- 3.7 The Chain Rule
- 3.8 Implicit Differentiation
- 3.9 Related Rates

Chapter 4 Applications of the Derivative

- 4.1 Linear Approximation and Applications
- 4.2 Extreme Values
- 4.3 The Mean Value Theorem and Monotonicity
- 4.4 The Shape of a Graph
- 4.5 Graph Sketching and Asymptotes
- 4.6 Applied Optimization
- 4.7 Newton's Method
- 4.8 Antiderivatives

Chapter 5 The Integral

- 5.1 Approximating and Computing Area
- 5.2 The Definite Integral
- 5.3 The Fundamental Theorem of Calculus, Part I
- 5.4 The Fundamental Theorem of Calculus, Part II
- 5.5 Net or Total Change as the Integral of a Rate
- 5.6 Substitution Method

Chapter 6 Applications of the Integral

- 6.1 Area Between Two Curves
- 6.2 Setting Up Integrals: Volume, Density, Average Value
- 6.3 Volumes of Revolution
- 6.4 The Method of Cylindrical Shells
- 6.5 Work and Energy

Chapter 7 Exponential Functions

- 7.1 Derivative of $f(x) = b^x$ and the Number e
- 7.2 Inverse Functions
- 7.3 Logarithms and Their Derivatives
- 7.4 Exponential Growth and Decay
- 7.5 Compound Interest and Present Value
- 7.6 Models Involving $y' = k(y - b)$
- 7.7 L'Hôpital's Rule
- 7.8 Inverse Trigonometric Functions
- 7.9 Hyperbolic Functions

Chapter 8 Techniques of Integration

- 8.1 Numerical Integration
- 8.2 Integration by Parts
- 8.3 Trigonometric Integrals
- 8.4 Trigonometric Substitution
- 8.5 The Method of Partial Fractions
- 8.6 Improper Integrals

Chapter 9 Further Applications of the Integral and Taylor Polynomials

- 9.1 Arc Length and Surface Area
- 9.2 Fluid Pressure and Force
- 9.3 Center of Mass
- 9.4 Taylor Polynomials

Chapter 10 Introduction to Differential Equations

- 10.1 Solving Differential Equations
- 10.2 Graphical and Numerical Methods

- 10.3 The Logistic Equation
- 10.4 First-Order Linear Equations

Chapter 11 Infinite Series

- 11.1 Sequences
- 11.2 Summing an Infinite Series
- 11.3 Convergence of Series with Positive Terms
- 11.4 Absolute and Conditional Convergence
- 11.5 The Ratio and Root Tests
- 11.6 Power Series
- 11.7 Taylor Series

Chapter 12 Parametric Equations, Polar Coordinates, and Conic Sections

- 12.1 Parametric Equations
- 12.2 Arc Length and Speed
- 12.3 Polar Coordinates
- 12.4 Area and Arc Length in Polar Coordinates
- 12.5 Conic Sections

Chapter 13 Vector Geometry

- 13.1 Vectors in the Plane
- 13.2 Vectors in Three Dimensions
- 13.3 Dot Product and the Angle Between Two Vectors
- 13.4 The Cross Product
- 13.5 Planes in Three-Space
- 13.6 Survey of Quadratic Surfaces
- 13.7 Cylindrical and Spherical Coordinates

Chapter 14 Calculus of Vector-Valued Functions

- 14.1 Vector-Valued Functions
- 14.2 Calculus of Vector-Valued Functions
- 14.3 Arc Length and Speed
- 14.4 Curvature
- 14.5 Motion in Three-Space
- 14.6 Planetary Motion According to Kepler and Newton

Chapter 15 Differentiation in Several Variables

- 15.1 Functions of Two or More Variables
- 15.2 Limits and Continuity in Several Variables
- 15.3 Partial Derivatives
- 15.4 Differentiability, Linear Approximation, and Tangent Planes
- 15.5 The Gradient and Directional Derivatives
- 15.6 The Chain Rule
- 15.7 Optimization in Several Variables
- 15.8 Lagrange Multipliers: Optimizing with a Constraint

Chapter 16 Multiple Integration

- 16.1 Integration in Several Variables
- 16.2 Double Integrals over More General Regions
- 16.3 Triple Integrals
- 16.4 Integration in Polar, Cylindrical, and Spherical Coordinates
- 16.5 Change of Variables

Chapter 17 Line and Surface Integrals

- 17.1 Vector Fields
- 17.2 Line Integrals
- 17.3 Conservative Vector Fields
- 17.4 Parametrized Surfaces and Surface Integrals
- 17.5 Surface Integrals of Vector Fields

Chapter 18 Fundamental Theorems of Vector Analysis

- 18.1 Green's Theorem
- 18.2 Stokes' Theorem
- 18.3 Divergence Theorem