New York Mills High School

Curriculum Document

Curriculum Area: Math

Course Name: Geometry II

Common Course Catalog Number: 249

Length of Course: Semester

Pre-Requisite: Geometry I

Grade Level: 10

Course Description: This course includes topics such as: relationships within triangles, similarity, right triangles and trigonometry, quadrilaterals, properties of transformations, and properties of circles.

Essential Learner Outcomes

- Students will know and understand the relationships within triangles.
- Students will use scale factor and/or similarities to solve real world problems
- Students will use trigonometric ratios to solve real world problems
- Students will understand the properties of special quadrilaterals
- Students will know the properties of transformations
- Students will be able to identify, measure, and graph circles

Units of Study:

- Students use properties of mid-segments to find lengths of segments in triangles. They then learn to write a coordinate proof. They explore perpendicular bisectors and use the concurrency of perpendicular bisectors of a triangle to solve problems. They use angle bisectors to find distance relationships and explore the concurrency of angle bisectors of a triangle. Students use medians of a triangle to find the centroid and to find segment lengths, and they use altitudes of a triangle to find and explore the orthocenter. Student relate side length and angle measures of a triangle, find possible side lengths for the third side of a triangle, use inequalities to make comparisons in two

triangles, and use the Hinge Theorem and its converse to solve multi-step problems. Finally, students learn to write indirect proofs.

- Students use ratios, proportions, and geometric means to solve geometry problems. They use ratios to find the scale of a drawing and then use the scale to find the actual distance on a map or the actual distance on a building. They use proportions to identify similar polygons and find the scale factor between two polygons, they use a scale factor to find corresponding lengths in similar polygons, and they use the AA Similarity Postulate, the SSS Similarity Theorem, or the SAS Similarity Theorem to determine whether two triangles are similar. Also, students use proportions and the Triangle Proportionality Theorem to its converse to find the lengths of segments related to triangles or parallel lines. Finally, students perform dilations that are reductions or enlargements and they verify that a figure is similar to it dilation.
- Students investigate side lengths and angles in triangles. They start by using the Pythagorean theorem to find the length of the third side in a right triangle, then use the Converse of the Pythagorean Theorem, and to other theorems, to decide if three given sides lengths form an acute, right , or obtuse triangle. Students explore ratios of lengths formed by an altitude to the hypotenuse of a right triangle and use the ratios of side lengths for a 45°–45°–90° triangle and a 30°–60°–90° triangle. Finally, students apply trigonometric ratios, the Law of Sines, and the Law of Cosines to find side lengths and angle measures in triangles.
- Students will name and sketch geometric figures, use postulates to identify congruent segments, find lengths of segments in the coordinate plane, and find the midpoint of a segment. Students also will name, measure and classify angles, identify complementary and supplementary angles, and classify polygons. Finally, they will find circumference and area of circles, and area and perimeter of rectangles.
- Students will perform translations with vectors, algebra and matrices. They will reflect figures in a given line, rotate figures about a point, identify line and rotational symmetry, and perform dilations using drawing tools and matrices.
- Students investigate aspects of circles. They start by drawing tangents to circles and seeing how a tangent to a circle related to the radius at the point of tangency. They use intercepted arcs of circles to measure angles formed by chords in a circle and to measure angles formed by secants and tangents to a circle. They explore relationships between segment lengths of chords that intersect in a circle, and they investigate relationships between segment lengths of secants and tangents to a circle. Finally, they use the standard equation of a circle to graph and describe circles in a coordinate plane.