ORANGE PUBLIC SCHOOLS OFFICE OF CURRICULUM AND INSTRUCTION OFFICE OF MATHEMATICS

GEOMETRY Pre - Assessment



School Year 2013-2014

Directions for Geometry Pre-Assessment

The Geometry Pre-Assessment is made up of two sections. Section 1 is made up of 15 short response, 10 multiple choice, and 4 extended response questions. Section 2 is made up of one long task that is split up into multiple parts.

Read each question carefully, including diagrams and graphs. Work as rapidly as you can without sacrificing accuracy. Do not spend too much time puzzling over a question that seems too difficult for you. Answer the easier questions first; then return to the harder ones. <u>Try to</u> <u>answer every question, even if you have to guess</u>.

Where necessary, you may use scratch paper for your work. Do not use the margins of the test booklet to do scratch work.

Record all answers in this test booklet. When necessary, be sure to provide all work and explanations in a clear and neat manner.

You may use a calculator for this test.

Geometry Pre Assessment – Section 1

Short Constructed Response Questions

1.



<u>Part A</u> What are the coordinates of the image of point *B* when line segment \overline{AB} in the coordinate plane above is reflected about the *x*-axis?

<u>Part B</u> What are the coordinates of the image of point *B* when line segment \overline{AB} in the coordinate plane above is reflected about the origin?

2. Parallelogram *EFGH* is shown in the coordinate plane below. Rotate *EFGH* 90 degrees clockwise about the origin and then translate it 3 units down. Label the resultant image *PQRS*.



3. Triangle *XYZ* is shown in the coordinate plane below. Dilate *XYZ* with center (0, 0) and scale factor $\frac{3}{2}$. Label the resultant image *PQR*.



4. Two quadrilaterals are shown in the coordinate plane below. Quadrilateral *ABCD* was dilated with a scale factor of 2 with the center at the origin and then rotated 180° about the origin to get the quadrilateral in Quadrant IV.



<u>Part B</u> Write a sentence that describes the relationship between the two quadrilaterals using the word "congruent" or the word "similar." 5. A rectangle has a width of 3.5 inches and a length of x inches. If the diagonal of the rectangle is 12.5 inches, what is the value of x? Give the exact solution or round your answer to the nearest tenth.

6.



Starting from the entrance of her school, Alyssa walked 400 feet due north, then 300 feet due east, and ended up at the entrance of a running track. Miki walked directly from the entrance of the school to the entrance of the running track. How many more feet did Alyssa walk than Miki?

7.



The figure above shows a movie screen with dimensions shown in feet. What is the length of the diagonal of the screen, in feet? Give the exact solution or round your answer to the nearest tenth of a foot.

8. A room is in the shape of a rectangular prism. The room has a width of 8 feet, a length of 12 feet, and a height of 9 feet. What is the greatest possible distance between two points on the walls in the room? Give the exact solution or round your answer to the nearest foot.

9. In the coordinate plane, what is the distance between the points (-2, 3) and (4, 0)? Give the exact solution or round your answer to the nearest tenth.

10.



In the coordinate plane above, what is the length of segment \overline{AB} ? Give the exact solution or round your answer to the nearest tenth.

11.



In the coordinate plane above, what is the perimeter of parallelogram *WXYZ*? Give the exact solution or round your answer to the nearest tenth.

12.



The cone in the figure above has a volume of 72π cubic centimeters and a height of 6 centimeters. What is the radius of the base of the cone, in centimeters?

13. The diameter of a spherical basketball is 10 inches. What is the volume of the basketball? Give the exact solution or round your answer to the nearest cubic inch.

14. Parallel lines ℓ and n (not shown) were each translated. Could lines t and u shown in the coordinate plane below be the image of lines ℓ and n after translation? Explain your reasoning.



15. Describe a sequence of transformations that can be used to show that triangle *ABC* is congruent to triangle *XYZ*.



Multiple Choice Questions

a.

b.

c.

d.

16. Angle ABC in the coordinate plane below will be rotated 90 degrees counterclockwise about the origin. What are the coordinates of the image of point *A* ?



17. Triangle *ABC* is shown in the coordinate plane below. Triangle *XYZ* (not shown) is located in the coordinate plane with vertices at points X(9, 0), Y(7, 4), and Z(7, 0).



Which of the following transformations shows that triangle ABC is congruent to triangle XYZ?

- a. Triangle *ABC* is translated 7 units to the right and 2 units down.
- b. Triangle *ABC* is translated 14 units to the right and 2 units down.
- c. Triangle *ABC* is reflected over the *x*-axis and translated 2 units down.
- d. Triangle *ABC* is reflected over the *y*-axis and translated 2 units down.

18. Rectangle *ABCD* is shown in the coordinate plane below. Rectangle *RVTS* (not shown) has coordinates R(0, 4), V(-9, 4), T(-9, 9), and S(0, 9). Which of the following is true about rectangles *ABCD* and *RVTS* ?



- a. $ABCD \cong RVTS$ since the image when ABCD is reflected over the y-axis is RVTS.
- b. ABCD \notin RVTS since the image when ABCD is reflected over the y-axis is not RVTS.
- c. $ABCD \cong RVTS$ since the image when ABCD is rotated 90° counterclockwise about the origin is RVTS.
- d. $ABCD \not\equiv RVTS$ since the image when ABCD is rotated 90° counterclockwise about the origin is <u>not</u> RVTS.

below. If the preimage triangle is reflected over the y-axis to get the image triangle, what are the coordinates of the vertices of the preimage triangle?



(-4, -1), (-6, -1), (-6, -6)a. (4, -1), (6, -1), (6, -6)b. (4, 6), (4, 1), (6, 1)(4. 1), (6, 1), (6, -6) c. 1

d.
$$(4, 1), (6, 1), (6, -6)$$

The circle shown in the coordinate plane below is the preimage under a dilation centered at the 20.

origin with scale factor 2. Which of the following points is NOT on the image of the dilation?



- a. (-6, -6)b. (0, 0)c. (0, 6)
- d. (6, -6)

21. Quadrilateral *ABCD*, shown in the coordinate plane below, is dilated with the center at the origin

to form quadrilateral *EFGH*. What is the scale factor of the dilation?



22. Quadrilaterals *JKLM* and *WXYZ* are shown in the coordinate plane below. Quadrilateral *WXYZ* is the image of quadrilateral *JKLM* under a transformation. Which of the following best



- d. A translation 2 units to the right and 3 units up.
- 23. Triangles *ABC*, *DEF*, *JKL*, and *PQR* can be placed in the coordinate plane below and are related to each other in the following manner.

- Triangle *ABC* is reflected over the *x*-axis to get triangle *DEF*.
- Triangle *DEF* is translated 6 units to the right and 4 units down to get triangle *JKL*.
- A transformation is applied to triangle *JKL* to get triangle *PQR*.
- Triangle *PQR* is similar to triangle *ABC* but **NOT** congruent to triangle *ABC*.

Which of the following could describe the transformation applied to triangle JKL to get triangle PQR?



- a. Triangle JKL is rotated 90° counterclockwise about the origin to get PQR.
- b. Triangle JKL is rotated 180° about the origin to get PQR.
- c. Triangle *JKL* is dilated with a scale factor of 1 with the center at the origin to get *PQR*.
- d. Triangle *JKL* is dilated with a scale factor of 5 with the center at (3, -4) to get *PQR*.
- 24. Which of the following expressions can be used to represent the distance between the points (2, 4) and (5, 3) in the coordinate plane?

a.
$$\sqrt{(2+4)^2 - (5+3)^2}$$

b. $\sqrt{(2-4)^2 + (5-3)^2}$
c. $\sqrt{(2+5)^2 - (4+3)^2}$
d. $\sqrt{(2-5)^2 + (4-3)^2}$

25.



The cylindrical jar above has a height of 12 centimeters and a radius of 4 centimeters. The jar contains 20 spherical marbles. Each marble has a radius of 0.8 centimeters. Which of the following represents the amount of space in the jar that is NOT occupied by marbles?

a.
$$12(4\pi)^2 - 20\left(\frac{4}{3}(0.8\pi)^3\right)$$
 cubic centimeters

b.
$$12\pi (4^2) - 20 \left(\frac{4}{3}\pi (0.8)^3\right)$$
 cubic centimeters

c.
$$12^2 (4\pi) - 20 \left(\frac{4}{3}\pi (0.8)^3\right)$$
 cubic centimeters

d.
$$12\pi (4^2) - 20 \left(\frac{4}{3} (0.8\pi)^3\right)$$
 cubic centimeters

Extended Constructed Response Questions





Are triangles ABC and XYZ similar? Justify your answer using one or more transformations.

27. Based on the figure below, determine whether each given statement must be true, and briefly explain why.



Statement	Must the statement be true? (Yes or No)	Explain why.
Line ℓ is parallel to line <i>m</i> .		
Line <i>t</i> is parallel to line <i>u</i> .		
x = 110		
<i>y</i> = 70		

28. In the figure below, does a = 120 ? Explain your answer.

29.



Jared drew the figure above in order to prove the Pythagorean theorem. The figure consists of 9 congruent right triangles that do not overlap.

Part A: Explain why Jared's drawing as labeled CANNOT be used to prove the Pythagorean theorem.

Part B: What equation can you conclude to be true based on Jared's drawing?

SECTION 2

Performance Task

Geometry Pre Assessment – Section 2

Part A: In the figure below, x = 23. Is line $\stackrel{\longleftarrow}{CH}$ parallel to line $\stackrel{\longleftarrow}{DG}$? Construct an argument for your answer.



Part B:



In triangle PQR above, $W^2 + x^2 = y^2$. Triangle STU is a right triangle, as shown.

The table below shows a partially completed proof that triangle PQR is a right triangle. Complete the table to describe the reasons for each statement in the proof.

Statement	Reason
1) $w^2 + x^2 = y^2$	1) Given.
2) $W^2 + X^2 = Z^2$	2)
3) $\gamma^2 = Z^2$	3)
4) <i>y</i> = <i>z</i>	4)
5) Triangle <i>PQR</i> is congruent with triangle <i>STU</i> .	5)
6) Angle <i>Q</i> is congruent with angle <i>T</i> .	6)
7) $m \angle Q = 90^{\circ}$.	7)
8) Triangle <i>PQR</i> is a right triangle.	8)

Part C:

A student made this conjecture about reflections on an xy-coordinate plane.

When a polygon is reflected over the y-axis, the x-coordinates of the corresponding vertices of the polygon and its image are opposite, but the y-coordinates are the same.

Develop a chain of reasoning to justify or disprove the conjecture. You must demonstrate that the conjecture is always true or that there is at least one counterexample in which the conjecture is not true.

You may include one or more graphs in your response.

