

## Geometry

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
G.1	Logical arguments and proofs		
G.1.A	Distinguish between inductive and deductive reasoning.	Introduction to Proof	Reasoning in Geometry
G.1.B	Use inductive reasoning to make conjectures, to test the plausibility of a geometric statement, and to help find a counterexample.	Introduction to Proof	Reasoning in Geometry
G.1.C	Use deductive reasoning to prove that a valid geometric statement is true.	Introduction to Proof	Reasoning in Geometry
G.1.D	Write the converse, inverse, and contrapositive of a valid proposition and determine their validity.	Introduction to Proof	Reasoning in Geometry
G.1.E	Identify errors or gaps in a mathematical argument and develop counterexamples to refute invalid statements about geometric relationships.	Introduction to Proof	Informal and Two-Column Proofs
G.1.F	Distinguish between definitions and undefined geometric terms and explain the role of definitions, undefined terms, postulates (axioms), and theorems.	Introduction to Proof	Informal and Two-Column Proofs
G.2	Lines and angles		
G.2.A	Know, prove, and apply theorems about parallel and perpendicular lines.	Introduction to Geometry	Parallel and Perpendicular Lines

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G.2.B	Know, prove, and apply theorems about angles, including angles that arise from parallel lines intersected by a transversal.	Introduction to Geometry	Parallel and Perpendicular Lines
G.2.C	Explain and perform basic compass and straightedge constructions related to parallel and perpendicular lines.	Connections from Algebra	Basic Elements of Geometry
G.2.D	Describe the intersections of lines in the plane and in space, of lines and planes, and of planes in space.	Connections from Algebra	The Intersection of Planes in Space
G.3	Two- and three-dimensional figures		
G.3.A	Know, explain, and apply basic postulates and theorems about triangles and the special lines, line segments, and rays associated with a triangle.	Triangles	Introduction to Triangles
G.3.B	Determine and prove triangle congruence, triangle similarity, and other properties of triangles.	Triangles Similarity	Congruent Triangles Similar Triangles
G.3.C	Use the properties of special right triangles (30°-60°-90° and 45°-45°-90°) to solve problems.	Triangles	Right Triangles and the Pythagorean Theorem

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G.3.D	Know, prove, and apply the Pythagorean Theorem and its converse.	Special Triangles	Right Triangles and the Pythagorean Theorem
G.3.E	Solve problems involving the basic trigonometric ratios of sine, cosine, and tangent.	Right Triangles and Trigonometry	Ratios of Right Triangles
G.3.F	Know, prove, and apply basic theorems about parallelograms.	Quadrilaterals and Polygons	Parallelograms
G.3.G	Know, prove, and apply theorems about properties of quadrilaterals and other polygons.	Quadrilaterals and Polygons	Squares, Rectangles, and Rhombi
G.3.H	Know, prove, and apply basic theorems relating circles to tangents, chords, radii, secants, and inscribed angles.	Circles	Special Segments in Circles  Special Angles and Arcs in Circles
G.3.I	Explain and perform constructions related to the circle.	Circles	Arcs and Special Segments
G.3.J	Describe prisms, pyramids, parallelepipeds, tetrahedra, and regular polyhedra in terms of their faces, edges, vertices, and properties.		
G.3.K	Analyze cross-sections of cubes, prisms, pyramids, and spheres and identify the resulting shapes.		

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G.4	Geometry in the coordinate plane		
G.4.A	Determine the equation of a line in the coordinate plane that is described geometrically, including a line through two given points, a line through a given point parallel to a given line, and a line through a given point perpendicular to a given line.	Lines and the Coordinate Plane	Graphing the Equation of a Line
G.4.B	Determine the coordinates of a point that is described geometrically.	Lines and the Coordinate Plane	The Coordinate Plane
G.4.C	Verify and apply properties of triangles and quadrilaterals in the coordinate plane.	Unit 4	Section 1
G.4.D	Determine the equation of a circle that is described geometrically in the coordinate plane and, given equations for a circle and a line, determine the coordinates of their intersection(s).	Circles	Equations of Circles: Why Should we Study the Equations of Circles?
G.5	Geometric transformations		
G.5.A	Sketch results of transformations and compositions of transformations for a given two-dimensional figure on the coordinate plane, and describe the rule(s) for performing translations or for performing	Transformations	Translations and Reflections

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	reflections about the coordinate axes or the line $y = x$ .		
G.5.B	Determine and apply properties of transformations.	Transformations	Translations and Reflections
G.5.C	Given two congruent or similar figures in a coordinate plane, describe a composition of translations, reflections, rotations, and dilations that superimposes one figure on the other.		
G.5.D	Describe the symmetries of two-dimensional figures and describe transformations, including reflections across a line and rotations about a point.		
G.6	Additional Key Content		
G.6.A	Derive and apply formulas for arc length and area of a sector of a circle.	Circles	Circumference and Area of a Circle
G.6.B	Analyze distance and angle measures on a sphere and apply these measurements to the geometry of the earth.		
G.6.C	Apply formulas for surface area and volume of three-dimensional figures to solve problems.	Surface Area and Volume	Surface Area and Volume of Prisms and Cylinders

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G.6.D	Predict and verify the effect that changing one, two, or three linear dimensions has on perimeter, area, volume, or surface area of two- and three-dimensional figures.		
G.6.E	Use different degrees of precision in measurement, explain the reason for using a certain degree of precision, and apply estimation strategies to obtain reasonable measurements with appropriate precision for a given purpose.		
G.6.F	Solve problems involving measurement conversions within and between systems, including those involving derived units, and analyze solutions in terms of reasonableness of solutions and appropriate units.		
G.7	Reasoning, problem solving, and communication		
G.7.A	Analyze a problem situation and represent it mathematically.	Triangles	Right Triangles and the Pythagorean Theorem
G.7.B	Select and apply strategies to solve problems.	Covered throughout course	Covered throughout course
G.7.C	Evaluate a solution for reasonableness, verify its accuracy, and interpret the solution in the context of the original problem.	Triangles	Right Triangles and the Pythagorean Theorem

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G.7.D	Generalize a solution strategy for a single problem to a class of related problems, and apply a strategy for a class of related problems to solve specific problems.	Triangles	Right Triangles and the Pythagorean Theorem
G.7.E	Read and interpret diagrams, graphs, and text containing the symbols, language, and conventions of mathematics.	Covered throughout course	Covered throughout course
G.7.F	Summarize mathematical ideas with precision and efficiency for a given audience and purpose.		
G.7.G	Synthesize information to draw conclusions and evaluate the arguments and conclusions of others.	Introduction to Proof	Reasoning in Geometry
G.7.H	Use inductive reasoning to make conjectures, and use deductive reasoning to prove or disprove conjectures.	Introduction to Proof	Reasoning in Geometry