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

Many of the Algebra II Mathematics Standards of Learning for Virginia Public Schools will require the use of *Eureka Math* content from other grade levels or courses, or 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 Algebra II Mathematics Standards of Learning for Virginia Public Schools while still benefiting from the coherence and rigor of *Eureka Math*.

INDICATORS

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

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

Red indicates that the Virginia 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 Virginia standards and in *Eureka Math*.

Mathematical Process Goals	Aligned Components of *Eureka Math*
Mathematical Problem Solving Students will apply mathematical concepts and skills and the relationships among them to solve problem situations of varying complexities. Students also will recognize and create problems from real-world data and situations within and outside mathematics and then apply appropriate strategies to determine acceptable solutions. To accomplish this goal, students will need to develop a repertoire of skills and strategies for solving a variety of problem types. A major goal of the mathematics program is to help students apply mathematics concepts and skills to become mathematical problem solvers.	This process goal is analogous to the CCSSM Standards for Mathematical Practice 1 and 2, which are specifically addressed in the following modules: Algebra II M1: Polynomial, Rational, and Radical Relationships Algebra II M2: Trigonometric Functions Algebra II M3: Exponential and Logarithmic Functions Algebra II M4: Inferences and Conclusions from Data
Mathematical Communication Students will communicate thinking and reasoning using the language of mathematics, including specialized vocabulary and symbolic notation, to express mathematical ideas with precision. Representing, discussing, justifying, conjecturing, reading, writing, presenting, and listening to mathematics will help students to clarify their thinking and deepen their understanding of the mathematics being studied. Mathematical communication becomes visible where learning involves participation in mathematical discussions.	This process goal is analogous to the CCSSM Standards for Mathematical Practice 3 and 6, which are specifically addressed in the following modules: Algebra II M1: Polynomial, Rational, and Radical Relationships Algebra II M2: Trigonometric Functions Algebra II M3: Exponential and Logarithmic Functions Algebra II M4: Inferences and Conclusions from Data

Mathematical Process Goals	Aligned Components of *Eureka Math*
Mathematical Reasoning Students will recognize reasoning and proof as fundamental aspects of mathematics. Students will learn and apply inductive and deductive reasoning skills to make, test, and evaluate mathematical statements and to justify steps in mathematical procedures. Students will use logical reasoning to analyze an argument and to determine whether conclusions are valid. In addition, students will use number sense to apply proportional and spatial reasoning and to reason from a variety of representations.	This process goal is analogous to the CCSSM Standards for Mathematical Practice 2 and 8, which are specifically addressed in the following modules: Algebra II M1: Polynomial, Rational, and Radical Relationships Algebra II M2: Trigonometric Functions Algebra II M3: Exponential and Logarithmic Functions Algebra II M4: Inferences and Conclusions from Data
Mathematical Connections Students will build upon prior knowledge to relate concepts and procedures from different topics within mathematics and see mathematics as an integrated field of study. Through the practical application of content and process skills, students will make connections among different areas of mathematics and between mathematics and other disciplines, and to real-world contexts. Science and mathematics teachers and curriculum writers are encouraged to develop mathematics and science curricula that support, apply, and reinforce each other.	This process goal is analogous to the CCSSM Standards for Mathematical Practice 4 and 5, which are specifically addressed in the following modules: Algebra II M1: Polynomial, Rational, and Radical Relationships Algebra II M2: Trigonometric Functions Algebra II M3: Exponential and Logarithmic Functions Algebra II M4: Inferences and Conclusions from Data

Mathematical Process Goals	Aligned Components of *Eureka Math*
Mathematical Representations Students will represent and describe mathematical ideas, generalizations, and relationships using a variety of methods. Students will understand that representations of mathematical ideas are an essential part of learning, doing, and communicating mathematics. Students should make connections among different representations—physical, visual, symbolic, verbal, and contextual—and recognize that representation is both a process and a product.	This process goal is analogous to the CCSSM Standards for Mathematical Practice 4, which is specifically addressed in the following modules: Algebra II M1: Polynomial, Rational, and Radical Relationships Algebra II M2: Trigonometric Functions Algebra II M3: Exponential and Logarithmic Functions Algebra II M4: Inferences and Conclusions from Data

Domain	Mathematical Content Standards		Aligned Components of *Eureka Math*
Expressions and Operations	**AII.1** The student will		
	a. add, subtract, multiply, divide, and simplify rational algebraic expressions;		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
	b. add, subtract, multiply, divide, and simplify radical expressions containing rational numbers and variables, and expressions containing rational exponents; and		Geometry M2 Topic D: Applying Similarity to Right Triangles Algebra II M1 Lesson 9: Radicals and Conjugates Algebra II M1 Lesson 28: A Focus on Square Roots Algebra II M1 Lesson 29: Solving Radical Equations Algebra II M3 Topic A: Real Numbers
	c. factor polynomials completely in one or two variables.		Algebra II M1 Lesson 8: The Power of Algebra—Finding Primes Algebra II M1 Lesson 11: The Special Role of Zero in Factoring Algebra II M1 Topic B: Factoring—Its Use and Its Obstacles
	AII.2 The student will perform operations on complex numbers and express the results in simplest form using patterns of the powers of *i*.		Algebra II M1 Topic D: A Surprise from Geometry—Complex Numbers Overcome All Obstacles

Domain	Mathematical Content Standards		Aligned Components of *Eureka Math*
Equations and Inequalities	**AII.3** The student will solve		
	a. absolute value equations and inequalities;		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 Graphs of Functions Note: Supplemental material may be necessary to completely address solving absolute value equations and inequalities.
	b. quadratic equations over the set of complex numbers;		Algebra II M1 Lesson 38: Complex Numbers as Solutions to Equations Algebra II M1 Lesson 39: Factoring Extended to the Complex Realm
	c. equations containing rational algebraic expressions; and		Algebra II M1 Lesson 26: Solving Rational Equations Algebra II M1 Lesson 27: Word Problems Leading to Rational Equations Precalculus and Advanced Topics M3 Topic B: Rational Functions and Composition of Functions
	d. equations containing radical expressions.		Algebra I M5: A Synthesis of Modeling with Equations and Functions Algebra II M1 Lesson 28: A Focus on Square Roots Algebra II M1 Lesson 29: Solving Radical Equations

Domain	Mathematical Content Standards		Aligned Components of *Eureka Math*
	AII.4 The student will solve systems of linear-quadratic and quadratic-quadratic equations, algebraically and graphically.		Algebra II M1 Lesson 31: Systems of Equations Algebra II M1 Lesson 32: Graphing Systems of Equations
Functions	**AII.5** The student will investigate and apply the properties of arithmetic and geometric sequences and series to solve practical problems, including writing the first n terms, determining the nth term, and evaluating summation formulas. Notation will include $\sum$ and a_n.		Algebra I M3 Lesson 3: Arithmetic and Geometric Sequences Algebra II M3 Topic E: Geometric Series and Finance
	AII.6 For absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic functions, the student will		
	a. recognize the general shape of function families; and		Algebra I M3 Topic C: Transformations of Functions Algebra I M4 Topic C: Function Transformations and Modeling Algebra II M1 Lessons 14: Graphing Factored Polynomials Algebra II M1 Lesson 15: Structure in Graphs of Polynomial Functions Precalculus and Advanced Topics M3 Topic B: Rational Functions and Composition of Functions

Domain	Mathematical Content Standards	Aligned Components of *Eureka Math*
	b. use knowledge of transformations to convert between equations and the corresponding graphs of functions.	Algebra I M3 Topic C: Transformations of Functions Algebra I M4 Topic C: Function Transformations and Modeling Algebra II M1 Lessons 14: Graphing Factored Polynomials Algebra II M1 Lesson 15: Structure in Graphs of Polynomial Functions Precalculus and Advanced Topics M3 Topic B: Rational Functions and Composition of Functions

Domain	Mathematical Content Standards		Aligned Components of *Eureka Math*
	AII.7 The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include		
	a. domain, range, and continuity;		Algebra I M3 Lesson 9: Representing, Naming, and Evaluating Functions Algebra I M3 Lesson 11: The Graph of a Function Algebra II M1 Lessons 16–17: Modeling with Polynomials—An Introduction Algebra II M3 Lesson 17: Graphing the Logarithm Function Algebra II M3 Lesson 20: Transformations of the Graphs of Logarithmic and Exponential Functions Algebra II M3 Lesson 22: Choosing a Model Precalculus and Advanced Topics M3 Topic B: Rational Functions and Composition of Functions

Domain	Mathematical Content Standards	Aligned Components of *Eureka Math*
	b. intervals in which a function is increasing or decreasing;	Algebra II M1 Lesson 15: Structure in Graphs of Polynomial Functions Algebra II M3 Lesson 18: Graphs of Exponential Functions and Logarithmic Functions Algebra II M3 Lesson 21: The Graph of the Natural Logarithm Function Algebra II M3 Lesson 22: Choosing a Model Algebra II M3 Topic D: Using Logarithms in Modeling Situations Precalculus and Advanced Topics M3 Topic B: Rational Functions and Composition of Functions
	c. extrema;	Algebra II M1 Lessons 14: Graphing Factored Polynomials Algebra II M1 Lesson 15: Structure in Graphs of Polynomial Functions Precalculus and Advanced Topics M3 Topic B: Rational Functions and Composition of Functions

Domain	Mathematical Content Standards	Aligned Components of *Eureka Math*
	d. zeros;	Algebra II M1 Lesson 11: The Special Role of Zero in Factoring Algebra II M1 Lesson 12: Overcoming Obstacles in Factoring 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
	e. intercepts;	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 M3 Lesson 7: Bacteria and Exponential Growth Algebra II M3 Topic C: Exponential and Logarithmic Functions and their Graphs Algebra II M3 Topic D: Using Logarithms in Modeling Situations Precalculus and Advanced Topics M3 Lesson 14: Graphing Rational Functions Precalculus and Advanced Topics M3 Lesson 15: Transforming Rational Functions

Domain	Mathematical Content Standards	Aligned Components of *Eureka Math*
	f. values of a function for elements in its domain;	Algebra II M1 Lessons 14: Graphing Factored Polynomials Algebra II M1 Lesson 15: Structure in Graphs of Polynomial Functions Precalculus and Advanced Topics M3 Topic B: Rational Functions and Composition of Functions
	g. connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs;	Algebra II M1 Lessons 14: Graphing Factored Polynomials Algebra II M1 Lesson 15: Structure in Graphs of Polynomial Functions Precalculus and Advanced Topics M3 Topic B: Rational Functions and Composition of Functions
	h. end behavior;	Algebra II M1 Lesson 15: Structure in Graphs of Polynomial Functions Algebra II M3 Lesson 17: Graphing the Logarithm Function Algebra II M3 Lesson 20: Transformations of the Graphs of Logarithmic and Exponential Functions Algebra II M3 Lesson 22: Choosing a Model Precalculus and Advanced Topics M3 Topic B: Rational Functions and Composition of Functions

Domain	Mathematical Content Standards	Aligned Components of *Eureka Math*
	i. vertical and horizontal asymptotes;	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 Precalculus and Advanced Topics M3 Topic B: Rational Functions and Composition of Functions
	j. inverse of a function; and	Algebra II M3 Lesson 7: Bacteria and Exponential Growth Algebra II M3 Lesson 8: The "WhatPower" 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
	k. composition of functions algebraically and graphically.	Precalculus and Advanced Topics M3 Topic C: Inverse Functions
	AII.8 The student will investigate and describe the relationships among solutions of an equation, zeros of a function, *x*-intercepts of a graph, and factors of a polynomial expression.	Algebra II M1 Lesson 11: The Special Role of Zero in Factoring Algebra II M1 Lesson 12: Overcoming Obstacles in Factoring Algebra II M1 Lesson 13: Mastering Factoring Algebra II M1 Lesson 14: Graphing Factored Polynomials

Domain	Mathematical Content Standards		Aligned Components of *Eureka Math*
Statistics	**AII.9** The student will collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve practical problems, using mathematical models of quadratic and exponential functions.		Algebra II M1 Topic B: Factoring—Its Use and Its Obstacles Algebra II M3 Topic D: Using Logarithms in Modeling Situations Algebra II M3 Lesson 33: The Million Dollar Problem
	AII.10 The student will represent and solve problems, including practical problems, involving inverse variation, joint variation, and a combination of direct and inverse variations.		G8 M4: Linear Equations Algebra II M3 Topic D: Using Logarithms in Modeling Situations Note: Supplemental material may be necessary to completely address this standard.
	AII.11 The student will		
	a. identify and describe properties of a normal distribution;		Algebra II M4: Inferences and Conclusions from Data
	b. interpret and compare z-scores for normally distributed data; and		Algebra II M4: Inferences and Conclusions from Data
	c. apply properties of normal distributions to determine probabilities associated with areas under the standard normal curve.		Algebra II M4: Inferences and Conclusions from Data
	AII.12 The student will compute and distinguish between permutations and combinations.		Precalculus and Advanced Topics M5 Topic A: Probability