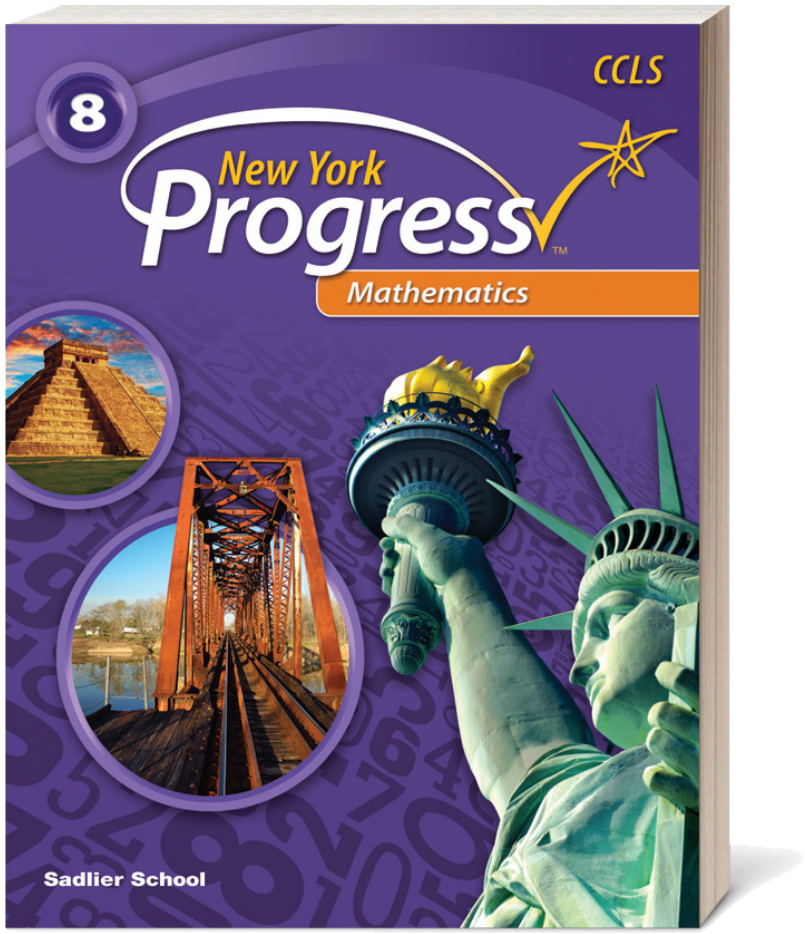
New York Progress Mathematics

Correlation to the New York State Next Generation Mathematics Learning Standards (2017) UPDATED JUNE 2019

Grade 8



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NY-8.NS THE NUMBER SYSTEM

Grade 8 Content Standards	*New York Progress Mathematics*, Grade 8
Know that there are numbers that are not rational, and approximate them by rational numbers.	
NY-8.NS.1 Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion eventually repeats. Know that other numbers that are not rational are called irrational.	**Lesson 1** Understand Rational and Irrational Numbers—pp. 10–17
NY-8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line, and estimate the value of expressions.	**Lesson 2** Use Rational Approximations of Irrational Numbers—pp. 18–25

NY-8.EE EXPRESSIONS, EQUATIONS, AND INEQUALITIES

Grade 8 Content Standards	*New York Progress Mathematics*, Grade 8
Work with radicals and integer exponents.	
NY-8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. Note: $3^2 \times 3^{(-5)} = 3^{(-3)} = \frac{1}{3^3} = \frac{1}{27}$	**Lesson 3** Understand Zero and Negative Exponent—pp. 32–39 **Lesson 4** Learn Properties of Exponents—pp. 40–47 **Lesson 5** Use Properties of Exponents Generate Equivalent Expressions—pp. 48–55
NY-8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Know square roots of perfect squares up to 225 and cube roots of perfect cubes up to 125. Know that the square root of a non-perfect square is irrational. e.g., The $\sqrt{2}$ is irrational.	**Lesson 6** Evaluate Square Roots and Cube Roots—pp. 56–63 **Lesson 7** Solve Simple Equations Involving Squares and Cubes—pp. 64–71

NY-8.EE EXPRESSIONS, EQUATIONS, AND INEQUALITIES

Grade 8 Content Standards	*New York Progress Mathematics*, Grade 8
NY-8.EE.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. e.g., 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.	**Lesson 8** Estimate and Compare Large or Small Quantities—pp. 72–79
NY-8.EE.4 Perform multiplication and division with numbers expressed in scientific notation, including problems where both standard decimal form and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology.	**Lesson 9** Calculate with Numbers in Scientific Notation—pp. 80–87
Understand the connections between proportional relationships, lines, and linear equations.	
NY-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. e.g., Compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.	**Lesson 10** Understand Proportional Relationships and Slope—pp. 88–95
NY-8.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.	**Lesson 11** Understand Slope—pp. 96–103 **Lesson 12** Write Equations for Lines—pp. 104–111

NY-8.EE EXPRESSIONS, EQUATIONS, AND INEQUALITIES

Grade 8 Content Standards	*New York Progress Mathematics*, Grade 8
Analyze and solve linear equations and pairs of simultaneous linear equations.	
NY-6.EE.7 Solve linear equations in one variable.	
NY-8.EE.7a Recognize when linear equations in one variable have one solution, infinitely many solutions, or no solutions. Give examples and show which of these possibilities is the case by successively transforming the given equation into simpler forms.	**Lesson 13** Solve Linear Equations—pp. 112–119
NY-8.EE.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and combining like terms. Note: This includes equations that contain variables on both sides of the equation.	**Lesson 13** Solve Linear Equations—pp. 112–119
NY-6.EE.8 Analyze and solve pairs of simultaneous linear equations..	
NY-8.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. Recognize when the system has one solution, no solution, or infinitely many solutions.	**Lesson 14** Solve Systems of Equations—pp. 120–127
NY-8.EE.8b Solve systems of two linear equations in two variables with integer coefficients: graphically, numerically using a table, and algebraically. Solve simple cases by inspection. e.g., $3x + y = 5$ and $3x + y = 6$ have no solution because $3x + y$ cannot simultaneously be 5 and 6. *continued*	**Lesson 14** Solve Systems of Equations—pp. 120–127

NY-8.EE EXPRESSIONS, EQUATIONS, AND INEQUALITIES

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Note: • Solving systems algebraically will be limited to at least one equation containing at least one variable whose coefficient is 1. Algebraic solution methods include elimination and substitution. • This standard is a fluency expectation for grade 8.	
NY-8.EE.8c Solve real-world and mathematical problems involving systems of two linear equations in two variables with integer coefficients.	**Lesson 15** Problem-Solving: Systems of Equations—pp. 128–135

NY-8.F FUNCTIONS

Grade 8 Content Standards	*New York Progress Mathematics*, Grade 8
Use functions to model relationships between quantities. Note: Function notation is not required in Grade 8.	
NY-8.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. Note: The terms *domain* and *range* may be introduced at this level; however, these terms are formally introduced in Algebra I (AI-F.IF.1).	**Lesson 16** Understand Functions—pp. 142–149 **Lesson 17** Represent Functions—pp. 150–157
NY-8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). e.g., Given a linear function represented by a table of values and a linear function represented by an algebraic equation, determine which function has the greater rate of change.	**Lesson 17** Represent Functions—pp. 150–157 **Lesson 18** Compare Functions—pp. 158–165

NY-8.F FUNCTIONS

Grade 8 Content Standards	*New York Progress Mathematics*, Grade 8
NY-8.F.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line. Recognize examples of functions that are linear and non-linear. e.g., 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.	**Lesson 19** Investigate Linear and Non-Linear Functions—pp. 166–173
Use functions to model relationships between quantities. Note: Function notation is not required in Grade 8.	
NY-8.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.	**Lesson 20** Use Functions to Model Relationships—pp. 174–181 **Lesson 21** Problem Solving: Use Linear Models—pp. 182–189
NY-8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph. Sketch a graph that exhibits the qualitative features of a function that has been described in a real-world context. e.g., where the function is increasing or decreasing or when the function is linear or non-linear.	**Lesson 22** Analyze Graphs of Functions—pp. 190–197

NY-8.G GEOMETRY

Grade 8 Content Standards	*New York Progress Mathematics*, Grade 8
Understand congruence and similarity using physical models, transparencies, or geometry software.	
NY-8.G.1 Verify experimentally the properties of rotations, reflections, and translations. a. Verify experimentally lines are mapped to lines, and line segments to line segments of the same length. b. Verify experimentally angles are mapped to angles of the same measure. c. Verify experimentally parallel lines are mapped to parallel lines.	**Lesson 23** Verify Properties of Reflections and Translations—pp. 204–211 **Lesson 24** Verify Properties of Rotations—pp. 212–219
NY-8.G.2 Know that a two-dimensional figure is congruent to another if the corresponding angles are congruent and the corresponding sides are congruent. Equivalently, two two-dimensional figures are congruent if one is the image of the other after a sequence of rotations, reflections, and translations. Given two congruent figures, describe a sequence that maps the congruence between them on the coordinate plane.	**Lesson 25** Understand and Identify Congruent Figures—pp. 220–227
NY-8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. Note: Lines of reflection are limited to both axes and lines of the form $y = k$ and $x = k$, where k is a constant. Rotations are limited to 90 and 180 degrees about the origin. Unless otherwise specified, rotations are assumed to be counterclockwise.	**Lesson 26** Reflect and Translate Figures on the Coordinate Plane—pp. 228–235 **Lesson 27** Rotate Figures on the Coordinate Plane—pp. 236–243 **Lesson 28** Dilate Figures on the Coordinate Plane—pp. 244–251
NY-8.G.4 Know that a two-dimensional figure is similar to another if the corresponding angles are congruent and the corresponding sides are in proportion. Equivalently, two two-dimensional figures are similar if one is the image of the other after a sequence of rotations, reflections, *continued*	**Lesson 29** Identify Similar Figures—pp. 252–259

NY-8.G GEOMETRY	
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translations, and dilations. Given two similar two-dimensional figures, describe a sequence that maps the similarity between them on the coordinate plane. Note: With dilation, the center and scale factor must be specified.	
NY-8.G.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. e.g., Arrange three copies of the same triangle so that the three angles appear to form a line, and give an argument in terms of transversals why this is so. Note: This standard does not include formal geometric proof. Multiple representations may be used to demonstrate understanding.	**Lesson 30** Establish Facts about Parallel Lines and Angles—pp. 260–265 **Lesson 31** Establish Facts about Triangles and Angles—pp. 266–275
Understand and apply the Pythagorean Theorem.	
NY-8.G.6 Understand a proof of the Pythagorean Theorem and its converse.	**Lesson 32** Understand the Pythagorean Theorem—pp. 276–283 **Lesson 33** Understand the Converse of the Pythagorean Theorem—pp. 284–291
NY-8.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.	**Lesson 34** Problem Solving: The Pythagorean Theorem—pp. 292–299
NY-8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	**Lesson 35** Calculate Distances in the Coordinate Plane—pp. 300–307

NY-8.G GEOMETRY

Grade 8 Content Standards	*New York Progress Mathematics*, Grade 8
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	
NY-8.G.9 Given the formulas for the volume of cones, cylinders, and spheres, solve mathematical and real-world problems.	**Lesson 35** Learn and Apply Volume Formulas—pp. 308–315

NY-8.SP STATISTICS AND PROBABILITY

Grade 8 Content Standards	*New York Progress Mathematics*, Grade 8
Investigate patterns of association in bivariate data.	
NY-8.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.	**Lesson 37** Construct and Interpret Scatter Plots—pp. 322–329
NY-8.SP.2 Understand 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.	**Lesson 38** Fit Linear Models to Data—pp. 330–337
NY-8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. e.g., 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.	**Lesson 39** Problem Solving: Use Linear Models—pp. 338–345