## Table of Contents

Letter to Homeschooling Parents -	
Chapter 1: Solving First-Degree Equations —————	
Lesson 1—Equations and their Uses	6
Lesson 2—The Language of Algebra	10
Lesson 3—Undoing in Reverse Order	15
Lesson 4—Money Problems	19
Lesson 5—Negative Numbers	22
Lesson 6—Negatives in Equations	27
Chapter 2: Simplifying First ————————————————————————————————————	31
Lesson 7—Rules of the Game	32
Lesson 8—Combining Numbers	36
Lesson 9—Combining x's	40
Lesson 10—Freeing the Trapped x	43
Lesson 11—Stocks and Bonds	47
Lesson 12—Parentheses, Brackets, and Braces	51
Lesson 13—Removing × from a Fraction	55
Lesson 14—x's on Both Sides	59
Lesson 15—Distance Problems	64
Chapter 3: Fractional Equations ————————————————————————————————————	69
Lesson 16—Reducing Rational Expressions and Exponents	70
Lesson 17—Reducing Rational Expressions with Sums	74
Lesson 18—Multiplying and Dividing Rational Expressions	79
Lesson 19—Adding and Subtracting Rational Expressions	83
Lesson 20—Rational Equations	88
Lesson 21—More on Rational Equations	93
Chapter 4: Powers and Exponents —	99
Lesson 22—Repeated Multiplication	100
Lesson 23—Combining Powers	105
Lesson 24—Multiplying Powers	108
Lesson 25—Distributing with Powers	112
Lesson 26—Dividing Powers	116
Lesson 27—Reducing Fractions with Powers	120
Lesson 28—Combining Fractions with Powers	124
Lesson 29—From the Enormous to the Tiny	128
Chapter 5: Roots & Irrational Numbers	133
Lesson 30—Inverse of a Power	134
Lesson 31—The Pythagorean Theorem and Irrational Numbers	138
Lesson 32—Multiplying and Dividing Irrationals	143
Lesson 33—Adding and Subtracting Irrationals	146
Lesson 34—Simplifying Irrationals	150
Lesson 35—More Multiplying Irrationals	154
Lesson 36—Rationalizing a Denominator	158

## TABLE OF CONTENTS

Lesson 3/—Turning Roots into Powers	164
Chapter 6: Solving Second-Degree Equations —————	169
Lesson 38—Quadratic Equations	170
Lesson 39—Undoing Quadratic Equations	174
Lesson 40—Solving by Factoring	179
Lesson 41—Coefficients Greater Than 1	184
Lesson 42—Completing the Square	188
Lesson 43—The Quadratic Formula	193
Chapter 7: Radical Equations	199
Lesson 44—Getting x out of the Radical	200
Lesson 45—More Under the Radical Sign	203
Lesson 46—Second Degree in Disguise	207
Lesson 47—More Than One Radical	211
Lesson 48—Radicals in the Bottom	215
Chapter 8: Imaginary and Complex Numbers	219
Lesson 49—The Square Root of a Negative	220
Lesson 50—The Not So Imaginary i	224
Lesson 51—Adding and Subtracting Imaginary Numbers	228
Lesson 52—Multiplying and Dividing Imaginary Numbers	231
Lesson 53—From Imaginary to Complex	235
Lesson 54—Complex Numbers and Physics	240
Lesson 55—Complex Solutions	244
Lesson 56—The Discriminant	248
Chapter 9: Solving Higher-Degree Equations —	253
Lesson 57—The Third Degree and Beyond	254
Lesson 58—Masquerading as Second Degree	258
Lesson 59—Polynomial Division	262
Lesson 60—More Polynomial Division	267
Lesson 61—Finding Your Own Hints	271
Lesson 62—Higher-Degree Equations with Imaginary and Complex Solutions	275
Chapter 10: First-Degree Equations with Two Variables	279
Lesson 63—Equations as Relationships	280
Lesson 64—Solving for a Variable	284
Lesson 65—The Picture is a Line	288
Lesson 66—Graphing Linear Equations	294
Lesson 67—Calculating the Rate of Change	300
Lesson 68—Negative and Fractional Rates of Change	305
Lesson 69—Writing the Equation for a Line	310
Lesson 70—Directly Proportional Variables	315
Lesson 71—Parallel and Perpendicular Lines	321
Lesson 72—Horizontal and Vertical Lines	325
Chapter 11: Second-Degree Equations with Two Variables ————	331
Lesson 73—Slicing Cones	332
Lesson 74—The Parabola	337
e	551

## TABLE OF CONTENTS

349 355
262
363
369
376
383
390
399
400
406
412
418
423
429
433
437
443
448
454
459
460
466
470
476
483
488
493
497
502
507
508
513
517
523
528
533
538
545
550
555
556
561
566

## TABLE OF CONTENTS

Lesson 115—Absolute-Value Inequalities	571
Chapter 16: Working with Functions and Logarithms	575
Lesson 116—The Function Concept	576
Lesson 117—Functional Notation	583
Lesson 118—Shifting Graphs on a Coordinate Plane	588
Lesson 119—Reflecting a Graph	595
Lesson 120—Combining Functions	602
Lesson 121—Working with a Graphing Calculator	608
Lesson 122—Exponential Functions	618
Lesson 123—Exponential Decay	629
Lesson 124—Logarithms	636
Lesson 125—More on Logarithms	643
Chapter 17: Statistics and Probability —————	649
Lesson 126—Statistics	650
Lesson 127—Range and Standard Deviation	658
Lesson 128—Frequency Distributions and the Normal Curve	666
Lesson 129—More on Statistics	674
Lesson 130—Probability	682
Lesson 131—Permutations and Combinations	690
Lesson 132—Probability Shortcuts	698
Lesson 133—Unequally Likely Outcomes	706
Chapter 18: Additional Topics —	711
Lesson 134—Sequences	712
Lesson 135—Dividing Complex Numbers	720
Lesson 136—Determinants	728
Lesson 137—Matrices	736
Appendices —	743
Appendix A—Basics	744
Appendix B—Polynomials and Rational Expressions	746
Appendix C—Radicals and Irrational Roots	748
Appendix D—Equations and Functions	750
Appendix E—Proof of the Quadratic Formula	752
Appendix F—Graphing	754
Appendix G—Systems	756
Appendix H—Absolute Value and Inequalities	758
Appendix I—Statistics and Probability	760
Index -	763