Geometry Topics

UNIT 1 – BASICS OF GEOMETRY

- Identify and apply the three undefined terms; points, lines and planes.
- Use the undefined terms to define segments, angles, rays, and bisector.
- Name and classify angles as acute, right, and obtuse.
- Identify angle pairs and find measures; adjacent, vertical, supplementary, complementary using algebraic (linear, quadratic) methods
- Apply formulas for perimeter, area and circumference.
- Develop and apply the formula for midpoint.
- Use the distance formula and Pythagorean Theorem to find the distance between two points on a coordinate plane.
- Identify reflections, rotations and translations of points, lines, segments and angles.

UNIT 2 – REASONING & PROOF

- Use inductive reasoning to identify patterns and make conjectures.
- Find counterexamples to disprove conjectures.
- Identify, write and analyze the truth value of conditional statements converse, inverse and contrapositive of conditional statements.
- Write and analyze bi-conditional statements.
- Identify properties of equality and congruence and use them to write algebraic proofs and geometric proofs.
- Write two-column proofs.
- Prove geometric theorems by using deductive reasoning.

UNIT 3 – PARALLEL & PERPENDICULAR LINES

- Identify parallel, perpendicular and skew lines.
- Construct parallel, perpendicular and skew lines.
- Prove and apply theorems about perpendicular lines.
- Identify the angles formed by two lines and a transversal.
- Prove and use theorems about the angles formed by parallel lines and a transversal.
- Use the angles formed by a transversal to prove 2 lines parallel.
- Use slope to identify parallel and perpendicular lines.
- Write equations of parallel and perpendicular lines.
- Classify lines as parallel, intersecting or coinciding on coordinate plane.

Geometry Topics

UNIT 4 – CONGRUENT TRIANGLES

- Classifying triangles by angle measure and sides length.
- Use triangle classification to find angle measure and side length. (Include linear and quadratic expressions)
- Use properties of congruent triangles.
- Prove triangles congruent by using the definition of congruence.
- Apply SSS, SAS and ASA to solve problems and prove triangles congruent.
- Use CPCTC to prove parts of triangles congruent.
- Draw, identify and describe transformations of triangles in a coordinate plane.
- Use properties of rigid motions to determine whether figures are congruent and to prove figures congruent.
- Position figures in coordinate plane for use in coordinate proofs.
- Prove geometric concepts by using coordinate proof.
- Prove theorems and apply properties about isosceles and equilateral triangles.

UNIT 5 – PROPERTIES OF TRIANGLES

- Prove and apply theorems about perpendicular bisectors and angle bisectors.
- Prove and apply properties of perpendicular bisectors, angle bisectors, medians, altitudes and mid-segments.
- Construct a perpendicular bisector of a segment, an angle bisector, the circum-center and in-center of a triangle.
- Use the Converse of Pythagorean Theorem to classify triangles.
- Justify and apply properties of 45-45-90 and 30-60-90 right triangles.

UNIT 6 – QUADRILATERALS

- Find and use the measures of interior and exterior angles of polygons.
- Prove and apply properties of parallelograms.
- Use and apply properties of parallelograms to solve problems.
- Prove that a given quadrilateral is a parallelogram.
- Prove an apply properties of rhombi, rectangles and squares.
- Use and apply properties of rhombi, rectangles and squares to solve problems.
- Prove that a given quadrilateral is a rhombus, rectangle or a square.
- Reflect, rotate and translate a parallelogram.

Geometry Topics

UNIT 7 – SIMILARITY

- Identify similar polygons.
- Apply properties of similar polygons to solve problems.
- Draw and describe similarity transformations in the coordinate plane.
- Use properties of similarity transformations to determine whether polygons are similar and to prove circles are similar.
- Use AA, SSS and SAS similarity criteria to determine if two triangles are similar.
- Use properties of similar triangles to solve problems and find segment lengths by indirect measure.
- Use properties of similar triangles to apply Triangle Angle Bisector Theorem and Triangle Proportionality Theorem.
- Apply similar triangle properties to use dilation on coordinate plane.

UNIT 8 – RIGHT TRIANGLES

- Use Geometric Mean to find segment lengths in right triangles.
- Apply similarity relationships in right triangles to solve problems.
- Find the sine, cosine and tangent of an acute angle.
- Use trigonometric ratios to find side lengths and angle measures in right triangles and to solve real world problems including but not limited to angle of elevation, and of depression, height, distance away, etc.

UNIT 9 – AREA

- Use the area formula for a triangle to create the area formula for regular polygons.
- Use right triangle relationships to help find the area of regular polygons.
- Find the measure of a remote interior angle of a regular polygon.
- Find the sum of the exterior angles of a regular polygon.
- Calculate Geometric Probability.

Geometry Topics

UNIT 10 – CIRCLES

- Identify tangents, secants and chords and use their properties to solve problems.
- Apply properties of arcs and chords.
- Find the area of sectors.
- Find arc lengths.
- Find the measure of an inscribed angle and use their properties of solve problems.
- Find the measures of angles and lengths of segments formed by lines that intersect circles.
- Use the measures of angles and lengths of segments formed by lines that intersect circles to solve problems.
- Write and graph the equation of a circle.
- Use the equation of a circle to solve problems.

UNIT 11 – 3 DIMENSIONAL FIGURES

- Classify 3-dimensional figures according to their properties.
- Use nets and cross-sections to analyze 3-dimensional figures.
- Apply the formula for volume for prism, cylinder, pyramid, cone and sphere.
- Use volume formula to solve real world problems.