INDIAN HILL EXEMPTED VILLAGE SCHOOL DISTRICT
Mathematics Curriculum - May 2009
High School Geometry

Main Idea: Basics of Geometry

Skills & Objectives:

- Recognize and explain the necessity for certain terms to remain undefined, such as point, line and plane.

Main Idea: Reasoning and Proof

Skills & Objectives:

- Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof.

Main Idea: Perpendicular and Parallel Lines & Congruent Triangles

Skills & Objectives:

- Formally define and explain key aspects of geometric figures, including:
  - Interior and exterior angles of polygons;
  - Segments related to triangles (median, altitude, midsegment);
  - Points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter).
- Circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle).
- Analyze two-dimensional figures in a coordinate plane; e.g., use slope and distance formulas to show that a quadrilateral is a parallelogram.

Main Idea: Properties of Triangles

Skills & Objectives:

- Formally define and explain key aspects of geometric figures, including:
  - segments related to triangles (median, altitude, midsegment);
  - points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter).
- Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or dynamic geometry software.
- Construct congruent or similar figures using tools, such as compass, straightedge, and protractor or dynamic geometry software.

Main Idea: Quadrilaterals

Skills & Objectives:

- Formally define and explain key aspects of geometric figures, including:
  - interior and exterior angles of polygons
- Recognize and explain the necessity for certain terms to remain undefined, such as point, line and plane.
- Identify the reflection and rotation symmetries of two- and three-dimensional figures.

Main Idea: Similarity

Skills & Objectives:

- Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including:
- Perform reflections and rotations using compass and straightedge constructions and dynamic geometry software.
- Derive coordinate rules for translations, reflections and rotations of geometric figures in the coordinate plane.
- Show and describe the results of combinations of translations, reflections and rotations (compositions); e.g., perform compositions and specify the result of a composition as the outcome of a single motion, when applicable.
- Use the ratio of lengths in similar two-dimensional figures or three-dimensional objects to calculate the ratio of their areas or volumes respectively.

Main Idea: Right Triangles and Trigonometry

Skills & Objectives:

- Solve problems involving unit conversion for situations involving distances, areas, volumes and rates within the same measurement system.
- Define the basic trigonometric ratios in right triangles: sine, cosine and tangent.
- Apply proportions and right triangle trigonometric ratios to solve problems involving missing lengths and angle measures in similar figures.
- Solve problems involving unit conversion for situations involving distances, areas, volumes and rates within the same measurement system.
- Use scale drawings and right triangle trigonometry to solve problems that include unknown distances and angle measures.
- Solve problems involving unit conversion for situations involving distances, areas, volumes and rates within the same measurement system.

Main Idea: Circles

Skills & Objectives:

- Formally define and explain key aspects of geometric figures, including
    - Circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle).
- Solve problems involving chords, radii, and arcs within the same circle.
    - Circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle).

Main Idea: Areas of Polygons and Circles & Surface Area and Volume

Skills & Objectives:

- Explain how a small error in measurement may lead to a large error in calculated results.
- Model problems dealing with uncertainty with area models (geometric probability).