

Peddie Summer School

Course Syllabus: GEOMETRY CREDIT

120 Hours

Textbook: Geometry by Larson, Boswell, Stiff; published by McDougal Littell

This is a course in the axiomatic system of Euclidean Geometry. It is an average course intended for students with typical mathematical and problem solving skills. Deductive reasoning, logic and proofs are used throughout the course. Students are encouraged to make convincing arguments in paragraph proof, two-column proof, flow proof, coordinate proof, and indirect proof formats. Students are immediately introduced to definitions, postulates, axioms and theorems. The language of geometry is stressed. Calculators are used extensively as we are interested in the ability of the student to apply their knowledge of geometry, not arithmetic.

In addition, students study conditional statements, including symbolic notation and the laws of logic. To help students learn to develop proofs, many assignments and tests are included in which students must complete a proof by either supplying the appropriate statements or reasons. Platonic solids, dilations, frieze patterns, and loci are not included in this course. However volume and surface area of prisms, pyramids, cones, cylinders, and spheres is included,

Assignments include:

- substantial work with the skills and concepts taught in each lesson including but not limited to plans for proofs, two column proofs and paragraph proofs, indirect proofs, and coordinate proofs.
- traditional constructions with straight edge and compass
- critical thinking and the application of theorems
- the ability to read and understand information to draw appropriate inferences and to solve real world problems

Required supplies:

- 3 ring binder with loose leaf paper
- quadrille graph paper
- calculator TI 83 or higher not TI 89
- straight edge, protractor and Statler compass

Chapters and Topics Covered

Chapter 1: Basics of Geometry

- patterns and inductive reasoning
- points, lines, planes
- segments and their measure
- angles and their measure
- types of angle pairs
- perimeter, circumference and area

Chapter 2: Reasoning and Proof

- conditional statements
- bi-conditional statements
- deductive reasoning
- algebraic reasoning
- proving statements about segments and angles

Chapter 3: Perpendicular and Parallel Lines

- lines and angles
- proofs with perpendicular lines
- parallel lines and transversals
- proving lines parallel
- properties of parallel lines
- parallel and perpendicular lines in the coordinate plane

Chapter 4: Congruent Triangles

- classifying angles and triangles
- triangle congruence
- proving triangles congruent
- coordinate proofs with triangles

Chapter 5: Properties of Triangles

- perpendiculars and bisectors
- medians and altitudes
- mid-segment theorem
- inequalities in a triangle
- indirect proofs

Chapter 6: Quadrilaterals

- properties of parallelograms
- proving a quadrilateral is a parallelogram
- rhombuses, rectangles, squares, trapezoids, and kites
- area of quadrilaterals and triangles

Chapter 7: Transformations

- reflections, translations, and rotations
- composition of transformations in the coordinate plane
- introduction of vectors

Chapter 8: Similarity

- ratios and proportions including problem solving
- similar polygons
- proving triangles similar
- proportions with similar triangles

Chapter 9: Right Triangles and Trigonometry

- similar right triangles
- Pythagorean Theorem and its converse
- special right triangles
- trigonometric ratios
- vectors

Chapter 10: Circles

- tangents and secants
- arcs and chords
- inscribed angles
- segment lengths
- equations of circles

Chapter 11: Area of Polygons and Circles

- interior and exterior angle measurement
- angle measurement in regular polygons
- perimeter and area of similar figures
- circumference and arc length
- area of circles and sectors
- geometric probability

Chapter 12: Surface Area and Volume

- surface area of prisms, pyramids, cylinders, cones, and spheres
- volume of prisms, pyramids, cylinders, cones, and spheres
- similar solids