Geometry EOC

Achievement level descriptions (ALDs) describe a student's level of achievement (e.g., Below Satisfactory, On-Grade-Level, Above Satisfactory) on a large-scale assessment. The purpose of the ALD development framework is to enable valid inferences about student content area knowledge and skill in relation to a state's content standards measured on a large-scale assessment.

Achievement Level	Achievement Level Descriptions
Level 1	Students performing at Level 1 are just beginning to access the challenging content of the B.E.S.T. Standards.
Level 2	Students at this level demonstrate a **below satisfactory** level of success with the challenging content of the *Florida B.E.S.T. Standards*. A student performing at Level 2: • solves mathematical problems that include numerical values involving postulates, relationships, and theorems of lines and angles. • identifies a missing statement or reason of a two-column, flow-chart, or informal proof for proving congruence or similarity using Side-Side-Side, Side-Angle-Side, Angle-Side-Angle, and Angle-Angle. • solves mathematical problems that include numerical values involving the postulates, relationships, and theorems related to the triangle sum theorem, triangle inequality theorem, base angles of an isosceles triangle, or exterior angles. • solves mathematical problems that include numerical values involving postulates, relationships, and theorems of parallelograms or classifies parallelograms based on their properties. • solves mathematical problems that include numerical values involving postulates, relationships, and theorems of trapezoids or identifies trapezoids based on their properties. • solves a mathematical problem involving similarity with two-dimensional figures using one algebraic expression. • given a pre-image and image, identifies the correct transformation, either a translation or a reflection over the *x*- or *y*-axis, and represents the transformation algebraically using coordinates. • given the pre-image and image on a coordinate plane, recognizes that translations and reflections preserve distance. • identifies the correct transformations, using words, to describe a sequence of two transformations that maps a given figure onto itself or another congruent figure, wherein the transformations include translations and reflections. • given a geometric figure and two transformations, identifies the transformed figure on a coordinate plane, where the transformations include translations or reflections about an axis. • identifies corresponding sides and angles that are congruent between two transformed figures. • identifies the corresponding sides that are proportional and the corresponding angles that are congruent between two transformed figures. • identifies the equation that can be used to find the weighted average between two points.

Achievement Level	Achievement Level Descriptions
Level 2	• given a mathematical context, uses coordinate geometry to classify triangles or right quadrilaterals using definitions, properties, and theorems. • uses coordinate geometry to solve mathematical problems involving lines and triangles using midpoints and slope criteria of lines. • uses coordinate geometry to find the perimeter of a polygon that does not require the use of the distance formula more than two times. • identifies the shapes of two-dimensional cross-sections of right cylinders and right rectangular prisms. • identifies a three-dimensional object generated by rotation of a square or rectangle about one of its sides or a right triangle about one of its legs. • compares the surface area of two three-dimensional figures to determine the dilation scale factor. • determines the equation that can be used to find the population density given a quadrilateral or triangle. • solves mathematical problems involving the volume of three-dimensional figures limited to right cylinders, right pyramids, and right prisms. • solves mathematical problems involving the surface area of three-dimensional figures limited to right pyramids and right prisms. • identifies the result of a construction of a copied segment or angle, or properties that result from the construction. • identifies the result of a construction of a bisector of a segment or an angle, including the perpendicular bisector of a segment or properties that result from the construction. • identifies the result of a construction of an inscribed and circumscribed circle of a triangle or properties that result from the construction. • solves mathematical problems that include numerical values involving the lengths of chords in a given circle. • solves mathematical problems that include numerical values involving the measures of central angles, inscribed angles, and their related arcs. • solves mathematical problems involving right triangles inscribed in a circle. • solves mathematical problems involving the area of a sector or arc length of a circle in terms of π when the radius is provided. • identifies the equation of a circle given the radius and center. • identifies the graph of mathematical problems that are modeled with an equation of a circle and identifies the center of the circle. • determines the lengths of the missing sides of a right triangle given a triangle with one side measure and at least one acute angle, using trigonometric ratios and the Pythagorean Theorem. • identifies the hypothesis and conclusion of a statement and rewrites it in "if. . . then" form. • identifies the valid statement from a series of arguments about the same topic.
Level 3	Students at this level demonstrate **on-grade-level** success with the challenging content of the *Florida B.E.S.T. Standards*. A student performing at Level 3: • identifies up to two missing statements and/or reasons of a two-column, flow-chart, or informal proof about lines and angles or uses algebraic equations to solve mathematical problems involving postulates, relationships, and theorems of lines and angles.

Achievement Level	Achievement Level Descriptions
Level 3	• identifies up to two missing statements and/or reasons of a two-column, flow-chart, or informal proof for proving congruence or similarity using Side-Side-Side, Side-Angle-Side, Angle-Side-Angle, Angle-Angle-Side, Angle-Angle, and Hypotenuse-Leg. • identifies up to two missing statements and/or reasons of a two-column, flow-chart, or informal proof about triangles or uses algebraic equations to solve mathematical problems involving postulates, relationships, and theorems of triangles. • identifies up to two missing statements and/or reasons of a two-column, flow-chart, or informal proof when all steps are provided about parallelograms or uses algebraic equations to solve mathematical problems involving postulates, relationships, and theorems of parallelograms. • identifies up to two missing statements and/or reasons of a two-column, flow-chart, or informal proof when all steps are provided about trapezoids or uses algebraic equations to solve mathematical problems involving postulates, relationships, and theorems of trapezoids. • solves mathematical problems involving congruence or similarity in two-dimensional figures. • given a pre-image and image, identifies the correct transformation, either a translation, rotation, or reflection, and represents the transformation algebraically using coordinates. • identifies a transformation that does or does not preserve distance. • identifies the correct transformations, using words or coordinates, to describe a sequence of up to three transformations that maps a given figure onto itself or another congruent figure, wherein the transformations include translations, rotations, and reflections. • given a geometric figure and two transformations, draws the transformed figure on a coordinate plane, where the transformations include translations, rotations by a multiple of 90°, or reflections about a horizontal or vertical line or axis. • determines whether the corresponding sides and angles are congruent between two transformed figures. • applies an appropriate dilation to map one figure onto another to justify that the two figures are similar. • determines the weighted average of two points on a line. • given a mathematical context, uses coordinate geometry to classify triangles or quadrilaterals using definitions, properties, and theorems. • uses coordinate geometry to solve mathematical problems involving lines, triangles, and quadrilaterals, including partitioning lines in even ratios. • uses coordinate geometry to solve mathematical and real-world problems involving perimeter or area of polygons that does not require the use of the distance formula more than two times. • identifies the shapes of two-dimensional cross-sections of right cylinders and right prisms • identifies a three-dimensional object generated by rotation of a square or rectangle about an axis parallel to one of its sides or a right triangle about an axis parallel to one of its legs. • determines how dilations affect the area of two-dimensional figures and the surface area of three-dimensional figures.

Achievement Level	Achievement Level Descriptions
Level 3	• solves mathematical or real-world problems involving the area of quadrilateral or triangles including finding missing dimensions or calculating population density. • solves mathematical or real-world problems involving the volume of three-dimensional figures limited to right cylinders, right pyramids, right prisms, and right cones. • solves mathematical or real-world problems involving the surface area of three-dimensional figures limited to right prisms, right cylinders, right pyramids, and right cones. • identifies one or two missing steps for completing the construction of a copied segment or angle. • identifies one or two missing steps for completing the construction of a bisector of a segment or an angle, including the perpendicular bisector of a segment. • completes a construction of an inscribed circle of a triangle. • solves mathematical problems that include algebraic expressions involving the length of a secant or chord in a given circle. • solves mathematical problems that include algebraic expressions involving the measures of arcs and related angles, limited to central angles and inscribed angles. • solves mathematical problems involving triangles or squares inscribed in a circle. • solves mathematical problems involving the arc length and area of a sector of a circle. • given a mathematical or real-world context, derives and creates the equation of a circle using key features without completing the square. • graphs and solves mathematical problems that are modeled with an equation of a circle given in standard form and identifies the center and radius. • determines trigonometric ratios for acute angles in right triangles given a triangle with all side measures. • solves mathematical problems involving the measures of missing angles and/or missing sides of a right triangle using trigonometric ratios. • identifies the converse and inverse of a given conditional statement and/or rewrites a bi-conditional statement as two conditional statements. • identifies a counterexample to disprove statements in an argument for a particular theorem.
Level 4	Students at this level demonstrate an **above satisfactory** level of success with the challenging content of the Florida B.E.S.T. Standards. A student performing at Level 4: • completes a proof about lines and angles or solves mathematical or real-world problems involving postulates, relationships, and theorems of lines and angles. • completes a proof about congruence or similarity using Side-Side-Side, Side-Angle-Side, Angle-Side-Angle, Angle-Angle-Side, Angle-Angle, and Hypotenuse-Leg. • completes a proof about triangles or solves mathematical or real-world problems involving postulates, relationships, and theorems of triangles.

Achievement Level	Achievement Level Descriptions
Level 4	• completes a proof about parallelograms or solves mathematical or real-world problems involving postulates, relationships, and theorems of parallelograms. • completes a proof about trapezoids or solves mathematical or real-world problems involving postulates, relationships, and theorems of trapezoids. • solves mathematical or real-world problems involving congruence or similarity in two-dimensional figures. • given a pre-image and image, describes the transformation and represents the transformation algebraically using coordinates. • identifies all transformations that do or do not preserve distance and angle measure. • identifies a sequence of transformations that will map a given figure onto itself or onto another congruent or similar figure. • given a geometric figure and a sequence of transformations, draws the transformed figure on a coordinate plane. • applies rigid transformations to map one figure onto another to justify that the two figures are congruent. • applies appropriate transformations to map one figure onto another to justify that the two figures are similar. • determines the weighted average of two or more points on a line. • given a mathematical or real-world context, uses coordinate geometry to classify or justify circles, triangles, or quadrilateral using definitions, properties, and theorems. • uses coordinate geometry to solve mathematical or real-world geometric problems involving lines, circles, triangles, and quadrilaterals. • uses coordinate geometry to solve mathematical or real-world problems on the coordinate plane involving perimeter or area of polygons. • identifies the shapes of two-dimensional cross-sections of three-dimensional figures. • identifies three-dimensional objects generated by rotations of two-dimensional figures. • determines how dilations affect the area of two-dimensional figures and the surface area or volume of three-dimensional figures. • solves mathematical or real-world problems involving the area of two-dimensional figures, including calculating population density. • solves mathematical or real-world problems involving the volume of three-dimensional figures limited to cylinders, pyramids, prisms, cones, and spheres, including finding missing dimensions. • solves mathematical or real-world problems involving the surface area of three-dimensional figures limited to cylinders, pyramids, prisms, cones, and spheres, including finding missing dimensions. • completes a construction of a copied segment or angle. • completes a construction of a bisector of a segment or an angle, including the perpendicular bisector of a segment. • completes a construction of an inscribed and circumscribed circle of a triangle. • solves mathematical or real-world problems involving the length of a secant, tangent, segment, or chord in a given circle. • solves mathematical or real-world problems involving the measures of arcs and related angles.

Achievement Level	Achievement Level Descriptions
Level 4	• solves mathematical problems involving triangles or quadrilaterals inscribed in a circle. • solves mathematical or real-world problems involving the arc length and area of a sector of a circle, including illustrating the proportional relationship between the arc length of an intercepted angle and the radius. • given a mathematical or real-world context, derives and creates the equation of a circle using key features. • graphs and solves mathematical or real-world problems that are modeled with an equation of a circle; determines and interprets key features in terms of the context. • defines trigonometric ratios for acute angles in a right triangle given a triangle with two side measures; identifies trigonometric ratios of triangles that are similar to a given triangle. • solves mathematical or real-world problems involving right triangles using trigonometric ratios and the Pythagorean Theorem. • identifies and accurately interprets "if. . . then," "if and only if," "all" and "not" statements, and finds the converse, inverse, and contrapositive of a statement. • judges the validity of arguments and gives counterexamples to disprove statements.
Level 5	Students at this level demonstrate **mastery** of the most challenging content of the *Florida B.E.S.T. Standards*. A student performing at Level 5: • analyzes a proof about lines and angles to determine a potential error. • analyzes a proof about congruence or similarity using Side-Side-Side, Side-Angle-Side, Angle-Side-Angle, Angle-Angle-Side, Angle-Angle, and Hypotenuse-Leg to determine a potential error. • analyzes a proof about triangles to determine a potential error. • analyzes a proof about parallelograms to determine a potential error. • analyzes a proof about trapezoids to determine a potential error. • solves mathematical and real-world problems involving congruence or similarity in two-dimensional figures, including problems that lead to solving quadratic equations. • given a pre-image and image, describes the transformation, including a reflection about a line written in slope intercept form wherein the slope is not equal to zero or undefined, and represents the transformation algebraically using coordinates. • identifies a sequence of transformations, including a reflection about a line written in slope intercept form, that will map a given figure onto itself or onto another congruent or similar figure. • given a geometric figure and a sequence of transformations, including a reflection about a line written in slope intercept form, draws the transformed figure on a coordinate plane. • given the location of one endpoint with its weight and the location of the weighted average, determines the location of the other endpoint. • analyzes errors of a classification and/or justification for circles, triangles, or quadrilateral based on definitions, properties, and theorems.

Achievement Level	Achievement Level Descriptions
Level 5	• uses coordinate geometry to solve mathematical and real-world geometric problems involving medians and centroids in triangles. • uses coordinate geometry to solve mathematical and real-world problems involving perimeter or area of composite figures of irregular polygons. • identifies the shapes of two-dimensional cross-sections that are not parallel or perpendicular to the base of three-dimensional figures. • identifies three-dimensional objects generated by rotations of two-dimensional figures that have multiple shapes or curved edges. • provides reasoning on how dilations affect the area of two-dimensional figures and the surface area or volume of three-dimensional figures; finds missing dimensions when given two three-dimensional figures and their surface area or volume. • solves real-world problems involving the area of two-dimensional figures, including finding the missing dimensions in population density scenarios. • analyzes errors in steps solved for mathematical or real-world problems involving the volume of three-dimensional figures. • analyzes errors in steps solved for mathematical or real-world problems involving the surface area of three-dimensional figures. • corrects errors within the steps of a construction of a copied segment or angle or uses a sequence of the construction(s) to create a new figure. • corrects errors within the steps of a construction of a bisector of a segment or an angle, including the perpendicular bisector of a segment; uses the construction to justify properties of the resulting quadrilateral formed in the construction. • uses the construction to justify the properties of the incenter or circumcenter. • solves mathematical or real-world problems that require the use of quadratic equations involving the length of a secant, tangent, segment, or chord in a given circle. • creates equations in terms of a defined variable representing the relationship between the measures of arcs and their related angles. • creates expressions or equations representing relationships involving triangles or quadrilaterals inscribed in a circle. • creates expressions or equations representing relationships involving the arc length and area of a sector of a circle. • given a mathematical or real-world problem that is modeled with an equation of a circle, analyzes errors in a graph or steps solved. • defines trigonometric ratios for acute angles in right triangles and justifies using the coordinate plane to make connections to the unit circle. • analyzes relationships between the sine and cosine of the acute angles in right triangles. • identifies and accurately interprets “if. . . then,” “if and only if,” “all” and “not” statements, and finds the converse, inverse, and contrapositive of a statement and connects to proofs. • improves an argument using valid examples.