

Contents

I	Multivariable Calculus	1
11	Parametric Equations and Polar Coordinates	2
11.1	Curves Defined by Parametric Equations	2
11.2	Calculus with Parametric Curves	2
11.3	Polar Coordinates	2
11.4	Areas and Lengths in Polar Coordinates	2
11.5	Conic Sections	2
11.6	Conic Sections in Polar Coordinates	2
12	Infinite Sequences and Series	3
12.1	Sequences	4
12.2	Series	4
12.3	The Integral Test and Estimates of Sums	4
12.4	The Comparison Tests	4
12.5	Alternating Series	4
12.6	Absolute Convergence and the Ratio and Root Tests	4
12.7	Strategy for Testing Series	4
12.8	Power Series	4
12.9	Representation of Functions as Power Series	4
12.10	Taylor and Maclaurin Series	4
12.11	The Binomial Series	4
12.12	Applications of Taylor Polynomials	4
13	Vectors and the Geometry of Space	5
13.1	Three-Dimensional Coordinate Systems	5
13.2	Vectors	5
13.3	The Dot Product	5
13.4	The Cross Product	5
13.5	Equations of Lines and Planes	5
13.6	Cylinders and Quadric Surfaces	5
13.7	Cylindrical and Spherical Coordinates	5
14	Vector Functions	6
14.1	Vector Functions and Space Curves	6
14.2	Derivatives and Integrals of Vector Functions	6

14.3	Arc Length and Curvature	6
14.4	Motion in Space: Velocity and Acceleration	6
15	Partial Derivatives	7
15.1	Functions of Several Variables	7
15.2	Limits and Continuity	7
15.3	Partial Derivatives	7
15.4	Tangent Planes and Linear Approximations	7
15.5	The Chain Rule	7
15.6	Directional Derivatives and the Gradient Vector	7
15.7	Maximum and Minimum Values	7
15.8	Lagrange Multipliers	7
16	Multiple Integrals	8
16.1	Double Integrals over Rectangles	8
16.2	Iterated Integrals	8
16.3	Double Integrals over General Regions	8
16.4	Double Integrals in Polar Coordinates	8
16.5	Applications of Double Integrals	8
16.6	Surface Area	8
16.7	Triple Integrals	8
16.8	Triple Integrals in Cylindrical and Spherical Coordinates	8
16.9	Change of Variables in Multiple Integrals	8
17	Vector Calculus	9
17.1	Vector Fields	9
17.2	Line Integrals	9
17.3	THE Fundamental Theorem for Line Integrals	9
17.4	Green's Theorem	9
17.5	Curl and Divergence	9
17.6	Parametric Surfaces and Their Areas	9
17.7	Surface Integrals	9
17.8	Stokes' Theorem	9
17.9	The Divergence Theorem	9
17.10	Summary	9
18	Second-Order Differential Equations	10
18.1	Second-Order Linear Equations	10
18.2	Nonhomogenous Linear Equations	10
18.3	Applications of Second-Order Differential Equations	10
18.4	Series Solutions	10

Part I

Multivariable Calculus

Chapter 11

Parametric Equations and Polar Coordinates

11.1 Curves Defined by Parametric Equations

11.2 Calculus with Parametric Curves

11.3 Polar Coordinates

11.4 Areas and Lengths in Polar Coordinates

11.5 Conic Sections

11.6 Conic Sections in Polar Coordinates

Chapter 12

Infinite Sequences and Series

12.1 Sequences

12.2 Series

12.3 The Integral Test and Estimates of Sums

12.4 The Comparison Tests

12.5 Alternating Series

12.6 Absolute Convergence and the Ratio and Root Tests

12.7 Strategy for Testing Series

12.8 Power Series

12.9 Representation of Functions as Power Series

12.10 Taylor and Maclaurin Series

12.11 The Binomial Series

12.12 Applications of Taylor Polynomials

Chapter 13

Vectors and the Geometry of Space

13.1 Three-Dimensional Coordinate Systems

13.2 Vectors

13.3 The Dot Product

13.4 The Cross Product

13.5 Equations of Lines and Planes

13.6 Cylinders and Quadric Surfaces

13.7 Cylindrical and Spherical Coordinates

Chapter 14

Vector Functions

14.1 Vector Functions and Space Curves

14.2 Derivatives and Integrals of Vector Functions

14.3 Arc Length and Curvature

14.4 Motion in Space: Velocity and Acceleration

Chapter 15

Partial Derivatives

15.1 Functions of Several Variables

15.2 Limits and Continuity

15.3 Partial Derivatives

15.4 Tangent Planes and Linear Approximations

15.5 The Chain Rule

15.6 Directional Derivatives and the Gradient
Vector

15.7 Maximum and Minimum Values

15.8 Lagrange Multipliers

Chapter 16

Multiple Integrals

16.1 Double Integrals over Rectangles

16.2 Iterated Integrals

16.3 Double Integrals over General Regions

16.4 Double Integrals in Polar Coordinates

16.5 Applications of Double Integrals

16.6 Surface Area

16.7 Triple Integrals

16.8 Triple Integrals in Cylindrical and Spherical Coordinates

16.9 Change of Variables in Multiple Integrals

Chapter 17

Vector Calculus

17.1 Vector Fields

17.2 Line Integrals

17.3 THE Fundamental Theorem for Line Integrals

17.4 Green's Theorem

17.5 Curl and Divergence

17.6 Parametric Surfaces and Their Areas

17.7 Surface Integrals

17.8 Stokes' Theorem

17.9 The Divergence Theorem

17.10 Summary

Chapter 18

Second-Order Differential Equations

18.1 Second-Order Linear Equations

18.2 Nonhomogenous Linear Equations

18.3 Applications of Second-Order Differential Equations

18.4 Series Solutions