## Table of Contents

CHAPTER 1 The Real Number Systemand Geometry 1
Study Strategies: The P.O.W.E.R. Framework ..... 2
Section 1.1 Review of Fractions ..... 4
Section 1.2 Exponents and Order of Operations 1
Section 1.3 Geometry Review ..... 23
Section 1.4 Sets of Numbers and Absolute Value ..... 34
Section 1.5 Addition and Subtraction of Real Numbers ..... 43
Section 1.6 Multiplication and Division of Real Numbers ..... 51
Section 1.7 Algebraic Expressions andProperties of Real Numbers 59Group Activity 73
emPOWERme: Measuring Your Math
Confidence ..... 74
Chapter 1 Summary ..... 75
Chapter 1 Review Exercises ..... 79
Chapter 1 Tes ..... 81
CHAPTER 2 Rules of Exponents ..... 83
Study Strategies: Reading Math (and Other)Textbooks 84
Section 2.1 Basic Rules of Exponents ..... 86
Part A: The Product Rule andPower Rules 86
Part B: Combining the Rules ..... 93
Section 2.2 Integer Exponents ..... 95
Part A: Real-Number Bases ..... 95
Part B: Variable Bases ..... 98
Section 2.3 The Quotient Rule 102
Putting It All Together ..... 105
Section 2.4 Scientific Notation ..... 108
Group Activity ..... 115
emPOWERme: Discover Your
Reading Style ..... 116
Chapter 2 Summary ..... 117
Chapter 2 Review Exercises ..... 118
Chapter 2 Test ..... 120
Cumulative Review for
CHAPTER 3 Linear Equations and Inequalities in One Variable 121
Study Strategies: Time Management ..... 122
Section 3.1 Solving Linear Equations Part I ..... 124
Section 3.2 Solving Linear Equations Part II ..... 135
Section 3.3 Applications of Linear Equations ..... 146
Section 3.4 Applications Involving Percents ..... 156
Section 3.5 Geometry Applications and Solving Formulas ..... 166
Section 3.6 Applications of Linear Equations toProportions, Money Problems, and$d=r t \quad 180$
Section 3.7 Linear Inequalities in One Variable ..... 195
Section 3.8 Compound Inequalities in
One Variable ..... 207
Group Activity ..... 214
emPOWERme: Find YourTime Style215
Chapter 3 Summary ..... 216
Chapter 3 Review Exercises ..... 220
Chapter 3 Tes ..... 223
Cumulative Review for
Chapters 1-3 ..... 224
CHAPTER 4 Linear Equations in Two Variables and Functions ..... 225
Study Strategies: Taking Notes in Class ..... 226
Section 4.1 Introduction to Linear Equations in Two Variables ..... 228
Section 4.2 Graphing by Plotting Points and Finding Intercepts ..... 242
Section 4.3 The Slope of a Line ..... 253
Section 4.4 The Slope-Intercept Form of a Line ..... 264
Section 4.5 Writing an Equation of a Line ..... 273
Section 4.6 Introduction to Functions ..... 285
Group Activity ..... 303
emPOWERme: Evalua
Class Notes ..... 304
Chapter 4 Summary ..... 305
Chapter 4 Review Exercises ..... 310
Chapter 4 Test ..... 314
Cumulative Review forChapters 1-4 315
CHAPTER 5 Solving Systems of Linear Equations ..... 317
Study Strategies: Taking Math Tests ..... 318
Section 5.1 Solving Systems by Graphing ..... 320
Section 5.2 Solving Systems by the Substitution Method ..... 330
Section 5.3 Solving Systems by the Elimination Method ..... 338
Putting It All Together ..... 347
Section 5.4 Applications of Systems of Two Equations ..... 349
Section 5.5 Solving Systems of Three Equations and Applications ..... 362
Section 5.6 Solving Systems of Linear EquationsUsing Matrices 374
Group Activity ..... 382
emPOWERme: Studying Smart ..... 382
Chapter 5 Summary ..... 383
Chapter 5 Review Exercises ..... 388
Chapter 5 Test ..... 390
Cumulative Review for
Chapters 1-5 ..... 391
CHAPTER 6 Polynomials ..... 393
Study Strategies: Doing Math Homework ..... 394
Section 6.1 Review of the Rules of Exponents ..... 396
Section 6.2 Addition and Subtraction of Polynomials ..... 400
Section 6.3 Multiplication of Polynomials ..... 409
Section 6.4 Division of Polynomials ..... 419
Group Activity ..... 427
emPOWERme: The Right Time and
Place for Homework ..... 428
Chapter 6 Summary ..... 429
Chapter 6 Review Exercises ..... 431
Chapter 6 Test ..... 433
Cumulative Review for
Chapters 1-6 ..... 434

## CHAPTER 7 Factoring Polynomials 435

Study Strategies: Making Academic Choices 436
Section 7.1 The Greatest Common Factor and Factoring by Grouping 438
Section 7.2 Factoring Trinomials of the Form $x^{2}+b x+c 448$
Section 7.3 Factoring Trinomials of the Form $a x^{2}+b x+c(a \neq 1) \quad 456$
Section 7.4 Factoring Special Trinomials and Binomials 464
Putting It All Together 474
Section 7.5 Solving Quadratic Equations by Factoring 479
Section 7.6 Applications of Quadratic Equations 488
Group Activity 498
emPOWERme: Identify Major Attractions 499
Chapter 7 Summary 501
Chapter 7 Review Exercises 503
Chapter 7 Test 505
Cumulative Review for Chapters 1-7 506

## CHAPTER 8 Rational Expressions 507

Study Strategies: Coping with Stress 508
Section 8.1 Rational Expressions and Functions 511
Section 8.2 Multiplying and Dividing Rational Expressions 522
Section 8.3 Finding the Least Common Denominator 529
Section 8.4 Adding and Subtracting Rational Expressions 537
Putting It All Together 546
Section 8.5 Simplifying Complex Fractions 551
Section 8.6 Solving Rational Equations 561
Section 8.7 Applications of Rational Equations 572
Section 8.8 Variation 580
Group Activity 588
emPOWERme: Determine Your Risk for Stress-Related IIIness 589
Chapter 8 Summary 591
Chapter 8 Review Exercises 596
Chapter 8 Test 599
Cumulative Review for
Chapters 1-8 600
CHAPTER 9 More Equations and Inequalities ..... 601
Study Strategies: Working with Technology ..... 602
Section 9.1 Absolute Value Equations ..... 604
Section 9.2 Absolute Value Inequalities ..... 611
Section 9.3 Linear and Compound Linear Inequalities in Two Variables ..... 618
Group Activity ..... 630
emPOWERme: Information,
Please! 630
Chapter 9 Summary ..... 631
Chapter 9 Review Exercises ..... 633
Chapter 9 Test ..... 634
Cumulative Review for
Chapters 1-9 ..... 634
CHAPTER 10 Radicals and Rational Exponents ..... 635
Study Strategies: Working with a Study Group ..... 636
Section 10.1 Finding Roots ..... 638
Section 10.2 Rational Exponents ..... 646
Section 10.3 Simplifying Expressions Containing Square Roots ..... 655
Section 10.4 Simplifying Expressions Containing Higher Roots ..... 666
Section 10.5 Adding, Subtracting, and Multiplying Radicals ..... 674
Section 10.6 Dividing Radicals 682 Putting It All Together ..... 694
Section 10.7 Solving Radical Equations ..... 699
Section 10.8 Complex Numbers ..... 708
Group Activity ..... 717
emPOWERme: Form a Study Group 718
Chapter 10 Summary ..... 719
Chapter 10 Review Exercises ..... 724
Chapter 10 Test ..... 726
Cumulative Review forChapters 1-10 727
CHAPTER 11 Quadratic Equations ..... 728
Study Strategies: Creating Visuals ..... 729
Section 11.1 Review of Solving Equations by Factoring ..... 731
Section 11.2 The Square Root Property and Completing the Square ..... 735
Section 11.3 The Quadratic Formula ..... 747
Putting It All Together ..... 756
Section 11.4 Equations in Quadratic Form ..... 760
Section 11.5 Formulas and Applications ..... 769
Group Activity ..... 776
emPOWERme: What's YourLearning Style?777
Chapter 11 Summary ..... 779
Chapter 11 Review Exercises ..... 781
Chapter 11 Test ..... 783
Cumulative Review forChapters 1-11 784
CHAPTER 12 Functions and TheirGraphs785
Study Strategies: Developing Financial Literacy ..... 786
Section 12.1 Relations and Functions ..... 788
Section 12.2 Graphs of Functions and Transformations ..... 803
Section 12.3 Quadratic Functions and Their Graphs ..... 816
Section 12.4 Applications of Quadratic Functions and Graphing Other Parabolas 828
Section 12.5 Quadratic and Rational Inequalities 842
Section 12.6 The Algebra of Functions ..... 853
Group Activity ..... 863
emPOWERme: Deter
Saving Style ..... 864
Chapter 12 Summary ..... 865
Chapter 12 Review Exercises ..... 871
Chapter 12 Test ..... 873
Cumulative Review for
CHAPTER 13 Exponential and Logarithmic Functions 876
Study Strategies: Using the Internet for Studying 877
Section 13.1 Inverse Functions ..... 879
Section 13.2 Exponential Functions ..... 890
Section 13.3 Logarithmic Functions ..... 901
Section 13.4 Properties of Logarithms ..... 914
Section 13.5 Common and Natural Logarithms and Change of Base ..... 924
Section 13.6 Solving Exponential and LogarithmicEquations 936Group Activity 947
emPOWERme: Should You Use theInternet to Supplement YourLearning? 948
Chapter 13 Summary ..... 949
Chapter 13 Review Exercises ..... 953
Chapter 13 Tes ..... 956
Cumulative Review for
Chapters 1-13 ..... 957
CHAPTER 14 Conic Sections, Nonlinear Systems, and Nonlinear Inequalities ..... 958
Study Strategies: Improving Your Memory ..... 959
Section 14.1 The Circle ..... 961
Section 14.2 The Ellipse and the Hyperbola ..... 970
Putting It All Together ..... 986
Section 14.3 Nonlinear Systems of Equations ..... 990
Section 14.4 Second-Degree Inequalities and
Systems of Inequalities ..... 997
Group Activity ..... 1002
emPOWERme: Memory Devices ..... 1003
Chapter 14 Summary ..... 1004
Chapter 14 Review Exercises ..... 1007
Chapter 14 Tes ..... 1008
Cumulative Review for
Chapters 1-14 ..... 1008

Chapter 15 and the Appendices are available online

## CHAPTER 15 Sequences and Series <br> 15-1

Section 15.1 Sequences and Series ..... 15-1
Section 15.2 Arithmetic Sequences andSeries 15-13
Section 15.3 Geometric Sequences andSeries15-24
Section 15.4 The Binomial Theorem ..... 15-36Chapter 15 Summary 15-45Chapter 15 Review Exercises 15-48Chapter 15 Test 15-51Cumulative Review forChapters 1-15 15-52
APPENDIX A Beginning AlgebraReview A-1
A.1: The Real Number System andGeometry A-1
A.2: Rules of Exponents ..... A-8
A.3: Linear Equations andInequalitiesA-11
A.4: Linear Equations in Two Variables ..... A-21
A.5: Solving Systems of LinearEquations A-29
A.6: Polynomials ..... A-37
A.7: Factoring Polynomials ..... A-44
A.8: Rational Expressions ..... A-51

## APPENDIX B

B.1: Determinants and Cramer's Rule B-1
B.2: Synthetic Division and the Remainder Theorem B-9

Answers to Exercises SA-1

## Credits C-1

Index I-1

