Course Title: Geometry Honors

Course #: 1417-1418

Course Description: This is an advanced college prep course in standard Euclidean geometry. Topics include points, lines, angles, triangles, right triangles, using congruent triangles, proofs, polygons, similar polygons, ratios, proportions, circles, areas and volumes of solids, and coordinate geometry. Throughout the course you will evaluate your own progress in learning, think logically and record your thinking, express complicated ideas with technical language, and problem solve in groups, all while having confidence in mathematics and relating mathematics to your present and future life.

UC/CSU Approval: “c” approved  
*Local honors weight only, not UC/CSU approved as an honors course

Grade Level: 9-12

Estimated Homework Per Week: 3-6 hours, depending on level of understanding. Approximately 30-40 problems per assignment, including critical thinking and word problems.

Prerequisite: Completion of Algebra 1A with a grade of “B” or higher each semester

Recommended Prerequisite Skills: Completion of Alg 1A with a grade of “A” is recommended for success in Geometry H

- Work with integers, fractions, and decimals
- Use properties of equality from algebra
- Solve simple multi-step equations
- Solve simple proportions by cross product
- Solve simple proportions involving distributive property
- Find the square of a number
- Find the square root of a number
- Use the Pythagorean Theorem
- Graph Coordinate Pairs
- Graph linear equations
- Graph systems of linear equations
- Solve equations with factoring
- Solve quadratic equations using the Quadratic Formula
- Use the distance formula and midpoint formula
- Identify angles by their measure
- Identify triangles by their angle measures
- Find perimeter and circumference of a figure
- Find the area of a rectangle, square, parallelogram and triangle
- Identify the parts of a right triangle
- Identify the parts of a circle
- Find area and circumference of a circle
- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning

**Course Grade Scale:**
- Homework: 15%
- Quizzes: 25%
- Tests: 45%
- Final: 15%

**Major Assessments:**

Students are assessed with a Quiz and Test each Chapter and a cumulative Final each semester. Assessments include:
- written definitions of terms, and descriptions of postulates and theorems
- application of reasoning with justifications in Geometric Proofs using geometry definitions, properties, postulates and theorems
- application of geometric properties with figures and Algebra to solve problems.

**Units/Topics:**

**Semester 1**

I. **Foundations of Geometry (all sections)**
   Students will identify and name points, lines, rays, segments, and angles, draw and interpret geometric figures. In addition, students will construct & measure segments and their midpoints as well as angles and their bisectors. Students will classify angles and identify angle pairs. Students will use geometry formulas to find lengths and areas and determine distances and find midpoint coordinates. Students will try to draw and identify transformations. (1 quiz and 1 test)

II. **Geometric Reasoning (section 5 and 6)**
Students will use the properties of equality and congruence and definitions and theorems to write algebraic and geometric two-column proofs. (1 quiz and 1 test)

III. **Parallel and Perpendicular Lines (all sections)**
Students will Identify Parallel, Perpendicular, and Skew Lines. In addition, students will identify the angle pairs formed by two lines and a transversal and find the measures of those angles. Students will use the converse theorems to prove that lines are parallel. Students will use Slopes to determine when lines are parallel or perpendicular and write the equations of perpendicular and parallel lines. (1 quiz and 1 test)

IV. **Triangle Congruence (all sections)**
Students will draw and identify transformations in the coordinate plane and determine whether transformations produce congruent figures. Students will also classify triangles by the measures of their angles and the lengths of their sides and find the measures of angles in isosceles and equilateral triangles. Students will use the triangle sum theorem and exterior angle theorem to determine the measures of angles of a triangle. Students will prove that triangles are congruent using five methods: SSS, SAS, ASA, AAS, and HL and use them to prove that corresponding parts of congruent triangles are congruent. (1 quiz and 1 test)

V. **Properties and Attributes of Triangles (all sections)**
Students will apply the perpendicular and angle bisector theorems to find distances. Students will construct and use the center theorems of triangles to Solve Real-World Problems and segment lengths. In addition, students will use the triangle midsegment theorem to calculate lengths. They will also use the angle-side relationships of a triangle to order side lengths and angle measures. In addition, they will prove and use the pythagorean theorem to determine the side lengths of a triangle and classify triangles. Finally, they will use the 45-45-90 Triangle Theorem and the 30-60-90 Triangle Theorem to Find the Sides of a Triangle (1 quiz and 1 test)

VI. **Polygons and Quadrilaterals (all sections)**
Identify types of polygons and construct various regular polygons. Find the interior and exterior Angle measures of regular and nonregular polygons. In addition, they will also use the properties of parallelograms and special parallelograms to find measures and complete proofs. Students will also use the condition for parallelogram theorems to verify that a figure is a parallelogram. Students will identify special parallelograms use the conditions theorems to prove that a given quadrilateral is a rectangle, rhombus, or square and use the properties of kites and trapezoids to find the measures of their sides and angles. Finally, they will use the trapezoid midsegment theorem to find lengths. (1 quiz and 1 test)

**Semester 2**

VII. **Similarity (omit section 2)**
Identify and determine the corresponding sides and angles of similar polygons and if they are similar. They will prove similarity within triangles and find segment lengths using the triangle proportionality theorem, the two-transversal proportionality theorem, and the triangle angle bisector theorem. Finally, they will use Ratios to Find Lengths, Perimeters, and Areas in order to draw similar polygons and make scale drawings. (1 quiz and 1 test)

VIII. Right Triangles and Trigonometry (omit sections 5 and 6)
Students will find the geometric mean between two numbers and use the corollaries to find the lengths of altitudes and legs. Also they will find and use trigonometric ratios by hand and by calculator to find lengths and angles, solve right triangles and real-world problems. Then students will find distances using angles of elevation and depression. students will write radicals in simplified form. (1 quiz and 1 test)

IX. Extending Transformational Geometry (all sections)
Students will identify and draw reflections, translations, rotations, dilations, and compositions of transformations, Students will apply theorems about isometries and identify and describe symmetry in geometric figures. Students will identify regular and semiregular tessellations and use transformations to draw tessellations. (1 quiz and 1 test)

X. Perimeter, Circumference, and Area (omit section 4)
Students will develop area formulas for triangles, quadrilaterals, and composite figures and calculate areas, given appropriate Measurements. In addition, they will calculate the circumference and area of a circle and the area of a regular polygon estimate the area of an irregularly shaped figure. In addition, describe the effect on area caused by a proportional change in dimension and the effect on dimension caused by a change in area. (1 quiz and 1 test)

XI. Spatial Reasoning (all sections)
Students will classify three-dimensional geometric figures and describe nets and cross sections of three-dimensional geometric figures. In addition, they will calculate volumes and surface areas of the geometric solids and describe the effects on volume and surface area caused by changes in dimension. (1 quiz and 1 test)

XII. Circles (all sections)
Students will Identify, construct, measure and find lengths of chords, arcs, secants, and tangents of a circle. Students will also use the tangency theorems to find lengths. They will find the measures of arcs and chords and calculate arc lengths sector and segment Areas. In addition they will find the measures of arcs, inscribed angles and angles formed by secants and tangents and chords to a circle and inscribed quadrilaterals as well as finding arc measures. Students will write the equation of a circle in the coordinate plane by finding the center and radius of a circle and graph the circle. (1 quiz and 1 test)

Note: Probability Unit Deleted
XIII. Algebra 2 Readiness

Students will review and reinforce fundamental Algebra skills in preparation for Algebra 2 Trig Honors.