Louisiana Guide to End-of-Course Assessment for Geometry

This guide includes:

I. Purpose of Assessment Guide

This document is designed to assist Louisiana educators in understanding the Geometry End-of-Course (EOC) online assessment.

II. Test Structure

The following table outlines the test structure and suggested testing times for the Geometry EOC test.

Subtest Description	Number of Items[1]	Number of Points	Suggested Testing Times
Multiple Choice, No Calculator	25	23	60 minutes
Constructed-Response, Calculator	2	4	40 minutes
Multiple Choice, Calculator	25	23	60 minutes
Totals	**52**	**50**	**160 minutes**

[1] Forty-six multiple-choice and one constructed-response items are operational. The other five items are embedded field test items, which may be used to develop new forms.

The test is **untimed**. Although suggested testing times are provided for each session, it is very important that students be given sufficient time to complete the test. Once students have started a test session, they should proceed without interruption until they have completed the session.

III. Test Design

The Louisiana Mathematics Standards define what students should know and be able to do by the end of the Geometry course. Related standards are organized into clusters, and clusters are combined to form the following domains[2]: Congruence; Similarity, Right Triangles, and Trigonometry; Circles; Expressing Geometric Properties with Equations; Geometric Measurement and Dimension; and Modeling with Geometry. Each test item is aligned to one or part of one standard.

For the EOC Geometry assessment, test content is prioritized based on whether a standard is considered to be major, supporting, or additional content[3] for the work of the Geometry course. Major content accounts for 75% of tested material, while supporting and additional content account for the remaining 25%. Supporting and additional content should be incorporated throughout instruction of the major content. Neglecting any material will leave gaps in student knowledge and cause instructional challenges in future courses. Constructed-response items may cover any content—major, supporting, or additional.

- Major content (green) requires greater emphasis based on the depth of the ideas, mastery time, and/or importance to future mathematics or demands of college and career readiness.
- Supporting content (blue) supports and strengthens areas of major emphasis.
- Additional content (yellow) bridges content from one course to the next, but may not establish tight or explicit connectivity to the major work of a course.

The Geometry EOC Test Design Table contains the following information:

- EOC subscore and domain/domains
- Number of points and percent of points per domain
- Major, supporting, and additional content standards assessed per domain

[2] Unlike Algebra I, the Geometry course is only composed of standards from one conceptual category (Geometry).
[3] The *Model Content Frameworks* serves as a basis for this determination.

Geometry EOC Test Design

Subscore 1	Congruence 10 of 50 points 20% of points	**Major Content**	
		G.CO.B.6	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
		G.CO.B.7	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
		G.CO.B.8	Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.
		G.CO.C.9	Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*
		G.CO.C.10	Prove theorems about triangles. *Theorems include: 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; the medians of a triangle meet at a point.*
		G.CO.C.11	Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*
		Supporting and Additional Content	
		G.CO.A.1	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
		G.CO.A.2	Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
		G.CO.A.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
		G.CO.A.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
		G.CO.A.5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
		G.CO.D.12	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *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.*
		G.CO.D.13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.
Subscore 2	Similarity, Right Triangles, and Trigonometry 20 of 50 points 40% of points	**Major Content**	
		G.SRT.A.1	Verify experimentally the properties of dilations given by a center and a scale factor: a. 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. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
		G.SRT.A.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
		G.SRT.A.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
		G.SRT.B.4	Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*
		G.SRT.B.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
		G.SRT.C.6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
		G.SRT.C.7	Explain and use the relationship between the sine and cosine of complementary angles.
		G.SRT.C.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. Click here to see a sample constructed-response item for this standard.
		Supporting and Additional Content	
		None	

Subscore 3	Circles 4 of 50 points 8% of points	**Major Content**	
		None	
		Supporting and Additional Content	
		G.C.A.1	Prove that all circles are similar.
		G.C.A.2	Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*
		G.C.A.3	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
		G.C.B.5	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.
	Expressing Geometric Properties with Equations 6 of 50 points 12% of points	**Major Content**	
		G.GPE.B.4	Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).*
		G.GPE.B.5	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
		G.GPE.B.6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
		G.GPE.B.7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.
		Supporting and Additional Content	
		G.GPE.A.1	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
Subscore 4	Geometric Measurement and Dimension 4 of 50 points 8% of points	**Major Content**	
		None	
		Supporting and Additional Content	
		G.GMD.A.1	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*
		G.GMD.A.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
		G.GMD.B.4	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
	Modeling with Geometry 6 of 50 points 12% of points	**Major Content**	
		G.MG.A.1	Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
		G.MG.A.2	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). Click here to see a sample constructed-response item for this standard.
		G.MG.A.3	Apply geometric methods to solve design problems (e.g., design an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). Click here to see a sample constructed-response item for this standard.
		Supporting and Additional Content	
		None	

IV. Testing Materials

The Geometry Typing Help has been updated to include how to type complex roots and inverse trigonometric functions. Teachers should incorporate the Typing Help and the Geometry Reference Sheet into their assessments as often as possible so as to prepare students in using these tools. Students should also regularly use the EOC Tests Online Calculator if this is the calculator they will be using on the assessment. Graph paper should be made available for student use throughout the year. The following table identifies the tools available for each session.

Tool	Provided	Session 1	Session 2	Session 3
scratch paper, graph paper, two pencils	by Test Administrator	YES	YES	YES
inch ruler, centimeter ruler, and protractor[4]	online	YES	YES	YES
calculator	online and/or by Test Administrator	NO	YES	YES
Geometry Typing Help	online and/or by Test Administrator	NO	YES	NO
Geometry Reference Sheet	online and/or by Test Administrator	YES	YES	YES

Note: Students are **NOT** allowed to use calculators during session 1 unless students have the approved accommodation *Assistive Technology* and are allowed the use of a calculator.

V. Calculator Policy

It is recommended that a calculator be made available to each student for instructional and assessment purposes. As with all instructional materials, each individual district and school should determine which calculator best supports its mathematics curriculum and instructional program. It is recommended that grade 9 – 12 students use a scientific calculator with graphing capabilities. Students are not allowed to share calculators within a test session. Calculator memories should be cleared at the end of each test session.

Calculators **not** permitted on statewide assessment:

- handheld or laptop computers
- pocket organizers
- calculators with Computer Algebra Systems (CAS) or other symbolic manipulation capabilities
- calculators with paper tape

[4] The ruler and protractor tools may not be available for some questions. If a tool is **not** available, the green tool button will not appear.

- calculators that talk or make noise
- calculators with QWERTY (typewriter-style) keypads
- electronic writing pads or pen input devices
- cell phone calculators

VI. Resources

Assessment Resources:

- Geometry Sample Test Items 2013-2014 and Geometry Sample Test Items 2014-2015: include sample items for all parts of the assessment, annotations explaining each item, and authentic student responses representing different score points for the constructed-response section
- Constructed-Response Samples: includes 3 constructed-response items with scoring information
- Achievement Level Descriptors: provides descriptions of what students know and can do at each Geometry achievement level

Instructional Resources:

- 2014 Math High School Guidebook: offers comprehensive information to support teacher in creating yearly, unit, and daily instructional plans for students
- Year Plan-Mathematics Geometry Sample: provides a suggested scope for implementation of curriculum
- Geometry Math Remediation Guide: connects the Geometry standards to middle school prerequisite knowledge
- Geometry Extended Constructed Response Tasks: contains only the Geometry ECR tasks from the 2014 Math High School Guidebook
- Geometry Instructional Tasks: contains only the Geometry instructional tasks from the 2014 Math High School Guidebook
- Unit Plan-Mathematics Geometry Unit 1 Sample: provides a suggested scope for the first instructional unit in Geometry
- EAGLE Sample Test Items: houses a bank of items that can be used for instructional or assessment purposes

General EOC Resources:

- EOC website: includes information on all aspects of the administration of the EOC tests, which can be accessed through the tabs at the top of the homepage (Some of the materials include announcements about current administrations, such as score report availability, registration dates, etc.; plus test coordinator and technology resources, such as the Test Administration Manual and technology guides.)
- EOC Interpretive Guide: includes an overview of the EOC tests, explanations of the processes for scoring the tests and establishing performance standards, and guidance on how to interpret the various EOC reports
- 2015-16 Louisiana Assessment Calendar: provides information on testing windows for all assessments administered in Louisiana