

Imlay City High School Geometry Alignment Record

Textbook: Prentice Hall Mathematics “Geometry”

Chapter Section	HSCE Code	Code Description
Chapter 1		
Section 1-1	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.
	L4.3.2	Construct proofs by contradiction. Use counterexamples, when appropriate, to disprove a statement.
Section 1-2	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.
	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.
Section 1-3	L4.1.1	Distinguish between inductive and deductive reasoning, identifying and providing examples of each.
Section 1-5	G1.1.3	Perform and justify constructions, including midpoint of a line segment and bisector of an angle, using straightedge and compass.
Section 1-6	G1.1.5	Given a line segment in terms of its endpoints in the coordinate plane, determine its length and midpoint.
Section 1-7	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.
	L3.1.1	Convert units of measurement within and between systems; explain how arithmetic operations on measurements affect units, and carry units through calculations correctly.
	G1.5.1	Know and use subdivision or circumscription methods to find areas of polygons (e.g., regular octagon, nonregular pentagon).
	G1.6.1	Solve multistep problems involving circumference and area of circles.
Chapter 2		
Section 2-1	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.
	L4.2.1	Know and use the terms of basic logic (e.g., proposition, negation, truth and falsity, implication, if and only if, contrapositive, and converse).
	L4.2.2	Use the connectives “not,” “and,” “or,” and “if..., then,” in mathematical and everyday settings. Know the truth table of each connective and how to logically negate statements involving these connectives.
	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.
	L4.3.1	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.
Section 2-2	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.
	L4.2.1	Know and use the terms of basic logic (e.g., proposition, negation, truth and falsity, implication, if and only if, contrapositive, and converse).
	L4.2.2	Use the connectives “not,” “and,” “or,” and “if..., then,” in mathematical and everyday settings. Know the truth table of each connective and how to logically negate statements involving these connectives.
Section 2-4	G1.1.1	Solve multistep problems and construct proofs involving vertical angles, linear pairs of angles, supplementary angles, complementary angles, and right angles.
Section 2-5	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.
	G1.1.1	Solve multistep problems and construct proofs involving vertical angles, linear pairs of angles, supplementary angles, complementary angles, and right angles.
Chapter 3		
Section 3-1	G1.1.2	Solve multistep problems and construct proofs involving corresponding angles, alternate interior angles, alternate exterior angles, and same-side (consecutive) interior angles.
Section 3-3	G1.2.1	Prove that the angle sum of a triangle is 180° and that an exterior angle of a triangle is the sum of the two remote interior angles.
	G1.2.2	Construct and justify arguments and solve multistep problems involving angle measure, side length, perimeter, and area of all types of triangles.

Section 3-4	G1.4.4	Prove theorems about the interior and exterior angle sums of a quadrilateral.
	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.
Section 3-7	G1.1.4	Given a line and a point, construct a line through the point that is parallel to the original line using straightedge and compass. Given a line and a point, construct a line through the point that is perpendicular to the original line. Justify the steps of the constructions.
Chapter 4		
Section 4-2	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.
Section 4-3	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.
Section 4-4	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.
	G2.3.2	Use theorems about congruent triangles to prove additional theorems and solve problems, with and without use of coordinates.
Section 4-5	G1.2.2	Construct and justify arguments and solve multistep problems involving angle measure, side length, perimeter, and area of all types of triangles.
Section 4-6	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.
Chapter 5		
Section 5-3	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.
Section 5-4	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).
	L4.2.2	Use the connectives “not,” “and,” “or,” and “if..., then,” in mathematical and everyday settings. Know the truth table of each connective and how to logically negate statements involving these connectives.
	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.
	L4.3.1	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.

	L4.3.2	Construct proofs by contradiction. Use counterexamples, when appropriate, to disprove a statement.
Chapter 6		
Section 6-1	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.
	G1.4.2	Solve multistep problems and construct proofs involving quadrilaterals (e.g., prove that the diagonals of a rhombus are perpendicular) using Euclidean methods or coordinate geometry.
	G1.4.3	Describe and justify hierarchical relationships among quadrilaterals (e.g., every rectangle is a parallelogram).
Section 6-2	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.
	G1.4.2	Solve multistep problems and construct proofs involving quadrilaterals (e.g., prove that the diagonals of a rhombus are perpendicular) using Euclidean methods or coordinate geometry.
Section 6-4	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.
	G1.4.2	Solve multistep problems and construct proofs involving quadrilaterals (e.g., prove that the diagonals of a rhombus are perpendicular) using Euclidean methods or coordinate geometry.
Section 6-5	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.
	G1.4.2	Solve multistep problems and construct proofs involving quadrilaterals (e.g., prove that the diagonals of a rhombus are perpendicular) using Euclidean methods or coordinate geometry.
Chapter 7		
Section 7-1	G1.2.2	Construct and justify arguments and solve multistep problems involving angle measure, side length, perimeter, and area of all types of triangles.
	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.
	G2.1.2	Know and demonstrate the relationships between the area formulas of various quadrilaterals (e.g., explain how to find the area of a trapezoid based on the areas of parallelograms and triangles).
Section 7-2	G1.2.3	Know a proof of the Pythagorean Theorem and use the Pythagorean Theorem and its converse to solve multistep problems.

Section 7-3	G1.2.4	Prove and use the relationships among the side lengths and the angles of 30°- 60°- 90° triangles and 45°- 45°- 90° triangles.
Section 7-4	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.
	G2.1.2	Know and demonstrate the relationships between the area formulas of various quadrilaterals (e.g., explain how to find the area of a trapezoid based on the areas of parallelograms and triangles).
Section 7-5	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.
Section 7-6	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.
Section 7-7	G1.6.1	Solve multistep problems involving circumference and area of circles.
	G1.6.4	Know and use properties of arcs and sectors and find lengths of arcs and areas of sectors.
Chapter 8		
Section 8-3	G2.3.3	Prove that triangles are similar by using SSS, SAS, and AA conditions for similarity.
	G2.3.4	Use theorems about similar triangles to solve problems with and without use of coordinates.
Chapter 9		
Section 9-1	G1.3.1	Define the sine, cosine, and tangent of acute angles in a right triangle as ratios of sides. Solve problems about angles, side lengths, or areas using trigonometric ratios in right triangles.
Section 9-2	G1.3.1	Define the sine, cosine, and tangent of acute angles in a right triangle as ratios of sides. Solve problems about angles, side lengths, or areas using trigonometric ratios in right triangles.
Section 9-3	G1.3.1	Define the sine, cosine, and tangent of acute angles in a right triangle as ratios of sides. Solve problems about angles, side lengths, or areas using trigonometric ratios in right triangles.
Section 9-4	L1.2.3	Use vectors to represent quantities that have magnitude and direction, interpret direction and magnitude of a vector numerically, and calculate the sum and difference of two vectors.
Section 9-5	G1.3.2	Know and use the Law of Sines and the Law of Cosines and use them to solve problems. Find the area of a triangle with sides a and b and included angle θ using the formula $\text{Area} = (1/2) a b \sin \theta$.
	G1.5.1	Know and use subdivision or circumscription methods to find areas of polygons (e.g., regular octagon,

		nonregular pentagon).
	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.
Chapter 10		
Section 10-1	G2.2.1	Identify or sketch a possible three-dimensional figure, given two-dimensional views (e.g., nets, multiple views). Create a two-dimensional representation of a three-dimensional figure.
	G2.2.2	Identify or sketch cross sections of three-dimensional figures. Identify or sketch solids formed by revolving two-dimensional figures around lines.
Section 10-2	G2.2.1	Identify or sketch a possible three-dimensional figure, given two-dimensional views (e.g., nets, multiple views). Create a two-dimensional representation of a three-dimensional figure.
	G2.2.2	Identify or sketch cross sections of three-dimensional figures. Identify or sketch solids formed by revolving two-dimensional figures around lines.
Section 10-3	G1.8.1	Solve multistep problems involving surface area and volume of pyramids, prisms, cones, cylinders, hemispheres, and spheres.
Section 10-4	G1.8.1	Solve multistep problems involving surface area and volume of pyramids, prisms, cones, cylinders, hemispheres, and spheres.
Section 10-5	G1.8.1	Solve multistep problems involving surface area and volume of pyramids, prisms, cones, cylinders, hemispheres, and spheres.
	G2.1.3	Know and use the relationship between the volumes of pyramids and prisms (of equal base and height) and cones and cylinders (of equal base and height).
Section 10-6	G1.8.1	Solve multistep problems involving surface area and volume of pyramids, prisms, cones, cylinders, hemispheres, and spheres.
	G2.1.3	Know and use the relationship between the volumes of pyramids and prisms (of equal base and height) and cones and cylinders (of equal base and height).
Section 10-7	G1.8.1	Solve multistep problems involving surface area and volume of pyramids, prisms, cones, cylinders, hemispheres, and spheres.
Section 10-8	G1.8.2	Identify symmetries of pyramids, prisms, cones, cylinders, hemispheres, and spheres.
Chapter 11		
Section 11-1	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).

Section 11-2	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).
Section 11-3	G1.6.3	Solve problems and justify arguments about central angles, inscribed angles, and triangles in circles.
Chapter 12		
Section 12-1	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.
Section 12-2	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.
Section 12-3	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.
Section 12-4	G3.1.3	Find the image of a figure under the composition of two or more isometries and determine whether the resulting figure is a reflection, rotation, translation, or glide reflection image of the original figure.
Section 12-7	G2.3.5	Know and apply the theorem stating that the effect of a scale factor of k relating one two-dimensional figure to another or one three-dimensional figure to another, on the length, area, and volume of the figures is to multiply each by k , k^2 , and k^3 , respectively.
	G3.2.1	Know the definition of dilation and find the image of a figure under a given dilation.
	G3.2.2	Given two figures that are images of each other under some dilation, identify the center and magnitude of the dilation.