Name:

Common Core Geometry Not as Common Regents Questions!

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Rigid Motions

Translations: Slide on the graph

Rotations: Turn the graph counter-clockwise (left), write down coordinates, turn back and plot points

Reflections: Flip (Count to what you are reflecting over) *Switch the coordinates for reflection over y = x

y = # is horizontal line, x = # is vertical line. You must graph these lines before you can reflect over them.

1. Triangle *ABC* is graphed on the set of axes below. Graph and label $\triangle A B'C'$, the image of $\triangle ABC$ after a reflection over the line x = 1.



2. In the diagram below, $\triangle ABC$ has coordinates A(1, 1), B(4, 1), and C(4, 5). Graph and the image of $\triangle ABC$ after the translation five units to the right and two units up.



3. The coordinates of the vertices of $\triangle RST$ are R(-2, 3), S(4, 4), and T(2, -2). Graph $\triangle RST$. Graph and label $\triangle R'S'T'$, the image of $\triangle RST$ after a reflection in the line y = x.



4. On the accompanying set of axes, graph $\triangle ABC$ with coordinates A(-1, 2), B(0, 6), and C(5, 4). Then graph $\triangle A'B'C'$, the image of $\triangle ABC$ after a rotation of 270 centered at the origin.



Scale factor = $\frac{image}{original}$

1. In the diagram below, ΔXYZ is the image of ΔARF after a dilation.

What is the scale factor of the dilation?



2. In the diagram below, $\triangle ACE$ is the image of $\triangle BDE$ after a sequence of transformations. If $\overline{AE} = 6$, $\overline{DE} = 3$, and $\overline{EB} = 4$, what is the scale factor?

3. In the diagram below, $\triangle ABC$ has coordinates A(1, 1), B(4, 1), and C(4, 5). The coordinates of its image after a sequence of transformations is A'(-9, -2), B'(-3, -2), and C'(-3, 6). What is the scale factor?

4. After a dilation with center (0, 0), the image of \overline{DB} is $\overline{D'B'}$. If DB = 4.5 and D'B' = 18, the scale factor of this dilation is

- 1) $\frac{1}{5}$ 3) $\frac{1}{4}$
- 2) 5 4) 4



5. $\triangle ABC$ has coordinates A(-2,8), B(6,8), and C(8,5). The coordinates of ΔXYZ , the image of ΔABC after a sequence of transformations is X(1,2), Y(7,2), and Z(8,0). What is the scale factor?



6. In the diagram below, \overline{CD} is the image of \overline{AB} after a dilation of scale factor k with center E.

Which ratio is equal to the scale factor k of the dilation?

- 1) EC ΕA
- 2) BA
- ĒΑ
- 3) EAΒA
- $\frac{EA}{EC}$ 4)



7. In the diagram below, $\triangle ABE$ is the image of $\triangle ACD$ after a dilation centered at the origin. The coordinates of the vertices are A(0,0), B(3,0), C(4.5,0), D(0,6), and E(0,4).

The scale factor of dilation is

- $\frac{2}{3}$ 1)
- 2)
- 323440
- 3)
- 4)



Dilations

If centered at the origin: multiply

If centered at a point: Count from the center to each point the number of times of the scale factor.

1. Triangle *SUN* has coordinates *S*(0,6), *U*(3,5), and *N*(3,0). On the accompanying grid, draw and label $\triangle SUN$. Then, graph and state the coordinates of $\triangle S'U'N'$, the image of $\triangle SUN$ after a dilation of 2 centered at the origin.



2. The coordinates of the vertices of $\triangle RST$ are R(-2, 3), S(4, 4), and T(2, -2). Graph $\triangle RST$ and $\triangle R'S'T'$, the image of $\triangle RST$ after a dilation of 3 centered at (1,2).



3. Triangle *ABC* and point D(1, 2) are graphed on the set of axes below.

Graph and label $\triangle A'B'C'$, the image of $\triangle ABC$, after a dilation of scale factor 2 centered at point *D*.



4. Triangle *QRS* is graphed on the set of axes below.

On the same set of axes, graph and label $\triangle Q' R' S'$, the image of $\triangle QRS$ after a dilation



Overlapping Similar Triangles

- 1) Separate the triangles and draw them with the same orientation
- 2) Match up the corresponding letters (use reflexive property)
- 3) Create a proportion and solve

1. In triangle *SEB*, *A* is on \overline{SB} , and *E* is on \overline{EB} so that $\angle E \cong \angle BAR$. If $\overline{SB} = 6$, $\overline{RB} = 2$, and $\overline{SE} = 3$, find \overline{RA} .

2. In triangle AON, K is on \overline{AO} so that $\angle A \cong \angle ONK$. If $\overline{ON} = 6$ and $\overline{OA} = 9$, find \overline{OK} .

3. In triangle *CHR*, *O* is on \overline{HR} , and *D* is on \overline{CR} so that $\angle H \cong RDO$. If RD = 4, RO = 6, and OH = 4, what is the length of \overline{CD} ?

4. In △SCU shown below, points T and O are on SU and CU, respectively. Segment OT is drawn so that ∠C ≅ ∠OTU.
If TU = 4, OU = 5, and OC = 7, what is the length of ST?









Similarity with Parallel Lines

1. If the lines are parallel, the triangles are similar and the sides are in proportion.

In the diagram below, \overline{AF} , and \overline{DB} intersect at C, and \overline{AD} and \overline{FBE} are drawn such that $m \angle D = 65^\circ$, $m \angle CBE = 115^\circ$, DC = 7.2, AC = 9.6, and FC = 21.6. What is the length of \overline{CB} ?



2. In the diagram below, \overline{AD} intersects \overline{BE} at C, and $\overline{AB} \| \overline{DE}$.

If CD = 6.6 cm, DE = 3.4 cm, CE = 4.2 cm, and BC = 5.25 cm, what is the length of \overline{AC} , to the *nearest hundredth of a centimeter*?



3. In the diagram below, AC = 7.2 and CE = 2.4. Which statement is *not* sufficient to prove $\triangle ABC \sim \triangle EDC$?

1) $\overline{AB} \parallel \overline{ED}$



- 3) CD = 3.6 and BC = 10.8
- 4) DE = 3.0, AB = 9.0, CD = 2.9, and BC = 8.7



d AB = 8.1

Cavalieri's Principle

If the area of the bases are congruent, and the heights are congruent, then the volumes are congruent.

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

Use Cavelieri's principle to explain why the volumes of these two stacks of quarters are equal.



2. The diagram below shows two figures. Figure A is a right triangular prism and figure B is an oblique triangular prism. The base of figure A has a height of 5 and a length of 8 and the height of prism A is 14. The base of figure B has a height of 8 and a length of 5 and the height of prism B is 14.

Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.



3. Sue believes that the two cylinders shown in the diagram below have equal volumes. Is Sue correct? Explain why.



Cross Sections (2 dimensional slice of a 3 dimensional object): The base of the shape is always one of its cross sections Rectangular Prism: Rectangle, triangle Cylinder: Circle, ellipse, rectangle Cone: Circle, ellipse, triangle, "curved" rectangle Pyramid: Rectangle, triangle Sphere: Circle

- Which type of shape can represent a two-dimensional cross-section of a sphere?
 - (1) circular (2) triangular (3) square (4) rectangular
- 2. Which is not a possible two-dimensional cross section of a three-dimensional cylinder?
 - (1) circle (2) rectangle (3) ellipes (4) triangle
- 3.

William is drawing pictures of cross sections of the right circular cone below.



Which drawing can not be a cross section of a cone?







(2)



4. A plane intersects a hexagonal prism. The plane is perpendicular to the base of the prism. Which two-dimensional figure is the cross section of the plane intersecting the prism?

1) triangle3) hexagon2) trapezoid4) rectangle

5. The cross section of a regular pyramid contains the altitude of the pyramid. The shape of this cross section is a

- 1) circle
- 2) square
- 3) triangle
- 4) rectangle

Area with Coordinate Geometry Box Method

- 1) Build a rectangle around the shape
- 2) Find the area of the rectangle (A = lw)
- 3) Find the area of the triangles outside of the shape $(A = \frac{1}{2}lw)$
- 4) Subtract the triangle areas from the rectangle areas

1. Find the area of triangle ABC if A(0,2), B(2,3), and C(1,5).



2. Triangle USA has vertices U(4,-7), S(-3,-4), and A(7,0). Find the area of triangle USA.



3. Triangle *RST* is graphed on the set of axes below.

How many square units are in the area of $\triangle RST$?

- 1) $9\sqrt{3} + 15$ 2) $9\sqrt{5} + 15$
- 3) 45
- 4) 90



4. On the set of axes below, the vertices of $\triangle PQR$ have coordinates P(-6, 7), Q(2, 1), and R(-1, -3).

What is the area of $\triangle PQR$?

- 1) 10 3) 25
- 2) 20 4) 50



5. Triangle *DAN* is graphed on the set of axes below. The vertices of $\triangle DAN$ have coordinates D(-6, -1), A(6, 3), and M

What is the area of $\triangle DAN$?

- 1) 60
- 2) 120
- 3) 20\sqrt{13}
- 4) 40 \sqrt{13}



Quadrilateral Inscribed In a Circle Opposite angles are supplementary (add to 180)

1. In the diagram below, quadrilateral *SBRE* is inscribed in the circle. If $m \angle BRE = 91$ and $m \angle SBR = 40$, find $m \angle BSE$ and $m \angle SER$



2. In the diagram below, quadrilateral ABCD is inscribed in circ

What is $m \angle ADC$?

- 1) 70°
- 2) 72°
- 3) 108°
- 4) 110°



3. Quadrilateral *ABCD* is inscribed in circle *O*, as shown below.

If $m \angle A = 80^\circ$, $m \angle B = 75^\circ$, $m \angle C = (y + 30)^\circ$, and $m \angle D = (x - 10)^\circ$, which statement is true?

1)
$$x = 85$$
 and $y = 50$
2) $x = 90$ and $y = 45$

- 3) x = 110 and y = 75
- 4) x = 115 and y = 70



Special Angles in a Circle (Look for Inscribed Angles)

Angles inscribed to the same/congruent arcs are congruent.	
A tangent and radius/diameter intersect to form a right angle.	
An angle is inscribed to a semicircle/diameter is a right angle.	

1. In circle O shown below, \overline{AE} is a diameter, \overline{SB} is a tangent, and chord \overline{AR} and \overline{RE} are drawn.

Which of the following statements is true?

1) $\angle EAR \cong \angle RAB$ 3) $\angle SAR \cong \angle BAE$ 2) $\angle REA \cong \angle SAE$ 4) $\angle ERA \cong \angle BAE$



2. In circle O shown below, \overline{BR} is a diameter and chords \overline{BU} , \overline{IU} , and \overline{IR} are drawn.

Which of the following statements is *not* true? 1) $\angle BUI \cong \angle BRI$ 3) $\angle UBT \cong \angle BRI$

2) $\angle ITR \cong \angle BTU$ 4) $\angle RBU \cong \angle RIU$



3. In circle O shown below, \overline{GM} is a diameter and chords \overline{EM} , \overline{OG} , \overline{EG} and \overline{EO} are drawn.

Which of the following statements is *not* true?1) $\angle MEO \cong \angle OGM$ 3) $\triangle MGR \cong \triangle EOR$ 2) $\angle GRM \cong \angle ORE$ 4) $\angle GEM$ is a right angle



4. In circle *B* shown below, \overline{TW} is a diameter, tangents *EW* and *ES* are drawn and chords \overline{WS} and \overline{TS} are drawn.

Which of the following statements is *not* true?

1) $\angle ESW \cong \angle WTS$ 2) $\angle WST \cong \angle EWT$ 3) $\angle EWS \cong \angle ESW$ 4) $\angle TWS \cong \angle STW$



5. In circle *M* below, diameter \overline{AC} , chords \overline{AB} and \overline{BC} , and radius \overline{MB} are drawn.

Which statement is *not* true?

- 1) $\triangle ABC$ is a right triangle.
- 2) $\triangle ABM$ is isosceles.
- 3) $\widehat{mBC} = m \angle BMC$
- 4) $\widehat{\text{mAB}} = \frac{1}{2} \text{m} \angle ACB$



6. In the diagram below, \overline{BC} is the diameter of circle A.

Point D, which is unique from points B and C, is plotted on circle A. Which statement must always be true?

- 1) $\triangle BCD$ is a right triangle.
- 2) $\triangle BCD$ is an isosceles triangle.
- 3) $\triangle BAD$ and $\triangle CBD$ are similar triangles.
- 4) $\triangle BAD$ and $\triangle CAD$ are congruent triangles.

