

JMAP REGENTS BY TYPE

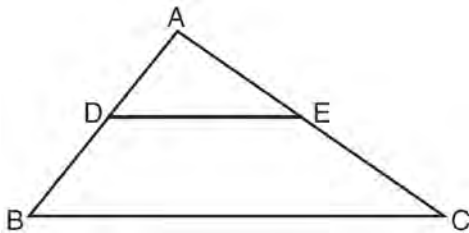
The NY Geometry CCSS Regents Exam Questions
from Fall 2014 to August 2016 Sorted by Type

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Geometry Common Core State Standards Multiple Choice Regents Exam Questions

- 1 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

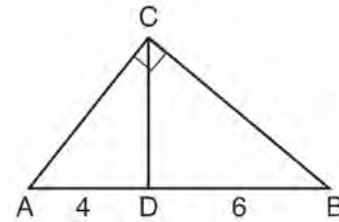
- 2 In the diagram below, $\triangle ABC \sim \triangle ADE$.



Which measurements are justified by this similarity?

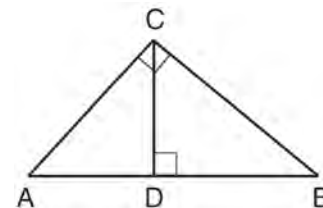
- 1) $AD = 3$, $AB = 6$, $AE = 4$, and $AC = 12$
 - 2) $AD = 5$, $AB = 8$, $AE = 7$, and $AC = 10$
 - 3) $AD = 3$, $AB = 9$, $AE = 5$, and $AC = 10$
 - 4) $AD = 2$, $AB = 6$, $AE = 5$, and $AC = 15$
- 3 The center of circle Q has coordinates $(3, -2)$. If circle Q passes through $R(7, 1)$, what is the length of its diameter?
- 1) 50
 - 2) 25
 - 3) 10
 - 4) 5

- 4 In the diagram of right triangle ABC , \overline{CD} intersects hypotenuse \overline{AB} at D .



If $AD = 4$ and $DB = 6$, which length of \overline{AC} makes $\overline{CD} \perp \overline{AB}$?

- 1) $2\sqrt{6}$
 - 2) $2\sqrt{10}$
 - 3) $2\sqrt{15}$
 - 4) $4\sqrt{2}$
- 5 In the diagram below, \overline{CD} is the altitude drawn to the hypotenuse \overline{AB} of right triangle ABC .



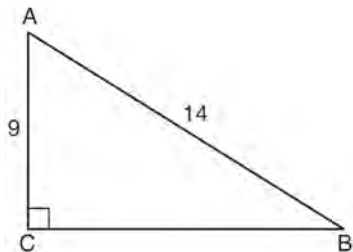
Which lengths would *not* produce an altitude that measures $6\sqrt{2}$?

- 1) $AD = 2$ and $DB = 36$
- 2) $AD = 3$ and $AB = 24$
- 3) $AD = 6$ and $DB = 12$
- 4) $AD = 8$ and $AB = 17$

- 6 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

- 7 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 $\overline{BC} \parallel \overline{AD}$

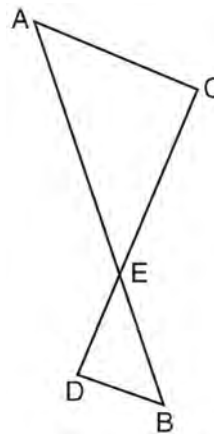
- 8 In the diagram of right triangle ABC shown below, $AB = 14$ and $AC = 9$.



What is the measure of $\angle A$, to the nearest degree?

- 1) 33
- 2) 40
- 3) 50
- 4) 57

- 9 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?

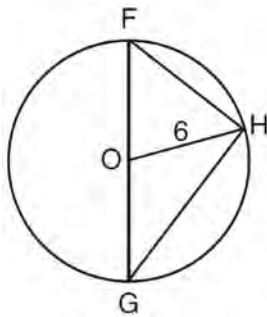
- 1) $\frac{CE}{DE} = \frac{EB}{EA}$
- 2) $\frac{AE}{BE} = \frac{AC}{BD}$
- 3) $\frac{EC}{AE} = \frac{BE}{ED}$
- 4) $\frac{ED}{EC} = \frac{AC}{BD}$

- 10 In $\triangle ABC$, where $\angle C$ is a right angle, $\cos A = \frac{\sqrt{21}}{5}$. What is $\sin B$?

- 1) $\frac{\sqrt{21}}{5}$
- 2) $\frac{\sqrt{21}}{2}$
- 3) $\frac{2}{5}$
- 4) $\frac{5}{\sqrt{21}}$

- 11 Line segment $A'B'$, whose endpoints are $(4, -2)$ and $(16, 14)$, is the image of \overline{AB} after a dilation of $\frac{1}{2}$ centered at the origin. What is the length of \overline{AB} ?
- 1) 5
 - 2) 10
 - 3) 20
 - 4) 40

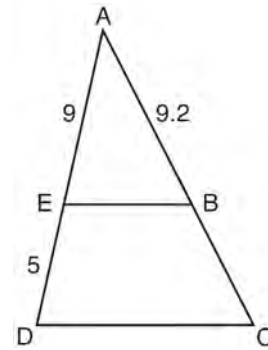
- 12 Triangle FGH is inscribed in circle O , the length of radius \overline{OH} is 6, and $\overline{FH} \cong \overline{OG}$.



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

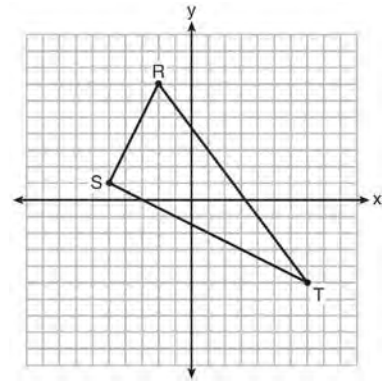
- 1) 2π
 - 2) $\frac{3}{2}\pi$
 - 3) 6π
 - 4) 24π
- 13 A fish tank in the shape of a rectangular prism has dimensions of 14 inches, 16 inches, and 10 inches. The tank contains 1680 cubic inches of water. What percent of the fish tank is empty?
- 1) 10
 - 2) 25
 - 3) 50
 - 4) 75

- 14 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?

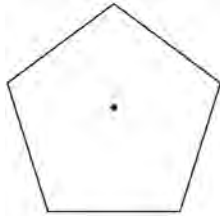
- 1) 5.1
 - 2) 5.2
 - 3) 14.3
 - 4) 14.4
- 15 Triangle RST is graphed on the set of axes below.



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

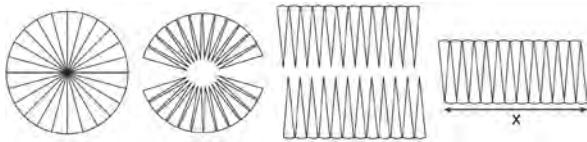
- 16 A regular pentagon is shown in the diagram below.



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°

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



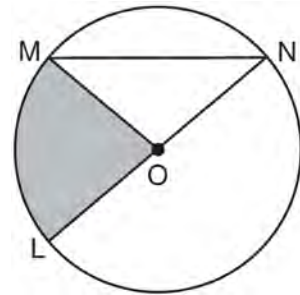
To the *nearest integer*, the value of x is

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

- 18 The endpoints of one side of a regular pentagon are $(-1,4)$ and $(2,3)$. What is the perimeter of the pentagon?

- 1) $\sqrt{10}$
- 2) $5\sqrt{10}$
- 3) $5\sqrt{2}$
- 4) $25\sqrt{2}$

- 19 In the diagram below of circle O , the area of the shaded sector LOM is $2\pi \text{ cm}^2$.



If the length of \overline{NL} is 6 cm, what is $m\angle N$?

- 1) 10°
- 2) 20°
- 3) 40°
- 4) 80°

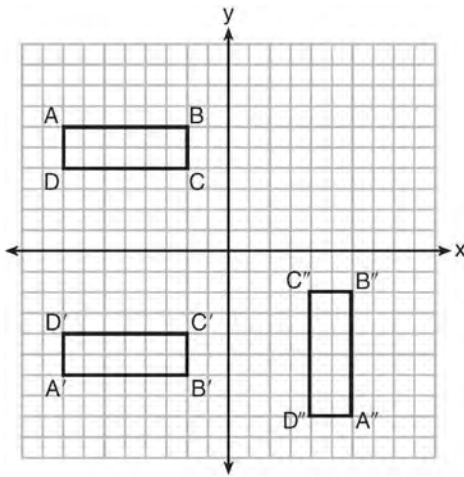
- 20 If an equilateral triangle is continuously rotated around one of its medians, which 3-dimensional object is generated?

- 1) cone
- 2) pyramid
- 3) prism
- 4) sphere

- 21 Which transformation would result in the perimeter of a triangle being different from the perimeter of its image?

- 1) $(x,y) \rightarrow (y,x)$
- 2) $(x,y) \rightarrow (x,-y)$
- 3) $(x,y) \rightarrow (4x,4y)$
- 4) $(x,y) \rightarrow (x+2,y-5)$

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



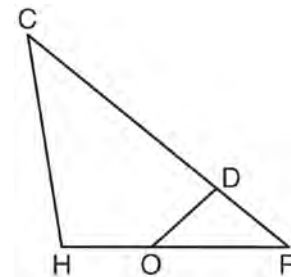
Which sequence of transformations maps $ABCD$ onto $A'B'C'D'$ and then maps $A'B'C'D'$ onto $A''B''C''D''$?

- 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
- 23 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

- 24 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) $y = 3x - 6$
- 25 A hemispherical water tank has an inside diameter of 10 feet. If water has a density of 62.4 pounds per cubic foot, what is the weight of the water in a full tank, to the nearest pound?
- 1) 16,336
 - 2) 32,673
 - 3) 130,690
 - 4) 261,381

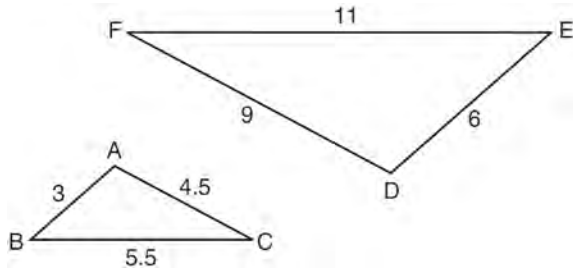
- 26 In triangle CHR , O is on \overline{HR} , and D is on \overline{CR} so that $\angle H \cong \angle RDO$.



If $RD = 4$, $RO = 6$, and $OH = 4$, what is the length of CD ?

- 1) $2\frac{2}{3}$
- 2) $6\frac{2}{3}$
- 3) 11
- 4) 15

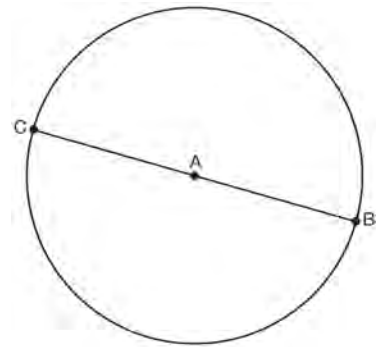
- 27 In the diagram below, $\triangle DEF$ is the image of $\triangle ABC$ after a clockwise rotation of 180° and a dilation where $AB = 3$, $BC = 5.5$, $AC = 4.5$, $DE = 6$, $FD = 9$, and $EF = 11$.



Which relationship must always be true?

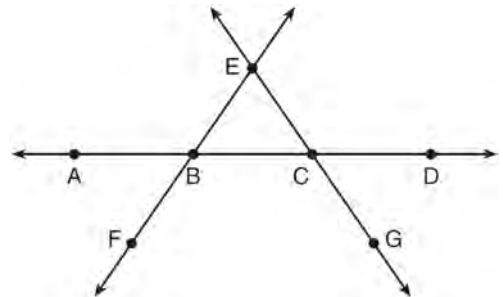
- 1) $\frac{m\angle A}{m\angle D} = \frac{1}{2}$
 - 2) $\frac{m\angle C}{m\angle F} = \frac{2}{1}$
 - 3) $\frac{m\angle A}{m\angle C} = \frac{m\angle F}{m\angle D}$
 - 4) $\frac{m\angle B}{m\angle E} = \frac{m\angle C}{m\angle F}$
- 28 The Great Pyramid of Giza was constructed as a regular pyramid with 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
- 29 The coordinates of the vertices of $\triangle RST$ are $R(-2, -3)$, $S(8, 2)$, and $T(4, 5)$. Which type of triangle is $\triangle RST$?
- 1) right
 - 2) acute
 - 3) obtuse
 - 4) equiangular

- 30 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.
- 31 In the diagram below, \overleftrightarrow{FE} bisects \overline{AC} at B , and \overleftrightarrow{GE} bisects \overline{BD} at C .



Which statement is always true?

- 1) $\overline{AB} \cong \overline{DC}$
- 2) $\overline{FB} \cong \overline{EB}$
- 3) \overleftrightarrow{BD} bisects \overleftrightarrow{GE} at C .
- 4) \overleftrightarrow{AC} bisects \overleftrightarrow{FE} at B .

- 32 If the rectangle below is continuously rotated about side w , which solid figure is formed?

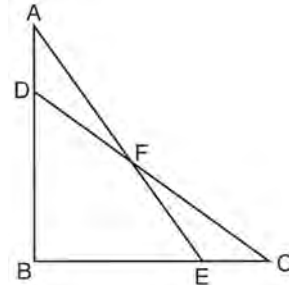


- 1) pyramid
 - 2) rectangular prism
 - 3) cone
 - 4) cylinder
- 33 Which transformation would *not* always produce an image that would be congruent to the original figure?
- 1) translation
 - 2) dilation
 - 3) rotation
 - 4) reflection
- 34 What are the coordinates of the point on the directed line 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) $(1, -1)$
- 35 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

- 36 The diameter of a basketball is approximately 9.5 inches and the diameter of a tennis ball is approximately 2.5 inches. The volume of the basketball is about how many times greater than the volume of the tennis ball?

- 1) 3591
- 2) 65
- 3) 55
- 4) 4

- 37 Given: $\triangle ABE$ and $\triangle CBD$ shown in the diagram below with $\overline{DB} \cong \overline{BE}$



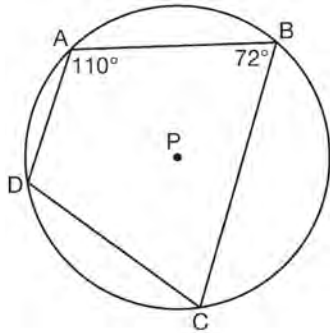
Which statement is needed to prove $\triangle ABE \cong \triangle CBD$ using only SAS \cong SAS?

- 1) $\angle CDB \cong \angle AEB$
 - 2) $\angle AFD \cong \angle EFC$
 - 3) $\overline{AD} \cong \overline{CE}$
 - 4) $\overline{AE} \cong \overline{CD}$
- 38 What are the coordinates of the center and the length of the radius of the circle represented by the equation $x^2 + y^2 - 4x + 8y + 11 = 0$?
- 1) center $(2, -4)$ and radius 3
 - 2) center $(-2, 4)$ and radius 3
 - 3) center $(2, -4)$ and radius 9
 - 4) center $(-2, 4)$ and radius 9

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- 39 In the diagram below, quadrilateral $ABCD$ is inscribed in circle P .



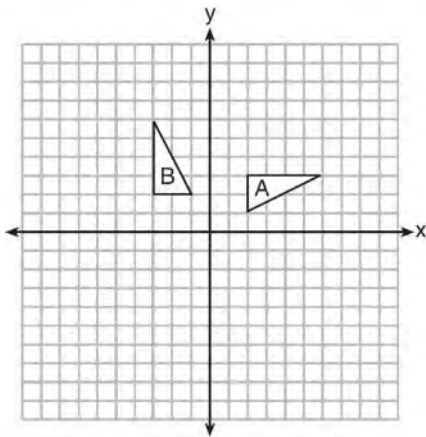
What is $m\angle ADC$?

- 1) 70°
 - 2) 72°
 - 3) 108°
 - 4) 110°
- 40 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
- 41 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) $3x - 2y = 5$
- 42 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
- 43 Two right triangles must be congruent if
- 1) an acute angle in each triangle is congruent
 - 2) the lengths of the hypotenuses are equal
 - 3) the corresponding legs are congruent
 - 4) the areas are equal
- 44 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) $\cos x$
- 45 Segment CD is the perpendicular bisector of \overline{AB} at E . Which pair of segments does *not* have to be congruent?
- 1) $\overline{AD}, \overline{BD}$
 - 2) $\overline{AC}, \overline{BC}$
 - 3) $\overline{AE}, \overline{BE}$
 - 4) $\overline{DE}, \overline{CE}$
- 46 In $\triangle ABC$, the complement of $\angle B$ is $\angle A$. Which statement is always true?
- 1) $\tan \angle A = \tan \angle B$
 - 2) $\sin \angle A = \sin \angle B$
 - 3) $\cos \angle A = \tan \angle B$
 - 4) $\sin \angle A = \cos \angle B$

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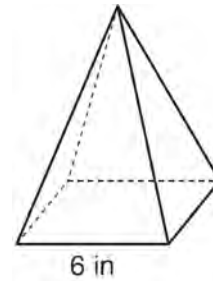
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- 47 A three-inch line segment is dilated by a scale factor of 6 and centered at its midpoint. What is the length of its image?
- 1) 9 inches
 - 2) 2 inches
 - 3) 15 inches
 - 4) 18 inches
- 48 A designer needs to create perfectly circular necklaces. The necklaces each need to have a radius of 10 cm. What is the largest number of necklaces that can be made from 1000 cm of wire?
- 1) 15
 - 2) 16
 - 3) 31
 - 4) 32
- 49 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

- 50 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
- 51 As shown in the diagram below, a regular pyramid has a square base whose side measures 6 inches.



If the altitude of the pyramid measures 12 inches, its volume, in cubic inches, is

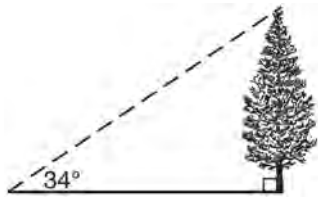
- 1) 72
 - 2) 144
 - 3) 288
 - 4) 432
- 52 The ratio of similarity of $\triangle BOY$ to $\triangle GRL$ is 1:2. If $BO = x + 3$ and $GR = 3x - 1$, then the length of \overline{GR} is
- 1) 5
 - 2) 7
 - 3) 10
 - 4) 20

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- 53 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

- 54 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
- 55 Seawater contains approximately 1.2 ounces of salt per liter on average. How many gallons of seawater, to the *nearest tenth of a gallon*, would contain 1 pound of salt?
- 1) 3.3
 - 2) 3.5
 - 3) 4.7
 - 4) 13.3

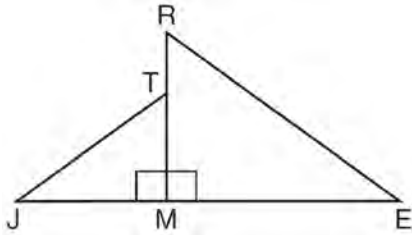
- 56 If $x^2 + 4x + y^2 - 6y - 12 = 0$ is the equation of a circle, the length of the radius is
- 1) 25
 - 2) 16
 - 3) 5
 - 4) 4

- 57 The density of the American white oak tree is 752 kilograms per cubic meter. If the trunk of an American white oak tree has a circumference of 4.5 meters and the height of the trunk is 8 meters, what is the approximate number of kilograms of the trunk?
- 1) 13
 - 2) 9694
 - 3) 13,536
 - 4) 30,456

- 58 Tennis balls are sold in cylindrical cans with the balls stacked one on top of the other. A tennis ball has a diameter of 6.7 cm. To the *nearest cubic centimeter*, what is the minimum volume of the can that holds a stack of 4 tennis balls?
- 1) 236
 - 2) 282
 - 3) 564
 - 4) 945

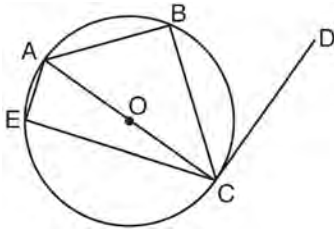
- 59 The coordinates of vertices A and B of $\triangle ABC$ are $A(3,4)$ and $B(3,12)$. If the area of $\triangle ABC$ is 24 square units, what could be the coordinates of point C ?
- 1) $(3,6)$
 - 2) $(8,-3)$
 - 3) $(-3,8)$
 - 4) $(6,3)$

- 60 In the diagram below, $\triangle ERM \sim \triangle JTM$.



Which statement is always true?

- 1) $\cos J = \frac{RM}{RE}$
 - 2) $\cos R = \frac{JM}{JT}$
 - 3) $\tan T = \frac{RM}{EM}$
 - 4) $\tan E = \frac{TM}{JM}$
- 61 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.

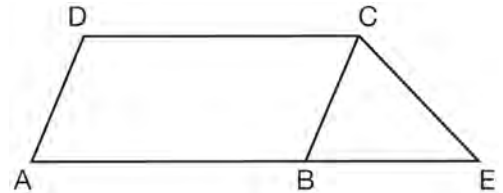


Which statement is *not* always true?

- 62 Line segment \overline{NY} has endpoints $N(-11,5)$ and $Y(5,-7)$. What is the equation of the perpendicular bisector of \overline{NY} ?

- 1) $y + 1 = \frac{4}{3}(x + 3)$
- 2) $y + 1 = -\frac{3}{4}(x + 3)$
- 3) $y - 6 = \frac{4}{3}(x - 8)$
- 4) $y - 6 = -\frac{3}{4}(x - 8)$

- 63 In the diagram below, $ABCD$ is a parallelogram, \overline{AB} is extended through B to E , and \overline{CE} is drawn.



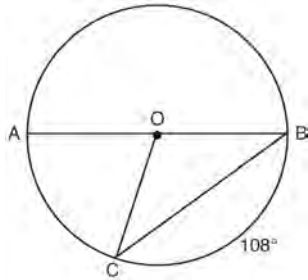
If $\overline{CE} \cong \overline{BE}$ and $m\angle D = 112^\circ$, what is $m\angle E$?

- 1) 44°
- 2) 56°
- 3) 68°
- 4) 112°

- 64 A 20-foot support post leans against a wall, making a 70° angle with the ground. To the *nearest tenth of a foot*, how far up the wall will the support post reach?

- 1) 6.8
- 2) 6.9
- 3) 18.7
- 4) 18.8

- 65 In circle O , diameter \overline{AB} , chord \overline{BC} , and radius \overline{OC} are drawn, and the measure of arc BC is 108° .



Some students wrote these formulas to find the area of sector COB :

Amy $\frac{3}{10} \cdot \pi \cdot (BC)^2$

Beth $\frac{108}{360} \cdot \pi \cdot (OC)^2$

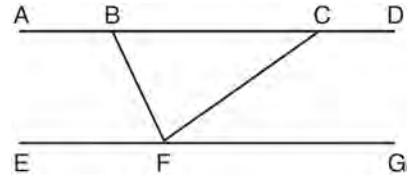
Carl $\frac{3}{10} \cdot \pi \cdot \left(\frac{1}{2}AB\right)^2$

Dex $\frac{108}{360} \cdot \pi \cdot \frac{1}{2}(AB)^2$

Which students wrote correct formulas?

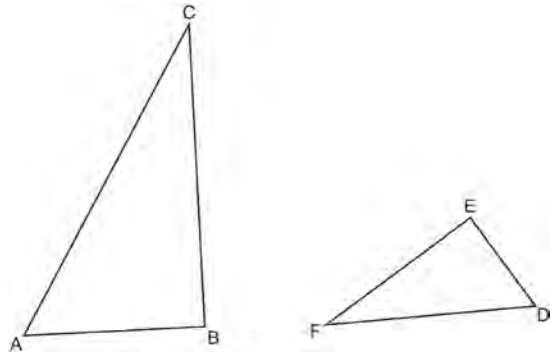
- 1) Amy and Dex
 - 2) Beth and Carl
 - 3) Carl and Amy
 - 4) Dex and Beth
- 66 The equation of a circle is $x^2 + y^2 + 6y = 7$. What are the coordinates of the center and the length of the radius of the circle?
- 1) center $(0,3)$ and radius 4
 - 2) center $(0,-3)$ and radius 4
 - 3) center $(0,3)$ and radius 16
 - 4) center $(0,-3)$ and radius 16

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



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

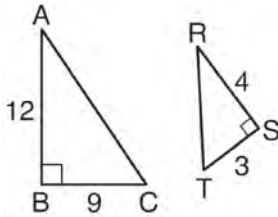
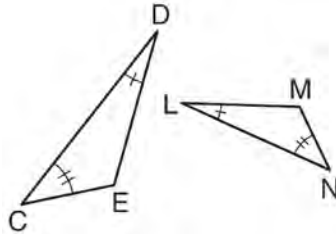
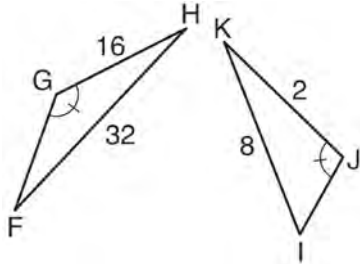
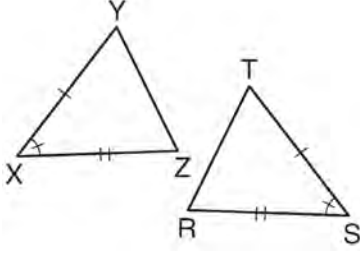
- 1) $\angle CFG \cong \angle FCB$
 - 2) $\angle ABF \cong \angle BFC$
 - 3) $\angle EFB \cong \angle CFB$
 - 4) $\angle CBF \cong \angle GFC$
- 68 Triangles ABC and DEF are drawn below.



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) $\frac{AB}{DE} = \frac{FE}{CB}$

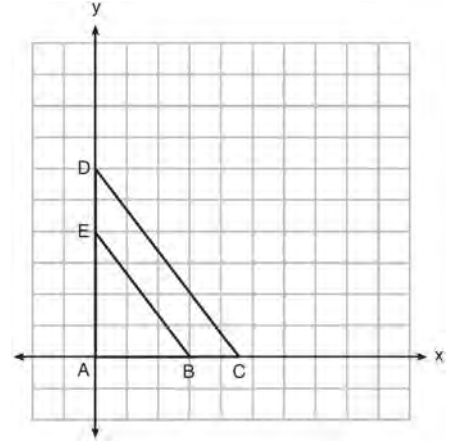
69 Using the information given below, which set of triangles can *not* be proven similar?

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

70 Which regular polygon has a minimum rotation of 45° to carry the polygon onto itself?

- 1) octagon
- 2) decagon
- 3) hexagon
- 4) pentagon

71 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 $E(0,4)$.



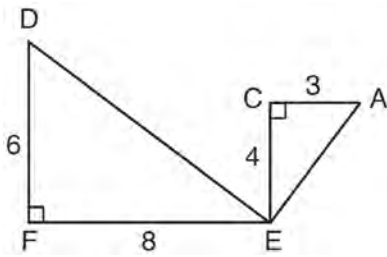
The ratio of the lengths of \overline{BE} to \overline{CD} is

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

72 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.

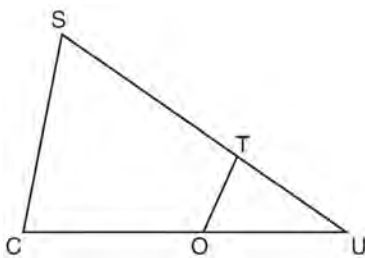
73 Given: $\triangle AEC$, $\triangle DEF$, and $\overline{FE} \perp \overline{CE}$



What is a correct sequence of similarity transformations that shows $\triangle AEC \sim \triangle DEF$?

- 1) a rotation of 180 degrees about point E followed by a horizontal translation
- 2) a counterclockwise rotation of 90 degrees about point E followed by a horizontal translation
- 3) a rotation of 180 degrees about point E followed by a dilation with a scale factor of 2 centered at point E
- 4) a counterclockwise rotation of 90 degrees about point E followed by a dilation with a scale factor of 2 centered at point E

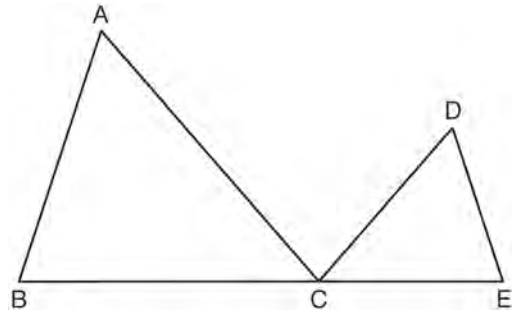
74 In $\triangle SCU$ shown below, points T and O are on \overline{SU} and \overline{CU} , respectively. Segment \overline{OT} is drawn so that $\angle C \cong \angle OTU$.



If $TU = 4$, $OU = 5$, and $OC = 7$, what is the length of \overline{ST} ?

- 1) 5.6
- 2) 8.75
- 3) 11
- 4) 15

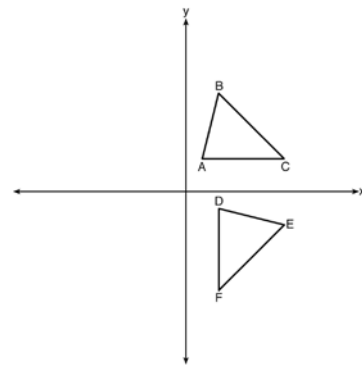
75 In the diagram below, $\triangle ABC \sim \triangle DEC$.



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

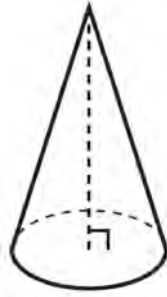
76 The image of $\triangle ABC$ after a rotation of 90° clockwise about the origin is $\triangle DEF$, as shown below.







Which statement is true?

- 1) $\overline{BC} \cong \overline{DE}$
- 2) $\overline{AB} \cong \overline{DF}$
- 3) $\angle C \cong \angle E$
- 4) $\angle A \cong \angle D$

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

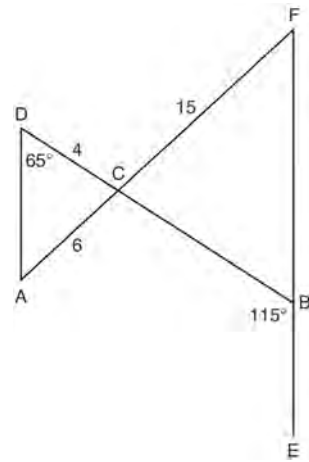


Which drawing can *not* be a cross section of a cone?

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

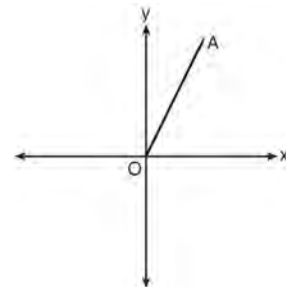
- 78 A line that passes through the points whose coordinates are $(1, 1)$ and $(5, 7)$ is dilated by a scale factor of 3 and centered at the origin. The image of the line
- 1) is perpendicular to the original line
 - 2) is parallel to the original line
 - 3) passes through the origin
 - 4) is the original line

- 79 In the diagram below, \overline{DB} and \overline{AF} intersect at point C , and \overline{AD} and \overline{FBE} are drawn.



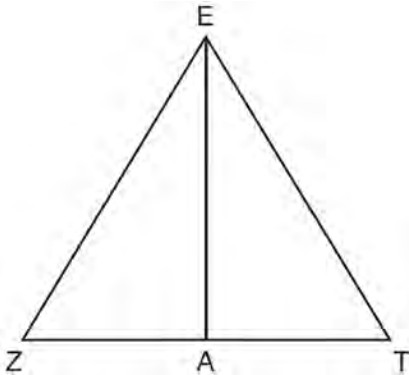
If $AC = 6$, $DC = 4$, $FC = 15$, $m\angle D = 65^\circ$, and $m\angle CBE = 115^\circ$, what is the length of \overline{CB} ?

- 1) 10
 - 2) 12
 - 3) 17
 - 4) 22.5
- 80 Which transformation of \overline{OA} would result in an image parallel to \overline{OA} ?



- 1) a translation of two units down
- 2) a reflection over the x -axis
- 3) a reflection over the y -axis
- 4) a clockwise rotation of 90° about the origin

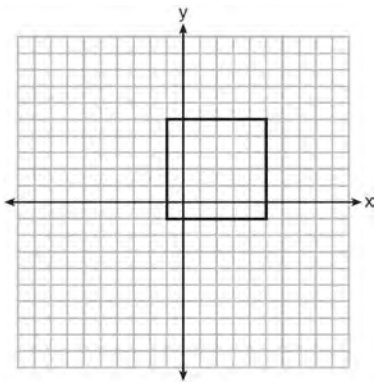
- 81 Line segment \overline{EA} is the perpendicular bisector of \overline{ZT} , and \overline{ZE} and \overline{TE} are drawn.



Which conclusion can *not* be proven?

- 1) \overline{EA} bisects angle ZET .
- 2) Triangle EZT is equilateral.
- 3) \overline{EA} is a median of triangle EZT .
- 4) Angle Z is congruent to angle T .

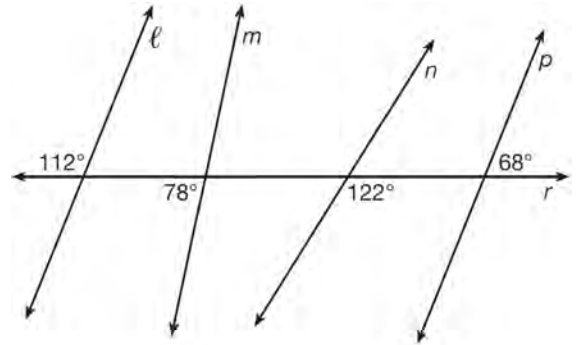
- 82 In the diagram below, a square is graphed in the coordinate plane.



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

- 1) $x = 5$
- 2) $y = 2$
- 3) $y = x$
- 4) $x + y = 4$

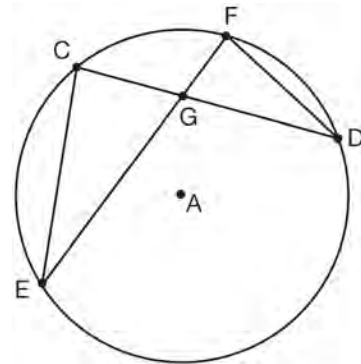
- 83 In the diagram below, lines ℓ , m , n , and p intersect line r .



Which statement is true?

- 1) $\ell \parallel n$
- 2) $\ell \parallel p$
- 3) $m \parallel p$
- 4) $m \parallel n$

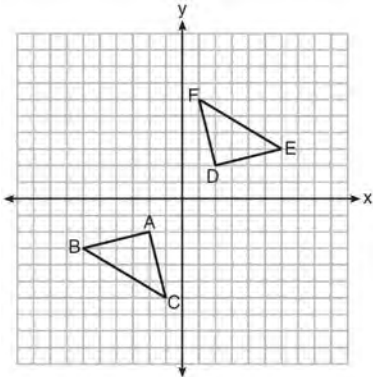
- 84 In the diagram of circle A shown below, chords \overline{CD} and \overline{EF} intersect at G , and chords \overline{CE} and \overline{FD} are drawn.



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) $\triangle CEG \sim \triangle FDG$

- 85 Triangle ABC and triangle DEF are graphed on the set of axes below.



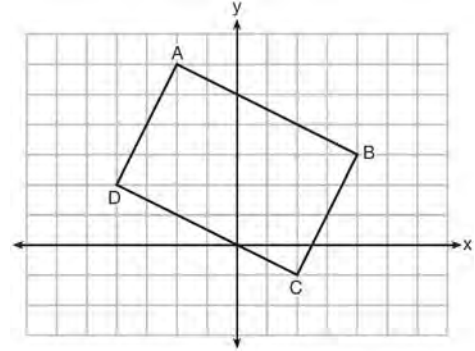
Which sequence of transformations maps triangle ABC onto triangle DEF ?

- 1) a reflection over the x -axis followed by a reflection over the y -axis
- 2) a 180° rotation about the origin followed by a reflection over the line $y = x$
- 3) a 90° clockwise rotation about the origin followed by a reflection over the y -axis
- 4) a translation 8 units to the right and 1 unit up followed by a 90° counterclockwise rotation about the origin

- 86 An equation of a line perpendicular to the line represented by the equation $y = -\frac{1}{2}x - 5$ and passing through $(6, -4)$ is

- 1) $y = -\frac{1}{2}x + 4$
- 2) $y = -\frac{1}{2}x - 1$
- 3) $y = 2x + 14$
- 4) $y = 2x - 16$

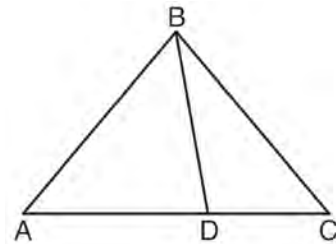
- 87 Quadrilateral $ABCD$ is graphed on the set of axes below.



When $ABCD$ is rotated 90° in a counterclockwise direction about the origin, its image is quadrilateral $A'B'C'D'$. Is distance preserved under this rotation, and which coordinates are correct for the given vertex?

- 1) no and $C'(1, 2)$
- 2) no and $D'(2, 4)$
- 3) yes and $A'(6, 2)$
- 4) yes and $B'(-3, 4)$

- 88 In the diagram below, $m\angle BDC = 100^\circ$, $m\angle A = 50^\circ$, and $m\angle DBC = 30^\circ$.

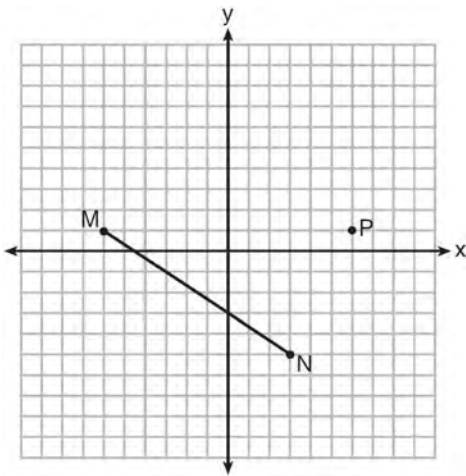


Which statement is true?

- 1) $\triangle ABD$ is obtuse.
- 2) $\triangle ABC$ is isosceles.
- 3) $m\angle ABD = 80^\circ$
- 4) $\triangle ABD$ is scalene.

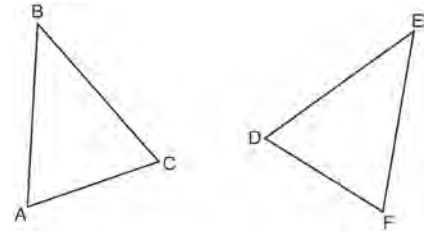
- 89 Line $y = 3x - 1$ is transformed by a dilation with a scale factor of 2 and centered at $(3, 8)$. The line's image is
- 1) $y = 3x - 8$
 - 2) $y = 3x - 4$
 - 3) $y = 3x - 2$
 - 4) $y = 3x - 1$

- 90 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} ?



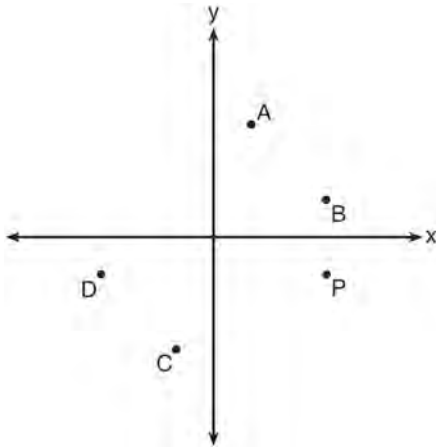
- 1) $y = -\frac{2}{3}x + 5$
- 2) $y = -\frac{2}{3}x - 3$
- 3) $y = \frac{3}{2}x + 7$
- 4) $y = \frac{3}{2}x - 8$

- 91 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 $\angle E$.
- 92 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) $y = 2x + 6$
- 93 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

- 94 Which point shown in the graph below is the image of point P after a counterclockwise rotation of 90° about the origin?



- 1) A
 - 2) B
 - 3) C
 - 4) D
- 95 Kevin's work for deriving the equation of a circle is shown below.

$$x^2 + 4x = -(y^2 - 20)$$

STEP 1 $x^2 + 4x = -y^2 + 20$

STEP 2 $x^2 + 4x + 4 = -y^2 + 20 - 4$

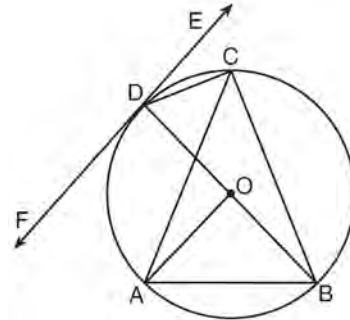
STEP 3 $(x + 2)^2 = -y^2 + 20 - 4$

STEP 4 $(x + 2)^2 + y^2 = 16$

In which step did he make an error in his work?

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

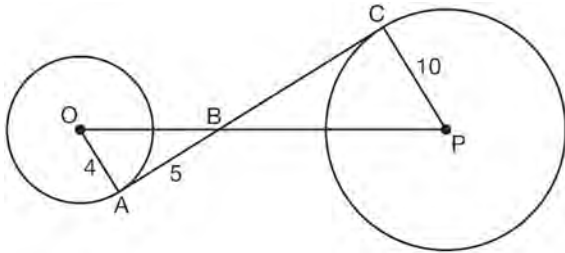
- 96 In the diagram below, \overline{DC} , \overline{AC} , \overline{DOB} , \overline{CB} , and \overline{AB} are chords of circle O , \overleftrightarrow{FDE} is tangent at point D , and radius \overline{AO} is drawn. Sam decides to apply this theorem to the diagram: "An angle inscribed in a semi-circle is a right angle."



Which angle is Sam referring to?

- 1) $\angle AOB$
 - 2) $\angle BAC$
 - 3) $\angle DCB$
 - 4) $\angle FDB$
- 97 An equilateral triangle has sides of length 20. To the nearest tenth, what is the height of the equilateral triangle?
- 1) 10.0
 - 2) 11.5
 - 3) 17.3
 - 4) 23.1
- 98 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

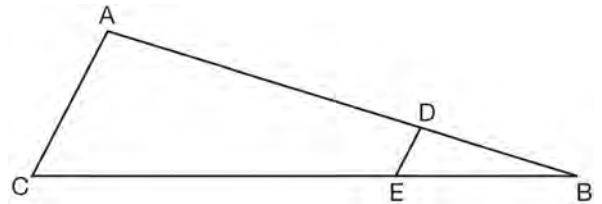
- 99 In the diagram shown below, \overline{AC} is tangent to circle O at A and to circle P at C , \overline{OP} intersects \overline{AC} at B , $OA = 4$, $AB = 5$, and $PC = 10$.



What is the length of \overline{BC} ?

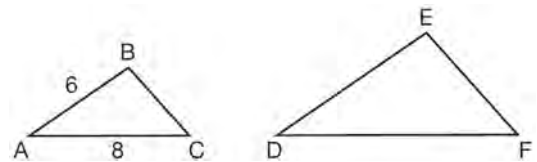
- 1) 6.4
 - 2) 8
 - 3) 12.5
 - 4) 16
- 100 Point P is on the directed line segment from point $X(-6, -2)$ to point $Y(6, 7)$ and divides the segment in the ratio $1:5$. What are the coordinates of point P ?
- 1) $\left(4, 5\frac{1}{2}\right)$
 - 2) $\left(-\frac{1}{2}, -4\right)$
 - 3) $\left(-4\frac{1}{2}, 0\right)$
 - 4) $\left(-4, -\frac{1}{2}\right)$
- 101 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) $y = 2x + 1$

- 102 In the diagram of $\triangle ABC$, points D and E are on \overline{AB} and \overline{CB} , respectively, such that $\overline{AC} \parallel \overline{DE}$.



If $AD = 24$, $DB = 12$, and $DE = 4$, what is the length of \overline{AC} ?

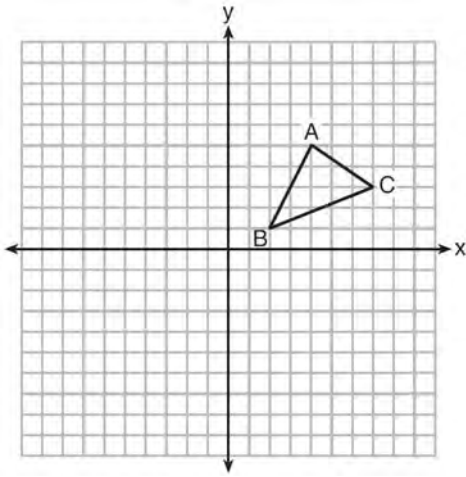
- 1) 8
 - 2) 12
 - 3) 16
 - 4) 72
- 103 In the diagram below, $\triangle ABC \sim \triangle DEF$.



If $AB = 6$ and $AC = 8$, which statement will justify similarity by SAS?

- 1) $DE = 9$, $DF = 12$, and $\angle A \cong \angle D$
 - 2) $DE = 8$, $DF = 10$, and $\angle A \cong \angle D$
 - 3) $DE = 36$, $DF = 64$, and $\angle C \cong \angle F$
 - 4) $DE = 15$, $DF = 20$, and $\angle C \cong \angle F$
- 104 In parallelogram $ABCD$, diagonals \overline{AC} and \overline{BD} intersect at E . Which statement does *not* prove parallelogram $ABCD$ is a rhombus?
- 1) $\overline{AC} \cong \overline{DB}$
 - 2) $\overline{AB} \cong \overline{BC}$
 - 3) $\overline{AC} \perp \overline{DB}$
 - 4) \overline{AC} bisects $\angle DCB$

- 105 In the diagram below, $\triangle ABC$ has vertices $A(4,5)$, $B(2,1)$, and $C(7,3)$.

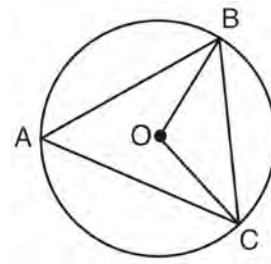


What is the slope of the altitude drawn from A to \overline{BC} ?

- 1) $\frac{2}{5}$
 - 2) $\frac{3}{2}$
 - 3) $-\frac{1}{2}$
 - 4) $-\frac{5}{2}$
- 106 What is the area of a sector of a circle with a radius of 8 inches and formed by a central angle that measures 60° ?

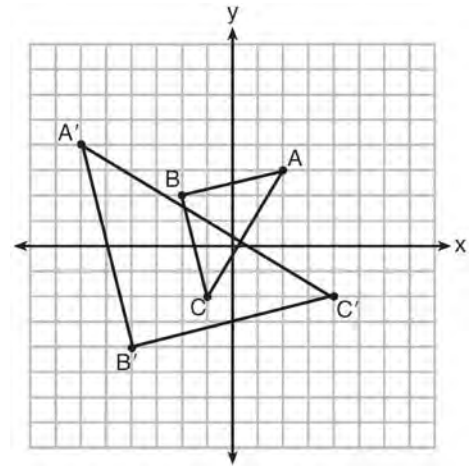
- 1) $\frac{8\pi}{3}$
- 2) $\frac{16\pi}{3}$
- 3) $\frac{32\pi}{3}$
- 4) $\frac{64\pi}{3}$

- 107 In the diagram below of circle O , \overline{OB} and \overline{OC} are radii, and chords \overline{AB} , \overline{BC} , and \overline{AC} are drawn.



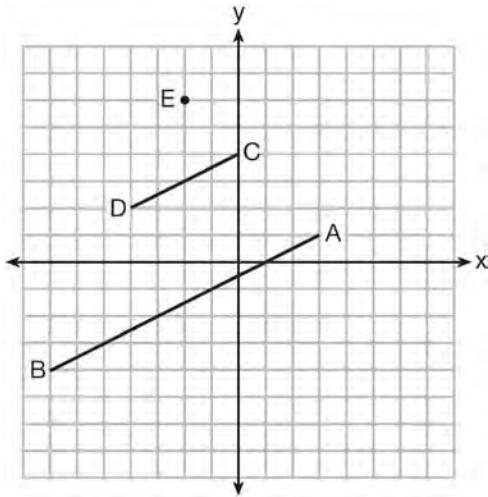
Which statement must always be true?

- 1) $\angle BAC \cong \angle BOC$
 - 2) $m\angle BAC = \frac{1}{2} m\angle BOC$
 - 3) $\triangle BAC$ and $\triangle BOC$ are isosceles.
 - 4) The area of $\triangle BAC$ is twice the area of $\triangle BOC$.
- 108 Which sequence of transformations will map $\triangle ABC$ onto $\triangle A'B'C'$?



- 1) reflection and translation
- 2) rotation and reflection
- 3) translation and dilation
- 4) dilation and rotation

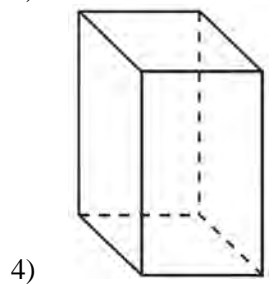
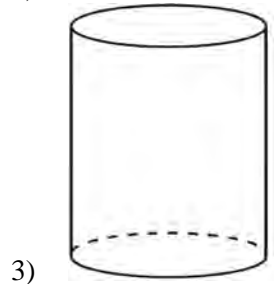
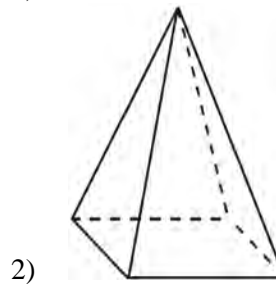
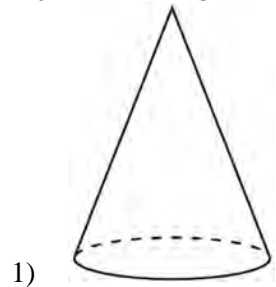
- 109 In the diagram below, \overline{CD} is the image of \overline{AB} after a dilation of scale factor k with center E .



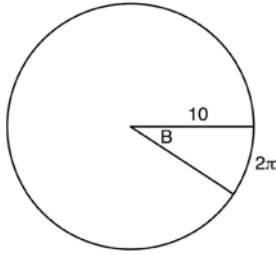
Which ratio is equal to the scale factor k of the dilation?

- 1) $\frac{EC}{EA}$
 - 2) $\frac{BA}{EA}$
 - 3) $\frac{EA}{BA}$
 - 4) $\frac{EA}{EC}$
- 110 A company is creating an object from a wooden cube with an edge length of 8.5 cm. A right circular cone with a diameter of 8 cm and an altitude of 8 cm will be cut out of the cube. Which expression represents the volume of the remaining wood?
- 1) $(8.5)^3 - \pi(8)^2(8)$
 - 2) $(8.5)^3 - \pi(4)^2(8)$
 - 3) $(8.5)^3 - \frac{1}{3}\pi(8)^2(8)$
 - 4) $(8.5)^3 - \frac{1}{3}\pi(4)^2(8)$

- 111 A student has a rectangular postcard that he folds in half lengthwise. Next, he rotates it continuously about the folded edge. Which three-dimensional object below is generated by this rotation?

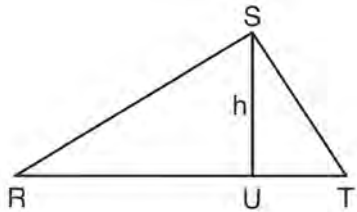


- 112 In the diagram below, the circle shown has radius 10. Angle B intercepts an arc with a length of 2π .



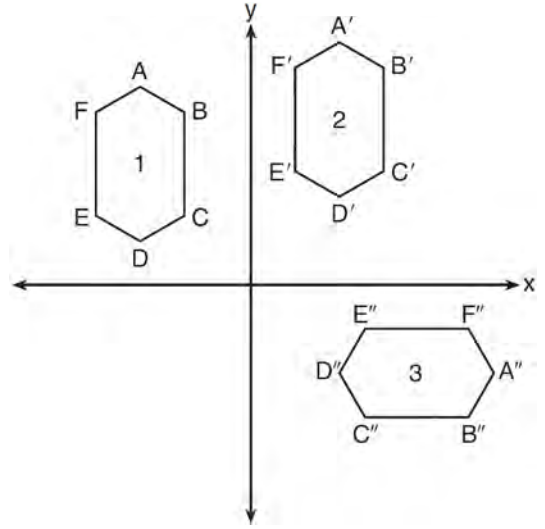
What is the measure of angle B , in radians?

- 1) $10 + 2\pi$
 - 2) 20π
 - 3) $\frac{\pi}{5}$
 - 4) $\frac{5}{\pi}$
- 113 In $\triangle RST$ shown below, altitude \overline{SU} is drawn to \overline{RT} at U .



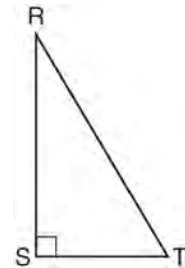
If $SU = h$, $UT = 12$, and $RT = 42$, which value of h will make $\triangle RST$ a right triangle with $\angle RST$ as a right angle?

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



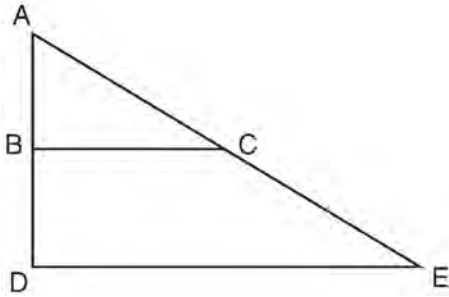
Which sequence of transformations maps figure 1 onto figure 2 and then figure 2 onto figure 3?

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



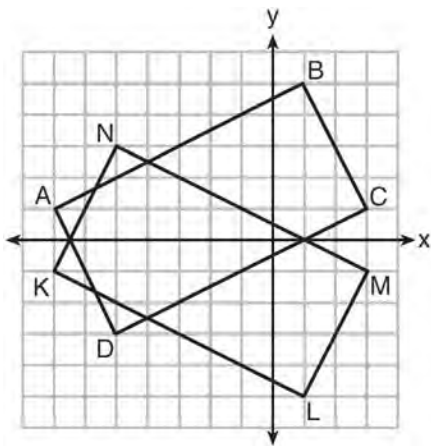
- 1) $6\sqrt{3}$
 - 2) $6\sqrt{10}$
 - 3) $6\sqrt{14}$
 - 4) $6\sqrt{35}$
- 1) a pyramid with a square base
 - 2) an isosceles triangle
 - 3) a right triangle
 - 4) a cone

- 116 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.



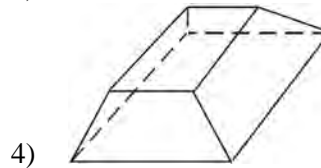
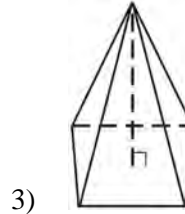
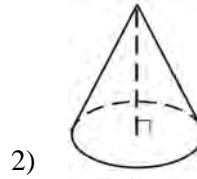
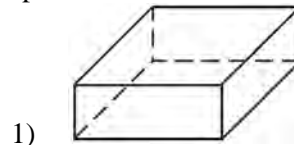
Which statement is always true?

- 1) $\frac{2AB}{AD} = \frac{AD}{DE}$
 - 2) $AD \perp DE$
 - 3) $AC = CE$
 - 4) $BC \parallel DE$
- 117 On the set of axes below, rectangle $ABCD$ can be proven congruent to rectangle $KLMN$ using which transformation?

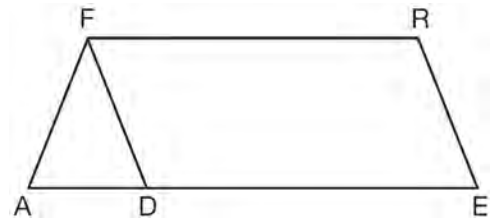


- 1) rotation
- 2) translation
- 3) reflection over the x -axis
- 4) reflection over the y -axis

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



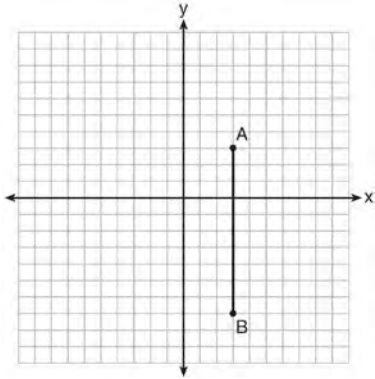
- 119 In the diagram of parallelogram $FRED$ shown below, \overline{ED} is extended to A , and \overline{AF} is drawn such that $AF \cong DF$.



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

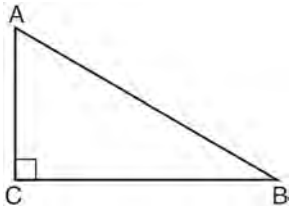
- 1) 124°
- 2) 112°
- 3) 68°
- 4) 56°

- 120 The graph below shows \overline{AB} , which is a chord of circle O . The coordinates of the endpoints of \overline{AB} are $A(3,3)$ and $B(3,-7)$. The distance from the midpoint of \overline{AB} to the center of circle O is 2 units.



What could be a correct equation for circle O ?

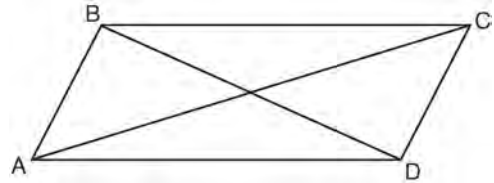
- 1) $(x - 1)^2 + (y + 2)^2 = 29$
 - 2) $(x + 5)^2 + (y - 2)^2 = 29$
 - 3) $(x - 1)^2 + (y - 2)^2 = 25$
 - 4) $(x - 5)^2 + (y + 2)^2 = 25$
- 121 In scalene triangle ABC shown in the diagram below, $m\angle C = 90^\circ$.



Which equation is always true?

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

- 122 Quadrilateral $ABCD$ with diagonals \overline{AC} and \overline{BD} is shown in the diagram below.



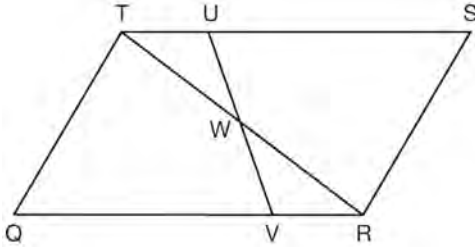
Which information is *not* enough to prove $ABCD$ is a parallelogram?

- 1) $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{DC}$
 - 2) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$
 - 3) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$
 - 4) $\overline{AB} \parallel \overline{DC}$ and $\overline{BC} \parallel \overline{AD}$
- 123 The diagonals of rhombus $TEAM$ intersect at $P(2,1)$. If the equation of the line that contains diagonal \overline{TA} is $y = -x + 3$, what is the equation of a line that contains diagonal \overline{EM} ?
- 1) $y = x - 1$
 - 2) $y = x - 3$
 - 3) $y = -x - 1$
 - 4) $y = -x - 3$

- 124 Molly wishes to make a lawn ornament in the form of a solid sphere. The clay being used to make the sphere weighs .075 pound per cubic inch. If the sphere's radius is 4 inches, what is the weight of the sphere, to the *nearest pound*?

- 1) 34
- 2) 20
- 3) 15
- 4) 4

- 125 In parallelogram $QRST$ shown below, diagonal \overline{TR} is drawn, U and V are points on \overline{TS} and \overline{QR} , respectively, and \overline{UV} intersects \overline{TR} at W .

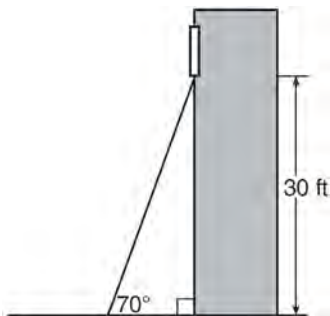


- If $m\angle S = 60^\circ$, $m\angle SRT = 83^\circ$, and $m\angle TWU = 35^\circ$, what is $m\angle WVQ$?
- 1) 37°
 - 2) 60°
 - 3) 72°
 - 4) 83°
- 126 If $\triangle ABC$ is dilated by a scale factor of 3, which statement is true of the image $\triangle A'B'C'$?
- 1) $3A'B' = AB$
 - 2) $B'C' = 3BC$
 - 3) $m\angle A' = 3(m\angle A)$
 - 4) $3(m\angle C') = m\angle C$

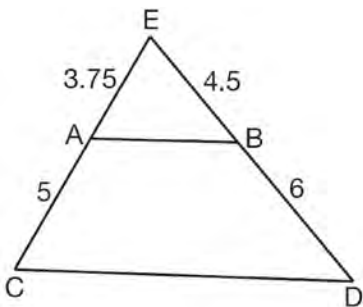
- 127 What are the coordinates of the center and length of the radius of the circle whose equation is $x^2 + 6x + y^2 - 4y = 23$?
- 1) $(3, -2)$ and 36
 - 2) $(3, -2)$ and 6
 - 3) $(-3, 2)$ and 36
 - 4) $(-3, 2)$ and 6

Geometry Common Core State Standards 2 Point Regents Exam Questions

- 128 A carpenter leans an extension ladder against a house to reach the bottom of a window 30 feet above the ground. As shown in the diagram below, the ladder makes a 70° angle with the ground. To the *nearest foot*, determine and state the length of the ladder.



- 129 In $\triangle CED$ as shown below, points A and B are located on sides \overline{CE} and \overline{ED} , respectively. Line segment \overline{AB} is drawn such that $AE = 3.75$, $AC = 5$, $EB = 4.5$, and $BD = 6$.

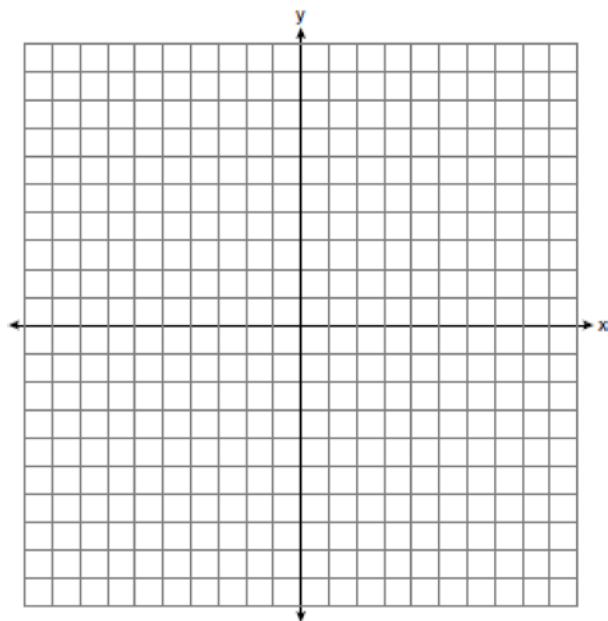


Explain why \overline{AB} is parallel to \overline{CD} .

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

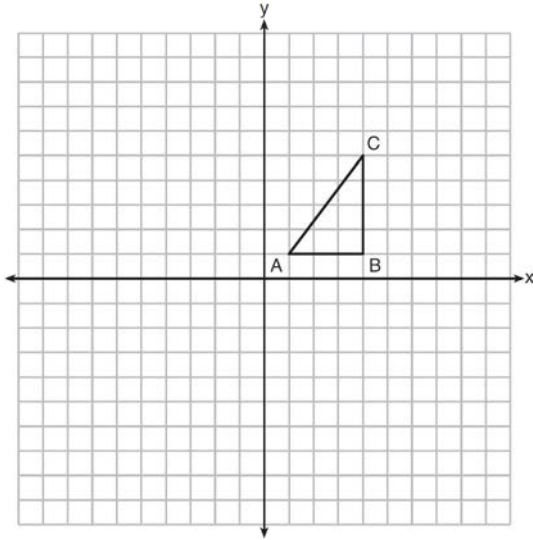
- 131 A contractor needs to purchase 500 bricks. The dimensions of each brick are 5.1 cm by 10.2 cm by 20.3 cm, and the density of each brick is 1920 kg/m^3 . The maximum capacity of the contractor's trailer is 900 kg. Can the trailer hold the weight of 500 bricks? Justify your answer.

- 132 Directed line segment \overline{PT} has endpoints whose coordinates are $P(-2, 1)$ and $T(4, 7)$. Determine the coordinates of point J that divides the segment in the ratio 2 to 1. [The use of the set of axes below is optional.]

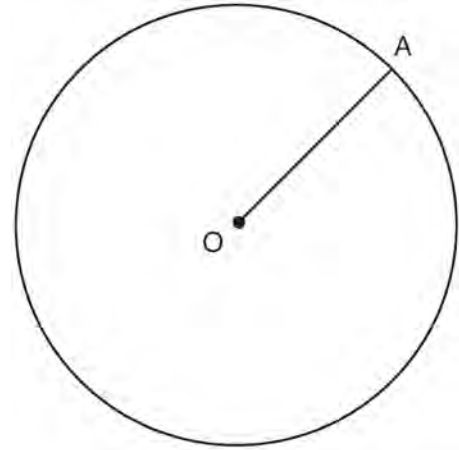


- 133 A circle has a center at $(1, -2)$ and radius of 4. Does the point $(3.4, 1.2)$ lie on the circle? Justify your answer.

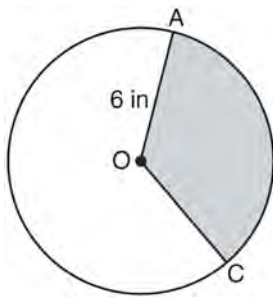
- 134 In the diagram below, $\triangle ABC$ has coordinates $A(1, 1)$, $B(4, 1)$, and $C(4, 5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.



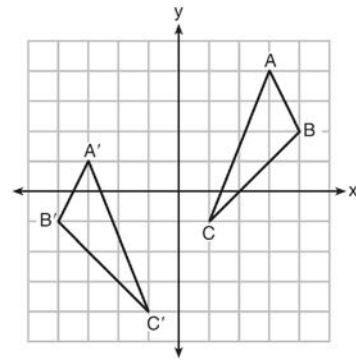
- 136 In the diagram below, radius \overline{OA} is drawn in circle O . Using a compass and a straightedge, construct a line tangent to circle O at point A . [Leave all construction marks.]



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

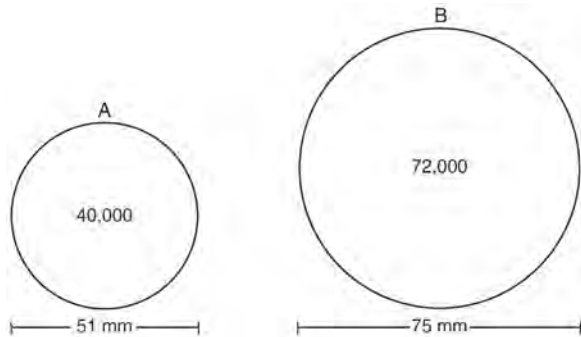


- 137 As graphed on the set of axes below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a sequence of transformations.



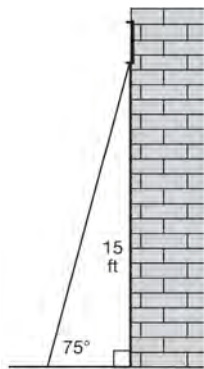
Is $\triangle A'B'C'$ congruent to $\triangle ABC$? Use the properties of rigid motion to explain your answer.

- 138 During an experiment, the same type of bacteria is grown in two petri dishes. Petri dish A has a diameter of 51 mm and has approximately 40,000 bacteria after 1 hour. Petri dish B has a diameter of 75 mm and has approximately 72,000 bacteria after 1 hour.

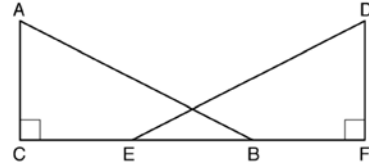


Determine and state which petri dish has the greater population density of bacteria at the end of the first hour.

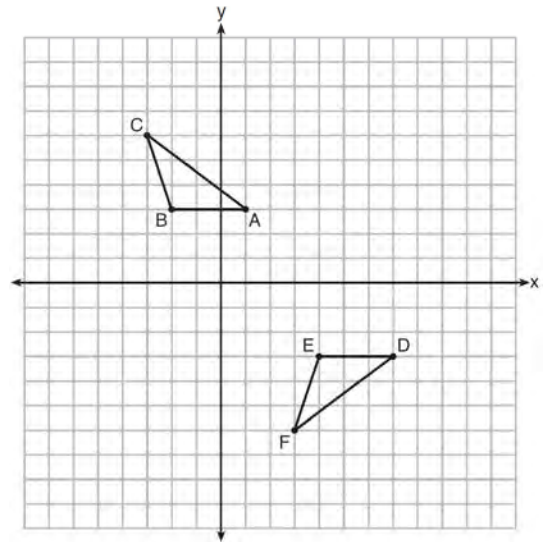
- 139 In the diagram below, a window of a house is 15 feet above the ground. A ladder is placed against the house with its base at an angle of 75° with the ground. Determine and state the length of the ladder to the nearest tenth of a foot.



- 140 '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 $\triangle ABC \cong \triangle DEF$.

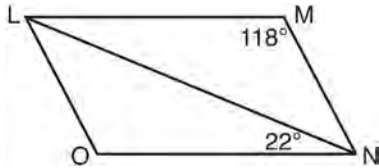


- 141 Describe a sequence of transformations that will map $\triangle ABC$ onto $\triangle DEF$ as shown below.



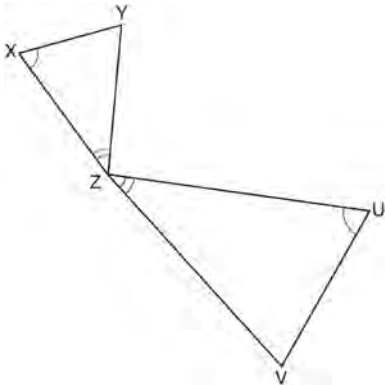
- 142 In right triangle ABC with the right angle at C , $\sin A = 2x + 0.1$ and $\cos B = 4x - 0.7$. Determine and state the value of x . Explain your answer.

- 143 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.

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



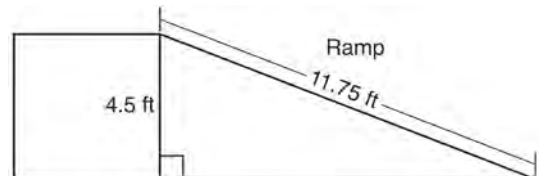
Describe a sequence of similarity transformations that shows $\triangle XYZ$ is similar to $\triangle UVZ$.

- 145 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.

- 146 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 |

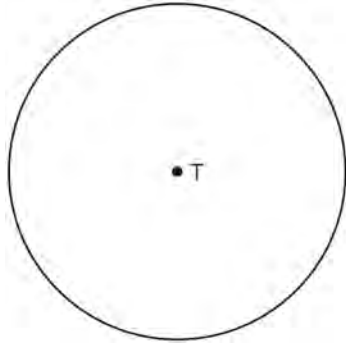
- 147 The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.



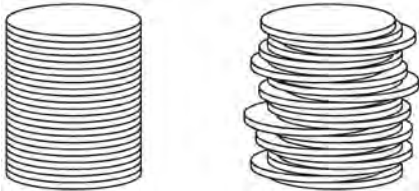
Determine and state, to the nearest degree, the angle of elevation formed by the ramp and the ground.

- 148 Point P is on segment AB such that $AP:PB$ is 4:5. If A has coordinates $(4,2)$, and B has coordinates $(22,2)$, determine and state the coordinates of P .

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



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

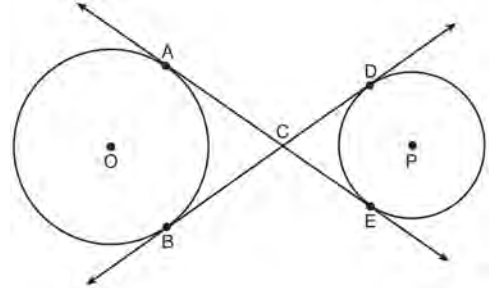


Use Cavalieri's principle to explain why the volumes of these two stacks of quarters are equal.

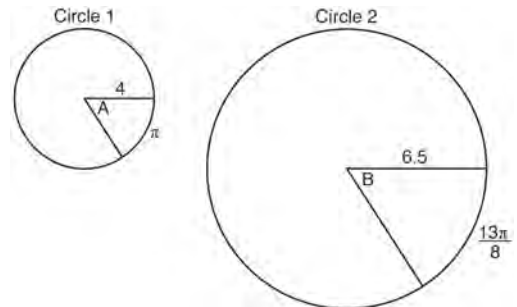
- 151 Line ℓ is mapped onto line m by a dilation centered at the origin with a scale factor of 2. The equation of line ℓ is $3x - y = 4$. Determine and state an equation for line m .

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

- 153 Lines AE and BD are tangent to circles O and P at $A, E, B,$ and D , as shown in the diagram below. If $AC:CE = 5:3$, and $BD = 56$, determine and state the length of \overline{CD} .

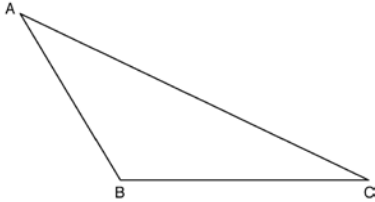


- 154 In the diagram below, Circle 1 has radius 4, while Circle 2 has radius 6.5. Angle A intercepts an arc of length π , and angle B intercepts an arc of length $\frac{13\pi}{8}$.



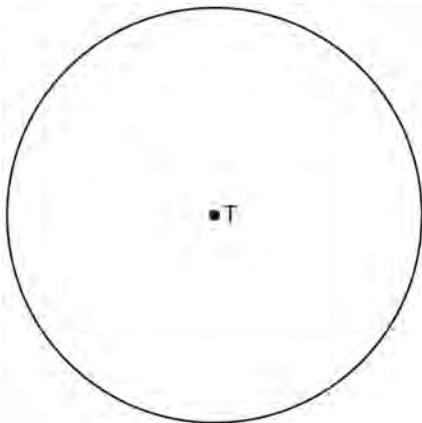
Dominic thinks that angles A and B have the same radian measure. State whether Dominic is correct or not. Explain why.

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



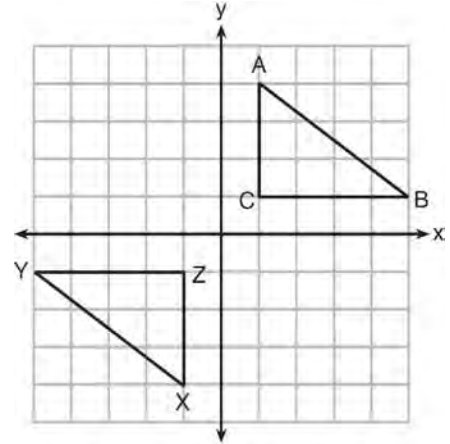
- 156 A ladder leans against a building. The top of the ladder touches the building 10 feet above the ground. The foot of the ladder is 4 feet from the building. Find, to the *nearest degree*, the angle that the ladder makes with the level ground.

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



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

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

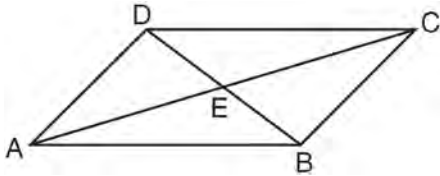


Use the properties of rigid motions to explain why $\triangle ABC \cong \triangle XYZ$.

- 160 A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.

- 161 Find the value of R that will make the equation $\sin 73^\circ = \cos R$ true when $0^\circ < R < 90^\circ$. Explain your answer.

- 162 In parallelogram $ABCD$ shown below, diagonals \overline{AC} and \overline{BD} intersect at E .

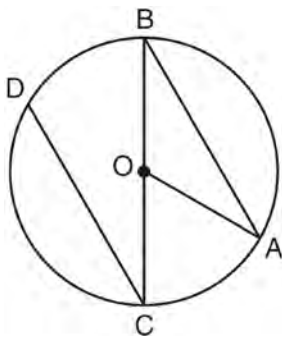


Prove: $\angle ACD \cong \angle CAB$

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

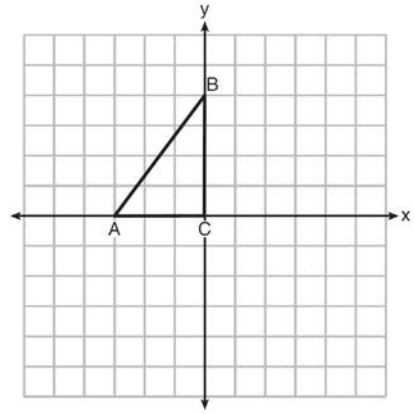


- 164 In the diagram below of circle O with diameter \overline{BC} and radius \overline{OA} , chord \overline{DC} is parallel to chord \overline{BA} .

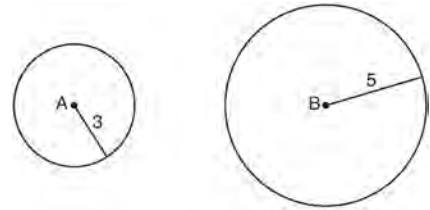


If $m\angle BCD = 30^\circ$, determine and state $m\angle AOB$.

- 165 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 $x = 1$.

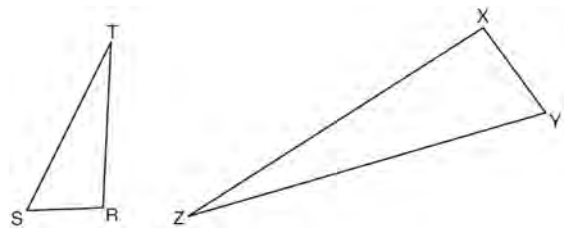


- 166 As shown in the diagram below, circle A has a radius of 3 and circle B has a radius of 5.

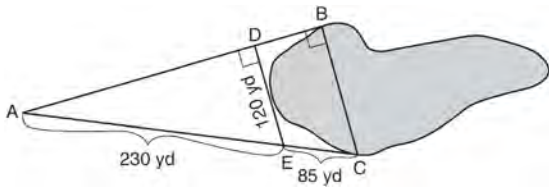


Use transformations to explain why circles A and B are similar.

- 167 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.

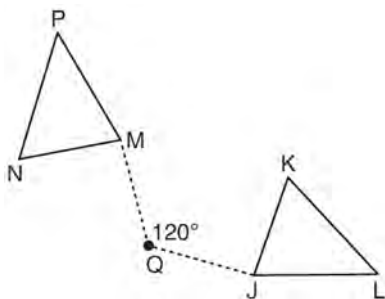


- 168 To find the distance across a pond from point B to point C , a surveyor drew the diagram below. The measurements he made are indicated on his diagram.

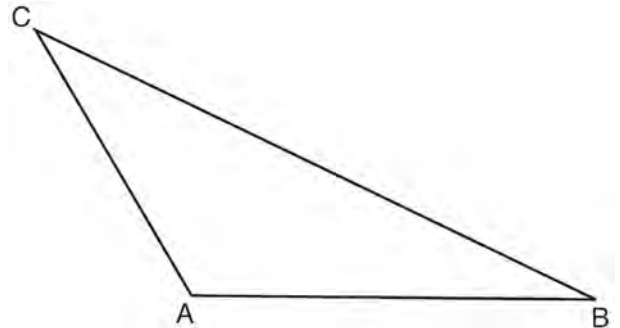


Use the surveyor's information to determine and state the distance from point B to point C , to the nearest yard.

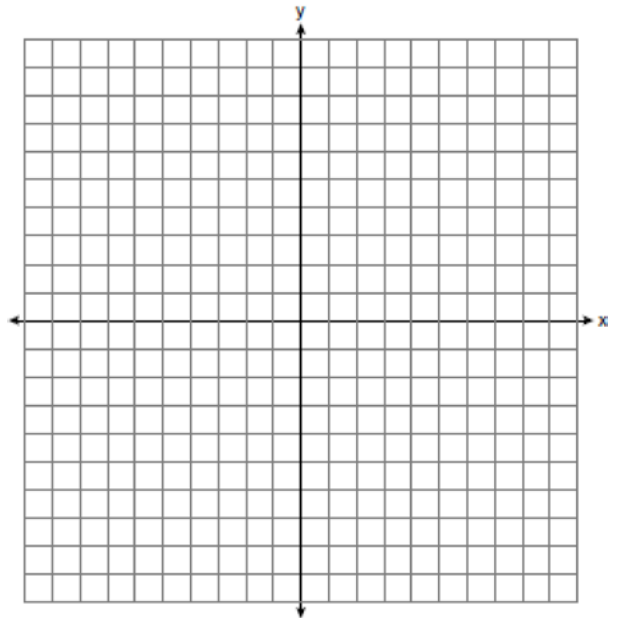
- 169 Triangle MNP is the image of triangle JKL after a 120° counterclockwise rotation about point Q . If the measure of angle L is 47° and the measure of angle N is 57° , determine the measure of angle M . Explain how you arrived at your answer.



- 170 In the diagram of $\triangle ABC$ shown below, use a compass and straightedge to construct the median to \overline{AB} . [Leave all construction marks.]

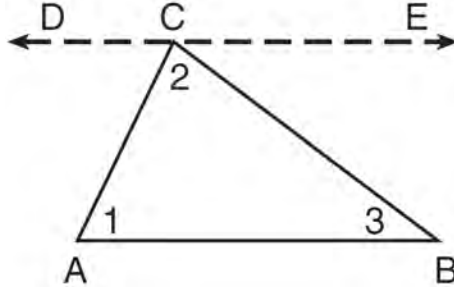


- 171 The coordinates of the endpoints of \overline{AB} are $A(-6,-5)$ and $B(4,0)$. Point P is on \overline{AB} . Determine and state the coordinates of point P , such that $AP:PB$ is $2:3$. [The use of the set of axes below is optional.]



Geometry Common Core State Standards 4 Point Regents Exam Questions

172 Given the theorem, “The sum of the measures of the interior angles of a triangle is 180° ,” complete the proof for this theorem.



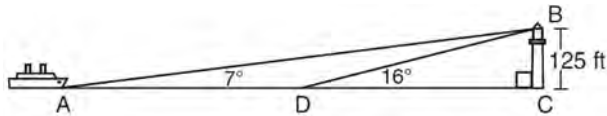
Given: $\triangle ABC$

Prove: $m\angle 1 + m\angle 2 + m\angle 3 = 180^\circ$

Fill in the missing reasons below.

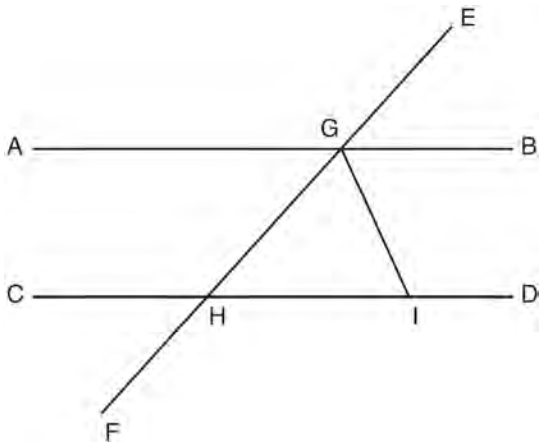
| Statements | Reasons |
|---|-----------------------------|
| (1) $\triangle ABC$ | (1) Given |
| (2) Through point C , draw \overline{DCE} parallel to \overline{AB} . | (2) _____ _____ _____ |
| (3) $m\angle 1 = m\angle ACD$, $m\angle 3 = m\angle BCE$ | (3) _____ _____ _____ |
| (4) $m\angle ACD + m\angle 2 + m\angle BCE = 180^\circ$ | (4) _____ _____ _____ |
| (5) $m\angle 1 + m\angle 2 + m\angle 3 = 180^\circ$ | (5) _____ _____ _____ |

- 173 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° .



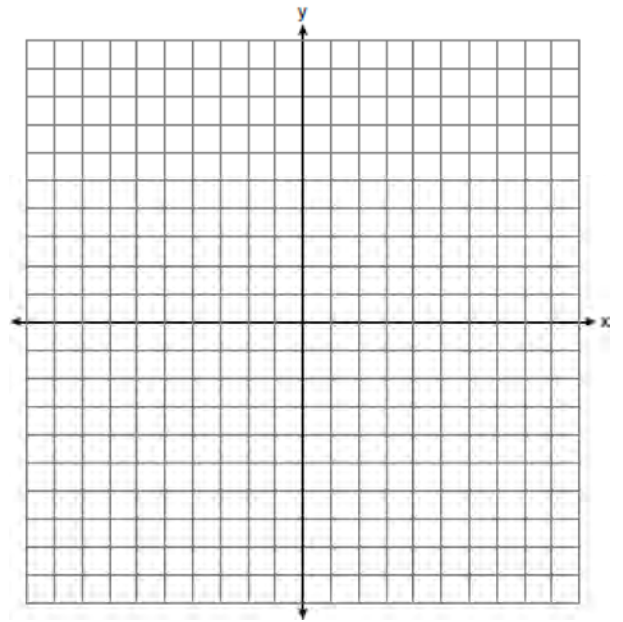
To the *nearest foot*, determine and state how far the ship traveled from point A to point D .

- 174 In the diagram below, \overline{EF} intersects \overline{AB} and \overline{CD} at G and H , respectively, and \overline{GI} is drawn such that $\overline{GH} \cong \overline{IH}$.

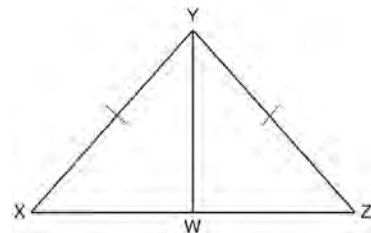


If $m\angle EGB = 50^\circ$ and $m\angle DIG = 115^\circ$, explain why $\overline{AB} \parallel \overline{CD}$.

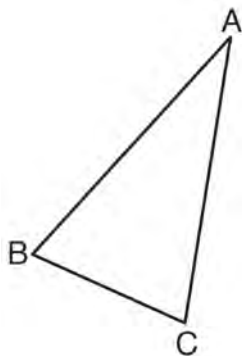
- 175 In rhombus $MATH$, the coordinates of the endpoints of the diagonal \overline{MT} are $M(0, -1)$ and $T(4, 6)$. Write an equation of the line that contains diagonal \overline{AH} . [Use of the set of axes below is optional.] Using the given information, explain how you know that your line contains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



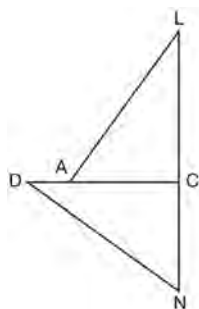
- 176 Given: $\triangle XYZ$, $\overline{XY} \cong \overline{ZY}$, and \overline{YW} bisects $\angle XYZ$. Prove that $\angle YWZ$ is a right angle.



- 177 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B . [Leave all construction marks.] Describe the relationship between the lengths of \overline{AC} and $\overline{A'C'}$.

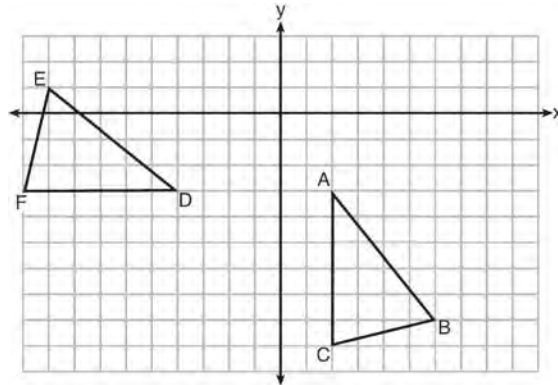


- 178 In the diagram of $\triangle LAC$ and $\triangle DNC$ below, $\overline{LA} \cong \overline{DN}$, $\overline{CA} \cong \overline{CN}$, and $\overline{DAC} \perp \overline{LCN}$.



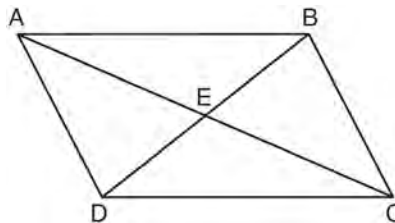
- Prove that $\triangle LAC \cong \triangle DNC$.
- Describe a sequence of rigid motions that will map $\triangle LAC$ onto $\triangle DNC$.

- 179 The grid below shows $\triangle ABC$ and $\triangle DEF$.



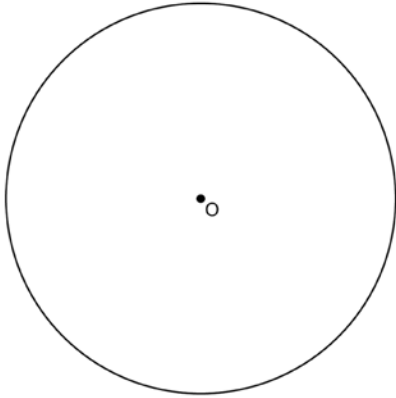
Let $\triangle A'B'C'$ be the image of $\triangle ABC$ after a rotation about point A . Determine and state the location of B' if the location of point C' is $(8, -3)$. Explain your answer. Is $\triangle DEF$ congruent to $\triangle A'B'C'$? Explain your answer.

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



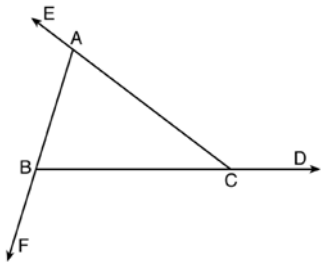
Prove: $\triangle AED \cong \triangle CEB$
Describe a single rigid motion that maps $\triangle AED$ onto $\triangle CEB$.

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



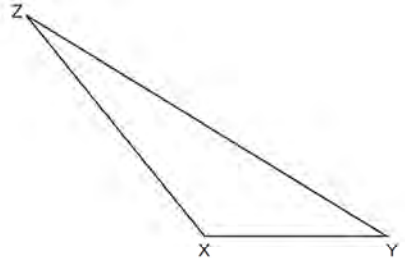
Determine the measure of the arc intercepted by two adjacent sides of the constructed square.
Explain your reasoning.

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

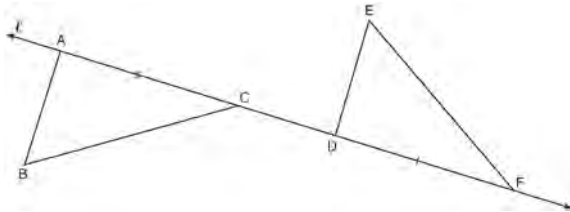


- 183 The aspect ratio (the ratio of screen width to height) of a rectangular flat-screen television is 16:9. The length of the diagonal of the screen is the television's screen size. Determine and state, to the *nearest inch*, the screen size (diagonal) of this flat-screen television with a screen height of 20.6 inches.

- 184 Triangle XYZ is shown below. Using a compass and straightedge, on the line below, construct and label $\triangle ABC$, such that $\triangle ABC \cong \triangle XYZ$. [Leave all construction marks.] Based on your construction, state the theorem that justifies why $\triangle ABC$ is congruent to $\triangle XYZ$.

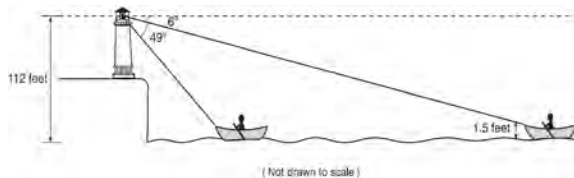


- 185 In the diagram below, $\overline{AC} \cong \overline{DF}$ and points A , C , D , and F are collinear on line ℓ .



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.

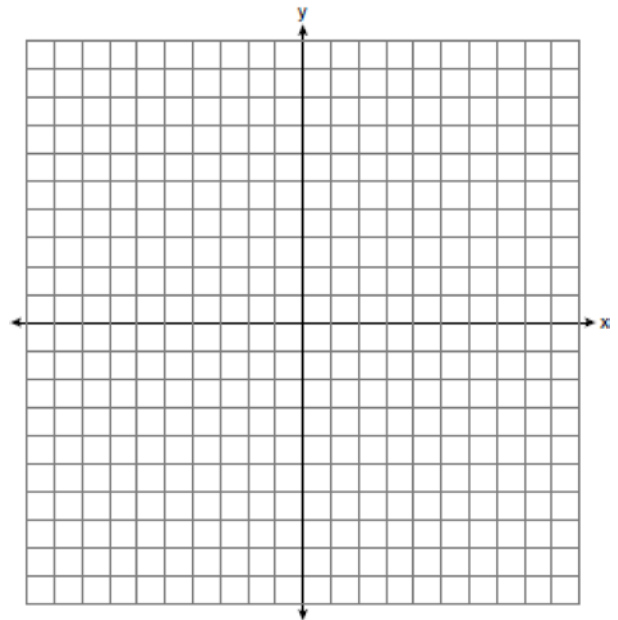
- 186 As shown below, a canoe is approaching a lighthouse on the coastline of a lake. The front of the canoe is 1.5 feet above the water and an observer in the lighthouse is 112 feet above the water.



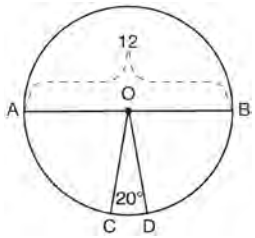
At 5:00, the observer in the lighthouse measured the angle of depression to the front of the canoe to be 6° . Five minutes later, the observer measured and saw the angle of depression to the front of the canoe had increased by 49° . Determine and state, to the nearest foot per minute, the average speed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

- 187 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.

- 188 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.]

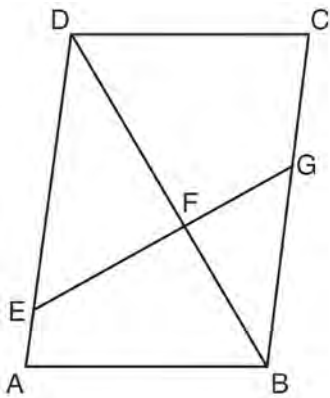


- 189 In the diagram below of circle O , diameter \overline{AB} and radii \overline{OC} and \overline{OD} are drawn. The length of \overline{AB} is 12 and the measure of $\angle COD$ is 20 degrees.



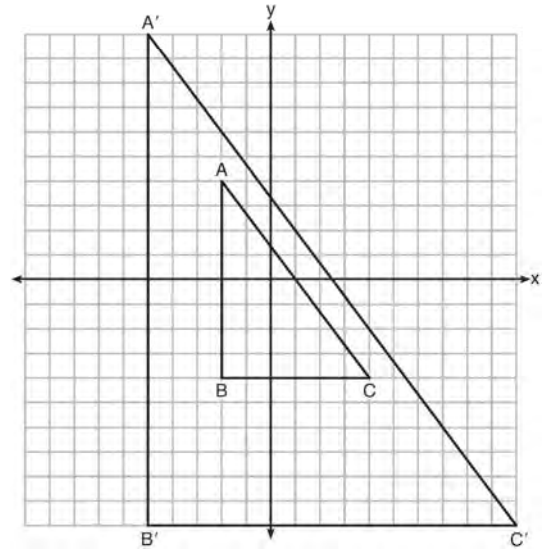
If $\widehat{AC} \cong \widehat{BD}$, find the area of sector BOD in terms of π .

- 190 Given: Parallelogram $ABCD$, \overline{EFG} , and diagonal \overline{DFB}



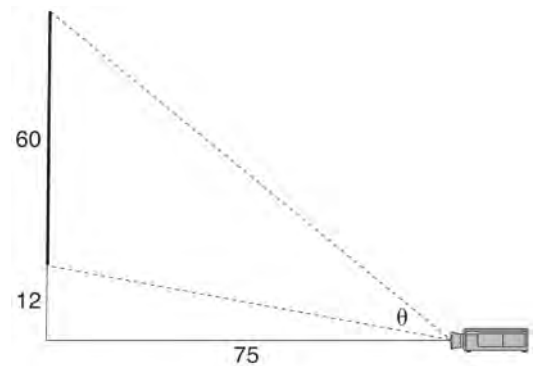
Prove: $\triangle DEF \sim \triangle BGF$

- 191 In the diagram below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a transformation.



Describe the transformation that was performed. Explain why $\triangle A'B'C' \sim \triangle ABC$.

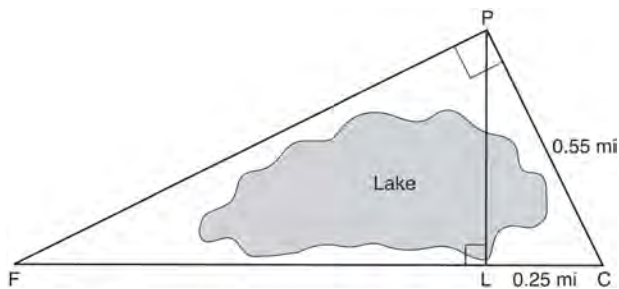
- 192 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.



Determine and state, to the nearest tenth of a degree, the measure of θ , the projection angle.

193 A barrel of fuel oil is a right circular cylinder where the inside measurements of the barrel are a diameter of 22.5 inches and a height of 33.5 inches. There are 231 cubic inches in a liquid gallon. Determine and state, to the *nearest tenth*, the gallons of fuel that are in a barrel of fuel oil.

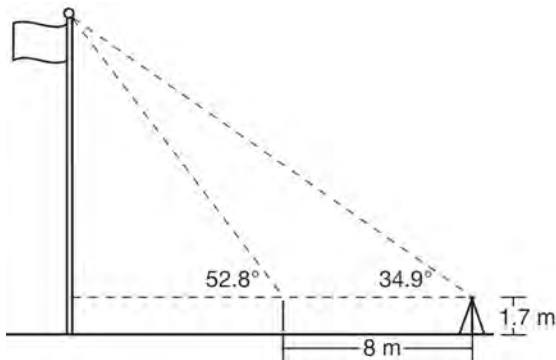
194 In the diagram below, the line of sight from the park ranger station, P , to the lifeguard chair, L , on the beach of a lake is perpendicular to the path joining the campground, C , and the first aid station, F . The campground is 0.25 mile from the lifeguard chair. The straight paths from both the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

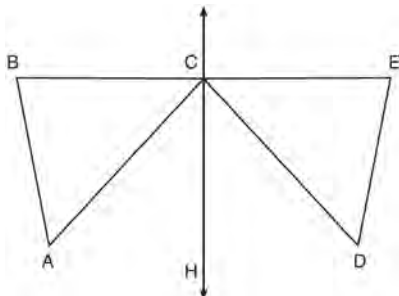
Geometry 6 Point Regents Exam Questions

- 195 Cathy wants to determine the height of the flagpole shown in the diagram below. She uses a survey instrument to measure the angle of elevation to the top of the flagpole, and determines it to be 34.9° . She walks 8 meters closer and determines the new measure of the angle of elevation to be 52.8° . At each measurement, the survey instrument is 1.7 meters above the ground.

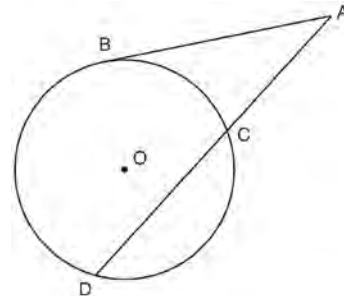


Determine and state, to the *nearest tenth of a meter*, the height of the flagpole.

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

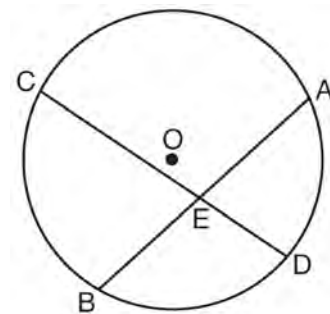


- 197 In the diagram below, secant \overline{ACD} and tangent \overline{AB} are drawn from external point A to circle O .



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. ($AC \cdot AD = AB^2$)

- 198 Given: Circle O , chords \overline{AB} and \overline{CD} intersect at E

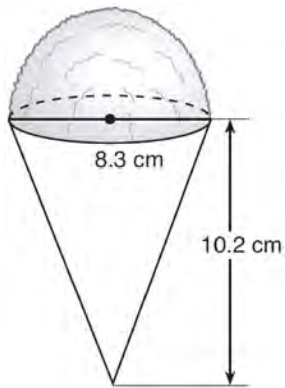


Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord. Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

Geometry 6 Point Regents Exam Questions

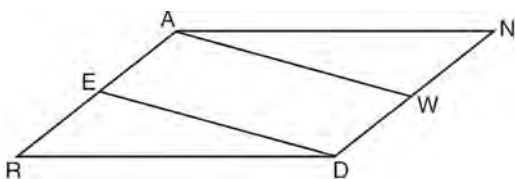
www.jmap.org

- 199 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.



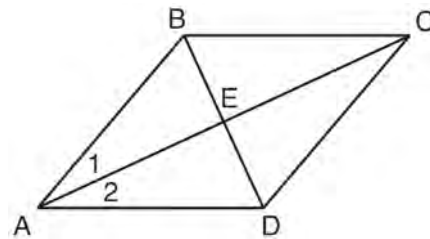
The desired density of the shaved ice is 0.697 g/cm^3 , and the cost, per kilogram, of ice is \$3.83. Determine and state the cost of the ice needed to make 50 snow cones.

- 200 Given: Parallelogram $ANDR$ with \overline{AW} and \overline{DE} bisecting \overline{ND} and \overline{RA} at points W and E , respectively



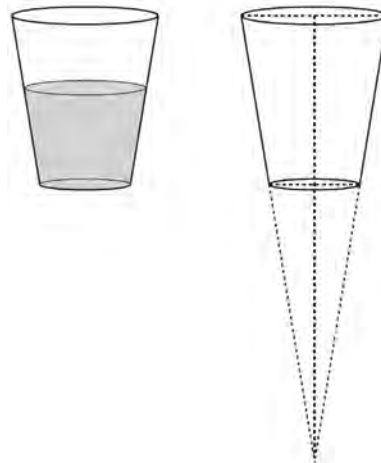
Prove that $\triangle ANW \cong \triangle DRE$. Prove that quadrilateral $AWDE$ is a parallelogram.

- 201 Given: Quadrilateral $ABCD$ with diagonals \overline{AC} and \overline{BD} that bisect each other, and $\angle 1 \cong \angle 2$



Prove: $\triangle ACD$ is an isosceles triangle and $\triangle AEB$ is a right triangle

- 202 A water glass can be modeled by a truncated right cone (a cone which is cut parallel to its base) as shown below.

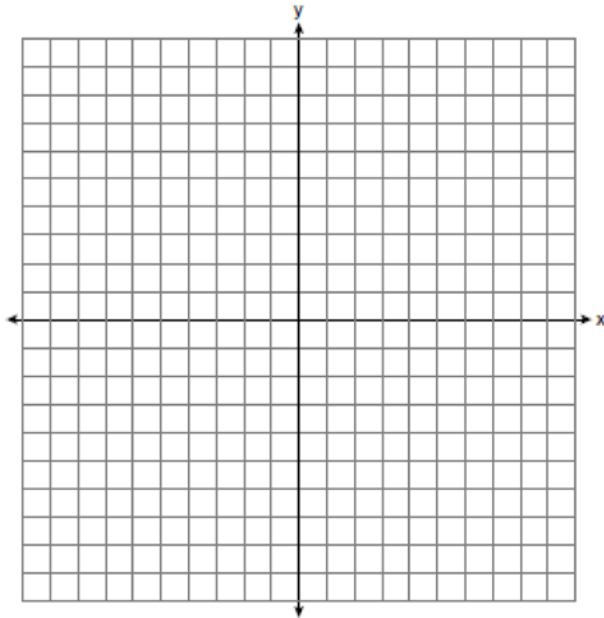


The diameter of the top of the glass is 3 inches, the diameter at the bottom of the glass is 2 inches, and the height of the glass is 5 inches. The base with a diameter of 2 inches must be parallel to the base with a diameter of 3 inches in order to find the height of the cone. Explain why. Determine and state, in inches, the height of the larger cone. Determine and state, to the nearest tenth of a cubic inch, the volume of the water glass.

Geometry 6 Point Regents Exam Questions

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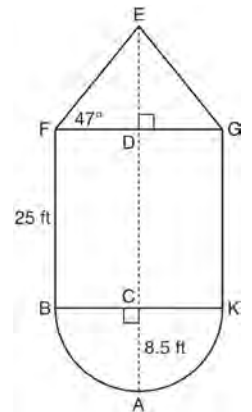
- 203 In the coordinate plane, the vertices of $\triangle RST$ are $R(6, -1)$, $S(1, -4)$, and $T(-5, 6)$. Prove that $\triangle RST$ is a right triangle. State the coordinates of point P such that quadrilateral $RSTP$ is a rectangle. Prove that your quadrilateral $RSTP$ is a rectangle. [The use of the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



- 205 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.

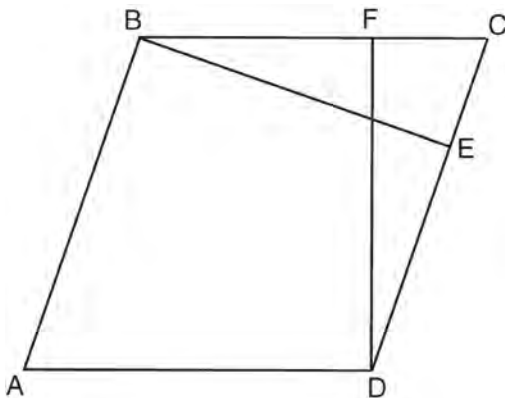


Source: <http://en.wikipedia.org>



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.

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

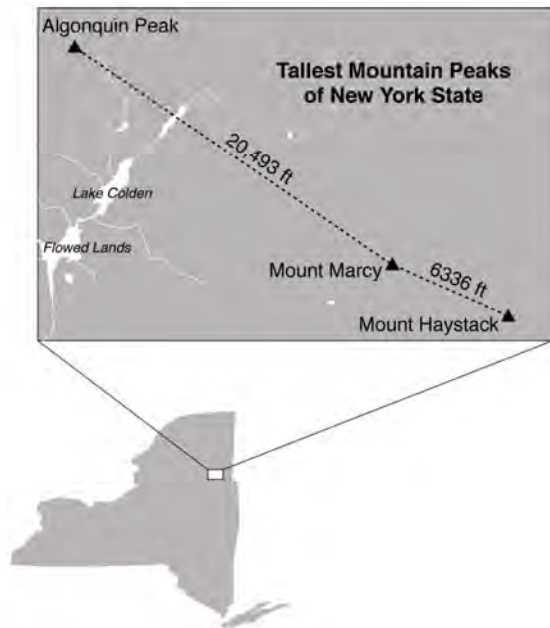


Prove $ABCD$ is a rhombus.

Geometry 6 Point Regents Exam Questions

www.jmap.org

- 206 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.

- 207 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 Common Core State Standards Multiple Choice Regents Exam Questions Answer Section

1 ANS: 2

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

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

PTS: 2

REF: 061519geo TOP: Surface and Lateral Area

2 ANS: 4

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

PTS: 2

REF: 081517geo TOP: Side Splitter Theorem

3 ANS: 3

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

PTS: 2

REF: 061503geo TOP: Circles in the Coordinate Plane

4 ANS: 2

$$x^2 = 4 \cdot 10$$

$$x = \sqrt{40}$$

$$x = 2\sqrt{10}$$

PTS: 2

REF: 081610geo TOP: Similarity KEY: leg

5 ANS: 2

$$\sqrt{3 \cdot 21} = \sqrt{63} = 3\sqrt{7}$$

PTS: 2

REF: 011622geo TOP: Similarity KEY: altitude

6 ANS: 3

PTS: 2

REF: 081502geo

TOP: Identifying Transformations

KEY: basic

7 ANS: 4

PTS: 2

REF: 061513geo

TOP: Parallelograms

8 ANS: 3

$$\cos A = \frac{9}{14}$$

$$A \approx 50^\circ$$

PTS: 2

REF: 011616geo

TOP: Using Trigonometry to Find an Angle

9 ANS: 2

PTS: 2

REF: 081519geo

TOP: Similarity

KEY: basic

10 ANS: 1

PTS: 2

REF: 081606geo

TOP: Cofunctions

11 ANS: 4

$$\sqrt{(32-8)^2 + (28-(-4))^2} = \sqrt{576 + 1024} = \sqrt{1600} = 40$$

PTS: 2 REF: 081621geo TOP: Line Dilations

12 ANS: 3

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

PTS: 2 REF: 081518geo TOP: Sectors

13 ANS: 2

$$14 \times 16 \times 10 = 2240 \quad \frac{2240 - 1680}{2240} = 0.25$$

PTS: 2 REF: 011604geo TOP: Volume

14 ANS: 3

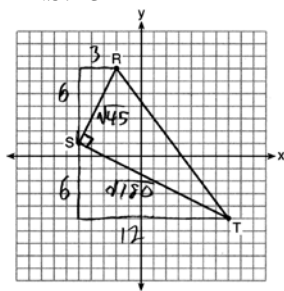
$$\frac{9}{5} = \frac{9.2}{x} \quad 5.1 + 9.2 = 14.3$$

$$9x = 46$$

$$x \approx 5.1$$

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

15 ANS: 3



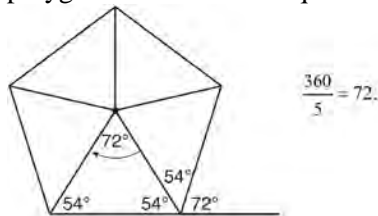
$$\sqrt{45} = 3\sqrt{5} \quad a = \frac{1}{2} (3\sqrt{5})(6\sqrt{5}) = \frac{1}{2} (18)(5) = 45$$

$$\sqrt{180} = 6\sqrt{5}$$

PTS: 2 REF: 061622geo TOP: Polygons in the Coordinate Plane

16 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

17 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

18 ANS: 2

$$\sqrt{(-1-2)^2 + (4-3)^2} = \sqrt{10}$$

PTS: 2 REF: 011615geo TOP: Polygons in the Coordinate Plane

19 ANS: 3

$$\frac{x}{360} \cdot 3^2 \pi = 2\pi \quad 180 - 80 = 100$$

$$x = 80 \quad \frac{180 - 100}{2} = 40$$

PTS: 2 REF: 011612geo TOP: Sectors

20 ANS: 1 PTS: 2 REF: 081603geo TOP: Rotations of Two-Dimensional Objects

21 ANS: 3 PTS: 2 REF: 011605geo

TOP: Analytical Representations of Transformations KEY: basic

22 ANS: 1 PTS: 2 REF: 081507geo TOP: Compositions of Transformations

KEY: identify

23 ANS: 4 PTS: 2 REF: 061502geo TOP: Identifying Transformations

KEY: basic

24 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: Line Dilations

25 ANS: 1

$$\frac{1}{2} \left(\frac{4}{3} \right) \pi \cdot 5^3 \cdot 62.4 \approx 16,336$$

PTS: 2 REF: 061620geo TOP: Density

26 ANS: 3

$$\frac{x}{10} = \frac{6}{4} \quad \overline{CD} = 15 - 4 = 11$$

$$x = 15$$

PTS: 2 REF: 081612geo TOP: Similarity KEY: basic

27 ANS: 4 PTS: 2 REF: 081514geo TOP: Similarity

28 ANS: 4

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

$$230 \approx s$$

PTS: 2 REF: 081521geo TOP: Volume

29 ANS: 1

$$m_{\overline{RT}} = \frac{5 - -3}{4 - -2} = \frac{8}{6} = \frac{4}{3} \quad m_{\overline{ST}} = \frac{5 - 2}{4 - 8} = \frac{3}{-4} = -\frac{3}{4}$$
 Slopes are opposite reciprocals, so lines form a right angle.

PTS: 2 REF: 011618geo TOP: Triangles in the Coordinate Plane

30 ANS: 1

The other statements are true only if $\overline{AD} \perp \overline{BC}$.

PTS: 2 REF: 081623geo TOP: Chords, Secants and Tangents

31 ANS: 1 PTS: 2 REF: 011606geo TOP: Lines and Angles

32 ANS: 4 PTS: 2 REF: 081503geo TOP: Rotations of Two-Dimensional Objects

33 ANS: 2 PTS: 2 REF: 081602geo TOP: Identifying Transformations

KEY: basic

34 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

35 ANS: 2 PTS: 2 REF: 081501geo TOP: Parallelograms

36 ANS: 3

$$\frac{\frac{4}{3}\pi\left(\frac{9.5}{2}\right)^3}{\frac{4}{3}\pi\left(\frac{2.5}{2}\right)^3} \approx 55$$

PTS: 2 REF: 011614geo TOP: Volume

37 ANS: 3 PTS: 2 REF: 081622geo TOP: Triangle Congruency

38 ANS: 1

$$x^2 - 4x + 4 + y^2 + 8y + 16 = -11 + 4 + 16$$

$$(x-2)^2 + (y+4)^2 = 9$$

PTS: 2 REF: 081616geo TOP: Equations of Circles

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

40 ANS: 4

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

PTS: 2 REF: 081522geo TOP: Polygons in the Coordinate Plane

41 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: Line Dilations

42 ANS: 3 PTS: 2 REF: 081613geo

TOP: Cross-Sections of Three-Dimensional Objects

43 ANS: 3

1) only proves AA; 2) need congruent legs for HL; 3) SAS; 4) only proves product of altitude and base is equal

PTS: 2 REF: 061607geo TOP: Triangle Proofs

44 ANS: 1 PTS: 2 REF: 081504geo TOP: Cofunctions

45 ANS: 4 PTS: 2 REF: 081611geo TOP: Lines and Angles

46 ANS: 4 PTS: 2 REF: 011609geo TOP: Cofunctions

47 ANS: 4

$$3 \times 6 = 18$$

PTS: 2 REF: 061602geo TOP: Line Dilations

48 ANS: 1

$$\frac{1000}{20\pi} \approx 15.9$$

PTS: 2 REF: 011623geo TOP: Properties of Circles

49 ANS: 2 PTS: 2 REF: 081513geo TOP: Identifying Transformations
KEY: graphics

50 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
51 ANS: 2

$$V = \frac{1}{3} \cdot 6^2 \cdot 12 = 144$$

PTS: 2 REF: 011607geo TOP: Volume
52 ANS: 4

$$\frac{1}{2} = \frac{x+3}{3x-1} \quad GR = 3(7) - 1 = 20$$

$$3x - 1 = 2x + 6$$

$$x = 7$$

PTS: 2 REF: 011620geo TOP: Similarity KEY: basic
53 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
54 ANS: 3

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

$$T \approx 13.5$$

PTS: 2 REF: 061505geo TOP: Using Trigonometry to Find a Side
55 ANS: 2

$$\frac{11}{1.2 \text{ oz}} \left(\frac{16 \text{ oz}}{1 \text{ lb}} \right) = \frac{13.31}{\text{lb}} \quad \frac{13.31}{\text{lb}} \left(\frac{1 \text{ g}}{3.7851} \right) \approx \frac{3.5 \text{ g}}{1 \text{ lb}}$$

PTS: 2 REF: 061618geo TOP: Density

56 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

57 ANS: 2

$$C = \pi d \quad V = \pi \left(\frac{2.25}{\pi} \right)^2 \cdot 8 \approx 12.8916 \quad W = 12.8916 \cdot 752 \approx 9694$$

$$4.5 = \pi d$$

$$\frac{4.5}{\pi} = d$$

$$\frac{2.25}{\pi} = r$$

PTS: 2 REF: 081617geo TOP: Density

58 ANS: 4

$$V = \pi \left(\frac{6.7}{2} \right)^2 (4 \cdot 6.7) \approx 945$$

PTS: 2 REF: 081620geo TOP: Volume

59 ANS: 3

$$A = \frac{1}{2} ab \quad 3 - 6 = -3 = x$$

$$24 = \frac{1}{2} a(8) \quad \frac{4 + 12}{2} = 8 = y$$

$$a = 6$$

PTS: 2 REF: 081615geo TOP: Polygons in the Coordinate Plane

60 ANS: 4

PTS: 2

REF: 061615geo TOP: Trigonometric Ratios

61 ANS: 1

PTS: 2

REF: 061520geo TOP: Chords, Secants and Tangents

62 ANS: 1

$$m = \left(\frac{-11 + 5}{2}, \frac{5 + -7}{2} \right) = (-3, -1) \quad m = \frac{5 - -7}{-11 - 5} = \frac{12}{-16} = -\frac{3}{4} \quad m_{\perp} = \frac{4}{3}$$

PTS: 2 REF: 061612geo TOP: Parallel and Perpendicular Lines

KEY: perpendicular bisector

63 ANS: 1

$$180 - (68 \cdot 2)$$

PTS: 2 REF: 081624geo TOP: Parallelograms

64 ANS: 4

$$\sin 70 = \frac{x}{20}$$

$$x \approx 18.8$$

PTS: 2 REF: 061611geo TOP: Using Trigonometry to Find a Side

65 ANS: 2 PTS: 2 REF: 081619geo TOP: Sectors

66 ANS: 2

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

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

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

67 ANS: 1

Alternate interior angles

PTS: 2 REF: 061517geo TOP: Lines and Angles

68 ANS: 3

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

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

$$90 = 90$$

PTS: 2 REF: 061515geo TOP: Similarity KEY: basic

69 ANS: 3

$$1) \frac{12}{9} = \frac{4}{3} \quad 2) \text{ AA} \quad 3) \frac{32}{16} \neq \frac{8}{2} \quad 4) \text{ SAS}$$

PTS: 2 REF: 061605geo TOP: Similarity

70 ANS: 1

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

PTS: 2 REF: 061510geo TOP: Mapping a Polygon onto Itself

71 ANS: 1

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

PTS: 2 REF: 081523geo TOP: Similarity

72 ANS: 1

$$3^2 = 9$$

PTS: 2 REF: 081520geo TOP: Similarity

73 ANS: 4 PTS: 2 REF: 081609geo TOP: Compositions of Transformations

KEY: grids

74 ANS: 3

$$\frac{12}{4} = \frac{x}{5} \quad 15 - 4 = 11$$

$$x = 15$$

PTS: 2 REF: 011624geo TOP: Similarity KEY: basic

75 ANS: 4

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

PTS: 2 REF: 061521geo TOP: Similarity KEY: perimeter and area

76 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

KEY: graphics

77 ANS: 1 PTS: 2 REF: 011601geo

TOP: Cross-Sections of Three-Dimensional Objects

78 ANS: 2 PTS: 2 REF: 011610geo TOP: Line Dilations

79 ANS: 1

$$\frac{f}{4} = \frac{15}{6}$$

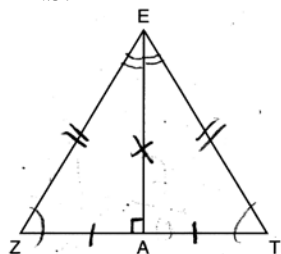
$$f = 10$$

PTS: 2 REF: 061617geo TOP: Lines and Angles

80 ANS: 1 PTS: 2 REF: 061604geo TOP: Identifying Transformations

KEY: graphics

81 ANS: 2



PTS: 2 REF: 061619geo TOP: Triangle Proofs

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

83 ANS: 2 PTS: 2 REF: 081601geo TOP: Lines and Angles

84 ANS: 1 PTS: 2 REF: 061508geo TOP: Chords, Secants and Tangents

85 ANS: 1 PTS: 2 REF: 011608geo TOP: Compositions of Transformations

KEY: identify

86 ANS: 4

$$m = -\frac{1}{2} \quad -4 = 2(6) + b$$

$$m_{\perp} = 2 \quad -4 = 12 + b$$

$$-16 = b$$

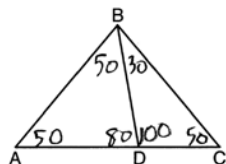
PTS: 2 REF: 011602geo TOP: Parallel and Perpendicular Lines

KEY: write equation of perpendicular line

87 ANS: 4 PTS: 2 REF: 011611geo TOP: Properties of Transformations

KEY: graphics

88 ANS: 2



PTS: 2 REF: 081604geo TOP: Interior and Exterior Angles of Triangles

89 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: Line Dilations

90 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

KEY: write equation of parallel line

91 ANS: 3 PTS: 2 REF: 061524geo TOP: Triangle Congruency

92 ANS: 1

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

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

PTS: 2 REF: 061509geo TOP: Parallel and Perpendicular Lines

KEY: identify perpendicular lines

93 ANS: 3

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

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

PTS: 2 REF: 061507geo TOP: Density

94 ANS: 1 PTS: 2 REF: 081605geo TOP: Rotations

KEY: grids

- 95 ANS: 2 PTS: 2 REF: 061603geo TOP: Equations of Circles
 96 ANS: 3 PTS: 2 REF: 011621geo TOP: Chords, Secants and Tangents

97 ANS: 3

$$\sqrt{20^2 - 10^2} \approx 17.3$$

- PTS: 2 REF: 081608geo TOP: Pythagorean Theorem
 KEY: without graphics

98 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

99 ANS: 3

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

- PTS: 2 REF: 081512geo TOP: Chords, Secants and Tangents

100 ANS: 4

$$x = -6 + \frac{1}{6}(6 - -6) = -6 + 2 = -4 \quad y = -2 + \frac{1}{6}(7 - -2) = -2 + \frac{9}{6} = -\frac{1}{2}$$

- PTS: 2 REF: 081618geo TOP: Directed Line Segments

- 101 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: Line Dilations

102 ANS: 2

$$\frac{12}{4} = \frac{36}{x}$$

$$12x = 144$$

$$x = 12$$

- PTS: 2 REF: 061621geo TOP: Side Splitter Theorem

103 ANS: 1

$$\frac{6}{8} = \frac{9}{12}$$

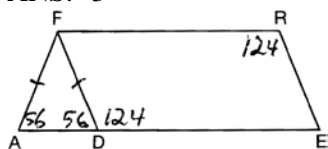
- PTS: 2 REF: 011613geo TOP: Similarity KEY: basic

- 104 ANS: 1
1) opposite sides; 2) adjacent sides; 3) perpendicular diagonals; 4) diagonal bisects angle
- PTS: 2 REF: 061609geo TOP: Parallelograms
- 105 ANS: 4
The slope of \overline{BC} is $\frac{2}{5}$. Altitude is perpendicular, so its slope is $-\frac{5}{2}$.
- PTS: 2 REF: 061614geo TOP: Parallel and Perpendicular Lines
KEY: find slope of perpendicular line
- 106 ANS: 3
$$\frac{60}{360} \cdot 8^2 \pi = \frac{1}{6} \cdot 64\pi = \frac{32\pi}{3}$$
- PTS: 2 REF: 061624geo TOP: Sectors
- 107 ANS: 2 PTS: 2 REF: 061610geo TOP: Chords, Secants and Tangents
- 108 ANS: 4 PTS: 2 REF: 061608geo TOP: Compositions of Transformations
KEY: grids
- 109 ANS: 1 PTS: 2 REF: 061518geo TOP: Line Dilations
- 110 ANS: 4 PTS: 2 REF: 061606geo TOP: Volume
- 111 ANS: 3 PTS: 2 REF: 061601geo TOP: Rotations of Two-Dimensional Objects
- 112 ANS: 3
$$\theta = \frac{s}{r} = \frac{2\pi}{10} = \frac{\pi}{5}$$
- PTS: 2 REF: fall1404geo TOP: Arc Length KEY: angle
- 113 ANS: 2
$$h^2 = 30 \cdot 12$$

$$h^2 = 360$$

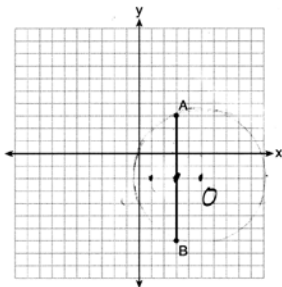
$$h = 6\sqrt{10}$$
- PTS: 2 REF: 061613geo TOP: Similarity KEY: altitude
- 114 ANS: 4 PTS: 2 REF: 061504geo TOP: Compositions of Transformations
KEY: identify
- 115 ANS: 4 PTS: 2 REF: 061501geo TOP: Rotations of Two-Dimensional Objects
- 116 ANS: 4 PTS: 2 REF: 081506geo TOP: Similarity
- 117 ANS: 3 PTS: 2 REF: 061616geo TOP: Identifying Transformations
KEY: graphics
- 118 ANS: 2 PTS: 2 REF: 061506geo
TOP: Cross-Sections of Three-Dimensional Objects

119 ANS: 3



PTS: 2 REF: 081508geo TOP: Parallelograms

120 ANS: 1



Since the midpoint of \overline{AB} is $(3, -2)$, the center must be either $(5, -2)$ or $(1, -2)$.

$$r = \sqrt{2^2 + 5^2} = \sqrt{29}$$

PTS: 2 REF: 061623geo TOP: Equations of Circles

121 ANS: 4 PTS: 2 REF: 061512geo TOP: Cofunctions

122 ANS: 3

(3) Could be a trapezoid.

PTS: 2 REF: 081607geo TOP: Parallelograms

123 ANS: 1

$$m_{\overline{TA}} = -1 \quad y = mx + b$$

$$m_{\overline{EM}} = 1 \quad 1 = 1(2) + b$$

$$-1 = b$$

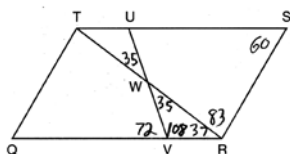
PTS: 2 REF: 081614geo TOP: Polygons in the Coordinate Plane

124 ANS: 2

$$\frac{4}{3} \pi \cdot 4^3 + 0.075 \approx 20$$

PTS: 2 REF: 011619geo TOP: Density

125 ANS: 3



PTS: 2 REF: 011603geo TOP: Parallelograms

126 ANS: 2 PTS: 2 REF: 061516geo TOP: Similarity

127 ANS: 4

$$x^2 + 6x + 9 + y^2 - 4y + 4 = 23 + 9 + 4$$

$$(x + 3)^2 + (y - 2)^2 = 36$$

PTS: 2

REF: 011617geo

TOP: Equations of Circles

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

128 ANS:

$$\sin 70 = \frac{30}{L}$$

$$L \approx 32$$

PTS: 2 REF: 011629geo TOP: Using Trigonometry to Find a Side

129 ANS:

$$\frac{3.75}{5} = \frac{4.5}{6} \quad \overline{AB} \text{ is parallel to } \overline{CD} \text{ because } \overline{AB} \text{ divides the sides proportionately.}$$

$$39.375 = 39.375$$

PTS: 2 REF: 061627geo TOP: Side Splitter Theorem

130 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

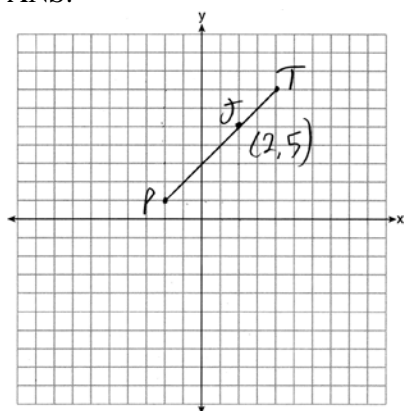
131 ANS:

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: Density

132 ANS:



$$x = \frac{2}{3}(4 - -2) = 4 \quad -2 + 4 = 2 \quad J(2, 5)$$

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

PTS: 2 REF: 011627geo TOP: Directed Line Segments

133 ANS:

Yes. $(x - 1)^2 + (y + 2)^2 = 4^2$

$$(3.4 - 1)^2 + (1.2 + 2)^2 = 16$$

$$5.76 + 10.24 = 16$$

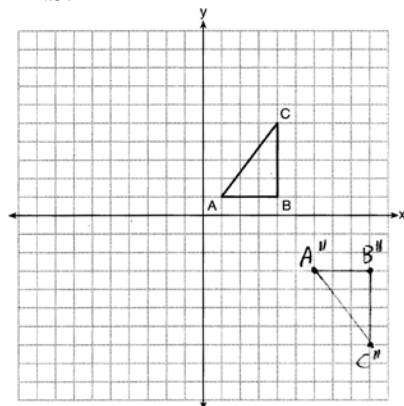
$$16 = 16$$

PTS: 2

REF: 081630geo

TOP: Circles in the Coordinate Plane

134 ANS:



PTS: 2

REF: 081626geo

TOP: Compositions of Transformations

KEY: grids

135 ANS:

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

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

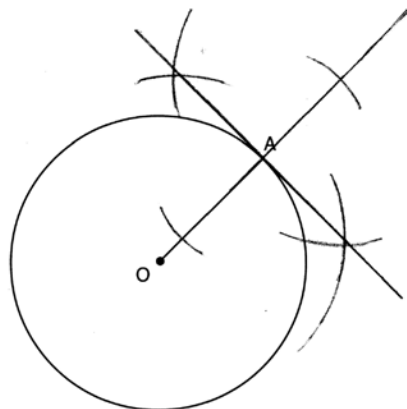
$$x = 120$$

PTS: 2

REF: 061529geo

TOP: Sectors

136 ANS:



PTS: 2

REF: 061631geo

TOP: Constructions

137 ANS:

Yes. The sequence of transformations consists of a reflection and a translation, which are isometries which preserve distance and congruency.

PTS: 2 REF: 011628geo TOP: Triangle Congruency

138 ANS:

$$\frac{40000}{\pi\left(\frac{51}{2}\right)^2} \approx 19.6 \quad \frac{72000}{\pi\left(\frac{75}{2}\right)^2} \approx 16.3 \text{ Dish A}$$

PTS: 2 REF: 011630geo TOP: Density

139 ANS:

$$\sin 75 = \frac{15}{x}$$

$$x = \frac{15}{\sin 75}$$

$$x \approx 15.5$$

PTS: 2 REF: 081631geo TOP: Using Trigonometry to Find a Side

140 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: Triangle Congruency

141 ANS:

$$T_{6,0} \circ R_{x\text{-axis}}$$

PTS: 2 REF: 061625geo TOP: Compositions of Transformations

KEY: identify

142 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

143 ANS:

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

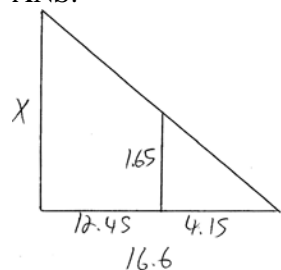
PTS: 2 REF: 061526geo TOP: Parallelograms

144 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, $\overline{X'Y'}$ maps onto \overline{UV} . Therefore, $\triangle XYZ \sim \triangle UVZ$.

PTS: 2 REF: spr1406geo TOP: Similarity

145 ANS:



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

$$4.15x = 27.39$$

$$x = 6.6$$

PTS: 2 REF: 061531geo TOP: Similarity KEY: basic

146 ANS:

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

PTS: 2 REF: 081525geo TOP: Density

147 ANS:

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

$$x \approx 23$$

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

148 ANS:

$$4 + \frac{4}{9}(22 - 4) \quad 2 + \frac{4}{9}(2 - 2) \quad (12, 2)$$

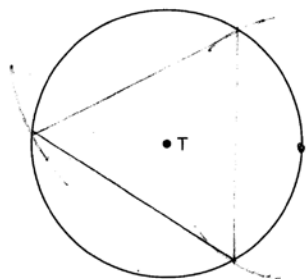
$$4 + \frac{4}{9}(18) \quad 2 + \frac{4}{9}(0)$$

$$4 + 8 \quad 2 + 0$$

$$12 \quad 2$$

PTS: 2 REF: 061626geo TOP: Directed Line Segments

149 ANS:



PTS: 2 REF: 081526geo TOP: Constructions

150 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: Volume

151 ANS:

$$\ell: y = 3x - 4$$

$$m: y = 3x - 8$$

PTS: 2 REF: 011631geo TOP: Line Dilations

152 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

153 ANS:

$$\frac{3}{8} \cdot 56 = 21$$

PTS: 2 REF: 081625geo TOP: Chords, Secants and Tangents

154 ANS:

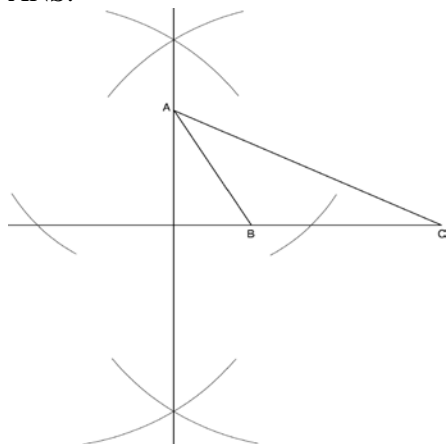
$$s = \theta \cdot r \quad s = \theta \cdot r \quad \text{Yes, both angles are equal.}$$

$$\pi = A \cdot 4 \quad \frac{13\pi}{8} = B \cdot 6.5$$

$$\frac{\pi}{4} = A \quad \frac{\pi}{4} = B$$

PTS: 2 REF: 061629geo TOP: Arc Length KEY: arc length

155 ANS:



PTS: 2 REF: fall1409geo TOP: Constructions

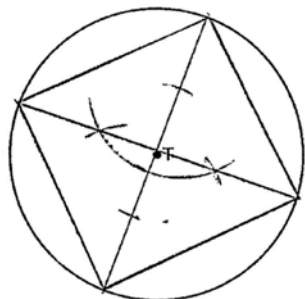
156 ANS:

$$\tan x = \frac{10}{4}$$

$$x \approx 68$$

PTS: 2 REF: 061630geo TOP: Using Trigonometry to Find an Angle

157 ANS:



PTS: 2 REF: 061525geo TOP: Constructions

158 ANS:

Reflections are rigid motions that preserve distance.

PTS: 2 REF: 061530geo TOP: Triangle Congruency

159 ANS:

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

PTS: 2 REF: 081530geo TOP: Triangle Congruency

160 ANS:

$$\frac{360}{6} = 60$$

PTS: 2 REF: 081627geo TOP: Mapping a Polygon onto Itself

- 161 ANS:
 $73 + R = 90$ Equal cofunctions are complementary.

$$R = 17$$

PTS: 2 REF: 061628geo TOP: Cofunctions

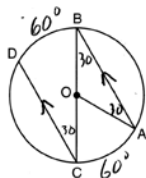
- 162 ANS:
 Parallelogram $ABCD$, diagonals \overline{AC} and \overline{BD} intersect at E (given). $\overline{DC} \parallel \overline{AB}$; $\overline{DA} \parallel \overline{CB}$ (opposite sides of a parallelogram are parallel). $\angle ACD \cong \angle CAB$ (alternate interior angles formed by parallel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

PTS: 2 REF: 081528geo TOP: Quadrilateral Proofs

- 163 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

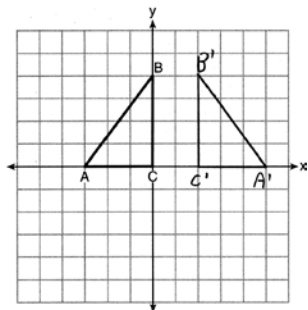
- 164 ANS:



$$180 - 2(30) = 120$$

PTS: 2 REF: 011626geo TOP: Chords, Secants and Tangents

- 165 ANS:



PTS: 2 REF: 011625geo TOP: Reflections KEY: grids

- 166 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: Properties of Circles

167 ANS:

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

$$126 = 126$$

PTS: 2 REF: 081529geo TOP: Similarity KEY: basic

168 ANS:

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

$$x = 164$$

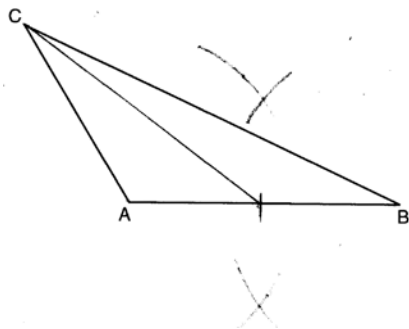
PTS: 2 REF: 081527geo TOP: Similarity KEY: basic

169 ANS:

$$M = 180 - (47 + 57) = 76 \text{ Rotations do not change angle measurements.}$$

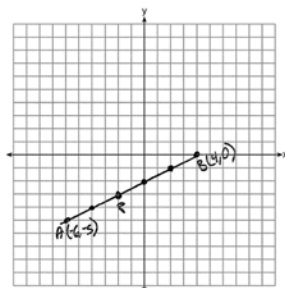
PTS: 2 REF: 081629geo TOP: Properties of Transformations

170 ANS:



PTS: 2 REF: 081628geo TOP: Constructions

171 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

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

172 ANS:

(2) Euclid's Parallel Postulate; (3) Alternate interior angles formed by parallel lines and a transversal are congruent; (4) Angles forming a line are supplementary; (5) Substitution

PTS: 4 REF: 011633geo TOP: Triangle Proofs

173 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

174 ANS:

Since linear angles are supplementary, $m\angle GIH = 65^\circ$. Since $\overline{GH} \cong \overline{IH}$, $m\angle GHI = 50^\circ (180 - (65 + 65))$. Since $\angle EGB \cong \angle GHI$, the corresponding angles formed by the transversal and lines are congruent and $\overline{AB} \parallel \overline{CD}$.

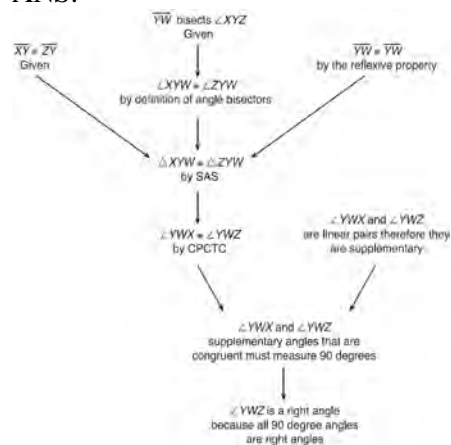
PTS: 4 REF: 061532geo TOP: Lines and Angles

175 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: Polygons in the Coordinate Plane

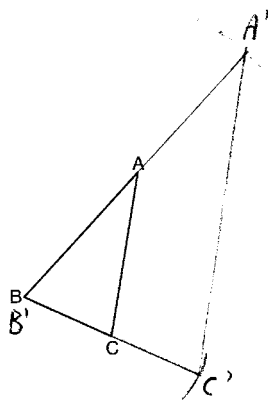
176 ANS:



$\triangle XYZ$, $\overline{XY} \cong \overline{ZY}$, 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

177 ANS:



The length of $\overline{A'C'}$ is twice \overline{AC} .

PTS: 4 REF: 081632geo TOP: Constructions

178 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 Proofs

179 ANS:

ABC – point of reflection $\rightarrow (-y, x) +$ point of reflection $\triangle DEF \cong \triangle A'B'C'$ because $\triangle DEF$ is a reflection of

$$A(2, -3) - (2, -3) = (0, 0) \rightarrow (0, 0) + (2, -3) = A'(2, -3)$$

$$B(6, -8) - (2, -3) = (4, -5) \rightarrow (5, 4) + (2, -3) = B'(7, 1)$$

$$C(2, -9) - (2, -3) = (0, -6) \rightarrow (6, 0) + (2, -3) = C'(8, -3)$$

$\triangle A'B'C'$ and reflections preserve distance.

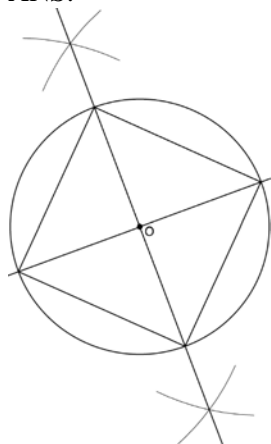
PTS: 4 REF: 081633geo TOP: Rotations KEY: grids

180 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

181 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

182 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: Triangle Proofs

183 ANS:

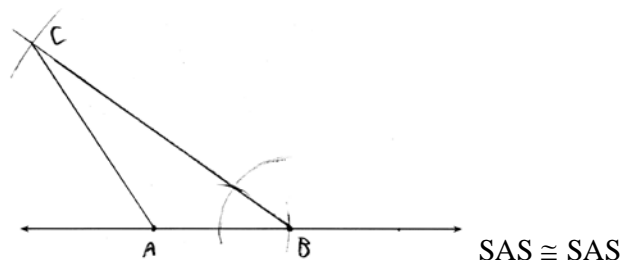
$$\frac{16}{9} = \frac{x}{20.6} \quad D = \sqrt{36.6^2 + 20.6^2} \approx 42$$

$$x \approx 36.6$$

PTS: 4 REF: 011632geo TOP: Pythagorean Theorem

KEY: without graphics

184 ANS:



PTS: 4 REF: 011634geo TOP: Constructions

185 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: Triangle Congruency

186 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. $\tan 6 = \frac{112 - 1.5}{x}$ $\tan(49 + 6) = \frac{112 - 1.5}{y}$ $\frac{1051.3 - 77.4}{5} \approx 195$

$$x \approx 1051.3$$

$$y \approx 77.4$$

PTS: 4

REF: spr1409geo

TOP: Using Trigonometry to Find a Side

187 ANS:

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

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

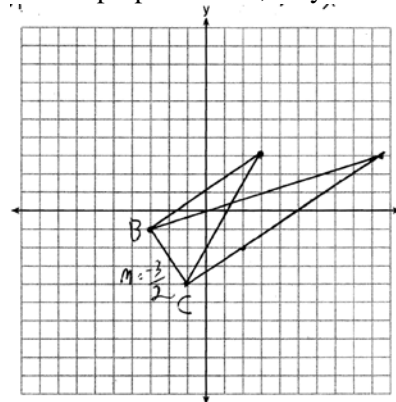
PTS: 4

REF: spr1412geo

TOP: Density

188 ANS:

The slopes of perpendicular line 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

189 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

190 ANS:

Parallelogram $ABCD$, \overline{EFG} , and diagonal \overline{DFB} (given); $\angle DFE \cong \angle BFG$ (vertical angles); $\overline{AD} \parallel \overline{CB}$ (opposite sides of a parallelogram are parallel); $\angle EDF \cong \angle GBF$ (alternate interior angles are congruent); $\triangle DEF \sim \triangle BGF$ (AA)

PTS: 4 REF: 061633geo TOP: Quadrilateral Proofs

191 ANS:

A dilation of $\frac{5}{2}$ about the origin. Dilations preserve angle measure, so the triangles are similar by AA.

PTS: 4 REF: 061634geo TOP: Similarity

192 ANS:

$$\tan x = \frac{12}{75} \quad \tan y = \frac{72}{75} \quad 43.83 - 9.09 \approx 34.7$$

$$x \approx 9.09 \quad y \approx 43.83$$

PTS: 4 REF: 081634geo TOP: Using Trigonometry to Find an Angle

193 ANS:

$$\frac{\pi \cdot 11.25^2 \cdot 33.5}{231} \approx 57.7$$

PTS: 4 REF: 061632geo TOP: Volume

194 ANS:

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

$$.9604 = y$$

PTS: 4 REF: 061534geo TOP: Similarity KEY: leg

Geometry 6 Point Regents Exam Questions Answer Section

195 ANS:

$$\begin{aligned} \tan 52.8 &= \frac{h}{x} & x \tan 52.8 &= x \tan 34.9 + 8 \tan 34.9 & \tan 52.8 &\approx \frac{h}{9} & 11.86 + 1.7 &\approx 13.6 \\ h &= x \tan 52.8 & x \tan 52.8 - x \tan 34.9 &= 8 \tan 34.9 & & & x &\approx 11.86 \\ \tan 34.9 &= \frac{h}{x+8} & x(\tan 52.8 - \tan 34.9) &= 8 \tan 34.9 & & & & \\ h &= (x+8) \tan 34.9 & x &= \frac{8 \tan 34.9}{\tan 52.8 - \tan 34.9} & & & & \\ & & & x &\approx 9 & & & \end{aligned}$$

PTS: 6 REF: 011636geo TOP: Using Trigonometry to Find a Side

196 ANS:

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} , and 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.

PTS: 6 REF: spr1414geo TOP: Triangle Congruency

197 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: Circle Proofs

198 ANS:

Circle O , chords \overline{AB} and \overline{CD} intersect at E (Given); Chords \overline{CB} and \overline{AD} are drawn (auxiliary lines drawn); $\angle CEB \cong \angle AED$ (vertical angles); $\angle C \cong \angle A$ (Inscribed angles that intercept the same arc are congruent); $\triangle BCE \sim \triangle DAE$ (AA); $\frac{AE}{CE} = \frac{ED}{EB}$ (Corresponding sides of similar triangles are proportional); $AE \cdot EB = CE \cdot ED$ (The product of the means equals the product of the extremes).

PTS: 6 REF: 081635geo TOP: Circle Proofs

199 ANS:

$$V = \frac{1}{3} \pi \left(\frac{8.3}{2} \right)^2 (10.2) + \frac{1}{2} \cdot \frac{4}{3} \pi \left(\frac{8.3}{2} \right)^3 \approx 183.961 + 149.693 \approx 333.65 \text{ cm}^3 \quad 333.65 \times 50 = 16682.7 \text{ cm}^3$$

$$16682.7 \times 0.697 = 11627.8 \text{ g} \quad 11.6278 \times 3.83 = \$44.53$$

PTS: 6 REF: 081636geo TOP: Density

200 ANS:

Parallelogram $ANDR$ with \overline{AW} and \overline{DE} bisecting \overline{NWD} and \overline{REA} at points W and E (Given). $\overline{AN} \cong \overline{RD}$, $\overline{AR} \cong \overline{DN}$ (Opposite sides of a parallelogram are congruent). $AE = \frac{1}{2} AR$, $WD = \frac{1}{2} DN$, so $\overline{AE} \cong \overline{WD}$ (Definition of bisect and division property of equality). $\overline{AR} \parallel \overline{DN}$ (Opposite sides of a parallelogram are parallel). $AWDE$ is a parallelogram (Definition of parallelogram). $RE = \frac{1}{2} AR$, $NW = \frac{1}{2} DN$, so $\overline{RE} \cong \overline{NW}$ (Definition of bisect and division property of equality). $\overline{ED} \cong \overline{AW}$ (Opposite sides of a parallelogram are congruent). $\triangle ANW \cong \triangle DRE$ (SSS).

PTS: 6 REF: 011635geo TOP: Quadrilateral Proofs

201 ANS:

Quadrilateral $ABCD$ with diagonals \overline{AC} and \overline{BD} that bisect each other, and $\angle 1 \cong \angle 2$ (given); quadrilateral $ABCD$ is a parallelogram (the diagonals of a parallelogram bisect each other); $\overline{AB} \parallel \overline{CD}$ (opposite sides of a parallelogram are parallel); $\angle 1 \cong \angle 3$ and $\angle 2 \cong \angle 4$ (alternate interior angles are congruent); $\angle 2 \cong \angle 3$ and $\angle 3 \cong \angle 4$ (substitution); $\triangle ACD$ is an isosceles triangle (the base angles of an isosceles triangle are congruent); $\overline{AD} \cong \overline{DC}$ (the sides of an isosceles triangle are congruent); quadrilateral $ABCD$ is a rhombus (a rhombus has consecutive congruent sides); $\overline{AE} \perp \overline{BE}$ (the diagonals of a rhombus are perpendicular); $\angle BEA$ is a right angle (perpendicular lines form a right angle); $\triangle AEB$ is a right triangle (a right triangle has a right angle).

PTS: 6 REF: 061635geo TOP: Triangle Proofs

202 ANS:

Similar triangles are required to model and solve a proportion. $\frac{x+5}{1.5} = \frac{x}{1} \quad \frac{1}{3} \pi (1.5)^2 (15) - \frac{1}{3} \pi (1)^2 (10) \approx 24.9$

$$x + 5 = 1.5x$$

$$5 = .5x$$

$$10 = x$$

$$10 + 5 = 15$$

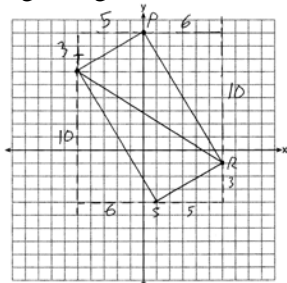
PTS: 6 REF: 061636geo TOP: Volume

203 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: Polygons in the Coordinate Plane

204 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

205 ANS:

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

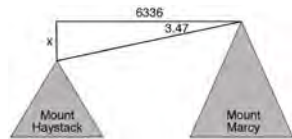
$$x \approx 9.115$$

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

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

PTS: 6 REF: 061535geo TOP: Density

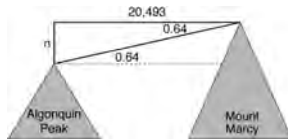
206 ANS:



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

$$M \approx 384$$

$$4960 + 384 = 5344$$



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

$$A \approx 229$$

$$5344 - 229 = 5115$$

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

207 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