

Contents

10 Vectors and the Geometry of Space	3
10.1 Three-Dimensional Coordinate Systems	3
10.2 Vectors	3
10.3 The Dot Product	3
10.4 The Cross Product	3
10.5 Equations of Lines and Planes	3
10.6 Cylinders and Quadric Surfaces	3
10.7 Vector Functions and Space Curves	3
10.8 Arc Length and Curvature	3
10.9 Motion in Space: Velocity and Acceleration	3
11 Partial Derivatives	4
11.1 Functions of Several Variables	4
11.2 Limits and Continuity	4
11.3 Partial Derivatives	4
11.4 Tangent Planes and Linear Approximations	4
11.5 The Chain Rule	4
11.6 Directional Derivatives and the Gradient Vector	4
11.7 Maximum and Minimum Values	4
11.8 Lagrange Multipliers	4
12 Multiple Integrals	5
12.1 Double Integrals Over Rectangles	5
12.2 Double Integrals Over General Regions	5
12.3 Double Integrals in Polar Coordinates	5
12.4 Applications of Double Integrals	5
12.5 Triple Integrals	5
12.6 Triple Integrals in Cylindrical Coordinates	5
12.7 Triple Integrals in Spherical Coordinates	5
12.8 Change of Variables in Multiple Integrals	5

13 Vector Calculus	6
13.1 Vector Fields	6
13.2 Line Integrals	6
13.3 The Fundamental Theorem for Line Integrals	6
13.4 Green's Theorem	6
13.5 Curl and Divergence	6
13.6 Parametric Surfaces and Their Areas	6
13.7 Surface Integrals	6
13.8 Stokes' Theorem	6
13.9 The Divergence Theorem	6

Chapter 10

Vectors and the Geometry of Space

10.1 Three-Dimensional Coordinate Systems

10.2 Vectors

10.3 The Dot Product

10.4 The Cross Product

10.5 Equations of Lines and Planes

10.6 Cylinders and Quadric Surfaces

10.7 Vector Functions and Space Curves

10.8 Arc Length and Curvature

10.9 Motion in Space: Velocity and Acceleration

Chapter 11

Partial Derivatives

11.1 Functions of Several Variables

11.2 Limits and Continuity

11.3 Partial Derivatives

11.4 Tangent Planes and Linear Approximations

11.5 The Chain Rule

11.6 Directional Derivatives and the Gradient Vector

11.7 Maximum and Minimum Values

11.8 Lagrange Multipliers

Chapter 12

Multiple Integrals

12.1 Double Integrals Over Rectangles

12.2 Double Integrals Over General Regions

12.3 Double Integrals in Polar Coordinates

12.4 Applications of Double Integrals

12.5 Triple Integrals

12.6 Triple Integrals in Cylindrical Coordinates

12.7 Triple Integrals in Spherical Coordinates

12.8 Change of Variables in Multiple Integrals

Chapter 13

Vector Calculus

13.1 Vector Fields

13.2 Line Integrals

13.3 The Fundamental Theorem for Line Integrals

13.4 Green's Theorem

13.5 Curl and Divergence

13.6 Parametric Surfaces and Their Areas

13.7 Surface Integrals

13.8 Stokes' Theorem

13.9 The Divergence Theorem