

# Contents

<b>Preface</b>	<b>1</b>
Components of the Text . . . . .	2
Structure of the Text: Eighth Grade . . . . .	3
Chapters 1 through 4: Linear Equations: Representations and Solutions . . . . .	3
Chapters 5 and 6: Functions: Analyzing and Synthesizing . . . . .	4
Chapters 7 and 8: Numbers and Measures, Large and Small . . . . .	5
Chapters 9 and 10: Explorations into Transformational Geometry . . . . .	7
Acknowledgments . . . . .	8
<b>Chapter 1. Linear Equations in One Variable</b>	<b>9</b>
Linear Expressions . . . . .	9
Section 1.1: Solving linear equations: obtaining the desired value of an expression . . . . .	12
Section 1.2: Solving linear equations: equating two expressions . . . . .	14
Section 1.3: Creating and Solving Linear Equations to Model Real World Problems . . . . .	17
<b>Chapter 2. Exploring Linear Relations</b>	<b>25</b>
Section 2.1: Linear Patterns and Contexts . . . . .	27
Proportional Relationships . . . . .	27
Linear relationships . . . . .	30
Section 2.2: Slope of a Line . . . . .	34
Section 2.3: The Equation $y = mx + b$ . . . . .	38
<b>Chapter 3. Representations of a Linear Relation</b>	<b>41</b>
Section 3.1: Linear relations: creating graphs, tables, equations of lines . . . . .	41
Section 3.2: Parallel and Perpendicular lines . . . . .	47
<b>Chapter 4. Simultaneous Linear Equations</b>	<b>53</b>
Section 4.1: Understanding Solutions of Simultaneous Linear Equations . . . . .	53
Section 4.2: Solving Simultaneous Linear Equations Algebraically . . . . .	58

Method of Substitution . . . . .	58
Method of Elimination . . . . .	60
Comments . . . . .	62
Solving Real World Problems using Systems . . . . .	66
<b>Chapter 5. Functions</b>	<b>71</b>
Section 5.1 What is a Function? . . . . .	72
Functions Defined by Graphs . . . . .	77
Section 5.2: Linear and Nonlinear Functions . . . . .	80
Section 5.3: Modeling and Analyzing a Functional Relationship . . . . .	83
Constructing Functions . . . . .	83
Analyzing a Functional Relationship . . . . .	85
<b>Chapter 6. Investigate Patterns of Association in Bivariate Data</b>	<b>89</b>
Section 6.1: Construct and Interpret Scatter Plots for Bivariate Data . . . . .	90
Section 6.2: Linear Models for Problem Solving . . . . .	96
Construct and Assess Best Fitting Lines . . . . .	96
Using Linear Models to Solve Problems . . . . .	98
Section 6.3: Analyzing Bivariate Categorical Data Using Two-way Frequency Tables . . . . .	100
Two-Way Frequency Tables . . . . .	100
Making and Interpreting Two-Way Relative Frequency Tables . . . . .	102
<b>Chapter 7. and Irrational Numbers</b>	<b>107</b>
Section 7.1: Representing Numbers Geometrically . . . . .	108
Section 7.2: Solutions to Equations Using Square and Cube Roots . . . . .	112
Section 7.3: Rational and Irrational Numbers . . . . .	113
The Rational Number System . . . . .	113
Express Decimals as Fractions . . . . .	116
Expand the Number System . . . . .	117
Approximating the Value of Irrational Numbers . . . . .	120

<b>Chapter 8. Integer Exponents, Scientific Notation and Volume</b>	<b>125</b>
Section 8.1: Integer exponents . . . . .	125
Section 8.2: Scientific Notation . . . . .	129
Scientific Notation and Place Value . . . . .	129
Solve Problems and Apply Scientific Notation . . . . .	132
Section 8.3: Volume . . . . .	136
Prisms and Cylinders . . . . .	136
Cones . . . . .	138
The Sphere . . . . .	141
<b>Chapter 9. Geometry: Transformations, Congruence and Similarity</b>	<b>145</b>
Section 9.1: Rigid motions and Congruence . . . . .	148
Translations . . . . .	150
Reflections . . . . .	151
Rotations . . . . .	154
Succession of rigid motions . . . . .	156
Congruence . . . . .	159
Section 9.2: Dilations and Similarity . . . . .	161
Similarity . . . . .	163
Similar Figures . . . . .	164
Summary . . . . .	165
<b>Chapter 10. Geometry: Angles, Triangles and Distance</b>	<b>167</b>
Section 10.1: Angles and Triangles . . . . .	168
Section 10.2 The Pythagorean Theorem . . . . .	172
Section 10.3 Applications of the Pythagorean Theorem . . . . .	176
Section 10.4 The Distance Between Two Points . . . . .	179
<b>Appendix. A Development of the Geometry Underlying 8th Grade Explorations</b>	<b>185</b>
Section 1: The Elements of Plane Geometry . . . . .	185

Section 2: Rigid motions . . . . .	187
Section 3: Fundamental Triangle Congruence theorem (SSS) . . . . .	189
Section 4: Angles . . . . .	190
Section 5. Congruence of Triangles . . . . .	193
Section 6: Measurement . . . . .	195
Section 7: Similarity . . . . .	196
Properties of dilations . . . . .	196
Similarity Theorems . . . . .	198