

STATE GOAL 9: Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.

Why This Goal Is Important: Geometry provides important methods for reasoning and solving problems with points, lines, planes and space. The word “geometry” comes from Greek words meaning “measurement of the Earth.” While we use modern technology and employ a wider variety of mathematical tools today, we still study geometry to understand the shapes and dimensions of our world. The applications of geometry are widespread in construction, engineering, architecture, mapmaking and art. Historically, geometry is a way to develop skill in forming convincing arguments and proofs. This goal of developing a means of argument and validation remains an important part of our reasons for studying geometry today.

A. Demonstrate and apply geometric concepts involving points, lines, planes and space.

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9.A.1a Identify related two- and three-dimensional shapes including circle-sphere, square-cube, triangle-pyramid, rectangle-rectangular prism and their basic properties.	9.A.2a Build physical models of two- and three-dimensional shapes.	9.A.3a Draw or construct two- and three- dimensional geometric figures including prisms, pyramids, cylinders and cones.	9.A.4a Construct a model of a three-dimensional figure from a two-dimensional pattern.	9.A.5 Use geometric figures and their properties to solve problems in the arts, the physical and life sciences and the building trades, with and without the use of technology.
9.A.1b Draw two-dimensional shapes.	9.A.2b Identify and describe how geometric figures are used in practical settings (e.g., construction, art, advertising).	9.A.3b Draw transformation images of figures, with and without the use of technology.	9.A.4b Make perspective drawings, tessellations and scale drawings, with and without the use of technology.	
	9.A.2c Describe and draw representations of geometric relationships, patterns, symmetries, and designs in two- and three-dimensions with and without technology.	9.A.3c Use concepts of symmetry, congruency, similarity, scale, perspective, and angles to describe and analyze two- and three-dimensional shapes found in practical applications (e.g., geodesic domes, A-frame houses, basketball courts, inclined planes, art forms, blueprints).		

B. Identify, describe, classify and compare relationships using points, lines, planes and solids.

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9.B.1a Identify and describe characteristics, similarities and differences of geometric shapes.	9.B.2 Compare geometric figures and determine their properties including parallel, perpendicular, similar, congruent and line symmetry.	9.B.3 Identify, describe, classify and compare two- and three- dimensional geometric figures and models according to their properties.	9.B.4 Recognize and apply relationships within and among geometric figures.	9.B.5 Construct and use two- and three- dimensional models of objects that have practical applications (e.g., blueprints, topographical maps, scale models).
9.B.1b Sort, classify and compare familiar shapes.				
9.B.1c Identify lines of symmetry in simple figures and construct symmetrical figures using various concrete materials.				

C. Construct convincing arguments and proofs to solve problems.

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9.C.1 Draw logical conclusions and communicate reasoning about simple geometric figures and patterns using concrete materials, diagrams and contemporary technology.	9.C.2 Formulate logical arguments about geometric figures and patterns and communicate reasoning.	9.C.3a Construct, develop and communicate logical arguments (informal proofs) about geometric figures and patterns.	9.C.4a Construct and test logical arguments for geometric situations using technology where appropriate.	9.C.5a Perform and describe an original investigation of a geometric problem and verify the analysis and conclusions to an audience.
		9.C.3b Develop and solve problems using geometric relationships and models, with and without the use of technology.	9.C.4b Construct and communicate convincing arguments for geometric situations.	9.C.5b Apply physical models, graphs, coordinate systems, networks and vectors to develop solutions in applied contexts (e.g., bus routing, areas of irregular shapes, describing forces and other physical quantities).
			9.C.4c Develop and communicate mathematical proofs (e.g., two-column, paragraph, indirect) and counter examples for geometric statements.	

D. Use trigonometric ratios and circular functions to solve problems.

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[BLANK]	[BLANK]	9.D.3 Compute distances, lengths and measures of angles using proportions, the Pythagorean theorem and its converse.	9.D.4 Analyze and solve problems involving triangles (e.g., distances which cannot be measured directly) using trigonometric ratios.	9.D.5 Analyze and solve problems involving periodic patterns (e.g., sound waves, tide variations) using circular functions and communicate results orally and in writing.