

Chapter 1: Techniques of Integration

1.1 Integration by parts

1.2 Trigonometric integrals

1.3 Trigonometric substitutions

1.4 Partial fractions

1.5 Integration strategies

1.6 Approximation techniques

1.7 Improper integrals

Chapter 2: Applications of Integration

- 2.1** Area between curves

- 2.2** Volumes by slicing

- 2.3** Volumes by shells

- 2.4** Arc length and surface area

- 2.5** Physical applications of integration

Chapter 3: Introduction to Differential Equations

3.1 The nature of differential equations

3.2 Separable differential equations

3.3 Applications of differential equations

Chapter 4: Sequences and Series

4.1 Motivation: Why study infinite series?

4.2 Foundations of sequences

4.3 Foundations of series

4.4 Convergence tests

4.5 Ratio Test, Root Test, and strategy

4.6 Power series and Taylor series in depth

Chapter 5: Parametric and Polar Coordinates

5.1 Parametric equations and motion

5.2 Integrating parametric curves

5.3 Polar coordinates and graphs

5.4 Calculus with polar coordinates