

Geometry

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
1	Students will use algebraic, spatial, and logical reasoning to solve geometry problems.		
1.1	Use inductive and deductive reasoning to develop mathematical arguments.		
1.1.a	Write conditional statements, converses, and inverses, and determine the truth value of these statements.	Introduction to Proof	Reasoning in Geometry
1.1.b	Formulate conjectures using inductive reasoning.	Introduction to Proof	Introduction to Proof
1.1.c	Prove a statement false by using a counterexample.	Introduction to Proof	Informal and Two-Column Proofs
1.2	Analyze characteristics and properties of angles.		
1.2.a	Use accepted geometric notation for lines, segments, rays, angles, similarity, and congruence.	Introduction to Geometry	Basic Elements of Geometry Rays and Angles
1.2.b	Identify and determine relationships in adjacent, complementary, supplementary, or vertical angles and linear pairs.	Introduction to Geometry	Rays and Angles
1.2.c	Classify angle pairs formed by two lines and a transversal.	Introduction to Geometry	Parallel and Perpendicular Lines
1.2.d	Prove relationships in angle pairs.	Introduction to Geometry	Parallel and Perpendicular Lines

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1.2.e	Prove lines parallel or perpendicular using slope or angle relationships.		
1.3	Analyze characteristics and properties of triangles.		
1.3.a	Prove congruency and similarity of triangles using postulates and theorems.	Triangles Similarity	Congruent Triangles Similar Triangles
1.3.b	Prove the Pythagorean Theorem in multiple ways, find missing sides of right triangles using the Pythagorean Theorem, and determine whether a triangle is a right triangle using the converse of the Pythagorean Theorem.	Right Triangles and Trigonometry	Review of the Pythagorean Theorem
1.3.c	Prove and apply theorems involving isosceles triangles.	Triangles	Introduction to Triangles
1.3.d	Apply triangle inequality theorems.	Triangles	Triangle Inequalities
1.3.e	Identify medians, altitudes, and angle bisectors of a triangle, and the perpendicular bisectors of the sides of a triangle, and justify the concurrency theorems.	Triangles	Triangle Inequalities

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1.4	Analyze characteristics and properties of polygons and circles.		
1.4.a	Use examples and counterexamples to classify subsets of quadrilaterals.	Quadrilaterals and Polygons	Squares, Rectangles, and Rhombii
1.4.b	Prove properties of quadrilaterals using triangle congruence relationships, postulates, and theorems.	Quadrilaterals and Polygons	Squares, Rectangles, and Rhombii
1.4.c	Derive, justify, and use formulas for the number of diagonals, lines of symmetry, angle measures, perimeter, and area of regular polygons.		
1.4.d	Define radius, diameter, chord, secant, arc, sector, central angle, inscribed angle, and tangent of a circle, and solve problems using their properties.	Circles	Special Segments in Circles Special Angles and Arcs in Circles
1.4.e	Show the relationship between intercepted arcs and inscribed or central angles, and find their measures.	Circles	Special Angles and Arcs in Circles
1.5	Perform basic geometric constructions, describing and justifying the procedures used.		
1.5.a	Investigate geometric relationships using constructions.	Introduction to Geometry	Rays and Angles

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1.5.b	Copy and bisect angles and segments.	Introduction to Geometry	Rays and Angles
1.5.c	Construct perpendicular and parallel lines.	Lines and Coordinate Plane	The Coordinate Plane Graphing the Equation of a Line
1.5.d	Justify procedures used to construct geometric figures.	Lines and Coordinate Plane	The Coordinate Plane Graphing the Equation of a Line
1.5.e	Discover and investigate conjectures about geometric properties using constructions.	Lines and Coordinate Plane	The Coordinate Plane Graphing the Equation of a Line
1.6	Analyze characteristics and properties of three-dimensional figures.		
1.6.a	Identify and classify prisms, pyramids, cylinders and cones based on the shape of their base(s).	Surface Area and Volume	Surface Area and Volume of Prisms and Cylinders Surface Area and Volume of Pyramids and Cones
1.6.b	Identify three-dimensional objects from different perspectives using nets, cross-sections, and two-dimensional views.	Surface Area and Volume	Surface Area and Volume of Spheres
1.6.c	Describe the symmetries of three-dimensional figures.		

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1.6.d	Describe relationships between the faces, edges, and vertices of polyhedra.	Surface Area and Volume	Surface Area and Volume of Prisms and Cylinders Surface Area and Volume of Pyramids and Cones
2	Students will use the language and operations of algebra to explore geometric relationships with coordinate geometry.		
2.1	Describe the properties and attributes of lines and line segments using coordinate geometry.		
2.1.a	Verify the classifications of geometric figures using coordinate geometry to find lengths and slopes.		
2.1.b	Find the distance between two given points and find the coordinates of the midpoint.	Lines and the Coordinate Plane	The Coordinate Plane
2.1.c	Write an equation of a line perpendicular or a line parallel to a line through a given point.	Lines and the Coordinate Plane	Graphing the Equation of a Line
2.2	Describe spatial relationships using coordinate geometry.		
2.2.a	Graph a circle given the equation in the form $(x - h)^2 + (y - k)^2 = r^2$, and write the equation when given the graph.	Circles	Equations of a Circle

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2.2.b	Determine whether points in a set are collinear.	Introduction to Geometry	Basic Elements of Geometry
3	Students will extend concepts of proportion and similarity to trigonometric ratios.		
3.1	Use triangle relationships to solve problems.		
3.1.a	Solve problems using the properties of special right triangles, e.g., 30°, 60°, 90° or 45°, 45°, 90°.	Triangles	Right Triangles and the Pythagorean Theorem
3.1.b	Identify the trigonometric relationships of sine, cosine, and tangent with the appropriate ratio of sides of a right triangle.	Right Triangles and Trigonometry	Ratios of Right Triangles
3.1.c	Express trigonometric relationships using exact values and approximations.		
3.2	Use the trigonometric ratios of sine, cosine, and tangent to represent and solve for missing parts of triangles.		
3.2.a	Find the angle measure in degrees when given the trigonometric ratio.	Right Triangles and Trigonometry	Ratios of Right Triangles

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3.2.b	Find the trigonometric ratio given the angle measure in degrees, using a calculator.	Right Triangles and Trigonometry	Ratios of Right Triangles
3.2.c	Find unknown measures of right triangles using sine, cosine, and tangent functions and inverse trigonometric functions.	Right Triangles and Trigonometry	Ratios of Right Triangles
4	Students will use algebraic, spatial, and logical reasoning to solve measurement problems.		
4.1	Find measurements of plane and solid figures.		
4.1.a	Find linear and angle measures in real-world situations using appropriate tools or technology.	Lines and the Coordinate Plane	Graphing the Equation of a Line
4.1.b	Develop surface area and volume formulas for polyhedra, cones, and cylinders.	Surface Area and Volume	Surface Area and Volume of Prisms and Cylinders Surface Area and Volume of Pyramids and Cones
4.1.c	Determine perimeter, area, surface area, lateral area, and volume for prisms, cylinders, pyramids, cones, and spheres when given the formulas.	Surface Area and Volume	Surface Area and Volume of Prisms and Cylinders Surface Area and Volume of Pyramids and Cones Surface Area and Volume of Spheres
4.1.d	Calculate or estimate the area of an irregular region.		

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4.1.e	Find the length of an arc and the area of a sector when given the angle measure and radius.	Circles	Circumference and Area of a Circle
4.2	Solve real-world problems using visualization and spatial reasoning.		
4.2.a	Solve problems using the Pythagorean Theorem and its converse.	Right Triangles and Trigonometry	Review of the Pythagorean Theorem
4.2.b	Solve problems using the distance formula.	Lines and the Coordinate Plane	The Coordinate Plane
4.2.c	Solve problems involving trigonometric ratios.	Right Triangles and Trigonometry	Ratios of Right Triangles
4.2.d	Solve problems involving geometric probability.		