

JMAP REGENTS BY TYPE

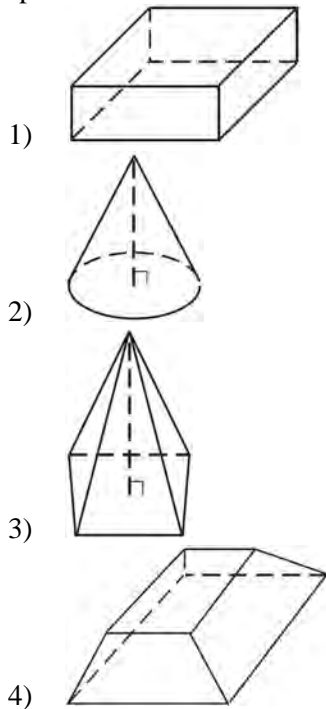
The NY Geometry CCSS Regents Exam Questions
from Fall 2014 to August 2015 Sorted by Type

www.jmap.org

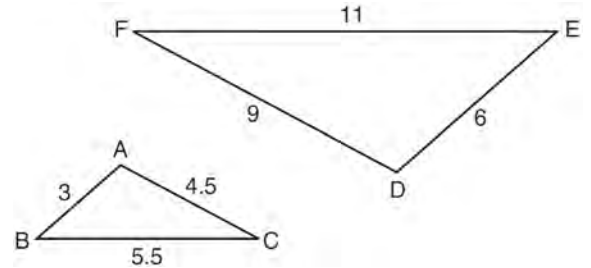
Geometry Common Core State Standards Multiple Choice Regents Exam Questions

- 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) $\left(0, -\frac{3}{2}\right)$
 - 4) $(1, -1)$

- 2 Which figure can have the same cross section as a sphere?

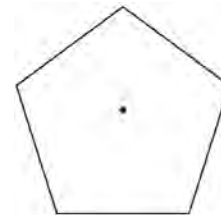


- 3 In the diagram below, $\triangle DEF$ is the image of $\triangle ABC$ after a clockwise rotation of 180° and a dilation where $AB = 3$, $BC = 5.5$, $AC = 4.5$, $DE = 6$, $FD = 9$, and $EF = 11$.



Which relationship must always be true?

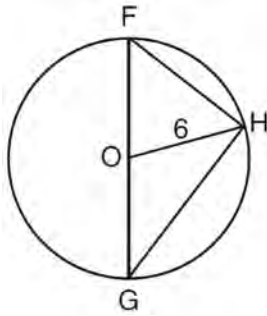
- 1) $\frac{m\angle A}{m\angle D} = \frac{1}{2}$
 - 2) $\frac{m\angle C}{m\angle F} = \frac{2}{1}$
 - 3) $\frac{m\angle A}{m\angle C} = \frac{m\angle F}{m\angle D}$
 - 4) $\frac{m\angle B}{m\angle E} = \frac{m\angle C}{m\angle F}$
- 4 A regular pentagon is shown in the diagram below.



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) 54°
- 2) 72°
- 3) 108°
- 4) 360°

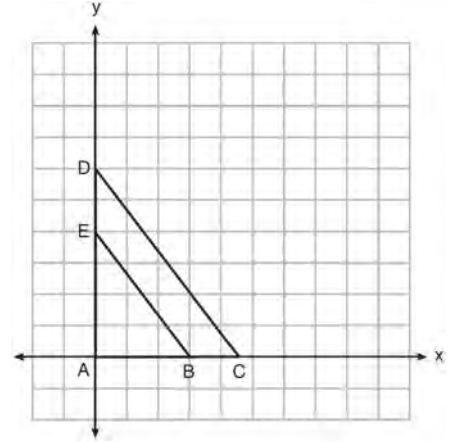
- 5 Triangle FGH is inscribed in circle O , the length of radius \overline{OH} is 6, and $\overline{FH} \cong \overline{OG}$.



What is the area of the sector formed by angle FOH ?

- 1) 2π
 - 2) $\frac{3}{2}\pi$
 - 3) 6π
 - 4) 24π
- 6 The center of circle Q has coordinates $(3, -2)$. If circle Q passes through $R(7, 1)$, what is the length of its diameter?
- 1) 50
 - 2) 25
 - 3) 10
 - 4) 5
- 7 The vertices of $\triangle JKL$ have coordinates $J(5, 1)$, $K(-2, -3)$, and $L(-4, 1)$. Under which transformation is the image $\triangle J'K'L'$ *not* congruent to $\triangle JKL$?
- 1) a translation of two units to the right and two units down
 - 2) a counterclockwise rotation of 180 degrees around the origin
 - 3) a reflection over the x -axis
 - 4) a dilation with a scale factor of 2 and centered at the origin

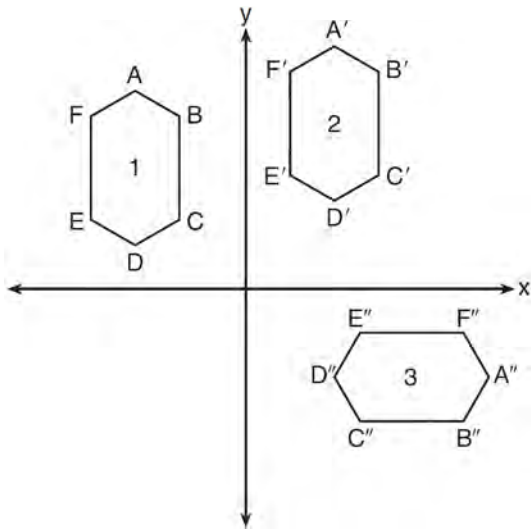
- 8 In the diagram below, $\triangle ABE$ is the image of $\triangle ACD$ after a dilation centered at the origin. The coordinates of the vertices are $A(0, 0)$, $B(3, 0)$, $C(4.5, 0)$, $D(0, 6)$, and $E(0, 4)$.



The ratio of the lengths of \overline{BE} to \overline{CD} is

- 1) $\frac{2}{3}$
 - 2) $\frac{3}{2}$
 - 3) $\frac{3}{4}$
 - 4) $\frac{4}{3}$
- 9 If $\triangle A'B'C'$ is the image of $\triangle ABC$, under which transformation will the triangles *not* be congruent?
- 1) reflection over the x -axis
 - 2) translation to the left 5 and down 4
 - 3) dilation centered at the origin with scale factor 2
 - 4) rotation of 270° counterclockwise about the origin

- 10 In the diagram below, congruent figures 1, 2, and 3 are drawn.

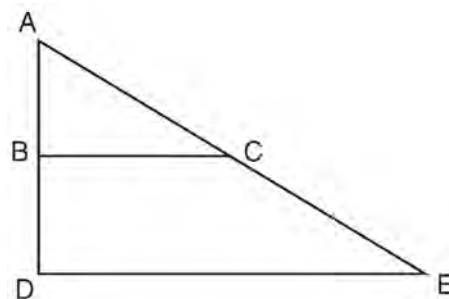


Which sequence of transformations maps figure 1 onto figure 2 and then figure 2 onto figure 3?

- 1) a reflection followed by a translation
 - 2) a rotation followed by a translation
 - 3) a translation followed by a reflection
 - 4) a translation followed by a rotation
- 11 The equation of a circle is $x^2 + y^2 + 6y = 7$. What are the coordinates of the center and the length of the radius of the circle?
- 1) center $(0, 3)$ and radius 4
 - 2) center $(0, -3)$ and radius 4
 - 3) center $(0, 3)$ and radius 16
 - 4) center $(0, -3)$ and radius 16

- 12 A quadrilateral has vertices with coordinates $(-3, 1)$, $(0, 3)$, $(5, 2)$, and $(-1, -2)$. Which type of quadrilateral is this?
- 1) rhombus
 - 2) rectangle
 - 3) square
 - 4) trapezoid

- 13 The image of $\triangle ABC$ after a dilation of scale factor k centered at point A is $\triangle ADE$, as shown in the diagram below.



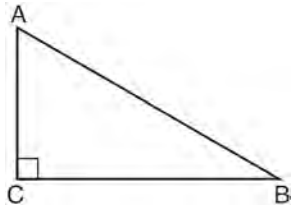
Which statement is always true?

- 1) $\overline{2AB} = \overline{AD}$
 - 2) $\overline{AD} \perp \overline{DE}$
 - 3) $\overline{AC} = \overline{CE}$
 - 4) $\overline{BC} \parallel \overline{DE}$
- 14 If the rectangle below is continuously rotated about side w , which solid figure is formed?



- 1) pyramid
- 2) rectangular prism
- 3) cone
- 4) cylinder

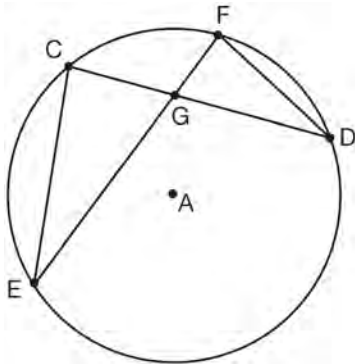
- 15 In scalene triangle ABC shown in the diagram below, $m\angle C = 90^\circ$.



Which equation is always true?

- 1) $\sin A = \sin B$
- 2) $\cos A = \cos B$
- 3) $\cos A = \sin C$
- 4) $\sin A = \cos B$

- 16 In the diagram of circle A shown below, chords \overline{CD} and \overline{EF} intersect at G, and chords \overline{CE} and \overline{FD} are drawn.



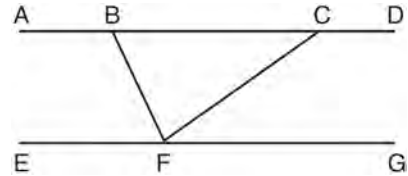
Which statement is *not* always true?

- 1) $\overline{CG} \cong \overline{FG}$
- 2) $\angle CEG \cong \angle FDG$
- 3) $\frac{CE}{EG} = \frac{FD}{DG}$
- 4) $\triangle CEG \sim \triangle FDG$

- 17 The line $y = 2x - 4$ is dilated by a scale factor of $\frac{3}{2}$ and centered at the origin. Which equation represents the image of the line after the dilation?

- 1) $y = 2x - 4$
- 2) $y = 2x - 6$
- 3) $y = 3x - 4$
- 4) $y = 3x - 6$

- 18 Steve drew line segments \overline{ABCD} , \overline{EFG} , \overline{BF} , and \overline{CF} as shown in the diagram below. Scalene $\triangle BFC$ is formed.



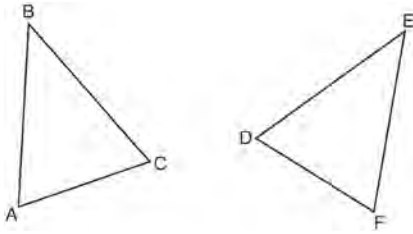
Which statement will allow Steve to prove $\overline{ABCD} \parallel \overline{EFG}$?

- 1) $\angle CFG \cong \angle FCB$
- 2) $\angle ABF \cong \angle BFC$
- 3) $\angle EFB \cong \angle CFB$
- 4) $\angle CBF \cong \angle GFC$

- 19 A gallon of paint will cover approximately 450 square feet. An artist wants to paint all the outside surfaces of a cube measuring 12 feet on each edge. What is the *least* number of gallons of paint he must buy to paint the cube?

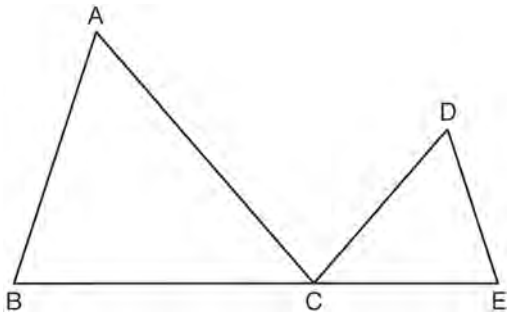
- 1) 1
- 2) 2
- 3) 3
- 4) 4

- 20 Which statement is sufficient evidence that $\triangle DEF$ is congruent to $\triangle ABC$?



- 1) $AB = DE$ and $BC = EF$
- 2) $\angle D \cong \angle A$, $\angle B \cong \angle E$, $\angle C \cong \angle F$
- 3) There is a sequence of rigid motions that maps \overline{AB} onto \overline{DE} , \overline{BC} onto \overline{EF} , and \overline{AC} onto \overline{DF} .
- 4) There is a sequence of rigid motions that maps point A onto point D , \overline{AB} onto \overline{DE} , and $\angle B$ onto $\angle E$.

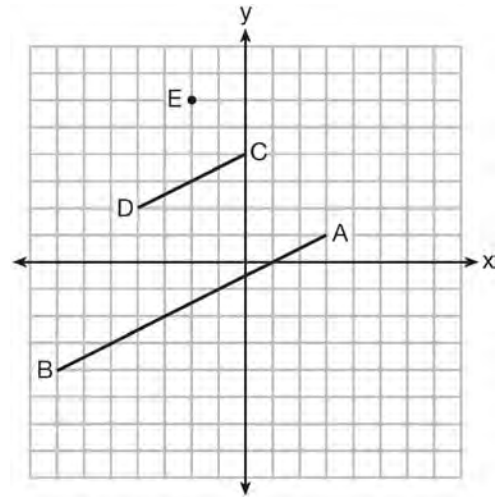
- 21 In the diagram below, $\triangle ABC \sim \triangle DEC$.



If $AC = 12$, $DC = 7$, $DE = 5$, and the perimeter of $\triangle ABC$ is 30, what is the perimeter of $\triangle DEC$?

- 1) 12.5
- 2) 14.0
- 3) 14.8
- 4) 17.5

- 22 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) $\frac{EC}{EA}$
- 2) $\frac{BA}{EA}$
- 3) $\frac{EA}{BA}$
- 4) $\frac{EA}{EC}$

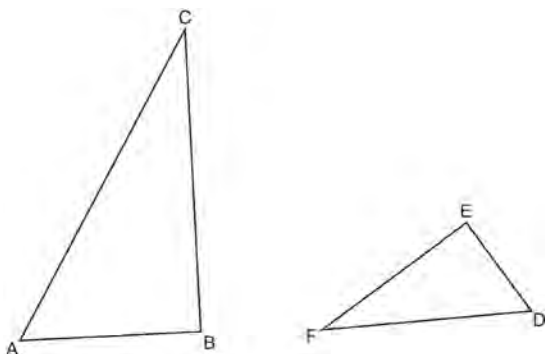
- 23 Linda is designing a circular piece of stained glass with a diameter of 7 inches. She is going to sketch a square inside the circular region. To the nearest tenth of an inch, the largest possible length of a side of the square is

- 1) 3.5
- 2) 4.9
- 3) 5.0
- 4) 6.9

- 24 Which regular polygon has a minimum rotation of 45° to carry the polygon onto itself?
- 1) octagon
 - 2) decagon
 - 3) hexagon
 - 4) pentagon

- 25 A shipping container is in the shape of a right rectangular prism with a length of 12 feet, a width of 8.5 feet, and a height of 4 feet. The container is completely filled with contents that weigh, on average, 0.25 pound per cubic foot. What is the weight, in pounds, of the contents in the container?
- 1) 1,632
 - 2) 408
 - 3) 102
 - 4) 92

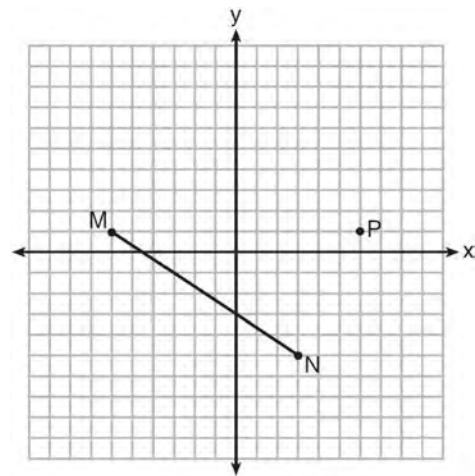
- 26 Triangles ABC and DEF are drawn below.



If $AB = 9$, $BC = 15$, $DE = 6$, $EF = 10$, and $\angle B \cong \angle E$, which statement is true?

- 1) $\angle CAB \cong \angle DEF$
- 2) $\frac{AB}{CB} = \frac{FE}{DE}$
- 3) $\triangle ABC \sim \triangle DEF$
- 4) $\frac{AB}{DE} = \frac{FE}{CB}$

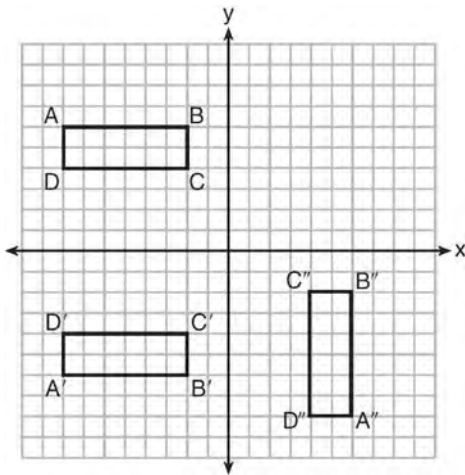
- 27 Given \overline{MN} shown below, with $M(-6, 1)$ and $N(3, -5)$, what is an equation of the line that passes through point $P(6, 1)$ and is parallel to \overline{MN} ?



- 1) $y = -\frac{2}{3}x + 5$
- 2) $y = -\frac{2}{3}x - 3$
- 3) $y = \frac{3}{2}x + 7$
- 4) $y = \frac{3}{2}x - 8$

- 28 A triangle is dilated by a scale factor of 3 with the center of dilation at the origin. Which statement is true?
- 1) The area of the image is nine times the area of the original triangle.
 - 2) The perimeter of the image is nine times the perimeter of the original triangle.
 - 3) The slope of any side of the image is three times the slope of the corresponding side of the original triangle.
 - 4) The measure of each angle in the image is three times the measure of the corresponding angle of the original triangle.

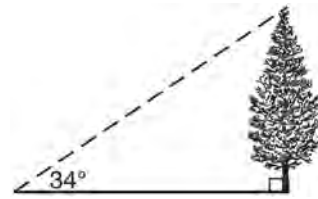
- 29 A sequence of transformations maps rectangle $ABCD$ onto rectangle $A''B''C''D''$, as shown in the diagram below.



Which sequence of transformations maps $ABCD$ onto $A'B'C'D'$ and then maps $A'B'C'D'$ onto $A''B''C''D''$?

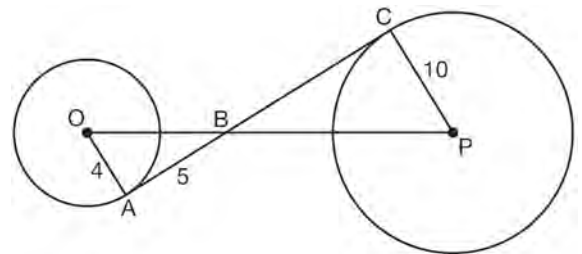
- 1) a reflection followed by a rotation
 - 2) a reflection followed by a translation
 - 3) a translation followed by a rotation
 - 4) a translation followed by a reflection
- 30 Which equation represents a line that is perpendicular to the line represented by $2x - y = 7$?
- 1) $y = -\frac{1}{2}x + 6$
 - 2) $y = \frac{1}{2}x + 6$
 - 3) $y = -2x + 6$
 - 4) $y = 2x + 6$

- 31 As shown in the diagram below, the angle of elevation from a point on the ground to the top of the tree is 34° .



If the point is 20 feet from the base of the tree, what is the height of the tree, to the nearest tenth of a foot?

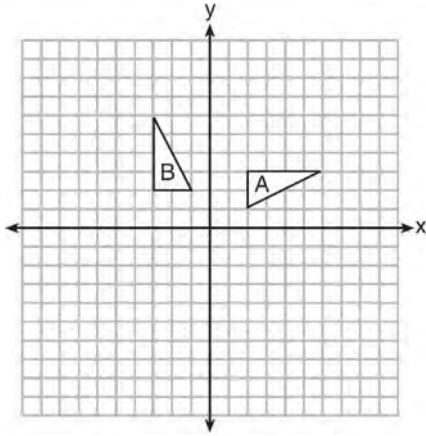
- 1) 29.7
 - 2) 16.6
 - 3) 13.5
 - 4) 11.2
- 32 In the diagram shown below, \overline{AC} is tangent to $\odot O$ at A and to $\odot P$ at C , \overline{OP} intersects \overline{AC} at B , $OA = 4$, $AB = 5$, and $PC = 10$.



What is the length of \overline{BC} ?

- 1) 6.4
- 2) 8
- 3) 12.5
- 4) 16

- 33 In the diagram below, which single transformation was used to map triangle A onto triangle B ?



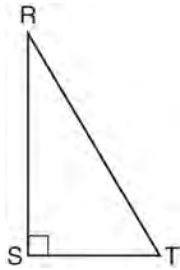
- 1) line reflection
 2) rotation
 3) dilation
 4) translation
- 34 The equation of line h is $2x + y = 1$. Line m is the image of line h after a dilation of scale factor 4 with respect to the origin. What is the equation of the line m ?
- 1) $y = -2x + 1$
 2) $y = -2x + 4$
 3) $y = 2x + 4$
 4) $y = 2x + 1$
- 35 Which expression is always equivalent to $\sin x$ when $0^\circ < x < 90^\circ$?
- 1) $\cos(90^\circ - x)$
 2) $\cos(45^\circ - x)$
 3) $\cos(2x)$
 4) $\cos x$

- 36 The Great Pyramid of Giza was constructed as a regular pyramid with a square base. It was built with an approximate volume of 2,592,276 cubic meters and a height of 146.5 meters. What was the length of one side of its base, to the *nearest meter*?
- 1) 73
 2) 77
 3) 133
 4) 230

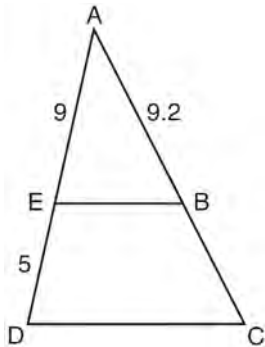
- 37 A parallelogram must be a rectangle when its
- 1) diagonals are perpendicular
 2) diagonals are congruent
 3) opposite sides are parallel
 4) opposite sides are congruent
- 38 The line $3y = -2x + 8$ is transformed by a dilation centered at the origin. Which linear equation could be its image?
- 1) $2x + 3y = 5$
 2) $2x - 3y = 5$
 3) $3x + 2y = 5$
 4) $3x - 2y = 5$

- 39 If $x^2 + 4x + y^2 - 6y - 12 = 0$ is the equation of a circle, the length of the radius is
- 1) 25
 2) 16
 3) 5
 4) 4

- 40 Which object is formed when right triangle RST shown below is rotated around leg \overline{RS} ?

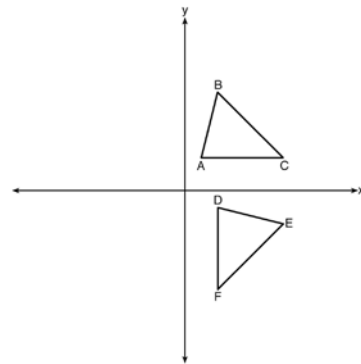


- 1) a pyramid with a square base
 - 2) an isosceles triangle
 - 3) a right triangle
 - 4) a cone
- 41 In the diagram of $\triangle ADC$ below, $\overline{EB} \parallel \overline{DC}$, $AE = 9$, $ED = 5$, and $AB = 9.2$.



What is the length of \overline{AC} , to the nearest tenth?

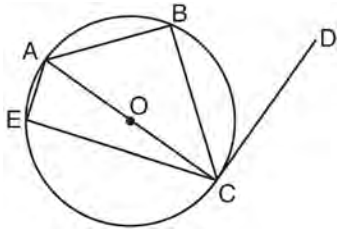
- 1) 5.1
 - 2) 5.2
 - 3) 14.3
 - 4) 14.4
- 42 If $\triangle ABC$ is dilated by a scale factor of 3, which statement is true of the image $\triangle A'B'C'$?
- 1) $3A'B' = AB$
 - 2) $B'C' = 3BC$
 - 3) $m\angle A' = 3(m\angle A)$
 - 4) $3(m\angle C') = m\angle C$
- 43 The image of $\triangle ABC$ after a rotation of 90° clockwise about the origin is $\triangle DEF$, as shown below.



Which statement is true?

- 1) $\overline{BC} \cong \overline{DE}$
 - 2) $\overline{AB} \cong \overline{DF}$
 - 3) $\angle C \cong \angle E$
 - 4) $\angle A \cong \angle D$
- 44 Quadrilateral $ABCD$ has diagonals \overline{AC} and \overline{BD} . Which information is *not* sufficient to prove $ABCD$ is a parallelogram?
- 1) \overline{AC} and \overline{BD} bisect each other.
 - 2) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{AD}$
 - 3) $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{CD}$
 - 4) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$

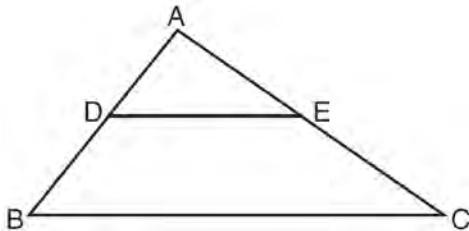
- 45 In circle O shown below, diameter \overline{AC} is perpendicular to \overline{CD} at point C , and chords \overline{AB} , \overline{BC} , \overline{AE} , and \overline{CE} are drawn.



Which statement is *not* always true?

- 1) $\angle ACB \cong \angle BCD$
- 2) $\angle ABC \cong \angle ACD$
- 3) $\angle BAC \cong \angle DCB$
- 4) $\angle CBA \cong \angle AEC$

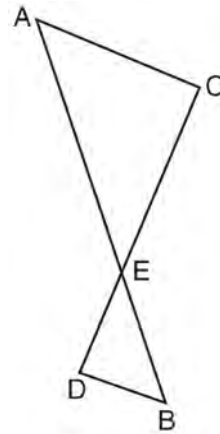
- 46 In the diagram below, $\triangle ABC \sim \triangle ADE$.



Which measurements are justified by this similarity?

- 1) $AD = 3$, $AB = 6$, $AE = 4$, and $AC = 12$
- 2) $AD = 5$, $AB = 8$, $AE = 7$, and $AC = 10$
- 3) $AD = 3$, $AB = 9$, $AE = 5$, and $AC = 10$
- 4) $AD = 2$, $AB = 6$, $AE = 5$, and $AC = 15$

- 47 As shown in the diagram below, \overline{AB} and \overline{CD} intersect at E , and $\overline{AC} \parallel \overline{BD}$.



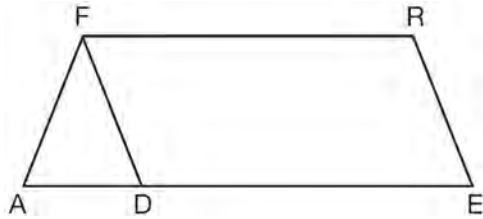
Given $\triangle AEC \sim \triangle BED$, which equation is true?

- 1) $\frac{CE}{DE} = \frac{EB}{EA}$
- 2) $\frac{AE}{BE} = \frac{AC}{BD}$
- 3) $\frac{EC}{AE} = \frac{BE}{ED}$
- 4) $\frac{ED}{EC} = \frac{AC}{BD}$

- 48 A man who is 5 feet 9 inches tall casts a shadow of 8 feet 6 inches. Assuming that the man is standing perpendicular to the ground, what is the angle of elevation from the end of the shadow to the top of the man's head, to the nearest tenth of a degree?

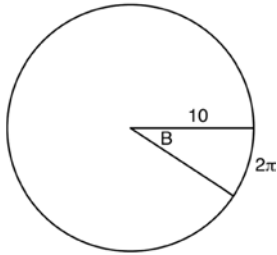
- 1) 34.1
- 2) 34.5
- 3) 42.6
- 4) 55.9

- 49 In the diagram of parallelogram $FRED$ shown below, \overline{ED} is extended to A , and \overline{AF} is drawn such that $AF \cong DF$.



If $m\angle R = 124^\circ$, what is $m\angle AFD$?

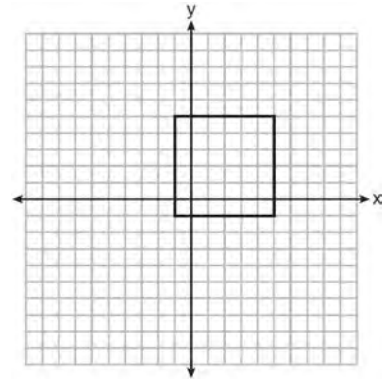
- 1) 124°
 - 2) 112°
 - 3) 68°
 - 4) 56°
- 50 In the diagram below, the circle shown has radius 10. Angle B intercepts an arc with a length of 2π .



What is the measure of angle B , in radians?

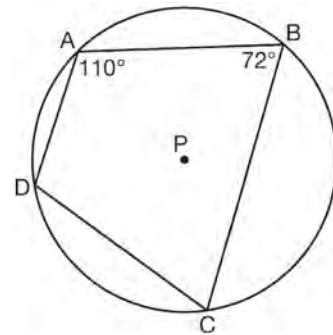
- 1) $10 + 2\pi$
- 2) 20π
- 3) $\frac{\pi}{5}$
- 4) $\frac{5}{\pi}$

- 51 In the diagram below, a square is graphed in the coordinate plane.



A reflection over which line does *not* carry the square onto itself?

- 1) $x = 5$
 - 2) $y = 2$
 - 3) $y = x$
 - 4) $x + y = 4$
- 52 In the diagram below, quadrilateral $ABCD$ is inscribed in circle P .



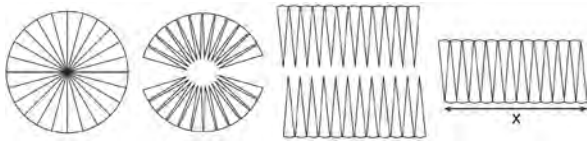
What is $m\angle ADC$?

- 1) 70°
- 2) 72°
- 3) 108°
- 4) 110°

- 53 A hemispherical tank is filled with water and has a diameter of 10 feet. If water weighs 62.4 pounds per cubic foot, what is the total weight of the water in a full tank, to the *nearest pound*?
- 1) 16,336
 - 2) 32,673
 - 3) 130,690
 - 4) 261,381

- 54 Line $y = 3x - 1$ is transformed by a dilation with a scale factor of 2 and centered at $(3, 8)$. The line's image is
- 1) $y = 3x - 8$
 - 2) $y = 3x - 4$
 - 3) $y = 3x - 2$
 - 4) $y = 3x - 1$

- 55 A circle with a radius of 5 was divided into 24 congruent sectors. The sectors were then rearranged, as shown in the diagram below.



To the *nearest integer*, the value of x is

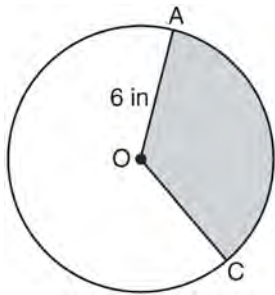
- 1) 31
- 2) 16
- 3) 12
- 4) 10

Geometry Common Core State Standards 2 Point Regents Exam Questions

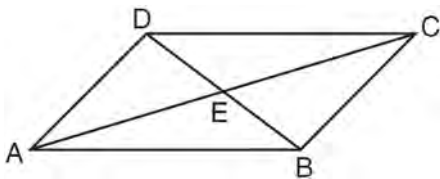
56 Explain why $\cos(x) = \sin(90 - x)$ for x such that $0 < x < 90$.

57 In right triangle ABC with the right angle at C , $\sin A = 2x + 0.1$ and $\cos B = 4x - 0.7$. Determine and state the value of x . Explain your answer.

58 In the diagram below of circle O , the area of the shaded sector AOC is $12\pi \text{ in}^2$ and the length of OA is 6 inches. Determine and state $m\angle AOC$.

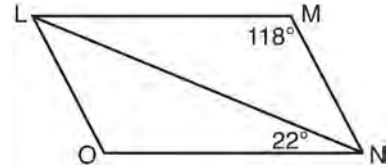


59 In parallelogram $ABCD$ shown below, diagonals AC and BD intersect at E .



Prove: $\angle ACD \cong \angle CAB$

60 The diagram below shows parallelogram $LMNO$ with diagonal \overline{LN} , $m\angle M = 118^\circ$, and $m\angle LNO = 22^\circ$.

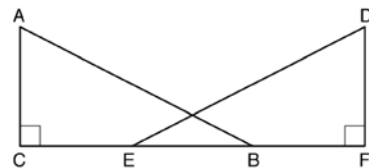


Explain why $m\angle NLO$ is 40 degrees.

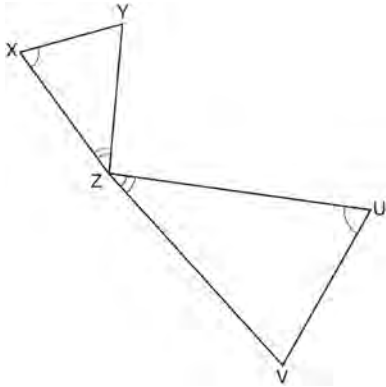
61 In isosceles $\triangle MNP$, line segment NO bisects vertex $\angle MNP$, as shown below. If $MP = 16$, find the length of MO and explain your answer.



62 Given right triangles ABC and DEF where $\angle C$ and $\angle F$ are right angles, $\overline{AC} \cong \overline{DF}$ and $\overline{CB} \cong \overline{FE}$. Describe a precise sequence of rigid motions which would show $\triangle ABC \cong \triangle DEF$.

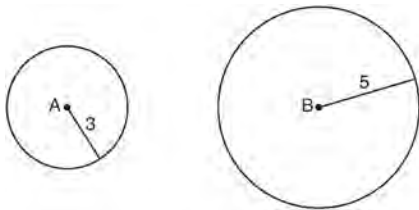


- 63 In the diagram below, triangles XYZ and UVZ are drawn such that $\angle X \cong \angle U$ and $\angle XZY \cong \angle UZV$.



Describe a sequence of similarity transformations that shows $\triangle XYZ$ is similar to $\triangle UVZ$.

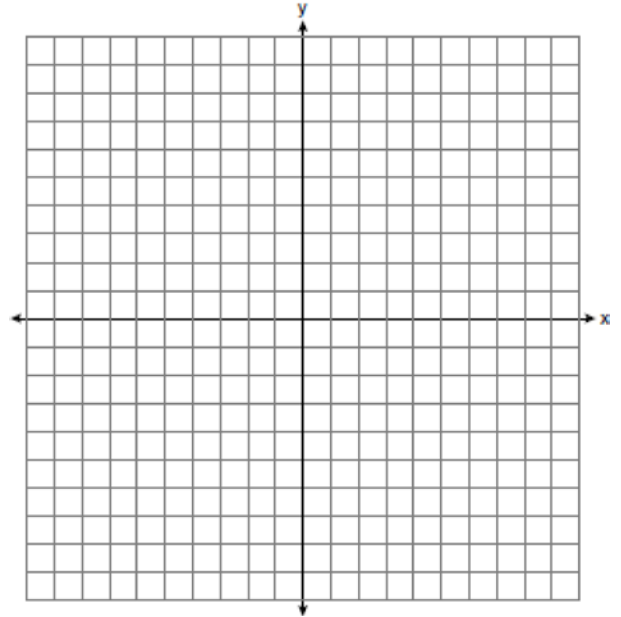
- 64 As shown in the diagram below, circle A has a radius of 3 and circle B has a radius of 5.



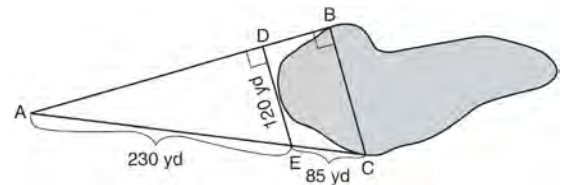
Use transformations to explain why circles A and B are similar.

- 65 A flagpole casts a shadow 16.60 meters long. Tim stands at a distance of 12.45 meters from the base of the flagpole, such that the end of Tim's shadow meets the end of the flagpole's shadow. If Tim is 1.65 meters tall, determine and state the height of the flagpole to the nearest tenth of a meter.

- 66 The coordinates of the endpoints of \overline{AB} are $A(-6, -5)$ and $B(4, 0)$. Point P is on \overline{AB} . Determine and state the coordinates of point P , such that $AP:PB$ is 2:3.
[The use of the set of axes below is optional.]

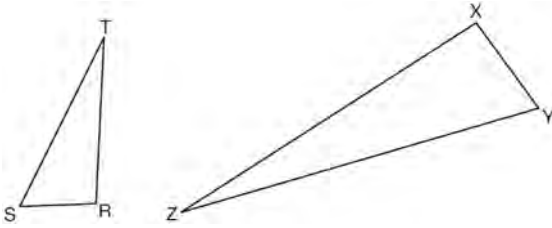


- 67 To find the distance across a pond from point B to point C , a surveyor drew the diagram below. The measurements he made are indicated on his diagram.



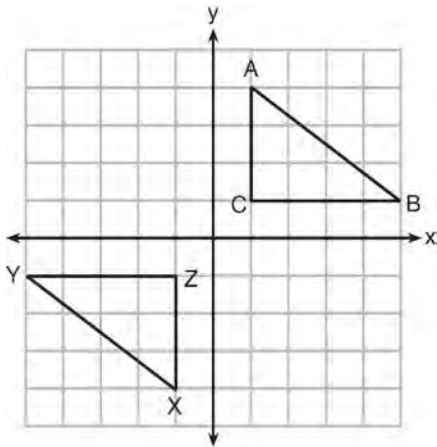
Use the surveyor's information to determine and state the distance from point B to point C , to the nearest yard.

- 68 Triangles RST and XYZ are drawn below. If $RS = 6$, $ST = 14$, $XY = 9$, $YZ = 21$, and $\angle S \cong \angle Y$, is $\triangle RST$ similar to $\triangle XYZ$? Justify your answer.



- 69 The endpoints of \overline{DEF} are $D(1,4)$ and $F(16,14)$. Determine and state the coordinates of point E , if $DE:EF = 2:3$.

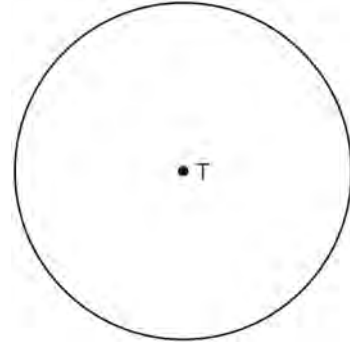
- 70 In the diagram below, $\triangle ABC$ and $\triangle XYZ$ are graphed.



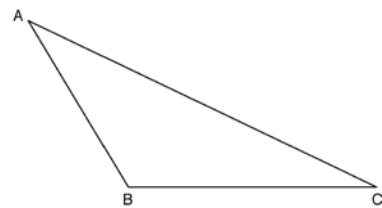
Use the properties of rigid motions to explain why $\triangle ABC \cong \triangle XYZ$.

- 71 After a reflection over a line, $\triangle A'B'C'$ is the image of $\triangle ABC$. Explain why triangle ABC is congruent to triangle $\triangle A'B'C'$.

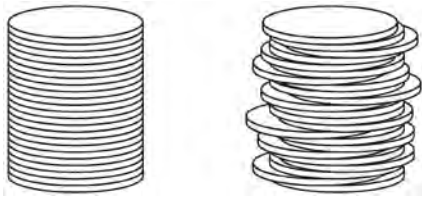
- 72 Construct an equilateral triangle inscribed in circle T shown below. [Leave all construction marks.]



- 73 Using a compass and straightedge, construct an altitude of triangle ABC below. [Leave all construction marks.]

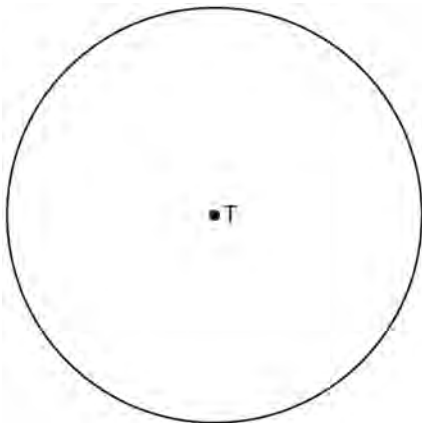


- 74 Two stacks of 23 quarters each are shown below. One stack forms a cylinder but the other stack does not form a cylinder.



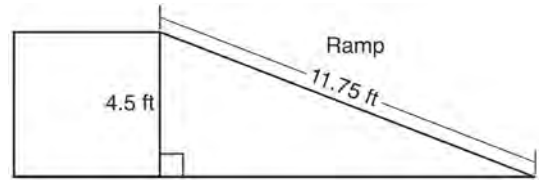
Use Cavalieri's principle to explain why the volumes of these two stacks of quarters are equal.

- 75 Use a compass and straightedge to construct an inscribed square in circle T shown below. [Leave all construction marks.]



- 76 A contractor needs to purchase 500 bricks. The dimensions of each brick are 5.1 cm by 10.2 cm by 20.3 cm, and the density of each brick is 1920 kg/m^3 . The maximum capacity of the contractor's trailer is 900 kg. Can the trailer hold the weight of 500 bricks? Justify your answer.

- 77 The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.



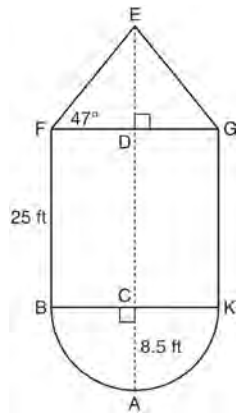
Determine and state, to the *nearest degree*, the angle of elevation formed by the ramp and the ground.

- 78 A wooden cube has an edge length of 6 centimeters and a mass of 137.8 grams. Determine the density of the cube, to the *nearest thousandth*. State which type of wood the cube is made of, using the density table below.

Type of Wood	Density (g/cm ³)
Pine	0.373
Hemlock	0.431
Elm	0.554
Birch	0.601
Ash	0.638
Maple	0.676
Oak	0.711

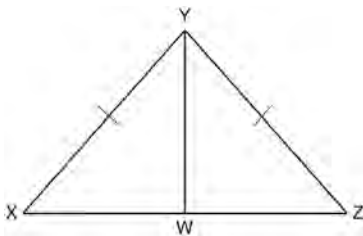
Geometry Common Core State Standards 4 Point Regents Exam Questions

- 79 The water tower in the picture below is modeled by the two-dimensional figure beside it. The water tower is composed of a hemisphere, a cylinder, and a cone. Let C be the center of the hemisphere and let D be the center of the base of the cone.

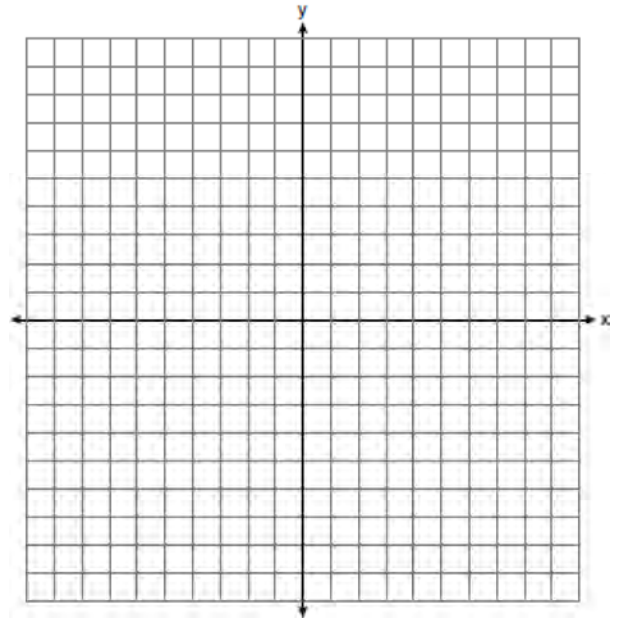


If $AC = 8.5$ feet, $BF = 25$ feet, and $m\angle EFD = 47^\circ$, determine and state, to the *nearest cubic foot*, the volume of the water tower. The water tower was constructed to hold a maximum of 400,000 pounds of water. If water weighs 62.4 pounds per cubic foot, can the water tower be filled to 85% of its volume and *not* exceed the weight limit? Justify your answer.

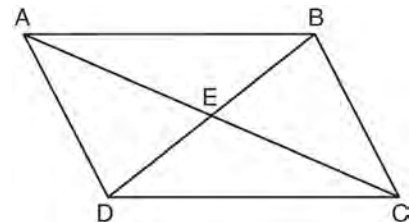
- 80 Given: $\triangle XYZ$, $\overline{XY} \cong \overline{ZY}$, and \overline{YW} bisects $\angle XYZ$
Prove that $\angle YWZ$ is a right angle.



- 81 Triangle ABC has vertices with $A(x,3)$, $B(-3,-1)$, and $C(-1,-4)$. Determine and state a value of x that would make triangle ABC a right triangle. Justify why $\triangle ABC$ is a right triangle. [The use of the set of axes below is optional.]

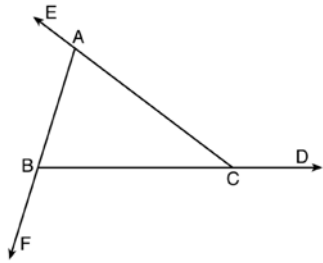


- 82 Given: Quadrilateral $ABCD$ is a parallelogram with diagonals \overline{AC} and \overline{BD} intersecting at E

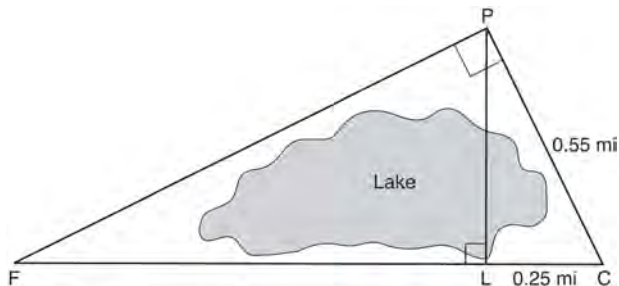


Prove: $\triangle AED \cong \triangle CEB$
Describe a single rigid motion that maps $\triangle AED$ onto $\triangle CEB$.

- 83 Prove the sum of the exterior angles of a triangle is 360° .

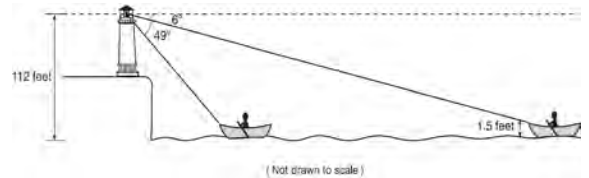


- 84 In the diagram below, the line of sight from the park ranger station, P , to the lifeguard chair, L , on the beach of a lake is perpendicular to the path joining the campground, C , and the first aid station, F . The campground is 0.25 mile from the lifeguard chair. The straight paths from both the campground and first aid station to the park ranger station are perpendicular.



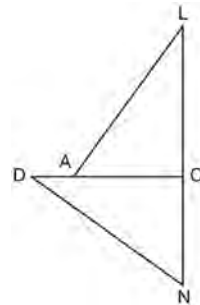
If the path from the park ranger station to the campground is 0.55 mile, determine and state, to the *nearest hundredth of a mile*, the distance between the park ranger station and the lifeguard chair. Gerald believes the distance from the first aid station to the campground is at least 1.5 miles. Is Gerald correct? Justify your answer.

- 85 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.



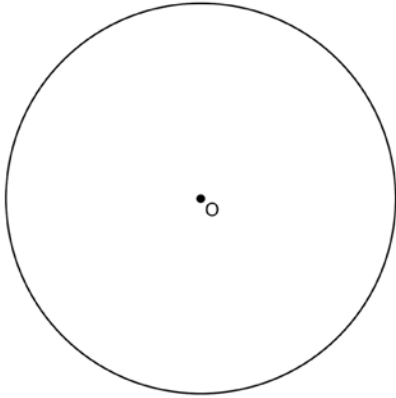
At 5:00, the observer in the lighthouse measured the angle of depression to the front of the canoe to be 6° . Five minutes later, the observer measured and saw the angle of depression to the front of the canoe had increased by 49° . Determine and state, to the *nearest foot per minute*, the average speed at which the canoe traveled toward the lighthouse.

- 86 In the diagram of $\triangle LAC$ and $\triangle DNC$ below, $\overline{LA} \cong \overline{DN}$, $\overline{CA} \cong \overline{CN}$, and $\overline{DAC} \perp \overline{LCN}$.



- Prove that $\triangle LAC \cong \triangle DNC$.
- Describe a sequence of rigid motions that will map $\triangle LAC$ onto $\triangle DNC$.

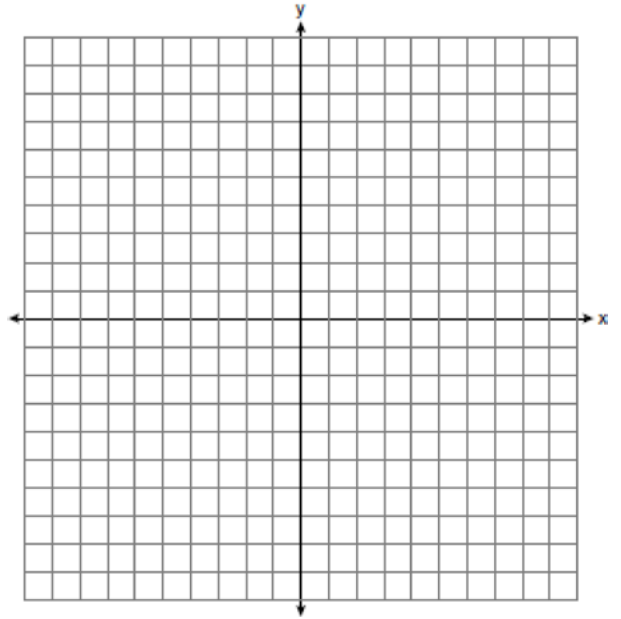
- 87 Using a straightedge and compass, construct a square inscribed in circle O below. [Leave all construction marks.]



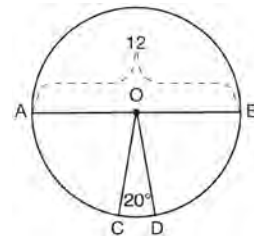
Determine the measure of the arc intercepted by two adjacent sides of the constructed square. Explain your reasoning.

- 88 Trees that are cut down and stripped of their branches for timber are approximately cylindrical. A timber company specializes in a certain type of tree that has a typical diameter of 50 cm and a typical height of about 10 meters. The density of the wood is 380 kilograms per cubic meter, and the wood can be sold by mass at a rate of \$4.75 per kilogram. Determine and state the minimum number of whole trees that must be sold to raise at least \$50,000.

- 89 In rhombus $MATH$, the coordinates of the endpoints of the diagonal \overline{MT} are $M(0,-1)$ and $T(4,6)$. Write an equation of the line that contains diagonal \overline{AH} . [Use of the set of axes below is optional.] Using the given information, explain how you know that your line contains diagonal \overline{AH} .

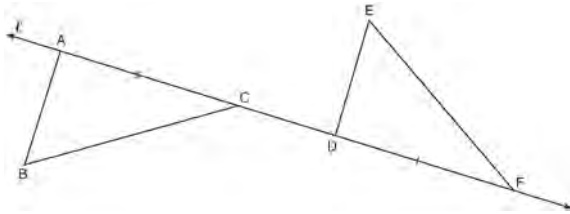


- 90 In the diagram below of circle O , diameter \overline{AB} and radii \overline{OC} and \overline{OD} are drawn. The length of \overline{AB} is 12 and the measure of $\angle COD$ is 20 degrees.



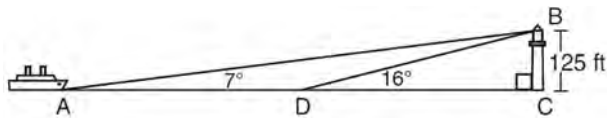
If $\widehat{AB} \cong \widehat{BD}$, find the area of sector BOD in terms of π .

- 91 In the diagram below, $\overline{AC} \cong \overline{DF}$ and points A , C , D , and F are collinear on line ℓ .



Let $\triangle D'E'F'$ be the image of $\triangle DEF$ after a translation along ℓ , such that point D is mapped onto point A . Determine and state the location of F' . Explain your answer. Let $\triangle D''E''F''$ be the image of $\triangle D'E'F'$ after a reflection across line ℓ . Suppose that E'' is located at B . Is $\triangle DEF$ congruent to $\triangle ABC$? Explain your answer.

- 92 As shown in the diagram below, a ship is heading directly toward a lighthouse whose beacon is 125 feet above sea level. At the first sighting, point A , the angle of elevation from the ship to the light was 7° . A short time later, at point D , the angle of elevation was 16° .



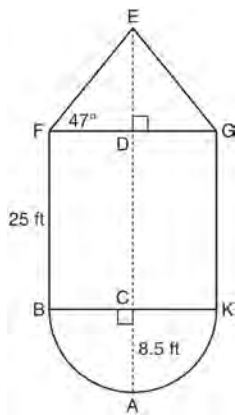
To the *nearest foot*, determine and state how far the ship traveled from point A to point D .

Geometry 6 Point Regents Exam Questions

- 93 The water tower in the picture below is modeled by the two-dimensional figure beside it. The water tower is composed of a hemisphere, a cylinder, and a cone. Let C be the center of the hemisphere and let D be the center of the base of the cone.

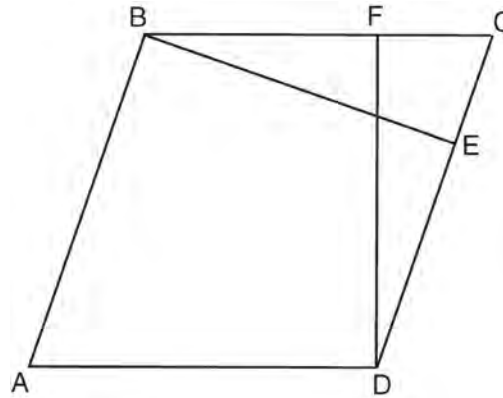


Source: <http://en.wikipedia.org>



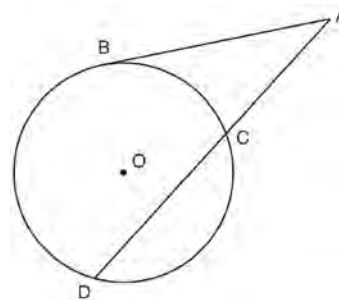
If $AC = 8.5$ feet, $BF = 25$ feet, and $m\angle EFD = 47^\circ$, determine and state, to the *nearest cubic foot*, the volume of the water tower. The water tower was constructed to hold a maximum of 400,000 pounds of water. If water weighs 62.4 pounds per cubic foot, can the water tower be filled to 85% of its volume and *not* exceed the weight limit? Justify your answer.

- 94 In the diagram of parallelogram $ABCD$ below, $\overline{BE} \perp \overline{CED}$, $\overline{DF} \perp \overline{BFC}$, $\overline{CE} \cong \overline{CF}$.



Prove $ABCD$ is a rhombus.

- 95 In the diagram below, secant \overline{ACD} and tangent \overline{AB} are drawn from external point A to circle O .

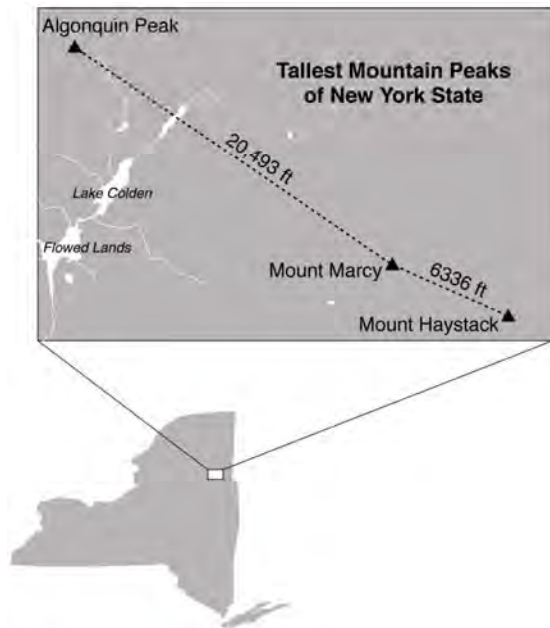


Prove the theorem: If a secant and a tangent are drawn to a circle from an external point, the product of the lengths of the secant segment and its external segment equals the length of the tangent segment squared. ($AC \cdot AD = AB^2$)

Geometry 6 Point Regents Exam Questions

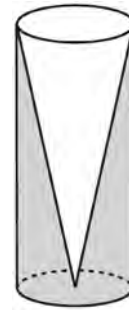
www.jmap.org

- 96 The map below shows the three tallest mountain peaks in New York State: Mount Marcy, Algonquin Peak, and Mount Haystack. Mount Haystack, the shortest peak, is 4960 feet tall. Surveyors have determined the horizontal distance between Mount Haystack and Mount Marcy is 6336 feet and the horizontal distance between Mount Marcy and Algonquin Peak is 20,493 feet.



The angle of depression from the peak of Mount Marcy to the peak of Mount Haystack is 3.47 degrees. The angle of elevation from the peak of Algonquin Peak to the peak of Mount Marcy is 0.64 degrees. What are the heights, to the *nearest foot*, of Mount Marcy and Algonquin Peak? Justify your answer.

- 97 Walter wants to make 100 candles in the shape of a cone for his new candle business. The mold shown below will be used to make the candles. Each mold will have a height of 8 inches and a diameter of 3 inches. To the *nearest cubic inch*, what will be the total volume of 100 candles?

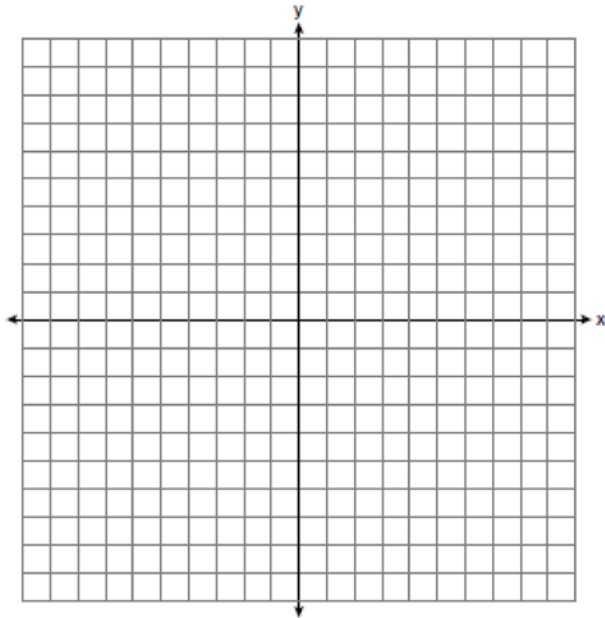


Walter goes to a hobby store to buy the wax for his candles. The wax costs \$0.10 per ounce. If the weight of the wax is 0.52 ounce per cubic inch, how much will it cost Walter to buy the wax for 100 candles? If Walter spent a total of \$37.83 for the molds and charges \$1.95 for each candle, what is Walter's profit after selling 100 candles?

Geometry 6 Point Regents Exam Questions

www.jmap.org

- 98 In the coordinate plane, the vertices of $\triangle RST$ are $R(6, -1)$, $S(1, -4)$, and $T(-5, 6)$. Prove that $\triangle RST$ is a right triangle. State the coordinates of point P such that quadrilateral $RSTP$ is a rectangle. Prove that your quadrilateral $RSTP$ is a rectangle. [The use of the set of axes below is optional.]



Geometry Common Core State Standards Multiple Choice Regents Exam Questions Answer Section

1 ANS: 4

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

$$-5 + \frac{3}{5}(10) \quad -4 + \frac{3}{5}(5)$$

$$-5 + 6 \quad -4 + 3$$

$$1 \quad -1$$

PTS: 2 REF: spr1401geo TOP: Directed Line Segments

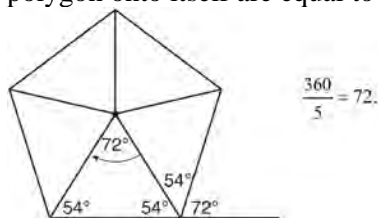
2 ANS: 2 PTS: 2 REF: 061506geo

TOP: Cross-Sections of Three-Dimensional Objects

3 ANS: 4 PTS: 2 REF: 081514geo TOP: Triangle Similarity

4 ANS: 2

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.



PTS: 2 REF: spr1402geo TOP: Mapping a Polygon onto Itself

5 ANS: 3

$$\frac{60}{360} \cdot 6^2 \pi = 6\pi$$

PTS: 2 REF: 081518geo TOP: Sectors

6 ANS: 3

$$r = \sqrt{(7-3)^2 + (1- -2)^2} = \sqrt{16+9} = 5$$

PTS: 2 REF: 061503geo TOP: Properties of Circles

7 ANS: 4 PTS: 2 REF: 061502geo TOP: Properties of Transformations

8 ANS: 1

$$\frac{4}{6} = \frac{3}{4.5} = \frac{2}{3}$$

PTS: 2 REF: 081523geo TOP: Dilations

9 ANS: 3 PTS: 2 REF: 081502geo TOP: Properties of Transformations

10 ANS: 4 PTS: 2 REF: 061504geo TOP: Identifying Transformations

11 ANS: 2

$$x^2 + y^2 + 6y + 9 = 7 + 9$$

$$x^2 + (y + 3)^2 = 16$$

PTS: 2 REF: 061514geo TOP: Equations of Circles

12 ANS: 4

$$\frac{-2-1}{-1--3} = \frac{-3}{2} \quad \frac{3-2}{0-5} = \frac{1}{-5} \quad \frac{3-1}{0--3} = \frac{2}{3} \quad \frac{2--2}{5--1} = \frac{4}{6} = \frac{2}{3}$$

PTS: 2 REF: 081522geo TOP: Coordinate Proofs

13 ANS: 4

PTS: 2

REF: 081506geo TOP: Similarity

14 ANS: 4

PTS: 2

REF: 081503geo TOP: Rotations of Two-Dimensional Objects

15 ANS: 4

PTS: 2

REF: 061512geo TOP: Cofunctions

16 ANS: 1

PTS: 2

REF: 061508geo TOP: Triangle Similarity

17 ANS: 2

The line $y = 2x - 4$ does not pass through the center of dilation, so the dilated line will be distinct from $y = 2x - 4$. Since a dilation preserves parallelism, the line $y = 2x - 4$ and its image will be parallel, with slopes of 2. To obtain the y -intercept of the dilated line, the scale factor of the dilation, $\frac{3}{2}$, can be applied to the y -intercept, $(0, 4)$.

Therefore, $\left(0 \cdot \frac{3}{2}, -4 \cdot \frac{3}{2}\right) \rightarrow (0, -6)$. So the equation of the dilated line is $y = 2x - 6$.

PTS: 2 REF: fall1403geo TOP: Dilations

18 ANS: 1

Alternate interior angles

PTS: 2 REF: 061517geo TOP: Parallel Lines and Transversals

19 ANS: 2

$$SA = 6 \cdot 12^2 = 864$$

$$\frac{864}{450} = 1.92$$

PTS: 2 REF: 061519geo TOP: Surface Area and Lateral Area

20 ANS: 3

PTS: 2

REF: 061524geo TOP: Triangle Congruency

21 ANS: 4

$$\frac{7}{12} \cdot 30 = 17.5$$

PTS: 2 REF: 061521geo TOP: Similarity

22 ANS: 1

PTS: 2

REF: 061518geo TOP: Dilations

23 ANS: 2

$$s^2 + s^2 = 7^2$$

$$2s^2 = 49$$

$$s^2 = 24.5$$

$$s \approx 4.9$$

PTS: 2

REF: 081511geo

TOP: Pythagorean Theorem

24 ANS: 1

$$\frac{360^\circ}{45^\circ} = 8$$

PTS: 2

REF: 061510geo

TOP: Mapping a Polygon onto Itself

25 ANS: 3

$$V = 12 \cdot 8.5 \cdot 4 = 408$$

$$W = 408 \cdot 0.25 = 102$$

PTS: 2

REF: 061507geo

TOP: Density

26 ANS: 3

$$\frac{AB}{BC} = \frac{DE}{EF}$$

$$\frac{9}{15} = \frac{6}{10}$$

$$90 = 90$$

PTS: 2

REF: 061515geo

TOP: Similarity

27 ANS: 1

$$m = -\frac{2}{3} \quad 1 = \left(-\frac{2}{3}\right)6 + b$$

$$1 = -4 + b$$

$$5 = b$$

PTS: 2

REF: 081510geo

TOP: Parallel and Perpendicular Lines

28 ANS: 1

$$3^2 = 9$$

PTS: 2

REF: 081520geo

TOP: Dilations

29 ANS: 1

PTS: 2

REF: 081507geo

TOP: Identifying Transformations

30 ANS: 1

$$m = \frac{-A}{B} = \frac{-2}{-1} = 2$$

$$m_{\perp} = -\frac{1}{2}$$

PTS: 2

REF: 061509geo TOP: Parallel and Perpendicular Lines

31 ANS: 3

$$\tan 34 = \frac{T}{20}$$

$$T \approx 13.5$$

PTS: 2

REF: 061505geo TOP: Using Trigonometry to Find a Side

32 ANS: 3

$$5 \cdot \frac{10}{4} = \frac{50}{4} = 12.5$$

PTS: 2

REF: 081512geo TOP: Properties of Circles

33 ANS: 2

PTS: 2

REF: 081513geo TOP: Identifying Transformations

34 ANS: 2

The given line h , $2x + y = 1$, does not pass through the center of dilation, the origin, because the y -intercept is at $(0, 1)$. The slope of the dilated line, m , will remain the same as the slope of line h , 2. All points on line h , such as $(0, 1)$, the y -intercept, are dilated by a scale factor of 4; therefore, the y -intercept of the dilated line is $(0, 4)$ because the center of dilation is the origin, resulting in the dilated line represented by the equation $y = -2x + 4$.

PTS: 2

REF: spr1403geo TOP: Dilations

35 ANS: 1

PTS: 2

REF: 081504geo TOP: Cofunctions

36 ANS: 4

$$2592276 = \frac{1}{3} \cdot s^2 \cdot 146.5$$

$$230 \approx s$$

PTS: 2

REF: 081521geo TOP: Volume

37 ANS: 2

PTS: 2

REF: 081501geo TOP: Parallelograms

38 ANS: 1

The line $3y = -2x + 8$ does not pass through the center of dilation, so the dilated line will be distinct from $3y = -2x + 8$. Since a dilation preserves parallelism, the line $3y = -2x + 8$ and its image $2x + 3y = 5$ are parallel, with slopes of $-\frac{2}{3}$.

PTS: 2

REF: 061522geo TOP: Dilations

39 ANS: 3

$$x^2 + 4x + 4 + y^2 - 6y + 9 = 12 + 4 + 9$$

$$(x + 2)^2 + (y - 3)^2 = 25$$

PTS: 2 REF: 081509geo TOP: Equations of Circles

40 ANS: 4 PTS: 2 REF: 061501geo TOP: Rotations of Two-Dimensional Objects

41 ANS: 3

$$\frac{9}{5} = \frac{9.2}{x} \quad 5.1 + 9.2 = 14.3$$

$$9x = 46$$

$$x \approx 5.1$$

PTS: 2 REF: 061511geo TOP: Side Splitter Theorem

42 ANS: 2 PTS: 2 REF: 061516geo TOP: Dilations

43 ANS: 4

The measures of the angles of a triangle remain the same after all rotations because rotations are rigid motions which preserve angle measure.

PTS: 2 REF: fall1402geo TOP: Properties of Transformations

44 ANS: 4 PTS: 2 REF: 061513geo TOP: Parallelograms

45 ANS: 1 PTS: 2 REF: 061520geo TOP: Arcs Determined by Angles

46 ANS: 4

$$\frac{2}{6} = \frac{5}{15}$$

PTS: 2 REF: 081517geo TOP: Similarity

47 ANS: 2 PTS: 2 REF: 081519geo TOP: Triangle Similarity

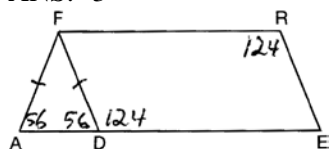
48 ANS: 1

The man's height, 69 inches, is opposite to the angle of elevation, and the shadow length, 102 inches, is adjacent to the angle of elevation. Therefore, tangent must be used to find the angle of elevation. $\tan x = \frac{69}{102}$

$$x \approx 34.1$$

PTS: 2 REF: fall1401geo TOP: Using Trigonometry to Find an Angle

49 ANS: 3



PTS: 2 REF: 081508geo TOP: Parallelograms

50 ANS: 3

$$\theta = \frac{s}{r} = \frac{2\pi}{10} = \frac{\pi}{5}$$

PTS: 2 REF: fall1404geo TOP: Arc Length

51 ANS: 1 PTS: 2 REF: 081505geo TOP: Mapping a Polygon onto Itself

52 ANS: 3 PTS: 2 REF: 081515geo TOP: Inscribed Quadrilaterals

53 ANS: 1

$$V = \frac{\frac{4}{3}\pi\left(\frac{10}{2}\right)^3}{2} \approx 261.8 \cdot 62.4 = 16,336$$

PTS: 2 REF: 081516geo TOP: Density

54 ANS: 4

The line $y = 3x - 1$ passes through the center of dilation, so the dilated line is not distinct.

PTS: 2 REF: 081524geo TOP: Dilations

55 ANS: 2

x is $\frac{1}{2}$ the circumference. $\frac{C}{2} = \frac{10\pi}{2} \approx 16$

PTS: 2 REF: 061523geo TOP: Properties of Circles

Geometry Common Core State Standards 2 Point Regents Exam Questions Answer Section

56 ANS:

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

PTS: 2 REF: spr1407geo TOP: Cofunctions

57 ANS:

$4x - .07 = 2x + .01$ $\sin A$ is the ratio of the opposite side and the hypotenuse while $\cos B$ is the ratio of the adjacent

$$2x = 0.8$$

$$x = 0.4$$

side and the hypotenuse. The side opposite angle A is the same side as the side adjacent to angle B . Therefore, $\sin A = \cos B$.

PTS: 2 REF: fall1407geo TOP: Cofunctions

58 ANS:

$$A = 6^2 \pi = 36\pi \quad 36\pi \cdot \frac{x}{360} = 12\pi$$

$$x = 360 \cdot \frac{12}{36}$$

$$x = 120$$

PTS: 2 REF: 061529geo TOP: Sectors

59 ANS:

Parallelogram $ABCD$, diagonals \overline{AC} and \overline{BD} intersect at E (given). $\overline{DC} \parallel \overline{AB}$; $\overline{DA} \parallel \overline{CB}$ (opposite sides of a parallelogram are parallel). $\angle ACD \cong \angle CAB$ (alternate interior angles formed by parallel lines and a transversal are congruent).

PTS: 2 REF: 081528geo TOP: Quadrilateral Proofs

60 ANS:

Opposite angles in a parallelogram are congruent, so $m\angle O = 118^\circ$. The interior angles of a triangle equal 180° . $180 - (118 + 22) = 40$.

PTS: 2 REF: 061526geo TOP: Parallelograms

61 ANS:

$\triangle MNO$ is congruent to $\triangle PNO$ by SAS. Since $\triangle MNO \cong \triangle PNO$, then $\overline{MO} \cong \overline{PO}$ by CPCTC. So \overline{NO} must divide \overline{MP} in half, and $MO = 8$.

PTS: 2 REF: fall1405geo TOP: Isosceles Triangles

62 ANS:

Translate $\triangle ABC$ along \overline{CF} such that point C maps onto point F , resulting in image $\triangle A'B'C'$. Then reflect $\triangle A'B'C'$ over \overline{DF} such that $\triangle A'B'C'$ maps onto $\triangle DEF$.

or

Reflect $\triangle ABC$ over the perpendicular bisector of \overline{EB} such that $\triangle ABC$ maps onto $\triangle DEF$.

PTS: 2

REF: fall1408geo TOP: Compositions of Transformations

63 ANS:

Triangle $X'Y'Z'$ is the image of $\triangle XYZ$ after a rotation about point Z such that \overline{ZX} coincides with \overline{ZU} . Since rotations preserve angle measure, \overline{ZY} coincides with \overline{ZV} , and corresponding angles X and Y , after the rotation, remain congruent, so $\overline{XY} \parallel \overline{UV}$. Then, dilate $\triangle X'Y'Z'$ by a scale factor of $\frac{ZU}{ZX}$ with its center at point Z . Since dilations preserve parallelism, \overline{XY} maps onto \overline{UV} . Therefore, $\triangle XYZ \sim \triangle UVZ$.

PTS: 2

REF: spr1406geo TOP: Similarity

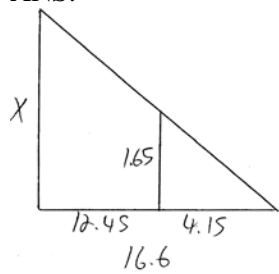
64 ANS:

Circle A can be mapped onto circle B by first translating circle A along vector \overline{AB} such that A maps onto B , and then dilating circle A , centered at A , by a scale factor of $\frac{5}{3}$. Since there exists a sequence of transformations that maps circle A onto circle B , circle A is similar to circle B .

PTS: 2

REF: spr1404geo TOP: Similarity

65 ANS:



$$\frac{1.65}{4.15} = \frac{x}{16.6}$$

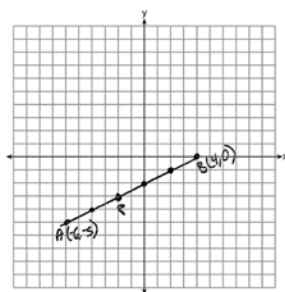
$$4.15x = 27.39$$

$$x = 6.6$$

PTS: 2

REF: 061531geo TOP: Similarity

66 ANS:



$$-6 + \frac{2}{5}(4 - -6) \quad -5 + \frac{2}{5}(0 - -5) \quad (-2, -3)$$

$$-6 + \frac{2}{5}(10) \quad -5 + \frac{2}{5}(5)$$

$$-6 + 4 \quad -5 + 2$$

$$-2 \quad -3$$

PTS: 2 REF: 061527geo TOP: Directed Line Segments

67 ANS:

$$\frac{120}{230} = \frac{x}{315}$$

$$x = 164$$

PTS: 2 REF: 081527geo TOP: Similarity

68 ANS:

$$\frac{6}{14} = \frac{9}{21} \text{ SAS}$$

$$126 = 126$$

PTS: 2 REF: 081529geo TOP: Similarity

69 ANS:

$$\frac{2}{5} \cdot (16 - 1) = 6 \quad \frac{2}{5} \cdot (14 - 4) = 4 \quad (1 + 6, 4 + 4) = (7, 8)$$

PTS: 2 REF: 081531geo TOP: Directed Line Segments

70 ANS:

The transformation is a rotation, which is a rigid motion.

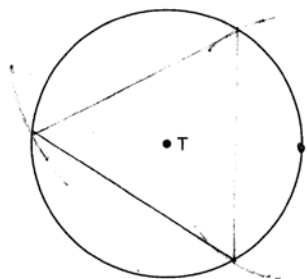
PTS: 2 REF: 081530geo TOP: Properties of Transformations

71 ANS:

Reflections are rigid motions that preserve distance.

PTS: 2 REF: 061530geo TOP: Triangle Congruency

72 ANS:

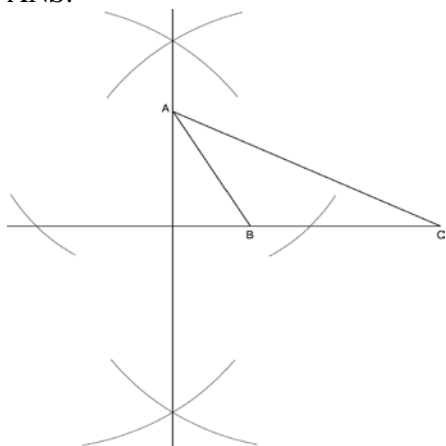


PTS: 2

REF: 081526geo

TOP: Constructions

73 ANS:



PTS: 2

REF: fall1409geo

TOP: Constructions

74 ANS:

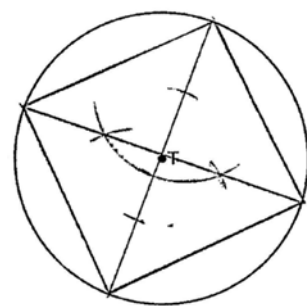
Each quarter in both stacks has the same base area. Therefore, each corresponding cross-section of the stacks will have the same area. Since the two stacks of quarters have the same height of 23 quarters, the two volumes must be the same.

PTS: 2

REF: spr1405geo

TOP: Cavalieri's Principle

75 ANS:



PTS: 2

REF: 061525geo

TOP: Constructions

76 ANS:

No, the weight of the bricks is greater than 900 kg. $500 \times (5.1 \text{ cm} \times 10.2 \text{ cm} \times 20.3 \text{ cm}) = 528,003 \text{ cm}^3$.

$$528,003 \text{ cm}^3 \times \frac{1 \text{ m}^3}{100 \text{ cm}^3} = 0.528003 \text{ m}^3. \quad \frac{1920 \text{ kg}}{\text{m}^3} \times 0.528003 \text{ m}^3 \approx 1013 \text{ kg}.$$

PTS: 2 REF: fall1406geo TOP: Volume

77 ANS:

$$\sin x = \frac{4.5}{11.75}$$

$$x \approx 23$$

PTS: 2 REF: 061528geo TOP: Using Trigonometry to Find an Angle

78 ANS:

$$\frac{137.8}{6^3} \approx 0.638 \text{ Ash}$$

PTS: 2 REF: 081525geo TOP: Density

Geometry Common Core State Standards 4 Point Regents Exam Questions Answer Section

79 ANS:

$$\tan 47 = \frac{x}{8.5} \quad \text{Cone: } V = \frac{1}{3} \pi (8.5)^2 (9.115) \approx 689.6 \quad \text{Cylinder: } V = \pi (8.5)^2 (25) \approx 5674.5 \quad \text{Hemisphere:}$$

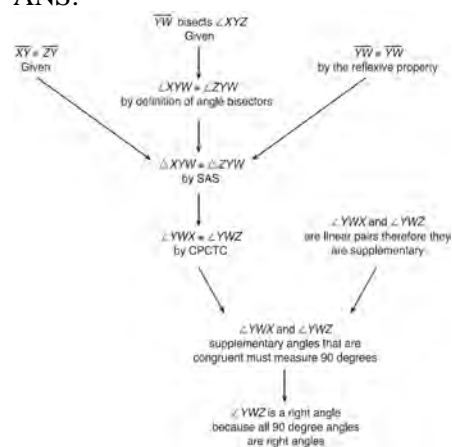
$$x \approx 9.115$$

$$V = \frac{1}{2} \left(\frac{4}{3} \pi (8.5)^3 \right) \approx 1286.3 \quad 689.6 + 5674.5 + 1286.3 \approx 7650 \quad \text{No, because } 7650 \cdot 62.4 = 477,360$$

$477,360 \cdot .85 = 405,756$, which is greater than 400,000.

PTS: 6 REF: 061535geo TOP: Volume

80 ANS:

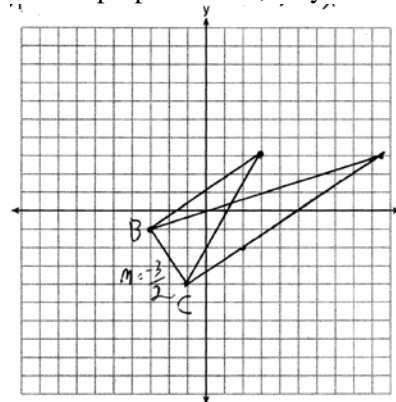


$\triangle XYZ$, $\overline{XY} \cong \overline{ZY}$, and \overline{YW} bisects $\angle XYZ$ (Given). $\triangle XYZ$ is isosceles (Definition of isosceles triangle). \overline{YW} is an altitude of $\triangle XYZ$ (The angle bisector of the vertex of an isosceles triangle is also the altitude of that triangle). $\overline{YW} \perp \overline{XZ}$ (Definition of altitude). $\angle YWZ$ is a right angle (Definition of perpendicular lines).

PTS: 4 REF: spr1411geo TOP: Triangle Proofs

81 ANS:

The slopes of perpendicular lines are opposite reciprocals. Since the lines are perpendicular, they form right angles



and a right triangle. $m_{\overline{BC}} = -\frac{3}{2}$ $-1 = \frac{2}{3}(-3) + b$ or $-4 = \frac{2}{3}(-1) + b$

$$\begin{array}{rcl}
 m_{\perp} = \frac{2}{3} & -1 = -2 + b & \frac{-12}{3} = \frac{-2}{3} + b \\
 & 1 = b & \\
 & 3 = \frac{2}{3}x + 1 & -\frac{10}{3} = b \\
 & 2 = \frac{2}{3}x & 3 = \frac{2}{3}x - \frac{10}{3} \\
 & 3 = x & 9 = 2x - 10 \\
 & & 19 = 2x \\
 & & 9.5 = x
 \end{array}$$

PTS: 4 REF: 081533geo TOP: Triangles in the Coordinate Plane

82 ANS:

Quadrilateral $ABCD$ is a parallelogram with diagonals \overline{AC} and \overline{BD} intersecting at E (Given). $\overline{AD} \cong \overline{BC}$ (Opposite sides of a parallelogram are congruent). $\angle AED \cong \angle CEB$ (Vertical angles are congruent). $\overline{BC} \parallel \overline{DA}$ (Definition of parallelogram). $\angle DBC \cong \angle BDA$ (Alternate interior angles are congruent). $\triangle AED \cong \triangle CEB$ (AAS). 180° rotation of $\triangle AED$ around point E .

PTS: 4 REF: 061533geo TOP: Quadrilateral Proofs

83 ANS:

As the sum of the measures of the angles of a triangle is 180° , $m\angle ABC + m\angle BCA + m\angle CAB = 180^\circ$. Each interior angle of the triangle and its exterior angle form a linear pair. Linear pairs are supplementary, so $m\angle ABC + m\angle FBC = 180^\circ$, $m\angle BCA + m\angle DCA = 180^\circ$, and $m\angle CAB + m\angle EAB = 180^\circ$. By addition, the sum of these linear pairs is 540° . When the angle measures of the triangle are subtracted from this sum, the result is 360° , the sum of the exterior angles of the triangle.

PTS: 4 REF: fall1410geo TOP: Interior and Exterior Angles of Triangles

84 ANS:

$$x = \sqrt{.55^2 - .25^2} \cong 0.49 \text{ No, } .49^2 = .25y \quad .9604 + .25 < 1.5$$

$$.9604 = y$$

PTS: 4 REF: 061534geo TOP: Similarity

85 ANS:

x represents the distance between the lighthouse and the canoe at 5:00; y represents the distance between the lighthouse and the canoe at 5:05. $\tan 6 = \frac{112 - 1.5}{x}$ $\tan(49 + 6) = \frac{112 - 1.5}{y}$ $\frac{1051.3 - 77.4}{5} \approx 195$

$$x \approx 1051.3 \qquad y \approx 77.4$$

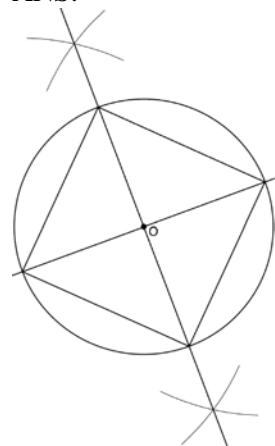
PTS: 4 REF: spr1409geo TOP: Using Trigonometry to Find a Side

86 ANS:

$\overline{LA} \cong \overline{DN}$, $\overline{CA} \cong \overline{CN}$, and $\overline{DAC} \perp \overline{LCN}$ (Given). $\angle LCA$ and $\angle DCN$ are right angles (Definition of perpendicular lines). $\triangle LAC$ and $\triangle DNC$ are right triangles (Definition of a right triangle). $\triangle LAC \cong \triangle DNC$ (HL). $\triangle LAC$ will map onto $\triangle DNC$ after rotating $\triangle LAC$ counterclockwise 90° about point C such that point L maps onto point D .

PTS: 4 REF: spr1408geo TOP: Triangle Congruency | Identifying Transformations

87 ANS:



Since the square is inscribed, each vertex of the square is on the circle and the diagonals of the square are diameters of the circle. Therefore, each angle of the square is an inscribed angle in the circle that intercepts the circle at the endpoints of the diameters. Each angle of the square, which is an inscribed angle, measures 90 degrees. Therefore, the measure of the arc intercepted by two adjacent sides of the square is 180 degrees because it is twice the measure of its inscribed angle.

PTS: 4 REF: fall1412geo TOP: Constructions

88 ANS:

$$r = 25 \text{ cm} \left(\frac{1 \text{ m}}{100 \text{ cm}} \right) = 0.25 \text{ m} \quad V = \pi(0.25 \text{ m})^2(10 \text{ m}) = 0.625\pi \text{ m}^3 \quad W = 0.625\pi \text{ m}^3 \left(\frac{380 \text{ K}}{1 \text{ m}^3} \right) \approx 746.1 \text{ K}$$

$$n = \frac{\$50,000}{\left(\frac{\$4.75}{\text{K}} \right)(746.1 \text{ K})} = 14.1 \quad 15 \text{ trees}$$

PTS: 4 REF: spr1412geo TOP: Volume

89 ANS:

$M\left(\frac{4+0}{2}, \frac{6-1}{2}\right) = M\left(2, \frac{5}{2}\right)$ $m = \frac{6-1}{4-0} = \frac{5}{4}$ $m_{\perp} = -\frac{4}{5}$ $y - 2.5 = -\frac{4}{5}(x - 2)$ The diagonals, \overline{MT} and \overline{AH} , of rhombus $MATH$ are perpendicular bisectors of each other.

PTS: 4 REF: fall1411geo TOP: Quadrilaterals in the Coordinate Plane

90 ANS:

$$\frac{\left(\frac{180-20}{2}\right)}{360} \times \pi(6)^2 = \frac{80}{360} \times 36\pi = 8\pi$$

PTS: 4 REF: spr1410geo TOP: Sectors

91 ANS:

Translations preserve distance. If point D is mapped onto point A , point F would map onto point C . $\triangle DEF \cong \triangle ABC$ as $AC \cong DF$ and points are collinear on line ℓ and a reflection preserves distance.

PTS: 4 REF: 081534geo TOP: Properties of Transformations

92 ANS:

$$\tan 7 = \frac{125}{x} \quad \tan 16 = \frac{125}{y} \quad 1018 - 436 \approx 582$$

$$x \approx 1018 \quad y \approx 436$$

PTS: 4 REF: 081532geo TOP: Using Trigonometry to Find a Side

Geometry 6 Point Regents Exam Questions Answer Section

93 ANS:

$$\tan 47 = \frac{x}{8.5} \quad \text{Cone: } V = \frac{1}{3} \pi (8.5)^2 (9.115) \approx 689.6 \quad \text{Cylinder: } V = \pi (8.5)^2 (25) \approx 5674.5 \quad \text{Hemisphere:}$$

$$x \approx 9.115$$

$$V = \frac{1}{2} \left(\frac{4}{3} \pi (8.5)^3 \right) \approx 1286.3 \quad 689.6 + 5674.5 + 1286.3 \approx 7650 \quad \text{No, because } 7650 \cdot 62.4 = 477,360$$

$477,360 \cdot .85 = 405,756$, which is greater than 400,000.

PTS: 6 REF: 061535geo TOP: Volume

94 ANS:

Parallelogram $ABCD$, $\overline{BE} \perp \overline{CED}$, $\overline{DF} \perp \overline{BFC}$, $\overline{CE} \cong \overline{CF}$ (given). $\angle BEC \cong \angle DFC$ (perpendicular lines form right angles, which are congruent). $\angle FCD \cong \angle BCE$ (reflexive property). $\triangle BEC \cong \triangle DFC$ (ASA). $\overline{BC} \cong \overline{CD}$ (CPCTC). $ABCD$ is a rhombus (a parallelogram with consecutive congruent sides is a rhombus).

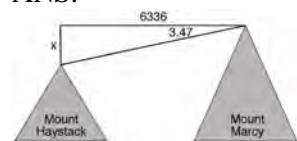
PTS: 6 REF: 081535geo TOP: Quadrilateral Proofs

95 ANS:

Circle O , secant \overline{ACD} , tangent \overline{AB} (Given). Chords \overline{BC} and \overline{BD} are drawn (Auxiliary lines). $\angle A \cong \angle A$, $\widehat{BC} \cong \widehat{BC}$ (Reflexive property). $m\angle BDC = \frac{1}{2} m\widehat{BC}$ (The measure of an inscribed angle is half the measure of the intercepted arc). $m\angle CBA = \frac{1}{2} m\widehat{BC}$ (The measure of an angle formed by a tangent and a chord is half the measure of the intercepted arc). $\angle BDC \cong \angle CBA$ (Angles equal to half of the same arc are congruent). $\triangle ABC \sim \triangle ADB$ (AA). $\frac{AB}{AC} = \frac{AD}{AB}$ (Corresponding sides of similar triangles are proportional). $AC \cdot AD = AB^2$ (In a proportion, the product of the means equals the product of the extremes).

PTS: 6 REF: spr1413geo TOP: Similarity Proofs

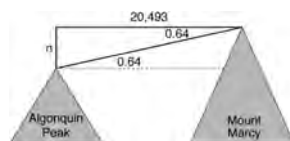
96 ANS:



$$\tan 3.47 = \frac{M}{6336}$$

$$M \approx 384$$

$$4960 + 384 = 5344$$



$$\tan 0.64 = \frac{A}{20,493}$$

$$A \approx 229$$

$$5344 - 229 = 5115$$

PTS: 6 REF: fall1413geo TOP: Using Trigonometry to Find a Side

97 ANS:

$$V = \frac{1}{3} \pi \left(\frac{3}{2} \right)^2 \cdot 8 \approx 18.85 \cdot 100 = 1885 \quad 1885 \cdot 0.52 \cdot 0.10 = 98.02 \quad 1.95(100) - (37.83 + 98.02) = 59.15$$

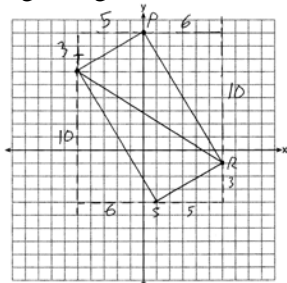
PTS: 6 REF: 081536geo TOP: Density

98 ANS:

$m_{\overline{TS}} = \frac{-10}{6} = -\frac{5}{3}$ $m_{\overline{SR}} = \frac{3}{5}$ Since the slopes of \overline{TS} and \overline{SR} are opposite reciprocals, they are perpendicular and

form a right angle. $\triangle RST$ is a right triangle because $\angle S$ is a right angle. $P(0,9)$ $m_{\overline{RP}} = \frac{-10}{6} = -\frac{5}{3}$ $m_{\overline{PT}} = \frac{3}{5}$

Since the slopes of all four adjacent sides (\overline{TS} and \overline{SR} , \overline{SR} and \overline{RP} , \overline{PT} and \overline{TS} , \overline{RP} and \overline{PT}) are opposite reciprocals, they are perpendicular and form right angles. Quadrilateral $RSTP$ is a rectangle because it has four right angles.



PTS: 6

REF: 061536geo TOP: Coordinate Proofs