Florida Geometry EOC Assessment
Study Guide

The Florida Geometry End of Course Assessment is computer-based. During testing students will have access to the Algebra I/Geometry EOC Assessments Reference Sheet (at the end of this document) and a scientific calculator. View the ePat Geometry Practice Test for additional information. The exam will be given in two 80 minute sessions for a total duration of 160 minutes. It will contain 30-35 multiple choice items and 20-25 gridded-response items. 10-20% of the test questions will be low complexity items, 60-80% will be moderate complexity items, and 10-20% will be high complexity items. In addition, 65% of the exam questions will come from Two-Dimensional Geometry, 20% from Three-Dimensional Geometry, and 15% from Trigonometry and Discrete Mathematics. Students in Geometry and Geometry Honors will be required to take the Geometry End of Course Assessment which is based on the regular Geometry Course (Course Code: 1206310).

Additional Resources:

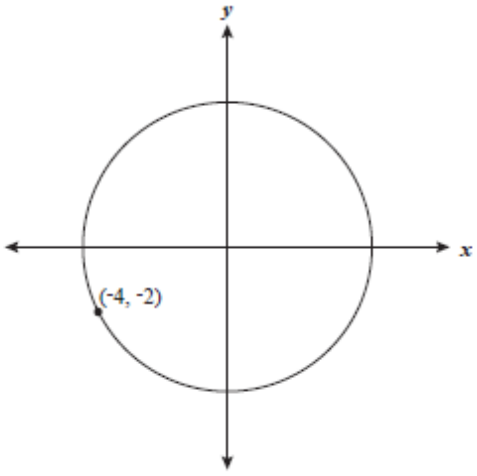
- Geometry Course Description: http://www.floridastandards.org/Courses/PublicPreviewCourse36.aspx
- Florida Algebra EOC Item Specifications: http://fcat.fldoe.org/eoc/pdf/GeometrySpecs.pdf
- Test Item Specifications , Computer-Based Practice Tests (ePATs) for EOC Assessments: http://fcat.fldoe.org/eoc /

Two-Dimensional Geometry (65%)

MA.912.G.1.1: Find the lengths and midpoints of line segments in two-dimensional coordinate systems. • **Benchmark Clarifications:** Students will find the length or midpoint or one of the end points of a segment. Students will justify lengths of segments. • **Content Limits** Items may require multiple steps. Items may include both distance and midpoint. • **Stimulus Attributes:** Graphics should be used for most of these items, as appropriate. Items may be set in either real-world or mathematical contexts. • **Response Attributes:** Fill-in response items may require that students provide the length of a segment or the *x*-coordinate (or *y*-coordinate) of a point of interest. Fill-in response items may have a negative answer.	Moderate Complexity	Item Type MC,FR	Textbook Alignment

Sample Item 2 **MC**

The circle shown below is centered at the origin and contains the point (-4, -2).



Which of the following is closest to the length of the diameter of the circle?

A. 13.41
B. 11.66
★ C. 8.94
D. 4.47

Item Context Mathematics

Sample Item 3 **FR**

On a coordinate grid, $\overline{AB}$ has end point B at (24, 16). The midpoint of $\overline{AB}$ is $P(4, -3)$. What is the y-coordinate of Point A?

				-	2	2

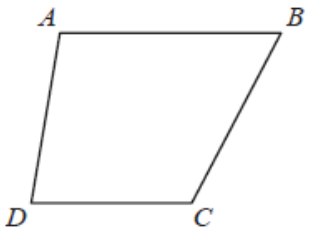
Sample Response -22

Item Context Mathematics

MA.912.G.1.3: Identify and use the relationships between special pairs of angles formed by parallel lines and transversals. • **Benchmark Clarification:** Students will recognize, represent, apply, and/or explain properties of angles formed by parallel lines and transversals. • **Content Limits:** Items may have multiple sets of parallel lines. Items will not include more than six lines in the graphic. • **Stimulus Attributes:** Items may be set in either real-world or mathematical contexts. Graphics should be used in these items, as appropriate. • **Response Attribute:** Fill-in response items may require that students provide an angle measure.	Moderate Complexity	Item Type: MC, FR	Textbook Alignment

Sample Item 4 **MC**

In the figure below, $\overline{AB}$ is parallel to $\overline{DC}$.



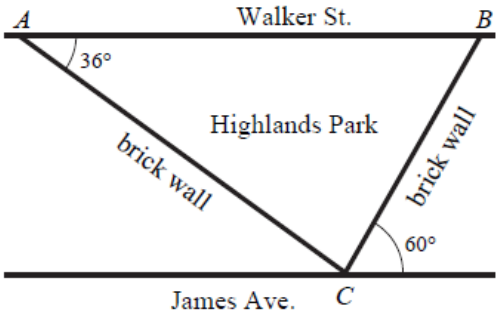
Which of the following statements about the figure must be true?

A. $m\angle DAB + m\angle ABC = 180°$
★ **B.** $m\angle DAB + m\angle CDA = 180°$
C. $\angle BAD \cong \angle ADC$
D. $\angle ADC \cong \angle ABC$

Item Context Mathematics

Sample Item 5 **FR**

Highlands Park is located between two parallel streets, Walker Street and James Avenue. The park faces Walker Street and is bordered by two brick walls that intersect James Avenue at point C, as shown below.



What is the measure, in degrees, of $\angle ACB$, the angle formed by the park's two brick walls?

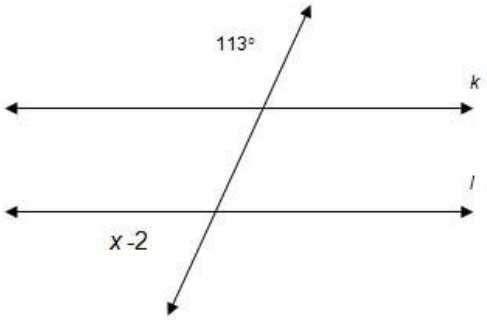
8	4					

Sample Response 84

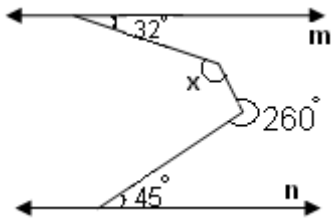
Item Context Mathematics

Examples from Standards Website:

Example 1: In the diagram, the lines k and l are parallel. Find the value of x. Find all angle values in the diagram. Explain your answer.



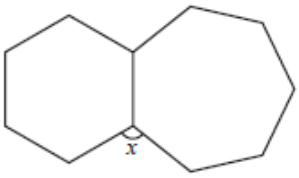
Example 2: In the diagram, the lines m and n are parallel. Find the value of x. Explain your answer.



MA.912.G.2.2: Determine the measures of interior and exterior angles of polygons, justifying the method used. • **Benchmark Clarification:** Students will determine the measures of interior and exterior angles of polygons. • **Content Limit:** All angle measurements will be in degrees. • **Stimulus Attributes:** Items may be set in either real-world or mathematical contexts. Graphics should be used in these items, as appropriate.	Moderate Complexity	Item Type: MC, FR	Textbook Alignment

Sample Item 6 **MC**

A regular hexagon and a regular heptagon share one side, as shown in the diagram below.



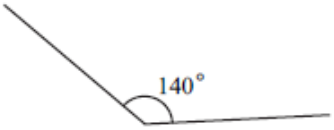
Which of the following is closest to the measure of x, the angle formed by one side of the hexagon and one side of the heptagon?

A. 102.9°
★ **B.** 111.4°
C. 120.0°
D. 124.5°

Item Context Mathematics

Sample Item 7 **FR**

Claire is drawing a regular polygon. She has drawn two of the sides with an interior angle of 140°, as shown below.



When Claire completes the regular polygon, what should be **the sum**, in degrees, of the measures of the interior angles?

			1	2	6	0

Sample Response 1,260

Item Context Mathematics

Examples from Standards Website:

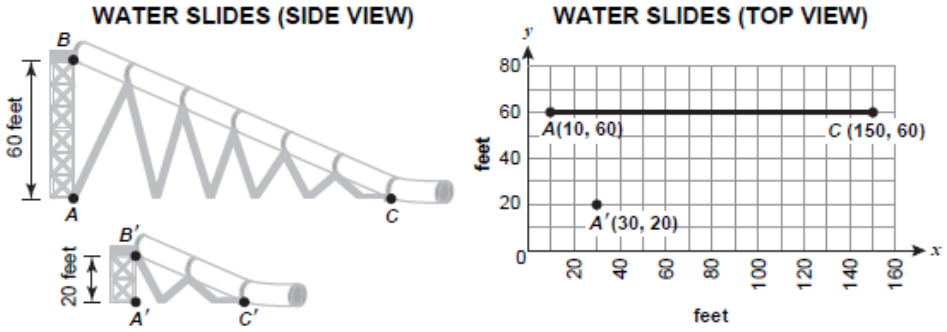
Example 1: Calculate the measure of one interior angle and one exterior of a regular octagon. Explain your method.

Example 2: Suppose that you will make a picture frame like the one shown below. To make the regular hexagonal frame, you will use identical trapezoidal pieces. What are the measures of the angles of the trapezoids? Explain your answer.

MA.912.G.2.3: Use properties of congruent and similar polygons to solve mathematical or real-world problems. • **Benchmark Clarification:** Students will use properties of congruent and/or similar polygons to solve problems. • **Content Limits:** All angle measurements will be in degrees. Items may require statements and/or justifications to complete formal and informal proofs. • **Stimulus Attribute:** Graphics should be used in these items, as appropriate.	High Complexity	Item Type: MC, FR	Textbook Alignment

Sample Item 8 **MC**

The owners of a water park want to build a scaled-down version of a popular tubular water slide for the children's section of the park. The side view of the water slide, labeled *ABC*, is shown below.



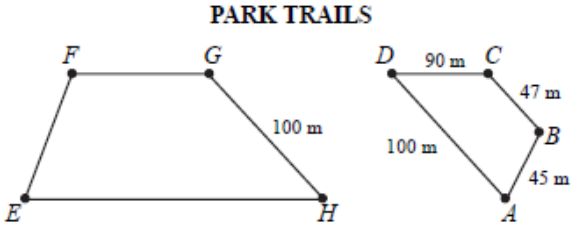
Points *A'*, *B'* and *C'*, shown above, are the corresponding points of the scaled-down slide. Which of the following would be closest to the coordinates of a new point *C'* that will make slide *A'B'C'* similar to slide *ABC*?

A. (90, 20)
★ **B.** (77, 20)
C. (50, 20)
D. (47, 20)

Item Context Social Studies/Consumerism

Sample Item 9 **FR**

Malik runs on the trails in the park. He normally runs 1 complete lap around trail *ABCD*. The length of each side of trail *ABCD* is shown in meters (m) in the diagram below.



If trail *EFGH* is similar in shape to trail *ABCD*, what is the minimum distance, to the nearest whole meter, Malik would have to run to complete one lap around trail *EFGH*?

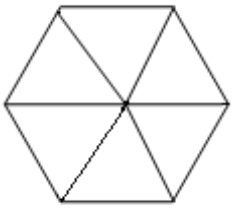
3	1	3				

Sample Response 313

Item Context Health/Physical Education

Example from Standards Website:

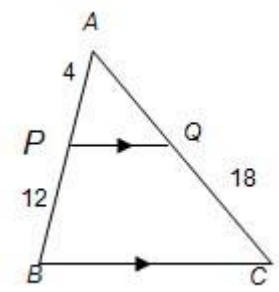
Suppose a building is in the shape of a regular hexagon. The architect wants to put walkways as indicated. Show that the triangles formed are equal in size and shape.



Items assessing MA.912.G.2.3 also assess:

- **MA.912.G.2.1: Identify and describe convex, concave, regular, and irregular polygons.** *High Complexity*
  Example from the Standards Website:
  Example 1: Draw a hexagon. Is it convex or concave? Is it regular or irregular? Explain your answers.
  Example 2: Define the terms convex, concave, regular and irregular polygon and draw a picture of the tern next to the definition.
- **MA.912.G.4.1: Classify, construct, and describe triangles that are right, acute, obtuse, scalene, isosceles, equilateral, and equiangular.** *Moderate Complexity*
  Triangle Classification Game This game explores triangle geometry in a discrete environment.http://www.floridastandards.org/Resources/PublicPreviewResource2378.aspx
- **MA.912.G.4.2: Define, identify, and construct altitudes, medians, angle bisectors, perpendicular bisectors, orthocenter, centroid, incenter, and circumcenter**. *Moderate Complexity*
  Example from the Standards Website: Draw several triangles. Construct their angle bisectors. What do you observe from your drawings?
- **MA.912.G.4.4: Use properties of congruent and similar triangles to solve problems involving lengths and areas.** *Moderate Complexity*
  Example from the Standards Website: Of two similar triangles, the second has sides half the length of the first. The area of the first triangle is 20 cm^2, What is the area of the second triangle?
- **MA.912.G.4.5: Apply theorems involving segments divided proportionally.** *Moderate Complexity*

  Example from the Standards Website: In triangle ABC shown below, $\overline{PQ}$ is parallel to $\overline{BC}$. What is the length of $\overline{AQ}$?

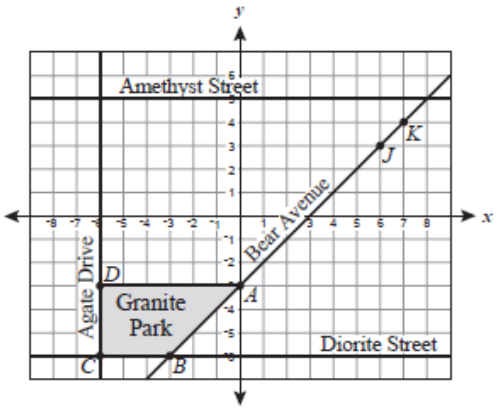


MA.912.G.2.4: Apply transformations (translations, reflections, rotations, dilations, and scale factors) to polygons. to determine congruence, similarity, and symmetry. Know that images formed by translations, reflections, and rotations are congruent to the original shape. Create and verify tessellations of the plane using polygons. • **Remarks:** Physical objects, drawings, and dynamic geometry software might help students explore this benchmark. Students' early work in elementary and middle school should form a base for teaching this benchmark (see MA.3.G.3.3, MA.4.G.5.2, and MA.7.G.4.2). Students should explore different types of transformations and observe that some transformations (translations, reflections, and rotations) result in congruent shapes. • **Benchmark Clarification:** Students will apply transformations to polygons to determine congruence, similarity, and symmetry. • **Content Limits:** Items may include using coordinate geometry to perform transformations in the plane. Items may require statements and/or justifications to determine congruence, similarity, and symmetry. • **Stimulus Attributes:** Items may assess transformations, including translations, reflections, rotations, dilations, and scale factors. Graphics should be used for most of these items, as appropriate. Items may be set in either real-world or mathematical contexts. • **Response Attributes:** Fill-in response items may require that students provide the length of a segment or the *x*-coordinate (or *y*-coordinate) of a point of interest. Fill-in response items may have a negative answer.	High Complexity	Item Type MC, FR	Textbook Alignment

Sample Item 10 **MC**

A top view of downtown Rockford is shown on the grid below, with Granite Park represented by quadrilateral *ABCD*. The shape of a new park, Mica Park, will be similar to the shape of Granite Park. Vertices *L* and *M* will be plotted on the grid to form quadrilateral *JKLM*, representing Mica Park.

Downtown Rockford



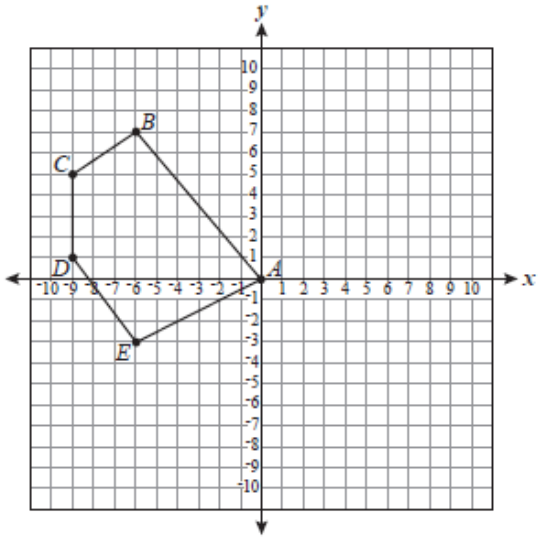
Which of the following coordinates for *L* and *M* could be vertices of *JKLM* so that the shape of Mica Park is similar to the shape of Granite Park?

A. *L*(4, 4), *M*(4, 3)
B. *L*(7, 1), *M*(6, 1)
C. *L*(7, 6), *M*(6, 6)
★ **D.** *L*(8, 4), *M*(8, 3)

Item Context Health/Physical Education

Sample Item 11 **FR**

Pentagon *ABCDE* is shown below on a coordinate grid. The coordinates of *A*, *B*, *C*, *D*, and *E* all have integer values.



If pentagon *ABCDE* is rotated 90° clockwise about point *A* to create pentagon *A'B'C'D'E'*, what will be the *x*-coordinate of *E'*?

					-	3

Sample Response -3

Item Context Mathematics

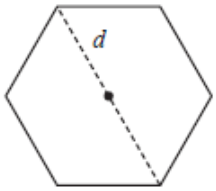
Example from Standards Website:
Explore regular polygons through manipulatives and/or drawing programs. Describe which of the polygons would be best for tiling a rectangular floor. Explain your reasoning.

MA.912.G.2.5: Explain the derivation and apply formulas for perimeter and area of polygons (triangles, quadrilaterals, pentagons, etc.). • **Benchmark Clarification:** Students will solve problems by using and/or deriving formulas for perimeter and/or area of polygons. • **Content Limits:** Items requiring students to calculate area may require the use of the apothem. Composite figures may include circles. • **Stimulus Attributes:** Items may be set in either mathematical or real-world contexts. Graphics should be used in most of these items, as appropriate.	Moderate Complexity	Item Type MC, FR	Textbook Alignment

Sample Item 12 **MC**

Marisol is creating a custom window frame that is in the shape of a regular hexagon. She wants to find the area of the hexagon to determine the amount of glass needed. She measured diagonal d and determined it was 40 inches. A diagram of the window frame is shown below.

Custom Window Frame



Which of the following is closest to the area, in square inches, of the hexagon?

A. 600
B. 849
★ **C.** 1,039
D. 1,200

Item Context Social Studies/Consumerism

Sample Item 13 **FR**

A package shaped like a rectangular prism needs to be mailed. For this package to be mailed at the standard parcel-post rate, the sum of the length of the longest side and the girth (the perimeter around its other two dimensions) must be less than or equal to 108 inches (in.). Figure 1 shows how to measure the girth of a package.

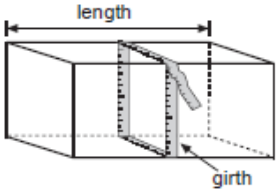


Figure 1

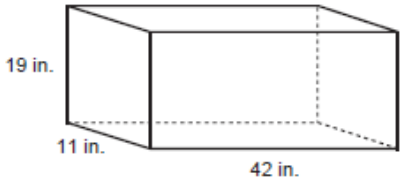


Figure 2

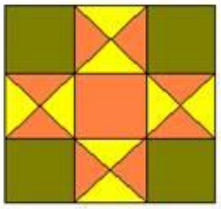
What is the sum of the length, in inches, of the longest side and the girth of the package shown in Figure 2?

1	0	2				

Sample Response 102

Item Context Social Studies/Consumerism

Examples from the Standards Website:
Example 1: A rectangle of area 360 square yards is ten times as long as it is wide. Find its length and width.
Example 2: Explain the derivation of the formula for the area of a triangle.
Example 3: The design below is called the Ohio Star. Assuming that it measures 9 inches by 9 inches, calculate the total area of all the orange patches, the total area of all the yellow patches, and the total area of all the green patches. How much fabric of each color will you need to cover an area that measures 72 inches by 90 inches?



Items Assessing MA.912.G.2.5 also assess:

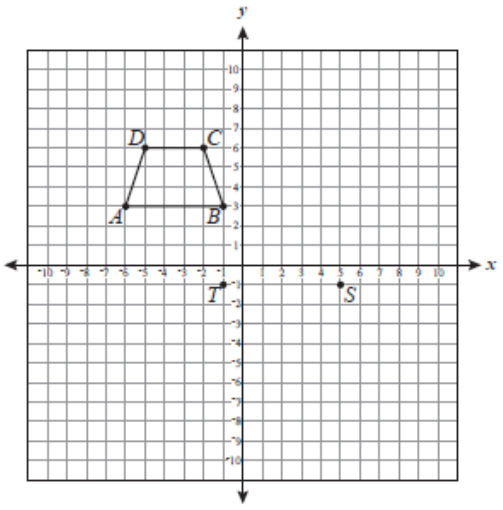
- **MA.912.G.2.7:** Determine how changes in dimensions affect the perimeter and area of common geometric figures. *Moderate Complexity*
  Example from the Standards Website: If the lengths of each side of a trapezoid are tripled, determine the change in its area, and justify your answer.

MA.912.G.3.3: Use coordinate geometry to prove properties of congruent, regular, and similar quadrilaterals.	High Complexity	Item Type MC	Textbook Alignment

- **Benchmark Clarification:** Students will use coordinate geometry and geometric properties to justify measures and characteristics of congruent, regular, and similar quadrilaterals.
- **Content Limits:** Items may include statements and/or justifications to complete formal and informal proofs. Items may include the use of coordinate planes.
- **Stimulus Attributes:** Graphics should be used for most of these items, as appropriate. Items may be set in either real-world or mathematical contexts.

Sample Item 14 **MC**

On the coordinate grid below, quadrilateral *ABCD* has vertices with integer coordinates.



Quadrilateral *QRST* is similar to quadrilateral *ABCD* with point *S* located at (5, -1) and point *T* located at (-1, -1). Which of the following could be possible coordinates for point *Q*?

A. (6, -4)
B. (7, -7)
★ **C.** (-3, -7)
D. (-2, -4)

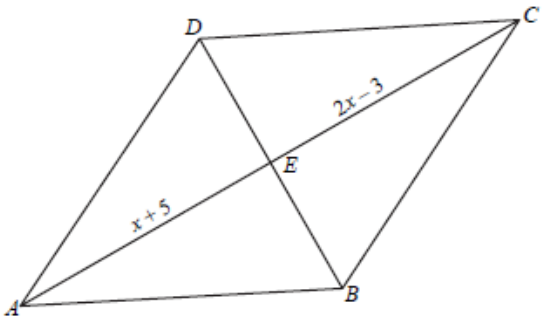
Item Context Mathematics

Examples from the Standards Website:
Example: Given a quadrilateral with vertices (0, 0), (5/2, 5√3/2), (5, 0), (7, 7√3/3), prove that the diagonals of this quadrilateral are perpendicular.
Example: Is rectangle ABCD with vertices at A(0, 0), B(4, 0), C(4, 2), D(0, 2) congruent to rectangle PQRS with vertices at P(-2, -1), Q(2, -1), R(2, 1), S(-2, 1)? Justify your answer.

MA.912.G.3.4: Prove theorems involving quadrilaterals. • **Benchmark Clarification:** Students will use geometric properties to justify measures and characteristics of quadrilaterals. • **Content Limit:** Items may require statements and/or justifications to complete formal and informal proofs. • **Stimulus Attributes:** Items may be set in either mathematical or real-world contexts. Graphics should be used in these items, as appropriate.	High Complexity	Item Type MC, FR	Textbook Alignment

Sample Item 15 **MC**

Figure $ABCD$ is a rhombus. The length of $\overline{AE}$ is $(x + 5)$ units, and the length of $\overline{EC}$ is $(2x - 3)$ units.



Which statement best explains why the equation $x + 5 = 2x - 3$ can be used to solve for x?

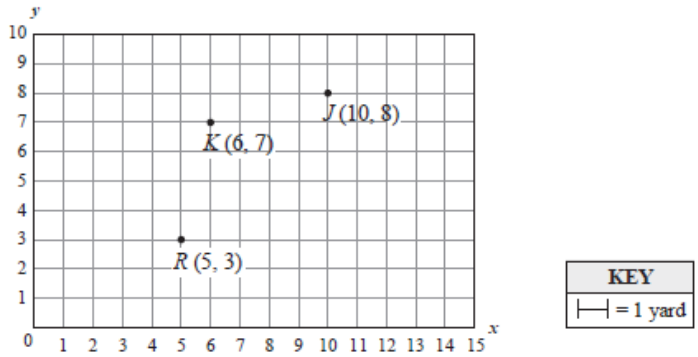
A. All four sides of a rhombus are congruent.
B. Opposite sides of a rhombus are parallel.
C. Diagonals of a rhombus are perpendicular.
★ **D.** Diagonals of a rhombus bisect each other.

Item Context Mathematics

Sample Item 16 **FR**

Four students are choreographing their dance routine for the high school talent show. The stage is rectangular and measures 15 yards by 10 yards. The stage is represented by the coordinate grid below. Three of the students—Riley (R), Krista (K), and Julian (J)—graphed their starting positions, as shown below.

DANCE ROUTINE STARTING POSITIONS



Let H represent Hannah's starting position on the stage. What should be the x-coordinate of point H so that $RKJH$ is a parallelogram?

						9

Sample Response 9

Item Context The Arts

Example from the Standards Website:
Prove that the diagonals of a rectangle are congruent.

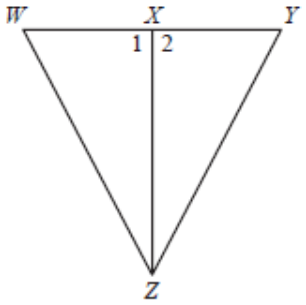
Items Assessing MA.912.G.3.4 also assess:

- **MA.912.D.6.4: Use methods of direct and indirect proof and determine whether a short proof is logically valid**. *Moderate Complexity*
  Example from the Standards Website: If somebody argues, "If it's Thursday, it is raining." along with "It is raining" implies that "it is Thursday.", is this a valid or invalid argument? Explain your answer.
- **MA.912.G.3.1: Describe, classify, and compare relationships among quadrilaterals including the square, rectangle, rhombus, parallelogram, trapezoid, and kite.** *Moderate Complexity*
  Remark: This benchmark examines properties of quadrilaterals one at a time.
  Example from the Standards Website: Explore a trapezoid through manipulatives, drawings and/or technology. Draw the diagonals and determine whether they are perpendicular. Give a convincing argument that your judgment is correct.
- **MA.912.G.3.2: Compare and contrast special quadrilaterals on the basis of their properties.** *Moderate Complexity*
  Remark: This benchmark examines properties of quadrilaterals one at a time.
  Example from the Standards Website: Explore a trapezoid through manipulatives, drawings and/or technology. Draw the diagonals and determine whether they are perpendicular. Give a convincing argument that your judgment is correct.
- **MA.912.G.8.5: Write geometric proofs, including proofs by contradiction and proofs involving coordinate geometry. Use and compare a variety of ways to present deductive proofs, such as flow charts, paragraphs, two-column, and indirect proofs.** *High Complexity*
  Examples from the Standards Website:
  Example 1: Prove that the sum of the measures of the interior angles of a triangle is 180°.
  Example 2: Prove that the perpendicular bisector of line segment AB is the set of all points equidistant from the endpoints A and B.
  Example 3: Prove that two lines are parallel if and only if the alternate interior angles the lines make with a transversal are equal.

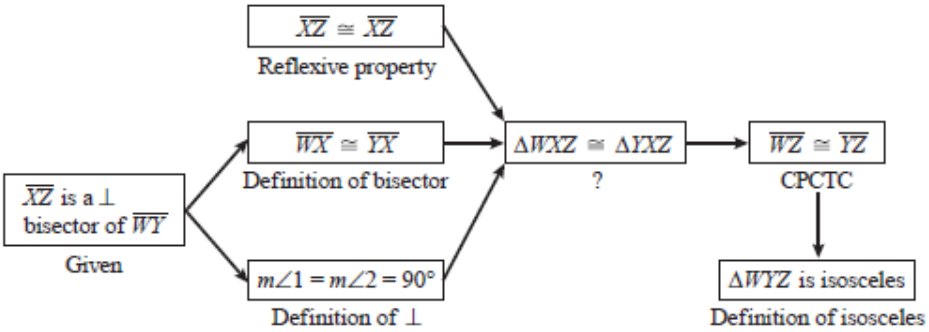
MA.912.G.4.6: Prove that triangles are congruent or similar and use the concept of corresponding parts of congruent triangles. • **Benchmark Clarification:** Students will use geometric properties to justify measures and characteristics of triangles. • **Content Limit:** Items may require statements and/or justifications to complete formal and informal proofs. • **Stimulus Attributes:** Items may be set in either real-world or mathematical contexts. Graphics should be used in these items, as appropriate.	High Complexity	Item Type MC	Textbook Alignment

Sample Item 17 **MC**

Nancy wrote a proof about the figure shown below.



In the proof below, Nancy started with the fact that $\overline{XZ}$ is a perpendicular bisector of $\overline{WY}$ and proved that ΔWYZ is isosceles.

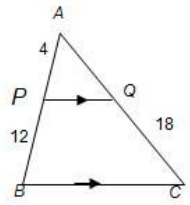


Which of the following correctly replaces the question mark in Nancy's proof?

A. ASA
B. SAA
★ **C.** SAS
D. SSS

Item Context Mathematics

Example from the Standards Website: Prove that triangles ABC and APQ are similar.



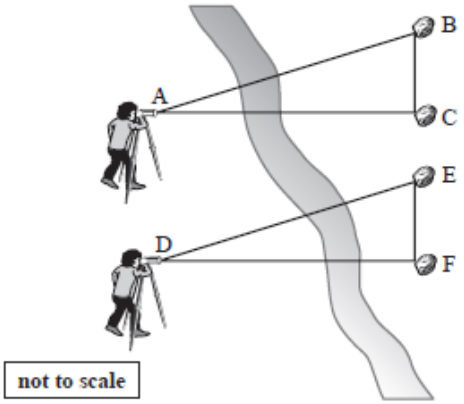
Items Assessing MA.912.G.4.6 also assess:

- **MA.912.D.6.4: Use methods of direct and indirect proof and determine whether a short proof is logically valid**. *Moderate Complexity*
  Example from the Standards Website: If somebody argues, "If it's Thursday, it is raining." along with "It is raining" implies that "it is Thursday.", is this a valid or invalid argument? Explain your answer.
- **MA.912.G.8.5: Write geometric proofs, including proofs by contradiction and proofs involving coordinate geometry. Use and compare a variety of ways to present deductive proofs, such as flow charts, paragraphs, two-column, and indirect proofs.** *High Complexity*
  Examples from the Standards Website:
  Example 1: Prove that the sum of the measures of the interior angles of a triangle is 180°.
  Example 2: Prove that the perpendicular bisector of line segment AB is the set of all points equidistant from the endpoints A and B.
  Example 3: Prove that two lines are parallel if and only if the alternate interior angles the lines make with a transversal are equal.

MA.912.G.4.7: Apply the inequality theorems: triangle inequality, inequality in one triangle, and the Hinge theorem. • **Benchmark Clarification:** Students will apply the inequality theorems to determine relationships about sides and angles within a triangle and between triangles. • **Content Limit:** Items may assess methods of proving triangles congruent. • **Stimulus Attributes:** Items may be set in either mathematical or real-world contexts. Graphics should be used in these items, as appropriate.	Moderate Complexity	Item Type MC	Textbook Alignment

Sample Item 18 **MC**

A surveyor took some measurements across a river, as shown below. In the diagram, $AC = DF$ and $AB = DE$.



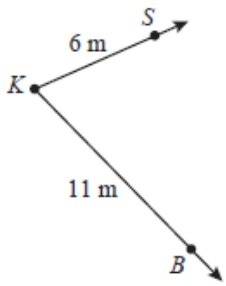
The surveyor determined that $m\angle BAC = 29$ and $m\angle EDF = 32$. Which of the following can he conclude?

A. $BC > EF$
★ **B.** $BC < EF$
C. $AC > DE$
D. $AC < DF$

Item Context Social Studies/Consumerism

Sample Item 19 **MC**

Kristin has two dogs, Buddy and Socks. She stands at point K in the diagram and throws two disks. Buddy catches one at point B, which is 11 meters (m) from Kristin. Socks catches the other at point S, which is 6 m from Kristin.



If KSB forms a triangle, which could be the length, in meters, of segment SB?

A. 5 m
★ **B.** 8 m
C. 17 m
D. 22 m

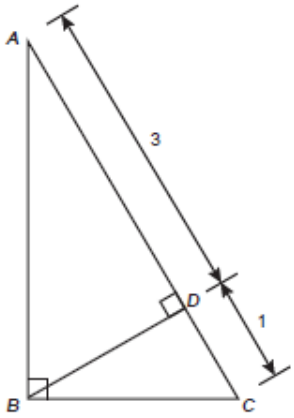
Item Context Health/Physical Education

Example from the Standards Website:
Can you draw a triangle with sides of length 7 cm, 4 cm, and 15 cm? Explain your answer.

MA.912.G.5.4: Solve real-world problem s involving right triangles. • **Content Limits:** Items may require students to apply the Pythagorean theorem, special right triangle relationships, and/or characteristics of triangles resulting from the altitude of a right triangle drawn from the right angle to the hypotenuse. Items may include the application of the geometric mean. • **Stimulus Attributes:** Items assessing MA.912.G.5.2 may be set in either mathematical or real-world contexts. All other items must be set in real-world context. Any radical expressions in the item stem must be in simplified or rationalized form. Graphics should be used in most of these items, as appropriate. • **Response Attributes:** Any radical expressions in multiple-choice options will be provided in simplified or rationalized form.	High Complexity	Item Type MC, FR	Textbook Alignment

Sample Item 20 **MC**

In ΔABC, $\overline{BD}$ is an altitude.



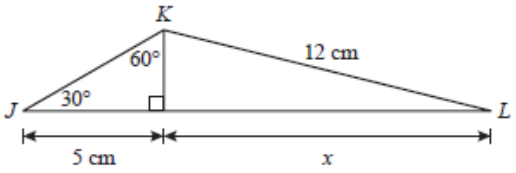
What is the length, in units, of $\overline{BD}$?

A. 1
B. 2
★ **C.** $\sqrt{3}$
D. $2\sqrt{3}$

Item Context Mathematics

Sample Item 21 **FR**

Nara created two right triangles. She started with ΔJKL and drew an altitude from point K to side JL. The diagram below shows ΔJKL and some of its measurements, in centimeters (cm).



Based on the information in the diagram, what is the measure of x to the nearest tenth of a centimeter?

1	1	.	6			

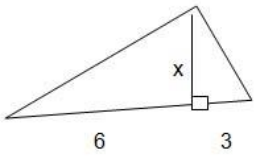
Sample Response 11.6

Item Context Mathematics

Example from the Standards Website: The distance of the base of a ladder from the wall it leans against should be at least 1/3 of the ladder's total length. Suppose a 12-ft ladder is placed according to these guidelines. Give the minimum distance of the base of the ladder from the wall. How far up the wall will the ladder reach? Explain and include a sketch in your explanation.

Items assessing MA.912.G.5.4 also assess:

- **MA.912.G.5.1: Prove and apply the Pythagorean theorem and its converse.** *High Complexity*
  Example: Determine if the triangle with side lengths of 10, 12, and 18 is a right triangle. Justify your reasoning.
- **MA.912.G.5.2: State and apply the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle.** *Moderate Complexity*
  Example from the Standards Website: Find the value of x in the right triangle shown here.



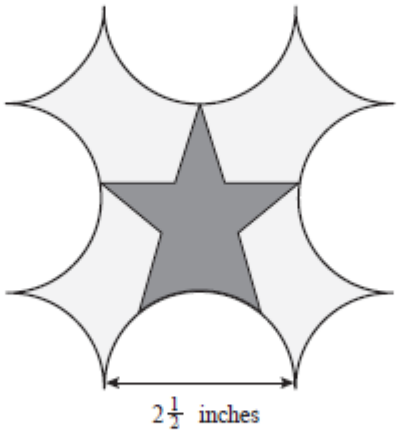
- **MA.912.G.5.3: Use special right triangles (30° - 60° - 90° and 45° - 45° - 90°) to solve problems.** *Moderate Complexity*
  Example: An isosceles right triangle has one leg 6 cm long. Find the lengths of the other two sides.

MA.912.G.6.5: Solve real-world problems using measures of circumference, arc length, and areas of circles and sectors. • **Benchmark Clarification:** Students will solve problems related to circles. • **Content Limits:** All angle measurements will be in degrees. Items may require statements and/or justifications to complete formal and informal proofs. • **Stimulus Attributes:** Items may be set in either real-world or mathematical contexts. Graphics should be used in most of these items, as appropriate.	High Complexity	Item Type MC, FR	Textbook Alignment

Sample Item 22 **MC**

Allison created an embroidery design of a stylized star emblem. The perimeter of the design is made by alternating semicircle and quarter-circle arcs. Each arc is formed from a circle with a $2\frac{1}{2}$-inch diameter. There are 4 semicircle and 4 quarter-circle arcs, as shown in the diagram below.

Embroidery Design



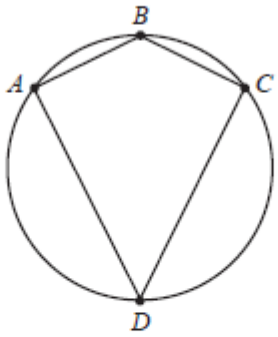
To the nearest whole inch, what is the **perimeter** of Allison's design?

A. 15 inches
B. 20 inches
★ **C.** 24 inches
D. 31 inches

Item Context The Arts

Sample Item 23 **FR**

Kayla inscribed kite $ABCD$ in a circle, as shown below.



If the measure of arc ADC is 255° in Kayla's design, what is the measure, in degrees, of $\angle ADC$?

			5	2	.	5

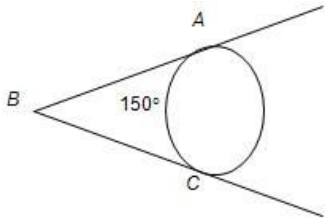
Sample Response 52.5

Item Context Mathematics

Example from the Standards Website: Which will give you more: three 6-inch pizzas or two 8-inch pizzas? Explain your answer.

Items assessing MA.912.G.6.5 also assess:

- **MA.912.G.6.2: Define and identify: circumference, radius, diameter, arc, arc length, chord, secant, tangent and concentric circles.** *Low Complexity*
  Example from the Standards Website: What is the angle between a tangent to a circle and the radius at the point where the tangent meets the circle?
- **MA.912.G.6.4: Determine and use measures of arcs and related angles (central, inscribed, and intersections of secants and tangents).** *Moderate Complexity*
  Example from the Standards Website: Find the measure of angle ABC in the diagram shown to the right.



MA.912.G.6.6: Given the center and the radius, find the equation of a circle in the coordinate plane or given the equation of a circle in center-radius form, state the center and the radius of the circle. • **Benchmark Clarification:** Students will identify the center, radius, and/or graph of a circle given the equation of a circle, or write the equation of a circle given the center, radius, and/or graph. • **Content Limit:** Equations of circles must be presented in center-radius form, where h and k are rational and r may be irrational. Items will not require students to manipulate equations to or from standard form. • **Stimulus Attributes:** Items may be set in either mathematical or real-world contexts. Graphics should be used in most of these items, as appropriate.	Moderate Complexity	Item Type MC	Textbook Alignment

Sample Item 24 **MC**

Circle Q has a radius of 5 units with center Q (3.7, -2). Which of the following equations defines circle Q?

A. $(x + 3.7)^2 + (y - 2)^2 = 5$
B. $(x + 3.7)^2 + (y - 2)^2 = 25$
C. $(x - 3.7)^2 + (y + 2)^2 = 5$
★ **D.** $(x - 3.7)^2 + (y + 2)^2 = 25$

Item Context Mathematics

Example from the Standards Website: Find the equation of the circle with radius 10 and center (6, -3).

Items assessing MA.912.G.6.6 also assess:

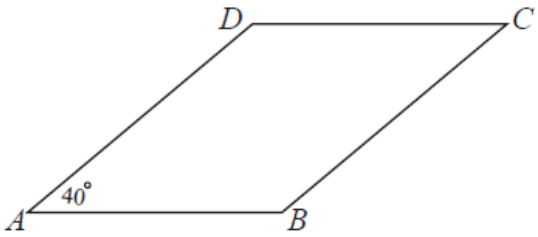
- **MA.912.G.6.7: Given the equation of a circle in center-radius form or given the center and the radius of a circle, sketch the graph of the circle.** *Moderate Complexity*

  Example: Sketch the graph of the circle whose equation is $(x-3)^2+(y+2)^2=16$

MA.912.G.8.4: Make conjectures with justifications about geometric ideas. Distinguish between information that supports a conjecture and the proof of a conjecture. • **Benchmark Clarification:** Students will provide statements and/or reasons in a formal or informal proof or distinguish between mere examples of a geometric idea and proof of that idea. • **Content Limits:** Items must adhere to the content limits stated in other benchmarks. Items may include proofs about congruent/similar triangles and parallel lines.	High Complexity	Item Type MC	Textbook Alignment

Sample Item 31 **MC**

For his mathematics assignment, Armando must determine the conditions that will make quadrilateral $ABCD$, shown below, a parallelogram.



Given that the m$\angle DAB = 40°$, which of the following statements will guarantee that $ABCD$ is a parallelogram?

A. m$\angle ADC$ + m$\angle DCB$ + m$\angle ABC$ + 40°= 360°
★ **B.** m$\angle DCB = 40°$; m$\angle ABC = 140°$
C. m$\angle ABC$ + 40°= 180°
D. m$\angle DCB = 40°$

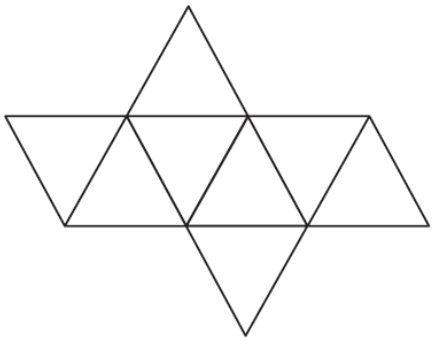
Example from the Standards Website: Calculate the ratios of side lengths in several different-sized triangles with angles of 90° , 50° , and 40° . What do you notice about the ratios? How might you prove that your observation is true (or show that it is false)?

Three-Dimensional Geometry (20%)

MA.912.G.7.1: Describe and make regular, non-regular, and oblique polyhedra, and sketch the net for a given polyhedron and vice versa. • **Benchmark Clarifications:** Students will identify the net for a given polyhedron and vice versa. Students will identify and determine the types of faces and/or the numbers of edges, faces, and vertices of a given polyhedron or a given net. • **Content Limits:** Items will only include: • The five Platonic solids (tetrahedron, hexahedron or cube, octahedron, dodecahedron, and icosahedron); • Right or oblique prisms or pyramids with up to 12 edges on the base or composites; • Composites of the right or oblique prisms or pyramids; and • Other solids with fewer than 15 faces. Items must not require use of formulas relating faces, edges, and vertices. Items may not include cones, spheres, or cylinders. • **Stimulus Attributes:** Graphics should be used for most of these items, as appropriate. Items may be set in either real-world or mathematical contexts. • **Response Attribute:** Fill-in response items may require that students provide the number of edges, faces, or vertices of a given polyhedron.	Moderate Complexity	Item Type MC, FR	Textbook Alignment

Sample Item 25 **MC**

Below is a net of a polyhedron.



How many edges does the polyhedron have?

A. 6
B. 8
★ **C.** 12
D. 24

Sample Item 26 **FR**

How many faces does a dodecahedron have?

1	2					

Sample Response 12

Example from the Standards Website: Make a net for a tetrahedron out of poster board and fold it up to make the tetrahedron. Is this a regular polyhedron? Explain why or why not.

Items assessing MA.912.G.7.1 also assess:

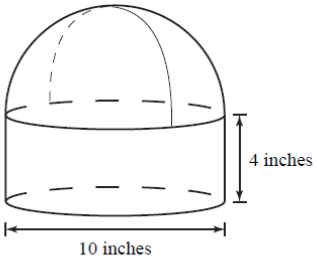
- **MA.912.G.7.2: Describe the relationships between the faces, edges, and vertices of polyhedra.** *Moderate Complexity*
  Example from Standards Website: Use manipulatives to investigate the relationships between faces, edges, and vertices of polyhedra i.e., Euler's Theorem.

MA.912.G.7.5: Explain and use formulas for lateral area, surface area, and volume of solids. • **Benchmark Clarification:** Students will explain and/or apply formulas to determine surface area, lateral area, and volume of solids. • **Content Limits:** Solids will be limited to right prisms, right-circular cylinders, spheres, right pyramids, right-circular cones, and/or composites of these solids. Items may not include oblique figures. Items may ask students to apply knowledge of congruent and similar solids. • **Stimulus Attributes:** Items may be set in either mathematical or real-world contexts. Graphics should be used in most of these items, as appropriate.	Moderate Complexity	Item Type MC, FR	Textbook Alignment

Sample Item 27 **MC**

Abraham works at the Delicious Cake Factory and packages cakes in cardboard containers shaped like right circular cylinders with hemispheres on top, as shown in the diagram below.

CAKE CONTAINER



Abraham wants to wrap the cake containers completely in colored plastic wrap and needs to know how much wrap he will need. What is the total exterior surface area of the container?

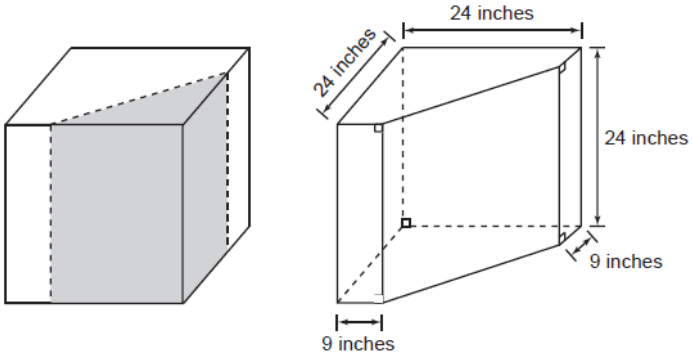
A. 90π square inches
★ **B.** 115π square inches
C. 190π square inches
D. 308π square inches

Item Context Social Studies/Consumerism

Sample Item 28 **FR**

At a garage sale, Jason bought an aquarium shaped like a truncated cube. A truncated cube can be made by slicing a cube with a plane perpendicular to the base of the cube and removing the resulting triangular prism, as shown in the cube diagram below.

Jason's Aquarium



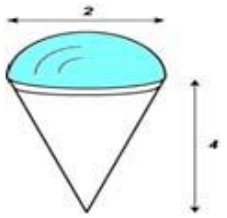
Cube **Truncated Cube**

What is the capacity, **in cubic inches**, of this truncated cube aquarium?

		1	1	1	2	4

Sample Response 11,124

Example from the Standards Website: A gold class ring is dropped into a glass that is a right cylinder with a 6 cm diameter. The water level rises 1 mm. What is the volume of the ring?
Example: Given the composite solid consisting of a hemisphere and a cone, calculate the surface area and the volume.



Items assessing MA.912.G.7.5 also assess:

- **MA.912.G.7.4: Identify chords, tangents, radii, and great circles of spheres** *Low Complexity*
  Example from Standards Website: On Earth, is the equator a great circle ? Explain your answer.
- **MA.912.G.7.6: Identify and use properties of congruent and similar solids.** *Moderate Complexity*
  Example from Standards Website: Explain how the surface area and volume of similar cylinders are related.

MA.912.G.7.7: Determine how changes in dimensions affect the surface area and volume of common geometric solids.	Moderate Complexity	Item Type MC, FR	Textbook Alignment

- **Benchmark Clarifications:** Students will determine how changes in parameter(s) affect perimeter, area, surface area, or volume, or vice-versa. Students will determine how changes to one parameter will change other parameters when the perimeter, area, surface area, or volume is held constant.
- **Content Limits:** One or two parameters may be changed, resulting in the change of another parameter. Three parameters may be changed in one item only if all three are changed by a constant factor. Solids will be limited to right prisms, right circular cylinders, spheres, right pyramids, right circular cones, and/or composites of these solids. Items may not include oblique figures. Items may involve, explicitly and/or implicitly, no more than four parameters. Changes in dimension may or may not result in similar figures.
- **Stimulus Attributes:** Items may be set in either mathematical or real-world contexts. Graphics should be used in most of these items, as appropriate.

Sample Item 29 **MC**

Kendra has a compost box that has the shape of a cube. She wants to increase the size of the box by extending every edge of the box by half of its original length. After the box is increased in size, which of the following statements is true?

A. The volume of the new compost box is exactly 112.5% of the volume of the original box.
B. The volume of the new compost box is exactly 150% of the volume of the original box.
★ **C.** The volume of the new compost box is exactly 337.5% of the volume of the original box.
D. The volume of the new compost box is exactly 450% of the volume of the original box.

Item Context Mathematics

Sample Item 30 **FR**

A city is planning to replace one of its water storage tanks with a larger one. The city's old tank is a right circular cylinder with a radius of 12 feet and a volume of 10,000 cubic feet. The new tank is a right circular cylinder with a radius of 15 feet and the same height as the old tank. What is the maximum number of cubic feet of water the new storage tank will hold?

1	5	6	2	5		

Sample Response 15,625

Item Context Social Studies/Consumerism

Example from the Standards Website: Explain how changing the radius or height of a cylinder affects its surface area and volume.

Items assessing MA.912.G.7.7 also assess:

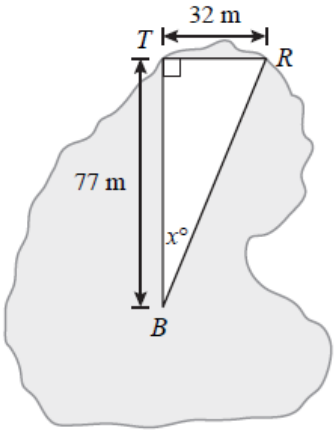
- **MA.912.G.2.7: Determine how changes in dimensions affect the perimeter and area of common geometric figures.** *Moderate Complexity*
  Example from the Standards Website: If the lengths of each side of a trapezoid are tripled, determine the change in its area, and justify your answer.

Trigonometry and Discrete Mathematics (15%)

MA.912.T.2.1: Define and use the trigonometric ratios (sine, cosine, tangent, cotangent, secant, cosecant) in terms of angles of right triangles. • **Benchmark Clarification:** Students will solve real-world problems involving right-triangle trigonometry. • **Content Limits:** Items should not include special right triangles (30°-60°-90° and 45°-45°-90°) or the Pythagorean theorem. Angle measures will be in degree measure. Items will assess only sine, cosine, and tangent to determine the length of a side or an angle measure. • **Stimulus Attributes:** Items may be set in either real-world or mathematical contexts. Graphics should be used in all items. • **Response Attributes:** Fill-in response items may require the student to provide an angle measure or a length. Radian equivalents of correct answers will not be used as distractors. Fill-in response items will specify the nature of the response, if the response is not an integer.	Moderate Complexity	Item Type MC, FR	Textbook Alignment

Sample Item 32 **MC**

A tackle shop and restaurant are located on the shore of a lake and are 32 meters (m) apart. A boat on the lake heading toward the tackle shop is a distance of 77 meters from the tackle shop. This situation is shown in the diagram below, where point T represents the location of the tackle shop, point R represents the location of the restaurant, and point B represents the location of the boat.



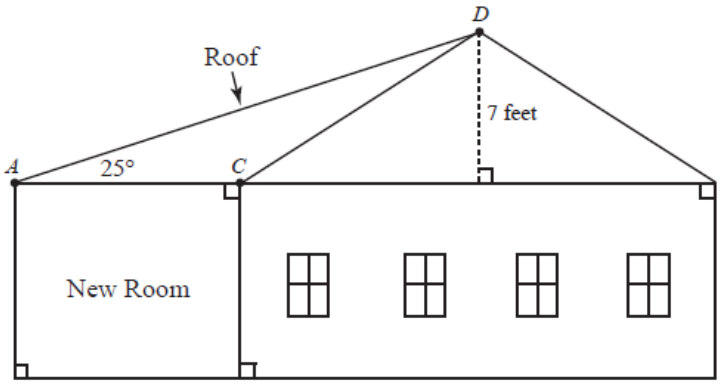
The driver of the boat wants to change direction to sail toward the restaurant. Which of the following is closest to the value of x?

★ **A.** 23
B. 25
C. 65
D. 67

Item Context Health/Physical Education

Sample Item 33 **FR**

Mr. Rose is remodeling his house by adding a room to one side, as shown in the diagram below. In order to determine the length of the boards he needs for the roof of the room, he must calculate the distance from point A to point D.



What is the length, to the nearest tenth of a foot, of $\overline{AD}$?

			1	6	.	6

Sample Response 16.6

Item Context Social Studies/Consumerism

Example: In triangle ABC, tan A = 1/5. Find sin A and cot A. Example: Show that the slope of a line at 135º to the x-axis is the same as the tangent of 135º.

MA.912.D.6.2: Find the converse, inverse, and contrapositive of a statement. • **Benchmark Clarification:** Students will identify the converse, inverse, or contrapositive of a given statement. • **Content Limits:** Truth tables or validity of a given statement will not be assessed. Items must present propositions as a sentence, and not by using symbols, e.g., $p \rightarrow q$ or $3x + 1 = 7 \rightarrow x = 2$. • **Stimulus Attribute:** Items may be set in either real-world or mathematical contexts.	Moderate Complexity	Item Type MC	Textbook Alignment

Sample Item 1 **MC**

Which of the following is the **converse** of the following statement?

"If today is Sunday, then tomorrow is Monday."

★ **A.** If tomorrow is Monday, then today is Sunday.
B. If tomorrow is not Monday, then today is Sunday.
C. If today is not Sunday, then tomorrow is not Monday.
D. If tomorrow is not Monday, then today is not Sunday.

Item Context Mathematics

Example from the Standards Website: Determine the inverse, converse and contrapositive of the statement, "If it is Thursday, there will be rain."

Items assessing MA.912.D.6.2 also assess:

- **MA.912.D.6.3: Determine whether two propositions are logically equivalent**. *Moderate Complexity*

  Example from the Standards Website: Determine whether the propositions $\sim(p \vee q)$ and $(\sim p \wedge \sim q)$ are logically equivalent.

Benchmarks that are not assessed by the End-of-Course Exam			
MA.912.G.1.2: Construct congruent segments and angles, angle bisectors, and parallel and perpendicular lines using a straight edge and compass or a drawing program, explaining and justifying the process used.	Moderate	Not assessed	
MA.912.G.4.3: Construct triangles congruent to given triangles.	High	Not assessed	
MA.912.G.8.1: Analyze the structure of Euclidean geometry as an axiomatic system. Distinguish between undefined terms, definitions, postulates, and theorems.	High	Not assessed	
MA.912.G.8.2: Use a variety of problem-solving strategies, such as drawing a diagram, making a chart, guess-and-check, solving a simpler problem, writing an equation, and working backwards.	Moderate	Not assessed	
MA.912.G.8.3: Determine whether a solution is reasonable in the context of the original situation.	Moderate	Not assessed	
MA.912.G.8.6: Perform basic constructions using straightedge and compass, and/or drawing programs describing and justifying the procedures used. Distinguish between sketching, constructing, and drawing geometric figures.	High	Not assessed	

The next two pages contain a copy of the Algebra I / Geometry EOC Assessment Reference Sheet which may be used on this exam. Not all references found on the sheet will be used on this exam.
A link to this reference sheet is:
http://sharepoint.leon.k12.fl.us/tdc/external/Shared%20Documents/FCAT%20Mathematics/Alg%201%20Geom%20EOC%20Ref%20Sheet%20.pdf

Algebra 1 End-of-Course and Geometry End-of-Course Assessments Reference Sheet

Area

Parallelogram	$A = bh$
Triangle	$A = \frac{1}{2}bh$
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$
Circle	$A = \pi r^2$
Regular Polygon	$A = \frac{1}{2}aP$

KEY

b	= base	A	= area
h	= height	B	= area of base
w	= width	C	= circumference
d	= diameter	V	= volume
r	= radius	P	= perimeter of base
ℓ	= slant height		
a	= apothem	$S.A.$	= surface area

Use 3.14 or $\frac{22}{7}$ for π.

Circumference

$C = \pi d$ or $C = 2\pi r$

	Volume/Capacity	Total Surface Area
 Rectangular Prism	$V = bwh$ or $V = Bh$	$S.A. = 2bh + 2bw + 2hw$ or $S.A. = Ph + 2B$
 Right Circular Cylinder	$V = \pi r^2 h$ or $V = Bh$	$S.A. = 2\pi rh + 2\pi r^2$ or $S.A. = 2\pi rh + 2B$
 Right Square Pyramid	$V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}P\ell + B$
 Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$ or $V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}(2\pi r)\ell + B$
 Sphere	$V = \frac{4}{3}\pi r^3$	$S.A. = 4\pi r^2$

Sum of the measures of the interior angles of a polygon $= 180(n-2)$

Measure of an interior angle of a regular polygon $= \frac{180(n-2)}{n}$

where:

n represents the number of sides

Algebra 1 End-of-Course and Geometry End-of-Course Assessments Reference Sheet

Slope formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

where m = slope and (x_1, y_1) and (x_2, y_2) are points on the line

Distance between two points

$P_1(x_1, y_1)$ and $P_2(x_2, y_2)$

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Midpoint between two points

$P_1(x_1, y_1)$ and $P_2(x_2, y_2)$

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Slope-intercept form of a linear equation

$$y = mx + b$$

where m = slope and b = y-intercept

Quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

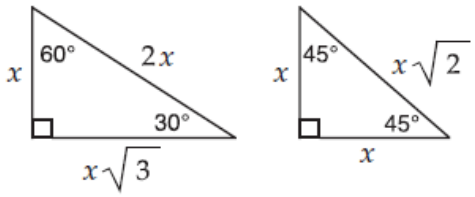
where a, b, and c are coefficients in an equation of the form $ax^2 + bx + c = 0$

Point-slope form of a linear equation

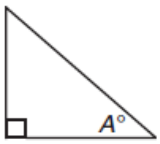
$$y - y_1 = m(x - x_1)$$

where m = slope and (x_1, y_1) is a point on the line

Special Right Triangles



Trigonometric Ratios



$$\sin A° = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos A° = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan A° = \frac{\text{opposite}}{\text{adjacent}}$$

Conversions

1 yard = 3 feet
1 mile = 1,760 yards = 5,280 feet
1 acre = 43,560 square feet
1 hour = 60 minutes
1 minute = 60 seconds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 pound = 16 ounces
1 ton = 2,000 pounds

1 meter = 100 centimeters = 1000 millimeters
1 kilometer = 1000 meters
1 liter = 1000 milliliters = 1000 cubic centimeters
1 gram = 1000 milligrams
1 kilogram = 1000 grams