

Geometry

Grade: 11&12

Goals:

This course will build on topics in Geometry and introduce many new concepts to lay a solid foundation in the types of functions and equations that form the basis for advanced high school mathematics. In addition it will outline the basics of geometry, constructions and equations of lines, polygons, congruence and similarity of triangles, circles, lines and planes of three-dimensional space, measurement of three-dimensional shapes and transformations in the plane. We will stress problem solving and build an understanding of mathematical modeling to see the powerful applications of the concepts we study. This course is a preparation for Pre-Calculus, AP Calculus and college mathematics and will move at an accelerated pace, thus requiring students to bring a positive attitude and a dedicated work ethic to the classroom each day.

Expectations & Policies:

Organization: Students are asked to create an organizational system to retain notes, homework and graded assignments throughout the entire year so they can use that material for studying – all the way through final exams

Homework/Practice: Is a large part of mastering any math course and thus is assigned almost every night. Homework is graded purely on effort. Late homework will not receive full credit. For full credit, students are asked to attempt **all** problems on the assignment whether or not they complete them or get the right answer, and then correct their work when we go over questions in class. Homework assignments are often accompanied by reading assignments from the textbook in order to reinforce concepts discussed in class.

School Grading Policy

10% College preparedness

40% Exams

40% Class work/Projects

5% Homework

5% organizational skills/time management

UNIT 1: Basics of Geometry

- 1.1 Segments and Angles (G.G.35, G.CO)
- 1.2 Line segment and intersecting lines
 - Vertical angles
- 1.3 Compound and conditional statements (G.G.25, G.G.26)
 - Conjunction, disjunction, conditional, negation, inverse, contrapositive, and logical equivalence
- 1.4 Parallel Lines and Transversals (G.G.35)
 - Corresponding angles, alternate interior angles, alternate exterior angles, same side interior angles
- 1.5 Angles in a Triangle (G.G.30, G.G.31, G.G.37)
 - Sum of interior angles is 180 degrees, Exterior angles equals two opposite interior angles in a triangle
- 1.6 Inequalities in Triangles (G.G.32, G.G.33, G.G.34)
 - Sum of the two short sides must be greater than the longest side of the triangle
- 1.7 The Pythagorean Theorem and Its Converse (G.G.48)
- 1.8 Distance ,Midpoint Formulas and directed line segment (G.G.66, G.G.67)
- 1.9 Slope of a Line and Slope of a Perpendicular Line (G.G.62)
- 1.10 Equation of a Line (G.G.63)
- 1.11 Equation of Parallel and Perpendicular Lines (G.G.19, G.G.63, G.G.65, G.G.64)

Unit 2: Constructions

- 2.1 Construction of a perpendicular bisector (G.G. 17, G.G.18)
- 2.2 Construction of an angle bisector (G.G.17)
- 2.3 Construction of perpendicular lines (G.G.19)
- 2.4 Construction of parallel lines (G.G.19)
- 2.5 Determine whether two lines are parallel or perpendicular (G.G.19)
- 2.6 Regular Polygons (Project) (G.G.37)
- 2.7 Polygons and angle measure (G.G.36)
- 2.8 Sum of interior and exterior angles of a given regular polygon (G.G.36, G.G. 37)
- 2.9 Types of Quadrilaterals (Parallelogram, rhombus, square, rectangle, and trapezoid) (G.G. 38, G.G.40, G.G.27, G.G.39)
- 2.10 Classifying Quadrilaterals (G.G.41)

Unit 3: Coordinate Geometry

- 3.1 Triangles and Quadrilaterals in the coordinate plane (G.G.27, G.G.69)
Investigate, justify and apply properties of triangles and quadrilaterals in the coordinate plane using the distance, midpoint, and slope formulas
- 3.2 Congruence and similarity (G.G.27, G.G.28, G.G.18)
- 3.3 Triangle congruence (SSS, SAS, ASA, AAS, and HL) (G.G.18, G.G. 27, G.G. 29)
- 3.4 Proving Triangles Similar (AA, SAS, and SSS theorems) (G.G.27, G.G.44)
- 3.5 Solving Similarity Problems (G.G.45)
- 3.6 Proportionality in a Triangle (G.G.42, G.G.45, G.G. 46)
- 3.7 Proportionality in a Right Triangle (G.G.47)
- 3.8 Concurrence, Medians and Altitudes in a Triangle (G.G.21, G.G.43, G.G.21)
- 3.9 Right Triangle Trigonometry

Unit 4: Circles

- 4.1 Area and Circumference of a Circle
- 4.2 Chords and Circles (G.G.49)
- 4.3 Tangent to Circles (G.G.50)
- 4.4 Secants-Secants to Circles (G.G.50)
- 4.5 Tangents and Secants (G.G.49, G.G.50)
- 4.6 Arcs (G.G. 51, G.G52), Arc Length
- 4.7 Tangent- Chord on /in a Circle (G.G.49, G.G.50)
- 4.8 Arcs of a Circle cut by two parallel lines (G.G.51)
- 4.9 Two tangents to a circle from the same external point (G.G.50)
- 4.10 Two secants in a circle from the same external point (G.G.50)

Unit 5: Circles in Coordinate Geometry

- 5.1 Circles in the coordinate plane (G.G.71, G.G.72, G.G.73, G.G.74)
- 5.2 Writing the equation of a circle with the center at the origin and a radius (G.G.71)
- 5.3 Write the equation of a circle given its graph (G.G.72)
- 5.4 Write the equation of a circle with its center not in the origin (G.G.73)
- 5.5 Graphing circles with a given center and radius (G.G.73)
- 5.6 Linear and Quadratic systems of an equation (graphically) (G.G. 70)

Unit 6:
Solid Geometry

- 6.1 Lines and Planes in three-dimensional space (G.G.1)
- 6.2 Planes and lines in space (G.G.3)
- 6.3 Perpendicular and parallel planes (G.G.5, G.G.7, G.G.8, G.G.9)
- 6.4 Three-dimensional shapes and types (G.G.3, G.G.8, G.G.9)
- 6.5 Measurement of three-dimensional shapes (Project) (G.G.3, G.G.8, G.G.9, G.G.10)
- 6.6 Prisms, Cylinders and Cones (G.G.10, G.G.11, G.G.12, G.G.14, G.G.13, G.G.15)

Unit 7:
Transformations in the Plane

- 7.1 Translation (G.G.54, G.G.55, G.G.61)
- 7.2 Reflection (G.G.54, G.G.55, G.G.61)
- 7.3 Rotations (G.G.54, G.G.55, G.G.61)
- 7.4 Dilations (G.G.58, G.G.59, G.G.60), Dilation and line Segment
- 7.5 Composition of Transformation