Geometry | Arkansas 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

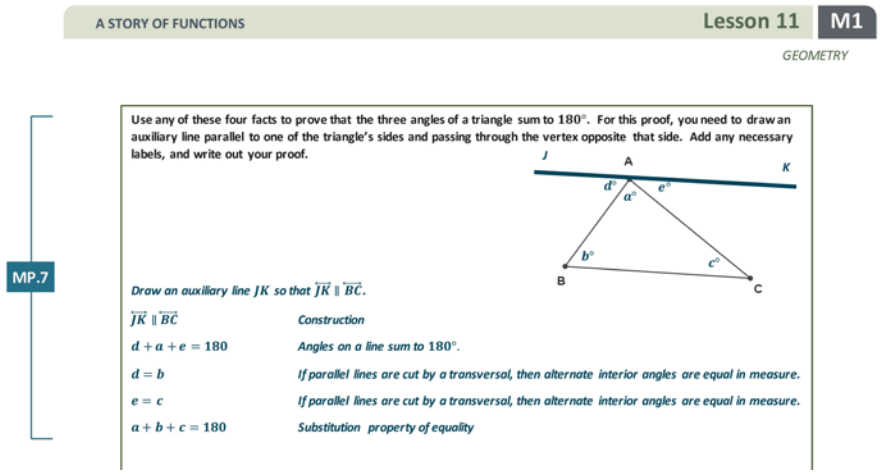
Schools and districts nationwide are experiencing student growth and impressive test scores after using *Eureka Math*. See their stories and data at greatminds.org/data.

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.	

Right Triangles

Special Right Triangles & Pythagorean Theorem

Students explore right triangles and apply the Pythagorean Theorem.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.RT.1 Apply the properties of special right triangles ($30°$-$60°$-$90°$ and $45°$-$45°$-$90°$) to solve real-world and mathematical problems.	Geometry M2 Lesson 27: Sine and Cosine of Complementary Angles and Special Angles
G.RT.2 Prove and apply the Pythagorean Theorem and its converse.	G8 M2 Lesson 15: Informal Proof of the Pythagorean Theorem G8 M3 Topic C: The Pythagorean Theorem G8 M7 Lesson 15: Pythagorean Theorem, Revisited G8 M7 Lesson 16: Converse of the Pythagorean Theorem Geometry M2 Lesson 24: Prove the Pythagorean Theorem Using Similarity

Right Triangles

Trigonometry Ratios

Students apply trigonometric ratios to solve problems.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.RT.3 Explain how the definitions for trigonometric ratios are developed by similarity and how the side ratios in right triangles are properties of the angles in the triangle.	Geometry M2 Lesson 25: Incredibly Useful Ratios Geometry M2 Lesson 26: The Definition of Sine, Cosine, and Tangent Geometry M2 Lesson 29: Applying Tangents

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.RT.4 Explain the relationship between the sine and cosine of complementary angles and use them to solve problems.	Geometry M2 Lesson 27: Sine and Cosine of Complementary Angles and Special Angles Geometry M2 Lesson 28: Solving Problems Using Sine and Cosine
G.RT.5 Determine the sine, cosine, and tangent ratios of acute angles given the side lengths of right triangles.	Geometry M2 Lesson 27: Sine and Cosine of Complementary Angles and Special Angles Geometry M2 Lesson 28: Solving Problems Using Sine and Cosine Geometry M2 Lesson 29: Applying Tangents
G.RT.6 Use trigonometric ratios (sine, cosine, and tangent) to calculate missing side lengths and angle measures in a right triangle, including applications of angles of elevation and depression; include real-world and mathematical problems.	Geometry M2 Lesson 28: Solving Problems Using Sine and Cosine Geometry M2 Lesson 29: Applying Tangents Geometry M2 Lesson 30: Trigonometry and the Pythagorean Theorem Geometry M2 Lesson 34: Unknown Angles

Circles

Circle Relationships

Students explore and use circle relationships to solve problems.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.CIR.1 Apply the precise definition and standard geometric notation for a circle to understand geometric relationships.	Geometry M5 Lesson 2: Circles, Chords, Diameters, and Their Relationships

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.CIR.2 Recognize and apply relationships between angles, radii, and chords, tangents, and secants including:	*This standard is fully addressed by the lessons aligned to its subsections.*
G.CIR.2.1 The relationship between central, inscribed, and circumscribed angles,	Geometry M5 Topic A: Central and Inscribed Angles Geometry M5 Topic C: Secants and Tangents
G.CIR.2.2 Inscribed angles on a diameter are right angles,	Geometry M5 Lesson 1: Thales' Theorem
G.CIR.2.3 The radius of a circle is perpendicular to the tangent where the radius intersects the circle, and	Geometry M5 Lesson 11: Properties of Tangents
G.CIR.2.4 The relationship of angles and segments formed by chords, secants and/or tangents to a circle.	Geometry M5 Lesson 7: The Angle Measure of an Arc Geometry M5 Lesson 8: Arcs and Chords Geometry M5 Topic C: Secants and Tangents
G.CIR.3 Use the proportional relationship between the measure of an arc length of a circle and the circumference of the circle to solve problems.	Geometry M5 Lesson 9: Arc Length and Areas of Sectors Geometry M5 Lesson 10: Unknown Length and Area Problems

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.CIR.4 Use the proportional relationship between the measure of the area of a sector of a circle and the area of the circle to solve problems.	Geometry M5 Lesson 9: Arc Length and Areas of Sectors Geometry M5 Lesson 10: Unknown Length and Area Problems
G.CIR.5 Explain why the formulas for the area and circumference of a circle work using dissection and informal limit arguments.	G7 M3 Lesson 16: The Most Famous Ratio of All G7 M3 Lesson 17: The Area of a Circle Geometry M3 Lesson 4: Proving the Area of a Disk

Circles

Equation of a Circle

Students solve problems involving the equation of a circle.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.CIR.6 Write the equation of a circle, given the radius and center, where the center is at the origin or another point.	Geometry M5 Lesson 17: Writing the Equation for a Circle
G.CIR.7 Identify the center and radius of a circle, given the equation of a circle, where the center is at the origin or another point.	Geometry M5 Lesson 17: Writing the Equation for a Circle
G.CIR.8 Apply the equation of a circle to solve real-world problems.	*Supplemental material is necessary to address this standard.*

Geometric Figures

Three-Dimensional

Students explore and solve problems involving three-dimensional figures.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.GF.1 Find the volume and surface area of complex three-dimensional figures composed of prisms, pyramids, cones, cylinders, and spheres.	G7 M6 Lesson 23: Surface Area G7 M6 Lesson 24: Surface Area G7 M6 Lesson 25: Volume of Right Prisms G8 M5 Lesson 10: Volumes of Familiar Solids—Cones and Cylinders G8 M5 Lesson 11: Volume of a Sphere Geometry M3 Lesson 11: The Volume Formula of a Pyramid and Cone Geometry M3 Lesson 12: The Volume Formula of a Sphere *Supplemental material is necessary to address finding the surface area of cones, cylinders, and spheres.*
G.GF.2 Use three-dimensional geometric figures and their measures to model real-world objects and solve problems.	Geometry M3 Topic B: Volume
G.GF.3 Explain why the formulas for the volume and surface area of a cylinder, pyramid, and cone work.	G7 M6 Lesson 23: Surface Area G7 M6 Lesson 24: Surface Area G8 M5 Lesson 10: Volumes of Familiar Solids—Cones and Cylinders Geometry M3 Lesson 10: The Volume of Prisms and Cylinders and Cavalieri's Principle Geometry M3 Lesson 11: The Volume Formula of a Pyramid and Cone *Supplemental material is necessary to address surface area of cylinders and cones.*

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.GF.4 Apply the Pythagorean Theorem to determine missing measurements in a three-dimensional figure.	G8 M7 Lesson 19: Cones and Spheres
G.GF.5 Identify the three-dimensional figure generated by rotating a two-dimensional figure.	Geometry M3 Lesson 6: General Prisms and Cylinders and Their Cross-Sections Geometry M3 Lesson 7: General Pyramids and Cones and Their Cross-Sections

Geometric Figures

Two-Dimensional

Students explore and solve problems involving two-dimensional figures.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.GF.6 Apply theorems about quadrilaterals, including those involving angles, diagonals, and sides to solve problems.	Geometry M4 Lesson 5: Criterion for Perpendicularity Geometry M4 Lesson 8: Parallel and Perpendicular Lines Geometry M4 Topic D: Partitioning and Extending Segments and Parameterization of Lines Geometry M5 Lesson 19: Equations for Tangent Lines to Circles
G.GF.7 Prove that a given quadrilateral is a parallelogram, rhombus, rectangle, square, kite, or trapezoid, and apply these relationships to solve problems.	Geometry M1 Lesson 28: Properties of Parallelograms Geometry M1 Lesson 34: Review of the Assumptions Geometry M4 Lesson 5: Criterion for Perpendicularity Geometry M4 Lesson 8: Parallel and Perpendicular Lines

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.GF.8 Prove and apply theorems about triangles including:	*This standard is addressed by the lessons aligned to its subsections.*
G.GF.8.1 Angle-Sum Theorem,	Geometry M1 Lesson 11: Unknown Angle Proofs—Proofs of Known Facts
G.GF.8.2 Exterior Angle Theorem,	Geometry M1 Lesson 8: Solve for Unknown Angles—Angles in a Triangle Geometry M1 Lesson 9: Unknown Angle Proofs—Writing Proofs
G.GF.8.3 Isosceles Triangle Theorem and its converse,	Geometry M1 Lesson 23: Base Angles of Isosceles Triangles
G.GF.8.4 Midsegment Theorem,	Geometry M1 Lesson 29: Special Lines in Triangles
G.GF.8.5 Proportionality Theorem,	Geometry M2 Lesson 19: Families of Parallel Lines and the Circumference of the Earth
G.GF.8.6 Inequality Theorem and its converse, and	*Supplemental material is necessary to address this standard.*
G.GF.8.7 Geometric Mean Theorem.	Geometry M2 Lesson 24: Prove the Pythagorean Theorem Using Similarity

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.GF.9 Calculate the perimeter of polygons when given the vertices, including using the distance formula.	Geometry M4 Topic C: Perimeters and Areas of Polygonal Regions in the Cartesian Plane
G.GF.10 Calculate the area of triangles and rectangles when given the vertices, including using the distance formula and decomposing figures.	Geometry M4 Topic C: Perimeters and Areas of Polygonal Regions in the Cartesian Plane
G.GF.11 Describe reflectional and rotational symmetry as they apply to a rectangle, parallelogram, trapezoid, or regular polygon.	Geometry M1 Lesson 15: Rotations, Reflections, and Symmetry

Geometric Figures

Geometric Probability

Students determine probability in geometric contexts.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.GF.12 Calculate probabilities as a proportion of area in a geometric context.	*Supplemental material is necessary to address this standard.*

Lines & Angles

Define & Construct

Students use precise definitions and various construction tools to create geometric figures.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.LA.1 Use precise definitions and standard geometric notation for angles, perpendicular lines, parallel lines, and line segments based on the undefined notions of point, line, and distance along a line.	Geometry M1 Lesson 1: Construct an Equilateral Triangle Geometry M1 Lesson 3: Copy and Bisect an Angle Geometry M1 Lesson 4: Construct a Perpendicular Bisector Geometry M1 Lesson 33: Review of the Assumptions
G.LA.2 Make formal geometric constructions with a variety of tools and methods including:	*This standard is fully addressed by the lessons aligned to its subsections.*
G.LA.2.1 Congruent segments and angles,	Geometry M1 Lesson 1: Construct an Equilateral Triangle Geometry M1 Lesson 2: Construct an Equilateral Triangle Geometry M1 Lesson 3: Copy and Bisect an Angle
G.LA.2.2 Segment and angle bisectors,	Geometry M1 Lesson 3: Copy and Bisect an Angle Geometry M1 Lesson 4: Construct a Perpendicular Bisector
G.LA.2.3 Perpendicular lines and perpendicular bisectors of a line segment,	Geometry M1 Lesson 4: Construct a Perpendicular Bisector *Supplemental material is necessary to address constructing perpendicular lines.*
G.LA.2.4 Parallel lines, and	Geometry M1 Lesson 18: Looking More Carefully at Parallel Lines

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.LA.2.5 An equilateral triangle, a square, and a regular hexagon inscribed in a circle.	Geometry M1 Lesson 1: Construct an Equilateral Triangle Geometry M1 Lesson 2: Construct an Equilateral Triangle *Supplemental material is necessary to address constructing a square inscribed in a circle.*

Lines & Angles

Coordinate Geometry

Students reason about geometric figures using the coordinate plane.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.LA.3 Determine the point that cuts a line segment into a specified ratio on a number line and a coordinate plane, including finding the midpoint.	Geometry M4 Lesson 12: Dividing Segments Proportionately Geometry M4 Lesson 13: Analytic Proofs of Theorems Previously Proved by Synthetic Means
G.LA.4 Derive the distance and midpoint formulas and use the formulas, including the slope formula, to verify geometric relationships on a coordinate plane.	G8 M2 Lesson 16: Applications of the Pythagorean Theorem G8 M7 Lesson 17: Distance on the Coordinate Plane Geometry M4 Lesson 1: Searching a Region in the Plane Geometry M4 Lesson 12: Dividing Segments Proportionately

Lines & Angles

Parallel & Perpendicular Lines

Students solve problems involving parallel and perpendicular lines.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.LA.5 Prove and apply slope criteria of parallel and perpendicular lines to solve problems.	Geometry M4 Topic B: Perpendicular and Parallel Lines in the Cartesian Plane Geometry M5 Lesson 19: Equations for Tangent Lines to Circles
G.LA.6 Write an equation of a line that is parallel or perpendicular to a given line and passing through a given point.	Geometry M4 Topic B: Perpendicular and Parallel Lines in the Cartesian Plane Geometry M5 Lesson 19: Equations for Tangent Lines to Circles
G.LA.7 Prove and apply theorems about lines and angles including:	*This standard is fully addressed by the lessons aligned to its subsections.*
G.LA.7.1 Vertical angles,	Geometry M1 Lesson 9: Unknown Angle Proofs—Writing Proofs
G.LA.7.2 Angles formed by parallel lines cut by a transversal, and	Geometry M1 Lesson 10: Unknown Angle Proofs—Proofs with Constructions Geometry M1 Lesson 11: Unknown Angle Proofs—Proofs of Known Facts
G.LA.7.3 Points on a perpendicular bisector.	Geometry M1 Lesson 17: Characterize Points on a Perpendicular Bisector

Transformations

Coordinate Plane

Students transform figures on the coordinate plane.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.TRF.1 Describe rotations, reflections, and translations as functions that take points in the coordinate plane as inputs and give other points as outputs; write in prime notation.	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.TRF.2 Compare transformations that preserve distance and angle (rotations, reflections, and translations) to those that do not (dilations) to develop definitions for congruence and similarity.	Geometry M1 Lesson 13: Rotations Geometry M1 Lesson 14: Reflections Geometry M1 Lesson 17: Characterize Points on a Perpendicular Bisector Geometry M1 Lesson 18: Looking More Carefully at Parallel Lines Geometry M1 Lesson 23: Base Angles of Isosceles Triangles Geometry M2 Lesson 6: Dilations as Transformations of the Plane

Transformations

Plane

Students transform figures and make geometric constructions.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.TRF.3 Apply understanding of angles, circles, perpendicular lines, parallel lines, and line segments to develop definitions for 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 16: Translations

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.TRF.4 Use geometric constructions to represent rotations, reflections, translations, and dilations in the plane with a variety of tools and methods.	Geometry M1 Lesson 12: Transformations—The Next Level Geometry M1 Lesson 13: Rotations Geometry M1 Lesson 14: Reflections Geometry M1 Lesson 16: Translations
G.TRF.5 Given two congruent figures, identify the sequence of transformations that maps one figure to another.	Geometry M1 Lesson 20: Applications of Congruence in Terms of Rigid Motions Geometry M1 Lesson 21: Correspondence and Transformations

Similarities & Congruence

Similarity

Students use similarity criteria to solve problems.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.SC.1 Given two figures, apply the definition of similarity in terms of a dilation to identify similar figures, proportional sides, and corresponding congruent angles.	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.SC.2 Develop and apply the criteria of similarity for triangles (AA~, SAS~, and SSS~) to solve problems and prove geometric relationships.	Geometry M2 Lesson 15: The Angle-Angle (AA) Criterion for Two Triangles to Be Similar Geometry M2 Lesson 16: Between-Figure and Within-Figure Ratios Geometry M2 Lesson 17: The Side-Angle-Side (SAS) and Side-Side-Side (SSS) Criteria for Two Triangles to Be Similar Geometry M2 Lesson 18: Similarity and the Angle Bisector Theorem Geometry M2 Topic D: Applying Similarity to Right Triangles

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.SC.3 Use transformations to prove all circles are similar.	Geometry M5 Lesson 7: The Angle Measure of an Arc

Similarities & Congruence

Triangle Congruence

Students apply congruence criteria to solve problems.

Arkansas Mathematics Standards	Aligned Components of *Eureka Math*
G.SC.4 Explain, using rigid motion transformations, why two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	Geometry M1 Lesson 19: Construct and Apply a Sequence of Rigid Motions Geometry M1 Lesson 20: Applications of Congruence in Terms of Rigid Motions Geometry M1 Lesson 21: Correspondence and Transformations Geometry M1 Topic D: Congruence Geometry M1 Lesson 34: Review of the Assumptions
G.SC.5 Develop and apply the criteria for triangle congruence (ASA, SAS, AAS, SSS, and HL) to solve problems and prove geometric relationships.	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