

Contents

Preface

ix

CHAPTER 0	Preliminaries	1
------------------	----------------------	----------

0-1	Sets	2
0-2	Linear Equations and Inequalities in One Variable	10
0-3	Quadratic Equations	20
0-4	Cartesian Coordinate Systems and Straight Lines	26
0-5	Functions and Graphs	40
0-6	Exponential Functions	59
0-7	Logarithmic Functions	66
0-8	Chapter Review	78

CHAPTER 1	Systems of Linear Equations; Matrices	85
------------------	--	-----------

1-1	Review: Systems of Linear Equations	86
1-2	Systems of Linear Equations and Augmented Matrices— Introduction	104
1-3	Gauss-Jordan Elimination	113
1-4	Matrices— Addition and Multiplication by a Number	127
1-5	Matrix Multiplication	134
1-6	Inverse of a Square Matrix; Matrix Equations	144
1-7	Leontief Input-Output Analysis (Optional)	160
1-8	Chapter Review	167

CHAPTER 2	Linear Inequalities and Linear Programming	171
------------------	---	------------

2-1	Systems of Linear Inequalities in Two Variables	171
2-2	Linear Programming in Two Dimensions— A Geometric Approach	181

2-3	A Geometric Introduction to the Simplex Method	204
2-4	The Simplex Method: Maximization with \leq Problem Constraints	209
2-5	The Dual; Minimization with \geq Problem Constraints	234
2-6	Maximization and Minimization with Mixed Problem Constraints (Optional)	251
2-7	Chapter Review	274

CHAPTER 3	Mathematics of Finance	279
-----------	------------------------	-----

3-1	Simple Interest	280
3-2	Compound Interest	286
3-3	Future Value of an Annuity; Sinking Funds	297
3-4	Present Value of an Annuity; Amortization	304
3-5	Chapter Review	314

CHAPTER 4	Probability	321
-----------	-------------	-----

4-1	Multiplication Principle, Permutations, and Combinations	323
4-2	Experiments, Sample Spaces, and Probability of an Event	339
4-3	Empirical Probability	357
4-4	Random Variable, Probability Distribution, and Expectation	366
4-5	Chapter Review	382

CHAPTER 5	Additional Topics in Probability	389
-----------	----------------------------------	-----

5-1	Union, Intersection, and Complement of Events; Odds	390
5-2	Conditional Probability, Intersection, and Independence	408
5-3	Bayes' Formula	427
5-4	Markov Chains	437
5-5	Chapter Review	447

CHAPTER 6	Data Description and Probability Distributions	453
------------------	---	------------

6-1	Graphing Qualitative Data	454
6-2	Graphing Quantitative Data	461
6-3	Measures of Central Tendency	463
6-4	Measures of Dispersion	476
6-5	Bernoulli Trials and Binomial Distributions	482
6-6	Normal Distributions	495
6-7	Chapter Review	508

CHAPTER 7	Games and Decisions	513
------------------	----------------------------	------------

7-1	Strictly Determined Games	515
7-2	Mixed Strategy Games	524
7-3	Linear Programming and 2×2 Games—Geometric Approach	537
7-4	Linear Programming and $m \times n$ Games—Simplex Method	544
7-5	Chapter Review	552

APPENDIX A	Special Topics	554
-------------------	-----------------------	------------

A-1	Integer Exponents and Square Root Radicals	554
A-2	Arithmetic Progressions	562
A-3	Geometric Progressions	567
A-4	The Binomial Formula	574

APPENDIX B	Tables	579
-------------------	---------------	------------

Table I	Exponential Functions (e^x and e^{-x})	580
Table II	Common Logarithms	584
Table III	Natural Logarithms ($\ln N = \log_e N$)	586
Table IV	Areas Under the Standard Normal Curve	588
Table V	Mathematics of Finance	591

Answers		A1
Index		I1
Applications Index		A11