

# Archdiocese of Philadelphia Secondary School System Geometry Standards

## ***Content Standard***

2.1 Develop mathematical arguments about geometric relationships

### ***Competency Standards***

- 2.1.1 Understand and identify undefined terms: point, line, plane
- 2.1.2 Investigate postulates about points, lines, and planes
- 2.1.3 Define and make geometry conjectures
- 2.1.4 Identify patterns and use inductive reasoning
- 2.1.5 Understand the meaning of the term proof
- 2.1.6 Use conditionals in logical arguments
- 2.1.7 Form converses of conditionals
- 2.1.8 Use principles of logic to create definitions
- 2.1.9 Identify and use Algebraic properties of equality
- 2.1.10 Link the steps of a proof using properties and postulates
- 2.1.11 Develop theorems from conjectures
- 2.1.12 Write two-column and paragraph proofs
- 2.1.13 Make conjectures and prove theorems using postulates and properties of parallel lines and transversals
- 2.1.14 Develop, identify, and use congruence postulates and theorems for triangles
- 2.1.15 Develop and use similarity tests for triangles

## ***Content Standard***

2.2 Analyze characteristics and properties of two- and three-dimensional geometric shapes

### ***Competency Standards***

- 2.2.1 Name and identify parts of an angle
- 2.2.2 Identify and use special pairs of angles
- 2.2.3 Describe relationships among lines, parts of lines, and planes
- 2.2.4 Identify the properties of quadrilaterals and the relationships among the properties
- 2.2.5 Identify and name circles, major arcs, minor arcs and semicircles
- 2.2.6 Identify segments, lines and angles related to circles
- 2.2.7 Identify relationship between arcs and chords
- 2.2.8 Identify segments and lines related to spheres
- 2.2.9 Describe properties of geometric figures, such as closed, convex, etc.
- 2.2.10 Identify and name polygons

- 2.2.11 Name types of prisms, cylinders, pyramids and cones and identify their parts

***Content Standard***

- 2.3 Use visualization, spatial reasoning, and geometric modeling to solve problems

***Competency Standards***

- 2.3.1 Solve problems by using congruent polygons
- 2.3.2 Use congruence to develop and use congruence of corresponding parts and the Isosceles Triangle Theorem
- 2.3.3 Develop conjectures about special polygons use ratios and proportions to solve problems
- 2.3.4 Identify similar shapes
- 2.3.5 Identify and apply the Pythagorean Theorem and its converse
- 2.3.6 Identify and use special right triangles
- 2.3.7 Solve real-world problems involving segments, lines and circles
- 2.3.8 Find circumference of circles and lengths of arcs
- 2.3.9 Solve real-world problems involving circumference and arc length
- 2.3.10 Represent lines and shapes on spheres
- 2.3.11 Explore geometry on real-world spheres
- 2.3.12 Explore probabilities using areas
- 2.3.13 Compare areas of similar figures
- 2.3.14 Use areas to solve real-world problems
- 2.3.15 Compare volumes and surface areas of similar solids
- 2.3.16 Use formulas for volume and surface area to solve real-world problems involving three-dimensional solids

***Content Standard***

- 2.4 Specify locations and describe spatial relationships using coordinate geometry and other representational systems

***Competency Standards***

- 2.4.1 Write equations for circles
- 2.4.2 Graph circles given an equation
- 2.4.3 Find the length of a segment using the distance formula
- 2.4.4 Find coordinates of the midpoint of a segment
- 2.4.5 Find the slope of a line
- 2.4.6 Write equations of lines
- 2.4.7 Compare slopes of parallel and perpendicular lines
- 2.4.8 Write equations for parallel and perpendicular lines
- 2.4.9 Place figures on coordinate axes and label vertices
- 2.4.10 Prove theorems using coordinate geometry

***Content Standard***

2.5 Apply transformations and use symmetry to analyze mathematical situations

***Competency Standards***

- 2.5.1 Locate a set of points in a plane or in space given certain conditions
- 2.5.2 Identify and perform reflections, rotations, translations and dilations
- 2.5.3 Describe and draw objects having line symmetry and point symmetry
- 2.5.4 Analyze real-world situations using symmetry
- 2.5.5 Use coordinate geometry to perform transformations
- 2.5.6 Represent transformations using matrices
- 2.5.7 Describe magnitude and directions of vectors
- 2.5.8 Identify horizontal and vertical components of vectors
- 2.5.9 Calculate and interpret scalar multiplication of vectors
- 2.5.10 Calculate and interpret vector sums
- 2.5.11 Use vectors to analyze real-world situations

***Content Standard***

2.6 Apply appropriate techniques, tools, and formulas to determine measurements

***Competency Standards***

- 2.6.1 Measure, draw, and classify angles
- 2.6.2 Construct figures using compass and straightedge
- 2.6.3 Develop and use formulas for the sums of the measures of interior and exterior angles of a polygon
- 2.6.4 Solve problems using the Pythagorean Theorem
- 2.6.5 Use the tangent, sine, and cosine ratios to solve problems
- 2.6.6 Find the measure of arcs
- 2.6.7 Find measures of angles and arcs formed by segments intersecting circles
- 2.6.8 Find lengths of segments formed by chords, tangents and secants
- 2.6.9 Find the interior and exterior angle sums of polygons
- 2.6.10 Determine each angle in regular polygons
- 2.6.11 Use angles and angle sums to solve real-world problems involving polygons
- 2.6.12 Find the areas of triangles and parallelograms
- 2.6.13 Find the areas of regular polygons and circles
- 2.6.14 Find the areas of sectors of circles
- 2.6.15 Find volumes, lateral areas and surface areas of right prisms, cylinders, cones and regular pyramids
- 2.6.16 Calculate the surface area and volume of spheres