CONTENTS

Preface		3.3 Double Sums	59
		3.4 A Few Aspects of Logic	61
1 Introductory Topics I: Algebr	a 1	3.5 Mathematical Proofs	67
1.1 The Real Numbers	1	3.6 Essentials of Set Theory	69
1.2 Integer Powers	4	3.7 Mathematical Induction	74
1.3 Rules of Algebra	10	Review Problems for Chapter 3	76
1.4 Fractions	15	Unumod Aspect	
1.5 Fractional Powers	19	4 Functions of One Variable	79
1.6 Inequalities	24	4.1 Introduction	79
1.7 Intervals and Absolute Values	29	4.2 Basic Definitions	80
Review Problems for Chapter 1	32	4.3 Graphs of Functions	86
20 2 A last condition of the		4.4 Linear Functions	89
2 Introductory Topics II:		4.5 Linear Models	96
Equations	35	4.6 Quadratic Functions	99
2.1 How to Solve Simple Equations	35	4.7 Polynomials	105
2.2 Equations with Parameters	38	4.8 Power Functions	112
2.3 Quadratic Equations	41	4.9 Exponential Functions	114
2.4 Linear Equations in Two Unknowns	46	4.10 Logarithmic Functions	120
2.5 Nonlinear Equations	48	Review Problems for Chapter 4	124
Review Problems for Chapter 2	49		
		5 Properties of Functions	127
3 Introductory Topics III:		5.1 Shifting Graphs	127
Miscellaneous	51	5.2 New Functions from Old	132
3.1 Summation Notation	51	5.3 Inverse Functions mio9 amont 1	136
3.2 Rules for Sums. Newton's Binomial		5.4 Graphs of Equations and Section 1	143
Formula	55	5.5 Distance in the Plane. Circles	146

5.6	General Functions	150	9 Integration	291
	Review Problems for Chapter 5	153	9.1 Indefinite Integrals	291
			9.2 Area and Definite Integrals	297
6 D	ifferentiation	155	9.3 Properties of Definite Integrals	303
6.1	Slopes of Curves	155	9.4 Economic Applications	306
	The Derivative. Tangents	157	9.5 Integration by Parts	313
	Increasing and Decreasing Functions	163	9.6 Integration by Substitution	316
	Rates of Change	165	9.7 Infinite Intervals of Integration	319
	A Dash of Limits	169	9.8 A Glimpse at Differential Equations	326
	Simple Rules for Differentiation	174	9.9 Separable and Linear Differential	
	Sums, Products, and Quotients	178	Equations	331
	Chain Rule	184	Review Problems for Chapter 9	336
	Higher-Order Derivatives	189		
	Exponential Functions	194	10 Interest Rates and	
	Logarithmic Functions	197	Present Values	339
0.11	Review Problems for Chapter 6	203	10.1 Interest Periods and Effective Rates	339
	Review Problems for Chapter o	203	10.2 Continuous Compounding	343
7 D	erivatives in Use	205	10.3 Present Value	345
			10.4 Geometric Series	347
	Implicit Differentiation	205	10.5 Total Present Value	352
	Economic Examples	210	10.6 Mortgage Repayments	357
	Differentiating the Inverse	213	10.7 Internal Rate of Return	362
	Linear Approximations	216	10.8 A Glimpse at Difference Equations	363
	Polynomial Approximations	221	Review Problems for Chapter 10	367
	Taylor's Formula	224		
	Why Economists Use Elasticities	228	11 Functions of Many	
	Continuity	232	Variables	369
7.9	More on Limits	236	11.1 Functions of Two Variables	369
7.10	Intermediate Value Theorem.		11.2 Partial Derivatives with Two Variables	373
	Newton's Method	244	11.3 Geometric Representation	379
	Infinite Sequences	248	11.4 Surfaces and Distance	386
7.12	L'Hôpital's Rule	250	11.5 Functions of More Variables	389
	Review Problems for Chapter 7	254	11.6 Partial Derivatives with More Variables	
		11.7 Economic Applications	396	
	ingle-Variable		11.8 Partial Elasticities	398
O	ptimization	257	Review Problems for Chapter 11	400
8.1	Introduction	257	S	
	Simple Tests for Extreme Points	260	12 Tools for Comparative	
	Economic Examples	264	Statics	403
	The Extreme Value Theorem	268	12.1 A Simple Chain Rule	403
	Further Economic Examples	274	12.1 A Shiple Chain Rule 12.2 Chain Rules for Many Variables	408
	Local Extreme Points	279	12.3 Implicit Differentiation along	400
	Inflection Points	285	a Level Curve	412
041	Review Problems for Chapter 8	289	12.4 More General Cases	416
	The first of the chapter of	20)	12.7 More Ocheral Cases	+10

12.5	Elasticity of Substitution	420	15.6 Gaussian Elimination	554
12.6	Homogeneous Functions of		15.7 Vectors	559
	Two Variables	423	15.8 Geometric Interpretation of Vectors	562
12.7	General Homogeneous and Homothetic	2	15.9 Lines and Planes	567
	Functions	427	Review Problems for Chapter 15	571
12.8	Linear Approximations	432	mars train they been M. a mabuse, Hosbinelinse	
	Differentials	436	16 Determinants and	
12.10	Systems of Equations	441	Inverse Matrices	573
12.11	Differentiating Systems of Equations	444	16.1 Determinants of Order 2	573
	Review Problems for Chapter 12	450	16.2 Determinants of Order 3	576
	विकास मार्थिक अस्तरीतिक विकासिता ।		16.3 Determinants of Order <i>n</i>	580
13 I	Multivariable		16.4 Basic Rules for Determinants	583
(Optimization	453	16.5 Expansion by Cofactors	588
	Two Variables: Necessary Conditions	453	16.6 The Inverse of a Matrix	591
	Two Variables: Necessary Conditions Two Variables: Sufficient Conditions	458	16.7 A General Formula for the Inverse	597
	Local Extreme Points	462	16.8 Cramer's Rule	600
	Linear Models with Quadratic	402	16.9 The Leontief Model	603
13.4	Objectives	467	Review Problems for Chapter 16	607
13.5	The Extreme Value Theorem	474	Review Hobienis for Chapter 10	007
	Three or More Variables	479	17 Linear Programming	609
	Comparative Statics and	419	Charles and the control of the contr	
13.7	the Envelope Theorem	482	17.1 A Graphical Approach	609
	Review Problems for Chapter 13	486	17.2 Introduction to Duality Theory	615
	Review Froblems for Chapter 15	400	17.3 The Duality Theorem	619
1/1 (Constrained Optimization	489	17.4 A General Economic Interpretation	622
			17.5 Complementary Slackness	624
	The Lagrange Multiplier Method	489	Review Problems for Chapter 17	629
	Interpreting the Lagrange Multiplier	496	Annandiu Casastu	C24
	Several Solution Candidates	499	Appendix: Geometry	631
14.4	Why the Lagrange Multiplier Method Works	501	The Greek Alphabet	633
14.5	Sufficient Conditions	505	Answers to the Problems	635
14.6	More Variables and More Constraints	508	ALIZA MONTH AND	
14.7	Comparative Statics	514	Index	715
14.8	Nonlinear Programming: A Simple Case	se 517		
14.9	More on Nonlinear Programming	523		
	Review Problems for Chapter 14	530		
15 I	Matrix and Vector			
	Algebra	533		
	Systems of Linear Equations	533		
	Matrices and Matrix Operations	537		
	Matrix Multiplication	540		
	Rules for Matrix Multiplication	545		
15.5	The Transpose	551		