Table of Contents

INTRODUCTION 1
About This Book 1
Foolish Assumptions 2
Icons Used in This Book 2
Beyond the Book 2
Where to Go from Here 3

PART 1: GETTING STARTED WITH BASIC MATH AND PRE-ALGEBRA 5

CHAPTER 1: We've Got Your Numbers 7
Getting in Place with Numbers and Digits 8
Rollover: Rounding Numbers Up and Down 10
Using the Number Line with the Big Four 12
The Column Lineup: Adding and Subtracting 14
Multiplying Multiple Digits 15
Cycling through Long Division 16
Solutions to We've Got Your Numbers 19

CHAPTER 2: Smooth Operators: Working with the Big Four Operations 23
Switching Things Up with Inverse Operations and the Commutative Property 24
Getting with the In-Group: Parentheses and the Associative Property 27
Becoming Unbalanced: Inequalities 29
Special Times: Powers and Square Roots 31
Solutions to Problems in Smooth Operators 34

CHAPTER 3: Getting Down with Negative Numbers 37
Case #1: Small Minus Big: Having a Little, Owing a Lot 37
Case #2: Negative-Negative: Owing and Owing More 38
Case #3: Big Negative Plus Smaller Positive: Owing Much and Getting Less 39
Case #4: Small Negative Plus Bigger Positive: Owing a Little and Getting More 40
Combining Signs 41
Knowing Signs of the Times (and Division) for Negative Numbers 42
Sign-Switching: Understanding Negation and Absolute Value 44
Solutions to Problems in Getting Down with Negative Numbers 46

CHAPTER 4: It's Just an Expression 49
Evaluating Expressions with Addition and Subtraction 50
Evaluating Expressions with Multiplication and Division 51
Making Sense of Mixed-Operator Expressions 52
Expressing Exponents 53
Prioritizing Parentheses 55
Pulling Apart Parentheses and Exponents 56

COPYRIGHTED MATERIAL

Figuring Out Nested Parentheses . . . 58
Bringing It All Together: The Order of Operations (PEMDAS) . . . 59
Solutions to It's Just an Expression . . . 61

CHAPTER 5: **Dividing Attention: Divisibility, Factors, and Multiples** . . . 69
Checking for Leftovers: Divisibility Tests . . . 70
Understanding Factors and Multiples . . . 72
One Number, Indivisible: Identifying Prime (And Composite) Numbers . . . 74
Generating a Number's Factors . . . 75
Decomposing a Number into Its Prime Factors . . . 77
Finding the Greatest Common Factor . . . 78
Generating the Multiples of a Number . . . 80
Finding the Least Common Multiple . . . 81
Solutions to Divisibility, Factors, and Multiples . . . 83

PART 2: SLICING THINGS UP: FRACTIONS, DECIMALS, AND PERCENTS . . . 89

CHAPTER 6: **Fractions Are a Piece of Cake** . . . 91
Getting Down the Basic Fraction Stuff . . . 91
In Mixed Company: Converting between Mixed Numbers and Improper Fractions . . . 94
Simplifying and Increasing the Terms of Fractions . . . 96
Comparing Fractions with Cross-Multiplication . . . 99
Working with Ratios and Proportions . . . 101
Solutions to Fractions Are a Piece of Cake . . . 103

CHAPTER 7: **Fractions and the Big Four** . . . 109
Reaching the Common Denominator: Adding Fractions . . . 109
The Other Common Denominator: Subtracting Fractions . . . 113
Multiplying Fractions: A Straight Shot . . . 115
Flipping for Fraction Division . . . 116
Carried Away: Adding Mixed Numbers . . . 118
Borrowing from the Whole: Subtracting Mixed Numbers . . . 120
Multiplying and Dividing Mixed Numbers . . . 123
Solutions to Fractions and the Big Four . . . 125

CHAPTER 8: **Getting to the Point with Decimals** . . . 139
Getting in Place: Basic Decimal Stuff . . . 140
Simple Decimal-Fraction Conversions . . . 143
New Lineup: Adding and Subtracting Decimals . . . 145
Counting Decimal Places: Multiplying Decimals . . . 147
Points on the Move: Dividing Decimals . . . 148
Converting Decimals to Fractions . . . 150
Changing Fractions to Decimals . . . 152
Solutions to Getting to the Point with Decimals . . . 154

CHAPTER 9: **Playing the Percentages** . . . 163
Converting Percents to Decimals . . . 163
Changing Decimals to Percents . . . 165

Switching from Percents to Fractions 166
Converting Fractions to Percents 167
Solving a Variety of Percent Problems Using Word Equations 169
Solutions to Playing the Percentages 171

PART 3: A GIANT STEP FORWARD: INTERMEDIATE TOPICS 175

CHAPTER 10: Seeking a Higher Power through Scientific Notation 177
On the Count of Zero: Understanding Powers of Ten 178
Exponential Arithmetic: Multiplying and Dividing Powers of Ten 180
Representing Numbers in Scientific Notation 181
Multiplying and Dividing with Scientific Notation 182
Solutions to Problems in Seeking a Higher Power through Scientific Notation 184

CHAPTER 11: Weighty Questions on Weights and Measures 187
Knowing the Basics of the English System 188
Going International with the Metric System 190
Converting Between English and Metric Units 193
Solutions to Problems in Weighty Questions on Weights and Measures 196

CHAPTER 12: Shaping Up with Geometry 203
Getting in Shape: Polygon (and Non-Polygon) Basics 204
Squaring Off with Quadrilaterals 204
Triangles: Three Sides to Every Story 208
Getting Around with Circle Measurements 212
Building Solid Measurement Skills 214
Solutions to Problems in Shaping Up with Geometry 218

CHAPTER 13: Getting Graphic: *xy*-Graphs 223
Getting the Point of the *xy*-Graph 223
Drawing the Line on the *xy*-Graph 227
Solutions to Problems in Getting Graphic: *xy*-Graphs 230

PART 4: THE X FACTOR: INTRODUCING ALGEBRA 235

CHAPTER 14: Expressing Yourself with Algebraic Expressions 237
Plug It In: Evaluating Algebraic Expressions 238
Knowing the Terms of Separation 240
Adding and Subtracting Like Terms 242
Multiplying and Dividing Terms 243
Simplifying Expressions by Combining Like Terms 245
Simplifying Expressions with Parentheses 247
FOILing: Dealing with Two Sets of Parentheses 249
Solutions to Problems in Expressing Yourself with Algebraic Expressions 251

CHAPTER 15: Finding the Right Balance: Solving Algebraic Equations 259
Solving Simple Algebraic Equations 259
Equality for All: Using the Balance Scale to Isolate *x* 262
Switching Sides: Rearranging Equations to Isolate *x* 264

Eliminating Fractions: Cross-Multiplying to Simplify Equations 266
Solutions to Problems in Finding the Right Balance: Solving Algebraic Equations 268

PART 5: THE PART OF TENS 275

CHAPTER 16: Ten Alternative Numeral and Number Systems 277
Tally Marks 277
Bundled Tally Marks 278
Egyptian Numerals 278
Babylonian Numerals 279
Ancient Greek Numerals 279
Roman Numerals 280
Mayan Numerals 280
Base-2 (Binary) Numbers 281
Base-16 (Hexadecimal) Numbers 282
Prime-Based Numbers 283

CHAPTER 17: Ten Curious Types of Numbers 285
Square Numbers 285
Triangular Numbers 286
Cubic Numbers 287
Factorial Numbers 287
Powers of Two 288
Perfect Numbers 288
Amicable Numbers 289
Prime Numbers 289
Mersenne Primes 290
Fermat Primes 290

INDEX 291