

MATHEMATICAL ANALYSIS 1

Introduction

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1. Functions

1.1 Functions and Their Graphs

1.2 Combining Functions; Shifting and Scaling Graphs

1.3 Trigonometric Functions

2. Limits and Continuity

2.1 Rates of Change and Tangent Lines to Curves

2.2 Limit of a Function and Limit Laws

2.3 The Precise Definition of a Limit

2.4 One-Sided Limits

2.5 Continuity

2.6 Limits Involving Infinity; Asymptotes of Graphs

3. Derivatives

3.1 Tangent Lines and the Derivative at a Point

3.2 The Derivative as a Function

3.3 Differentiation Rules

3.4 The Derivative as a Rate of Change

3.5 Derivatives of Trigonometric Functions

3.6 The Chain Rule

3.7 Implicit Differentiation

3.8 Related Rates

3.9 Linearization and Differentials

4. Applications of Derivatives

4.1 Extreme Values of Functions on Closed Intervals

4.2 The Mean Value Theorem

4.3 Monotonic Functions and the First Derivative Test

4.4 Concavity and Curve Sketching

4.5 Applied Optimization

4.6 Newton's Method

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5. Integrals

5.1 Area and Estimating with Finite Sums

5.2 Sigma Notation and Limits of Finite Sums

5.3 The Definite Integral

5.4 The Fundamental Theorem of Calculus

5.5 Indefinite Integrals and the Substitution Method

5.6 Definite Integral Substitutions and the Area Between Curves

6. Applications of Definite Integrals

6.1 Volumes Using Cross-Sections

6.2 Volumes Using Cylindrical Shells

6.3 Arc Length

6.4 Areas of Surfaces of Revolution

6.5 Work and Fluid Forces

6.6 Moments and Centers of Mass

7. Techniques of Integration

8.1 Using Basic Integration Formulas

8.2 Integration by Parts

8.3 Trigonometric Integrals

8.4 Trigonometric Substitutions

8.5 Integration of Rational Functions by Partial Fractions

8.6 Integral Tables and Computer Algebra Systems

8.7 Numerical Integration

8.8 Improper Integrals

9. First-Order Differential Equations

9.1 Solutions, Slope Fields, and Euler's Method

9.2 First-Order Linear Equations

9.3 Applications

9.4 Graphical Solutions of Autonomous Equations

9.5 Systems of Equations and Phase Plane

10. Parametric Equations and Polar Coordinates

10.1 Parametrizations of Plane Curves

10.2 Calculus with Parametric Curves

10.3 Polar Coordinates

10.4 Graphing Polar Coordinate Equations

10.5 Areas and Lengths in Polar Coordinates

10.6 Conic Sections

10.7 Conics in Polar Coordinates

11. Infinite Sequences and Series

11.1 Sequences

11.2 Infinite Series

11.3 The Integral Test

11.4 Comparison Tests

11.5 Absolute Convergence; The Ratio and Root Tests

11.6 Alternating Series and Conditional Convergence

11.7 Power Series

11.8 Taylor and Maclaurin Series

11.9 Convergence of Taylor Series

11.10 Applications of Taylor Series

12. Second-Order Differential Equations

12.1 Second-Order Linear Equations

12.2 Nonhomogeneous Linear Equations

12.3 Applications

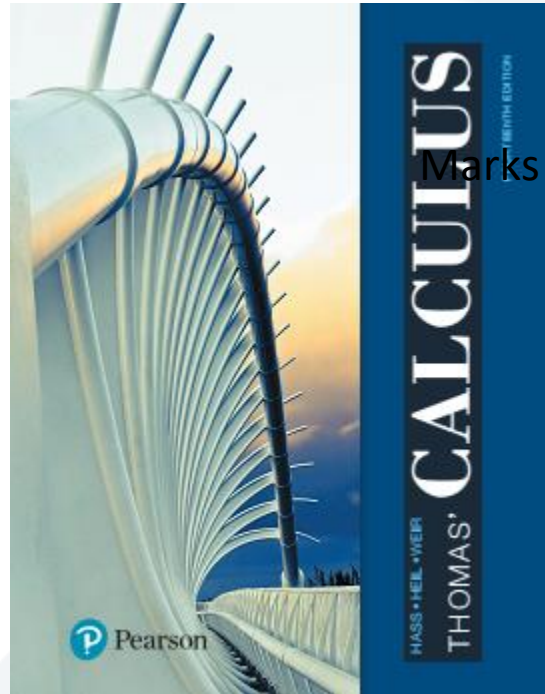
12.4 Euler Equations

12.5 Power-Series Solutions

References

THOMAS'

CALCULUS



Marks Distribution

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