

Geometry Objectives

- I. The student will understand the relationship between defined and undefined terms.
- II. The student will develop and use principles of logic and reasoning.
- III. The student will use the properties of polygons.
- IV. The student will recognize and perform transformations.
- V. The student will analyze circles and apply their properties to geometric problems.
- VI. The student will be able to interpret, calculate, and apply geometric measurement concepts.

Learning Standards for Geometry – Quarter 1

1. Students will learn the foundation blocks for the structure of geometry

Students will

- learn to use inductive reasoning to make conjectures.
- understand basic terms: points, lines, planes, segments, rays, and parallel lines and parallel planes, perpendicular.
- measure segments and angles.
- use the distance and midpoint formulas.
- determine perimeter, circumference, and area.

2. Students will develop skills involving reasoning and proof.

Students will

- recognize and write conditional and corresponding converse statements.
- distinguish between the Law of Detachment and Law of Syllogism and how they apply to various situations.
- connect reasoning in algebra and geometry by use of properties.
- recognize and apply appropriate theorems to prove congruency of angles.

3. Students will prove and use properties of parallel lines and learn about angle measures in triangles and other polygons.

Students will

- identify angles formed by two lines and a transversal and use properties of parallel lines.

- apply appropriate theorems and postulates to prove parallel lines given a transversal.
- understand the relationships between parallel and perpendicular lines.
- classify triangles and find the measures and sums of their interior and exterior angles.
- write and graph the equation of a line.
- use slope to determine when lines are parallel, perpendicular or intersecting.

Learning Standards for Geometry – Quarter 2

4. Students will learn how to prove that triangles are congruent

Students will

- recognize congruent figures and their corresponding parts.
- prove triangles are congruent using the SSS, SAS and ASA postulates as well as the AAS and HL theorems.
- use CPCTC to prove that corresponding parts of congruent triangles are congruent.
- apply properties of isosceles and equilateral triangles.

5. Students will learn about geometric relationships within triangles

Students will

- use properties of midsegments of triangles to solve problems.
- apply properties of perpendicular bisectors, angle bisectors, medians and altitudes.
- write the inverse and contrapositive of a conditional statement.
- use indirect reasoning.
- apply triangle inequalities.

6. Students will classify and use properties of quadrilaterals.

Students will

- define and classify special types of quadrilaterals.
- use relationships among sides, angles, diagonals and transversals of parallelograms.
- be able to determine whether a quadrilateral is a parallelogram.
- work with properties of rhombi.
- verify and use properties of trapezoids and kites.

Learning Standards for Geometry – Quarter 3

7. Students will learn how to find the area of geometric figures.

Students will

- find the areas of parallelograms, triangles, trapezoids, rhombuses, kites, and regular polygons.
- learn to use the Pythagorean Theorem and its converse.
- use the properties of special triangles: 45° - 45° - 90° and 30° - 60° - 90° .
- use CPCTC to prove that corresponding parts of congruent triangles are congruent.
- find the measures of central angles and arcs of circles.
- find the circumference and arc lengths of circles.
- find the areas of circles, sectors, and segment of circles.

8. Students will learn and use to apply the properties of similar polygons

Students will

- write ratios and solve proportions.
- use proportions to identify similar polygons.
- use and apply AA, SAS, and SSS similarity statements.
- find and use relationships in similar right triangles.
- use the Side-Splitter Theorem and the Triangle-Angle Bisector Theorem.
- find perimeters and areas of similar figures.

9. Students will learn the basics of right-angle trigonometry

Students will

- use the sine, cosine, and tangent ratios to determine side and angle measurements in right triangles.
- use Angle of Elevation and Angle of Depression to solve problems.
- learn the Pythagorean Identity.
- use trigonometry to find the area of a regular polygon and any triangle.

Learning Standards for Geometry – Quarter 4

10. Students will learn about Surface Area and Volume

Students will

- be able to recognize the parts of a polyhedron (i.e. faces, edges, vertices).
- find the surface area of a prism, cylinder, pyramid, cone, and sphere.
- find the volume of a prism, cylinder, pyramid, cone, and sphere.
- find relationships between the ratios of the areas and volumes of similar solids.

11. Students will learn Circles

Students will

- use the relationship between a radius and a tangent.
- use the relationship between two tangents from one point.
- use congruent chords, arcs, and central angles.
- recognize properties of lines through the center of a circle.
- calculate the measure of an inscribed angle.
- calculate an angle formed by a tangent and a chord.
- find the measures of angles formed by chords, secants and tangents.
- find the lengths of segments associated with circles.
- be able to write an equation of a circle.
- find the center and radius of a circle.

12. Students will learn to use Transformations for relating two given congruent shapes to each other

Students will

- be able to find reflection images of figures.
- identify isometries.
- find translation images.
- draw and identify rotation images of figures.
- use composition of reflections.
- identify glide reflections.
- identify the type of symmetry in a figure.
- identify transformations and tessellations and figures that will tessellate.
- identify symmetries in tessellations.
- locate dilation images in figures.