

Contents

Chapter 1	
Graphs and Level Sets	1
Chapter 2	
Vector Fields	6
Chapter 3	
The Tangent Space	13
Chapter 4	
Surfaces	16
Chapter 5	
Vector Fields on Surfaces; Orientation	23
Chapter 6	
The Gauss Map	31
Chapter 7	
Geodesics	38
Chapter 8	
Parallel Transport	45
	xi

xii	Contents
Chapter 9	
The Weingarten Map	53
Chapter 10	
Curvature of Plane Curves	62
Chapter 11	
Arc Length and Line Integrals	68
Chapter 12	
Curvature of Surfaces	82
Chapter 13	
Convex Surfaces	95
Chapter 14	
Parametrized Surfaces	108
Chapter 15	
Local Equivalence of Surfaces and Parametrized Surfaces	121
Chapter 16	
Focal Points	132
Chapter 17	
Surface Area and Volume	139
Chapter 18	
Minimal Surfaces	156
Chapter 19	
The Exponential Map	163
Chapter 20	
Surfaces with Boundary	177
Chapter 21	
The Gauss-Bonnet Theorem	190
Chapter 22	
Rigid Motions and Congruence	210

Contents	xiii
Chapter 23 Isometries	220
Chapter 24 Riemannian Metrics	231
Bibliography	245
Notational Index	247
Subject Index	249