

MATHEMATICS STANDARDS

Geometry

STANDARD:

Students will demonstrate their ability to construct formal, logical arguments and proofs in geometric settings and problems.

Student Performance Expectations: All students who have completed one year of Geometry shall be expected to:

Standard 1.0:

Students demonstrate understanding by identifying and giving examples of undefined terms, axioms, theorems, and inductive and deductive reasoning.

Standard 2.0:

Students write geometric proofs, including proofs by contradiction.

Standard 3.0:

Students construct and judge the validity of a logical argument and give counterexamples to disprove a statement.

Standard 4.0:

Students prove basic theorems involving congruence and similarity.

Standard 5.0:

Students prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles.

Standard 6.0:

Students are able to use properties about triangles, including the triangle inequality theorem.

Standard 7.0:

Students prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles.

Standard 8.0:

Students derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.

Standard 9.0:

Students compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders.

Standard 10.0:

Students compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.

Standard 11.0:

Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.

Standard 12.0:

Students find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems.

Standard 13.0:

Students prove relationships between angles in polygons by using properties of complementary, supplementary, vertical, and exterior angles.

Standard 14.0:

Students prove the Pythagorean theorem.

Standard 15.0:

Students use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles.

Standard 16.0:

Students perform basic constructions with a straightedge and compass, such as angle bisectors, perpendicular bisectors, and the line parallel to a given line through a point off the line.

Standard 17.0:

Students prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles.

Standard 18.0:

Students apply the definitions of the basic trigonometric functions defined by the angles of a right triangle. They also are able to use elementary relationships between them. For example, $\sin^2 x + \cos^2 x = 1$.

Standard 19.0:

Students use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side.

Standard 20.0:

Students are able to use angle and side relationships in problems with special triangles, such as 30, 60, and 90 triangles and 45 and 90 triangles.

Standard 21.0:

Students prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles.

Standard 22.0

Students demonstrate an understanding of the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections.