

## **Algebra IIA/Geometry, Form II**

### **Course Description**

The purpose of this course is twofold. The first purpose is to give the students a solid foundation in geometry. Skills developed in Algebra I are integrated throughout this course, although geometry will constitute the main emphasis and subject matter. The students will work on geometry topics for the first three quarters of the year. The second purpose is to reinforce algebra skills and to prepare students, through the introductory two chapters of the Brooks /Cole textbook, for the next mathematics class. This will be done in the last quarter and it will set the stage for following year as students will continue with this text in their junior mathematics course.

This course begins with basic geometric concepts and builds on this. Students will be exposed to logic, geometric reflections utilizing congruency, polygons and symmetry, triangle congruency, indirect and coordinate proofs, direct and indirect reasoning, similarity, and work with circles. Additionally, the coordinate geometry follows from the algebra and the transformation geometry introduces the idea of functions in an applied setting. Applications of new mathematical concepts are included in each chapter through the use of word problems.

Graphing calculators are required in this course. Additionally, students will be using Geometer's Sketchpad. They will be utilizing this venue for constructions, exploring concepts and applications as well as a means to prove various geometric theorems.

### **Course Goals**

- Students will become proficient in the language and vocabulary of geometry
- Students will develop the ability to logically prove theorems, utilizing properties, definitions and already proved theorems
- Students will develop the ability to visualize, recognize patterns, draw and follow algorithms
- Students will become proficient with the Geometer's Sketchpad software
- Students will be able to apply geometric ideas in real world situations
- Students will be able to represent geometric concepts with coordinates or diagrams
- Students will review algebraic concepts from Algebra I and be introduced to equations and inequalities

### **Course Objectives**

- Construct, rotate, translate and reflect different figures both manually (using a protractor and compass) and with the Geometer's Sketchpad
- Identify and apply the definitions, properties and theorems about segments, lines, rays and angles and use them to prove theorems
- Identify and apply properties and theorems regarding parallel and perpendicular lines and use them to prove theorems
- Analyze and apply angle relationships (linear pairs, vertical, complimentary, supplementary, corresponding and alternate interior angles) in real world and mathematical situations

- Understand and use the properties, definitions and concerning congruent and similar triangles and other figures to prove additional theorems and solve problems
- Use and understand the basic properties of circles (arcs, chords, central angles, inscribed angles) to prove basic theorems and solve problems
- Analyze and apply spatial relationships concerning points, lines and planes - betweenness of points, midpoint, segment length, collinear, coplanar, parallel, perpendicular, and skew
- Explore geometry to make and test conjectures using geometric tools and the Geometer's Sketchpad
- Use transformations (translations, rotations, reflections, glide reflections and dilations) to gain insight, via sketches, coordinates, vectors, function notation, and technology, into other areas of mathematics and to solve real world problems
- Use similarity of figures and scale factors to analyze and solve problems
- Model real world problems using visualization, spatial reasoning and geometric relationships
- Understand and express the slope of a line, use two coordinates to find the slope, and use slope to express parallelism and perpendicularity
- Find the distance between two points using their coordinates and the Pythagorean Formula or the distance formula
- Find the equation of a circle given its center and radius
- Find the midpoint of a segment with the midpoint formula and the coordinates of the endpoints