Achievement Level Descriptors
Geometry

ALD	Standard	Level 2	Level 3	Level 4	Level 5
Policy	MAFS	Students at this level demonstrate a **below satisfactory** level of success with the challenging content of the *Florida Standards*.	Students at this level demonstrate a **satisfactory** level of success with the challenging content of the *Florida Standards*.	Students at this level demonstrate an **above satisfactory** level of success with the challenging content of the *Florida Standards*.	Students at this level demonstrate **mastery** of the most challenging content of the *Florida Standards*.
		A student performing at Level 2	**A student performing at Level 3**	**A student performing at Level 4**	**A student performing at Level 5**
Circles, Geometric Measurement, and Geometric Properties with Equations					
Range	MAFS.912. G-C.1.1	identifies that all circles are similar	uses a sequence of no more than two transformations to prove that two circles are similar	uses the measures of different parts of a circle to determine similarity	explains why all circles are similar
Range	MAFS.912. G-C.1.2	solves problems using the properties of central angles, diameters, and radii	solves problems that use no more than two properties including using the properties of inscribed angles, circumscribed angles, and chords	solves problems that use no more than two properties, including using the properties of tangents	solves problems using at least three properties of central angles, diameters, radii, inscribed angles, circumscribed angles, chords, and tangents
Range	MAFS.912. G-C.1.3	identifies inscribed and circumscribed circles of a triangle	creates or provides steps for the construction of the inscribed and circumscribed circles of a triangle; uses properties of angles for a quadrilateral inscribed in a circle; chooses a property of angles for a quadrilateral inscribed in a circle within an informal argument	solves problems that use the incenter and circumcenter of a triangle; justifies properties of angles of a quadrilateral that is inscribed in a circle; proves properties of angles for a quadrilateral inscribed in a circle	proves the unique relationships between the angles of a triangle or quadrilateral inscribed in a circle

ALD	Standard	Level 2	Level 3	Level 4	Level 5
Range	MAFS.912. G-C.2.5	identifies a sector area of a circle as a proportion of the entire circle	applies similarity to solve problems that involve the length of the arc intercepted by an angle and the radius of a circle; defines radian measure as the constant of proportionality	derives the formula for the area of a sector and uses the formula to solve problems; derives, using similarity, the fact that the length of the arc intercepted by an angle is proportional to the radius	proves that the length of the arc intercepted by an angle is proportional to the radius, with the radian measure of the angle being the constant of proportionality
Range	MAFS.912. G-CO.1.1	uses definitions to choose examples and non-examples	uses precise definitions that are based on the undefined notions of point, line, distance along a line, and distance around a circular arc	analyzes possible definitions to determine mathematical accuracy	explains whether a possible definition is valid by using precise definitions
Congruence, Similarity, Right Triangles, and Trigonometry					
Range	MAFS.912. G-CO.1.2 and MAFS.912. G-CO.1.4	represents transformations in the plane; determines transformations that preserve distance and angle to those that do not	uses transformations to develop definitions of angles, perpendicular lines, parallel lines; describes translations as functions	uses transformations to develop definitions of circles and line segments; describes rotations and reflections as functions	[intentionally left blank]
Range	MAFS.912. G-CO.1.3 and MAFS.912. G-CO.1.5	chooses a sequence of two transformations that will carry a given figure onto itself or onto another figure	uses transformations that will carry a given figure onto itself or onto another figure	uses algebraic descriptions to describe rotations and/or reflections that will carry a figure onto itself or onto another figure	applies transformations that will carry a figure onto another figure or onto itself, given coordinates of the geometric figure in the stem
Range	MAFS.912. G-CO.2.6	determines if a sequence of transformations will result in congruent figures	uses the definition of congruence in terms of rigid motions to determine if two figures are congruent; uses rigid motions to transform figures	explains that two figures are congruent using the definition of congruence based on rigid motions	[intentionally left blank]
Range	MAFS.912. G-CO.2.7 and MAFS.912. G-CO.2.8	identifies corresponding parts of two congruent triangles	shows that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent using the definition of congruence in terms of rigid motions; applies congruence to solve problems; uses rigid motions to show ASA, SAS, SSS, or HL is true for two triangles	shows and explains, using the definition of congruence in terms of rigid motions, the congruence of two triangles; uses algebraic descriptions to describe rigid motion that will show ASA, SAS, SSS, or HL is true for two triangles	justifies steps of a proof given algebraic descriptions of triangles, using the definition of congruence in terms of rigid motions that the triangles are congruent using ASA, SAS, SSS, or HL

ALD	Standard	Level 2	Level 3	Level 4	Level 5
Range	MAFS.912.G-CO.3.9	uses theorems about parallel lines with one transversal to solve problems; uses the vertical angles theorem to solve problems	completes no more than two steps of a proof using theorems about lines and angles; solves problems using parallel lines with two to three transversals; solves problems about angles using algebra	completes a proof for vertical angles are congruent, alternate interior angles are congruent, and corresponding angles are congruent	creates a proof, given statements and reasons, for points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints
Range	MAFS.912.G-CO.3.10	uses theorems about interior angles of a triangle, exterior angle of a triangle	completes no more than two steps in a proof using theorems (measures of interior angles of a triangle sum to 180,; base angles of isosceles triangles are congruent, the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length) about triangles; solves problems about triangles using algebra; solves problems using the triangle inequality and the Hinge theorem	completes a proof for theorems about triangles; solves problems by applying algebra using the triangle inequality and the Hinge theorem; solves problems for the midsegment of a triangle, concurrency of angle bisectors, and concurrency of perpendicular bisectors	completes proofs using the medians of a triangle meet at a point; solves problems by applying algebra for the midsegment of a triangle, concurrency of angle bisectors, and concurrency of perpendicular bisectors
Range	MAFS.912.G-CO.3.11	uses properties of parallelograms to find numerical values of a missing side or angle or select a true statement about a parallelogram	completes no more than two steps in a proof for opposite sides of a parallelogram are congruent and opposite angles of a parallelogram are congruent; uses theorems about parallelograms to solve problems using algebra	creates proofs to show the diagonals of a parallelogram bisect each other, given statements and reasons	proves that rectangles and rhombuses are parallelograms, given statements and reasons

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Range	MAFS.912. G-CO.4.12 and MAFS.912. G-CO.4.13	chooses a visual or written step in a construction	identifies, sequences, or reorders steps in a construction: copying a segment, copying an angle, bisecting a segment, bisecting an angle, constructing perpendicular lines, including the perpendicular bisector of a line segment, and constructing a line parallel to a given line through a point not on the line	identifies sequences or reorders steps in a construction of an equilateral triangle, a square, and a regular hexagon inscribed in a circle	explains steps in a construction
Circles, Geometric Measurement, and Geometric Properties with Equations					
Range	MAFS.912. G-GMD.1.1	gives an informal argument for the formulas for the circumference of a circle and area of a circle	uses dissection arguments and Cavalier's principle for volume of a cylinder, pyramid, and cone	sequences an informal limit argument for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone	explains how to derive a formula using an informal argument
Range	MAFS.912. G-GMD.1.3	substitutes given dimensions into the formulas for the volume of cylinders, pyramids, cones, and spheres, given a graphic, in a real-world context	finds a dimension, when given a graphic and the volume for cylinders, pyramids, cones, or spheres	solves problems involving the volume of composite figures that include a cube or prism, and a cylinder, pyramid, cone, or sphere (a graphic would be given); finds the volume when one or more dimensions are changed	finds the volume of composite figures with no graphic; finds a dimension when the volume is changed
Range	MAFS.912. G-GMD.2.4	identifies the shapes of two-dimensional cross-sections formed by a vertical or horizontal plane	identifies a three-dimensional object generated by rotations of a triangular and rectangular object about a line of symmetry of the object; identifies the location of a horizontal or vertical slice that would give a particular cross-section; draws the shape of a particular two-dimensional cross-section that is the result of horizontal or vertical slice of a three-dimensional shape	identifies a three-dimensional object generated by rotations of a closed two-dimensional object about a line of symmetry of the object; identifies the location of a nonhorizontal or nonvertical slice that would give a particular cross-section; draws the shape of a particular two-dimensional cross-section that is the result of a nonhorizontal or nonvertical slice of a three-dimensional shape; compares and contrasts different types of slices	identifies a three-dimensional object generated by rotations, about a line of symmetry, of an open two-dimensional object or a closed two-dimensional object with empty space between the object and the line of symmetry; compares and contrasts different types of rotations

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Range	MAFS.912. G-GPE.1.1	determines the center and radius of a circle given its equation in general form	completes the square to find the center and radius of a circle given by its equation; derives the equation of a circle using the Pythagorean theorem, the coordinates of a circle's center, and the circle's radius	derives the equation of the circle using the Pythagorean theorem when given coordinates of a circle's center and a point on the circle	derives the equation of a circle using the Pythagorean theorem when given coordinates of a circle's center as variables and the circle's radius as a variable
Range	MAFS.912. G-GPE.2.4	uses coordinates to prove or disprove that a figure is a parallelogram	uses coordinates to prove or disprove that a figure is a square, right triangle, or rectangle; uses coordinates to prove or disprove properties of triangles, properties of circles, properties of quadrilaterals when given a graph	uses coordinates to prove or disprove properties of triangles, properties of circles, properties of quadrilaterals without a graph; provide an informal argument to prove or disprove properties of triangles, properties of circles, properties of quadrilaterals; uses coordinates to prove or disprove properties of regular polygons when given a graph	completes an algebraic proof or writes an explanation to prove or disprove simple geometric theorems
Range	MAFS.912. G-GPE.2.5	identifies that the slopes of parallel lines are equal	creates the equation of a line that is parallel given a point on the line and an equation, in slope-intercept form, of the parallel line or given two points (coordinates are integral) on the line that is parallel; creates the equation of a line that is perpendicular given a point on the line and an equation of a line, in slope-intercept form	creates the equation of a line that is parallel given a point on the line and an equation, in a form other than slope-intercept; creates the equation of a line that is perpendicular that passes through a specific point when given two points or an equation in a form other than slope-intercept	proves the slope criteria for parallel and perpendicular lines; writes equations of parallel or perpendicular lines when the coordinates are written using variables or the slope and y-intercept for the given line contains a variable
Range	MAFS.912. G-GPE.2.6	finds the point on a line segment that partitions the segment in a given ratio of 1 to 1, given a visual representation of the line segment	finds the point on a line segment that partitions, with no more than five partitions, the segment in a given ratio, given the coordinates for the endpoints of the line segment	finds the endpoint on a directed line segment given the partition ratio, the point at the partition, and one endpoint	finds the point on a line segment that partitions or finds the endpoint on a directed line segment when the coordinates contain variables
Range	MAFS.912. G-GPE.2.7	finds areas and perimeters of right triangles, rectangles, and squares when given a graphic in a real-world context	when given a graphic, finds area and perimeter of regular polygons where at least two sides have a horizontal or vertical side; finds area and perimeter of parallelograms	finds area and perimeter of irregular polygons that are shown on the coordinate plane; finds the area and perimeter of shapes when given coordinates	finds area and perimeter of shapes when coordinates are given as variables

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			Modeling with Geometry		
Range	MAFS.912. G-MG.1.1	uses measures and properties to model and describe a real-world object that can be modeled by a three-dimensional object	uses measures and properties to model and describe a real-world object that can be modeled by composite three-dimensional objects; uses given dimensions to answer questions about area, surface area, perimeter, and circumference of a real-world object that can be modeled by composite three-dimensional objects	finds a dimension for a real-world object that can be modeled by a composite three-dimensional figure when given area, volume, surface area, perimeter, and/or circumference	applies the modeling cycle to determine a measure when given a real-world object that can be modeled by a composite three-dimensional figure
Range	MAFS.912. G-MG.1.2	calculates density based on a given area, when division is the only step required, in a real-world context	calculates density based on area and volume and identifies appropriate unit rates	finds area or volume given density; interprets units to solve a density problem	applies the basic modeling cycle to model a situation using density
Range	MAFS.912. G-MG.1.3	uses ratios and a grid system to determine values for dimensions in a real-world context	applies geometric methods to solve design problems where numerical physical constraints are given; writes an equation that models a design problem that involves perimeter, area, or volume of simple composite figures; uses ratios and a grid system to determine perimeter, area, or volume	constructs a geometric figure given physical constraints; chooses correct statements about a design problem; writes an equation that models a design problem that involves surface area or lateral area; uses ratios and a grid system to determine surface area or lateral area	applies the basic modeling cycle to solve a design problem that involves cost; applies the basic modeling cycle to solve a design problem that requires the student to make inferences from the context
Range	MAFS.912. G-SRT.1.1a, b	identifies the scale factors of dilations	chooses the properties of dilations when a dilation is presented on a coordinate plane, as a set of ordered pairs, as a diagram, or as a narrative; properties are: a dilation takes a line not passing through the center of the dilation to a parallel line and leaves a line passing through the center unchanged; the dilation of a line segment is longer or shorter in the ratio given by the scale factor	explains why a dilation takes a line not passing through the center of dilation to a parallel line and leaves a line passing through the center unchanged or that the dilation of a line segment is longer or shorter in ratio given by the scale factor	explains whether a dilation presented on a coordinate plane, as a set of ordered pairs, as a diagram, or as a narrative correctly verifies the properties of dilations

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Range	MAFS.912. G-SRT.1.2	determines if two given figures are similar	uses the definition of similarity in terms of similarity transformations to decide if two figures are similar; determines if given information is sufficient to determine similarity	shows that corresponding angles of two similar figures are congruent and that their corresponding sides are proportional	explains using the definition of similarity in terms of similarity transformations that corresponding angles of two figures are congruent and that corresponding sides of two figures are proportional
Range	MAFS.912. G-SRT.1.3 and MAFS.912. G-SRT.2.4	identifies that two triangles are similar using the AA criterion	establishes the AA criterion for two triangles to be similar by using the properties of similarity transformations	proves that two triangles are similar if two angles of one triangle are congruent to two angles of the other triangle, using the properties of similarity transformations; uses triangle similarity to prove theorems about triangles	proves the Pythagorean theorem using similarity
Range	MAFS.912. G-SRT.2.5	finds measures of sides and angles of congruent and similar triangles when given a diagram	solves problems involving triangles, using congruence and similarity criteria; provides justifications about relationships using congruence and similarity criteria	completes proofs about relationships in geometric figures by using congruence and similarity criteria for triangles	proves conjectures about congruence or similarity in geometric figures, using congruence and similarity criteria
Range	MAFS.912. G-SRT.3.6, MAFS.912. G-SRT.3.7 and MAFS.912. G-SRT.3.8	calculates unknown side lengths using the Pythagorean theorem given a picture of a right triangle; recognizes the sine, cosine, or tangent ratio when given a picture of a right triangle with two sides and an angle labeled	solves for sides of right triangles using trigonometric ratios and the Pythagorean theorem in applied problems; uses the relationship between sine and cosine of complementary angles	assimilates that the ratio of two sides in one triangle is equal to the ratio of the corresponding two sides of all other similar triangles leading to definitions of trigonometric ratios for acute angles; explains the relationship between the sine and cosine of complementary angles; solves for missing angles of right triangles using sine, cosine, and tangent	uses the modeling context to solve problems that require more than one trigonometric ratio and/or the Pythagorean theorem; solves for sides of right triangles using trigonometric ratios and the Pythagorean theorem when side lengths and/or angles are given using variables