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New York State Regents Examination in Geometry (Common Core)

Performance Level Descriptions

August 2015

Geometry Performance Level Descriptions

Policy-Level Performance Level Definitions

For each subject area, there are students performing along a proficiency continuum with regard to the skills and knowledge necessary to meet the demands of Common Core Learning Standards for Mathematics. There are students who are exceed the expectations of the standards, students meet the expectations, students who partially meet the expectations, and students who do not demonstrate sufficient knowledge or skills required for any performance level. New York State assessments are designed to classify students into one of four proficiency categories; these proficiency categories are defined as:

NYS Level 5
Students performing at this level exceed Common Core expectations**.**

NYS Level 4
Students performing at this level meet Common Core expectations.

NYS Level 3
Students performing at this level partially meet Common Core expectations (required for current Regents Diploma purposes).

NYS Level 2 (Safety Net)
Students performing at this level partially meet Common Core expectations (required for Local Diploma purposes).

NYS Level 1
Students performing at this level do not demonstrate the knowledge and skills required for NYS Level 2.

Performance Level Descriptions
Performance Level Descriptions (PLDs) describe the range of knowledge and skills students should demonstrate at a given performance level.

How were the PLDs developed?
The New York State Education Department (NYSED) convened the state's English Language Arts (ELA) and Math Content Advisory Panels (CAPs) to develop the initial draft PLDs for Algebra I and English Language Arts. The CAPs are classroom teachers from elementary, middle and high school, school and district administrators, English Language Learner (ELL) and students with disabilities (SWD) specialists, and higher education faculty members from across the state.

The draft PLDs from the CAPs then went through additional rounds of review and edit from a number of NYS-certified educators, content specialists, and assessment experts under NYSED supervision. In developing PLDs, participants considered policy-level definitions of the performance levels (see above) and the expectations for each grade level in the Common Core Learning Standards.

How are the PLDs used in Assessment?

PLDs are essential in setting standards for the New York State Regents Examinations. Standard setting panelists use PLDs to determine the threshold expectations for students to demonstrate the knowledge and skills necessary to attain just barely a Level 2, Level 3, Level 4, or Level 5 on the assessment. These discussions then influence the panelists in establishing the cut scores on the assessment. PLDs are also used to inform item development, as each test needs questions that distinguish performance all along the continuum.

How can the PLDs be used in Instruction?

PLDs help communicate to students, families, educators and the public the specific knowledge and skills expected of students to demonstrate proficiency and can serve a number of purposes in classroom instruction. They are the foundation of rich discussion around what students need to do to perform at higher levels and to explain the progression of learning within a subject area. We encourage the use of the PLDs for a variety of purposes, such as differentiating instruction to maximize individual student outcomes, creating classroom assessments and rubrics to help in identifying target performance levels for individual or groups of students, and tracking student growth along the proficiency continuum as described by the PLDs. In order to facilitate the use of the PLDs in instruction, the skills differentiating performance levels have been identified using bold text.

Geometry (Common Core) Performance Level Descriptions

Domain	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Congruence (G-CO)	**Use precise language** to describe a sequence of rigid motions to determine the congruency of figures.	**Describe** a sequence of rigid motions **to determine the congruency of figures**.	Identify and draw a **sequence** of rigid motions in the plane **to verify the congruency of figures**.	Identify and draw a rigid motion in the plane.	Sketch triangles and rectangles.
	Use precise language to predict the effect of a given rigid motion on a given figure.	**Predict the effect** of a given rigid motion on a given figure.	Identify the image and **describe the effect** of a given rigid motion.	Identify the image of a given rigid motion.	
	Formulate a complete line of geometric reasoning to prove a geometric **theorem**.	**Formulate a complete line** of geometric reasoning to prove a specific geometric statement.	**Formulate a partial line** of geometric reasoning in an effort **to prove a specific geometric statement**.	Provide a correct geometric statement pertaining to the given geometric information.	Restate given information in the context of a proof.
	Use the rotations and reflections that carry a figure onto itself to prove or explain if the figure is or is not regular.	**Describe** the rotations and reflections that carry a figure onto itself.	**Identify** the rotations and reflections that carry a figure onto itself.		
	Determine the validity of geometric arguments and **revise invalid geometric arguments**.	Determine the validity of geometric arguments **with justification.**	Determine the validity of geometric arguments.		

Geometry (Common Core) Performance Level Descriptions

Domain	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
(G-CO continued)	Make **advanced formal geometric constructions** using appropriate tools.	**Construct the application of the listed constructions,** for example, using the construction of a midpoint to construct the median of a triangle or construct the dilation of a figure not on the coordinate plane.	Make basic formal geometric constructions using appropriate tools. Examples of basic constructions include but are not limited to: copy a segment, bisecting a segment, bisecting an angle.	Construct rays, triangles, and angles.	Construct lines and line segments.

Domain	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Similarity, Right Triangles, and Trigonometry (G-SRT)	**Use precise language** to describe a sequence of similarity transformations to determine the similarity of figures.	**Describe** a sequence of similarity transformations **to determine the similarity of figures**.	**Identify a sequence of similarity transformations** in the plane **to verify the similarity of figures**.	Perform a dilation in the coordinate plane centered at the origin. Distinguish between a dilation and a translation, reflection, or rotation.	
	Formulate a complete line of geometric reasoning to prove a geometric **theorem**.	**Formulate a complete line** of geometric reasoning to prove a specific geometric statement.	**Formulate a partial line** of geometric reasoning in an effort **to prove a specific geometric statement**.	Provide correct geometric statements pertaining to the given geometric information.	Restate given information in the context of a proof.

Geometry (Common Core) Performance Level Descriptions

Domain	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
(G-SRT continued)	Apply congruence or similarity criteria to solve **complex problems involving multiple concepts**, and explain the geometric reasoning involved.	Apply congruence or similarity criteria to solve problems, **and explain the geometric reasoning involved**.	Apply congruence or similarity criteria to **solve problems**.	Apply congruence or similarity criteria to solve simple problems.	
		Use the Pythagorean Theorem, trigonometric ratios, and the relationship between sine and cosine of complementary angles **to solve complex problems.**	**Use the Pythagorean Theorem, trigonometric ratios, and the relationship between sine and cosine of complementary angles to solve problems.**	Identify the trigonometric ratios of a right triangle.	Sketch and label the sides of right triangles.
	Determine the validity of geometric arguments and **revise invalid geometric arguments**.	Determine the validity of geometric arguments **with justification.**	Determine the validity of geometric arguments.		

Domain	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Circles (G-C)	Use appropriate tools to construct the inscribed and circumscribed circle for a given triangle **and justify the construction**.	Use appropriate tools to construct the **inscribed** and circumscribed circle for a given triangle.	Use appropriate tools to construct the **circumscribed** circle for a given triangle.		
	Derive the formula for the arc length and area of a sector.	**Apply formulas** for arc length and area of a sector **to solve complex problems**.	Determine the arc length and area of a sector given any central angle in degrees or **radians.**	Determine the area of a quarter, half, or three-quarter circle, given the area of the entire circle.	Write an expression for the area of a circle given the radius.

Geometry (Common Core) Performance Level Descriptions

Domain	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
(G-C continued)		Apply theorems about arcs, angles, and **segments** related to circles.	**Apply theorems** about arcs and angles related to circles.	Identify arcs, angles, and segments related to circles.	Visually compare central angle measures.
		Explain the radian measure of a central angle as the constant of proportionality between the arc length and the radius of a circle.	**Identify** central angles in different circles that have the same radian measure.		
		Formulate a complete line of geometric reasoning to prove properties of angles for a quadrilateral inscribed in a circle.	Formulate a **partial** line of geometric reasoning in an effort to prove properties of angles for a quadrilateral inscribed in a circle.	**Identify** a missing angle in a diagram involving a quadrilateral inscribed in a circle.	
		Formulate a complete line of geometric reasoning to prove that circles are similar.	Formulate a **partial** line of geometric reasoning in an effort to prove that circles are similar.	Find missing radius and circumference measurements using circle similarity.	

Domain	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Expressing Geometric Properties with Equations (G-GPE)	**Use the Pythagorean theorem to derive the equation of a circle**.	Given the equation of a circle in standard form, **complete the square to obtain the center and radius**.	**Identify the center and radius of a circle** when given the equation in center-radius form.	Complete the square with a single variable.	
	Use coordinates to formulate a complete line of geometric reasoning to **prove or disprove** a geometric theorem.	Use coordinates to **formulate a complete line** of geometric reasoning to prove a specific geometric statement.	Use numerical coordinates to formulate a partial line of geometric reasoning in an effort to prove a specific geometric statement.	Given three coordinates of a special quadrilateral, determine the fourth coordinate.	
	Explain why parallel lines have the same slopes and perpendicular lines have negative reciprocal slopes.	Use the slope criteria for parallel and perpendicular lines **to solve geometric problems**.	Identify the **equations of lines as parallel, perpendicular, or neither**.	Identify the slope of a line given its equation.	Distinguish between lines in a coordinate plane with positive and negative slopes.
		Identify **the rational coordinates of a point that divides a segment into a given ratio.	Identify **the whole number coordinates of a point that divides a segment into a given ratio**.	Identify the coordinates of the midpoint of a line segment.	Locate the midpoint of a horizontal or vertical line in a coordinate plane.

Geometry (Common Core) Performance Level Descriptions

Domain	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
(G-GPE continued)	Use coordinates to compute perimeters and areas of **compound figures**.	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles with rational or **irrational bases and heights**.	Use coordinates to **compute perimeters of polygons with rational side lengths**. Use coordinates to **compute areas of triangles and rectangles with rational bases and heights**.	Compute the length of vertical, horizontal, and diagonal segments on the coordinate plane with integer coordinates. Compute the perimeter of polygons with integer side lengths in the coordinate plane. Compute the area of triangles and rectangles with integer bases and heights in the coordinate plane.	Identify the whole number coordinates of triangles and rectangles.

Domain	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Geometric Measurement & Dimensions (G-GMD)	Write a **formal argument** for the formulas for the circumference of a circle, area of a circle, and volumes of a cylinder, pyramid, and cone.	Write an **informal argument** for the formulas for the circumference of a circle, area of a circle, and volumes of a cylinder, pyramid, and cone.			
	Use the volume formulas for cylinders, pyramids, cones, and spheres to solve **modeling problems involving compound figures**.	Use the volume formulas for cylinders, pyramids, cones, and spheres **to solve modeling problems**.	Use the volume formulas for cylinders, **pyramids**, cones, and spheres **to find various dimensions of the solid**, such as finding the radius of a sphere given the volume.	Compute the volumes for cylinders, cones, and spheres.	Compute the volume of a rectangular prism with integer dimensions.

Geometry (Common Core) Performance Level Descriptions

Domain	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
(G-GMD continued)	**Describe the similarities and differences between various cross-sections** of three-dimensional objects, such as explaining the difference between the areas of different cross-sections of the same figure.	**Describe** the two-dimensional cross-sections of three-dimensional objects.	Identify the two-dimensional cross-sections using a **diagram of a three-dimensional object**.	Identify a two-dimensional cross-section that results from slicing a right rectangular prism or a right rectangular pyramid.	Identify the shape of the base of a rectangular prism, triangular prism, or cylinder.
	Describe the similarities and differences between various rotations of two-dimensional objects, such as a half rotation or rotating about different axes.	**Describe** three-dimensional objects generated by rotations of two-dimensional objects.	**Identify** three-dimensional objects generated by rotations of two-dimensional objects.		

Domain	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Modeling with Geometry (G-MG)	**Create a model to solve real-world problems**, which may include applying density to real-world situations or solving design problems.	Apply geometric concepts in modeling situations to **solve complex real-world problems**, which may include applying density to real-world situations or **solving design problems**.	Apply **concepts of density to solve a problem** that may include **converting between two- and three-dimensional units.**	**Given two of the three values in the density formula, find the third value.**	Compute the area of a rectangular region, given whole number dimensions.