
Contents

How to Use This Book	iii
----------------------	-----

Acknowledgements	vii
------------------	-----

1	Follow the Rules	1
1.1	Numbers	2
1.2	Order of Operations	3
1.3	When Does Order Matter?	5
1.4	Distribution and Factoring	12
1.5	Equations	18
1.6	Exponents	28
1.7	Fractional Exponents	37
1.8	Radicals	42
1.9	Summary	49

2	x Marks the Spot	52
2.1	Expressions	53
2.2	Arithmetic with Expressions	55
2.3	Distribution, Subtraction, and Factoring	62
2.4	Fractions	68
2.5	Summary	73

3	One-Variable Linear Equations	77
3.1	Solving Linear Equations I	77
3.2	Solving Linear Equations II	82
3.3	Word Problems	88

3.4★	Linear Equations in Disguise	93
3.5	Summary	98

4 More Variables **103**

4.1	Evaluating Multi-Variable Expressions	105
4.2	Still More Arithmetic	106
4.3	Distribution and Factoring	110
4.4	Fractions	115
4.5	Equations	118
4.6	Summary	120

5 Multi-Variable Linear Equations **123**

5.1	Introduction to Two-Variable Linear Equations	123
5.2	Substitution	127
5.3	Elimination	131
5.4	Word Problems	136
5.5	More Linear Equations in Disguise	142
5.6	More Variables	145
5.7	Summary	150

6 Ratios and Percents **157**

6.1	Basic Ratio Problems	157
6.2	More Challenging Ratio Problems	161
6.3	Conversion Factors	166
6.4	Percent	173
6.5	Percentage Problems	176
6.6	Summary	182

7 Proportion **187**

7.1	Direct Proportion	187
7.2	Inverse Proportion	190
7.3	Joint Proportion	192
7.4	Rate Problems	197
7.5	Summary	204

8	Graphing Lines	208
8.1	The Number Line and the Cartesian Plane	208
8.2	Introduction to Graphing Linear Equations	215
8.3	Using Slope in Problems	225
8.4	Find the Equation	228
8.5	Slope and Intercepts	232
8.6	Comparing Lines	238
8.7	Summary	245

9	Introduction to Inequalities	252
9.1	The Basics	253
9.2	Which Is Greater?	260
9.3	Linear Inequalities	264
9.4	Graphing Inequalities	269
9.5	Optimization	272
9.6	Summary	280

10	Quadratic Equations – Part 1	286
10.1	Getting Started With Quadratics	286
10.2	Factoring Quadratics I	293
10.3	Factoring Quadratics II	298
10.4	Sums and Products of Roots of a Quadratic	307
10.5★	Extensions and Applications	312
10.6	Summary	318

11	Special Factorizations	324
11.1	Squares of Binomials	324
11.2	Difference of Squares	332
11.3	Sum and Difference of Cubes	339
11.4	Rationalizing Denominators	344
11.5	Simon’s Favorite Factoring Trick	348
11.6	Summary	352

12	Complex Numbers	357
12.1	Numbers, Numbers, and More Numbers!	357
12.2	Imaginary Numbers	358
12.3	Complex Numbers	362
12.4	Summary	369

13	Quadratic Equations – Part 2	372
13.1	Squares of Binomials Revisited	372
13.2	Completing the Square	379
13.3	The Quadratic Formula	385
13.4★	Applications and Extensions	392
13.5	Summary	397

14	Graphing Quadratics	404
14.1	Parabolas	404
14.2	Circles	415
14.3	Summary	421

15	More Inequalities	425
15.1	Quadratic Inequalities	425
15.2	Beyond Quadratics	431
15.3	The Trivial Inequality	435
15.4★	Quadratic Optimization	439
15.5	Summary	446

16	Functions	451
16.1	The Machine	451
16.2	Combining Functions	460
16.3	Composition	464
16.4	Inverse Functions	467
16.5	Problem Solving with Functions	472
16.6	Operations	477
16.7	Summary	479

17	Graphing Functions	484
17.1	Basics	484
17.2	Transformations	491
17.3	Inverse Functions Revisited	502
17.4	Summary	506

18	Polynomials	512
18.1	Addition and Subtraction	513
18.2	Multiplication	516
18.3	Summary	522

19	Exponents and Logarithms	525
19.1	Exponential Functions	525
19.2	Show Me the Money	532
19.3	Interest-ing Problems	540
19.4	What is a Logarithm?	545
19.5	Summary	553

20	Special Functions	558
20.1	Radicals	558
20.2	Absolute Value	562
20.3	Floor and Ceiling	569
20.4	Rational Functions	573
20.5	Piecewise Defined Functions	578
20.6	Summary	584

21	Sequences & Series	589
21.1	Arithmetic Sequences	590
21.2	Arithmetic Series	594
21.3	Geometric Sequences	602
21.4	Geometric Series	605
21.5★	Telescoping	617
21.6	Summary	621

22	Special Manipulations	628
22.1	Raising Equations to Powers	628
22.2	Self-similarity	631
22.3	Symmetry	635
22.4	Summary	638

Hints to Selected Problems	643
-----------------------------------	------------

Index	653
--------------	------------