DRAFT New Louisiana Standards for 2016-2017 Correlation to *Eureka Math*

Grade 8

April 2016

Draft

EUREKA MATH™

Grade 8 Mathematics

The majority of the Grade 8 Louisiana Standards for Mathematics are fully covered by the Grade 8 *Eureka Math* curriculum. The primary area where the Grade 8 Louisiana Standards for Mathematics and *Eureka Math* do not align is in the domain of Geometry. Standards from this domain will require use of supplemental materials. A detailed analysis of alignment is provided in the table below. With strategic placement of supplemental materials, *Eureka Math* can ensure students are successful in achieving the proficiencies of the Louisiana Standards for Mathematics while benefiting from the coherence and rigor of *Eureka Math*.

Indicators


Green indicates that the Louisiana standard is fully addressed in *Eureka Math*.


Yellow indicates that the Louisiana standard may not be completely addressed in *Eureka Math*.


Red indicates that the Louisiana standard is not addressed in *Eureka Math*.


Blue indicates there is a discrepancy between the grade level at which this standard is addressed in the Louisiana standards and in *Eureka Math*.

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Standards for Mathematical Practice	Aligned Components of *Eureka Math*
1. Make sense of problems and persevere in solving them. In grade 8, students solve real world problems through the application of algebraic and geometric concepts. Students seek the meaning of a problem and look for efficient ways to represent and solve it. They may check their thinking by asking themselves, "What is the most efficient way to solve the problem?", "Does this make sense?", and "Can I solve the problem in a different way?"	Lessons in every module engage students in making sense of problems and persevering in solving them as required by this standard. This standard is analogous to the CCSSM Standard for Mathematical Practice 1, which is specifically addressed in the following modules: ▪ G8 M1: Integer Exponents and Scientific Notation ▪ G8 M4: Linear Equations
2. Reason abstractly and quantitatively. In grade 8, students represent a wide variety of real world contexts through the use of real numbers and variables in mathematical expressions, equations, and inequalities. They examine patterns in data and assess the degree of linearity of functions. Students contextualize to understand the meaning of the number or variable as related to the problem and decontextualize to manipulate symbolic representations by applying properties of operations.	Lessons in every module engage students in reasoning abstractly and quantitatively as required by this standard. This standard is analogous to the CCSSM Standard for Mathematical Practice 2, which is specifically addressed in the following modules: ▪ G8 M1: Integer Exponents and Scientific Notation ▪ G8 M2: The Concept of Congruence ▪ G8 M4: Linear Equations ▪ G8 M5: Examples of Functions from Geometry ▪ G8 M6: Linear Functions
3. Construct viable arguments and critique the reasoning of others. In grade 8, students construct arguments using verbal or written explanations accompanied by expressions, equations, inequalities, models, and graphs, tables, and other data displays (i.e. box plots, dot plots, histograms, etc.). They further refine their mathematical communication skills through mathematical discussions in which they critically evaluate their own thinking and the thinking of other students. They pose questions like "How did you get that?", "Why is that true?" "Does that always work?" They explain their thinking to others and respond to others' thinking.	Lessons in every module engage students in constructing viable arguments and critiquing the reasoning of others as required by this standard. This standard is analogous to the CCSSM Standard for Mathematical Practice 3, which is specifically addressed in the following modules: ▪ G8 M1: Integer Exponents and Scientific Notation ▪ G8 M2: The Concept of Congruence ▪ G8 M3: Similarity ▪ G8 M4: Linear Equations

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4. Model with mathematics. In grade 8, students model problem situations symbolically, graphically, tabularly, and contextually. Students form expressions, equations, or inequalities from real world contexts and connect symbolic and graphical representations. Students solve systems of linear equations and compare properties of functions provided in different forms. Students use scatterplots to represent data and describe associations between variables. Students need many opportunities to connect and explain the connections between the different representations. They should be able to use all of these representations as appropriate to a problem context.	Lessons in every module engage students in modeling with mathematics as required by this standard. This standard is analogous to the CCSSM Standard for Mathematical Practice 4, which is specifically addressed in the following modules: ▪ G8 M3: Similarity ▪ G8 M4: Linear Equations ▪ G8 M6: Linear Functions
5. Use appropriate tools strategically. Students consider available tools (including estimation and technology) when solving a mathematical problem and decide when certain tools might be helpful. For instance, students in grade 8 may translate a set of data given in tabular form to a graphical representation to compare it to another data set. Students might draw pictures, use applets, or write equations to show the relationships between the angles created by a transversal.	Lessons in every module engage students in using appropriate tools strategically as required by this standard. This standard is analogous to the CCSSM Standard for Mathematical Practice 5, which is specifically addressed in the following modules: ▪ G8 M3: Similarity ▪ G8 M4: Linear Equations ▪ G8 M6: Linear Functions
6. Attend to precision. In grade 8, students continue to refine their mathematical communication skills by using clear and precise language in their discussions with others and in their own reasoning. Students use appropriate terminology when referring to the number system, functions, geometric figures, and data displays.	Lessons in every module engage students in attending to precision as required by this standard. This standard is analogous to the CCSSM Standard for Mathematical Practice 6, which is specifically addressed in the following modules: ▪ G8 M1: Integer Exponents and Scientific Notation ▪ G8 M2: The Concept of Congruence ▪ G8 M3: Similarity ▪ G8 M4: Linear Equations ▪ G8 M5: Examples of Functions from Geometry ▪ G8 M6: Linear Functions ▪ G8 M7: Introduction to Irrational Numbers Using Geometry

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7. Look for and make use of structure. Students routinely seek patterns or structures to model and solve problems. In grade 8, students apply properties to generate equivalent expressions and solve equations. Students examine patterns in tables and graphs to generate equations and describe relationships. Additionally, students experimentally verify the effects of transformations and describe them in terms of congruence and similarity.	Lessons in every module engage students in looking for and making use of structure as required by this standard. This standard is analogous to the CCSSM Standard for Mathematical Practice 7, which is specifically addressed in the following modules: ▪ G8 M1: Integer Exponents and Scientific Notation ▪ G8 M4: Linear Equations ▪ G8 M6: Linear Functions ▪ G8 M7: Introduction to Irrational Numbers Using Geometry
8. Look for and express regularity in repeated reasoning. In grade 8, students use repeated reasoning to understand algorithms and make generalizations about patterns. Students use iterative processes to determine more precise rational approximations for irrational numbers. During multiple opportunities to solve and model problems, they notice that the slope of a line and rate of change are the same value. Students flexibly make connections between covariance, rates, and representations showing the relationships between quantities.	Lessons in every module engage students in looking for and expressing regularity in repeated reasoning as required by this standard. This standard is analogous to the CCSSM Standard for Mathematical Practice 8, which is specifically addressed in the following modules: ▪ G8 M1: Integer Exponents and Scientific Notation ▪ G8 M3: Similarity ▪ G8 M5: Examples of Functions from Geometry ▪ G8 M7: Introduction to Irrational Numbers Using Geometry

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Domain	Standards	Aligned Components of *Eureka Math*
The Number System	**Cluster A: Know that there are numbers that are not rational, and approximate them by rational numbers.**	
	8.NS.A.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. Convert a decimal expansion that repeats eventually into a rational number by analyzing repeating patterns.	G8 M7 Topic A: Square and Cube Roots G8 M7 Topic B: Decimal Expansions of Numbers
	8.RP.A.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of* $\sqrt{2}$*, show that* $\sqrt{2}$ *is between* 1 *and* 2*, then between* 1.4 *and* 1.5*, and explain how to continue on to get better approximations to the hundredths place.*	G8 M7 Topic A: Square and Cube Roots G8 M7 Topic B: Decimal Expansions of Numbers Note: Consider adjusting these lessons to approximate to the hundredths place.
Expressions and Equations	**Cluster A: Work with radicals and integer exponents.**	
	8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.	G8 M1 Topic A: Exponential Notation and Properties of Integer Exponents
	8.EE.A.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. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.	G8 M7: Introduction to Irrational Numbers Using Geometry

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	8.EE.A.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. *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.*	G8 M1 Topic B: Magnitude and Scientific Notation
	8.EE.A.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use 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.	G8 M1 Topic B: Magnitude and Scientific Notation
	Cluster B: Understand the connections between proportional relationships, lines, and linear equations.	
	8.EE.B.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 distance-time equation to determine which of two moving objects has greater speed.*	G8 M4 Topic C: Slope and Equations of Lines G8 M4 Topic D: Systems of Linear Equations and Their Solutions
	8.EE.B.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.	G8 M4 Topic C: Slope and Equations of Lines

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	Cluster C: Analyze and solve linear equations and pairs of simultaneous linear equations.	
	8.EE.C.7 Solve linear equations in one variable.	
	a. 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).	G8 M4 Lesson 6: Solutions of a Linear Equation G8 M4 Lesson 7: Classification of Solutions
	b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	G8 M4 Topic A: Writing and Solving Linear Equations
	8.EE.C.8 Analyze and solve pairs of simultaneous linear equations.	
	a. 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	G8 M4 Topic D: Systems of Linear Equations and Their Solutions Note: Learning systems of linear equations are extended in Algebra I Module 1 Topic C.

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	b. 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*.*	G8 M4 Topic D: Systems of Linear Equations and Their Solutions G8 M4 Lesson 31: System of Equations Leading to Pythagorean Triples Note: Learning systems of linear equations are extended in Algebra I Module 1 Topic C.
	c. 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.*	G8 M4 Topic D: Systems of Linear Equations and Their Solutions G8 M4 Lesson 31: System of Equations Leading to Pythagorean Triples Note: Learning systems of linear equations are extended in Algebra I Module 1 Topic C.
Functions	**Cluster A: Define, evaluate, and compare functions.**	
	8.F.A.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. (Function notation is not required in this grade level)	G8 M5 Topic A: Functions
	8.F.A.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.*	G8 M5 Topic A: Functions G8 M6 Topic A: Linear Functions

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	8.F.A.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; categorize functions as linear or nonlinear when given equations, graphs, or tables. *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.*	G8 M5 Topic A: Functions G8 M6 Topic A: Linear Functions G8 M6 Lesson 12: Nonlinear Models in a Data Context
	Cluster B: Use functions to model relationships between quantities.	
	8.F.B.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.	G8 M5 Topic A: Functions G8 M6: Linear Functions
	8.F.B.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.	G8 M6 Lessons 4–5: Increasing and Decreasing Functions

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Geometry	**Cluster A: Understand congruence and similarity using physical models, transparencies, or geometry software.**	
	8.G.A.1 Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines.	G8 M2 Topic A: Definitions and Properties of the Basic Rigid Motions
	8.G.A.2 Explain 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. (Rotations are only about the origin and reflections are only over the y-axis and x-axis in Grade 8.)	G8 M2 Topic B: Sequencing the Basic Rigid Motions G8 M2 Lesson 11: Definition of Congruence and Some Basic Properties Note: Most transformations in *Eureka Math* are described as in a plane, not just the coordinate plane. The lessons listed above are where there is direct instruction involving the coordinate plane. These lessons rotate around points other than the origin and reflect across lines other than the axes. Lessons may need to be modified for full alignment

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	8.G.A.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. (Rotations are only about the origin, dilations only use the origin as the center of dilation, and reflections are only over the y-axis and x-axis in Grade 8.)	G8 M2 Lesson 6: Rotations of 180 Degrees G8 M2 Topic B: Sequencing the Basic Rigid Motions G8 M3 Topic A: Dilation G8 M3 Lesson 8: Similarity G8 M3 Lesson 9: Basic Properties of Similarity Note: Most transformations in *Eureka Math* are described as in a plane, not just the coordinate plane. The lessons listed above are where there is direct instruction involving the coordinate plane. These lessons rotate around points other than the origin and reflect across lines other than the axes. Lessons may need to be modified for full alignment.
	8.G.A.4 Explain 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. (Rotations are only about the origin, dilations only use the origin as the center of dilation, and reflections are only over the y-axis and x-axis in Grade 8.)	G8 M3 Topic B: Similar Figures Note: Most transformations in *Eureka Math* are described as in a plane, not just the coordinate plane. The lessons listed above are where there is direct instruction involving the coordinate plane. These lessons rotate around points other than the origin and reflect across lines other than the axes. Dilations on the coordinate plane have only the origin as the center. Lessons may need to be modified for full alignment.

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	8.G.A.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. *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.*	G8 M2 Topic C: Congruence and Angle Relationships G8 M3 Topic B: Similar Figures
	Cluster B: Understand and apply the Pythagorean Theorem.	
	8.G.B.6 Explain a proof of the Pythagorean Theorem and its converse using the area of squares.	G8 M7 Lesson 15: Pythagorean Theorem, Revisited Note: In this lesson students prove only that a triangle is not a right triangle based on area of squares. Consider supplementing with materials that prove the converse using area of squares more generally.
	8.G.B.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	G8 M2 Topic D: The Pythagorean Theorem G8 M3 Topic C: The Pythagorean Theorem G8 M4 Lesson 31: System of Equations Leading to Pythagorean Triples G8 M7 Lesson 1: The Pythagorean Theorem G8 M7 Topic C: The Pythagorean Theorem G8 M7 Topic D: Applications of Radicals and Roots

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	8.G.A.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	G8 M2 Lesson 16: Applications of the Pythagorean Theorem G8 M7 Lesson 17: Distance on the Coordinate Plane
	Cluster C: Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	
	8.G.C.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	G8 M5 Topic B: Volume G8 M7 Lesson 19: Cones and Spheres G8 M7 Lesson 21: Volume of Composite Solids
Statistics and Probability	**Cluster A: Investigate patterns of association in bivariate data.**	
	8.SP.A.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.	G8 M6 Topic B: Bivariate Numerical Data G8 M6 Topic C: Linear and Nonlinear Models
	8.SP.A.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.	G8 M6 Lesson 8: Informally Fitting a Line G8 M6 Lesson 9: Determining the Equation of a Line Fit to Data G8 M6: Topic C: Linear and Nonlinear Models

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Domain	Standards	Aligned Components of *Eureka Math*
	8.SP.B.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.*	G8 M6 Lesson 8: Informally Fitting a Line G8 M6 Lesson 9: Determining the Equation of a Line Fit to Data G8 M6: Topic C: Linear and Nonlinear Models
	8.SP.B.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. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible 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?*	G8 M6 Topic D: Bivariate Categorical Data

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