Geometry | Georgia's K–12 Mathematics Standards Correlation to *Eureka Math*®

About *Eureka Math*

Created by Great Minds®, a mission-driven Public Benefit Corporation, *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

Great Minds offers detailed analyses that demonstrate how each grade of *Eureka Math* aligns with specific state standards. Access these free alignment studies at greatminds.org/state-studies.

Data

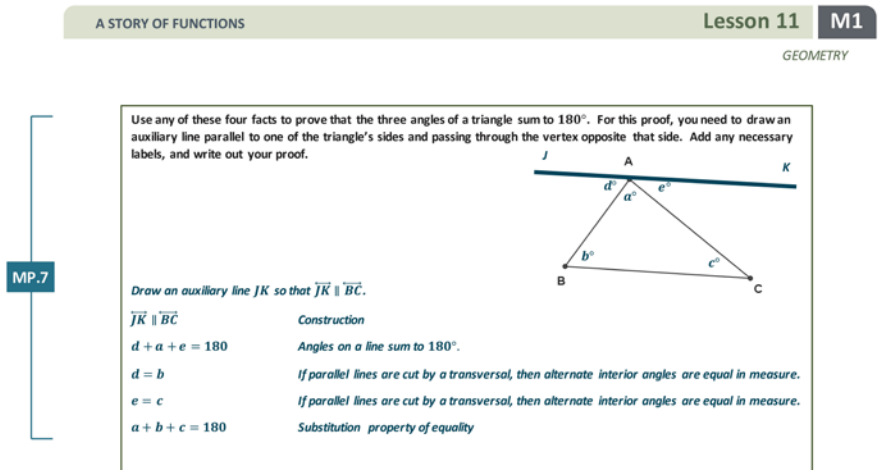
Schools and districts nationwide are experiencing student growth and impressive test scores after using *Eureka Math*. See their stories and data at greatminds.org/data.

Full Suite of Resources

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

Standards for Mathematical Practice	Aligned Components of *Eureka Math*
MP.1 Make sense of problems and persevere in solving them.	Lessons in every module engage students in mathematical practices. These are designated in the Module Overview and labeled in lessons. For example: 
MP.2 Reason abstractly and quantitatively.	
MP.3 Construct viable arguments and critique the reasoning of others.	
MP.4 Model with mathematics.	
MP.5 Use appropriate tools strategically.	
MP.6 Attend to precision.	
MP.7 Look for and make use of structure.	
MP.8 Look for and express regularity in repeated reasoning.	

Mathematical Modeling Framework	Aligned Components of *Eureka Math*
MF.1 Explore and describe real-life, mathematical situations or problems.	Lessons in every module engage students in mathematical modeling.
MF.2 Gather information, make assumptions, and define variables related to the problem.	
MF.3 Create a model and arrive at a solution to explain the problem presented.	
MF.4 Analyze and revise models, as necessary.	
MF.5 Evaluate the model and interpret solutions generated from other models. Draw and validate conclusions.	

Framework for Statistical Reasoning	Aligned Components of *Eureka Math*
SR.I **Formulate Statistical Investigative Questions** Ask questions that anticipate variability.	*Supplemental material is necessary to fully address the Framework for Statistical Reasoning.*
SR.II **Collect & Consider the Data** Ensure that data collection designs acknowledge variability.	
SR.III **Analyze the Data** Make sense of data and communicate what the data mean using pictures (graphs) and words. Give an accounting of variability, as appropriate.	
SR.IV **Interpret the Results** Answer statistical investigative questions based on the collected data.	

Patterning & Algebraic Reasoning—polynomial expressions

G.PAR.2 Interpret the structure of and perform operations with polynomials within a geometric framework.

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.PAR.2.1 Interpret polynomial expressions of varying degrees that represent a quantity in terms of its given geometric framework.	Algebra I M1 Lesson 26: Recursive Challenge Problem—The Double and Add 5 Game Algebra I M1 Lesson 27: Recursive Challenge Problem—The Double and Add 5 Game Algebra I M4 Lesson 1: Multiplying and Factoring Polynomial Expressions Algebra I M4 Lesson 2: Multiplying and Factoring Polynomial Expressions Algebra I M4 Lesson 3: Advanced Factoring Strategies for Quadratic Expressions Algebra I M4 Lesson 4: Advanced Factoring Strategies for Quadratic Expressions Algebra I M4 Lesson 12: Completing the Square Algebra I M4 Lesson 17: Graphing Quadratic Functions from the Standard Form, $f(x) = ax^2 + bx + c$
G.PAR.2.2 Perform operations with polynomials and prove that polynomials form a system analogous to the integers in that they are closed under these operations.	Algebra I M1 Lesson 8: Adding and Subtracting Polynomials Algebra I M1 Lesson 9: Multiplying Polynomials Algebra I M4 Lesson 1: Multiplying and Factoring Polynomial Expressions Algebra I M4 Lesson 2: Multiplying and Factoring Polynomial Expressions Algebra I M4 Lesson 3: Advanced Factoring Strategies for Quadratic Expressions Algebra I M4 Lesson 4: Advanced Factoring Strategies for Quadratic Expressions
G.PAR.2.3 Using algebraic reasoning, add, subtract, and multiply single variable polynomials.	Algebra I M1 Lesson 8: Adding and Subtracting Polynomials Algebra I M1 Lesson 9: Multiplying Polynomials Algebra I M4 Lesson 1: Multiplying and Factoring Polynomial Expressions Algebra I M4 Lesson 2: Multiplying and Factoring Polynomial Expressions

Geometric & Spatial Reasoning—congruence

G.GSR.3 Experiment with transformations in the plane to develop precise definitions for translations, rotations, and reflections and use these to describe symmetries and congruence to model and explain real-life phenomena.

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.GSR.3.1 Use geometric reasoning and symmetries of regular polygons to develop definitions of rotations, reflections, and translations.	Geometry M1 Lesson 12: Transformations—The Next Level Geometry M1 Lesson 13: Rotations Geometry M1 Lesson 14: Reflections Geometry M1 Lesson 15: Rotations, Reflections, and Symmetry Geometry M1 Lesson 16: Translations
G.GSR.3.2 Verify experimentally the congruence properties of rotations, reflections, and translations: lines are taken to lines and line segments to line segments of the same length; angles are taken to angles of the same measure; parallel lines are taken to parallel lines.	Geometry M1 Lesson 12: Transformations—The Next Level Geometry M1 Lesson 13: Rotations Geometry M1 Lesson 14: Reflections Geometry M1 Lesson 15: Rotations, Reflections, and Symmetry Geometry M1 Lesson 16: Translations Geometry M1 Lesson 20: Applications of Congruence in Terms of Rigid Motions
G.GSR.3.3 Use geometric descriptions of rigid motions to draw the transformed figures and to predict the effect on a given figure. Describe a sequence of transformations from one figure to another and use transformation properties to determine congruence.	Geometry M1 Topic C: Transformations/Rigid Motions

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.GSR.3.4 Explain how the criteria for triangle congruence follow from the definition of congruence in terms of rigid motions. Use congruency criteria for triangles to solve problems and to prove relationships in geometric figures.	Geometry M1 Lesson 22: Congruence Criteria for Triangles—SAS Geometry M1 Lesson 24: Congruence Criteria for Triangles—ASA and SSS Geometry M1 Lesson 25: Congruence Criteria for Triangles—AAS and HL Geometry M1 Lesson 34: Review of the Assumptions

Geometric & Spatial Reasoning—geometric foundations, constructions, and proof

G.GSR.4 Establish facts between angle relations and generate valid arguments to defend facts established. Prove theorems and solve geometric problems involving lines and angles to model and explain real-life phenomena.

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.GSR.4.1 Use the undefined notions of point, line, line segment, plane, distance along a line segment, and distance around a circular arc to develop and use precise definitions and symbolic notations to prove theorems and solve geometric problems.	Geometry M1 Topic B: Unknown Angles Geometry M1 Lesson 18: Looking More Carefully at Parallel Lines Geometry M1 Lesson 33: Review of the Assumptions Geometry M4 Lesson 12: Dividing Segments Proportionally Geometry M5 Lesson 9: Arc Length and Areas of Sectors Geometry M5 Lesson 10: Unknown Length and Area Problems
G.GSR.4.2 Classify quadrilaterals in the coordinate plane by proving simple geometric theorems algebraically.	Geometry M1 Lesson 28: Properties of Parallelograms Geometry M4 Lesson 13: Analytic Proofs of Theorems Previously Proved by Synthetic Means *Supplemental material is necessary to fully address this standard.*

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.GSR.4.3 Make formal geometric constructions with a variety of tools and methods.	Geometry M1 Topic A: Basic Constructions Geometry M1 Lesson 13: Rotations Geometry M1 Lesson 14: Reflections Geometry M1 Lesson 16: Translations Geometry M1 Lesson 17: Characterize Points on a Perpendicular Bisector Geometry M1 Lesson 18: Looking More Carefully at Parallel Lines
G.GSR.4.4 Prove and apply theorems about lines and angles to solve problems.	Geometry M1 Topic B: Unknown Angles Geometry M1 Lesson 18: Looking More Carefully at Parallel Lines Geometry M1 Lesson 33: Review of the Assumptions Geometry M2 Lesson 18: Similarity and the Angle Bisector Theorem Geometry M4 Lesson 5: Criterion for Perpendicularity Geometry M4 Lesson 8: Parallel and Perpendicular Lines
G.GSR.4.5 Use geometric reasoning 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.	G8 M2 Lesson 12: Angles Associated with Parallel Lines G8 M2 Lesson 13: Angle Sum of a Triangle G8 M2 Lesson 14: More on the Angles of a Triangle Geometry M1 Lesson 9: Unknown Angle Proofs—Writing Proofs

Geometric & Spatial Reasoning—similarity

G.GSR.5 Describe dilations in terms of center and scale factor and use these terms to describe properties of dilations; use the precise definition of a dilation to describe similarity and establish the criterion for triangles to be similar; use these terms, definitions, and criterion to prove similarity, model, and explain real-life phenomena.

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.GSR.5.1 Verify experimentally the properties of dilations.	Geometry M2 Topic B: Dilations
G.GSR.5.2 Given two figures, use and apply the definition of similarity in terms of similarity transformations.	Geometry M2 Lesson 12: What Are Similarity Transformations, and Why Do We Need Them? Geometry M2 Lesson 13: Properties of Similarity Transformations Geometry M2 Lesson 14: Similarity
G.GSR.5.3 Use the properties of similarity transformations to establish criterion for two triangles to be similar. Use similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	Geometry M2 Lesson 15: The Angle-Angle (AA) Criterion for Two Triangles to Be Similar Geometry M2 Lesson 17: The Side-Angle-Side (SAS) and Side-Side-Side (SSS) Criteria for Two Triangles to Be Similar
G.GSR.5.4 Construct formal proofs to justify and apply theorems about triangles.	Geometry M1 Lesson 23: Base Angles of Isosceles Triangles Geometry M1 Lesson 29: Special Lines in Triangles Geometry M1 Lesson 30: Special Lines in Triangles Geometry M2 Lesson 4: Comparing the Ratio Method with the Parallel Method Geometry M2 Leeson 5: Scale Factors Geometry M2 Lesson 24: Prove the Pythagorean Theorem Using Similarity

Geometric & Spatial Reasoning—right triangle trigonometry

G.GSR.6 Examine side ratios of similar triangles; use the relationship between right triangles to develop an understanding of sine, cosine, and tangent to solve mathematically applicable geometric problems and to model and explain real-life phenomena.

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.GSR.6.1 Explain that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	Geometry M2 Lesson 25: Incredibly Useful Ratios Geometry M2 Lesson 26: The Definition of Sine, Cosine, and Tangent
G.GSR.6.2 Explain and use the relationship between the sine and cosine of complementary angles.	Geometry M2 Lesson 27: Sine and Cosine of Complementary Angles and Special Angles
G.GSR.6.3 Use trigonometric ratios and the Pythagorean Theorem to solve for sides and angles of right triangles in applied problems.	Geometry M2 Lesson 28: Solving Problems Using Sine and Cosine Geometry M2 Lesson 29: Applying Tangents Geometry M2 Lesson 31: Using Trigonometry to Determine Area Geometry M2 Lesson 32: Using Trigonometry to Find Side Lengths of an Acute Triangle

Geometric & Spatial Reasoning—trigonometry and the unit circle

G.GSR.7 Explore the concept of a radian measure and special right triangles.

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.GSR.7.1 Explore and interpret a radian as the ratio of the arc length to the radius of a circle.	Algebra II M2 Lesson 9: Awkward! Who Chose the Number 360, Anyway?
G.GSR.7.2 Explore and explain the relationship between radian measures and degree measures and convert fluently between degree and radian measures.	Algebra II M2 Lesson 9: Awkward! Who Chose the Number 360, Anyway?
G.GSR.7.3 Use special right triangles on the unit circle to determine the values of sine, cosine, and tangent for $30° \left(\frac{\pi}{6}\right)$, $45° \left(\frac{\pi}{4}\right)$ and $60° \left(\frac{\pi}{3}\right)$ angle measures. Use reflections of triangles to determine reference angles and identify coordinate values in all four quadrants of the coordinate plane.	Algebra II M2 Lesson 4: From Circle-ometry to Trigonometry Algebra II M2 Lesson 5: Extending the Domain of Sine and Cosine to All Real Numbers Algebra II M2 Lesson 6: Why Call It Tangent? Algebra II M2 Lesson 10: Basic Trigonometric Identities from Graphs Precalculus and Advanced Topics M4 Lesson 1: Special Triangles and the Unit Circle

Geometric & Spatial Reasoning—circles

G.GSR.8 Examine and apply theorems involving circles; describe and derive arc length and area of a sector; and model and explain real-life frameworks involving circles.

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.GSR.8.1 Identify and apply angle relationships formed by chords, tangents, secants and radii with circles.	Geometry M5 Lesson 1: Thales' Theorem Geometry M5 Lesson 2: Circles, Chords, Diameters, and Their Relationships Geometry M5 Lesson 3: Rectangles Inscribed in Circles Geometry M5 Lesson 8: Arcs and Chords Geometry M5 Topic C: Secants and Tangents
G.GSR.8.2 Using similarity, derive the fact that the length of the arc (arc length) intercepted by an angle is proportional to the radius; derive the formula for the area of a sector. Solve mathematically applicable problems involving applications of arc length and area of sector.	Geometry M5 Lesson 9: Arc Length and Areas of Sectors Geometry M5 Lesson 10: Unknown Length and Area Problems
G.GSR.8.3 Write and graph the equation of circles in standard form.	Geometry M5 Lesson 17: Writing the Equation for a Circle Geometry M5 Lesson 18: Recognizing Equations of Circles

Geometric & Spatial Reasoning—equations and measurement

G.GSR.9 Develop informal arguments for geometric formulas using dissection arguments, limit arguments, and Cavalieri's principle; solve mathematically applicable problems involving volume; explore and visualize relationships between two-dimensional and three-dimensional objects to model and explain real-life phenomena.

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.GSR.9.1 Use volume formulas for prisms, cylinders, pyramids, cones, and spheres to solve problems including right and oblique solids.	Geometry M3 Lesson 6: General Prisms and Cylinders and Their Cross-Sections Geometry M3 Lesson 8: Definition and Properties of Volume Geometry M3 Lesson 11: The Volume Formula of a Pyramid and Cone Geometry M3 Lesson 12: The Volume Formula of a Sphere Geometry M3 Lesson 13: How Do 3D Printers Work?
G.GSR.9.2 Use geometric shapes, their measures, and their properties to describe objects and approximate volumes.	Geometry M2 Lesson 19: Families of Parallel Lines and the Circumference of the Earth Geometry M2 Lesson 20: How Far Away Is the Moon? Geometry M3 Topic B: Volume
G.GSR.9.3 Apply concepts of density based on area and volume in modeling situations.	Geometry M3 Lesson 8: Definition and Properties of Volume Geometry M3 Lesson 11: The Volume Formula of a Pyramid and Cone

Probabilistic Reasoning—compound events and expected values

G.PR.10 Solve problems involving the probability of compound events to make informed decisions; interpret expected value and measures of variability to analyze probability distributions.

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.PR.10.1 Describe categories of events as subsets of a sample space using unions, intersections, or complements of other events. Apply the Addition Rule conceptually, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answers in context.	Algebra II M4 Lesson 1: Chance Experiments, Sample Spaces, and Events Algebra II M4 Lesson 5: Events and Venn Diagrams Algebra II M4 Lesson 6: Probability Rules Algebra II M4 Lesson 7: Probability Rules
G.PR.10.2 Apply and interpret the general Multiplication Rule conceptually to independent events of a sample space, $P(A \text{ and } B) = [P(A)] \times [P(B\|A)] = [P(B)] \times [P(A\|B)]$ using contingency tables or tree diagrams.	Precalculus and Advanced Topics M5 Lesson 1: The General Multiplication Rule Precalculus and Advanced Topics M5 Lesson 13: Games of Chance and Expected Value Precalculus and Advanced Topics M5 Lesson 14: Games of Chance and Expected Value Precalculus and Advanced Topics M5 Lesson 15: Using Expected Values to Compare Strategies Precalculus and Advanced Topics M5 Lesson 16: Making Fair Decisions Precalculus and Advanced Topics M5 Lesson 17: Fair Games
G.PR.10.3 Use conditional probability to interpret risk in terms of decision-making and investigate questions such as those involving false positives or false negatives from screening tests.	Precalculus and Advanced Topics M5 Lesson 16: Making Fair Decisions Precalculus and Advanced Topics M5 Lesson 17: Fair Games *Supplemental material is necessary to fully address this standard.*

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.PR.10.4 Define permutations and combinations and apply this understanding to compute probabilities of compound events and solve meaningful problems.	Precalculus and Advanced Topics M5 Lesson 2: Counting Rules—The Fundamental Counting Principle and Permutations Precalculus and Advanced Topics M5 Lesson 3: Counting Rules—Combinations Precalculus and Advanced Topics M5 Lesson 4: Using Permutations and Combinations to Compute Probabilities Precalculus and Advanced Topics M5 Lesson 18: Analyzing Decisions and Strategies Using Probability Precalculus and Advanced Topics M5 Lesson 19: Analyzing Decisions and Strategies Using Probability
G.PR.10.5 Interpret the probability distribution for a given random variable and interpret the expected value.	Precalculus and Advanced Topics M5 Lesson 5: Discrete Random Variables Precalculus and Advanced Topics M5 Lesson 6: Probability Distribution of a Discrete Random Variable Precalculus and Advanced Topics M5 Lesson 13: Games of Chance and Expected Value Precalculus and Advanced Topics M5 Lesson 14: Games of Chance and Expected Value Precalculus and Advanced Topics M5 Lesson 15: Using Expected Values to Compare Strategies
G.PR.10.6 Develop a probability distribution for variables of interest using theoretical and empirical (observed) probabilities and calculate and interpret the expected value.	Precalculus and Advanced Topics M5 Lesson 9: Determining Discrete Probability Distributions Precalculus and Advanced Topics M5 Lesson 10: Determining Discrete Probability Distributions Precalculus and Advanced Topics M5 Lesson 11: Estimating Probability Distributions Empirically Precalculus and Advanced Topics M5 Lesson 12: Estimating Probability Distributions Empirically Precalculus and Advanced Topics M5 Lesson 13: Games of Chance and Expected Value Precalculus and Advanced Topics M5 Lesson 14: Games of Chance and Expected Value Precalculus and Advanced Topics M5 Lesson 15: Using Expected Values to Compare Strategies

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.PR.10.7 Calculate the expected value of a random variable and interpret it as the mean of a given probability distribution.	Precalculus and Advanced Topics M5 Lesson 7: Expected Value of a Discrete Random Variable Precalculus and Advanced Topics M5 Lesson 8: Interpreting Expected Value Precalculus and Advanced Topics M5 Lesson 13: Games of Chance and Expected Value Precalculus and Advanced Topics M5 Lesson 14: Games of Chance and Expected Value Precalculus and Advanced Topics M5 Lesson 15: Using Expected Values to Compare Strategies
G.PR.10.8 Compare the payoff values associated with the probability distribution for a random variable and make informed decisions based on expected value and measures of variability.	Precalculus and Advanced Topics M5 Topic C: Using Probability to Make Decisions

Data & Statistical Reasoning; Probabilistic Reasoning—categorical data in two-way frequency tables; conditional probability

G.DSR.11 Examine real-life situations presented in a two-way frequency table to calculate probabilities, to model categorical data, and to explain real-life phenomena.

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.DSR.11.1 Construct and summarize categorical data for two categories in two-way frequency tables.	Algebra I M2 Topic C: Categorical Data on Two Variables

Georgia's K–12 Mathematics Standards	Aligned Components of *Eureka Math*
G.DSR.11.2 Use categorical data in two-way frequency tables to calculate and interpret probabilities based on the investigation.	Algebra I M2 Topic C: Categorical Data on Two Variables