



GEOMETRY Learning Objectives



GEOMETRY

The learner will

- ☑ demonstrate understanding by identifying and giving examples of undefined terms, axioms, theorems and inductive and deductive reasoning.
- ☑ write geometric proofs, including proofs by contradiction.
- ☑ construct and judge the validity of a logical argument and give counterexamples to disprove a statement.
- ☑ prove basic theorems involving congruence and similarity.
- ☑ prove that triangles are congruent or similar and they are able to use the concept of corresponding parts of congruent triangles.
- ☑ know and be able to use the triangle inequality theorem.
- ☑ prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals and the properties of circles.
- ☑ know, derive and solve problems involving the perimeter, circumference, area, volume, lateral area and surface area of common geometric figures.
- ☑ compute the volumes and surface areas of prisms, pyramids, cylinders, cones and spheres.
- ☑ commit to memory the formulas for prisms, pyramids and cylinders.
- ☑ compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms and trapezoids.
- ☑ determine how changes in dimensions affect the perimeter, area and volume of common geometric figures and solids.
- ☑ find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems.
- ☑ prove relationships between angles in polygons by using properties of complementary, supplementary, vertical and exterior angles.
- ☑ prove the Pythagorean theorem.
- ☑ use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles.
- ☑ 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.
- ☑ 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.
- ☑ know the definitions of the basic trigonometric functions defined by the angles of a right triangle and know and be able to use elementary relationships between them. For example, $\tan(x) = \sin(x)/\cos(x)$, $(\sin(x))^2 + (\cos(x))^2 = 1$.
- ☑ 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.
- ☑ know and be able to use angle and side relationships in problems with special right triangles, such as 30° , 60° and 90° triangles and 45° , 45° and 90° triangles.
- ☑ prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles and inscribed and circumscribed polygons of circles.
- ☑ know the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations and reflections.

LOGIC AND SET THEORY

The learner will

- ☑ use truth tables to solve logic problems.
- ☑ define sets and explore the notation of set theory.
- ☑ find the union and intersection of sets and their complements.
- ☑ model logic problems using Venn diagrams.

RESOURCES

Prentice-Hall Geometry (2005 ed.)

Internet research, applications and modeling.

PASCO measurement devices, laboratory investigations and supplemental materials.