

# Table of Contents

<b>Letter to Homeschooling Parents</b>	<b>1</b>
<b>Chapter 1: Algebra Basics</b>	<b>2</b>
Lesson 1—Advanced Arithmetic	3
Lesson 2—The Purpose of Algebra	7
Lesson 3—Undoing and the Golden Rule of Algebra	12
Lesson 4—Undoing Multiplication and Division	18
Lesson 5—Commutative Properties	22
Lesson 6—Algebra Notation	26
Lesson 7—Percent Problems	32
Lesson 8—Banking and Business	37
Lesson 9—Moon Vacation	41
Lesson 10—Extending the Concept of Speed	46
<b>Chapter 2: Working with Integers</b>	<b>49</b>
Lesson 11—Less than Zero	50
Lesson 12—Negatives in Action	54
Lesson 13—Adding with Negatives	58
Lesson 14—Subtracting with Negatives	62
Lesson 15—Multiplying Negatives	67
Lesson 16—Dividing Negatives ...	70
Lesson 17—Undoing Equations with Negatives	73
Lesson 18—Negatives and Fractions	77
Lesson 19—Changing $-x$ to $x$	80
<b>Chapter 3: Order of Operations</b>	<b>83</b>
Lesson 20—Order of Operations	84
Lesson 21—Equations Too	89
Lesson 22—Help from the Fraction Bar	94
Lesson 23—Undoing In Reverse Order	100
Lesson 24—Undoing with Division	104
Lesson 25—More than Two Operations	108
Lesson 26—Using the Associative Property	114
Lesson 27—More on the Associative Property	119
<b>Chapter 4: Combining Like Terms</b>	<b>125</b>
Lesson 28—Combining $x$ 's	126
Lesson 29—More on Rates	131
Lesson 30—Invisible Coefficients	135
Lesson 31—Getting Bigger/Getting Smaller	139
Lesson 32—Two Unknowns	144
<b>Chapter 5: Equation-Solving Techniques</b>	<b>149</b>
Lesson 33—Freeing $x$ from Parentheses	150
Lesson 34—More Distributing	155
Lesson 35—Minus Sign Outside	159

Lesson 36—Clashing Knights	163
Lesson 37—Parentheses within Parentheses	168
Lesson 38—Freeing $x$ from a Fraction (Part 1)	172
Lesson 39—Freeing $x$ from a Fraction (Part 2)	177
<b>Chapter 6: <math>x</math>'s on Both Sides</b>	<b>181</b>
Lesson 40—From one Side to the Other	182
Lesson 41—Moving Shortcuts	191
Lesson 42—Chase Scene	195
Lesson 43—Mixing it All Up	199
Lesson 44—Mixture Problems Again	203
Lesson 45—Solving Freestyle	206
Lesson 46—False Equations and Identities	211
<b>Chapter 7: Rational Expressions</b>	<b>215</b>
Lesson 47—Reducing Fractions	216
Lesson 48—Factoring into Prime Numbers	220
Lesson 49—Reducing Rational Expressions	224
Lesson 50—Rational Expressions and Parentheses	228
Lesson 51—Distributing in Reverse (Part 1)	232
Lesson 52—Distributing in Reverse (Part 2)	237
Lesson 53—Multiplying Rational Expressions	243
Lesson 54—Dividing Rational Expressions	248
Lesson 55—Adding Rational Expressions	253
Lesson 56—Subtracting Rational Expressions	259
<b>Chapter 8: Solving Rational Equations</b>	<b>265</b>
Lesson 57—Rational Equations	266
Lesson 58—More than $x$ in the Bottom	272
Lesson 59—Ratios and Proportions	277
Lesson 60—Clearing More than One Fraction	283
Lesson 61—When the Denominators are Different	288
Lesson 62—Finding the Lowest Common Denominator	293
Lesson 63—Rational Equations with Complicated Denominators	298
<b>Chapter 9: Powers and Exponents</b>	<b>305</b>
Lesson 64—Raising a Number to a Power	306
Lesson 65—Scientific Notation	311
Lesson 66—Order of Operations and Powers	315
Lesson 67—Combining Powers	320
Lesson 68—Multiplying Powers	324
Lesson 69—Advanced Distributing	328
Lesson 70—Dividing Powers	333
Lesson 71—More Scientific Notation	337
Lesson 72—Harder Rational Expressions	341
Lesson 73—Combining Harder Rational Expressions	346
<b>Chapter 10: Radical Expressions</b>	<b>353</b>
Lesson 74—Root: The Inverse of a Power	354

Lesson 75—Undoing Powers and Roots	359
Lesson 76—Irrational Roots	363
Lesson 77—Estimating Irrationals	367
Lesson 78—The Pythagorean Theorem	372
<b>Chapter 11: Quadratic Equations</b>	<b>380</b>
Lesson 79—Two Solutions	381
Lesson 80—Undoing Several Operations	386
Lesson 81—The Uncombinables	392
Lesson 82—More Solving by Factoring	396
Lesson 83—Advanced Reverse Distributing	399
Lesson 84—Equations that Won't Factor Easily	403
Lesson 85—Completing the Square	407
Lesson 86—Building a Pool Deck	412
<b>Chapter 12: Powers, Polynomials, and Radicals</b>	<b>425</b>
Lesson 87—Relations, Functions, and Equations	426
Lesson 88—Solving for the Other Variable	431
Lesson 89—Calculating Profits	436
Lesson 90—Galileo Analyzes Motion	441
Lesson 91—Kepler Tracks the Planets	447
Lesson 92—Equations with Several Variables	453
Lesson 93—Newton's Equation of the Universe	460
<b>Chapter 13: More on Polynomials and Rational Expressions</b>	<b>467</b>
Lesson 94—Adding and Subtracting with Several Variables	468
Lesson 95—Multiplying with Several Variables	474
Lesson 96—Distributing with Several Variables	480
Lesson 97—Reducing Rational Expressions with Several Variables	486
Lesson 98—More Reducing with Several Variables	492
Lesson 99—Finding the Right Pair with Several Variables	498
Lesson 100—Difference of Two Squares	504
Lesson 101—Multiplying and Dividing Rational Expressions with Several Variables	510
Lesson 102—Adding and Subtracting Rational Expressions with Several Variables	516
Lesson 103—Equation-Solving Strategies	522
Lesson 104—Curved Mirrors and Headlights	528
<b>Chapter 14: Graphing Functions and Slope</b>	<b>533</b>
Lesson 105—Drawing a Picture	534
Lesson 106—Graphing Linear Equations	540
Lesson 107—Graphing Higher-Degree Equations	546
Lesson 108—Graphing Shortcuts	552
<b>Chapter 15: Rate of Change and Slope</b>	<b>557</b>
Lesson 109—Change in $y$ over Change in $x$	558
Lesson 110—Different Kinds of Slopes	564
Lesson 111—Horizontal and Vertical Lines	570
Lesson 112—Slope Intercept Form	576
Lesson 113—Point-Slope Form	582

<b>Chapter 16: Systems of Equations</b>	<b>587</b>
Lesson 114—Solving Systems	588
Lesson 115—Solving Systems by Subtraction	594
Lesson 116—More on the Addition and Subtraction Methods	700
Lesson 117—Solving Systems by Substitution	706
Lesson 118—Graphing Systems	712
Lesson 119—Inconsistent and Dependent Systems	718
<b>Chapter 17: Inequalities and Radicals</b>	<b>723</b>
Lesson 120—Inequalities	724
Lesson 121—Undoing Inequalities	730
Lesson 122—Undoing Inequalities in Reverse Order	736
Lesson 123—Multiplying Irrationals	742
Lesson 124—Dividing Irrationals	748
Lesson 125—Adding and Subtracting Irrationals	754
Lesson 126—Simplifying Irrationals	760
Lesson 127—Compound Inequalities	765
Lesson 128—Two-Variable Inequalities	770
Lesson 129—Graphing Two-Variable Inequalities	775
Lesson 130—Systems of Two-Variable Inequalities	780
<b>Chapter 18: Absolute Value and the Function Concept</b>	<b>785</b>
Lesson 131—Absolute Value	786
Lesson 132—Absolute Value Equations	791
Lesson 133—Solving Absolute Value Equations with Algebra	796
Lesson 134—Function Basics	801
Lesson 135—Working with Functions	806
<b>Chapter 19: Statistics and Probability</b>	<b>811</b>
Lesson 136—Statistics	812
Lesson 137—Measures of Dispersion	817
Lesson 138—More Measures of Dispersion	822
Lesson 139—Probability	827
Lesson 140—Probability Shortcuts	832
<b>Chapter 20: Additional Topics</b>	<b>837</b>
Lesson 141—The Quadratic Formula	842
Lesson 142—Using a Graphing Calculator	847
<b>Appendices</b>	<b>852</b>