



SADLIER PROGRESS IN MATHEMATICS

Foundations of Algebra

Aligned to the Chapter 111.

Texas Essential Knowledge and Skills for Mathematics

Subchapter B. Middle School, §111.28, Grade 8, Adopted 2012.

Grade 8

(b) Knowledge and skills

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(b) Knowledge and skills

GRADE 8 TEXAS ESSENTIAL KNOWLEDGE AND SKILLS FOR MATHEMATICS

(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution and evaluating the problem-solving process and the reasonableness of the solution;

SADLIER *FOUNDATIONS OF ALGEBRA*, GRADE 8

In every lesson, students have the opportunity to apply problem-solving skills to everyday situations and challenges.

Students become confident problem solvers as they learn and apply 10 key strategies taught and reviewed in the special Problem Solving Strategy lesson found at the end of each chapter. In addition, students apply individual strategies within the context of the real-world introduction to many regular lessons (identified by the round, purple problem solving strategy logo and accompanying activity in the Teacher's Edition).

Problem Solving Strategies

Account for All Possibilities—SB pp. 182, 210, 260, 312–313, 372–73, 386–387, 398–399, 401–402; PB pp. 351–352, 424, 438, 440

Adopt a Different Point of View—SB pp. 59, 211, 230, 259, 260–261, 273, 339; PB pp. 291–292

Consider Extreme Cases—SB pp. 366–367; PB pp. 413–414

Find a Pattern—SB pp. 60, 150–151, 158–159, 161, 186, 230–231, 232–233, 294–295, 296–297, 298–299, 314–315, 316, 338–339, 384; PB pp. 165–166, 180, 333–334, 335–336, 337–338, 340

Guess and Test—SB pp. 90–91, 148; PB pp. 97–98

Make a Drawing—SB pp. 10, 30–31, 40, 52–53, 58–59, 118, 211, 232–233, 250–251, 252–253, 254–255, 259, 261, 278, 281–286, 320–321, 337, 342; PB pp. 29–30, 280, 282, 312, 363–364

Organize Data—SB pp. 8, 30–31, 32–33, 58–59, 90–91, 93, 116–117, 118–119, 148, 150–151, 160–161, 208–209, 230–231, 248–249, 260, 288, 312–313, 338, 344–345, 347, 348–349, 350–351, 352–353, 354–355, 356–357, 358–359, 362–363, 365, 368–369, 372–373, 386, 388, 390–393, 401–402; PB pp. 61–62, 344, 391–392, 394, 395–396, 398, 400, 401–402, 404, 406, 407–408, 409–410, 453–454

Reason Logically—SB pp. 23, 27, 29–31, 33, 48–51, 59, 62, 69, 92, 109, 110, 118–119, 120, 150–51, 182–84, 210–12, 230, 234, 245, 258–61, 264, 288–89, 312–13, 316, 338–39, 342, 368–69, 370, 372–373, 390–400; PB pp. 2, 6, 18, 44, 52, 54, 126, 194, 201–202, 232, 257–58, 274, 276, 376, 441–448

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Review of Strategies—SB pp. 118-119, 230-231, 338-339, 398-399; PB pp. 129-130, 257-258, 381-382, 449-450

Solve a Simpler Problem—SB pp. 150-151, 210-211, 316; PB pp. 233-234

Work Backward—SB pp. 70, 79, 154, 288-289; PB pp. 323-324
Problem Solving Applications (Mixed Strategies)—SB pp. 13, 34, 59, 121, 122, 173, 185, 197, 198-199, 201, 203, 208-209, 214, 219, 230-231, 234, 256-257, 271, 291-292, 316, 377, 402; PB pp. 2, 4, 6, 8, 12, 26, 32, 48, 52, 56, 58, 60, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 99, 114, 118, 122, 124, 129-130, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 168, 172, 178, 182, 188, 190, 192, 194, 196, 216, 218, 220, 226, 228, 230, 236, 244, 248, 250, 252, 257-258, 268, 270, 276, 280, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 334, 336, 338, 340, 344, 348, 350, 364, 366, 368, 372, 378, 380, 381-382, 388, 394, 404, 406, 408, 410, 420, 426, 428, 430, 432, 434, 449-450

- (C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

Foundations of Algebra lessons feature a variety of learning tools, models, and techniques.

Estimation

check for reasonableness—pp. 14-21, 234, 292
rounding rational numbers—pp. 12-13, 404(SU); PB 11-12
square root—pp. 42-43; PB 45-46

Estimation Strategies

compatible numbers—pp. 12-13, 21, 195, 218-19, 222-25, 234, 292, 404(SU); PB 11-12
front-end—pp. 13; PB 11-12
rounding—pp. 12-13, 14, 18-20, 62, 218-219, 404(SU); PB 11-12

Manipulatives

algebra tiles—pp. 74-75, 128-29, 130-31, 132-33, 134-35, 136; PB 81-82, 143-44, 145, 149-50
centimeter graph paper—pp. 59, 261
compass—pp. 59, 250-51, 252-53, 254-55; PB 281-82, 283-84, 285-86
dot paper—pp. 259, 320
grid paper—pp. 259, 320
nets—pp. 322-23, 324, 340-41; PB 383-84
protractor—pp. 59, 236, 248, 412(SU); PB 267-68
ruler—pp. 12, 59
spinner—pp. 380, 401
straightedge—pp. 59, 250-251, 252-253, 254-255; PB 281-282, 283-84, 285-286

Mental Math—pp. 417-423; PB 4, 18, 42, 86, 92, 94, 110, 148, 150, 154, 182, 192, 222, 246, 276, 342, 348, 372, 380, 430

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Technology

calculator

- change fraction to decimal—PB pp. 9-10
- check
 - estimation—p. 13
 - solution—pp. 28, 83, 84-85, 182, 210
- compute
 - in scientific notation—pp. 39
- interest—pp. 228-229
- evaluate
 - combinations—p. 389
 - factorials—p. 387
 - polynomials—p. 127
 - powers and roots—pp. 56-57; PB 59-60
- find
 - angles of depression—p. 256; PB 287
 - angles of elevation—p. 256; PB 287
 - number of permutations—p. 387
 - rational approximate of irrational number—pp. 44-45; PB 47-48
 - square roots—pp. 41-43
 - unknown angle measures—pp. 256-257
- generate random numbers—pp. 377; PB 428
- graph
 - inequalities—pp. 99; PB 109-10
 - nonlinear functions—pp. 310-11; PB 349-50
- make box-and-whisker plots/histograms—pp. 364-65; PB 411-12
- measure variations of distances indirectly—pp. 256-257
- order
 - decimals—pp. 11; PB 10
 - fractions—pp. 11; PB 10
- simplify expressions—p. 39
- solve equations—p. 77
- use trigonometric ratios
 - cosine ratios—pp. 206-207, 256
 - tangent ratios—pp. 206-207, 209, 257

computer

- geometry software (transformations)—p. 287
- spreadsheet—pp. 227, 335

-
- (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

Students are given several opportunities in daily lessons to respond to the presentation of new concepts by the teacher, thereby building communication skills through discussion, questioning, reading, and writing.

The “English Language Learner” section at the beginning of each chapter and each lesson in the Teacher’s Edition features special strategies for building oral language, vocabulary, and reading and writing skills.

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New math vocabulary and terminology are highlighted in yellow and defined in context in the Student Text (also included in the Glossary). In addition, a Vocabulary Development activity is included at the end of every chapter in the Practice Book.

The “Discuss and Write” activity for each lesson in the SourceBook helps anchor the newly learned concept. “Tell About It” is the concluding section of each chapter test, and “Write About It” appears at the end of many lessons in the Practice Book.

And the “Math Journal” activities in the TE and SourceBook encourage students to take notes, prepare tables, and make drawings to help them understand, describe, and differentiate between math concepts and processes.

Communication

Discuss and Write—pp. 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 33, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 60, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 92, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 120, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 153, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 184, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 213, 217, 219, 221, 223, 225, 227, 229, 233, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 263, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 295, 297, 299, 301, 303, 305, 307, 309, 311, 315, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 341, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 369, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 400

Write About It—PB pp. 12, 28, 40, 72, 84, 144, 216, 220, 274, 312, 318, 320, 338, 376, 408

Tell About It—PB pp. 36, 68, 104, 136, 172, 208, 240, 264, 298, 330, 358, 388, 420, 456

- (E) create and use representations to organize, record, and communicate mathematical ideas;

Early on in the *Foundations of Algebra* lesson sequence, students review how to translate the numerical data of real-world challenges into abstract mathematical representations they can process using equations and inequalities to generate useful solutions.

Chapter 3 Expressions and Equations—pp. TE pp. 63–92A / SB pp. 63–92 / PB pp. 71–99

Chapter 4 Inequalities—pp. TE pp. 95–120A / SB pp. 95–120 / PB pp. 95–131

In Chapter 8, students study collecting data, recording it, and organizing it using graphical representations. In chapters 8 and 12, they focus on analyzing and interpreting data to make predictions and draw conclusions that can solve problems.

Chapter 13 Data Analysis and Statistics—pp. TE pp. 343–369B / SB pp. 343–369 / PB pp. 391–416

Chapter 12 Probability and Logic—pp. TE pp. 371–400A / SB pp. 371–400 / PB pp. 371–451

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Other chapters on using mathematical representations to justify informed, logical conclusions include

- Chapter 6 Linear Functions and Inequalities
- Chapter 7 Ratio and Proportion
- Chapter 8 Percent Applications
- Chapter 10 Geometric Measures and Coordinate Geometry
- Chapter 11 Patterns and Nonlinear Functions
- Chapter 12 Three-Dimensional Geometry

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

The Professional Development page at the beginning of each chapter in the Teacher's Edition describes the connection between previously studied material and the new concepts that will be presented in the chapter. It includes Prerequisite Skills and Math Background.

The expanded margin in the TE version of the first page of each chapter features a chapter overview. It connects skills that will be taught in the chapter with the personal lives of students.

The first page of each chapter in the SourceBook features a preview of skills students will learn.

To ensure they are prepared to be successful learning the new topics, students review the Do You Remember? list of prerequisite skills they have studied previously.

Do You Remember?—SB pp. 1, 35, 63, 95, 123, 155, 187, 215, 235, 265, 293, 317, 343, 371

Part 4 of the daily lesson plan in the TE—Summarize/Assess—is subtitled “Conceptual Thinking.” For this activity, students are asked to participate in a discussion of how mathematical ideas are interconnected.

For example, the Conceptual Thinking activity on TE page 177B has students “explain how fractions, decimals, and percents are related.”

(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Activities that develop mathematical reasoning are featured throughout the program. Students focus on distinguishing between correct and incorrect solutions.

Justify/Verify Answers

Logic/Logical Reasoning—SB pp. 23, 27, 62, 157, 161, 165, 177, 182–183, 247, 259, 264, 313, 390–391, 392–393, 394–95, 396; PB 201–202, 441–444

Reasonableness of Solution—SB pp. 14–15, 16–17, 18–19, 20–21, 61, 214, 234, 288–289, 292, 312; PB pp. 13–14, 15–16, 17–18

Validity of Results—SB pp. 13, 29, 30–31, 41, 42–43, 58–59, 60, 61, 70–71, 72–73, 74–75, 76–77, 78–79, 80–81, 82–83, 84–85, 86–87, 90–91, 99, 100–101, 102–103, 104–105, 121, 122, 141, 143, 145, 150–151, 158–159, 176–177, 182–183, 185, 191, 210–211, 214, 222, 231, 237, 249, 256, 260–261, 288–289, 291–292, 309, 312–313, 342, 366–367, 399, 401–402; PB p. 12

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GRADE 8 TEXAS ESSENTIAL KNOWLEDGE AND SKILLS FOR MATHEMATICS	SADLIER <i>FOUNDATIONS OF ALGEBRA</i> , GRADE 8
<p>(2) Number and operations. The student applies mathematical process standards to represent and use real numbers in a variety of forms. The student is expected to:</p> <p>(A) extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers;</p> <p>(B) approximate the value of an irrational number, including π and square roots of numbers less than 225, and locate that rational number approximation on a number line;</p> <p>(C) convert between standard decimal notation and scientific notation; and</p> <p>(D) order a set of real numbers arising from mathematical and real-world contexts.</p>	<p>2-7 The Real Number System (Venn diagram)—TE pp. 48–49B; pp. SB 48–49 / PB pp. 51–52 Objective(s): To classify real numbers; to locate real numbers on a number line; to find the distance between two points on a line; to find the midpoint between two numbers on a number line.</p> <p>2-5 Irrational Numbers—TE pp. 44–45B; SB pp. 44–45 / PB pp. 47–48 Objective(s): To classify numbers as rational or irrational; to find a rational approximate value of an irrational number to a given place.</p> <p>2-6 Square Roots as Irrational Numbers—TE pp. 46–47B; SB 46–47 / PB pp. 49–50 Objective(s): To simplify irrational square roots.</p> <p>2-7 The Real Number System—TE pp. 48–49B; pp. SB 48–49 / PB pp. 51–52 Objective(s): To classify real numbers; to locate real numbers on a number line; to find the distance between two points on a line; to find the midpoint between two numbers on a number line.</p> <p>2-1 Scientific Notation—TE pp. 36–37B; SB pp. 36–37 / PB pp. 39–40 Objective(s): To write very large or very small numbers in standard form in scientific notation; to write numbers in scientific notation as very large or very small numbers in standard form; to compare numbers in scientific notation; to order numbers in scientific notation.</p> <p>2-7 The Real Number System—TE pp. 48–49B; pp. SB 48–49 / PB pp. 51–52 Objective(s): To classify real numbers; to locate real numbers on a number line; to find the distance between two points on a line; to find the midpoint between two numbers on a number line.</p> <p><i>*Related content—</i></p> <p>1-5 Compare and Order Rational Numbers—TE pp. 10–11 B; SB pp. 10–11 / PB pp. 9–10 Objective(s): To compare and order rational numbers.</p>
<p>(3) Proportionality. The student applies mathematical process standards to use proportional relationships to describe dilations. The student is expected to:</p> <p>(A) generalize that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation;</p>	<p>7-9 Similarity—TE pp. 204–205B; SB pp. 204–205 / PB pp. 227–228 Objective(s): To determine whether figures are similar; to use scale factors and to find missing dimensions in similar figures.</p> <p>7-11 Indirect Measurement—TE pp. 208–209B; SB pp. 208–209 / PB pp. 231–232 Objective(s): To find measures indirectly by applying the properties of similar figures; to find measures indirectly by using the trigonometric ratios.</p> <p>10-10 Coordinate Plane: Dilations—TE pp. 284–285B; SB pp. 284–285 / PB pp. 319–320 Objective(s): To identify and create dilations of plane figures.</p>

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GRADE 8 TEXAS ESSENTIAL KNOWLEDGE AND SKILLS FOR MATHEMATICS

SADLIER *FOUNDATIONS OF ALGEBRA*, GRADE 8

	<p>12-8 Similar Three-Dimensional Figures—TE pp. 332–333B; SB pp. 332–333 / PB pp. 375–376 Objective(s): To find linear dimensions of similar three-dimensional figures; to find the surface area of similar three-dimensional figures; to find the volume of similar three-dimensional figures.</p>
<p>(B) compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane; and</p>	<p>10-10 Coordinate Plane: Dilations—TE pp. 284–285B; SB pp. 284–285 / PB pp. 319–320 Objective(s): To identify and create dilations of plane figures.</p>
<p>(C) use an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation.</p>	<p>10-10 Coordinate Plane: Dilations—TE pp. 284–285B; SB pp. 284–285 / PB pp. 319–320 Objective(s): To identify and create dilations of plane figures.</p>
<p>(4) Proportionality. The student applies mathematical process standards to explain proportional and non-proportional relationships involving slope. The student is expected to:</p>	
<p>(A) use similar right triangles to develop an understanding that slope, m, given as the rate comparing the change in y-values to the change in x-values, $(y_2 - y_1) / (x_2 - x_1)$, is the same for any two points (x_1, y_1) and (x_2, y_2) on the same line;</p>	<p>6-4 Slope of a Line—TE pp. 162–163B; SB pp. 162–163 / PB pp. 181–182 Objective(s): To find the slope of a line given two points on the line; to interpret slopes of lines. 7-9 Similarity (similar right triangles)—TE pp. 204–205B; SB pp. 204–205 / PB pp. 227–228 Objective(s): To determine whether figures are similar; to use scale factors and to find missing dimensions in similar figures.</p>
<p>(B) graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship; and</p>	<p>6-4 Slope of a Line—TE pp. 162–163B; SB pp. 162–163 / PB pp. 181–182 Objective(s): To find the slope of a line given two points on the line; to interpret slopes of lines. 7-1 Ratios, Rates, and Unit Rates—TE pp. 188–189B; SB pp. 188–189 / PB pp. 211–212 Objective(s): To identify and apply equal ratios; to identify and apply rates; to compare rates as whole numbers, decimals, and fractions; to compare ratios as whole numbers, decimals, and fractions. *7-5A Proportions and Unit Rates—Online Objective(s): To rewrite a proportion to find a unit rate. *7-5B Graph Proportional Relationships—Online Objective(s): To use the unit-rate form of a ratio to graph the proportional relationship (use unit rate as slope). *7-5C Compare Proportional Relationships—Online Objective(s): To compare two different proportional relationships represented in different ways.</p>
<p>(C) use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems.</p>	<p>*6-2A Compare Functions (rate of change)—Online Objective(s): To compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). 6-4 Slope of a Line—TE pp. 162–163B; SB pp. 162–163 / PB pp. 181–182 Objective(s): To find the slope of a line given two points on the line; to interpret slopes of lines.</p>

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GRADE 8 TEXAS ESSENTIAL KNOWLEDGE AND SKILLS FOR MATHEMATICS

SADLIER *FOUNDATIONS OF ALGEBRA*, GRADE 8

(5) Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to:

- (A) represent linear proportional situations with tables, graphs, and equations in the form of $y = kx$;
- (B) represent linear non-proportional situations with tables, graphs, and equations in the form of $y = mx + b$, where $b \neq 0$;
- (C) contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation;

6-5 The x - and y -Intercepts of a Line—TE pp. 164–165B; SB pp. 164–165 / PB pp. 183–184

Objective(s): To find the x -intercept of a line given its equation; to find the y -intercept of a line given its equation; to graph an equation using x - and y -intercepts; to determine the x - and y -intercepts of a line from a graph.

6-6 Linear Functions: Standard Form and Slope-Intercept Form—TE pp. 166–167B; SB pp. 166–167 / PB pp. 185–186

Objective(s): To identify the slope from an equation of a line; to identify the y -intercept from an equation of a line; to graph an equation in slope-intercept form; to write an equation of a line from a graph using the y -intercept and slope.

6-9 Direct Variation—TE pp. 172–173B; SB pp. 172–173 / PB pp. 191–192

Objective(s): To determine whether a data set shows direct variation; to determine equations for direct variations; to solve problems involving direct variation by using proportion.

*7-5A Proportions and Unit Rates ($y = kx$)—Online

Objective(s): To rewrite a proportion to find a unit rate.

3-13 Literal Equations (solve $y = mx + b$ for m)—TE pp. 88–89B; SB pp. 88–89 / PB pp. 95–96

Objective(s): To solve a literal equation for a specified variable; to transform a formula into an equivalent equation.

6-6 Linear Functions: Standard Form and Slope-Intercept Form (equations in the form $y = mx + b$)—TE pp. 166–167B; SB pp. 166–167 / PB pp. 185–186

Objective(s): To identify the slope from an equation of a line; to identify the y -intercept from an equation of a line; to graph an equation in slope-intercept form; to write an equation of a line from a graph using the y -intercept and slope.

6-1 Relations and Functions—TE pp. 156–157B; SB pp. 156–157 / PB pp. 175–176

Objective(s): To identify relations; to identify functions; to represent relations with tables; to represent relations with mapping diagrams; to represent relations with graphs; to represent relations with equations; to identify the domain of a relation; to identify the range of a relation; to evaluate a function using function notation.

6-2 Graphs of Functions—TE pp. 158–159B; SB pp. 158–159 / PB pp. 177–178

Objective(s): To write a function rule; to use a table to graph functions; to find solutions of a function using a graph.

6-6 Linear Functions: Standard Form and Slope-Intercept Form—TE pp. 166–167B; SB pp. 166–167 / PB pp. 185–186

Objective(s): To identify the slope from an equation of a line; to identify the y -intercept from an equation of a line; to graph an equation in slope-intercept form; to write an equation of a line from a graph using the y -intercept and slope.

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	<p>6-7 Linear Functions: Point-Slope Form—TE pp. 168–169B; SB pp. 168–169 / PB pp. 187–188 Objective(s): To write the equation of a line, given one point and the slope; to graph a linear equation, given one point and the slope; to recognize and use point-slope form and relate it to slope-intercept form.</p> <p>*6-7A Analyzing Trend Lines—Online Objective(s): To find the equation of the line of best fit in situations that involve linear association.</p> <p>6-8 Parallel Lines and Perpendicular Lines—TE pp. 170–171B; SB pp. 170–171 / PB pp. 189–190 Objective(s): To determine if two lines are parallel using slope; to determine if two lines are perpendicular using slope; to write an equation of a line that is parallel to a given line; to write an equation of a line that is perpendicular to a given line.</p> <p>11-6 Nonlinear Functions: Quadratic—TE pp. 304–305B; SB pp. 304–305 / PB pp. 343–344 Objective(s): To recognize equations of quadratic functions; to recognize graphs of quadratic functions; to recognize tables of quadratic functions.</p> <p>11-7 Other Nonlinear Functions—TE pp. 306–307B; SB pp. 306–307 / PB pp. 345–346 Objective(s): To recognize graphs of other nonlinear functions, such as step, absolute-value, and exponential functions.</p> <p>11-8 Inverse Variation—TE pp. 308–309B; SB pp. 308–309 / PB pp. 347–348 Objective(s): To recognize inverse variation from a table; to recognize inverse variation from a graph; to recognize inverse variation from an equation; to write an equation for a graph that represents an inverse variation.</p> <p>11-9 Technology: Graphs of Nonlinear Functions—TE pp. 310–311B; SB pp. 310–311 / PB pp. 349–350 Objective(s): To graph nonlinear functions using a calculator; to explore how changes to the equations for nonlinear functions affect the graph.</p>
<p>(D) use a trend line that approximates the linear relationship between bivariate sets of data to make predictions;</p>	<p>*6-7A Analyzing Trend Lines—Online Objective(s): To find the equation of the line of best fit in situations that involve linear association.</p>
<p>(E) solve problems involving direct variation;</p>	<p>6-9 Direct Variation—TE pp. 172–173B; SB pp. 172–173 / PB pp. 191–192 Objective(s): To determine whether a data set shows direct variation; to determine equations for direct variations; to solve problems involving direct variation by using proportion.</p>
<p>(F) distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form $y = kx$ or $y = mx + b$, where $b \neq 0$;</p>	<p>6-1 Relations and Functions—TE pp. 156–157B; SB pp. 156–157 / PB pp. 175–176 Objective(s): To identify relations; to identify functions; to represent relations with tables; to represent relations with graphs; to represent relations with equations; to identify the domain of a relation; to identify the range of a relation; to evaluate a function using function notation.</p> <p>6-2 Graphs of Functions—TE pp. 158–159B; SB pp. 158–159 / PB pp. 177–178 Objective(s): To write a function rule; to use a table to graph functions; to find solutions of a function using a graph.</p>

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GRADE 8 TEXAS ESSENTIAL KNOWLEDGE AND SKILLS FOR MATHEMATICS

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(G) identify functions using sets of ordered pairs, tables, mappings, and graphs;

6-1 Relations and Functions—TE pp. 156–157B; SB pp. 156–157 / PB pp. 175–176

Objective(s): To identify relations; to identify functions; to represent relations with tables; to represent relations with mapping diagrams; to represent relations with graphs; to represent relations with equations; to identify the domain of a relation; to identify the range of a relation; to evaluate a function using function notation.

6-2 Graphs of Functions—TE pp. 158–159B; SB pp. 158–159 / PB pp. 177–178

Objective(s): To write a function rule; to use a table to graph functions; to find solutions of a function using a graph.

(H) identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems; and

7-5 Direct Proportions—TE pp. 196–197B; SB pp. 196–197 / PB pp. 219–220

Objective(s): To write and solve direct proportions using equation form; to write and solve direct proportions using cross products.

*7-5A Proportions and Unit Rates—Online

Objective(s): To rewrite a proportion to find a unit rate.

*7-5B Graph Proportional Relationships—Online

Objective(s): To use the unit-rate form of a ratio to graph the proportional relationship (use unit rate as slope).

*7-5C Compare Proportional Relationships—Online

Objective(s): To compare two different proportional relationships represented in different ways.

7-6 Partitive Proportions—TE pp. 198–199B; SB pp. 198–199 / PB pp. 221–222

Objective(s): To solve partitive proportions by writing an equation; to solve partitive proportions by using the ratio of part to whole.

(I) write an equation in the form $y = mx + b$ to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations.

3-13 Literal Equations—TE pp. 88–89B; SB pp. 88–89 / PB pp. 95–96

Objective(s): To solve a literal equation for a specified variable; to transform a formula into an equivalent equation.

6-6 Linear Functions: Standard Form and Slope-Intercept Form—TE pp. 166–167B; SB pp. 166–167 / PB pp. 185–186

Objective(s): To identify the slope from an equation of a line; to identify the y -intercept from an equation of a line; to graph an equation in slope-intercept form; to write an equation of a line from a graph using the y -intercept and slope.

(6) Expressions, equations, and relationships. The student applies mathematical process standards to develop mathematical relationships and make connections to geometric formulas. The student is expected to:

(A) describe the volume formula $V = Bh$ of a cylinder in terms of its base area and its height;

12-5 Volume of Prisms and Cylinders—TE pp. 326–327B; SB pp. 326–327 / PB pp. 369–370

Objective(s): To find the volume of prisms; to find the volume of cylinders; to compare and contrast the volume of prisms and cylinders.

(B) model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect that relationship to the formulas; and

*Related content—

12-5 Volume of Prisms and Cylinders—TE pp. 326–327B; SB pp. 326–327 / PB pp. 369–370

Objective(s): To find the volume of prisms; to find the volume of cylinders; to compare and contrast the volume of prisms and cylinders.

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GRADE 8 TEXAS ESSENTIAL KNOWLEDGE AND SKILLS FOR MATHEMATICS

SADLIER *FOUNDATIONS OF ALGEBRA*, GRADE 8

(C) use models and diagrams to explain the Pythagorean theorem.

(7) Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to solve problems. The student is expected to:

(A) solve problems involving the volume of cylinders, cones, and spheres;

(B) use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders;

12-6 Volume of Pyramids and Cones—TE pp. 328–329B; SB pp. 328–329 / PB pp. 371–372

Objective(s): To find the volume of pyramids using formulas; to find the volume of cones using formulas; to find unknown dimensions of pyramids given their volume; to find unknown dimensions of cones given their volume.

2-9 Pythagorean Theorem—TE pp. 52–53B; SB pp. 52–53 / PB pp. 55–56

Objective(s): To use the Pythagorean Theorem to find a missing side of a right triangle; to determine whether a given triangle is a right triangle.

10-7 Coordinate Plane and Polygons—TE pp. 278–279B; SB pp. 278–279 / PB pp. 313–314

Objective(s): To graph polygons on a coordinate plane; to apply perimeter formulas to polygons on a coordinate plane; to apply area formulas to polygons on a coordinate plane; to apply the Pythagorean Theorem to polygons on a coordinate plane; to determine whether three points are collinear without graphing.

*10-7A Apply Pythagorean Theorem—Online

Objective(s): To apply the Pythagorean Theorem to determine unknown side lengths in right triangles.

12-5 Volume of Prisms and Cylinders—TE pp. 326–327B; SB pp. 326–327 / PB pp. 369–370

Objective(s): To find the volume of prisms; to find the volume of cylinders; to compare and contrast the volume of prisms and cylinders.

12-6 Volume of Pyramids and Cones—TE pp. 328–329B; SB pp. 328–329 / PB pp. 371–372

Objective(s): To find the volume of pyramids using formulas; to find the volume of cones using formulas; to find unknown dimensions of pyramids given their volume; to find unknown dimensions of cones given their volume.

12-3 Surface Area of Prisms and Cylinders—TE pp. 322–323B; SB pp. 322–323 / PB pp. 365–366

Objective(s): To visualize the surface area of prisms and cylinders from nets; to find lateral area of cylinders; to find lateral area of prisms; to find surface areas of prisms; to find surface areas of cylinders.

12-8 Similar Three-Dimensional Figures (surface area of triangular prism)—TE pp. 332–333B; SB pp. 332–333 / PB pp. 375–376

Objective(s): To find linear dimensions of similar three-dimensional figures; to find the surface area of similar three-dimensional figures; to find the volume of similar three-dimensional figures.

12-9 Effect of Changing Dimensions (surface area of triangular prism)—TE pp. 334–335B; SB pp. 334–335 / PB pp. 377–378

Objective(s): To determine the effect of changing linear dimensions of a three-dimensional figure on its surface area and volume; to project the measures of scale models of three-dimensional figures, given scale factors.

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(C) use the Pythagorean Theorem and its converse to solve problems; and

(D) determine the distance between two points on a coordinate plane using the Pythagorean Theorem.

(8) Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to:

(A) write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants;

**Enrichment—*

12-4 Surface Area of Pyramids and Cones—TE pp. 324–325B; SB pp. 324–325 / PB pp. 367–368

Objective(s): To visualize the surface area of pyramids and cones from nets; to find lateral area of pyramids; to find lateral area of cones; to find surface areas of pyramids; to find surface areas of cones.

2-9 Pythagorean Theorem—TE pp. 52–53B; SB pp. 52–53 / PB pp. 55–56

Objective(s): To use the Pythagorean Theorem to find a missing side of a right triangle; to determine whether a given triangle is a right triangle.

*2-9A Proof of the Pythagorean Theorem—Online

Objective(s): To explain a proof of the Pythagorean Theorem and its converse.

10-7 Coordinate Plane and Polygons—TE pp. 278–279B; SB pp. 278–279 / PB pp. 313–314

Objective(s): To graph polygons on a coordinate plane; to apply perimeter formulas to polygons on a coordinate plane; to apply area formulas to polygons on a coordinate plane; to apply the Pythagorean Theorem to polygons on a coordinate plane; to determine whether three points are collinear without graphing.

*10-7A Apply Pythagorean Theorem—Online

Objective(s): To apply the Pythagorean Theorem to determine unknown side lengths in right triangles.

10-7 Coordinate Plane and Polygons—TE pp. 278–279B; SB pp. 278–279 / PB pp. 313–314

Objective(s): To graph polygons on a coordinate plane; to apply perimeter formulas to polygons on a coordinate plane; to apply area formulas to polygons on a coordinate plane; to apply the Pythagorean Theorem to polygons on a coordinate plane; to determine whether three points are collinear without graphing.

*10-7A Apply Pythagorean Theorem—Online

Objective(s): To apply the Pythagorean Theorem to determine unknown side lengths in right triangles.

3-9 Multistep Equations with Variables on Both Sides—TE pp. 80–81B; SB pp. 80–81 / PB pp. 87–88

Objective(s): To solve multistep equations with variables on both sides.

3-10 Multistep Equations: Fractions and Decimals—TE pp. 82–83B; SB pp. 82–83 / PB pp. 89–90

Objective(s): To solve multistep equations involving decimals and fractions; to solve equations with variables in denominators.

3-13 Literal Equations—TE pp. 88–89B; SB pp. 88–89 / PB pp. 95–96

Objective(s): To solve a literal equation for a specified variable; to transform a formula into an equivalent equation

4-9 Multistep Inequalities with Variables on Both Sides—TE pp. 112–113B; SB pp. 112–113 / PB pp. 123–124

Objective(s): To solve inequalities with variables on both sides.

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(B) write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants;

**Related content—*

3-9 Multistep Equations with Variables on Both Sides—TE pp. 80–81B; SB pp. 80–81 / PB pp. 87–88

Objective(s): To solve multistep equations with variables on both sides.

3-10 Multistep Equations: Fractions and Decimals—TE pp. 82–83B; SB pp. 82–83 / PB pp. 89–90

Objective(s): To solve multistep equations involving decimals and fractions; to solve equations with variables in denominators.

3-13 Literal Equations—TE pp. 88–89B; SB pp. 88–89 / PB pp. 95–96

Objective(s): To solve a literal equation for a specified variable; to transform a formula into an equivalent equation

4-9 Multistep Inequalities with Variables on Both Sides—TE pp. 112–113B; SB pp. 112–113 / PB pp. 123–124

Objective(s): To solve inequalities with variables on both sides.

(C) model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants; and

3-9 Multistep Equations with Variables on Both Sides—TE pp. 80–81B; SB pp. 80–81 / PB pp. 87–88

Objective(s): To solve multistep equations with variables on both sides.

3-10 Multistep Equations: Fractions and Decimals—TE pp. 82–83B; SB pp. 82–83 / PB pp. 89–90

Objective(s): To solve multistep equations involving decimals and fractions; to solve equations with variables in denominators.

(D) use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

9-4 Angles of Polygons—TE pp. 242–243B; SB pp. 242–243 / PB pp. 273–274

Objective(s): To find the sum of the measures of interior angles of a convex polygon; to find the sum of the measures of exterior angles of a convex polygon; to find the measures of an exterior angle of a regular polygon; to find the measures of an interior angle of a regular polygon; to solve problems involving angles of polygons.

(9) Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to develop foundational concepts of simultaneous linear equations. The student is expected to identify and verify the values of x and y that simultaneously satisfy two linear equations in the form $y = mx + b$ from the intersections of the graphed equations.

6-10 Solve Systems of Equations by Graphing—TE pp. 174–175B; SB pp. 174–175 / PB pp. 193–194

Objective(s): To solve a system of linear equations by graphing.

**6-11A Use Systems to Solve Problems—Online*

Objective(s): To solve systems of equations where the determining information for both lines is given but not both equations.

**Readiness—*

6-6 Linear Functions: Standard Form and Slope-Intercept

Form—TE pp. 166–167B; SB pp. 166–167 / PB pp. 185–186

Objective(s): To identify the slope from an equation of a line; to identify the y -intercept from an equation of a line; to graph an equation in slope-intercept form; to write an equation of a line from a graph using the y -intercept and slope.

(10) Two-dimensional shapes. The student applies mathematical process standards to develop transformational geometry concepts. The student is expected to:

(A) generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane;

9-5 Congruent Polygons—TE pp. 244–245B; SB pp. 244–245 / PB pp. 275–276

Objective(s): To identify congruent corresponding parts of

– *continued on next page* –

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polygons; to determine congruence among polygons; to use the triangle congruence rules, SSS, SAS, ASA, SAA, and HL, to determine if triangles are congruent.

10-8 Coordinate Plane: Reflections and Translations (orientation)—TE pp. 280–281B; SB pp. 280–281 / PB pp. 315–316

Objective(s): To transform plane figures using reflections; to transform plane figures using translations; to relate reflections to symmetry.

10-9 Coordinate Plane: Rotations (congruent rotation image)—TE pp. 282–283B; SB pp. 282–283 / PB pp. 317–318

Objective(s): To transform plane figures using rotations; to relate rotations to symmetry.

*10-9A Properties of Rigid Transformations—Online

Objective(s): To verify experimentally that under rigid transformations the image of a line segment is a line segment and the image of a line is a line; to verify experimentally that under rigid transformations the image of an angle is an angle; to verify experimentally that under rigid transformations the image of parallel lines is parallel lines.

10-10 Coordinate Plane: Dilations—TE pp. 284–285B; SB pp. 284–285 / PB pp. 319–320

Objective(s): To identify and create dilations of plane figures.

10-11 Combine Transformations—TE pp. 286–287B; SB pp. 286–287 / PB pp. 321–322

Objective(s): To determine what combination of transformations produces a given image; to find the coordinates of the final image of a polygon after a combined transformation.

(B) differentiate between transformations that preserve congruence and those that do not;

*10-11A Transformations and Congruence—Online

Objective(s): To 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; to describe a sequence of rigid transformations that exhibits the congruence between two given congruent figures.

(C) explain the effect of translations, reflections over the x - or y -axis, and rotations limited to 90° , 180° , 270° , and 360° as applied to two-dimensional shapes on a coordinate plane using an algebraic representation; and

10-8 Coordinate Plane: Reflections and Translations—TE pp. 280–281B; SB pp. 280–281 / PB pp. 315–316

Objective(s): To transform plane figures using reflections; to transform plane figures using translations; to relate reflections to symmetry.

10-9 Coordinate Plane: Rotations—TE pp. 282–283B; SB pp. 282–283 / PB pp. 317–318

Objective(s): To transform plane figures using rotations; to relate rotations to symmetry.

10-11 Combine Transformations (glide reflection)—TE pp. 286–287B; SB pp. 286–287 / PB pp. 321–322

Objective(s): To determine what combination of transformations produces a given image; to find the coordinates of the final image of a polygon after a combined transformation.

(D) model the effect on linear and area measurements of dilated two-dimensional shapes.

10-7 Coordinate Plane and Polygons—TE pp. 278–279B; SB pp. 278–279 / PB pp. 313–314

Objective(s): To graph polygons on a coordinate plane; to apply perimeter formulas to polygons on a coordinate plane; to apply area formulas to polygons on a coordinate plane; to apply the Pythagorean Theorem to polygons on a coordinate plane; to determine whether three points are collinear without graphing.

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(11) Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to:

- (A) construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data;
- (B) determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points; and
- (C) simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected.

(12) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:

- (A) solve real-world problems comparing how interest rate and loan length affect the cost of credit;
- (B) calculate the total cost of repaying a loan, including credit cards and easy access loans, under various rates of interest and over different periods using an online calculator;

10-10 Coordinate Plane: Dilations—TE pp. 284–285B; SB pp. 284–285 / PB pp. 319–320
Objective(s): To identify and create dilations of plane figures.

6-3 Scatter Plots—TE pp. 160–161B; SB pp. 160–161 / PB pp. 179–180
Objective(s): To make and read scatter plots; to identify lines of best fit; to draw lines of best fit; to interpret data sets as having positive, negative, or no correlation; to recognize trends in correlated data.
*6-3A Analyze outliers—Online
Objective(s): To analyze data with and without outliers.
*6-3B Clustering—Online
Objective(s): To use clustering to identify the strength of the correlation data.
*6-3C Analyze Scatter Plots—Online
Objective(s): To identify when association between data is nonlinear and line of best fit is not predictive for extrapolation

*Related content—
6-3 Scatter Plots (data points)—TE pp. 160–161B; SB pp. 160–161 / PB pp. 179–180
Objective(s): To make and read scatter plots; to identify lines of best fit; to draw lines of best fit; to interpret data sets as having positive, negative, or no correlation; to recognize trends in correlated data.

13-2 Surveys and Samples (random samples)—TE pp. 346–347B; SB pp. 346–347 / PB pp. 393–394
Objective(s): To identify populations for surveys; to identify samples for surveys; to identify and distinguish among sampling methods; to distinguish biased from unbiased samples; to display and use Venn diagrams to analyze sample data.

8-7 Simple and Compound Interest—TE pp. 228–229B; SB pp. 228–229 / PB pp. 255–256
Objective(s): To compute simple interest; to compute rate of interest; to compute compound interest by successive calculations of interest per period plus principal; to compute compound interest with a calculator in consumer applications.

8-7 Simple and Compound Interest (total cost for a loan)—TE pp. 228–229B; SB pp. 228–229 / PB pp. 255–256
Objective(s): To compute simple interest; to compute rate of interest; to compute compound interest by successive calculations of interest per period plus principal; to compute compound interest with a calculator in consumer applications.

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(C) explain how small amounts of money invested regularly, including money saved for college and retirement, grow over time;

8-7 Simple and Compound Interest (comparing interest on savings; saving with a money market account)—TE pp. 228–229B; SB pp. 228–229 / PB pp. 255–256

Objective(s): To compute simple interest; to compute rate of interest; to compute compound interest by successive calculations of interest per period plus principal; to compute compound interest with a calculator in consumer applications.

(D) calculate and compare simple interest and compound interest earnings;

8-7 Simple and Compound Interest—TE pp. 228–229B; SB pp. 228–229 / PB pp. 255–256

Objective(s): To compute simple interest; to compute rate of interest; to compute compound interest by successive calculations of interest per period plus principal; to compute compound interest with a calculator in consumer applications.

(E) identify and explain the advantages and disadvantages of different payment methods;

n/a

(F) analyze situations to determine if they represent financially responsible decisions and identify the benefits of financial responsibility and the costs of financial irresponsibility; and

n/a

(G) estimate the cost of a two-year and four-year college education, including family contribution, and devise a periodic savings plan for accumulating the money needed to contribute to the total cost of attendance for at least the first year of college.

**Related content—*

8-7 Simple and Compound Interest (tuition)—TE pp. 228–229B; SB pp. 228–229 / PB pp. 255–256

Objective(s): To compute simple interest; to compute rate of interest; to compute compound interest by successive calculations of interest per period plus principal; to compute compound interest with a calculator in consumer applications.

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