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

Algebra I

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Draft

EUREKA MATH™

Algebra I Mathematics

The majority of the Algebra I Louisiana Standards for Mathematics are fully covered by the Algebra I *Eureka Math* curriculum. The primary areas where the Algebra I Louisiana Standards for Mathematics and *Eureka Math* do not align are Algebra: Reasoning with Equations and Inequalities, and Functions: Interpreting Functions. 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*.

Standards for Mathematical Practice	Aligned Components of *Eureka Math*
1. Make sense of problems and persevere in solving them. High school students start to examine problems by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. By high school, students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. They check their answers to problems using different methods and continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.	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: ▪ Algebra I M1: Relationships Between Quantities and Reasoning with Equations and Their Graphs ▪ Algebra I M2: Descriptive Statistics ▪ Algebra I M3: Linear and Exponential Functions ▪ Algebra I M4: Polynomial and Quadratic Expressions, Equations, and Functions ▪ Algebra I M5: A Synthesis of Modeling with Equations and Functions
2. Reason abstractly and quantitatively. High school students seek to make sense of quantities and their relationships in problem situations. They abstract a given situation and represent it symbolically, manipulate the representing symbols, and pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Students use quantitative reasoning to create coherent representations of the problem at hand; consider the units involved; attend to the meaning of quantities, not just how to compute them; and know and flexibly use different properties of operations and objects.	Lessons in every module encourage students to reason 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: ▪ Algebra I M1: Relationships Between Quantities and Reasoning with Equations and Their Graphs ▪ Algebra I M2: Descriptive Statistics ▪ Algebra I M3: Linear and Exponential Functions ▪ Algebra I M4: Polynomial and Quadratic Expressions, Equations, and Functions ▪ Algebra I M5: A Synthesis of Modeling with Equations and Functions

Standards for Mathematical Practice	Aligned Components of *Eureka Math*
3. Construct viable arguments and critique the reasoning of others. High school students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. High school students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. High school students learn to determine domains to which an argument applies, listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.	Lessons in every module require students to construct viable arguments and critique others' reasoning 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: ▪ Algebra I M1: Relationships Between Quantities and Reasoning with Equations and Their Graphs ▪ Algebra I M2: Descriptive Statistics
4. Model with mathematics. High school students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. High school students making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.	Lessons in every module engage students in modeling process 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: ▪ Algebra I M1: Relationships Between Quantities and Reasoning with Equations and Their Graphs ▪ Algebra I M2: Descriptive Statistics ▪ Algebra I M3: Linear and Exponential Functions ▪ Algebra I M4: Polynomial and Quadratic Expressions, Equations, and Functions ▪ Algebra I M5: A Synthesis of Modeling with Equations and Functions

Standards for Mathematical Practice	Aligned Components of *Eureka Math*
5. Use appropriate tools strategically. High school students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. High school students should be sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. They are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.	Lessons in every module encourage students to use 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: ▪ Algebra I M2: Descriptive Statistics ▪ Algebra I M4: Polynomial and Quadratic Expressions, Equations, and Functions ▪ Algebra I M5: A Synthesis of Modeling with Equations and Functions
6. Attend to precision. High school students try to communicate precisely to others by using clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. By the time they reach high school they have learned to examine claims and make explicit use of definitions.	Lessons in every module require that students attend 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: ▪ Algebra I M1: Relationships Between Quantities and Reasoning with Equations and Their Graphs ▪ Algebra I M2: Descriptive Statistics ▪ Algebra I M4: Polynomial and Quadratic Expressions, Equations, and Functions ▪ Algebra I M5: A Synthesis of Modeling with Equations and Functions

Standards for Mathematical Practice	Aligned Components of *Eureka Math*
7. Look for and make use of structure. By high school, students look closely to discern a pattern or structure. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y. High school students use these patterns to create equivalent expressions, factor and solve equations, and compose functions, and transform figures.	Lessons in every module encourage students to make 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: ▪ Algebra I M1: Relationships Between Quantities and Reasoning with Equations and Their Graphs ▪ Algebra I M3: Linear and Exponential Functions ▪ Algebra I M4: Polynomial and Quadratic Expressions, Equations, and Functions
8. Look for and express regularity in repeated reasoning. High school students notice if calculations are repeated, and look both for general methods and for shortcuts. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, derive formulas or make generalizations, high school students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.	Lessons in every module encourage students to use 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: ▪ Algebra I M1: Relationships Between Quantities and Reasoning with Equations and Their Graphs ▪ Algebra I M3: Linear and Exponential Functions

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
Number and Quantity	**The Real Number System**	**Cluster B: Use properties of rational and irrational numbers.**	
		N-RN.B.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	Algebra I M4 Lesson 13: Solving Quadratic Equations by Completing the Square
	Quantities	**Cluster A: Reason quantitatively and use units to solve problems.**	
		N-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	Algebra I M1 Topic A: Introduction to Functions Studied This Year—Graphing Stories Algebra I M1 Topic D: Creating Equations to Solve Problems
		N-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.	Algebra I M1 Topic A: Introduction to Functions Studied This Year—Graphing Stories Algebra I M5 Lesson 1: Analyzing a Graph Algebra I M5 Topic B: Completing the Modeling Cycle

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		N-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Algebra I M1 Topic A: Introduction to Functions Studied This Year—Graphing Stories Algebra I M5 L6: Modelling a Context from Data Algebra I M5 L9: Modeling a Context from a Verbal Description
Algebra	**Seeing Structure in Expressions**	**Cluster A: Interpret the structure of expressions.**	
		A-SSE.A.1 Interpret expressions that represent a quantity in terms of its context.	
		a. Interpret parts of an expression, such as terms, factors, and coefficients.	Algebra I M1 Lessons 26 and 27: Recursive Challenge Problem—The Double and Add 5 Game Algebra I M4 Lessons 1 and 2: Multiplying and Factoring Polynomial Expressions Algebra I M4 Lessons 3 and 4: Advanced Factoring Strategies for Quadratic Expressions Algebra I M4 Lessons 11 and 12: Completing the Square

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.*	Algebra I M3 Topic A: Linear and Exponential Sequences Algebra I M4 Lesson 22: Comparing Quadratic, Square Root, and Cube Root Functions Represented in Different Ways
		A-SSE.A.2 Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$, or see $(2x^2 + 8x)$ as $(2x)(x) + (2x)(4)$, thus recognizing it as a polynomial whose terms are products of monomials and the polynomial can be factored as $2x(x+4)$.	Algebra I M1 Lesson 6: Algebraic Expressions—The Distributive Property Algebra I M1 Lesson 7: Algebraic Expressions—The Commutative and Associative Properties Algebra I M1 Lesson 17: Equations Involving Factored Expressions Algebra I M4 Lessons 1 and 2: Multiplying and Factoring Polynomial Expressions Algebra I M4 Lessons 3 and 4: Advanced Factoring Strategies for Quadratic Expressions Algebra I M4 Lessons 11 and 12: Completing the Square

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		Cluster B: Write expressions in equivalent forms to solve problems.	
		A-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	
		a. Factor a quadratic expression to reveal the zeros of the function it defines.	Algebra I M4 Lesson 9: Graphing Quadratic Functions from Factored Form, $f(x) = a(x - m)(x - n)$ Algebra I M4 Lesson 23: Modeling with Quadratic Functions
		b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	Algebra I M4 Lesson 12: Completing the Square Algebra I M4 Lesson 17: Graphing Quadratics from Standard Form, $f(x) = ax^2 + bx + c$ Algebra I M4 Lesson 21: Transformations of the Quadratic Parent Function, $f(x) = x^2$ Algebra I M4 Lesson 23: Modeling with Quadratic Functions
		c. Use the properties of exponents to transform expressions for exponential functions emphasizing integer exponents. For example the growth of bacteria can be modeled by either $f(t) = 3^{(t+2)}$ or $g(t) = 9(3^t)$ because the expression $3^{(t+2)}$ can be rewritten as $(3^t)(3^2) = 9(3^t)$.	Algebra I M3 Lesson 23: Newton's Law of Cooling

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
	Arithmetic with Polynomials and Rational Expressions	**Cluster A: Perform arithmetic operations on polynomials.**	
		A-APR.A.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	Algebra I M1 Lesson 8: Adding and Subtracting Polynomials Algebra I M1 Lesson 9: Multiplying Polynomials Algebra I M4 Lessons 1 and 2: Multiplying and Factoring Polynomial Expressions
		Cluster B: Understand the relationship between zeros and factors of polynomials.	
		A-APR.B.3 Identify zeros of quadratic functions, and use the zeros to sketch a graph of the function defined by the polynomial.	Algebra I M4 Lesson 9: Graphing Quadratic Functions from Factored Form, $f(x) = a(x - m)(x - n)$ Algebra I M4 Lesson 15: Using the Quadratic Formula Algebra I M4 Lesson 23: Modeling with Quadratic Functions

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
	Creating Equations	**Cluster A: Create equations that describe numbers or relationships.**	
		A-CED.A.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear, quadratic, and exponential functions.*	Algebra I M1 Lesson 18: Equations Involving a Variable Expression in the Denominator Algebra I M1 Topic D: Creating Equations to Solve Problems Algebra I M3 Lesson 21: Comparing Linear and Exponential Models Again Algebra I M3 Lesson 23: Newton's Law of Cooling Algebra I M4 Lesson 6: Solving Basic One-Variable Quadratic Equations Algebra I M4 Lesson 7: Creating and Solving Quadratic Equations in One Variable Algebra I M5 Topic B: Completing the Modeling Cycle

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		A-CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Algebra I M1 Lesson 5: Two Graphing Stories Algebra I M1 Lesson 20: Solution Sets to Equations with Two Variables Algebra I M1 Lesson 24: Applications of Systems of Equations and Inequalities Algebra I M1 Lesson 28: Federal Income Tax Algebra I M4 Lesson 9: Graphing Quadratic Functions from Factored Form, $f(x) = a(x-m)(x-n)$ Algebra I M4 Lesson 12: Completing the Square Algebra I M4 Lesson 16: Graphing Quadratics from Vertex Form, $y = a(x-h)^2 + k$ Algebra I M4 Lessons 23 and 24: Modeling with Quadratic Functions Algebra I Module 5: A Synthesis of Modeling Equations and Functions

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		A-CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	Algebra I M1 Lesson 15: Solution Sets of Two or More Equations (or Inequalities) Joined by "And" or "Or" Algebra I M1 Lesson 20: Solution Sets to Equations with Two Variables Algebra I M1 Lesson 24: Applications of Systems of Equations and Inequalities Algebra I M3 Lesson 8: Why Stay with Whole Numbers? Algebra I M3 Lesson 24: Piecewise and Step Functions in Context
		A-CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law $V = IR$ to highlight resistance R.*	Algebra I M1 Lesson 19: Rearranging Formulas

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
	Reasoning with Equations and Inequalities	**Cluster A: Understand solving equations as a process of reasoning and explain the reasoning.**	
		A-REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	Algebra I M1 Lesson 12: Solving Equations Algebra I M1 Lesson 13: Some Potential Dangers when Solving Equations Algebra I M1 Lesson 17: Equations Involving Factored Expressions Algebra I M1 Lesson 18: Equations Involving a Variable Expression in the Denominator
		Cluster B: Solve equations and inequalities in one variable.	
		A-REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Algebra I M1 Topic C: Solving Equations and Inequalities Algebra I M1 Lesson 25: Solving Problems in Two Ways—Rates and Algebra Algebra I M1 Lesson 27: Recursive Challenge Problem—The Double and Add 5 Game

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		A-REI.B.4 Solve quadratic equations in one variable	
		a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.	Algebra I M4 Lesson 13: Solving Quadratic Equations by Completing the Square Algebra I M4 Lesson 14: Deriving the Quadratic Formula Algebra I M4 Lesson 15: Using the Quadratic Formula
		b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$, taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as "no real solution."	Algebra I M4 Lesson 5: The Zero Product Property Algebra I M4 Lesson 6: Solving Basic One-Variable Quadratic Equations Algebra I M4 Lesson 7: Creating and Solving Quadratic Equations in One Variable Algebra I M4 Lesson 13: Solving Quadratic Equations by Completing the Square Algebra I M4 Lesson 14: Deriving the Quadratic Formula Algebra I M4 Lesson 15: Using the Quadratic Formula

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		Cluster C: Solve systems of equations.	
		A-REI.C.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	Algebra I M1 Lesson 23: Solution Sets to Simultaneous Equations
		A-REI.C.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	Algebra I M1 Lessons 22 and 23: Solution Sets to Simultaneous Equations Algebra I M1 Lesson 24: Applications of Systems of Equations and Inequalities
		Cluster D: Represent and solve equations and inequalities graphically.	
		A-REI.D.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	Algebra I M1 Lesson 20: Solution Sets to Equations with Two Variables

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		A-REI.D.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$are linear, polynomial, rational, piecewise linear (to include absolute value), and exponential functions.	Algebra I M3 Lesson 16: Graphs Can Solve Equations Too Note: Consider supplementing Algebra I M3 Lesson 16 with additional examples that include rational functions. The lesson addresses linear, polynomial, piecewise linear (including absolute value), and exponential functions.
		A-REI.D.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	Algebra I M1 Lesson 21: Solution Sets to Inequalities with Two Variables Equations Algebra I M1 Lesson 22: Solution Sets to Simultaneous Equations Algebra I M1 Lesson 24: Applications of Systems of Equations and Inequalities
Functions	**Interpreting Functions**	**Cluster A: Understand the concept of a function and use function notation.**	
		F-IF.A.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.	Algebra I M3 Lesson 1: Integer Sequences—Should You Believe in Patterns? Algebra I M3 Topic B: Functions and Their Graphs

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		F-IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	Algebra I M3 Topic A: Linear and Exponential Sequences Algebra I M3 Lesson 8: Why Stay with Whole Numbers Algebra I M3 Lessons 9 and 10: Representing, Naming, and Evaluating Functions
		F-IF.A.3 Recognize that sequences are functions whose domain is a subset of the integers. Relate arithmetic sequences to linear functions and geometric sequences to exponential functions.	Algebra I M3 Topic A: Linear and Exponential Sequences

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		Cluster B: Interpret functions that arise in applications in terms of the context.	
		F-IF.B.4 For linear, piecewise linear (to include absolute value), quadratic, and exponential functions that model a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior.	Algebra I M3 Lesson 13: Interpreting the Graph of a Function Algebra I M3 Lesson 14: Linear and Exponential Models—Comparing Growth Rates Algebra I M3 Lesson 22: Modeling an Invasive Species Population Algebra I M3 Lesson 23: Newton's Law of Cooling Algebra I M4 Lesson 10: Interpreting Quadratic Functions from Graphs and Tables Algebra I M4 Lesson 16: Graphing Quadratic Functions from the Vertex Form, $y = a(x - h)^2 + k$ Algebra I M4 Lesson 17: Graphing Quadratic Functions from the Standard Form, $f(x) = ax^2 + bx + c$ Algebra I M4 Lesson 22: Comparing Quadratic, Square Root, and Cube Root Functions Represented in Different Ways Algebra I M5 Lesson 1: Analyzing a Graph Algebra I M5 Lesson 4: Modeling a Context from a Graph

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		F-IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.	Algebra I M3 Topic B: Functions and Their Graphs Algebra I M4 Lesson 9: Graphing Quadratic Functions from Factored Form, $f(x) = a(x - m)(x - n)$ Algebra I M4 Lesson 10: Interpreting Quadratic Functions from Graphs and Tables Algebra I M4 Lesson 17: Graphing Quadratic Functions from the Standard Form, $f(x) = ax^2 + bx + c$ Algebra I M5 Lesson 1: Analyzing a Graph Algebra I M5 Lesson 4: Modeling a Context from a Graph

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		F-IF.B.6 Calculate and interpret the average rate of change of a linear, quadratic, piecewise linear (to include absolute value) and exponential function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	Algebra I M3 Lesson 6: Exponential Growth—U.S. Population and World Population Algebra I M3 Lesson 21: Comparing Linear and Exponential Models Again Algebra I M3 Lesson 22: Modeling an Invasive Species Population Algebra I M4 Lesson 8: Exploring the Symmetry in Graphs of Quadratic Functions Algebra I M4 Lesson 10: Interpreting Quadratic Functions from Graphs and Tables Algebra I M4 Lesson 17: Graphing Quadratic Functions from the Standard Form, $f(x) = ax^2 + bx + c$ Algebra I M4 Lesson 22: Comparing Quadratic, Square Root, and Cube Root Functions Represented in Different Ways Algebra I M5 Lesson 4: Modeling a Context from a Graph

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		Cluster C: Analyze functions using different representations.	
		F-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	
		a. Graph linear and quadratic functions and show intercepts, maxima, and minima.	Algebra I M3 Lesson 12: The Graph of the Equation $y = f(x)$ Algebra I M3 Lesson 21: Comparing Linear and Exponential Models Again Algebra I M4 Lesson 8: Exploring the Symmetry in Graphs of Quadratic Functions Algebra I M4 Lesson 8: Exploring the Symmetry in Graphs of Quadratic Functions Algebra I M4 Lesson 9: Graphing Quadratic Functions from Factored Form, $f(x) = a(x-m)(x-n)$ Algebra I M4 Lesson 16: Graphing Quadratic Functions from the Vertex Form, $y = a(x-h)^2 + k$ Algebra I M4 Lesson 17: Graphing Quadratic Functions from the Standard Form, $f(x) = ax^2 + bx + c$ Algebra I M4 Lesson 19: Translating Graphs of Functions Algebra I M4 Lesson 20: Stretching and Shrinking the Graphs of Functions Algebra I M4 Lesson 21: Transformations of the Quadratic Parent Function, $f(x) = x^2$

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		b. Graph piecewise linear (to include absolute value) and exponential functions.	Algebra I M3 Topic C: Transformations of Functions Algebra I M3 Lesson 21: Comparing Linear and Exponential Models Again Algebra I M4 Lesson 19: Translating Graphs of Functions Algebra I M4 Lesson 20: Stretching and Shrinking the Graphs of Functions
		F-IF.C.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	
		a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	Algebra I M4 Lesson 9: Graphing Quadratic Functions from Factored Form, $f(x) = a(x-m)(x-n)$ Algebra I M4 Lesson 16: Graphing Quadratic Functions from the Vertex Form, $y = a(x-h)^2 + k$ Algebra I M4 Lesson 17: Graphing Quadratic Functions from the Standard Form, $f(x) = ax^2 + bx + c$ Algebra I M4 Lesson 21: Transformations of the Quadratic Parent Function, $f(x) = x^2$ Algebra I M4 Lesson 23: Modeling with Quadratic Functions

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		F-IF.C.9 Compare properties of two functions (linear, quadratic, piecewise linear [to include absolute value] or exponential) each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, determine which has the larger maximum.*	Algebra I M3 Lesson 24: Piecewise and Step Functions in Context Algebra I M4 Lesson 22: Comparing Quadratic, Square Root, and Cube Root Functions Represented in Different Ways Note: Consider supplementing M4 Lesson 22 with additional examples that address comparing linear, piecewise, and exponential functions. The lesson addresses quadratic, square root, cubic, and cube root functions.
	Building Functions	**Cluster A: Build a function that models a relationship between two quantities.**	
		F-BF.A.1 Write a linear, quadratic, or exponential function that describes a relationship between two quantities.	
		a. Determine an explicit expression, a recursive process, or steps for calculation from a context.	Algebra I M3 Topic A: Linear and Exponential Sequences Algebra I M3 Topic D: Using Functions and Graphs to Solve Problems Algebra I M5 Lesson 2: Analyzing a Data Set Algebra I M5 Lesson 5: Modeling from a Sequence

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		Cluster B: Build new functions from existing functions.	
		F-BF.B.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative). Without technology find the value of k given the graphs of linear and quadratic functions. With technology, experiment with cases and illustrate an explanation of the effects on the graphs that include cases where $f(x)$ is a linear, quadratic, piecewise linear (to include absolute value) or exponential function.	Algebra I M3 Topic C: Transformations of Functions Algebra I M4 Lesson 19: Translating Graphs of Functions Algebra I M4 Lesson 20: Stretching and Shrinking the Graphs of Functions Algebra I M4 Lesson 21: Transformations of the Quadratic Parent Function, $f(x) = x^2$
	Linear, Quadratic, and Exponential Models	**Cluster A: Construct and compare linear, quadratic, and exponential models and solve problems.**	
		F-LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.	
		a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.	Algebra I M3 Lesson 5: The Power of Exponential Growth Algebra I M3 Lesson 6: Exponential Growth—U.S. Population and World Population Algebra I M3 Lesson 14: Linear and Exponential Models—Comparing Growth Rates Algebra I M3 Lesson 21: Comparing Linear and Exponential Models Again

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	Algebra I M3 Lesson 14: Linear and Exponential Models—Comparing Growth Rates Algebra I M3 Lesson 21: Comparing Linear and Exponential Models Again Algebra I M5 Lesson 2: Analyzing a Data Set Algebra I M5 Lesson 6: Modeling a Context from Data
		c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	Algebra I M3 Lesson 4: Why Do Banks Pay YOU to Provide Their Services? Algebra I M3 Lesson 6: Exponential Growth—U.S. Population and World Population Algebra I M3 Lesson 7: Exponential Decay Algebra I M5 Lesson 3: Analyzing a Verbal Description Algebra I M5 Lesson 8: Modeling a Context from a Verbal Description
		F-LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	Algebra I M3 Topic A: Linear and Exponential Sequences Algebra I M3 Topic D: Using Functions and Graphs to Solve Problems Algebra I M5: A Synthesis of Modeling with Equations and Functions

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		F-LE.A.3 Observe, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	Algebra I M3 Lesson 5: The Power of Exponential Growth Algebra I M3 Lesson 6: Exponential Growth—U.S. Population and World Population Algebra I M3 Lesson 14: Linear and Exponential Models—Comparing Growth Rates Algebra I M3 Lesson 21: Comparing Linear and Exponential Models Again
		Cluster B: Interpret expressions for functions in terms of the situation they model.	
		F-LE.B.5 Interpret the parameters in a linear, quadratic, or exponential function in terms of a context.	Algebra I M3 Lesson 21: Comparing Linear and Exponential Models Again Algebra I M3 Lesson 22: Modeling an Invasive Species Population
Statistics and Probability	**Interpreting Categorical and Quantitative Date**	**Cluster A: Summarize, represent, and interpret data on a single count or measurement variable.**	
		S-ID.A.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	Algebra I M2 Topic A: Shapes and Centers of Distributions Algebra I M2 Topic B: Describing Variability and Comparing Distributions

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		S-ID.A.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	Algebra I M2 Topic A: Shapes and Centers of Distributions Algebra I M2 Topic B: Describing Variability and Comparing Distributions
		Cluster B: Summarize, represent, and interpret data on two categorical and quantitative variables.	
		S-ID.B.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	Algebra I M2 Topic C: Categorical Data on Two Variables
		S-ID.B.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	
		a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and quadratic models.	Algebra I M2 Lessons 12 and 13: Relationships Between Two Numerical Variables Algebra I M2 Lesson 18: Analyzing Residuals Algebra I M2 Lesson 20: Analyzing Data Collected on Two Variables
		b. Informally assess the fit of a function by plotting and analyzing residuals.	Algebra I M2 Topic D: Numerical Data on Two Variables

Conceptual Category	Domain	Cluster and Standard	Aligned Components of *Eureka Math*
		c. Fit a linear function for a scatter plot that suggests a linear association.	Algebra I M2 Topic D: Numerical Data on Two Variables
		Cluster C: Interpret linear models.	
		S-ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	Algebra I M2 Lesson 14: Modeling Relationships with a Line
		S-ID.C.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.	Algebra I M2 Lesson 19: Interpreting Correlation Algebra I M2 Lesson 20: Analyzing Data Collected on Two Variables
		S-ID.C.9 Distinguish between correlation and causation.	Algebra I M2 Lesson 11: Conditional Relative Frequencies and Association Algebra I M2 Lesson 19: Interpreting Correlation Algebra I M2 Lesson 20: Analyzing Data Collected on Two Variables