CONTENTS

		PREFACE	X
		NOTATION	χv
CHAPTER	1	THE GEOMETRY OF EUCLIDEAN SPACE	1
	1.1	Vectors in three-dimensional space	1
	1.2	The inner product	17
	1.3	The cross product	25
	1.4	Cylindrical and spherical coordinates	40
	1.5	n-dimensional Euclidean space	47
		Review exercises for chapter 1	58
CHAPTER	2	DIFFERENTIATION	61
	2.1	The geometry of real-valued functions	62
	2.2	Limits and continuity	81
	2.3	Differentiation	104
	2.4	Properties of the derivative	115
	2.5	Gradients and directional derivatives	128
	2.6	Iterated partial derivatives	138
		Review exercises for chapter 2	145

CHAPTER	3	VECTOR-VALUED FUNCTIONS	151
	3.1	Paths and velocity	151
		Arc length	162
	3.3	Vector fields	170
	3.4	Divergence and curl of a vector field	178
	3.5	Vector differential calculus	190
		Review exercises for chapter 3	197
CHAPTER 4		HIGHER-ORDER DERIVATIVES;	
		MAXIMA AND MINIMA	199
	4.1	Taylor's theorem	200
	4.2	Extrema of real-valued functions	205
	4.3	Constrained extrema and lagrange multipliers	217
	4.4	,	232
	4.5	Some applications	243
		Review exercises for chapter 4	249
CHAPTER 5		INTEGRATION	254
	5.1	Introduction	254
	5.2	The double integral over a rectangle	264
	5.3	The double integral over more general regions	278
	5.4	Changing the order of integration	286
	5.5	Improper integrals (optional)	291
	5.6	The triple integral	298
	5.7		306
	5.8	The change of variables theorem	313
		Review exercises for chapter 5	330
CHAPTER 6		INTEGRALS OVER PATHS AND SURFACES	334
	6.1	The path integral	335
	6.2	E	340
	6.3		359
	6.4		36'
	6.5	ε	379
	6.6	Surface integrals of vector functions	38′
		Review evercises for chanter 6	400

CHAPTER 7	VECTOR ANALYSIS	403
7.1	Green's theorem	404
7.2	Stokes' theorem	416
7.3	Conservative fields	428
7.4	Gauss' theorem	438
7.5	Applications to physics and differential	
	equations (optional)	451
7.6	Differential forms (optional)	472
	Review exercises for chapter 7	488
APPENDIX A	SOME TECHNICAL DIFFERENTIATION	
	THEOREMS	493
APPENDIX B	SOME TECHNICAL INTEGRATION	
	THEOREMS	507
APPENDIX C	TABLES	519
1.	Trigonometric functions	520
2.	Derivatives	521
3.	Integrals	522
APPENDIX D	ANSWERS TO ODD-NUMBERED	
	EXERCISES	529
APPENDIX E	A FEW IMPORTANT SYMBOLS	581
	INDEX	583