Geometry

• develop an awareness of the structure of a mathematical system, connecting definitions, postulates, logical reasoning, and theorems;[Geo.1A]

• recognize the historical development of geometric systems and know mathematics is developed for a variety of purposes[Geo.1B]

• compare and contrast the structures and implications of Euclidean and non-Euclidean geometries.[Geo.1C]

• use constructions to explore attributes of geometric figures and to make conjectures about geometric relationships[Geo.2A]

• make conjectures about angles, lines, polygons, circles, and three-dimensional figures and determine the validity of the conjectures, choosing from a variety of approaches such as coordinate, transformational, or axiomatic.[Geo.2B]

• determine the validity of a conditional statement, its converse, inverse, and contrapositive;[Geo.3A]

• construct and justify statements about geometric figures and their properties;[Geo.3B]

• use logical reasoning to prove statements are true and find counter examples to disprove statements that are false;[Geo.3C]

• use inductive reasoning to formulate a conjecture[Geo.3D]

• use deductive reasoning to prove a statement.[Geo.3E]

• The student is expected to select an appropriate representation (concrete, pictorial, graphical, verbal, or symbolic) in order to solve problems.[Geo.4A]

• use numeric and geometric patterns to develop algebraic expressions representing geometric properties; [Geo.5A]

• use numeric and geometric patterns to make generalizations about geometric properties, including properties of polygons, ratios in similar figures and solids, and angle relationships in polygons and circles;[Geo.5B]

• use properties of transformations and their compositions to make connections between mathematics and the real world, such as tessellations[Geo.5C]

• identify and apply patterns from right triangles to solve meaningful problems, including special right triangles (45-45-90 and 30-60-90) and triangles whose sides are Pythagorean triples.[Geo.5D]

• describe and draw the intersection of a given plane with various three-dimensional geometric figures;[Geo.6A]

• use nets to represent and construct three-dimensional geometric figures[Geo.6B]

• use orthographic and isometric views of three-dimensional geometric figures to represent and construct three-dimensional geometric figures and solve problems.[Geo.6C]

• use one- and two-dimensional coordinate systems to represent points, lines, rays, line segments, and figures; [Geo.7A]

• use slopes and equations of lines to investigate geometric relationships, including parallel lines, perpendicular lines, and special segments of triangles and other polygons[Geo.7B]

• derive and use formulas involving length, slope, and midpoint.[Geo.7C]

• find areas of regular polygons, circles, and composite figures;[Geo.8A]

• find areas of sectors and arc lengths of circles using proportional reasoning;[Geo.8B]

• derive, extend, and use the Pythagorean Theorem[Geo.8C]

• find surface areas and volumes of prisms, pyramids, spheres, cones, cylinders, and composites of these figures in problem situations.[Geo.8D]

• formulate and test conjectures about the properties of parallel and perpendicular lines based on explorations and concrete models;[Geo.9A]

• formulate and test conjectures about the properties and attributes of polygons and their component parts based on explorations and concrete models;[Geo.9B]

• formulate and test conjectures about the properties and attributes of circles and the lines that intersect them based on explorations and concrete models[Geo.9C]

• analyze the characteristics of polyhedra and other three-dimensional figures and their component parts based on explorations and concrete models.[Geo.9D]

• use congruence transformations to make conjectures and justify properties of geometric figures including figures represented on a coordinate plane[Geo.10A]

• justify and apply triangle congruence relationships.[Geo.10B]

Geometry

- use and extend similarity properties and transformations to explore and justify conjectures about geometric figures;[Geo.11A]
- use ratios to solve problems involving similar figures;[Geo.11B]
- develop, apply, and justify triangle similarity relationships, such as right triangle ratios, trigonometric ratios, and Pythagorean triples using a variety of methods[Geo.11C]
- describe the effect on perimeter, area, and volume when one or more dimensions of a figure are changed and apply this idea in solving problems.[Geo.11D]

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