Regents Examination in Geometry (

ple Items

Sprie

- Notice the application of mathematical ways of thinking to real-world issues and challenges.
- Pay attention to the strong distractors in each multiple-choice question.
- Don't consider these questions to be the only way the standards will be assessed.
- Don't assume that the sample questions represent a mini-version of future State exams.

Understanding Math Sample Questions

Multiple-Choice Questions

Sample multiple-choice math questions are designed to assess CCLS math standards. Math multiple-choice questions assess procedural fluency and conceptual understanding. Unlike questions on past math exams, many require the use of multiple skills and concepts. Within the sample questions, all distractors will be based on plausible missteps.

Constructed Response Questions

Math constructed response questions are similar to past questions, asking students to show their work in completing one or more tasks or more extensive problems. Constructed response questions allow students to show their understanding of math procedures, conceptual understanding, and application.

Format of the Math Sample Questions Document

The Math Sample Questions document is formatted so that headings appear below each item to provide information for teacher use to help interpret the item, understand measurement with the CCLS, and inform instruction. A list of the headings with a brief description of the associated information is shown below.

Key: This is the correct response or, in the case of multiple-choice items, the correct option.

Measures CCLS: This item measures the knowledge, skills, and proficiencies characterized by the standards within the identified cluster.

Mathematical Practices: If applicable, this is a list of mathematical practices associated with the item.

Commentary:

Common Core Sample Question #1

1 What are the coordinates of the point on the directed line segment from K(–5,–4) to L(5,1) that partitions the segment into a ratio of 3 to 2?

(1) (–3,–3)

(2) (–1,–2)

(3) $(0, \frac{3}{2})$

(4) (1,–1)

Key: 4

Measures CCLS: G-GPE.B

Mathematical Practice: 2, 7

Commentary: This question measures G-GPE.B because the student needs to find the coordinates of a point dividing a directed line segment into the ratio of 3 to 2.

Rationale: Option 4 is correct. Since $\overline{KL}$ is a directed line segment, the point dividing $\overline{KL}$ into a ratio of 3 to 2 is $\frac{3}{5}$ the distance from point . to point /.

x

$5 \quad \frac{3}{5}(5 \quad 5)$

$5 \quad \frac{3}{5}(10)$

5

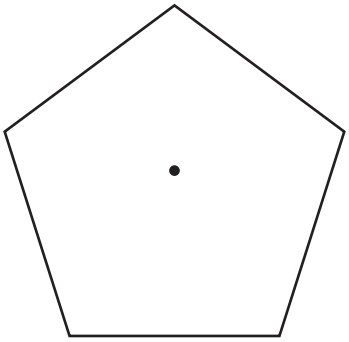
y

$4 \quad \frac{3}{5}(1 \quad 4)$

$4 \quad \frac{3}{5}(5)$

Common Core Sample Question #2

2 A regular pentagon is shown in the diagram below.



If the pentagon is rotated clockwise around its center, the minimum number of degrees it must be rotated to carry the pentagon onto itself is

(1) 54º
(2) 72º
(3) 108º
(4) 360º

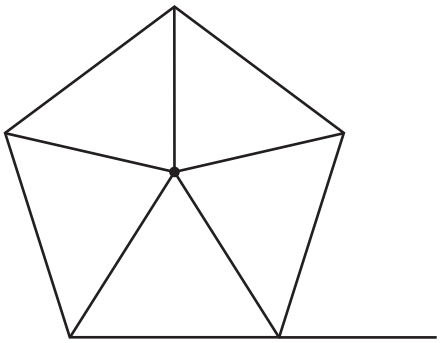
Key: 2

Measures CCLS: G-CO.A

Mathematical Practice: 2, 7

Commentary: This question measures G-CO.A because it requires the student to describe a rotation that carries a regular pentagon onto itself.

Rationale: Option 2 is correct. Segments drawn from the center of the regular pentagon bisect each angle of the pentagon, and create five isosceles triangles as shown in the diagram below. Since each exterior angle equals the angles formed by the segments drawn from the center of the regular pentagon, the minimum degrees necessary to carry a regular polygon onto itself are equal to the measure of an exterior angle of the regular polygon.



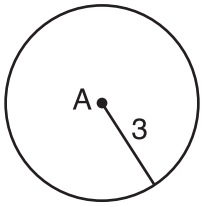
Common Core Sample Question #3

3 The equation of line h is $2x \quad y \quad 1$. Line m is the image of line h after a dilation of scale factor 4 with respect to the origin. What is the equation of the line m?

(1) $y = -2x + 1$
(2) $y = -2x + 4$
(3) $y = 2x + 4$
(4) $y = 2x + 1$

Common Core Sample Question #4

4 As shown in the diagram below, circle A as a radius of 3 and circle B has a radius of 5. Use transformations to explain why circles



Key: See explanation in the rationale below. A correct explan

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Common Core Sample Question #5

5 Two stacks of 23 quarters each are shown below. One stack forms a cylinder but the other stack does not form a cylinder.

Key: See explanation in rationale below.

Measures CCLS: G-GMD.A

Mathematical Practice: 3, 6

Commentary: This question measures G-GMD.A because the student is required to

Common Core Sample Question #6

6 In the diagram below, triangles XYZ and UVZ are drawn such that X‘ ‘ # and
‘ XZY # ‘

Common Core Sample Question #7

7 Explain why $\cos(x) = \sin(90 - x)$ for x such that $0 < x < 90$.

Key: See explanation in the rationale below. A correct explanation must include a written verbal statement.

Measures CCLS: G-SRT.C

Mathematical Practice: 3, 6

Commentary: This question measures G-SRT.C because the student is required to explain why the sine and cosine of complementary angles are equal.

Rationale: The acute angles in a right triangle are always complementary. The sine of any acute angle is equal to the cosine of its complement.

Rubric:

[2] A correct and complete explanation is written.

[1] One conceptual error is made, but an appropriate explanation is written.

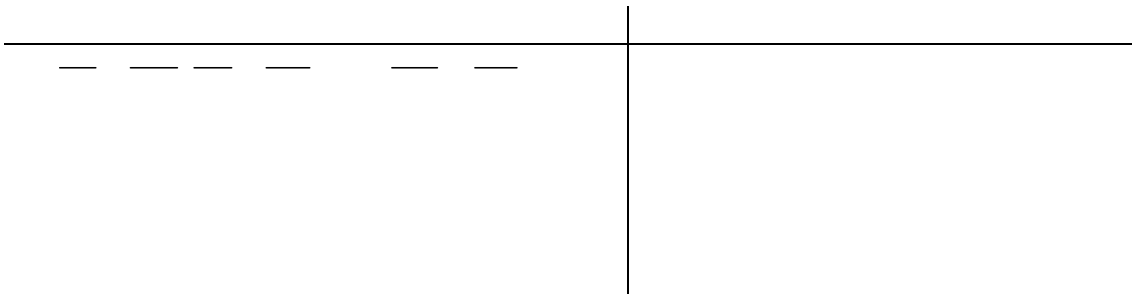
or

[1] An incomplete or partially correct explanation is written.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

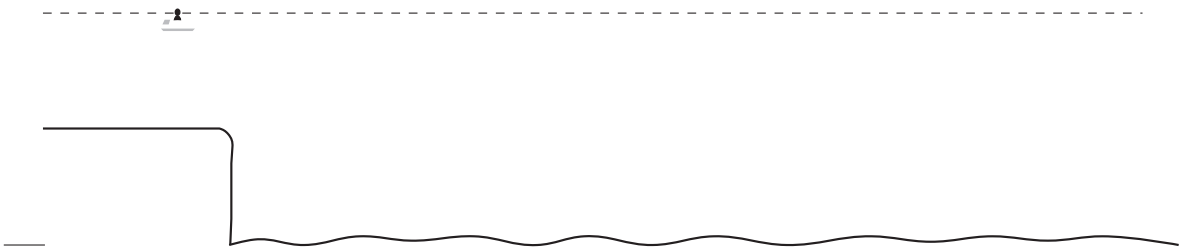
Common Core Sample Question #8

8 In the diagram of $\overline{LAC}$ and $\overline{BAD}$, $\overline{LA} \cong \overline{DA}$ and $\overline{CA} \cong \overline{BA}$.



Common Core Sample Question #9

9 As shown below, a canoe is approaching a lighthouse on the coastline of a lake. The front of the canoe is 1.5 feet above the water and an observer in the lighthouse is 112 feet above the water.



or

[1] Appropriate work is shown to find the distance from the lighthouse at either 5:00 or at 5:05, but no further correct work is shown.

or

[1] 195, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Key: 8 Œ

Measures CCLS: G-C.B

Mathematical Practice: 2

Commentary: This question measures G-C.B because students are required to find the area of a sector.

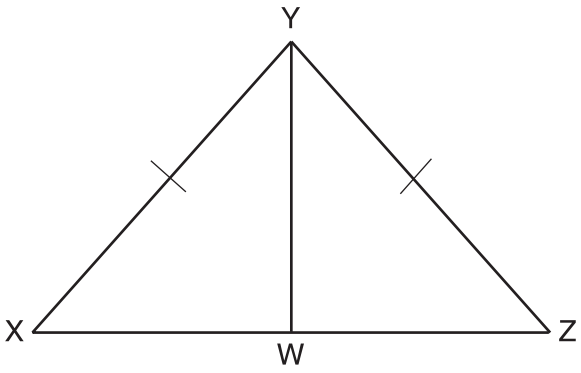
Rationale: A_0 represents the area of circle O and A_s represents the area of sector BOD.

$$A = \pi r^2 \qquad \frac{180}{20} \qquad \frac{A}{80}$$

Common Core Sample Question #11

11 Given: +XYZ, $\overline{XY} \# \overline{ZY}$, and $\overline{YW}$ bisects ‘ XYZ

Prove that ØYWZis a right angle.



or

Statements	
1. +XYZ, $\overline{XY}$ # ___, ___ bisects	
___	
___ ___	

Key: 15

Measures CCLS:G-MG.A

Mathematical Practice: 1, 4

Commentary: This question measures G-MG.A because a cylinder is used to model a tree trunk to solve the problem. This problem requires students to navigate multiple steps and develrtV7)0ltip ap Thpri(navigate m)8.5.odel a

Common Core Sample Question #13

13 In the diagram below, secant $\overline{ACD}$ and tangent $\overline{AB}$ are drawn from external point

[4] A proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but two statements and/or reasons are missing or are incorrect.

or

[4] $\angle ABC \cong \angle ADB$, but no further correct work is shown.

[3] A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[2] A proof is written that demonstrates a method of proof, but one conceptual error is made, and one statement and/or reason is missing or is incorrect.

or

[2] Some correct relevant statements about the proof are made, but three or four statements or reasons are missing or are incorrect.

[1] Only one correct relevant statement and reason are written.

[0] The “given” and/or the “prove” statements are rewritten in the style of a formal proof, but no further correct relevant statements are written.

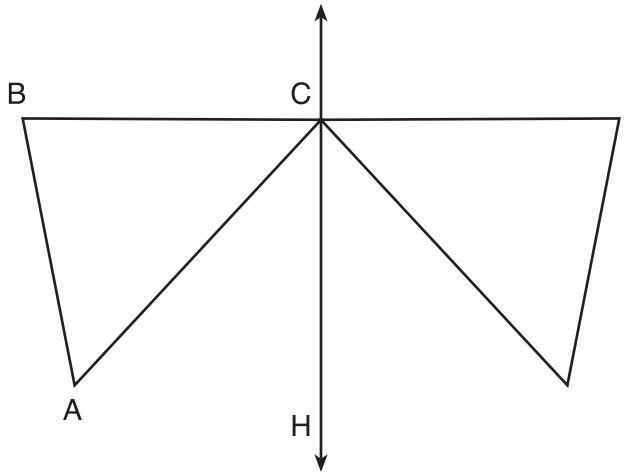
or

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Common Core Sample Question #14

14 Given: D is the image of A after a reflection over $\overleftrightarrow{CH}$.
$\overleftrightarrow{CH}$ is the perpendicular bisector of $\overline{BCE}$
$\triangle ABC$ and $\triangle DEC$ are drawn

Prove: $\triangle ABC \cong \triangle DEC$



Key: See proof in the rationale below.

Measures CCLS: G-CO.B

Mathematical Practice: 3, 6

Commentary: This question measures G-CO.B because the student is required to prove that two triangles are congruent using the definition of congruence in terms of rigid motion.

Rationale:

It is given that point D is the image of point A after a reflection in line CH.

It is given that $\overleftrightarrow{CH}$ is the perpendicular bisector of $\overline{BE}$ at point C. Since a bisector divides a segment into two congruent segments at its midpoint, $\overline{BC} \cong \overline{EC}$. Point E is the image of point B after a reflection over the line CH, since points B and E are equidistant from point C and it is given that $\overleftrightarrow{CH}$ is perpendicular to $\overline{BE}$.

Point C is on $\overleftrightarrow{CH}$ therefore, point C maps to itself after the reflection over $\overleftrightarrow{CH}$.

Since all three vertices of triangle ABC map to all three vertices of triangle DEC under the same line reflection, then $\triangle ABC \cong \triangle DEC$ because a line reflection is a rigid motion and triangles are congruent when one can be mapped onto the other using a sequence of rigid motions.

Rubric:

[6] A complete and correct proof that includes a concluding statement is written.

[5] A proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one supporting statement and/or reason is missing or is incorrect.

[4] A proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but two supporting statements and/or reasons are missing or are incorrect.

[3] A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[2] A proof is written that demonstrates a method of proof, but one conceptual error is made, and one supporting statement and/or reason is missing or is incorrect.

[1] Only one correct relevant statement and reason are written.

[0] The “given” and/or the “prove” statements are rewritten, but no further correct relevant statements are written.

or

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.