

Geometry Course Outline

Learning Targets Unit 1: Proof, Parallel, and Perpendicular Lines

- 1-1-1 Identify, describe, and name points, lines, line segments, rays and planes using correct notation.
- 1-1-2 Identify and name angles.
- 1-2-1 Describe angles and angle pairs.
- 1-2-2 Identify and name parts of a circle.
- 2-1-1 Make conjectures by applying inductive reasoning.
- 2-1-2 Recognize the limits of inductive reasoning.
- 2-2-1 Use deductive reasoning to prove that a conjecture is true.
- 2-2-2 Develop geometric and algebraic arguments based on deductive reasoning.
- 3-1-1 Distinguish between undefined and defined terms.
- 3-1-2 Use properties to complete algebraic two-column proofs.
- 3-2-1 Identify the hypothesis and conclusion of a conditional statement.
- 3-2-2 Give counterexamples for false conditional statements.
- 3-3-1 Write and determine the truth value of the converse, inverse, and contrapositive of a conditional statement.
- 3-3-2 Write and interpret biconditional statements.
- 4-1-1 Apply the Segment Addition Postulate to find lengths of segments.
- 4-1-2 Use the definition of midpoint to find lengths of segments.
- 4-2-1 Apply the Angle Addition Postulate to find angle measures.
- 4-2-2 Use the definition of angle bisector to find angle measures.
- 5-1-1 Derive the Distance Formula.
- 5-1-2 Use the Distance Formula to find the distance between two points on the coordinate plane.
- 5-2-1 Use inductive reasoning to determine the Midpoint Formula.
- 5-2-2 Use the Midpoint Formula to find the coordinates of the midpoint of a segment on the coordinate plane.
- 6-1-1 Use definitions, properties, and theorems to justify a statement.
- 6-1-2 Write two-column proofs to prove theorems about lines and angles.
- 6-2-1 Complete two-column proofs to prove theorems about segments.
- 6-2-2 Complete two-column proofs to prove theorems about angles.
- 7-1-1 Make conjectures about the angles formed by a pair of parallel lines and a transversal.
- 7-1-2 Prove theorems about these angles.
- 7-2-1 Develop theorems to show that lines are parallel.
- 7-2-2 Determine whether lines are parallel.
- 7-3-1 Develop theorems to show that lines are perpendicular.
- 7-3-2 Determine whether lines are perpendicular.
- 8-1-1 Make conjectures about the slopes of parallel and perpendicular lines.
- 8-1-2 Use slope to determine whether lines are parallel or perpendicular.
- 8-2-1 Write the equation of a line that is parallel to a given line.
- 8-2-2 Write the equation of a line that is perpendicular to a given line.

Learning Targets Unit 2: Transformations, Triangles and Quadrilaterals

- 9-1-1 Perform transformations on and off the coordinate plane.
- 9-1-2 Identify characteristics of transformations that are rigid motions and characteristics of

transformations that are non rigid motions.

9-1-3 Represent a transformation as a function using coordinates and show how a figure is transformed by a function.

9-2-1 Perform translations on and off the coordinate plane.

9-2-2 Predict the effect of a translation on a figure.

9-3-1 Perform reflections on and off the coordinate plane.

9-3-2 Identify reflectional symmetry in plane figures.

9-4-1 Perform rotations on and off the coordinate plane.

9-4-2 Identify and distinguish between reflectional and rotational symmetry.

10-1-1 Find the image of a figure under a composition of rigid motions.

10-1-2 Find the pre-image of a figure under a composition of rigid motions.

10-2-1 Determine whether given figures are congruent.

10-2-2 Specify a sequence of rigid motions that will carry a given figure to a congruent figure.

11-1-1 Use the fact that congruent triangles have congruent corresponding parts.

11-2-2 Determine unknown angle measures or side lengths in congruent triangles.

11-2-1 Develop criteria for providing triangle congruence.

11-2-2 Determine which congruence criteria can be used to show that two triangles are congruent.

11-3-1 Prove that congruence criteria follow from the definition of congruence.

11-3-2 Use the congruence criteria in simple proofs.

11-4-1 Apply congruence criteria to figures in the coordinate plane.

11-4-2 Prove the AAS criterion and develop the HL criterion.

12-1-1 Write a simple flowchart proof as a two column proof.

12-1-2 Write a flowchart proof.

12-2-1 Write a proof in three different formats.

12-2-2 Write proofs using the fact that corresponding parts of congruent triangles are congruent.

START PART B

13-1-1 Prove theorems about angle measures in triangles.

13-1-2 Apply theorems about angle measures in triangles.

13-2-1 Develop theorems about isosceles triangles.

13-2-2 Prove theorems about isosceles triangles.

14-1-1 Determine the point of concurrency of the altitudes of a triangle.

14-1-2 Use the point of concurrency of the altitudes of a triangle to solve problems.

14-2-1 Determine the point of concurrency of the medians of a triangle.

14-2-2 Use the point of concurrency of the medians of a triangle to solve problems.

14-3-1 Determine the points of concurrency of the perpendicular bisectors and angle bisectors of a triangle.

14-3-2 Use the points of concurrency of the perpendicular bisectors and the angles bisectors of a triangle to solve problems.

15-1-1 Develop properties of kites.

15-1-2 Prove the triangle midsegment theorem.

15-2-1 Develop properties of trapezoids.

- 15-2-2 Prove properties of trapezoids.
- 15-3-1 Develop properties of parallelograms.
- 15-3-2 Prove properties of parallelograms.
- 15-4-1 Develop properties of rectangles, rhombi, and squares.
- 15-4-2 Prove properties of rectangles, rhombi, and squares.
- 16-1-1 Develop criteria for showing that a quadrilateral is a parallelogram.
- 16-1-2 Prove that a quadrilateral is a parallelogram.
- 16-2-1 Develop criteria for showing that a quadrilateral is a rectangle.
- 16-2-2 Prove that a quadrilateral is a rectangle.
- 16-3-1 Develop criteria for showing that a quadrilateral is a rhombus.
- 16-3-2 Prove that a quadrilateral is a rhombus.
- 16-4-1 Develop criteria for showing that a quadrilateral is a square.
- 16-4-2 Prove that a quadrilateral is a square.

Learning Targets Unit 3: Similarity and Trigonometry

- 17-1-1 Perform dilations on and off the coordinate plane.
- 17-1-2 Describe dilations.
- 17-2-1 Understand the meaning of similarity transformations.
- 17-2-2 Use similarity transformations to determine whether figures are similar.
- 17-3-1 Identify properties of similar figures.
- 17-3-2 Apply properties of similar figures.
- 18-1-1 Develop criteria for triangle similarity.
- 18-1-2 Prove the AA similarity criterion.
- 18-2-1 Show triangles are similar.
- 18-2-2 Use similar triangles to solve problems.
- 18-3-1 Prove the Triangle Proportionality Theorem and its converse.
- 18-3-2 Apply the Triangle Proportionality Theorem and its converse.
- 19-1-1 Identify the relationships that exist when an altitude is drawn to the hypotenuse of a right triangle.
- 19-1-2 Prove the Right Triangle Altitude Theorem.
- 19-2-1 Identify the relationships that exist when an altitude is drawn to the hypotenuse of a right triangle.
- 19-2-2 Apply the relationships that exist when an altitude is drawn to the hypotenuse of a right triangle.
- 20-1-1 Use similar triangles to prove the Pythagorean Theorem.
- 20-1-2 Apply the Pythagorean Theorem to solve problems.
- 20-2-1 Use the converse of the Pythagorean Theorem to solve problems.
- 20-2-2 Develop and apply Pythagorean inequalities.
- 21-1-1 Describe the relationships among the side lengths of 45-45-90 triangles.
- 21-1-2 Apply relationships in special right triangles to solve problems.
- 21-2-1 Describe the relationships among the side lengths of 30-60-90 triangles.
- 21-2-2 Apply relationships in special right triangles to solve problems.
- 22-1-1 Find ratios of side lengths in similar triangles.
- 22-1-2 Given an acute angle of a right triangle, identify the opposite leg and adjacent leg.
- 22-2-1 Understand the definitions of sine, cosine, and tangent ratios.
- 22-2-2 Calculate the trigonometric ratios in a right triangle.

- 22-2-3 Describe the relationship between the sine and cosine of complementary angles.
- 22-3-1 Use trigonometric ratios to find the unknown side lengths in right triangles.
- 22-3-2 Solve real-world problems using trigonometric ratios.
- 22-4-1 Calculate angle measures from trigonometric ratios.
- 22-4-2 Solve right triangles.

- 23-1-1 Prove the Law of Sines.
- 23-1-2 Apply the Law of Sines.
- 23-2-1 Understand when the ambiguous case of the Law of Sines.
- 23-2-2 Solve problems using the Law of Sines.
- 23-3-1 Prove the Law of Cosines.
- 23-3-2 Solve problems using the Law of Cosines.
- 23-4-1 Determine when to use the Law of Sines and when to use the Law of Cosines.
- 23-4-2 Solve problems using the Law of Cosines and/or Law of Sines.

Learning Targets Unit 4 Circles, Coordinates, and Constructions

- 24-1-1 Describe relationships among tangents and radii of circles.
- 24-1-2 Use arcs, chords, and diameters of a circle to solve problems.
- 24-2-1 Describe relationships among diameters and chords of a circle.
- 24-2-2 Prove and apply theorems about chords of a circle.
- 24-3-1 Prove that the tangent segments to a circle from a point outside the circle are congruent.
- 24-3-2 Use tangent segments to solve problems.
- 25-1-1 Understand how to measure an arc of a circle.
- 25-1-2 Use relationships among arcs and central angles to solve problems.
- 25-2-1 Describe the relationship among inscribed angles, central angles, and arcs.
- 25-2-2 Use inscribed angles to solve problems.
- 25-3-1 Describe the relationship among the angles formed by intersecting chords of a circle.
- 25-3-2 Use angles formed by chords to solve problems.
- 25-4-1 Describe the relationship among the angles formed by tangents to a circle or secants to a circle.
- 25-4-2 Use angles formed by tangents or secants to solve problems.
- 26-1-1 Write coordinate proofs.
- 26-1-2 Prove the midpoint formula.
- 26-2-1 Write coordinate proofs.
- 26-2-2 Prove the slope criteria for parallel and perpendicular lines.
- 26-3-1 Write coordinate proofs.
- 26-3-2 Prove that the medians of a triangle are congruent.
- 26-4-1 Find the coordinates of the point that is a given fraction's distance along a line segment.
- 26-4-2 Find the coordinates of the point that partitions a line segment in a given ratio.
- 27-1-1 Derive the general equation of a circle given the center and radius.
- 27-1-2 Write the equation of a circle given three points on the circle.
- 27-2-1 Find the center and radius of a circle given its equation.
- 29-1-1 Use constructions to copy a segment or an angle.*
- 29-1-2 Use constructions to bisect a segment or an angle.*
- 29-2-1 Construct parallel and perpendicular lines.*

- 29-2-2 Use constructions to make conjectures about geometric relationships.*
- 29-3-1 Construct inscribed and circumscribed circles.*
- 29-3-2 Construct tangents to a circle.*

Learning Targets Unit 5: Extending Two Dimensions to Three Dimensions

- 30-1-1 Solve problems using the areas of rectangles, parallelograms and composite figures
- 30-1-2 Use coordinates to compute perimeters and areas of figures.
- 30-2-1 Solve problems using the areas of triangles and composite figures.
- 30-2-2 Use coordinates to compute perimeters and areas of figures.
- 30-3-1 Solve problems using the perimeters and areas of rhombi, trapezoids, and composite figures.
- 30-30-2 Solve problems using density.
- 31-1-1 Develop a formula for the sum of the measures of the interior angles of a polygon.
- 31-1-2 Determine the sum of the measures of the interior angles of a polygon.
- 31-2-1 Develop a formula for each interior angle measure of a regular polygon.
- 31-2-2 Determine the measure of each exterior angle of a polygon.
- 31-3-1 Develop a formula for the area of a regular polygon.
- 31-3-2 Solve problems using perimeter and area of regular polygons.
- 32-1-1 Develop and apply a formula for the circumference of a circle.
- 32-1-2 Develop and apply a formula for the area of a circle.
- 32-2-1 Develop and apply a formula for the area of a sector.
- 32-2-2 Develop and apply a formula for arc length.
- 32-3-1 Prove that all circles are similar.
- 32-3-2 Describe and apply radian measure.
- 33-1-1 Describe the properties and cross sections of prisms and pyramids.
- 33-1-2 Describe the relationship among the faces, edges, and vertices of a polyhedron.
- 33-2-1 Describe the properties and cross sections of a cylinder.
- 33-2-2 Describe the properties and cross sections of a cone.
- 33-3-1 Describe the properties and cross sections of a sphere.
- 33-3-2 Identify three dimension objects generated by rotations of two dimensional objects.
- 34-1-1 Solve problems by finding lateral area and total surface area of a prism.
- 34-1-2 Solve problems by finding lateral area and total surface area of a cylinder.
- 34-2-1 Solve problems by finding the volume of a prism.
- 34-2-2 Solve problems by finding the volume of a cylinder.
- 35-1-1 Solve problems by finding the lateral area and total surface area of a pyramid.
- 35-1-2 Solve problems by finding the lateral area and total surface area of a cone.
- 35-2-1 Solve problems by finding the volume of a pyramid.
- 35-2-3 Solve problems by finding the volume of a cone.
- 35-3-1 Apply concepts of density in modeling situations.
- 35-3-2 Apply surface area and volume to solve design problems.
- 36-1-1 Solve problems using the properties of spheres.
- 36-1-2 Solve problems by finding the surface area of a sphere.
- 36-2-1 Solve problems by finding the volume of a sphere.
- 37-1-1 Describe how changes in the linear dimensions of a shape affect its perimeter, area,

surface area, and volume.

37-1-2 Use geometric shapes and their measures to model real-world objects.