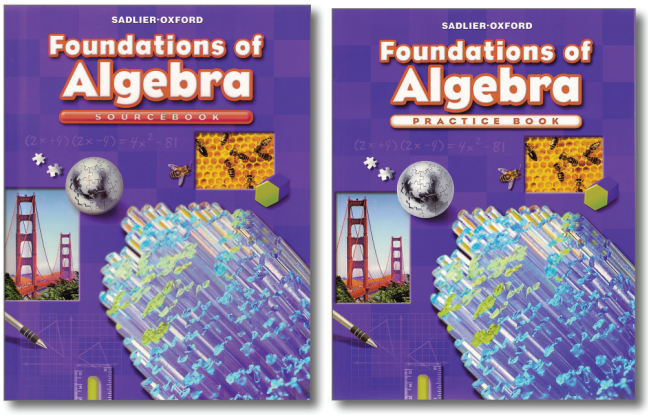
SADLIER

Foundations of Algebra



Aligned to the

Georgia

Standards of Excellence 2015-2016 Mathematics

Grade 8

Contents

Sadlier
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The Number System 8.NS

GEORGIA STANDARDS OF EXCELLENCE 2015–2016: MATHEMATICS		SADLIER *FOUNDATIONS OF ALGEBRA*, GRADE 8
Know that there are numbers that are not rational, and approximate them by rational numbers.		
MGSE8.NS.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.	**1-1 The Rational Numbers** — TE pp. 2–3B; SB pp. 2–3 / PB pp. 1–2 **1-2 The Rational Numbers on a Number Line**— TE pp. 4–5B; SB pp. 4–5 / PB pp. 3–4 **2-5 Irrational Numbers** — TE pp. 44–45B; SB pp. 44–45 / PB pp. 47–48
MGSE8.NS.2	Use rational approximation of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line, and estimate the value of expressions (e.g., estimate π^2 to the nearest tenth). *For example, by truncating the decimal expansion of √2 (square root of 2), show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*	**2-4 Estimate Square Roots** — TE pp. 42–43B; SB pp. 42–43 / PB pp. 45–46 **2-5 Irrational Numbers** — TE pp. 44–45B; SB pp. 44–45 / PB pp. 47–48

Expressions and Equations 8.EE

Georgia Standards of Excellence 2015–2016: Mathematics		Sadlier *Foundations of Algebra*, Grade 8
Work with radicals and integer exponents.		
MGSE 8.EE.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{(-5)} = 3^{(-3)} = 1/(3)^3 = 1/27$.	**1-12 Integral Exponents** — TE pp. 24–25B; SB pp. 24–25 / PB pp. 23–24 **1-13 Powers and Exponents** — TE pp. 26–27B; SB pp. 26–27 / PB pp. 25–26
MGSE8.EE.2	Use square root and cube root symbols to represent solutions to equations. Recognize that $x^2 = p$ (where p is a positive rational number and $\|x\| \leq 25$) has 2 solutions and $x^3 = p$ (where p is a negative or positive rational number and $\|x\| \leq 10$) has one solution. Evaluate square roots of perfect squares ≤ 625 and cube roots of perfect cubes ≥ -1000 and ≤ 1000.	**2-3 Perfect Squares and Square Roots** — TE pp. 40–41B; SB pp. 40–41 / PB pp. 43–44 **2-4 Estimate Square Roots** — TE pp. 42–43B; SB pp. 42–43 / PB pp. 45–46 ***12-5A Perfect Cubes and Cube Roots** — Online ***12-5B Use Cube Root Symbols** — Online
MGSE8.EE.3	Use numbers expressed in scientific notation to estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as* 3×10^8 *and the population of the world as* 7×10^9*, and determine that the world population is more than 20 times larger.*	**2-1 Scientific Notation** — TE pp. 36–37B; SB pp. 36–37 / PB pp. 39–40 **2-2 Multiply and Divide in Scientific Notation** — TE pp. 38–39B; SB pp. 38–39 / PB pp. 41–42
MGSE8.EE.4	Add, subtract, multiply and divide numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Understand scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g. use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology (e.g. calculators).	**2-2 Multiply and Divide in Scientific Notation** — TE pp. 38–39B; SB pp. 38–39 / PB pp. 41–42
Understand the connections between proportional relationships, lines, and linear equations.		
MCC.8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a*	**6-9 Direct Variation** — TE pp. 172–173B; SB pp. 172–173 / PB pp. 191–192 **7-1 Ratios, Rates, and Unit Rates** — TE pp. 188–189B; SB pp. 188–189 / PB pp. 211–212

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Expressions and Equations 8.EE

Georgia Standards of Excellence 2015–2016: Mathematics		Sadlier *Foundations of Algebra*, Grade 8
	distance-time equation to determine which of two moving objects has greater speed.	**7-3 Conversion Factors and Measurement Systems**—TE pp. 192–193B; SB pp. 192–193 / PB pp. 215–216 **7-5 Direct Proportions**—TE pp. 196–197B; SB pp. 196–197 / PB pp. 219–220 ***7-5A Proportions and Unit Rates**—Online ***7-5B Graph Proportional Relationships**—Online ***7-5C Compare Proportional Relationships**—Online
MGSE8.EE.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.	**6-6 Linear Functions: Standard Form and Slope-Intercept Form**—TE pp. 166–167B; SB pp. 166–167 / PB pp. 185–186 **6-9 Direct Variation**—TE pp. 172–173B; SB pp. 172–173 / PB pp. 191–192 **10-7 Coordinate Plane and Polygons**—TE pp. 278–279B; SB pp. 278–279 / PB pp. 313–314
Analyze and solve linear equations and pairs of simultaneous linear equations.		
MGSE8.EE.7	Solve linear equations in one variable.	
	MGSE8.EE.7a Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).	**3-3 Equations**—TE pp. 68–69B; SB pp. 68–69 / PB pp. 75–76 ***3-5A Identify Equations with One, Many, or No Solutions**—Online ***3-5B Solve Equations with One, Many, or No Solutions**—Online
	MGSE8.EE.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	**1-15 Problem-Solving Strategy: Make a Drawing**—TE pp. 30–31B; SB pp. 30–31 / PB pp. 29–30 **3-3 Equations**—TE pp. 68–69B; SB pp. 68–69 / PB pp. 75–76 **3-4 One-Step Addition and Subtraction Equations**—TE pp. 70–71B; SB pp. 70–71 / PB pp. 77–78 **3-5 One-Step Multiplication and Division Equations**—TE pp. 72–73B; SB pp. 72–73 / PB pp. 79–80 **3-6 Model Two-Step Equations**—TE pp. 74–75B; SB pp. 74–75 / PB pp. 81–82 **3-7 Two-Step Equations**—TE pp. 76–77B; SB pp. 76–77 / PB pp. 83–84 **3-8 Multistep Equations with Grouping Symbols**—TE pp. 78–79B; SB pp. 78–79 / PB pp. 85–86 **3-9 Multistep Equations with Variables on Both Sides**—TE pp. 80–81B; SB pp. 80–81 / PB pp. 87–88

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Expressions and Equations 8.EE

Georgia Standards of Excellence 2015–2016: Mathematics		Sadlier *Foundations of Algebra*, Grade 8
		3-10 Multistep Equations: Fractions and Decimals—TE pp. 82–83B; SB pp. 82–83 / PB pp. 89–90 **3-14 Problem-Solving Strategy: Guess and Test**—TE pp. 90–91B; SB pp. 90–91 / PB pp. 97–98 **6-14 Problem-Solving Strategy: Reason Logically**—TE pp. 182–183B; SB pp. 182–183 / PB pp. 201–202 **7-2 Proportions**—TE pp. 190–191B; SB pp. 190–191 / PB pp. 213–214 **7-12 Problem-Solving Strategy: Solve a Simpler Problem**—TE pp. 210–211B; SB pp. 210–211 / PB pp. 233–234 **9-13 Problem-Solving Strategy: Adopt a Different Point of View**—TE pp. 260–261B; SB pp. 260–261 / PB pp. 291–292 **10-12 Problem-Solving Strategy: Work Backward**—TE pp. 288–289B; SB pp. 288–289 / PB pp. 323–324 **12-11 Problem-Solving Strategy: Review of Strategies** (Find a Pattern/Adopt a Different Point of View)—TE pp. 338–339B; SB pp. 338–339 / PB pp. 381–382
MGSE8.EE.8	Analyze and solve pairs of simultaneous linear equations (systems of linear equations).	
	MGSE8.EE.8a Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.	**6-1 Relations and Functions**—TE pp. 156–157B; SB pp. 156–157 / PB pp. 175–176 **6-2 Graphs of Functions**—TE pp. 158–159B; SB pp. 158–159 / PB pp. 177–178
	MGSE8.EE.8b Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.*	**3-14 Problem-Solving Strategy: Guess and Test**—TE pp. 90–91B; SB pp. 90–91 / PB pp. 97–98 **6-10 Solve Systems of Equations by Graphing**—TE pp. 174–175B; SB pp. 174–175 / PB pp. 193–194 **6-11 Solve Systems of Equations by Substitution and Elimination**—TE pp. 176–177B; SB pp. 176–177 / PB pp. 195–196 **6-14 Problem-Solving Strategy: Reason Logically**—TE pp. 182–183B; SB pp. 182–183 / PB pp. 201–202 **9-13 Problem-Solving Strategy: Adopt a Different Point of View**—TE pp. 260–261B; SB pp. 260–261 / PB pp. 291–292 **11-10 Problem-Solving Strategy: Account for All Possibilities**—TE pp. 312–313B; SB pp. 312–313 / PB pp. 351–352

Expressions and Equations 8.EE

Georgia Standards of Excellence 2015–2016: Mathematics	Sadlier *Foundations of Algebra*, Grade 8
MGSE8.EE.8c Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*	**3-14 Problem-Solving Strategy: Guess and Test** — TE pp. 90–91B; SB pp. 90–91 / PB pp. 97–98 **6-10 Solve Systems of Equations by Graphing**— TE pp. 174–175B; SB pp. 174–175 / PB pp. 193–194 **6-11 Solve Systems of Equations by Substitution and Elimination** — TE pp. 176–177B; SB pp. 176–177 / PB pp. 195–196 ***6-11A Use Systems to Solve Problems** — Online **11-10 Problem-Solving Strategy: Account for All Possibilities** — TE pp. 312–313B; SB pp. 312–313 / PB pp. 351–352

Functions 8.F

Georgia Standards of Excellence 2015–2016: Mathematics		Sadlier *Foundations of Algebra*, Grade 8
Define, evaluate, and compare functions.		
MGSE8.F.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.	**6-1 Relations and Functions** — TE pp. 156–157B; SB pp. 156–157 / PB pp. 175–176 **6-2 Graphs of Functions** — TE pp. 158–159B; SB pp. 158–159 / PB pp. 177–178 ***6-2A Compare Functions** — Online
MGSE8.F.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.*	**6-2 Graphs of Functions** — TE pp. 158–159B; SB pp. 158–159 / PB pp. 177–178 ***6-2A Compare Functions** — Online
MGSE8.F.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.*	**6-6 Linear Functions: Standard Form and Slope-Intercept Form** — TE pp. 166–167B; SB pp. 166–167 / PB pp. 185–186 **11-6 Nonlinear Functions: Quadratic** — TE pp. 304–305B; SB pp. 304–305 / PB pp. 343–344 **11-7 Other Nonlinear Functions** — TE pp. 306–307B; SB pp. 306–307 / PB pp. 345–346 **11-9 Technology: Graphs of Nonlinear Functions** — TE pp. 310–311B; SB pp. 310–311 / PB pp. 349–350
Use functions to model relationships between quantities.		
MGSE8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	**6-1 Relations and Functions** — TE pp. 156–157B; SB pp. 156–157 / PB pp. 175–176 **6-2 Graphs of Functions** — TE pp. 158–159B; SB pp. 158–159 / PB pp. 177–178
MGSE8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	**6-4 Slope of a Line** — TE pp. 162–163B; SB pp. 162–163 / PB pp. 181–182 **6-5 The *x*- and *y*-Intercepts of a Line** — TE pp. 164–165B; SB pp. 164–165 / PB pp. 183–184 **6-6 Linear Functions: Standard Form and Slope-Intercept Form** — TE pp. 166–167B; SB pp. 166–167 / PB pp. 185–186

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TE = Teacher's Edition, SB = Sourcebook, PB = Practice Book. *Online lessons at www.SadlierConnect.com/PIM

Functions 8.F

Georgia Standards of Excellence 2015–2016: Mathematics	Sadlier *Foundations of Algebra*, Grade 8
	6-7 Linear Functions: Point-Slope Form —TE pp. 168–169B; SB pp. 168–169 / PB pp. 187–188 **11-5 Find Function Values** —TE pp. 302–303B; SB pp. 302–303 / PB pp. 341–342 **12-11 Problem-Solving Strategy: Review of Strategies** (Find a Pattern/Adopt a Different Point of View) —TE pp. 338–339B; SB pp. 338–339 / PB pp. 381–382

Geometry 8.G

Georgia Standards of Excellence 2015–2016: Mathematics		Sadlier *Foundations of Algebra*, Grade 8
Understand congruence and similarity using physical models, transparencies, or geometry software.		
MGSE8.G.1	Verify experimentally the congruence properties of rotations, reflections, and translations: lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines.	***10-9A Properties of Rigid Transformations**— Online
MGSE8.G.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.	**9-5 Congruent Polygons**—TE pp. 244–245B; SB pp. 244–245 / PB pp. 275–276 **9-13 Problem-Solving Strategy: Adopt a Different Point of View**—TE pp. 260–261B; SB pp. 260–261 / PB pp. 291–292 **10-8 Coordinate Plane: Reflections and Translations**—TE pp. 280–281B; SB pp. 280–281 / PB pp. 315–316 **10-9 Coordinate Plane: Rotations**—TE pp. 282–283B; SB pp. 282–283 / PB pp. 317–318 **10-10 Coordinate Plane: Dilations**—TE pp. 284–285B; SB pp. 284–285 / PB pp. 319–320 **10-11 Combine Transformations**—TE pp. 286–287B; SB pp. 286–287 / PB pp. 321–322 ***10-11A Transformations and Congruence**—Online
MGSE8.G.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	**10-7 Coordinate Plane and Polygons**—TE pp. 278–279B; SB pp. 278–279 / PB pp. 313–314 **10-8 Coordinate Plane: Reflections and Translations**—TE pp. 280–281B; SB pp. 280–281 / PB pp. 315–316 **10-9 Coordinate Plane: Rotations**—TE pp. 282–283B; SB pp. 282–283 / PB pp. 317–318 **10-10 Coordinate Plane: Dilations**—TE pp. 284–285B; SB pp. 284–285 / PB pp. 319–320
MGSE8.G.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	**7-9 Similarity**—TE pp. 204–205B; SB pp. 204–205 / PB pp. 227–228 **10-11 Combine Transformations**—TE pp. 286–287B; SB pp. 286–287 / PB pp. 321–322 ***10-11A Transformations and Congruence**—Online ***10-11B Transformations and Similarity**—Online
MGSE8.G.5	Use informal arguments to establish facts about the angle sum and exterior angle of	**7-9 Similarity**—TE pp. 204–205B; SB pp. 204–205 / PB pp. 227–228
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Geometry 8.G

Georgia Standards of Excellence 2015–2016: Mathematics		Sadlier *Foundations of Algebra*, Grade 8
	triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*	**7-12 Problem-Solving Strategy: Solve a Simpler Problem** — TE pp. 210–211B; SB pp. 210–211 / PB pp. 233–234 **9-1 Angle Pairs**— TE pp. 236–237B; SB pp. 236–237 / PB pp. 267–268 **9-2 Angles of Parallel Lines** — TE pp. 238–239B; SB pp. 238–239 / PB pp. 269–270 **9-4 Angles of Polygons** — TE pp. 242–243B; SB pp. 242–243 / PB pp. 273–274 ***9-4A Angle-Angle Criterion for Similar Triangles** — Online **13-12 Problem-Solving Strategy: Consider Extreme Cases** — TE pp. 366–367B; SB pp. 366–367 / PB pp. 413–414
Understand and apply the Pythagorean Theorem.		
MGSE8.G.6	Explain a proof of the Pythagorean Theorem and its converse.	**2-9 Pythagorean Theorem** — TE pp. 52–53B; SB pp. 52–53 / PB pp. 55–56 ***2-9A Proof of the Pythagorean Theorem** — Online
MGSE8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	**2-10 Special Right Triangles**— TE pp. 54–55B; SB pp. 54–55 / PB pp. 57–58 ***12-6A Compute Missing Dimensions of Three-Dimensional Figures** — Online
MGSE8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	**10-7 Coordinate Plane and Polygons** — TE pp. 278–279B; SB pp. 278–279 / PB pp. 313–314 ***10-7A Apply Pythagorean Theorem** — Online
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.		
MGSE8.G.9	Apply the formulas for the volume of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	**12-5 Volume of Prisms and Cylinders** — TE pp. 326–327B; SB pp. 326–327 / PB pp. 369–370 **12-6 Volume of Pyramids and Cones** — TE pp. 328–329B; SB pp. 328–329 / PB pp. 371–372 **12-7 Volume of Spheres** — TE pp. 330–331B; SB pp. 330–331 / PB pp. 373–374 **13-12 Problem-Solving Strategy: Consider Extreme Cases** — TE pp. 366–367B; SB pp. 366–367 / PB pp. 413–414

Statistics and Probability 8.SP

Georgia Standards of Excellence 2015–2016: Mathematics		Sadlier *Foundations of Algebra*, Grade 8
Investigate patterns of association in bivariate data.		
MGSE8.SP.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	**6-3 Scatter Plots** — TE pp. 160–161B; SB pp. 160–161 / PB pp. 179–180 ***6-3A Analyze Outliers** — Online ***6-3B Clustering** — Online ***6-3C Analyze Scatter Plots** — Online
MGSE8.SP.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.	**6-3 Scatter Plots** — TE pp. 160–161B; SB pp. 160–161 / PB pp. 179–180
MGSE8.SP.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.*	***6-7A Analyzing Trend Lines** — Online ***6-7B Use Linear Models to Solve Problems** — Online
MGSE8.SP.4	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table.	
	a. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects.	**2-12 Problem-Solving Strategy: Organize Data** — TE pp. 58–59B; SB 58–59 / PB pp. 61–62 **11-10 Problem-Solving Strategy: Account for All Possibilities** — TE pp. 312–313B; SB pp. 312–313 / PB pp. 351–352 ***13-5A Patterns of Association in Categorical Data** — Online ***13-5B Examine Patterns of Association** — Online
	b. Use relative frequencies calculated for rows or columns to describe possible	**2-12 Problem-Solving Strategy: Organize Data** — TE pp. 58–59B; SB 58–59 / PB pp. 61–62

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Statistics and Probability 8.SP

GEORGIA STANDARDS OF EXCELLENCE 2015–2016: MATHEMATICS	SADLIER *FOUNDATIONS OF ALGEBRA*, GRADE 8
association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*	**11-10 Problem-Solving Strategy: Account for All Possibilities** — TE pp. 312–313B; SB pp. 312–313 / PB pp. 351–352 ***13-5A Patterns of Association in Categorical Data** — Online ***13-5B Examine Patterns of Association** — Online