

Comstock Public Schools
Geometry POWER STANDARDS

L1.1 Number Systems and Number Sense

- **L1.1.6** Explain the importance of the irrational numbers $\sqrt{2}$ and $\sqrt{3}$ in basic right triangle trigonometry, the importance of π because of its role in circle relationships, and the role of e in applications such as continuously compounded interest.

L4.1 Mathematical Reasoning

- **L4.1.1** Distinguish between inductive and deductive reasoning, identifying and providing examples of each.
- **L4.1.3** Define and explain the roles of axioms (postulates), definitions, theorems, counterexamples, and proofs in the logical structure of mathematics. Identify and give examples of each.

L4.2 Language and Laws of Logic

- **L4.2.1** Know and use the terms of basic logic (e.g., proposition, negation, truth and falsity, implication, if and only if, contrapositive, and converse).
- **L4.2.4** Write the converse, inverse, and contrapositive of an “If..., then...” statement. Use the fact, in mathematical and everyday settings, that the contrapositive is logically equivalent to the original while the inverse and converse are not.

L4.3 Proof

- **L4.3.1** Know the basic structure for the proof of an “If..., then...” statement (assuming the hypothesis and ending with the conclusion) and that proving the contrapositive is equivalent.

G1.1 Lines and Angles; Basic Euclidean and Coordinate Geometry

- **G1.1.1** Solve multistep problems and construct proofs involving vertical angles, linear pairs of angles, supplementary angles, complementary angles, and right angles.

- **G1.1.2** Solve multistep problems and construct proofs involving corresponding angles, alternate interior angles, alternate exterior angles, and same-side (consecutive) interior angles.
- **G1.1.5** Given a line segment in terms of its endpoints in the coordinate plane, determine its length and midpoint.
- **G1.1.6** Recognize Euclidean geometry as an axiom system. Know the key axioms and understand the meaning of and distinguish between undefined terms (e.g., point, line, and plane), axioms, definitions, and theorems.

G1.2 Triangles and Their Properties

- **G1.2.2** Construct and justify arguments and solve multistep problems involving angle measure, side length, perimeter, and area of all types of triangles.
- **G1.2.5** Solve multistep problems and construct proofs about the properties of medians, altitudes, and perpendicular bisectors to the sides of a triangle, and the angle bisectors of a triangle. Using a straightedge and compass, construct these lines.

G1.3 Triangles and Trigonometry

- **G1.3.1** Define the sine, cosine, and tangent of acute angles in a right triangles as ratios of sides. Solve problems about angles, side lengths, or areas using trigonometric ratios in right triangles.

G1.4 Quadrilaterals and Their Properties

- **G1.4.1** Solve multistep problems and construct proofs involving angle measure, side length, diagonal length, perimeter, and area of squares, rectangles, parallelograms, kites, and trapezoids.
- **G1.4.3** Describe and justify hierarchical relationships among quadrilaterals (e.g., every rectangle is a parallelogram).

G1.5 Other Polygons and Their Properties

- **G1.5.2** Know, justify, and use formulas for the perimeter and area of a regular n -gon and formulas to find interior and exterior angles of a regular n -gon and their sums.

G1.6 Circles and Their Properties

- **G1.6.1** Solve multistep problems involving circumference and area of circles.
- **G1.6.2** Solve problems and justify arguments about chords (e.g., if a line through the center of a circle is perpendicular to a chord, it bisects the chord) and lines tangent to circles (e.g., a line tangent to a circle is perpendicular to the radius drawn to the point of tangency).
- **G1.6.3** Solve problems and justify arguments about central angles, inscribed angles, and triangles in circles.
- **G1.6.4** Know and use properties of arcs and sectors and find lengths of arcs and areas of sectors.

G1.8 Three-dimensional Figures

- **G1.8.1** Solve multistep problems involving surface area and volume of pyramids, prisms, cones, cylinders, hemispheres, and spheres.

G2.1 Relationships Between Area and Volume Formulas

- **G2.1.1** Know and demonstrate the relationships between the area formula of a triangle, the area formula of a parallelogram, and the area formula of a trapezoid.

G2.3 Congruence and Similarity

- **G2.3.1** Prove that triangles are congruent using the SSS, SAS, ASA, and AAS criteria and that right triangles are congruent using the hypotenuse-leg criterion.
- **G2.3.4** Use theorems about similar triangles to solve problems with and without use of coordinates.

G3.1 Distance-preserving Transformations: Isometries

- **G3.1.1** Define reflection, rotation, translation, and glide reflection and find the image of a figure under a given isometry.
- **G3.1.2** Given two figures that are images of each other under an isometry, find the isometry and describe it completely.

G3.2 Shape-reserving Transformations: Dilations and Isometries

- **G3.2.1** Know the definition of dilation and find the image of a figure under a given dilation.