

Math - Geometry

Idaho Department of Education Content Standards	Objective	Sub Objectives	ACT Objectives	Task Analysis	Essential Vocabulary	Sample Assessment	Resources
Standard 1: Number and Operation							
Goal 1.1: Understand numbers, ways of representing numbers, relationships among numbers, and number systems.	Understand the meaning of real numbers.	<ul style="list-style-type: none"> Describe the attributes of rational and irrational numbers. 	<ul style="list-style-type: none"> Work with squares and square roots of numbers. 	<ul style="list-style-type: none"> Define and explain π as the ratio of the circumference of a circle to its diameter. Identify π as an irrational number. Use 3.14 & 22/7 as an approximation for π. Compare rational and irrational numbers including square roots (include radicands that are not perfect squares). 	<ul style="list-style-type: none"> π irrational numbers real numbers rational numbers diameter circumference radical 	Geo Sample Assessment Goal 1.1 07.docx	http://www.funmaths.com/worksheets/math_measurement_06.htm
Goal 1.2: Understand meaning of operations and how they relate to one another.	No objectives at this grade level.						
Goal 1.3: Compute fluently and make reasonable estimates.	G.1.3.1 Judge the reasonableness of numerical computations and their results.	<ul style="list-style-type: none"> Distinguish between reasonable and unreasonable computations and their results. 	<ul style="list-style-type: none"> Estimate or calculate the length of a line segment based on other lengths given on a geometric figure. Solve problems integrating multiple algebraic and/or geometric concepts. 	<ul style="list-style-type: none"> Recognize reasonable and unreasonable answers. Simplify expressions in terms of π. Simplify square roots including radicands which are not perfect squares. Use appropriate methods to estimate answers Distinguish between exact and approximate values of irrational numbers. 		Geometry Sample Assessment Goal 1. 3 07.docx	
Standard 2: Concepts and Principles of Measurement							
Goal 2.1: Understand measurable attributes of objects and the units, systems, and processes of measurement.	G.2.1.1 Select appropriate units for problems involving measurement.	<ul style="list-style-type: none"> Select appropriate units for problems involving measurement. 	<ul style="list-style-type: none"> Use relationships involving area, perimeter, and volume of geometric figures to compute another measure. Use scale factors to determine the magnitude of a size change. 	<ul style="list-style-type: none"> Explain relationships between units and convert from one unit to another. Select appropriate units for distance, angle measure, area, and volume. Use appropriate methods and units to estimate measurements in metric and customary units. Explain the relationship between scale factors and length, area, and volume of similar shapes. Solve problems involving scale factors, rates, ratios, and proportions. 	<ul style="list-style-type: none"> Apothem base of a polygon cone circumference cylinder diameter face lateral area prism pyramid regular polygon radii semicircle sphere altitude arc length axioms postulates central angle chord common tangent consecutive interior angles or same side interior angles, corollary diagonal exterior angle interior angle hemisphere hypotenuse inscribed angle intercepted arc legs of a right triangle legs of a trapezoid linear pair segment notation major arc minor arc point of tangency Pythagorean triple Pythagorean Theorem secant line tangent line secant segment sector of a circle vertex. 	Geometry Sample Assessment Goal 2.1 07.docx	
Goal 2.2: Apply appropriate techniques, tools, and formulas to determine measurements.	G.2.2.1 Understand and use formulas to calculate the perimeter, circumference, area, surface area, and volume of geometric figures.	<ul style="list-style-type: none"> Select and use appropriate formulas to calculate perimeter, etc. 	<ul style="list-style-type: none"> Exhibit knowledge of angles associated with parallel lines. Compute the perimeter of polygons when all side lengths are given. Compute the area of and perimeter of triangles and rectangles. Use geometric formulas when all necessary information is given. Use several angle properties to find an unknown angle measure. Recognize Pythagorean triples. 	<ul style="list-style-type: none"> Calculate the perimeter and area of triangles, quadrilateral, and other regular polygons. Calculate the circumference and area of a circle, the area of a sector of a circle. Calculate the surface area and volume of prisms, cylinders, pyramids, cones, and spheres. Develop strategies to determine the areas of irregular shapes. 		Geometry Sample Assessment Goal 2.2.1 07.docx	http://www.funmaths.com/worksheets/downloads/ws0136.pdf
	G.2.2.2 Understand and apply definitions, theorems, corollaries, and postulates to determine measurement.	<ul style="list-style-type: none"> Explain and use definitions, theorems, corollaries, and postulates to determine measurement. 	<ul style="list-style-type: none"> Compute the area and circumference of circles. Compute the perimeter of composite geometric figures. Use relationships among angles, arcs, and distances in a circle. Use the Pythagorean theorem. 	<ul style="list-style-type: none"> Apply the segment addition postulate to find the measures of segments. Apply the angle addition postulate to find the measures of angles. Find the measures of angles (adjacent, complementary, supplementary, vertical angles, linear pairs, and special angles formed by parallel lines cut by a transversal). Use and apply the triangle inequality theorem to find missing measures. Calculate the sums of the interior and exterior angles of a polygon. Calculate the measure of each interior and exterior angle of a regular polygon. Use and apply the Pythagorean Theorem. Find the measures of inscribed and central angles and their corresponding intercept arcs. Find the lengths and measures of arcs of a circle. Find the lengths of segments and measures of angles formed by radii, chords, secants, and tangents of circles. 		Geometry Sample Assessment Goal 2.2.2 07.docx	

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Standard 3: Concepts and Language of Algebra and Functions							
Goal 3.1 Understand patterns, relations, and functions.	G.3.1.1 Describe the graphs of linear functions and discuss their appearances in terms of the basic concepts of intercepts and rate of change.	<ul style="list-style-type: none"> Describe the graphs of linear functions and discuss their appearances in terms of the basic concepts of intercepts and rate of change (slope). 	<ul style="list-style-type: none"> Exhibit knowledge of slope. Determine the slope of a line from points or equations. Use properties of parallel and perpendicular lines to determine an equation of line or coordinates of a point. 	<ul style="list-style-type: none"> Find and interpret the slope (rate of change) and intercepts in relation to the context. Explain the relationships of the slopes of parallel and perpendicular lines. Find the slopes of the lines parallel and perpendicular when given the equation of the line. Graph the lines parallel and perpendicular to a line given the equation (slope-intercept, standard, point-slope) through a given point. 	rate of change • slope • parallel • perpendicular • intercepts	Geometry Sample Assessment Goal 3.1 07.docx	
Goal 3.2 Represent and analyze mathematical situations and structures using algebraic symbols.	G.3.2.1 Represent linear patterns and relationships with an equation.	<ul style="list-style-type: none"> Compose equations which represent linear patterns and relationships. 		<ul style="list-style-type: none"> Write equations for parallel and perpendicular lines, given: slope and points or equation and point. 		Geometry Sample Assessment Goal 3.2 07.docx	
Goal 3.3 Use mathematical models to represent and understand quantitative relationships.	No objectives at this grade level.						
Goal 3.4 Analyze change in various contexts.	No objectives at this grade level.						
Standard 4: Concepts and Principles of Geometry							
Goal 4.1: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.	G.4.1.1 Analyze properties and determine attributes of two- and three-dimensional objects.	<ul style="list-style-type: none"> Compare and contrast properties and attributes of geometric objects. 	<ul style="list-style-type: none"> Exhibit some knowledge of the angles associated with parallel lines. Find the measure of an angle using properties of parallel lines. Use properties of isosceles triangles. Use relationships among angles arcs, and distances in a circle. 	<ul style="list-style-type: none"> Apply the fundamental concepts, properties, and relationships among points, lines, rays, planes, and angles. Use accepted geometric notation for lines, planes, segments, rays, angles, similarity and congruence. Classify angles by their measure (acute, right, obtuse, straight). Identify and determine relationships in adjacent, complementary, supplementary, and vertical angles, and in linear pairs. Identify and use the special angle pairs formed by parallel lines and a transversal. Classify triangles by side and angle (acute, right, obtuse, scalene, isosceles, equilateral, equiangular). Classify, compare and contrast, quadrilaterals by their attributes (parallelograms, rectangles, rhombi, squares). Classify polygons by side and concavity. Classify polygons as regular or not. 	<ul style="list-style-type: none"> acute triangle • adjacent angles • adjacent sides • alternate interior angles • alternate exterior angles • angle bisector • angle of elevation • angle of depression • axioms • postulates • base angles of an isosceles triangle • base angles of an isosceles trapezoid • bisect • collinear • compass • concave polygon • concentric circles • conclusion • hypothesis • conditional statement • congruent • conjecture • consecutive interior angles • constructions • convex polygon • coplanar • corollary • corresponding angles • cosine • sine • tangent • diagonal • dilation • distance formula • exterior angle • interior angle • geometric mean • image • inductive reasoning • deductive reasoning • inscribed polygon • legs of an isosceles triangle • line of reflection • perpendicular • segment notation • major arc • minor arc • median of a triangle • midpoint • midpoint formula • midsegment of a trapezoid • net • parallel • perpendicular bisector 	Geometry Sample Assessment Goal 4.1.1 07.docx	http://mathbits.com/MathBits/GSP/GSP.htm http://mathbits.com/MathBits/TeacherResources/Geometry/Geometry.htm www.geogebra.org http://geocentral.net/geometry http://illumination.net http://www.shodor.org/interactive http://www.homeschoolmath.net/online/geometry.php http://www.mathsnet.net/geometry/index.html http://www.funmaths.com/worksheets/math_geometry_02.htm http://www.explorelearning.com/index.cfm?method=cResource.dspChildrenForCourse&CourseID=339&submit=Go
	G.4.1.2 Explore congruence and similarity among classes of two dimensional objects and solve problems involving them.	<ul style="list-style-type: none"> Identify congruence and similarity among classes of two dimensional objects and solve problems. 		<ul style="list-style-type: none"> Identify and apply congruency and similarity in two-dimensional figures. Identify the scale factor between two similar figures and use it to find missing lengths. Solve problems involving the geometric mean of two numbers. Solve problems involving the geometric mean given a right triangle with an altitude drawn to the hypotenuse. 	pre-image • reflection • rotation • scale factor	Geometry Sample Assessment Goal 4.1.2 07.docx	
	G.4.1.3 Establish the validity of geometric conjectures.	<ul style="list-style-type: none"> Prove the validity of geometric conjecture using inductive and deductive reasoning (formally and informally). 	<ul style="list-style-type: none"> Draw conclusions based on a set of conditions. 	<ul style="list-style-type: none"> Construct logical arguments, form conjectures, judge their validity, and give counterexamples to disprove statements. Prove triangles are congruent using SSS, SAS, ASA, AAS, HL. Prove lines are parallel or perpendicular using special angle pair theorems (formal and informal). 		Geometry Sample Assessment Goal 4.1.3 07.docx	

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	<ul style="list-style-type: none"> Students should see the power of deductive proof in justifying the validity of general results from given conditions. Students should hypothesize, develop conjectures, and test counterexamples in order to effectively produce and present logical arguments with emphasis on careful explanation of the reasoning, rather than on the form of proof used (e.g., paragraph proof or two-column proof). 						
	G.4.1.4 Apply trigonometric relationships to determine lengths and angle measures.	<ul style="list-style-type: none"> Apply trigonometric relationships to determine lengths and angle measures. 	<ul style="list-style-type: none"> Apply basic trigonometric ratios to solve right-triangle problems. Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths. Apply properties of 30-60-90, 45-45-90, similar and congruent triangles. 	<ul style="list-style-type: none"> Identify and use special triangle relationships (45-45-90, 30-60-90) to determine the lengths of the sides of a triangle. Apply similarity of right triangles to the trigonometric functions. Identify sine, cosine, and tangent ratios in right triangles and use them to model contextual problems. 		Geometry Sample Assessment Goal 4.1.4 07.docx	
Goal 4.2: Specify locations and describe spatial relationships using coordinate geometry and other representational systems.	G.4.2.1 Use Cartesian coordinates to analyze geometric situations.	<ul style="list-style-type: none"> Use Cartesian coordinates to analyze geometric situations. 	<ul style="list-style-type: none"> Locate points in the coordinate plane. Find the midpoint of a segment. Use the distance formula. 	<ul style="list-style-type: none"> Find the midpoint of a segment in the coordinate plane. Find the length of segments using the distance formula, given the two endpoints. Examine points in the coordinate plane to verify the figure formed. 		Geometry Sample Assessment Goal 4.2 07.docx	
Goal 4.3: Apply transformations and use symmetry to analyze mathematical situations.	G.4.3.1 Understand and represent translations, reflections, dilations, and rotations of objects in the plane.	<ul style="list-style-type: none"> Identify and draw translations, reflections, and rotations. 		<ul style="list-style-type: none"> Use transformations to rotate, translate, and reflect two-dimensional figures. 		Geometry Sample Assessment Goal 4.3 07.docx	
Goal 4.4: Use visualization, spatial reasoning, and geometric models to solve problems.	G.4.4.1 Draw and construct representations of two dimensional geometric objects using a variety of tools.	<ul style="list-style-type: none"> Draw and construct representations of two dimensional geometric objects using a variety of tools. 		<ul style="list-style-type: none"> Identify and construct and solve problems involving medians, altitudes, angle bisectors, and perpendicular bisectors. 		Geometry Sample Assessment Goal 4.4 07.docx	
Standard 5: Data Analysis, Probability, and Statistics							
	No objectives at this grade level.						
	No objectives at this grade level.						