EUREKA MATH™

GREAT MINDS

ABOUT *EUREKA MATH*

Created by the nonprofit Great Minds, *Eureka Math* helps teachers deliver unparalleled math instruction that provides students with a deep understanding and fluency in math. Crafted by teachers and math scholars, the curriculum carefully sequences the mathematical progressions to maximize coherence from Prekindergarten through Precalculus—a principle tested and proven to be essential in students' mastery of math.

Teachers and students using *Eureka Math* find the trademark "Aha!" moments in *Eureka Math* to be a source of joy and inspiration, lesson after lesson, year after year.

ALIGNED

Eureka Math is the only curriculum found by EdReports.org to align fully with the Common Core State Standards for Mathematics for all grades, Kindergarten through Grade 8. Great Minds offers detailed analyses which demonstrate how each grade of *Eureka Math* aligns with specific state standards. Access these free alignment studies at greatminds.org/state-studies.

DATA

Schools and districts nationwide are experiencing student growth and impressive test scores after using *Eureka Math*. See their stories and data at greatminds.org/data.

FULL SUITE OF RESOURCES

As a nonprofit, Great Minds offers the *Eureka Math* curriculum as PDF downloads for free, noncommercial use. Access the free PDFs at greatminds.org/math/curriculum.

The teacher–writers who created the curriculum have also developed essential resources, available only from Great Minds, including the following:

- Printed material in English and Spanish
- Digital resources
- Professional development
- Classroom tools and manipulatives
- Teacher support materials
- Parent resources

ALGEBRA II MATHEMATICS

The majority of the Algebra II Arkansas Mathematics Standards will require the use of *Eureka Math* content from other courses. 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 Algebra II Arkansas Mathematics Standards while still benefiting from the coherence and rigor of *Eureka Math*.

INDICATORS

- Green indicates that the Arkansas standard is fully addressed in *Eureka Math*.
- Yellow indicates that the Arkansas standard may not be completely addressed in *Eureka Math*.
- Red indicates that the Arkansas 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 California standards and in *Eureka Math*.

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
The Real Number System	**Cluster: Extend the properties of exponents to rational exponents**	
	AR.Math.Content.HSN.RN.A.1 Explain how extending the properties of integer exponents to rational exponents provides an alternative notation for radicals	Algebra II M3 Topic A: Real Numbers
	AR.Math.Content.HSN.RN.A.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents	Algebra II M3 Topic A: Real Numbers
	Cluster: Use properties of rational and irrational numbers	
	AR.Math.Content.HSN.RN.B.4 ▪ Simplify *radical expressions* ▪ Perform operations (add, subtract, multiply, and divide) with *radical expressions* ▪ Rationalize denominators and/or numerators	Geometry M2 Topic D: Applying Similarity to Right Triangles Algebra II M1 Lesson 9: Radicals and Conjugates Algebra II M3 Lesson 4: Properties of Exponents and Radicals

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
Quantities	**Cluster: Reason quantitatively and use units to solve problems**	
	AR.Math.Content.HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling (i.e., use units appropriate to the problem being solved)	Algebra I M1 Topic A: Introduction to Functions Studied this Year—Graphing Stories Algebra I M5: A Synthesis of Modeling with Equations and Functions Algebra II M1 Lessons 20–21: Modeling Riverbeds with Polynomials Algebra II M3 Lesson 2: Base 10 and Scientific Notation Algebra II M3 Lesson 9: Logarithms—How Many Digits Do You Need?
The Complex Number System	**Cluster: Perform arithmetic operations with complex numbers**	
	AR.Math.Content.HSN.CN.A.1 Know there is a *complex number i* such that $i^2 = -1$, and every *complex number* has the form $a + bi$ with a and b real	Algebra II M1 Lesson 37: A Surprising Boost from Geometry
	AR.Math.Content.HSN.CN.A.2 Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply *complex numbers*	Algebra II M1 Lesson 37: A Surprising Boost from Geometry

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	AR.Math.Content.HSN.CN.A.3 ▪ Find the conjugate of a *complex number* ▪ Use conjugates to find quotients of *complex numbers*	Precalculus and Advanced Topics M1 Lessons 7–8: Complex Number Division Precalculus and Advanced Topics M1 Lesson 9: The Geometric Effect of Some Complex Arithmetic Precalculus and Advanced Topics M1 Lesson 17: The Geometric Effect of Multiplying by a Reciprocal
	Cluster: Use complex numbers in polynomial identities and equations	
	AR.Math.Content.HSN.CN.C.7 Solve quadratic equations with real coefficients that have real or complex solutions	Algebra II M1 Lesson 38: Complex Numbers as Solutions to Equations Algebra II M1 Lesson 39: Factoring Extended to the Complex Realm
	AR.Math.Content.HSN.CN.C.8 Extend polynomial identities to the *complex numbers*	Algebra II M1 Lesson 39: Factoring Extended to the Complex Realm Algebra II M1 Lesson 40: Obstacles Resolved—A Surprising Result
	AR.Math.Content.HSN.CN.C.9 ▪ Know the Fundamental Theorem of Algebra ▪ Show that it is true for quadratic polynomials	Algebra II M1 Lesson 40: Obstacles Resolved—A Surprising Result

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
Vector and Matrix Quantities	**Cluster: Perform operations on matrices and use matrices in applications**	
	AR.Math.Content.HSN.VM.C.6 Use matrices to represent and manipulate data (e.g., to represent payoffs or incidence relationships in a network)	Precalculus and Advanced Topics M2 Topic A: Networks and Matrices
	AR.Math.Content.HSN.VM.C.7 Multiply matrices by scalars to produce new matrices (e.g., as when all of the payoffs in a game are doubled)	Precalculus and Advanced Topics M2 Topic A: Networks and Matrices Precalculus and Advanced Topics M2 Lesson 4: Linear Transformations Review Precalculus and Advanced Topics M2 Lesson 5: Coordinates of Points in Space Precalculus and Advanced Topics M2 Lesson 6: Linear Transformations as Matrices Precalculus and Advanced Topics M2 Topic E: First-Person Video Games—Projection Matrices
	AR.Math.Content.HSN.VM.C.8 Add, subtract, and multiply matrices of appropriate dimensions	Precalculus and Advanced Topics M1 Lesson 22: Modeling Video Game Motion with Matrices Precalculus and Advanced Topics M1 Lesson 24: Matrix Notation Encompasses New Transformations! Precalculus and Advanced Topics M1 Lesson 25: Matrix Multiplication and Addition Precalculus and Advanced Topics M2: Vectors and Matrices

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	AR.Math.Content.HSN.VM.C.9 Understand that, unlike multiplication of numbers, *matrix* multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties	Precalculus and Advanced Topics M2 Lesson 10: Matrix Multiplication Is Not Commutative Precalculus and Advanced Topics M2 Lesson 12: Matrix Multiplication Is Distributive and Associative
	AR.Math.Content.HSN.VM.C.10 Understand that: ▪ The zero and identity matrices play a role in *matrix* addition and multiplication similar to the role of 0 and 1 in the real numbers ▪ The *determinant* of a square *matrix* is nonzero if and only if the *matrix* has a multiplicative inverse	Precalculus and Advanced Topics M1 Topic C: The Power of the Right Notation Precalculus and Advanced Topics M2 Lesson 6: Linear Transformations as Matrices Precalculus and Advanced Topics M2 Lesson 13: Using Matrix Operations for Encryption Precalculus and Advanced Topics M2 Topic C: Systems of Linear Equations
	AR.Math.Content.HSN.VM.C.12 Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the *determinant* in terms of area	Precalculus and Advanced Topics M1 Topic C: Systems of Linear Equations Precalculus and Advanced Topics M2 Lesson 8: Composition of Linear Transformations

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
Seeing Structure in Expressions	**Cluster: Interpret the structure of expressions**	
	AR.Math.Content.HSA.SSE.A.1 Interpret expressions that represent a quantity in terms of its context ▪ Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients ▪ Interpret complicated expressions by viewing one or more of their parts as a single entity	Algebra II M1 Lesson 14: Graphing Factored Polynomials Algebra II M1 Lesson 15: Structure in Graphs of Polynomial Functions Algebra II M3 Topic D: Using Logarithms in Modeling Situations
	AR.Math.Content.HSA.SSE.A.2 Use the structure of an expression to identify ways to rewrite it	Algebra II M1 Topic A: Polynomials—From Base Ten to Base X Algebra II M1 Lesson 12: Overcoming Obstacles in Factoring Algebra II M1 Lesson 13: Mastering Factoring Algebra II M3 Lesson 12: Properties of Logarithms Algebra II M3 Lesson 14: Solving Logarithmic Equations Algebra II M3 Lesson 15: Why Were Logarithms Developed?

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	Cluster: Write expressions in equivalent forms to solve problems	
	AR.Math.Content.HSA.SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression ▪ Factor a quadratic expression to reveal the *zeros* of the function it defines ▪ Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines ▪ Use the properties of exponents to transform expressions for exponential functions	Algebra I M3 Lesson 23: Newton's Law of Cooling 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 15: Using the Quadratic Formula Algebra I M4 Lesson 17: Graphing Quadratic Functions from the Standard Form, $f(x) = ax^2 + bx + c$ Algebra II M3 Lesson 26: Percent Rate of Change

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
Arithmetic with Polynomials and Rational Expressions	**Cluster: Perform arithmetic operations on polynomials**	
	AR.Math.Content.HSA.APR.A.1 ▪ Add, subtract, and multiply polynomials ▪ Understand that polynomials, like the integers, are **closed** under addition, subtraction, and multiplication	Algebra I M1 Topic B: The Structure of Expressions Algebra I M4 Lessons 1–2: Multiplying and Factoring Polynomial Expressions Algebra I M4 Lessons 3–4: Advanced Factoring Strategies for Quadratic Expressions
	Cluster: Understand the relationship between zeros and factors of polynomials	
	AR.Math.Content.HSA.APR.B.2 Know and apply the Factor and Remainder Theorems: for a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$	Algebra II M1 Lesson 19: The Remainder Theorem
	AR.Math.Content.HSA.APR.B.3 ▪ Identify *zeros* of polynomials when suitable factorizations are available ▪ Use the *zeros* to construct a rough graph of the function defined by the polynomial	Algebra II M1 Lesson 11: The Special Role of Zero in Factoring Algebra II M1 Lesson 14: Graphing Factored Polynomials
	Cluster: Use polynomial identities to solve problems	
	AR.Math.Content.HSA.APR.C.4 Prove polynomial identities and use them to describe numerical relationships	Algebra II M1 Topic A: Polynomials—From Base Ten to Base X

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	Cluster: Rewrite rational expressions	
	AR.Math.Content.HSA.APR.D.6 Rewrite simple *rational expressions* in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system	Algebra II M1 Lesson 4: Comparing Methods—Long Division, Again? Algebra II M1 Lesson 18: Overcoming a Second Obstacle in Factoring—What If There Is a Remainder? Algebra II M1 Lesson 22: Equivalent Rational Expressions Algebra II M1 Lesson 24: Multiplying and Dividing Rational Expressions Algebra II M1 Lesson 25: Adding and Subtracting Rational Expressions
	AR.Math.Content.HSA.APR.D.7 ▪ Add, subtract, multiply, and divide by nonzero *rational expressions* ▪ Understand that *rational expressions*, like the integers, are closed under addition, subtraction, and multiplication	Algebra II M1 Lesson 22: Equivalent Rational Expressions Algebra II M1 Lesson 23: Comparing Rational Expressions Algebra II M1 Lesson 24: Multiplying and Dividing Rational Expressions Algebra II M1 Lesson 25: Adding and Subtracting Rational Expressions

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
Creating Equations	**Cluster: Create equations that describe numbers or relationships**	
	AR.Math.Content.HSA.CED.A.1 Create equations and inequalities in one variable and use them to solve problems	Algebra II M1 Lesson 27: Word Problems Leading to Rational Equations Algebra II M3 Lesson 7: Bacteria and Exponential Growth Algebra II M3 Lesson 26: Percent Rate of Change Algebra II M3 Lesson 27: Modeling with Exponential Functions
	AR.Math.Content.HSA.CED.A.2 ▪ Create equations in two or more variables to represent relationships between quantities ▪ Graph equations, in two variables, on a coordinate plane	Algebra II M1 Lesson 1: Successive Differences in Polynomials Algebra II M1 Lessons 16–17: Modeling with Polynomials—An Introduction Algebra II M1 Lessons 20–21: Modeling Riverbeds with Polynomials Algebra II M2 Lesson 12: Ferris Wheels—Using Trigonometric Functions to Model Cyclical Behavior Algebra II M2 Lesson 13: Tides, Sound Waves, and Stock Markets

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	AR.Math.Content.HSA.CED.A.3 ▪ Represent and interpret constraints by equations or inequalities, and by *systems of equations* and/or inequalities ▪ Interpret solutions as viable or nonviable options in a modeling and/or real-world context	Algebra II M1 Lessons 20–21: Modeling Riverbeds with Polynomials Algebra II M3 Topic E: Geometric Series and Finance
	AR.Math.Content.HSA.CED.A.4 Rearrange *literal equations* using the properties of equality	Algebra I M1 Lesson 19: Rearranging Formulas
Reasoning with Equations and Inequalities	**Cluster: Understand solving equations as a process of reasoning and explain the reasoning**	
	AR.Math.Content.HSA.REI.A.1 Assuming that equations have a solution, construct a solution and justify the reasoning used	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 Algebra II M1 Lesson 26: Solving Rational Equations Algebra II M1 Lesson 28: A Focus on Square Roots

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	AR.Math.Content.HSA.REI.A.2 Solve simple rational and radical equations in one variable, and give examples showing how *extraneous solutions* may arise	Algebra II M1 Lesson 22: Equivalent Rational Expressions Algebra II M1 Lesson 23: Comparing Rational Expressions Algebra II M1 Lesson 26: Solving Rational Equations Algebra II M1 Lesson 27: Word Problems Leading to Rational Equations Algebra II M1 Lesson 28: A Focus on Square Roots Algebra II M1 Lesson 29: Solving Radical Equations
	Cluster: Solve equations and inequalities in one variable	
	AR.Math.Content.HAS.REI.B.4 Solve quadratic equations in one variable ▪ 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 ▪ Solve quadratic equations (as appropriate to the initial form of the equation) by: ▫ Inspection of a graph ▫ Taking square roots ▫ Completing the square ▫ Using the quadratic formula ▫ Factoring Recognize complex solutions and write them as $a \pm bi$ for real numbers a and b.	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 Algebra II M1 Lesson 31: Systems of Equations Algebra II M1 Lesson 38: Complex Numbers as Solutions to Equations

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	Cluster: Solve systems of equations and inequalities graphically	
	AR.Math.Content.HSA.REI.C.5 ▪ Solve *systems of equations* in two variables using substitution and elimination ▪ Understand that the solution to a system of equations will be the same when using substitution and elimination	Algebra I M1 Lesson 23: Solution Sets to Simultaneous Equations
	AR.Math.Content.HSA.REI.C.6 Solve *systems of equations* algebraically and graphically	Algebra I M1 Lessons 22–23: Solution Sets to Simultaneous Equations Algebra I M1 Lesson 24: Applications of Systems of Equations and Inequalities Algebra I M4 Lesson 24: Modeling with Quadratic Functions Algebra II M1 Lesson 30: Linear Systems in Three Variables Algebra II M1 Lesson 31: Systems of Equations Algebra II M1 Lesson 32: Graphing Systems of Equations
	AR.Math.Content.HSA.REI.C.7 Solve *systems of equations* consisting of linear equations and nonlinear equations in two variables algebraically and graphically	Algebra II M1 Lesson 31: Systems of Equations Algebra II M1 Lesson 32: Graphing Systems of Equations

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	AR.Math.Content.HSA.REI.C.8 Represent a system of linear equations as a single matrix equation in a vector variable	Precalculus and Advanced Topics M2 Topic C: Systems of Linear Equations
	AR.Math.Content.HSA.REI.C.9 Find the inverse of a *matrix* (*matrix inverse*) if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater)	Precalculus and Advanced Topics M2 Topic C: Systems of Linear Equations
	Cluster: Solve systems of equations	
	AR.Math.Content.HSA.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 by: ▪ Using technology to graph the functions ▪ Making tables of values ▪ Finding successive approximations Include cases (but not limited to) where $f(x)$ and/or $g(x)$ are: ▪ *Linear* ▪ *Polynomial* ▪ *Rational* ▪ *Exponential* ▪ *Logarithmic functions*	Algebra I M3 Lesson 16: Graphs Can Solve Equations Too Algebra II M1 Lesson 36: Overcoming a Third Obstacle to Factoring—What If There Are No Real Number Solutions? Algebra II M3 Lesson 24: Solving Exponential Equations

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	AR.Math.Content.HSA.REI.D.12 Solve linear inequalities and systems of linear inequalities in two variables by graphing	Algebra I M1 Lesson 21: Solution Sets to Inequalities with Two Variables Algebra I M1 Lesson 22: Solution Sets to Simultaneous Equations Algebra I M1 Lesson 24: Applications of Systems of Equations and Inequalities
Interpreting Functions	**Cluster: Understand the concept of a function and use function notation**	
	AR.Math.Content.HSF.IF.A.3 Recognize that sequences are functions, sometimes defined *recursively*, whose domain is a subset of the integers.	Algebra I M3 Lesson 2: Recursive Formulas for Sequences Algebra I M3 Lesson 3: Arithmetic and Geometric Sequences Algebra I M3 Lesson 4: Why Do Banks Pay YOU to Provide Their Services? Algebra II M3 Lesson 26: Percent Rate of Change

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	Cluster: Interpret functions that arise in applications in terms of the context	
	AR.Math.Content.HSF.IF.B.4 For a function that models 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	Algebra II M1 Lessons 16–17: Modeling with Polynomials—An Introduction Algebra II M2 Lesson 12: Ferris Wheels—Using Trigonometric Functions to Model Cyclical Behavior Algebra II M2 Lesson 13: Tides, Sound Waves, and Stock Markets Algebra II M3 Lesson 18: Graphs of Exponential Functions and Logarithmic Functions Algebra II M3 Lesson 20: Transformations of the Graphs of Logarithmic and Exponential Functions Algebra II M3 Lesson 21: The Graph of the Natural Logarithm Function
	AR.Math.Content.HSF.IF.B.6 ▪ Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval ▪ Estimate the rate of change from a graph	Algebra II M3 Lesson 6: Euler's Number, *e* Algebra II M3 Lesson 27: Modeling with Exponential Functions

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	Cluster: Analyze functions using different representations	
	AR.Math.Content.HSF.IF.C.7 Graph functions expressed algebraically and show key features of the graph, with and without technology: ▪ Graph *polynomial functions*, identifying *zeros* when suitable factorizations are available, and showing *end behavior* ▪ Graph *rational functions,* identifying *zeros* and *asymptotes* when suitable factorizations are available, and showing *end behavior* ▪ Graph *exponential* and *logarithmic functions*, showing intercepts and *end behavior* ▪ Graph *trigonometric functions*, showing *period*, *midline*, and *amplitude*	Algebra II M1 Lesson 14: Graphing Factored Polynomials Algebra II M1 Lesson 15: Structure in Graphs of Polynomial Functions Algebra II M1 Lesson 16: Modeling with Polynomials—An Introduction Algebra II M2 Lesson 8: Graphing the Sine and Cosine Functions Algebra II M2 Lesson 11: Transforming the Graph of the Sine Function Algebra II M2 Lesson 12: Ferris Wheels—Using Trigonometric Functions to Model Cyclical Behavior Algebra II M3 Lesson 16: Rational and Irrational Numbers Algebra II M3 Lesson 18: Graphs of Exponential Functions and Logarithmic Functions Algebra II M3 Lesson 20: Transformations of the Graphs of Logarithmic and Exponential Functions Algebra II M3 Lesson 33: The Million Dollar Problem Precalculus and Advanced Topics M3 Topic B: Rational Functions and Composition of Functions

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	AR.Math.Content.HSF.IF.C.8 Write expressions for functions in different but equivalent forms to reveal key features of the function ▪ Use the properties of exponents to interpret expressions for *exponential functions*	Algebra I M4 Lesson 9: Graphing Quadratic Functions from Factored Form, $f(x) = a(x - m)(x - n)$ Algebra I M4 Topic B: Using Different Forms for Quadratic Functions Algebra I M4 Lesson 21: Transformations of the Quadratic Parent Function, $f(x) = x^2$ Algebra I M4 Lesson 23: Modeling with Quadratic Functions Algebra II M3 Lesson 23: Bean Counting Algebra II M3 Lesson 27: Modeling with Exponential Functions Algebra II M3 Topic E: Geometric Series and Finance

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
Building Functions	**Cluster: Build a function that models a relationship between two quantities**	
	AR.Math.Content.HSF.BF.A.1 Write a function that describes a relationship between two quantities ▪ From a context, determine an explicit expression, a recursive process, or steps for calculation ▪ Combine standard function types using arithmetic operations (e.g., given that $f(x)$ and $g(x)$ are functions developed from a context, find $(f + g)(x)$, $(f – g)(x)$, $(fg)(x)$, $(f/g)(x)$, and any combination thereof, given $g(x) \neq 0$.) ▪ Compose functions	Algebra I M3: Linear and Exponential Functions Algebra I M5: A Synthesis of Modeling with Equations and Functions Algebra II M2 Lesson 12: Ferris Wheels—Using Trigonometric Functions to Model Cyclical Behavior Algebra II M3 Lesson 28: Newton's Law of Cooling, Revisited Algebra II M3 Lesson 30: Buying a Car Algebra II M3 Lesson 33: The Million Dollar Problem Precalculus and Advanced Topics M3 Lesson 16: Function Composition Precalculus and Advanced Topics M3 Lesson 17: Solving Problems by Function Composition
	AR.Math.Content.HSF.BF.A.2 ▪ Write *arithmetic* and *geometric sequences* both *recursively* and with an explicit formula, and translate between the two forms ▪ Use *arithmetic* and *geometric sequences* to model situations	Algebra I M3 Topic A: Linear and Exponential Sequences Algebra II M3 Lesson 25: Geometric Sequences and Exponential Growth and Decay Algebra II M3 Lesson 26: Percent Rate of Change Algebra II M3 Lesson 29: The Mathematics Behind a Structured Savings Plan

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	Cluster: Build new functions from existing functions	
	AR.Math.Content.HSF.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 (k, a constant both positive and negative); ▪ Find the value of k given the graphs of the transformed functions ▪ Experiment with multiple transformations and illustrate an explanation of the effects on the graph with or without technology	Algebra II M2 Lesson 11: Transforming the Graph of the Sine Function Algebra II M2 Lesson 12: Ferris Wheels—Using Trigonometric Functions to Model Cyclical Behavior Algebra II M3 Lesson 20: Transformations of the Graphs of Logarithmic and Exponential Functions
	AR.Math.Content.HSF.BF.B.4 Find inverse functions. ▪ Solve an equation of the form $y = f(x)$ for a simple function f that has an *inverse* and write an expression for the *inverse* ▪ Verify by *composition* that one function is the *inverse* of another ▪ Read values of an inverse function from a graph or a table, given that the function has an *inverse* ▪ Produce an invertible function from a non-invertible function by restricting the domain	Algebra II M3 Lesson 7: Bacteria and Exponential Growth Algebra II M3 Lesson 8: The "What Power" Function Algebra II M3 Lesson 19: The Inverse Relationship Between Logarithmic and Exponential Functions Algebra II M3 Lesson 24: Solving Exponential Equations Precalculus and Advanced Topics M3 Topic C: Inverse Functions

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
	AR.Math.Content.HSF.BF.B.5 ▪ Relate the domain of a function to its graph ▪ Relate the domain of a function to the quantitative relationship it describes	Precalculus and Advanced Topics M3 Topic C: Inverse Functions
Linear, Quadratic, and Exponential Models	**Cluster: Construct and compare linear, quadratic, and exponential models and solve problems**	
	AR.Math.Content.HSF.LE.A.2 Construct linear and exponential equations, 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: Linear and Exponential Functions Algebra I M5: A Synthesis of Modeling with Equations and Functions Algebra II M3 Lesson 1: Integer Exponents Algebra II M3 Lesson 6: Euler's Number, *e* Algebra II M3 Lesson 22: Choosing a Model
	AR.Math.Content.HSF.LE.A.4 ▪ Express exponential models as logarithms ▪ Express logarithmic models as exponentials ▪ Use properties of logarithms to simplify and evaluate logarithmic expressions (expanding and/or condensing logarithms as appropriate) ▪ Evaluate logarithms with or without technology	Algebra II M3 Topic B: Logarithms Algebra II M3 Lesson 19: The Inverse Relationship Between Logarithmic and Exponential Functions Algebra II M3 Topic D: Using Logarithms in Modeling Situations

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
Expressing Geometric Properties with Equations	**Cluster: Translate between the geometric description and the equation of a conic section**	
	AR.Math.Content.HSG.GPE.A.2 Derive the equation of a parabola given a focus and directrix	Algebra II M1 Lesson 33: The Definition of a Parabola Algebra II M1 Lesson 34: Are All Parabolas Congruent? Algebra II M1 Lesson 35: Are All Parabolas Similar?
Interpreting Categorical and Quantitative Data	**Cluster: Summarize, represent, and interpret data on a single count or measurement variable**	
	AR.Math.Content.HSS.ID.A.4 ▪ Use the mean and *standard deviation* of a data set to fit it to a normal distribution and to estimate population percentages ▪ Recognize that there are data sets for which such a procedure is not appropriate ▪ Use calculators and/or spreadsheets to estimate areas under the normal curve	Algebra II M4 Topic B: Modeling Data Distributions
	Cluster: Make inferences and justify conclusions from sample surveys, experiments, and observational studies	
	AR.Math.Content.HSS.ID.B.6 Represent data on two *quantitative variables* on a scatter plot, and describe how the variables are related ▪ Fit a function to the data; use functions fitted to data to solve problems in the context of the data	Algebra II M2 Lesson 13: Tides, Sound Waves, and Stock Markets Algebra II M3 Lesson 23: Bean Counting Algebra II M3 Lesson 27: Modeling with Exponential Functions

Domain	Standards for Mathematical Content	Aligned Components of *Eureka Math*
Making Inferences and Justifying Conclusions	**Cluster: Understand and evaluate random processes underlying statistical experiments**	
	AR.Math.Content.HSS.IC.A.1 Recognize statistics as a process for making inferences about population parameters based on a random sample from that population	Algebra II M4 Topic C: Drawing Conclusions Using Data from a Sample
	AR.Math.Content.HSS.IC.A.2 Compare *theoretical* and *empirical probabilities* using simulations (e.g., such as flipping a coin, rolling a number cube, spinning a spinner, and technology)	Algebra II M4 Lesson 1: Chance Experiments, Sample Spaces, and Events Note: Consider supplementing with additional opportunities to carry out simulations of events (using objects like coins or dice or random number generators) and comparing the results to theoretical probabilities.
	Cluster: Make inferences and justify conclusions from sample surveys, experiments, and observational studies	
	AR.Math.Content.HSS.IC.B.3 ▪ Recognize the purposes of and differences among sample surveys, experiments, and observational studies ▪ Explain how randomization relates to sample surveys, experiments, and observational studies	Algebra II M4 Lesson 12: Types of Statistical Studies Algebra II M4 Topic D: Drawing Conclusions Using Data from an Experiment

Domain	Standards for Mathematical Content		Aligned Components of *Eureka Math*
	AR.Math.Content.HSS.IC.B.6 Read and explain, in context, the validity of data from outside reports by ▪ Identifying the variables as *quantitative* or *categorical*. ▪ Describing how the data was collected. ▪ Indicating any potential biases or flaws. ▪ Identifying inferences the author of the report made from sample data		Algebra II M4 Lesson 22: Evaluating Reports Based on Data from a Sample Algebra II M4 Topic D: Drawing Conclusions Using Data from an Experiment