Geometry Regents Exam Questions at Random Worksheet # 1 NAME:_____
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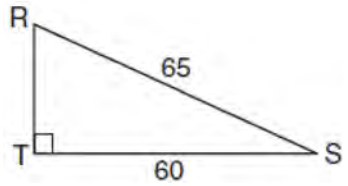
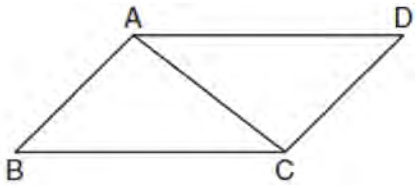
Geometry Regents at Random Worksheets

1 In the diagram of $\triangle RST$ below, $m\angle T = 90°$, $RS = 65$, and $ST = 60$.



What is the measure of $\angle S$, to the *nearest degree*?
1) 23º
2) 43º
3) 47º
4) 67º

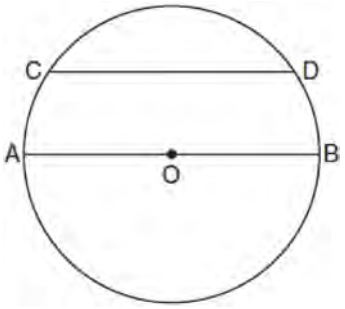
2 Given: Parallelogram $ABCD$ with diagonal $\overline{AC}$ drawn



Prove: $\triangle ABC \cong \triangle CDA$

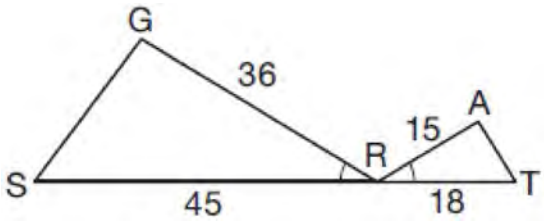
3 An isosceles right triangle whose legs measure 6 is continuously rotated about one of its legs to form a three-dimensional object. The three-dimensional object is a
1) cylinder with a diameter of 6
2) cylinder with a diameter of 12
3) cone with a diameter of 6
4) cone with a diameter of 12

4 In the diagram below of circle O, chord $\overline{CD}$ is parallel to diameter $\overline{AOB}$ and $m\overset{\frown}{CD} = 130$.



What is $m\overset{\frown}{AC}$?
1) 25
2) 50
3) 65
4) 115

5 In the diagram below, $\angle GRS \cong \angle ART$, $GR = 36$, $SR = 45$, $AR = 15$, and $RT = 18$.



Which triangle similarity statement is correct?
1) $\triangle GRS \sim \triangle ART$ by AA.
2) $\triangle GRS \sim \triangle ART$ by SAS.
3) $\triangle GRS \sim \triangle ART$ by SSS.
4) $\triangle GRS$ is not similar to $\triangle ART$.

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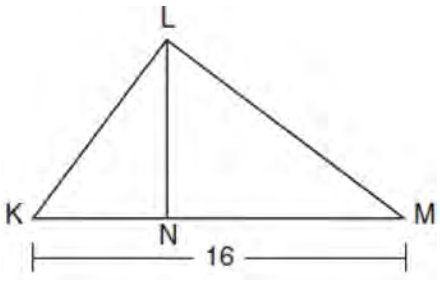
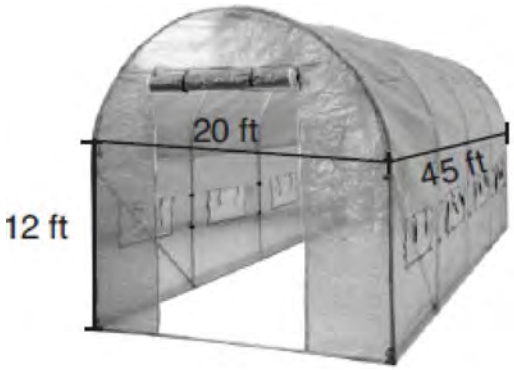
6 Kirstie is testing values that would make triangle *KLM* a right triangle when $\overline{LN}$ is an altitude, and *KM* = 16, as shown below.



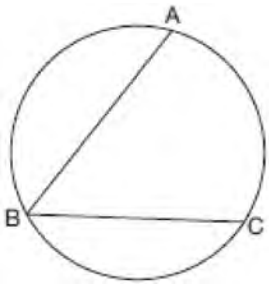
Which lengths would make triangle *KLM* a right triangle?
1) *LM* = 13 and *KN* = 6
2) *LM* = 12 and *NM* = 9
3) *KL* = 11 and *KN* = 7
4) *LN* = 8 and *NM* = 10

7 The greenhouse pictured below can be modeled as a rectangular prism with a half-cylinder on top. The rectangular prism is 20 feet wide, 12 feet high, and 45 feet long. The half-cylinder has a diameter of 20 feet.



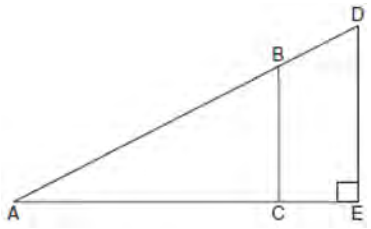
To the *nearest cubic foot*, what is the volume of the greenhouse?
1) 17,869
2) 24,937
3) 39,074
4) 67,349

8 In the diagram below, $m\overset{\frown}{ABC} = 268°$.



What is the number of degrees in the measure of $\angle ABC$?
1) 134°
2) 92°
3) 68°
4) 46°

9 In the diagram of right triangle *ADE* below, $\overline{BC} \parallel \overline{DE}$.



Which ratio is always equivalent to the sine of $\angle A$?
1) $\frac{AD}{DE}$
2) $\frac{AE}{AD}$
3) $\frac{BC}{AB}$
4) $\frac{AB}{AC}$

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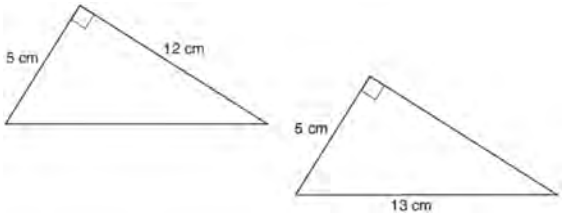
10 Line MN is dilated by a scale factor of 2 centered at the point $(0,6)$. If $\overleftrightarrow{MN}$ is represented by $y = -3x + 6$, which equation can represent $\overleftrightarrow{M'N'}$, the image of $\overleftrightarrow{MN}$?

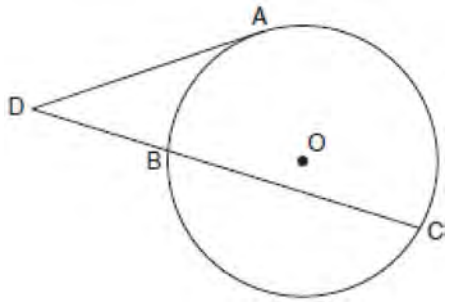
1) $y = -3x + 12$
2) $y = -3x + 6$
3) $y = -6x + 12$
4) $y = -6x + 6$

11 Skye says that the two triangles below are congruent. Margaret says that the two triangles are similar.



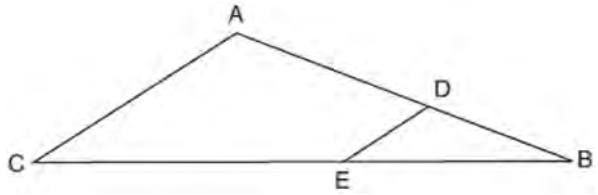
Are Skye and Margaret both correct? Explain why.

12 In the diagram below, tangent $\overline{DA}$ and secant $\overline{DBC}$ are drawn to circle O from external point D, such that $\overset{\frown}{AC} \cong \overset{\frown}{BC}$.



If $m\overset{\frown}{BC} = 152°$, determine and state $m\angle D$.

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



If EB is 3 more than DB, $AB = 14$, and $CB = 21$, what is the length of $\overline{AD}$?

1) 6
2) 8
3) 9
4) 12

14 A circle whose center is the origin passes through the point $(-5,12)$. Which point also lies on this circle?

1) $(10,3)$
2) $(-12,13)$
3) $(11,2\sqrt{12})$
4) $(-8,5\sqrt{21})$

15 A two-dimensional cross section is taken of a three-dimensional object. If this cross section is a triangle, what can *not* be the three-dimensional object?

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

Geometry Regents Exam Questions at Random Worksheet # 4 NAME:_____
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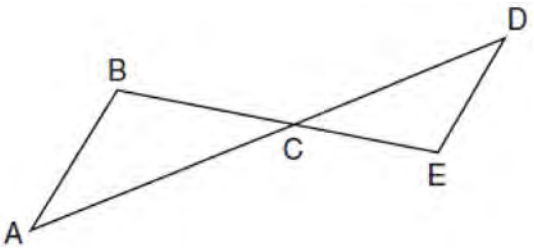
16 The base of a pyramid is a rectangle with a width of 4.6 cm and a length of 9 cm. What is the height, in centimeters, of the pyramid if its volume is 82.8 cm^3?
1) 6
2) 2
3) 9
4) 18

17 What is an equation of the line that passes through the point $(6,8)$ and is perpendicular to a line with equation $y = \frac{3}{2}x + 5$?
1) $y - 8 = \frac{3}{2}(x - 6)$
2) $y - 8 = -\frac{2}{3}(x - 6)$
3) $y + 8 = \frac{3}{2}(x + 6)$
4) $y + 8 = -\frac{2}{3}(x + 6)$

18 The equation of a circle is $x^2 + y^2 - 12y + 20 = 0$. What are the coordinates of the center and the length of the radius of the circle?
1) center $(0,6)$ and radius 4
2) center $(0,-6)$ and radius 4
3) center $(0,6)$ and radius 16
4) center $(0,-6)$ and radius 16

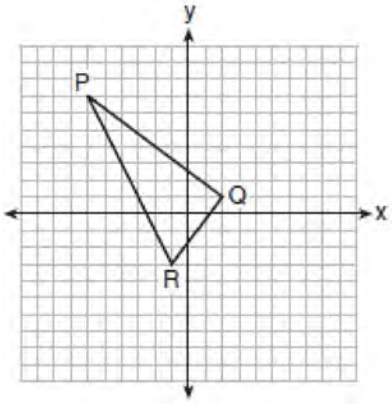
19 Directed line segment DE has endpoints $D(-4,-2)$ and $E(1,8)$. Point F divides $\overline{DE}$ such that $DF:FE$ is 2:3. What are the coordinates of F?
1) (-3.0)
2) $(-2,2)$
3) $(-1,4)$
4) $(2,4)$

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



If $CD = 6.6$ cm, $DE = 3.4$ cm, $CE = 4.2$ cm, and $BC = 5.25$ cm, what is the length of $\overline{AC}$, to the *nearest hundredth of a centimeter*?
1) 2.70
2) 3.34
3) 5.28
4) 8.25

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



What is the area of $\triangle PQR$?
1) 10
2) 20
3) 25
4) 50

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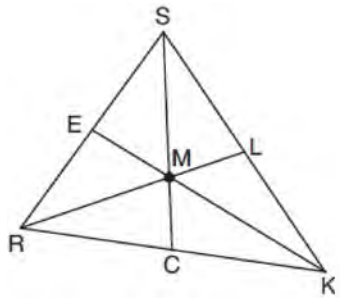
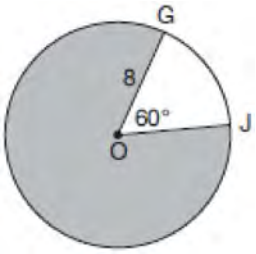
22 In triangle *SRK* below, medians $\overline{SC}$, $\overline{KE}$, and $\overline{RL}$ intersect at *M*.



Which statement must always be true?

1) $3(MC) = SC$
2) $MC = \frac{1}{3}(SM)$
3) $RM = 2MC$
4) $SM = KM$

23 In the diagram below of circle *O*, $GO = 8$ and $m\angle GOJ = 60°$.

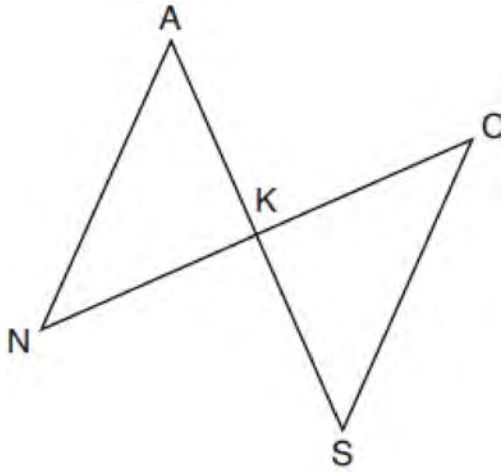


What is the area, in terms of π, of the shaded region?

1) $\frac{4\pi}{3}$
2) $\frac{20\pi}{3}$
3) $\frac{32\pi}{3}$
4) $\frac{160\pi}{3}$

24 Triangle *A'B'C'* is the image of triangle *ABC* after a translation of 2 units to the right and 3 units up. Is triangle *ABC* congruent to triangle *A'B'C'*? Explain why.

25 In the diagram below, $\overline{AKS}$, $\overline{NKC}$, $\overline{AN}$, and $\overline{SC}$ are drawn such that $\overline{AN} \cong \overline{SC}$.



Which additional statement is sufficient to prove $\triangle KAN \cong \triangle KSC$ by AAS?

1) $\overline{AS}$ and $\overline{NC}$ bisect each other.
2) *K* is the midpoint of $\overline{NC}$.
3) $\overline{AS} \perp \overline{CN}$
4) $\overline{AN} \parallel \overline{SC}$

26 A ladder 20 feet long leans against a building, forming an angle of 71° with the level ground. To the *nearest foot*, how high up the wall of the building does the ladder touch the building?

1) 15
2) 16
3) 18
4) 19

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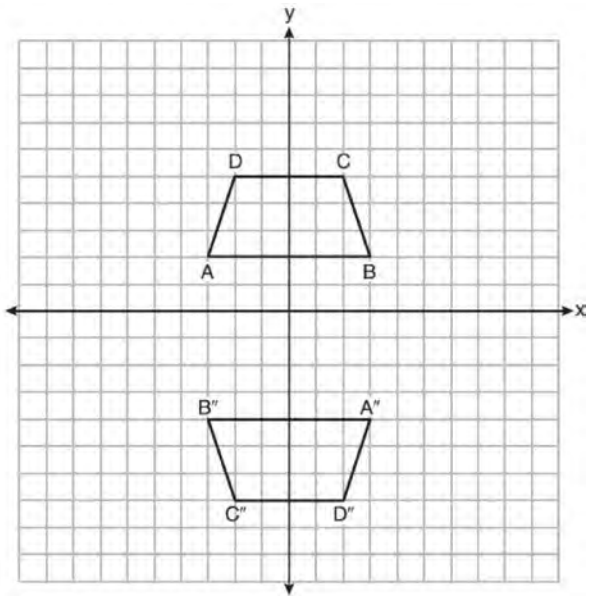
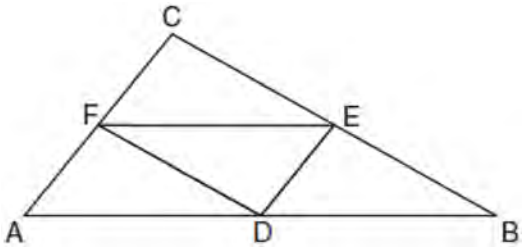
27 Trapezoids *ABCD* and *A"B"C"D"* are graphed on the set of axes below.



Describe a sequence of transformations that maps trapezoid *ABCD* onto trapezoid *A"B"C"D"*.

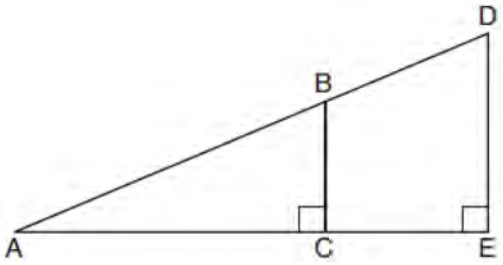
28 In the diagram below of $\triangle ABC$, *D*, *E*, and *F* are the midpoints of $\overline{AB}$, $\overline{BC}$, and $\overline{CA}$, respectively.



What is the ratio of the area of $\triangle CFE$ to the area of $\triangle CAB$?

1) 1:1
2) 1:2
3) 1:3
4) 1:4

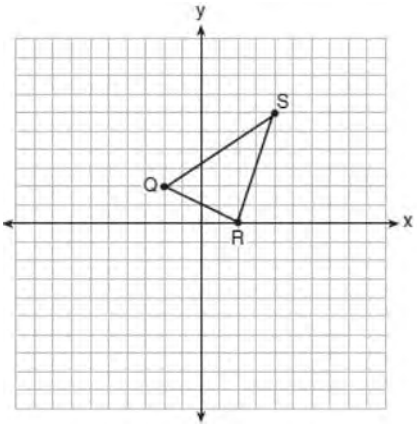
29 In the diagram below of right triangle *AED*, $\overline{BC} \parallel \overline{DE}$.



Which statement is always true?

1) $\frac{AC}{BC} = \frac{DE}{AE}$
2) $\frac{AB}{AD} = \frac{BC}{DE}$
3) $\frac{AC}{CE} = \frac{BC}{DE}$
4) $\frac{DE}{BC} = \frac{DB}{AB}$

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



On the same set of axes, graph and label $\triangle Q'R'S'$, the image of $\triangle QRS$ after a dilation with a scale factor of $\frac{3}{2}$ centered at the origin. Use slopes to explain why $Q'R' \parallel QR$.

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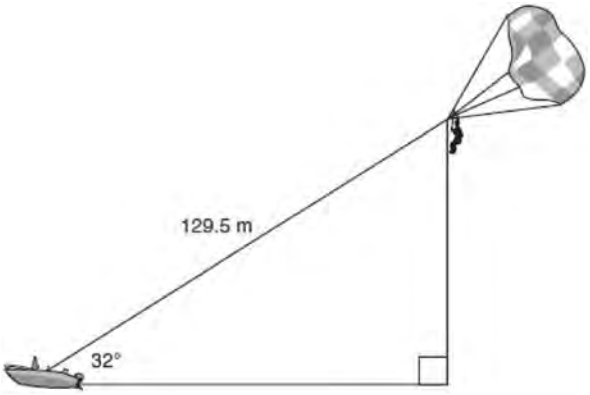
31 Rectangle *A'B'C'D'* is the image of rectangle *ABCD* after a dilation centered at point *A* by a scale factor of $\frac{2}{3}$. Which statement is correct?

1) Rectangle *A'B'C'D'* has a perimeter that is $\frac{2}{3}$ the perimeter of rectangle *ABCD*.
2) Rectangle *A'B'C'D'* has a perimeter that is $\frac{3}{2}$ the perimeter of rectangle *ABCD*.
3) Rectangle *A'B'C'D'* has an area that is $\frac{2}{3}$ the area of rectangle *ABCD*.
4) Rectangle *A'B'C'D'* has an area that is $\frac{3}{2}$ the area of rectangle *ABCD*.

32 A man was parasailing above a lake at an angle of elevation of 32° from a boat, as modeled in the diagram below.



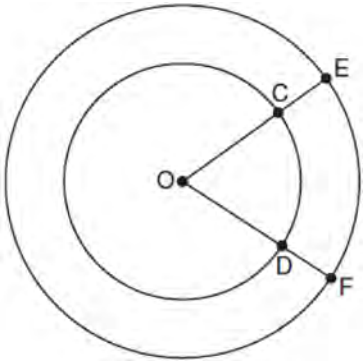
If 129.5 meters of cable connected the boat to the parasail, approximately how many meters above the lake was the man?

1) 68.6
2) 80.9
3) 109.8
4) 244.4

33 In a right triangle, the acute angles have the relationship $\sin(2x + 4) = \cos(46)$. What is the value of *x*?

1) 20
2) 21
3) 24
4) 25

34 In the diagram below, two concentric circles with center *O*, and radii $\overline{OC}$, $\overline{OD}$, $\overline{OGE}$, and $\overline{ODF}$ are drawn.



If $OC = 4$ and $OE = 6$, which relationship between the length of arc *EF* and the length of arc *CD* is always true?

1) The length of arc *EF* is 2 units longer than the length of arc *CD*.
2) The length of arc *EF* is 4 units longer than the length of arc *CD*.
3) The length of arc *EF* is 1.5 times the length of arc *CD*.
4) The length of arc *EF* is 2.0 times the length of arc *CD*.

35 Determine and state the coordinates of the center and the length of the radius of a circle whose equation is $x^2 + y^2 - 6x = 56 - 8y$.

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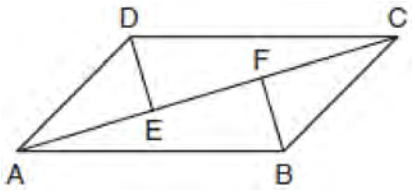
36 In quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$, $\overline{AB} \parallel \overline{CD}$, and $\overline{BF}$ and $\overline{DE}$ are perpendicular to diagonal $\overline{AC}$ at points F and E.

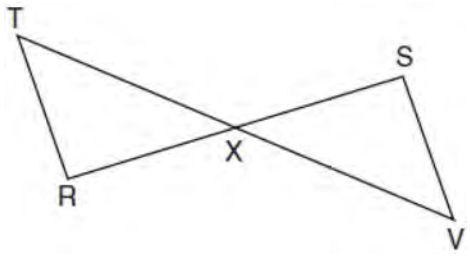


Prove: $\overline{AE} \cong \overline{CF}$

37 A water cup in the shape of a cone has a height of 4 inches and a maximum diameter of 3 inches. What is the volume of the water in the cup, to the *nearest tenth of a cubic inch*, when the cup is filled to half its height?

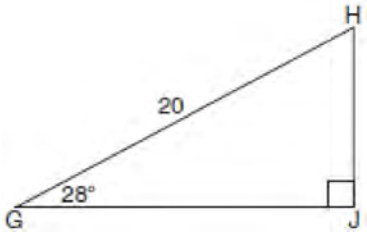
1) 1.2
2) 3.5
3) 4.7
4) 14.1

38 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn

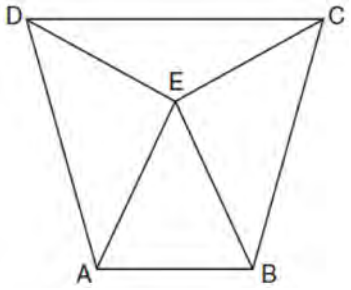


Prove: $\overline{TR} \parallel \overline{SV}$

39 When instructed to find the length of $\overline{HJ}$ in right triangle HJG, Alex wrote the equation $\sin 28° = \frac{HJ}{20}$ while Marlene wrote $\cos 62° = \frac{HJ}{20}$. Are both students' equations correct? Explain why.



40 Isosceles trapezoid $ABCD$ has bases $\overline{DC}$ and $\overline{AB}$ with nonparallel legs $\overline{AD}$ and $\overline{BC}$. Segments AE, BE, CE, and DE are drawn in trapezoid $ABCD$ such that $\angle CDE \cong \angle DCE$, $\overline{AE} \perp \overline{DE}$, and $\overline{BE} \perp \overline{CE}$.



Prove $\triangle ADE \cong \triangle BCE$ and prove $\triangle AEB$ is an isosceles triangle.

41 Bob places an 18-foot ladder 6 feet from the base of his house and leans it up against the side of his house. Find, to the *nearest degree*, the measure of the angle the bottom of the ladder makes with the ground.

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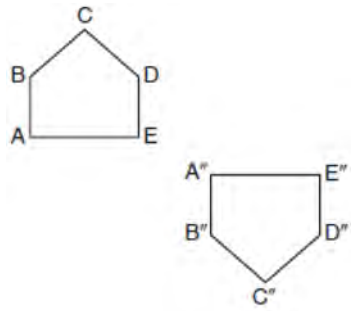
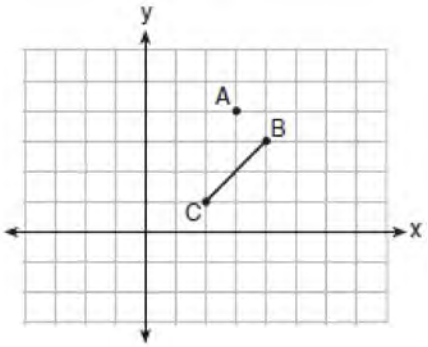
42 Identify which sequence of transformations could map pentagon *ABCDE* onto pentagon *A"B"C"D"E"*, as shown below.



1) dilation followed by a rotation
2) translation followed by a rotation
3) line reflection followed by a translation
4) line reflection followed by a line reflection

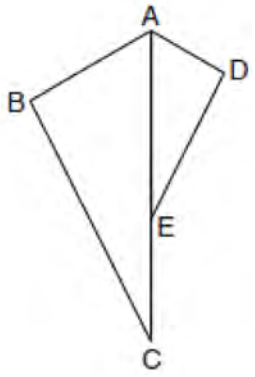
43 On the graph below, point $A(3,4)$ and $\overline{BC}$ with coordinates $B(4,3)$ and $C(2,1)$ are graphed.



What are the coordinates of *B'* and *C'* after $\overline{BC}$ undergoes a dilation centered at point *A* with a scale factor of 2?

1) $B'(5,2)$ and $C'(1,-2)$
2) $B'(6,1)$ and $C'(0,-1)$
3) $B'(5,0)$ and $C'(1,-2)$
4) $B'(5,2)$ and $C'(3,0)$

44 In the diagram below, $\triangle ADE$ is the image of $\triangle ABC$ after a reflection over the line *AC* followed by a dilation of scale factor $\frac{AE}{AC}$ centered at point *A*.



Which statement must be true?

1) $m\angle BAC \cong m\angle AED$
2) $m\angle ABC \cong m\angle ADE$
3) $m\angle DAE \cong \frac{1}{2}m\angle BAC$
4) $m\angle ACB \cong \frac{1}{2}m\angle DAB$

45 What is an equation of a line which passes through $(6,9)$ and is perpendicular to the line whose equation is $4x - 6y = 15$?

1) $y - 9 = -\frac{3}{2}(x - 6)$
2) $y - 9 = \frac{2}{3}(x - 6)$
3) $y + 9 = -\frac{3}{2}(x + 6)$
4) $y + 9 = \frac{2}{3}(x + 6)$

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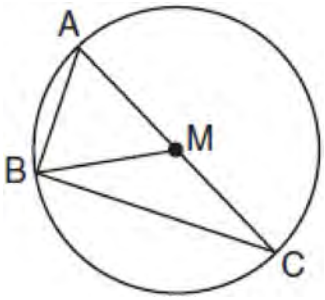
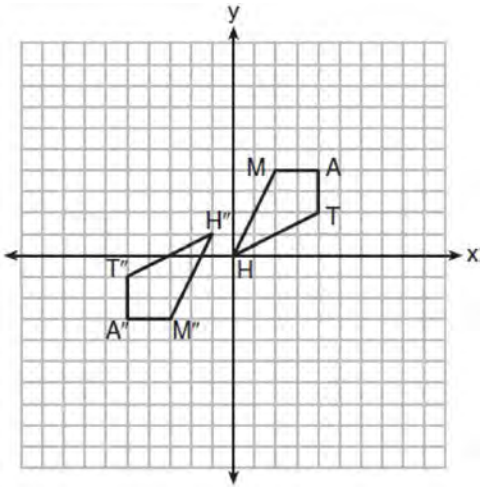
46 In circle M below, diameter $\overline{AC}$, chords $\overline{AB}$ and $\overline{BC}$, and radius $\overline{MB}$ are drawn.



Which statement is *not* true?

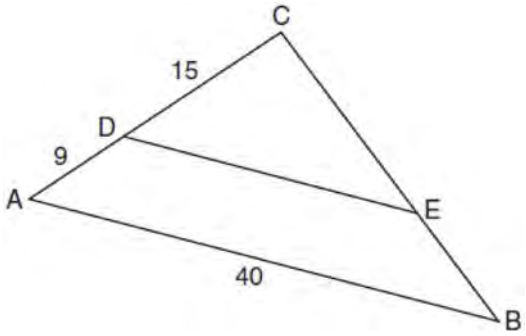
1) $\triangle ABC$ is a right triangle.
2) $\triangle ABM$ is isosceles.
3) $m\overset{\frown}{BC} = m\angle BMC$
4) $m\overset{\frown}{AB} = \frac{1}{2} m\angle ACB$

47 Quadrilateral $MATH$ and its image $M''A''T''H''$ are graphed on the set of axes below.



Describe a sequence of transformations that maps quadrilateral $MATH$ onto quadrilateral $M''A''T''H''$.

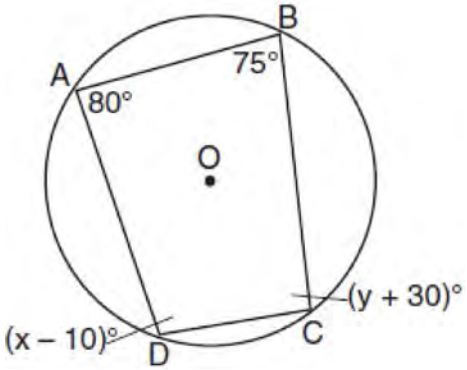
48 In the diagram of $\triangle ABC$ below, $\overline{DE}$ is parallel to $\overline{AB}$, $CD = 15$, $AD = 9$, and $AB = 40$.



The length of $\overline{DE}$ is

1) 15
2) 24
3) 25
4) 30

49 Quadrilateral $ABCD$ is inscribed in circle O, as shown below.



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

1) $x = 85$ and $y = 50$
2) $x = 90$ and $y = 45$
3) $x = 110$ and $y = 75$
4) $x = 115$ and $y = 70$

Geometry Regents Exam Questions at Random Worksheet # 11 NAME:_____
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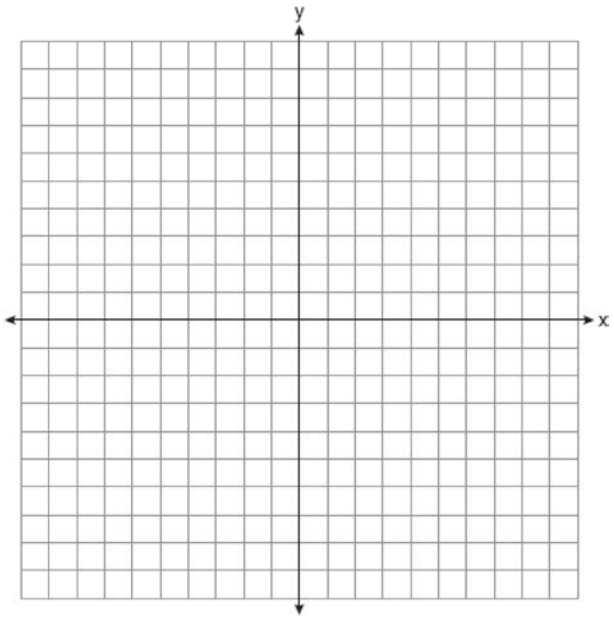
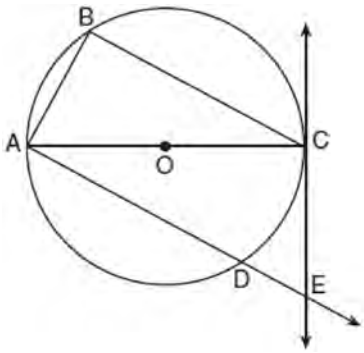
50 The vertices of quadrilateral *MATH* have coordinates $M(-4,2)$, $A(-1,-3)$, $T(9,3)$, and $H(6,8)$. Prove that quadrilateral *MATH* is a parallelogram. Prove that quadrilateral *MATH* is a rectangle. [The use of the set of axes below is optional.]



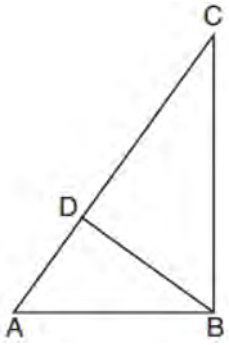
51 In the diagram below of circle *O*, tangent $\overleftrightarrow{EC}$ is drawn to diameter $\overline{AC}$. Chord $\overline{BC}$ is parallel to secant $\overline{ADE}$, and chord $\overline{AB}$ is drawn.



Prove: $\frac{BC}{CA} = \frac{AB}{EC}$

52 A farmer has 64 feet of fence to enclose a rectangular vegetable garden. Which dimensions would result in the biggest area for this garden?
1) the length and the width are equal
2) the length is 2 more than the width
3) the length is 4 more than the width
4) the length is 6 more than the width

53 In the accompanying diagram of right triangle *ABC*, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



Which statement must always be true?
1) $\frac{AD}{AB} = \frac{BC}{AC}$
2) $\frac{AD}{AB} = \frac{AB}{AC}$
3) $\frac{BD}{BC} = \frac{AB}{AD}$
4) $\frac{AB}{BC} = \frac{BD}{AC}$

54 Which transformation would *not* carry a square onto itself?
1) a reflection over one of its diagonals
2) a 90° rotation clockwise about its center
3) a 180° rotation about one of its vertices
4) a reflection over the perpendicular bisector of one side

Geometry Regents Exam Questions at Random Worksheet # 12 NAME:_____
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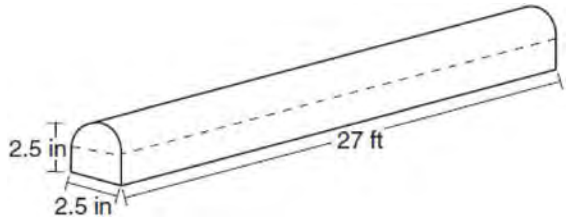
55 A fabricator is hired to make a 27-foot-long solid metal railing for the stairs at the local library. The railing is modeled by the diagram below. The railing is 2.5 inches high and 2.5 inches wide and is comprised of a rectangular prism and a half-cylinder.



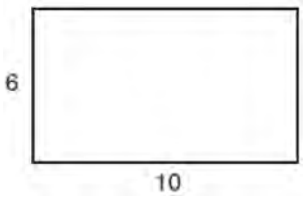
How much metal, to the *nearest cubic inch*, will the railing contain?
1) 151
2) 795
3) 1808
4) 2025

56 A child's tent can be modeled as a pyramid with a square base whose sides measure 60 inches and whose height measures 84 inches. What is the volume of the tent, to the *nearest cubic foot*?
1) 35
2) 58
3) 82
4) 175

57 The vertices of square *RSTV* have coordinates $R(-1,5)$, $S(-3,1)$, $T(-7,3)$, and $V(-5,7)$. What is the perimeter of *RSTV*?
1) $\sqrt{20}$
2) $\sqrt{40}$
3) $4\sqrt{20}$
4) $4\sqrt{40}$

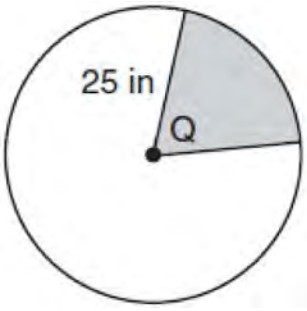
58 A machinist creates a solid steel part for a wind turbine engine. The part has a volume of 1015 cubic centimeters. Steel can be purchased for \$0.29 per kilogram, and has a density of 7.95 g/cm^3. If the machinist makes 500 of these parts, what is the cost of the steel, to the *nearest dollar*?

59 A rectangle whose length and width are 10 and 6, respectively, is shown below. The rectangle is continuously rotated around a straight line to form an object whose volume is 150π.



Which line could the rectangle be rotated around?
1) a long side
2) a short side
3) the vertical line of symmetry
4) the horizontal line of symmetry

60 In the diagram below, the circle has a radius of 25 inches. The area of the *unshaded* sector is 500π in^2.



Determine and state the degree measure of angle *Q*, the central angle of the shaded sector.

Geometry Regents Exam Questions at Random Worksheet # 13 NAME:_____
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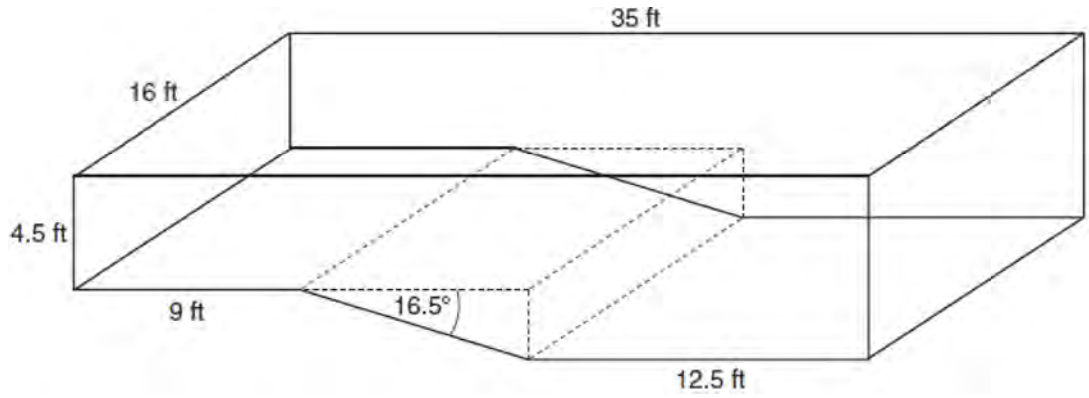
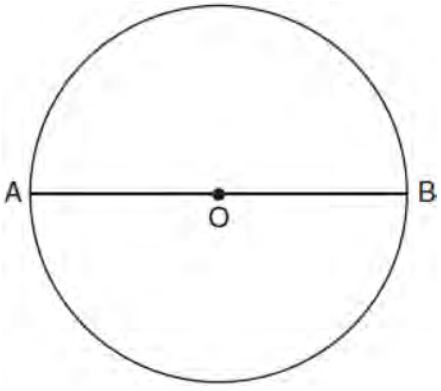
61 A rectangular in-ground pool is modeled by the prism below. The inside of the pool is 16 feet wide and 35 feet long. The pool has a shallow end and a deep end, with a sloped floor connecting the two ends. Without water, the shallow end is 9 feet long and 4.5 feet deep, and the deep end of the pool is 12.5 feet long.

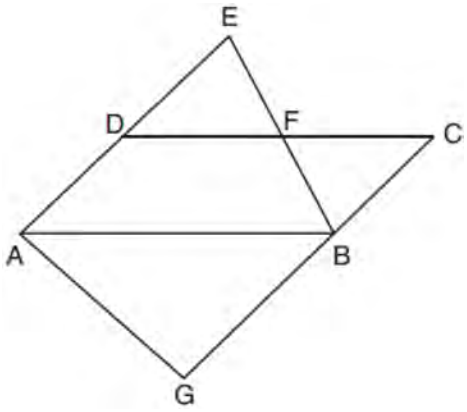


If the sloped floor has an angle of depression of 16.5 degrees, what is the depth of the pool at the deep end, to the *nearest tenth of a foot*? Find the volume of the inside of the pool to the *nearest cubic foot*. A garden hose is used to fill the pool. Water comes out of the hose at a rate of 10 .5 gallons per minute. How much time, to the *nearest hour*, will it take to fill the pool 6 inches from the top? [1 ft^3=7.48 gallons]

62 The diagram below shows circle *O* with diameter $\overline{AB}$. Using a compass and straightedge, construct a square that is inscribed in circle *O*. [Leave all construction marks.]



63 In the diagram below, $\overline{AB} \parallel \overline{DFC}$, $\overline{EDA} \parallel \overline{CBG}$, and $\overline{EFB}$ and $\overline{AG}$ are drawn.

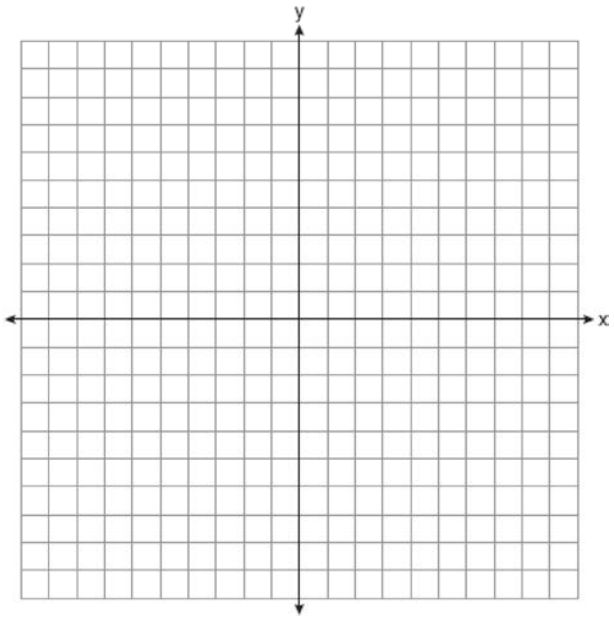


Which statement is always true?

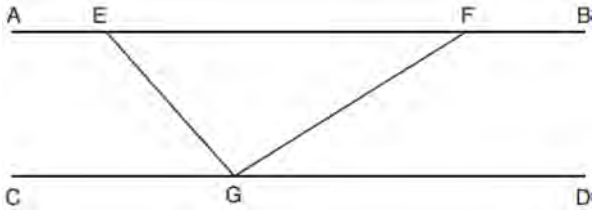
1) $\triangle DEF \cong \triangle CBF$
2) $\triangle BAG \cong \triangle BAE$
3) $\triangle BAG \sim \triangle AEB$
4) $\triangle DEF \sim \triangle AEB$

Geometry Regents Exam Questions at Random Worksheet # 14 NAME:_____
www.jmap.org

64 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below. Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$. Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.



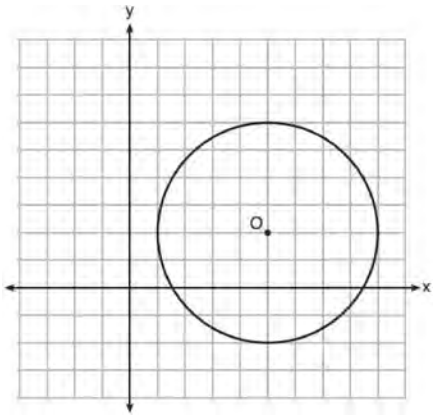
65 In the diagram below, $\overline{AEFB} \parallel \overline{CGD}$, and $\overline{GE}$ and $\overline{GF}$ are drawn.



If $m\angle EFG = 32°$ and $m\angle AEG = 137°$, what is $m\angle EGF$?

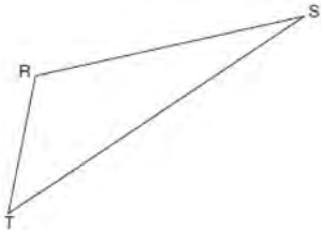
1) 11°
2) 43°
3) 75°
4) 105°

66 What is an equation of circle O shown in the graph below?



1) $x^2 + 10x + y^2 + 4y = -13$
2) $x^2 - 10x + y^2 - 4y = -13$
3) $x^2 + 10x + y^2 + 4y = -25$
4) $x^2 - 10x + y^2 - 4y = -25$

67 Using a compass and straightedge, construct the line of reflection over which triangle RST reflects onto triangle $R'S'T'$. [Leave all construction marks.]



Geometry Regents Exam Questions at Random Worksheet # 15 NAME:_____
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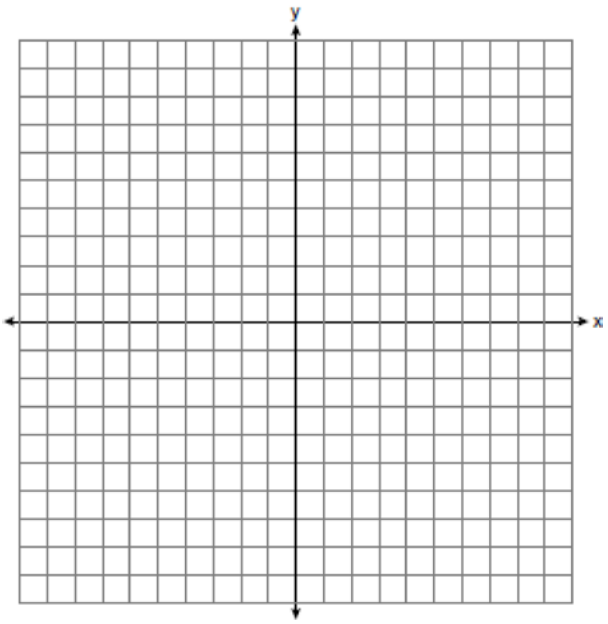
68 Triangle *ABC* has vertices with coordinates $A(-1,-1)$, $B(4,0)$, and $C(0,4)$. Prove that $\triangle ABC$ is an isosceles triangle but *not* an equilateral triangle. [The use of the set of axes below is optional.]



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

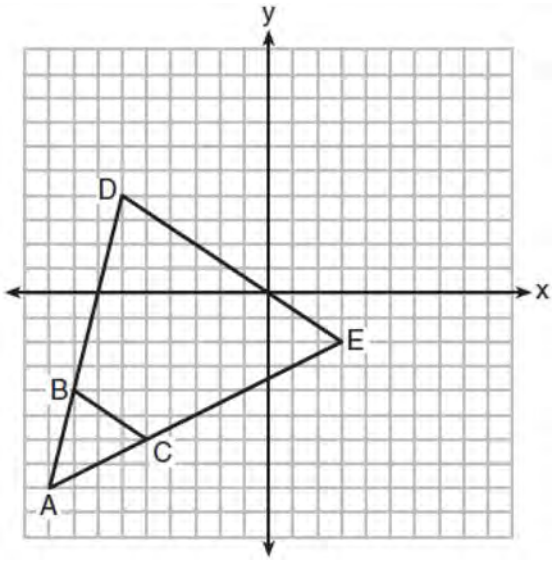
1) triangle
2) trapezoid
3) hexagon
4) rectangle

70 The line represented by the equation $4y = 3x + 7$ is transformed by a dilation centered at the origin. Which linear equation could represent its image?

1) $3x - 4y = 9$
2) $3x + 4y = 9$
3) $4x - 3y = 9$
4) $4x + 3y = 9$

71 New streetlights will be installed along a section of the highway. The posts for the streetlights will be 7.5 m tall and made of aluminum. The city can choose to buy the posts shaped like cylinders or the posts shaped like rectangular prisms. The cylindrical posts have a hollow core, with aluminum 2.5 cm thick, and an outer diameter of 53.4 cm. The rectangular-prism posts have a hollow core, with aluminum 2.5 cm thick, and a square base that measures 40 cm on each side. The density of aluminum is 2.7 g/cm3, and the cost of aluminum is \$0.38 per kilogram. If all posts must be the same shape, which post design will cost the town less? How much money will be saved per streetlight post with the less expensive design?

72 Triangle *ABC* and triangle *ADE* are graphed on the set of axes below.



Describe a transformation that maps triangle *ABC* onto triangle *ADE*. Explain why this transformation makes triangle *ADE* similar to triangle *ABC*.

Geometry Regents Exam Questions at Random Worksheet # 16 NAME:_____
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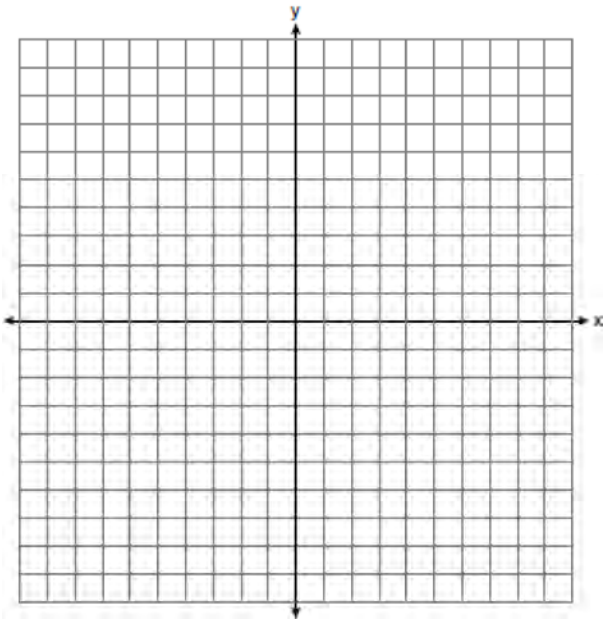
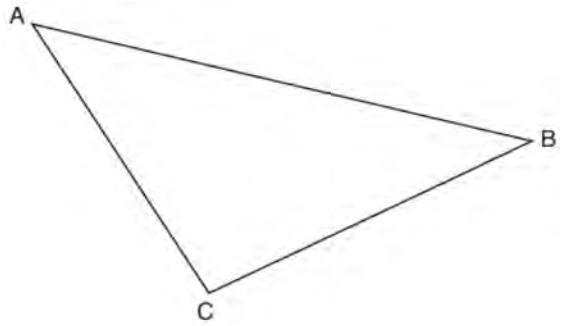
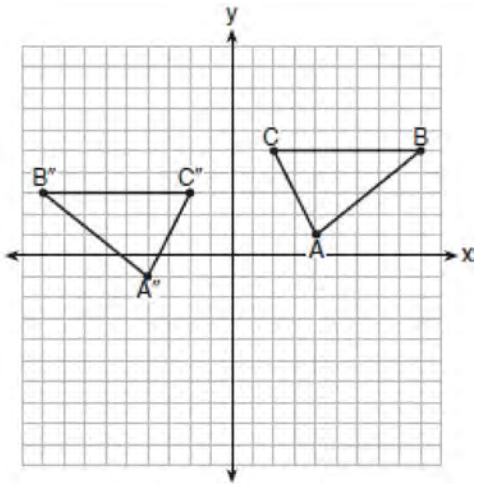
73 Triangle PQR has vertices $P(-3,-1)$, $Q(-1,7)$, and $R(3,3)$, and points A and B are midpoints of $\overline{PQ}$ and $\overline{RQ}$, respectively. Use coordinate geometry to prove that $\overline{AB}$ is parallel to $\overline{PR}$ and is half the length of $\overline{PR}$. [The use of the set of axes below is optional.]



74 Using a compass and straightedge, construct the median to side $\overline{AC}$ in $\triangle ABC$ below. [Leave all construction marks.]



75 The graph below shows $\triangle ABC$ and its image, $\triangle A''B''C''$.



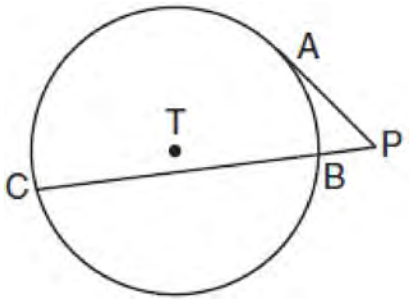
Describe a sequence of rigid motions which would map $\triangle ABC$ onto $\triangle A''B''C''$.

76 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, she sees the airplane at an angle of elevation of 52°. How far has the airplane traveled, to the *nearest foot*? Determine and state the speed of the airplane, to the *nearest mile per hour*.

77 A regular decagon is rotated n degrees about its center, carrying the decagon onto itself. The value of n could be
1) 10°
2) 150°
3) 225°
4) 252°

Geometry Regents Exam Questions at Random Worksheet # 17 NAME:_____
www.jmap.org

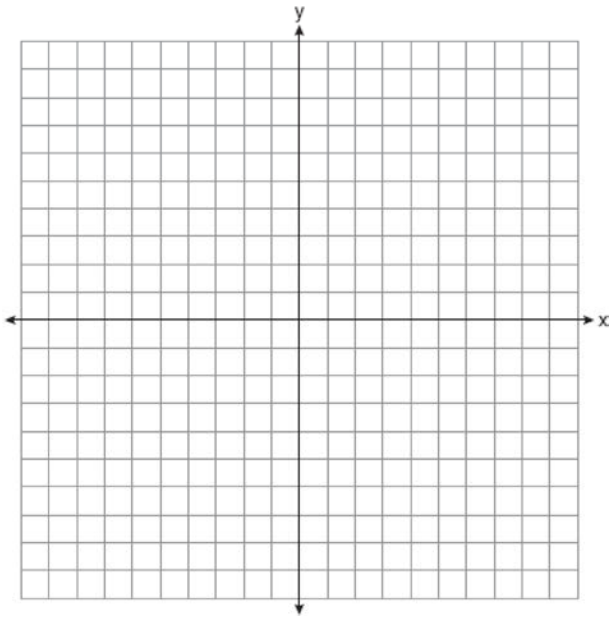
78 In the diagram shown below, $\overline{PA}$ is tangent to circle T at A, and secant $\overline{PBC}$ is drawn where point B is on circle T.



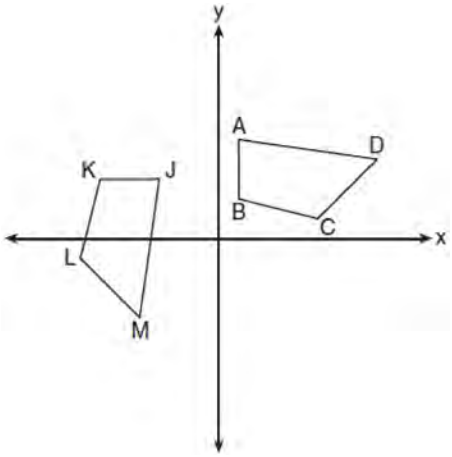
If $PB = 3$ and $BC = 15$, what is the length of $\overline{PA}$?

1) $3\sqrt{5}$
2) $3\sqrt{6}$
3) 3
4) 9

79 Quadrilateral $PQRS$ has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$. Prove that $PQRS$ is a rhombus. Prove that $PQRS$ is *not* a square. [The use of the set of axes below is optional.]



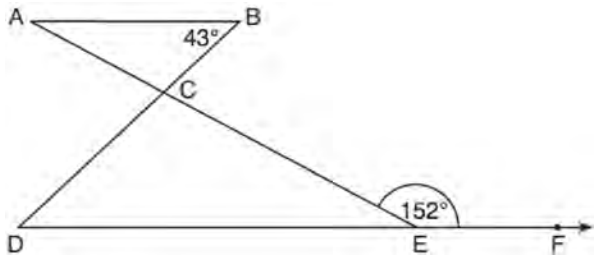
80 In the diagram below, a sequence of rigid motions maps $ABCD$ onto $JKLM$.



If $m\angle A = 82°$, $m\angle B = 104°$, and $m\angle L = 121°$, the measure of $\angle M$ is

1) 53°
2) 82°
3) 104°
4) 121°

81 In the diagram below, $\overline{AB} \parallel \overrightarrow{DEF}$, $\overline{AE}$ and $\overline{BD}$ intersect at C, $m\angle B = 43°$, and $m\angle CEF = 152°$.



Which statement is true?

1) $m\angle D = 28°$
2) $m\angle A = 43°$
3) $m\angle ACD = 71°$
4) $m\angle BCE = 109°$

Geometry Regents Exam Questions at Random Worksheet # 18 NAME:_____
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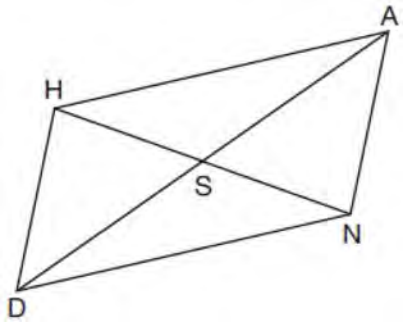
82 Parallelogram *HAND* is drawn below with diagonals $\overline{HN}$ and $\overline{AD}$ intersecting at *S*.



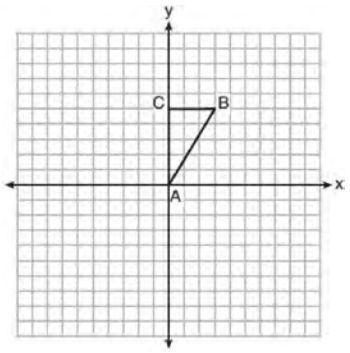
Which statement is always true?

1) $AN = \frac{1}{2}AD$
2) $AS = \frac{1}{2}AD$
3) $\angle AHS \cong \angle ANS$
4) $\angle HDS \cong \angle NDS$

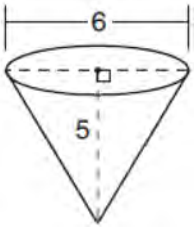
83 Quadrilateral *MATH* has both pairs of opposite sides congruent and parallel. Which statement about quadrilateral *MATH* is always true?

1) $\overline{MT} \cong \overline{AH}$
2) $\overline{MT} \perp \overline{AH}$
3) $\angle MHT \cong \angle ATH$
4) $\angle MAT \cong \angle MHT$

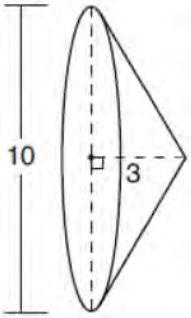
84 Triangle *ABC*, with vertices at $A(0,0)$, $B(3,5)$, and $C(0,5)$, is graphed on the set of axes shown below.

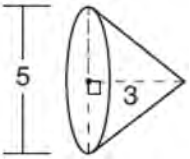


Which figure is formed when $\triangle ABC$ is rotated continuously about $\overline{BC}$?

1)


2)


3)


4)


85 An ice cream waffle cone can be modeled by a right circular cone with a base diameter of 6.6 centimeters and a volume of 54.45π cubic centimeters. What is the number of centimeters in the height of the waffle cone?

1) $3\frac{3}{4}$
2) 5
3) 15
4) $24\frac{3}{4}$

Geometry Regents Exam Questions at Random Worksheet # 19 NAME:_____
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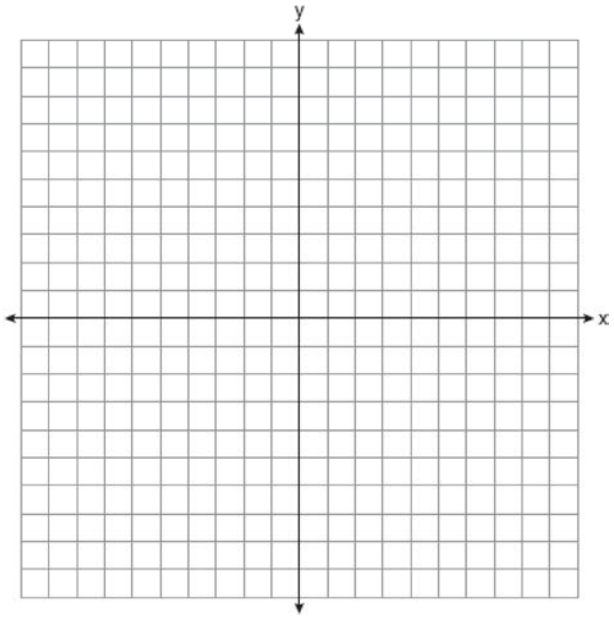
86 The 2010 U.S. Census populations and population densities are shown in the table below.

State	Population Density $\left(\frac{\text{people}}{\text{mi}^2}\right)$	Population in 2010
Florida	350.6	18,801,310
Illinois	231.1	12,830,632
New York	411.2	19,378,102
Pennsylvania	283.9	12,702,379

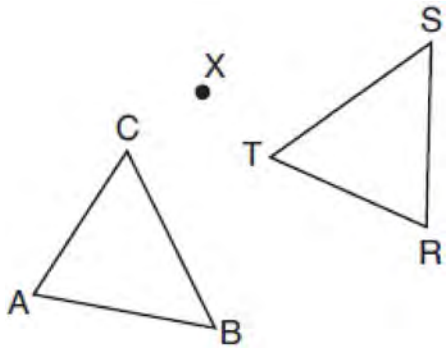
Based on the table above, which list has the states' areas, in square miles, in order from largest to smallest?

1) Illinois, Florida, New York, Pennsylvania
2) New York, Florida, Illinois, Pennsylvania
3) New York, Florida, Pennsylvania, Illinois
4) Pennsylvania, New York, Florida, Illinois

87 In square *GEOM*, the coordinates of *G* are $(2,-2)$ and the coordinates of *O* are $(-4,2)$. Determine and state the coordinates of vertices *E* and *M*. [The use of the set of axes below is optional.]



88 After a counterclockwise rotation about point *X*, scalene triangle *ABC* maps onto $\triangle RST$, as shown in the diagram below.



Which statement must be true?

1) $\angle A \cong \angle R$
2) $\angle A \cong \angle S$
3) $\overline{CB} \cong \overline{TR}$
4) $\overline{CA} \cong \overline{TS}$

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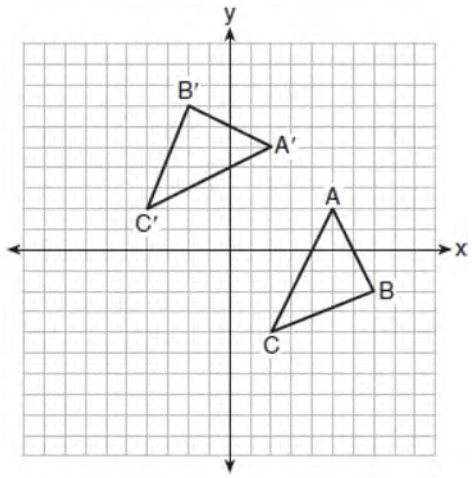
89 Point Q is on $\overline{MN}$ such that $MQ:QN = 2:3$. If M has coordinates $(3,5)$ and N has coordinates $(8,-5)$, the coordinates of Q are
1) $(5,1)$
2) $(5,0)$
3) $(6,-1)$
4) $(6,0)$

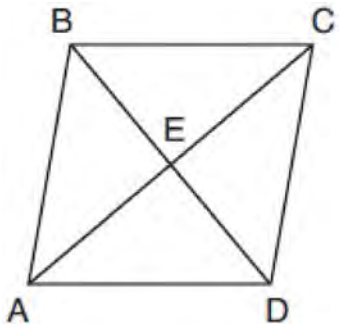
90 The graph below shows two congruent triangles, ABC and $A'B'C'$.



Which rigid motion would map $\triangle ABC$ onto $\triangle A'B'C'$?
1) a rotation of 90 degrees counterclockwise about the origin
2) a translation of three units to the left and three units up
3) a rotation of 180 degrees about the origin
4) a reflection over the line $y = x$

91 In circle O, secants $\overline{ADB}$ and $\overline{AEC}$ are drawn from external point A such that points D, B, E, and C are on circle O. If $AD = 8$, $AE = 6$, and EC is 12 more than BD, the length of $\overline{BD}$ is
1) 6
2) 22
3) 36
4) 48

92 The diagram below shows parallelogram $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$ intersecting at E.



What additional information is sufficient to prove that parallelogram $ABCD$ is also a rhombus?
1) $\overline{BD}$ bisects $\overline{AC}$.
2) $\overline{AB}$ is parallel to $\overline{CD}$.
3) $\overline{AC}$ is congruent to $\overline{BD}$.
4) $\overline{AC}$ is perpendicular to $\overline{BD}$.

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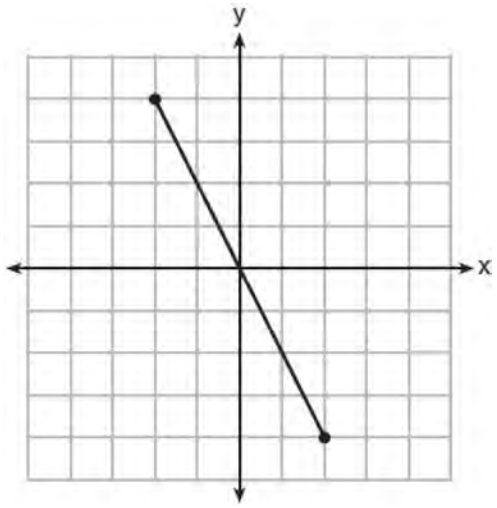
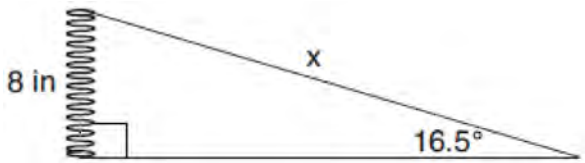
93 What is an equation of the perpendicular bisector of the line segment shown in the diagram below?



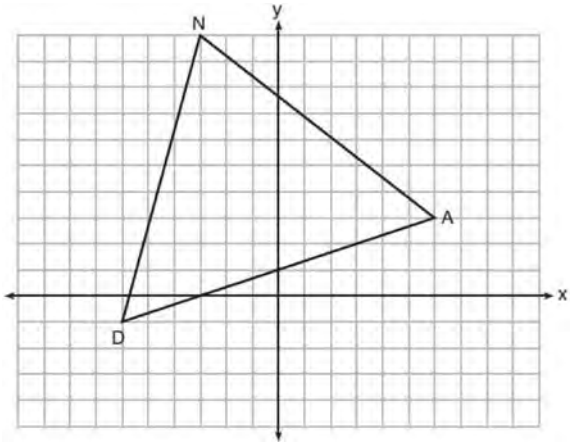
1) $y + 2x = 0$
2) $y - 2x = 0$
3) $2y + x = 0$
4) $2y - x = 0$

94 Yolanda is making a springboard to use for gymnastics. She has 8-inch-tall springs and wants to form a 16.5° angle with the base, as modeled in the diagram below.



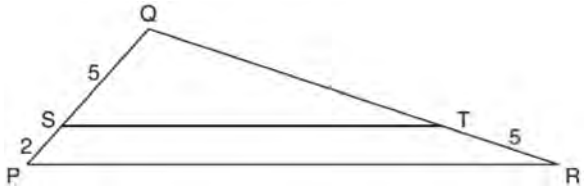
To the *nearest tenth of an inch*, what will be the length of the springboard, x?
1) 2.3
2) 8.3
3) 27.0
4) 28.2

95 Triangle DAN is graphed on the set of axes below. The vertices of $\triangle DAN$ have coordinates $D(-6,-1)$, $A(6,3)$, and $N(-3,10)$.



What is the area of $\triangle DAN$?
1) 60
2) 120
3) $20\sqrt{13}$
4) $40\sqrt{13}$

96 In the diagram below of $\triangle PQR$, $\overline{ST}$ is drawn parallel to $\overline{PR}$, $PS = 2$, $SQ = 5$, and $TR = 5$.



What is the length of $\overline{QR}$?
1) 7
2) 2
3) $12\frac{1}{2}$
4) $17\frac{1}{2}$

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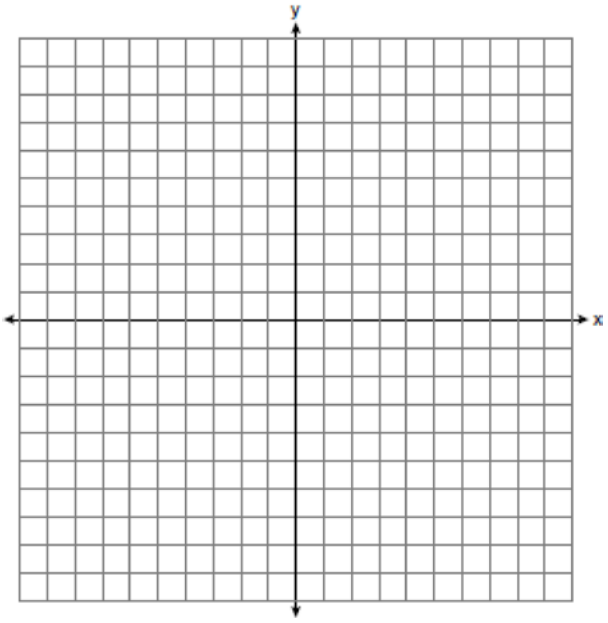
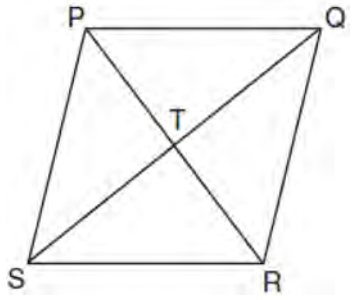
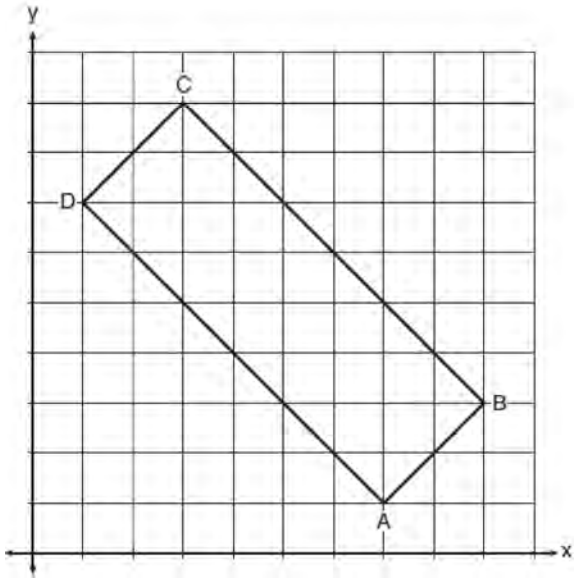
97 In the coordinate plane, the vertices of triangle *PAT* are $P(-1,-6)$, $A(-4,5)$, and $T(5,-2)$. Prove that $\triangle PAT$ is an isosceles triangle. State the coordinates of *R* so that quadrilateral *PART* is a parallelogram. Prove that quadrilateral *PART* is a parallelogram. [The use of the set of axes below is optional.]



98 In the diagram of rhombus *PQRS* below, the diagonals $\overline{PR}$ and $\overline{QS}$ intersect at point *T*, $PR = 16$, and $QS = 30$. Determine and state the perimeter of *PQRS*.



99 In the diagram below, rectangle *ABCD* has vertices whose coordinates are $A(7,1)$, $B(9,3)$, $C(3,9)$, and $D(1,7)$.



Which transformation will *not* carry the rectangle onto itself?

1) a reflection over the line $y = x$
2) a reflection over the line $y = -x + 10$
3) a rotation of 180° about the point $(6,6)$
4) a rotation of 180° about the point $(5,5)$

100 Which set of statements would describe a parallelogram that can always be classified as a rhombus?

I. Diagonals are perpendicular bisectors of each other.

II. Diagonals bisect the angles from which they are drawn.

III. Diagonals form four congruent isosceles right triangles.

1) I and II
2) I and III
3) II and III
4) I, II, and III

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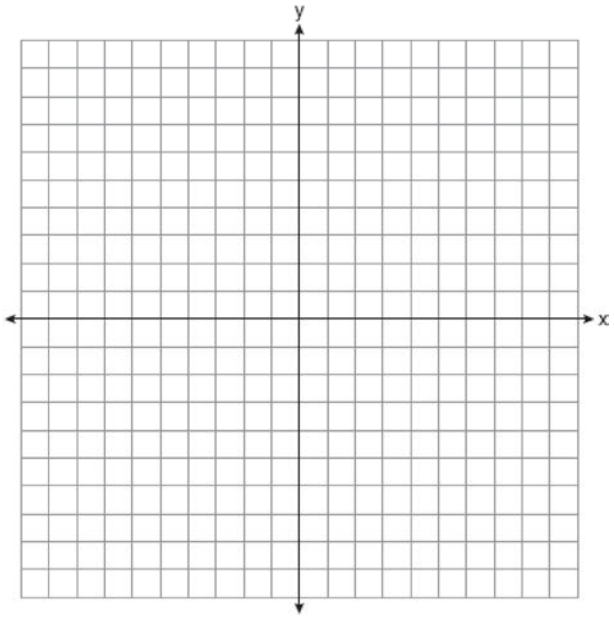
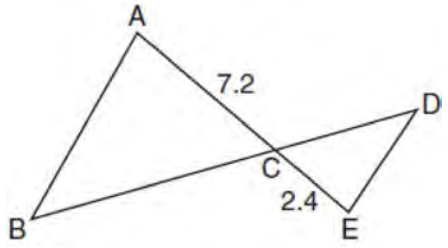
101 Line n is represented by the equation $3x + 4y = 20$. Determine and state the equation of line p, the image of line n, after a dilation of scale factor $\frac{1}{3}$ centered at the point $(4,2)$. [The use of the set of axes below is optional.] Explain your answer.



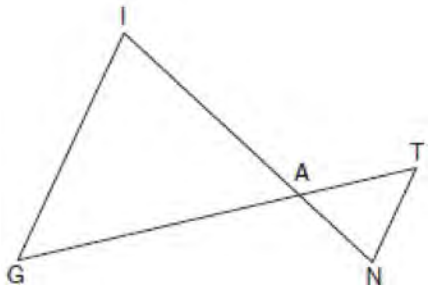
102 In the diagram below, $AC = 7.2$ and $CE = 2.4$.



Which statement is *not* sufficient to prove $\triangle ABC \sim \triangle EDC$?

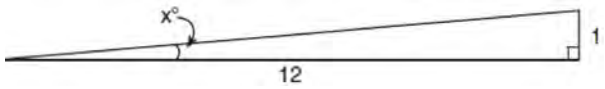
1) $\overline{AB} \parallel \overline{ED}$
2) $DE = 2.7$ and $AB = 8.1$
3) $CD = 3.6$ and $BC = 10.8$
4) $DE = 3.0$, $AB = 9.0$, $CD = 2.9$, and $BC = 8.7$

103 In the diagram below, $\overline{GI}$ is parallel to $\overline{NT}$, and $\overline{IN}$ intersects $\overline{GT}$ at A.



Prove: $\triangle GIA \sim \triangle TNA$

104 To build a handicapped-access ramp, the building code states that for every 1 inch of vertical rise in height, the ramp must extend out 12 inches horizontally, as shown in the diagram below.



What is the angle of inclination, x, of this ramp, to the *nearest hundredth of a degree*?

1) 4.76
2) 4.78
3) 85.22
4) 85.24

105 An equation of circle O is $x^2 + y^2 + 4x - 8y = -16$. The statement that best describes circle O is the

1) center is $(2,-4)$ and is tangent to the x-axis
2) center is $(2,-4)$ and is tangent to the y-axis
3) center is $(-2,4)$ and is tangent to the x-axis
4) center is $(-2,4)$ and is tangent to the y-axis

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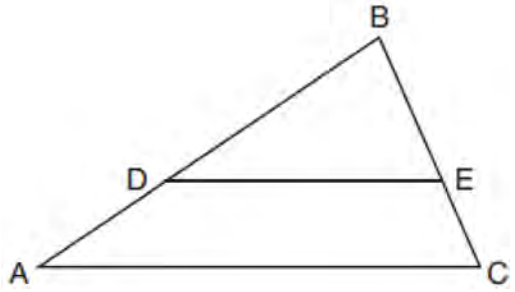
106 In right triangle ABC, $m\angle C = 90°$. If $\cos B = \frac{5}{13}$, which function also equals $\frac{5}{13}$?

1) $\tan A$
2) $\tan B$
3) $\sin A$
4) $\sin B$

107 In triangle ABC, points D and E are on sides $\overline{AB}$ and $\overline{BC}$, respectively, such that $\overline{DE} \parallel \overline{AC}$, and $AD:DB = 3:5$.



If $DB = 6.3$ and $AC = 9.4$, what is the length of DE, to the *nearest tenth*?

1) 3.8
2) 5.6
3) 5.9
4) 15.7

108 Which figure always has exactly four lines of reflection that map the figure onto itself?

1) square
2) rectangle
3) regular octagon
4) equilateral triangle

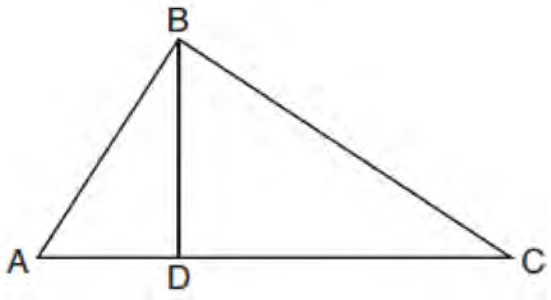
109 The line whose equation is $3x - 5y = 4$ is dilated by a scale factor of $\frac{5}{3}$ centered at the origin. Which statement is correct?

1) The image of the line has the same slope as the pre-image but a different y-intercept.
2) The image of the line has the same y-intercept as the pre-image but a different slope.
3) The image of the line has the same slope and the same y-intercept as the pre-image.
4) The image of the line has a different slope and a different y-intercept from the pre-image.

110 The vertices of $\triangle PQR$ have coordinates $P(2,3)$, $Q(3,8)$, and $R(7,3)$. Under which transformation of $\triangle PQR$ are distance and angle measure preserved?

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

111 In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



If $BD = 4$, $AD = x - 6$, and $CD = x$, what is the length of $\overline{CD}$?

1) 5
2) 2
3) 8
4) 11

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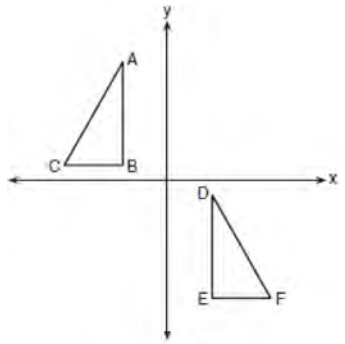
112 In the diagram below, $\triangle ABC \cong \triangle DEF$.



Which sequence of transformations maps $\triangle ABC$ onto $\triangle DEF$?

1) a reflection over the *x*-axis followed by a translation
2) a reflection over the *y*-axis followed by a translation
3) a rotation of 180° about the origin followed by a translation
4) a counterclockwise rotation of 90° about the origin followed by a translation

113 The image of $\triangle DEF$ is $\triangle D'E'F'$. Under which transformation will he triangles *not* be congruent?

1) a reflection through the origin
2) a reflection over the line $y = x$
3) a dilation with a scale factor of 1 centered at $(2,3)$
4) a dilation with a scale factor of $\frac{3}{2}$ centered at the origin

114 The coordinates of the endpoints of directed line segment *ABC* are $A(-8,7)$ and $C(7,-13)$. If $AB{:}BC = 3{:}2$, the coordinates of *B* are

1) $(1,-5)$
2) $(-2,-1)$
3) $(-3,0)$
4) $(3,-6)$

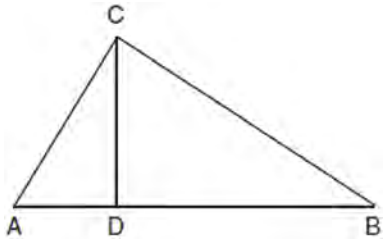
115 A right cylinder is cut perpendicular to its base. The shape of the cross section is a

1) circle
2) cylinder
3) rectangle
4) triangular prism

116 A candle maker uses a mold to make candles like the one shown below.

The height of the candle is 13 cm and the circumference of the candle at its widest measure is 31.416 cm. Use modeling to approximate how much wax, to the *nearest cubic centimeter*, is needed to make this candle. Justify your answer.

117 In right triangle *ABC* shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. Explain why $\triangle ABC \sim \triangle ACD$.



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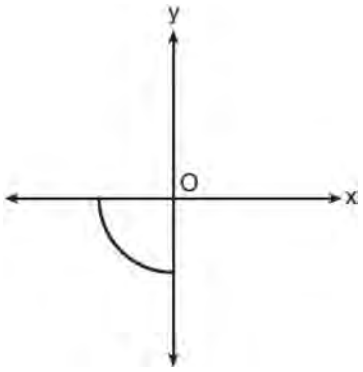
118 Under which transformation would $\triangle A'B'C'$, the image of $\triangle ABC$, *not* be congruent to $\triangle ABC$?
1) reflection over the *y*-axis
2) rotation of 90° clockwise about the origin
3) translation of 3 units right and 2 units down
4) dilation with a scale factor of 2 centered at the origin

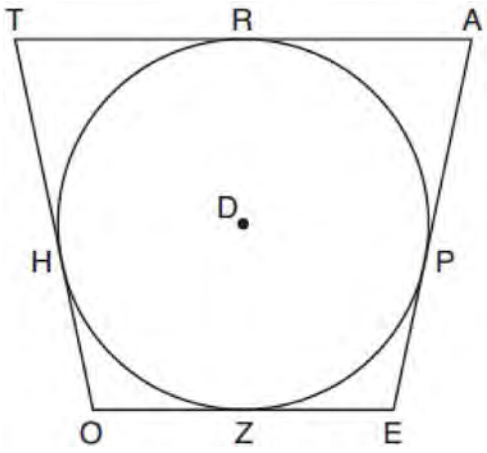
119 A bakery sells hollow chocolate spheres. The larger diameter of each sphere is 4 cm. The thickness of the chocolate of each sphere is 0.5 cm. Determine and state, to the *nearest tenth of a cubic centimeter*, the amount of chocolate in each hollow sphere. The bakery packages 8 of them into a box. If the density of the chocolate is 1.308 g/cm^3, determine and state, to the *nearest gram*, the total mass of the chocolate in the box.

120 Circle *O* is centered at the origin. In the diagram below, a quarter of circle *O* is graphed.



Which three-dimensional figure is generated when the quarter circle is continuously rotated about the *y*-axis?
1) cone
2) sphere
3) cylinder
4) hemisphere

121 In the figure shown below, quadrilateral *TAEO* is circumscribed around circle *D*. The midpoint of $\overline{TA}$ is *R*, and $\overline{HO} \cong \overline{PE}$.



If $AP = 10$ and $EO = 12$, what is the perimeter of quadrilateral *TAEO*?
1) 56
2) 64
3) 72
4) 76

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

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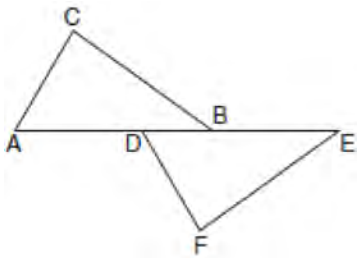
123 Triangle RJM has an area of 6 and a perimeter of 12. If the triangle is dilated by a scale factor of 3 centered at the origin, what are the area and perimeter of its image, triangle $R'J'M'$?
1) area of 9 and perimeter of 15
2) area of 18 and perimeter of 36
3) area of 54 and perimeter of 36
4) area of 54 and perimeter of 108

124 In right triangle ABC, hypotenuse $\overline{AB}$ has a length of 26 cm, and side $\overline{BC}$ has a length of 17.6 cm. What is the measure of angle B, to the *nearest degree*?
1) 48°
2) 47°
3) 43°
4) 34°

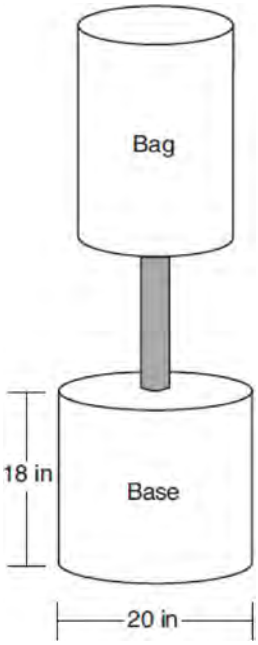
125 Kelly is completing a proof based on the figure below.



She was given that $\angle A \cong \angle EDF$, and has already proven $\overline{AB} \cong \overline{DE}$. Which pair of corresponding parts and triangle congruency method would *not* prove $\triangle ABC \cong \triangle DEF$?
1) $\overline{AC} \cong \overline{DF}$ and SAS
2) $\overline{BC} \cong \overline{EF}$ and SAS
3) $\angle C \cong \angle F$ and AAS
4) $\angle CBA \cong \angle FED$ and ASA

126 Given $\triangle ABC \cong \triangle DEF$, which statement is *not* always true?
1) $\overline{BC} \cong \overline{DF}$
2) $m\angle A = m\angle D$
3) area of $\triangle ABC$ = area of $\triangle DEF$
4) perimeter of $\triangle ABC$ = perimeter of $\triangle DEF$

127 Shae has recently begun kickboxing and purchased training equipment as modeled in the diagram below. The total weight of the bag, pole, and unfilled base is 270 pounds. The cylindrical base is 18 inches tall with a diameter of 20 inches. The dry sand used to fill the base weighs 95.46 lbs per cubic foot.



To the *nearest pound*, determine and state the total weight of the training equipment if the base is filled to 85% of its capacity.

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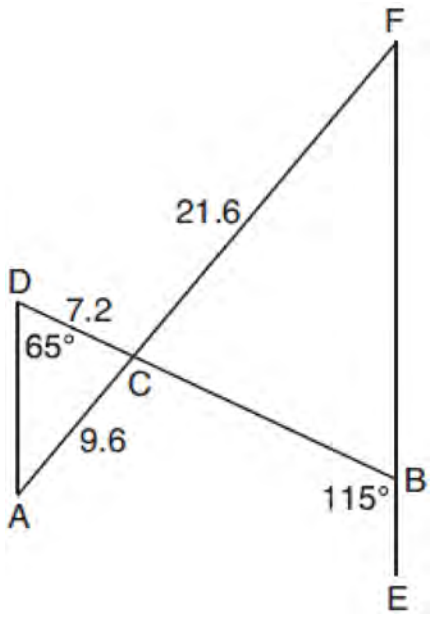
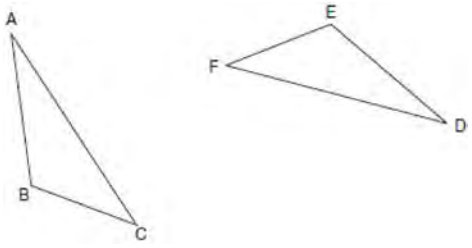
128 In the diagram below, $\overline{AF}$, and $\overline{DB}$ intersect at C, and $\overline{AD}$ and $\overline{FBE}$ are drawn such that $m\angle D = 65°$, $m\angle CBE = 115°$, $DC = 7.2$, $AC = 9.6$, and $FC = 21.6$.



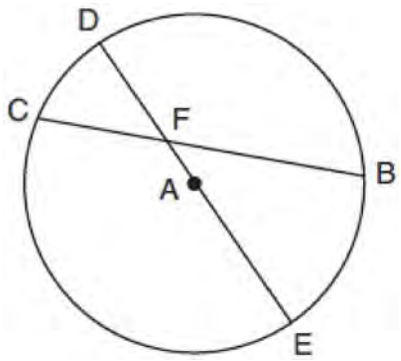
What is the length of $\overline{CB}$?
1) 3.2
2) 4.8
3) 16.2
4) 19.2

129 Triangle ABC and triangle DEF are drawn below.



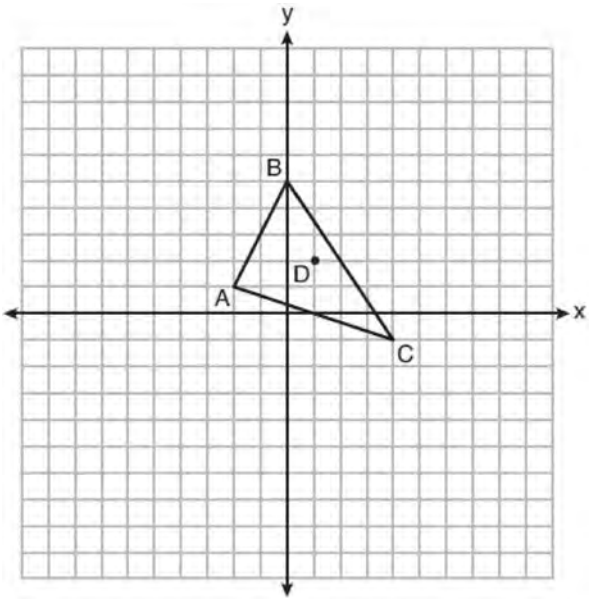
If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle ABC onto triangle DEF.

130 In circle A below, chord $\overline{BC}$ and diameter $\overline{DAE}$ intersect at F.



If $m\overset{\frown}{CD} = 46°$ and $m\overset{\frown}{DB} = 102°$, what is $m\angle CFE$?

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



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

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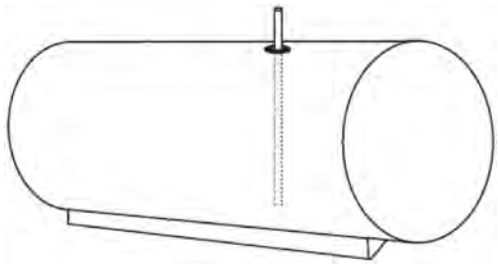
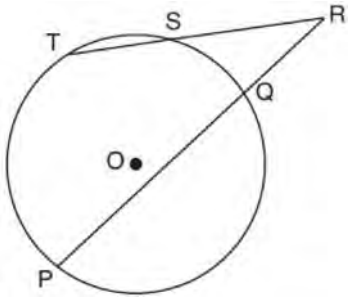
132 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3=7.48 gallons]

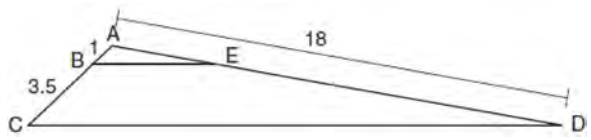
133 In the diagram below, secants $\overline{RST}$ and $\overline{RQP}$, drawn from point *R*, intersect circle *O* at *S*, *T*, *Q*, and *P*.



If $RS = 6$, $ST = 4$, and $RP = 15$, what is the length of $\overline{RQ}$?

134 Given: Right triangle *ABC* with right angle at *C*. If $\sin A$ increases, does $\cos B$ increase or decrease? Explain why.

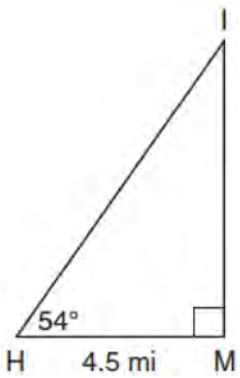
135 In the diagram below, triangle *ACD* has points *B* and *E* on sides $\overline{AC}$ and $\overline{AD}$, respectively, such that $\overline{BE} \parallel \overline{CD}$, $AB = 1$, $BC = 3.5$, and $AD = 18$.



What is the length of $\overline{AE}$, to the *nearest tenth*?

1) 14.0
2) 5.1
3) 3.3
4) 4.0

136 As shown in the diagram below, an island (*I*) is due north of a marina (*M*). A boat house (*H*) is 4.5 miles due west of the marina. From the boat house, the island is located at an angle of 54° from the marina.



Determine and state, to the *nearest tenth of a mile*, the distance from the boat house (*H*) to the island (*I*). Determine and state, to the *nearest tenth of a mile*, the distance from the island (*I*) to the marina (*M*).

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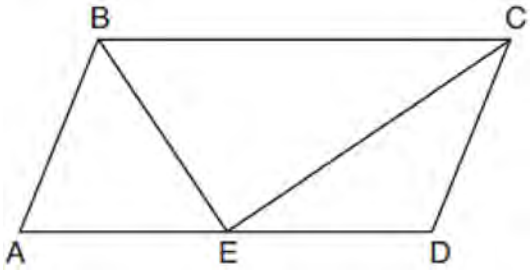
137 In parallelogram *ABCD* shown below, the bisectors of $\angle ABC$ and $\angle DCB$ meet at *E*, a point on $\overline{AD}$.



If $m\angle A = 68°$, determine and state $m\angle BEC$.

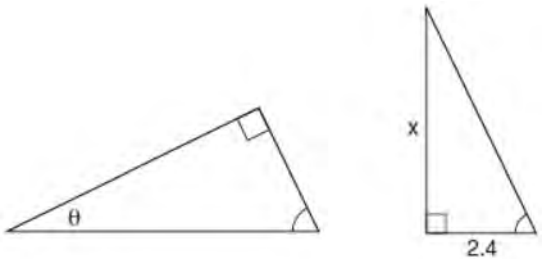
138 A line segment is dilated by a scale factor of 2 centered at a point not on the line segment. Which statement regarding the relationship between the given line segment and its image is true?

1) The line segments are perpendicular, and the image is one-half of the length of the given line segment.
2) The line segments are perpendicular, and the image is twice the length of the given line segment.
3) The line segments are parallel, and the image is twice the length of the given line segment.
4) The line segments are parallel, and the image is one-half of the length of the given line segment.

139 In right triangle *ABC*, $m\angle A = 32°$, $m\angle B = 90°$, and $AC = 6.2$ cm. What is the length of $\overline{BC}$, to the *nearest tenth of a centimeter*?

1) 3.3
2) 3.9
3) 5.3
4) 11.7

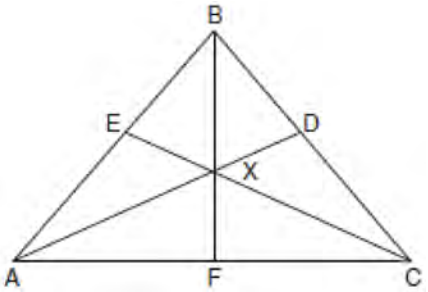
140 The diagram below shows two similar triangles.



If $\tan\theta = \frac{3}{7}$, what is the value of *x*, to the *nearest tenth*?

1) 1.2
2) 5.6
3) 7.6
4) 8.8

141 In the diagram below of isosceles triangle *ABC*, $\overline{AB} \cong \overline{CB}$ and angle bisectors $\overline{AD}$, $\overline{BF}$, and $\overline{CE}$ are drawn and intersect at *X*.



If $m\angle BAC = 50°$, find $m\angle AXC$.

142 Randy's basketball is in the shape of a sphere with a maximum circumference of 29.5 inches. Determine and state the volume of the basketball, to the *nearest cubic inch*.

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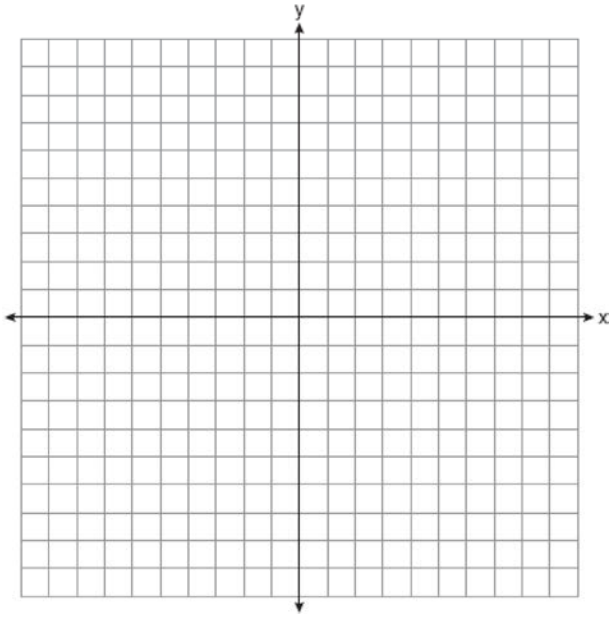
143 Given square *RSTV*, where *RS* = 9 cm. If square *RSTV* is dilated by a scale factor of 3 about a given center, what is the perimeter, in centimeters, of the image of *RSTV* after the dilation?

1) 12
2) 27
3) 36
4) 108

144 Aliyah says that when the line $4x + 3y = 24$ is dilated by a scale factor of 2 centered at the point $(3,4)$, the equation of the dilated line is $y = -\frac{4}{3}x + 16$. Is Aliyah correct? Explain why.

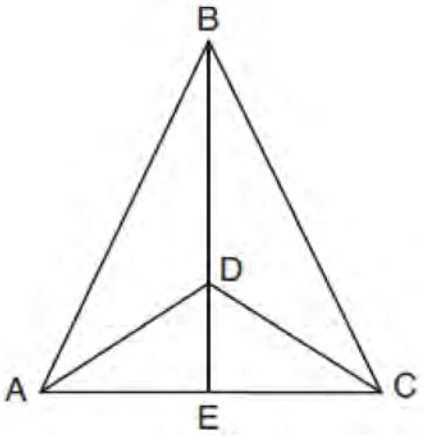
[The use of the set of axes below is optional.]



145 Determine and state, in terms of π, the area of a sector that intercepts a 40° arc of a circle with a radius of 4.5.

146 Given: $\triangle ABC$, $\overline{AEC}$, $\overline{BDE}$ with $\angle ABE \cong \angle CBE$, and $\angle ADE \cong \angle CDE$

Prove: $\overline{BDE}$ is the perpendicular bisector of $\overline{AC}$



Fill in the missing statement and reasons below.

Statements	Reasons
1 $\triangle ABC$, $\overline{AEC}$, $\overline{BDE}$ with $\angle ABE \cong \angle CBE$, and $\angle ADE \cong \angle CDE$	1 Given
2 $\overline{BD} \cong \overline{BD}$	2
3 $\angle BDA$ and $\angle ADE$ are supplementary. $\angle BDC$ and $\angle CDE$ are supplementary.	3 Linear pairs of angles are supplementary.
4	4 Supplements of congruent angles are congruent.
5 $\triangle ABD \cong \triangle CBD$	5 ASA
6 $\overline{AD} \cong \overline{CD}$, $\overline{AB} \cong \overline{CB}$	6
7 $\overline{BDE}$ is the perpendicular bisector of $\overline{AC}$.	7

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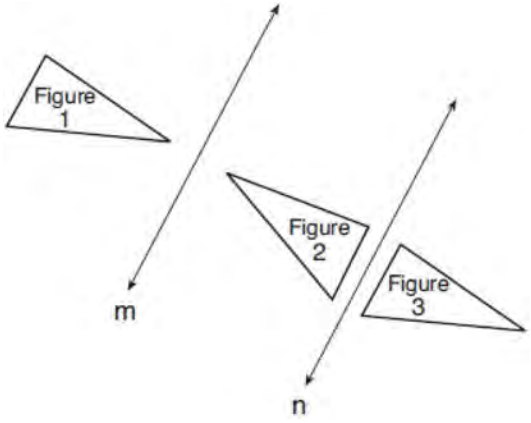
147 In the diagram below, line *m* is parallel to line *n*. Figure 2 is the image of Figure 1 after a reflection over line *m*. Figure 3 is the image of Figure 2 after a reflection over line *n*.

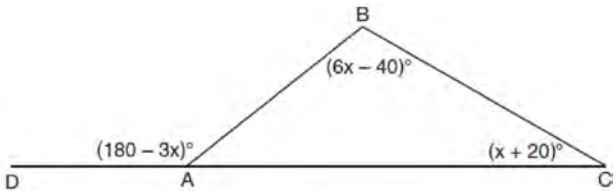


Which single transformation would carry Figure 1 onto Figure 3?
1) a dilation
2) a rotation
3) a reflection
4) a translation

148 The equation of a circle is $x^2 + y^2 - 6y + 1 = 0$. What are the coordinates of the center and the length of the radius of this circle?
1) center $(0,3)$ and radius = $2\sqrt{2}$
2) center $(0,-3)$ and radius = $2\sqrt{2}$
3) center $(0,6)$ and radius = $\sqrt{35}$
4) center $(0,-6)$ and radius = $\sqrt{35}$

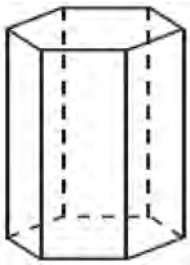
149 In a right triangle, $\sin(40-x)^\circ = \cos(3x)^\circ$. What is the value of x?
1) 10
2) 15
3) 20
4) 25

150 In $\triangle ABC$ shown below, side $\overline{AC}$ is extended to point D with $m\angle DAB = (180-3x)^\circ$, $m\angle B = (6x-40)^\circ$, and $m\angle C = (x+20)^\circ$.



What is $m\angle BAC$?
1) 20°
2) 40°
3) 60°
4) 80°

151 A right hexagonal prism is shown below. A two-dimensional cross section that is perpendicular to the base is taken from the prism.



Which figure describes the two-dimensional cross section?
1) triangle
2) rectangle
3) pentagon
4) hexagon

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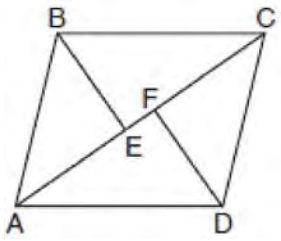
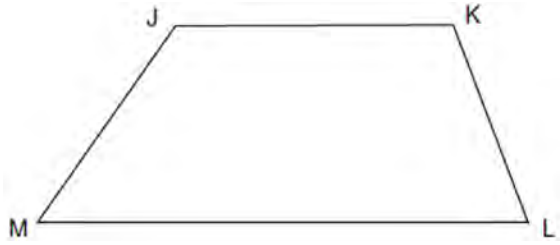
152 In the diagram below, if $\triangle ABE \cong \triangle CDF$ and $\overline{AEFC}$ is drawn, then it could be proven that quadrilateral *ABCD* is a



1) square
2) rhombus
3) rectangle
4) parallelogram

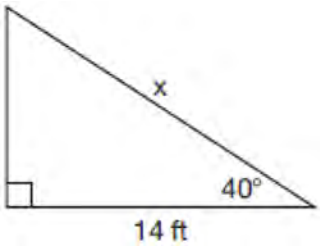
153 Given: Trapezoid *JKLM* with $\overline{JK} \parallel \overline{ML}$
Using a compass and straightedge, construct the altitude from vertex *J* to $\overline{ML}$. [Leave all construction marks.]



154 If $\sin(2x+7)° = \cos(4x-7)°$, what is the value of *x*?
1) 7
2) 15
3) 21
4) 30

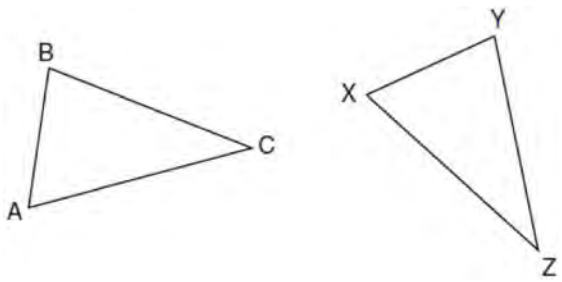
155 Which rotation about its center will carry a regular decagon onto itself?
1) 54°
2) 162°
3) 198°
4) 252°

156 Given the right triangle in the diagram below, what is the value of *x*, to the *nearest foot*?



1) 11
2) 17
3) 18
4) 22

157 In the diagram below of $\triangle ABC$ and $\triangle XYZ$, a sequence of rigid motions maps $\angle A$ onto $\angle X$, $\angle C$ onto $\angle Z$, and $\overline{AC}$ onto $\overline{XZ}$.



Determine and state whether $\overline{BC} \cong \overline{YZ}$. Explain why.

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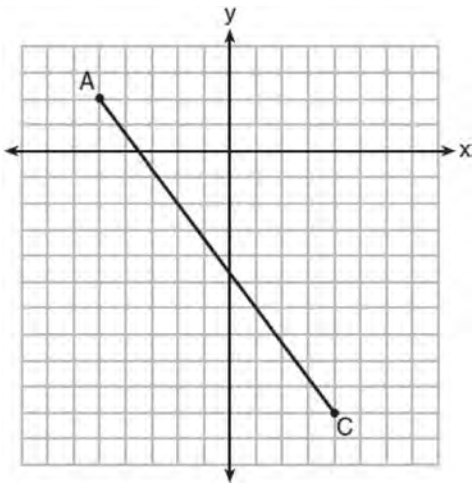
158 In the diagram below, $\overline{AC}$ has endpoints with coordinates $A(-5,2)$ and $C(4,-10)$.



If B is a point on $\overline{AC}$ and $AB:BC = 1:2$, what are the coordinates of B?

1) $(-2,-2)$
2) $\left(-\frac{1}{2},-4\right)$
3) $\left(0,-\frac{14}{3}\right)$
4) $(1,-6)$

159 Which equation represents the line that passes through the point $(-2,2)$ and is parallel to $y = \frac{1}{2}x + 8$?

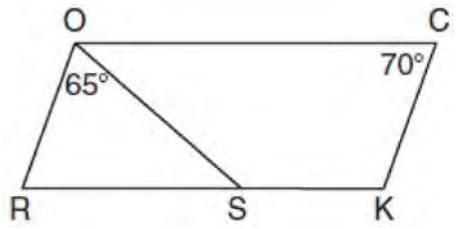
1) $y = \frac{1}{2}x$
2) $y = -2x - 3$
3) $y = \frac{1}{2}x + 3$
4) $y = -2x + 3$

160 In $\triangle ABC$, $\overline{BD}$ is the perpendicular bisector of $\overline{ADC}$. Based upon this information, which statements below can be proven?

I. $\overline{BD}$ is a median.
II. $\overline{BD}$ bisects $\angle ABC$.
III. $\triangle ABC$ is isosceles.

1) I and II, only
2) I and III, only
3) II and III, only
4) I, II, and III

161 In the diagram below of parallelogram $ROCK$, $m\angle C$ is 70° and $m\angle ROS$ is 65°.



What is $m\angle KSO$?

1) 45°
2) 110°
3) 115°
4) 135°

162 In a circle with a diameter of 32, the area of a sector is $\frac{512\pi}{3}$. The measure of the angle of the sector, in radians, is

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

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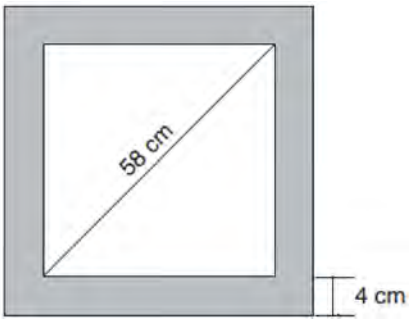
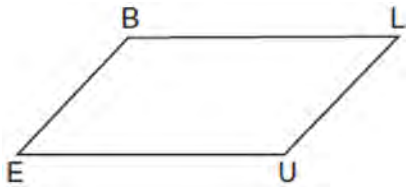
163 A parallelogram is always a rectangle if
1) the diagonals are congruent
2) the diagonals bisect each other
3) the diagonals intersect at right angles
4) the opposite angles are congruent

164 Keira has a square poster that she is framing and placing on her wall. The poster has a diagonal 58 cm long and fits exactly inside the frame. The width of the frame around the picture is 4 cm.



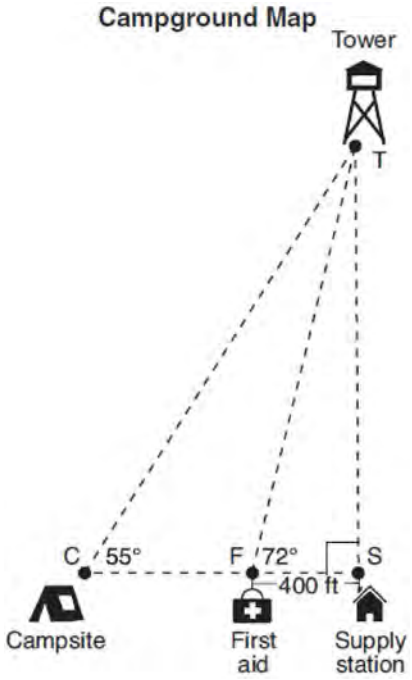
Determine and state the total area of the poster and frame to the *nearest tenth of a square centimeter*.

165 In quadrilateral *BLUE* shown below, $\overline{BE} \cong \overline{UL}$.



Which information would be sufficient to prove quadrilateral *BLUE* is a parallelogram?
1) $\overline{BL} \parallel \overline{EU}$
2) $\overline{LU} \parallel \overline{BE}$
3) $\overline{BE} \cong \overline{BL}$
4) $\overline{LU} \cong \overline{EU}$

166 The map of a campground is shown below. Campsite *C*, first aid station *F*, and supply station *S* lie along a straight path. The path from the supply station to the tower, *T*, is perpendicular to the path from the supply station to the campsite. The length of path $\overline{FS}$ is 400 feet. The angle formed by path $\overline{TF}$ and path $\overline{FS}$ is 72°. The angle formed by path $\overline{TC}$ and path $\overline{CS}$ is 55°.



Determine and state, to the *nearest foot*, the distance from the campsite to the tower.

167 Parallelogram *ABCD* has coordinates $A(0,7)$ and $C(2,1)$. Which statement would prove that *ABCD* is a rhombus?
1) The midpoint of $\overline{AC}$ is $(1,4)$.
2) The length of $\overline{BD}$ is $\sqrt{40}$.
3) The slope of $\overline{BD}$ is $\frac{1}{3}$.
4) The slope of $\overline{AB}$ is $\frac{1}{3}$.

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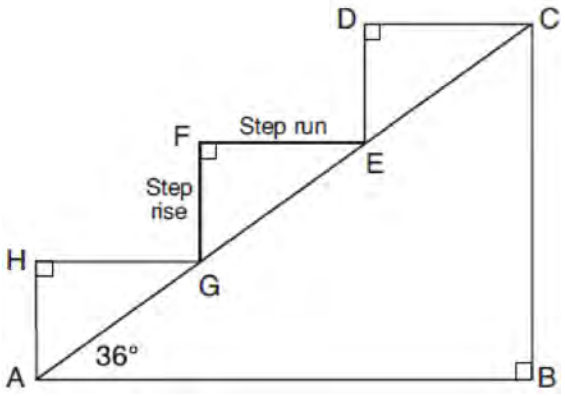
168 If *ABCD* is a parallelogram, which statement would prove that *ABCD* is a rhombus?
1) $\angle ABC \cong \angle CDA$
2) $\overline{AC} \cong \overline{BD}$
3) $\overline{AC} \perp \overline{BD}$
4) $\overline{AB} \perp \overline{CD}$

169 A homeowner is building three steps leading to a deck, as modeled by the diagram below. All three step rises, $\overline{HA}$, $\overline{FG}$, and $\overline{DE}$, are congruent, and all three step runs, $\overline{HG}$, $\overline{FE}$, and $\overline{DC}$, are congruent. Each step rise is perpendicular to the step run it joins. The measure of $\angle CAB = 36°$ and $\angle CBA = 90°$.

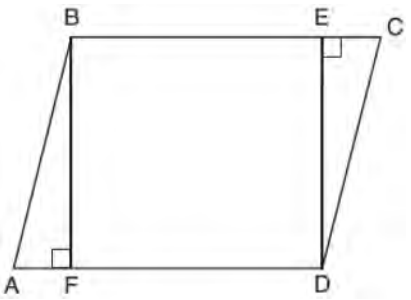


If each step run is parallel to $\overline{AB}$ and has a length of 10 inches, determine and state the length of each step rise, to the *nearest tenth of an inch*. Determine and state the length of $\overline{AC}$, to the *nearest inch*.

170 A parallelogram must be a rhombus if its diagonals
1) are congruent
2) bisect each other
3) do not bisect its angles
4) are perpendicular to each other

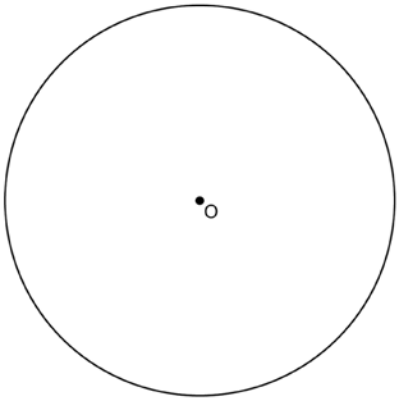
171 If $\triangle ABC$ is mapped onto $\triangle DEF$ after a line reflection and $\triangle DEF$ is mapped onto $\triangle XYZ$ after a translation, the relationship between $\triangle ABC$ and $\triangle XYZ$ is that they are always
1) congruent and similar
2) congruent but not similar
3) similar but not congruent
4) neither similar nor congruent

172 Given: Parallelogram *ABCD*, $\overline{BF} \perp \overline{AFD}$, and $\overline{DE} \perp \overline{BEC}$



Prove: *BEDF* is a rectangle

173 Using a compass and straightedge, construct a regular hexagon inscribed in circle *O*. [Leave all construction marks.]



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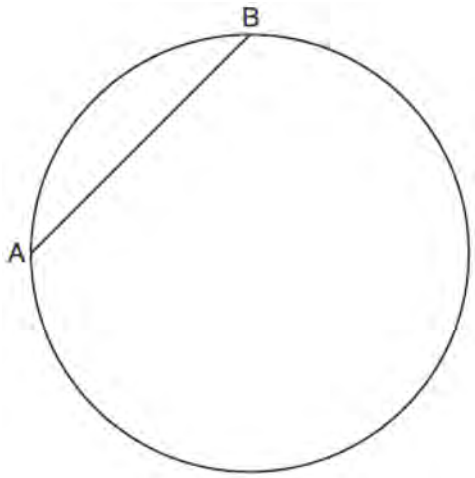
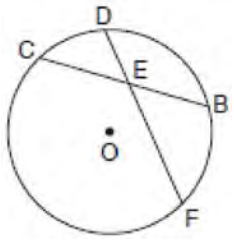
174 In the circle below, $\overline{AB}$ is a chord. Using a compass and straightedge, construct a diameter of the circle. [Leave all construction marks.]

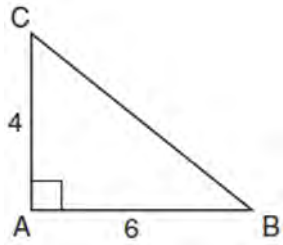


175 In the diagram below of circle O, chord $\overline{DF}$ bisects chord $\overline{BC}$ at E.



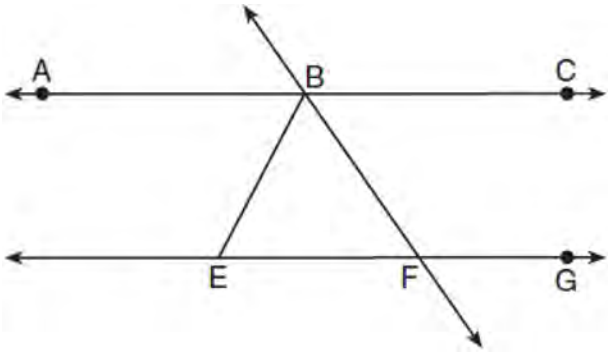
If $BC = 12$ and FE is 5 more than DE, then FE is
1) 13
2) 9
3) 6
4) 4

176 In the diagram below, right triangle ABC has legs whose lengths are 4 and 6.



What is the volume of the three-dimensional object formed by continuously rotating the right triangle around $\overline{AB}$?
1) 32π
2) 48π
3) 96π
4) 144π

177 As shown in the diagram below, $\overleftrightarrow{ABC} \parallel \overleftrightarrow{EFG}$ and $\overline{BF} \cong \overline{EF}$.



If $m\angle CBF = 42.5°$, then $m\angle EBF$ is
1) 42.5°
2) 68.75°
3) 95°
4) 137.5°

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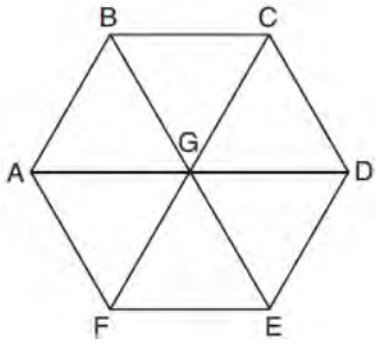
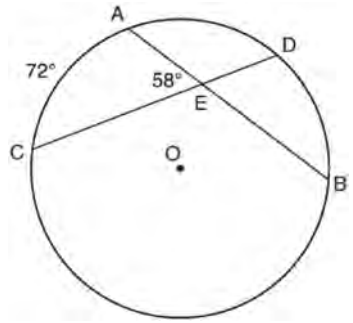
178 In regular hexagon *ABCDEF* shown below, $\overline{AD}$, $\overline{BE}$, and $\overline{CF}$ all intersect at *G*.



When $\triangle ABG$ is reflected over $\overline{BG}$ and then rotated 180° about point *G*, $\triangle ABG$ is mapped onto
1) $\triangle FEG$
2) $\triangle AFG$
3) $\triangle CBG$
4) $\triangle DEG$

179 In the diagram below of circle *O*, chords $\overline{AB}$ and $\overline{CD}$ intersect at *E*.

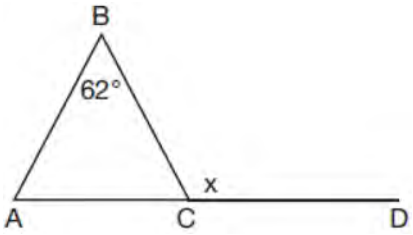


If $\text{m}\overset{\frown}{AC} = 72°$ and $\text{m}\angle AEC = 58°$, how many degrees are in $\text{m}\overset{\frown}{DB}$?
1) 108°
2) 65°
3) 44°
4) 14°

180 The coordinates of the endpoints of $\overline{AB}$ are $A(-8,-2)$ and $B(16,6)$. Point *P* is on $\overline{AB}$. What are the coordinates of point *P*, such that *AP*:*PB* is 3:5?
1) (1,1)
2) (7,3)
3) (9.6,3.6)
4) (6.4,2.8)

181 Line segment *RW* has endpoints $R(-4,5)$ and $W(6,20)$. Point *P* is on $\overline{RW}$ such that *RP*:*PW* is 2:3. What are the coordinates of point *P*?
1) (2,9)
2) (0,11)
3) (2,14)
4) (10,2)

182 Given $\triangle ABC$ with $\text{m}\angle B = 62°$ and side $\overline{AC}$ extended to *D*, as shown below.



Which value of *x* makes $\overline{AB} \cong \overline{CB}$?
1) 59°
2) 62°
3) 118°
4) 121°

Geometry Regents Exam Questions at Random Worksheet # 39 NAME:_____
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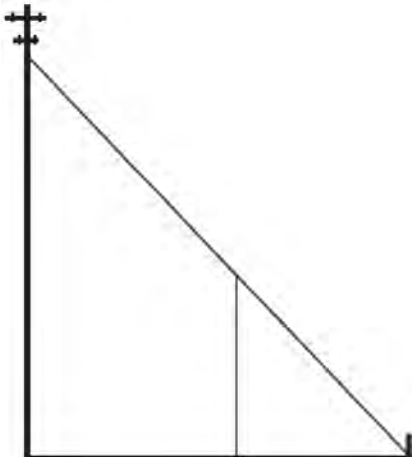
183 In the model below, a support wire for a telephone pole is attached to the pole and anchored to a stake in the ground 15 feet from the base of the telephone pole. Jamal places a 6-foot wooden pole under the support wire parallel to the telephone pole, such that one end of the pole is on the ground and the top of the pole is touching the support wire. He measures the distance between the bottom of the pole and the stake in the ground.

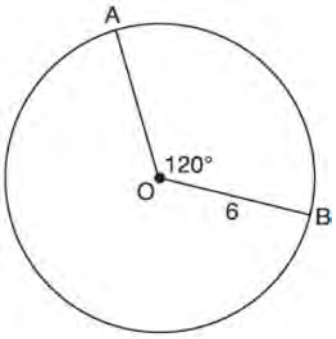


Jamal says he can approximate how high the support wire attaches to the telephone pole by using similar triangles. Explain why the triangles are similar.

184 In the two distinct acute triangles *ABC* and *DEF*, $\angle B \cong \angle E$. Triangles *ABC* and *DEF* are congruent when there is a sequence of rigid motions that maps

1) $\angle A$ onto $\angle D$, and $\angle C$ onto $\angle F$
2) $\overline{AC}$ onto $\overline{DF}$, and $\overline{BC}$ onto $\overline{EF}$
3) $\angle C$ onto $\angle F$, and $\overline{BC}$ onto $\overline{EF}$
4) point *A* onto point *D*, and $\overline{AB}$ onto $\overline{DE}$

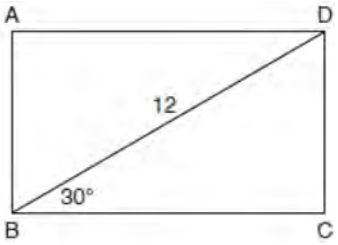
185 The diagram below shows circle *O* with radii $\overline{OA}$ and $\overline{OB}$. The measure of angle *AOB* is 120°, and the length of a radius is 6 inches.



Which expression represents the length of arc *AB*, in inches?

1) $\frac{120}{360}(6\pi)$
2) $120(6)$
3) $\frac{1}{3}(36\pi)$
4) $\frac{1}{3}(12\pi)$

186 The diagram shows rectangle *ABCD*, with diagonal $\overline{BD}$.



What is the perimeter of rectangle *ABCD*, to the *nearest tenth*?

1) 28.4
2) 32.8
3) 48.0
4) 62.4

Geometry Regents Exam Questions at Random Worksheet # 40 NAME:_____
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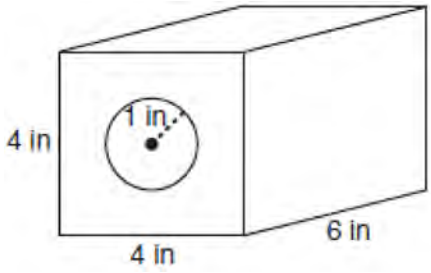
187 A solid metal prism has a rectangular base with sides of 4 inches and 6 inches, and a height of 4 inches. A hole in the shape of a cylinder, with a radius of 1 inch, is drilled through the entire length of the rectangular prism.



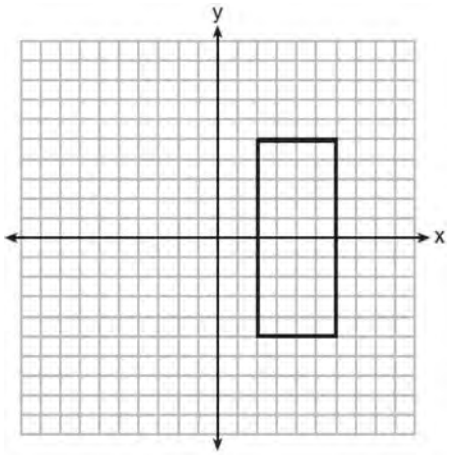
What is the approximate volume of the remaining solid, in cubic inches?

1) 19
2) 77
3) 93
4) 96

188 What is an equation of a line that is perpendicular to the line whose equation is $2y = 3x - 10$ and passes through $(-6, 1)$?

1) $y = -\frac{2}{3}x - 5$
2) $y = -\frac{2}{3}x - 3$
3) $y = \frac{2}{3}x + 1$
4) $y = \frac{2}{3}x + 10$

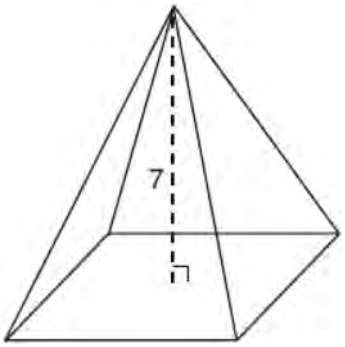
189 As shown in the graph below, the quadrilateral is a rectangle.



Which transformation would *not* map the rectangle onto itself?

1) a reflection over the x-axis
2) a reflection over the line $x = 4$
3) a rotation of 180° about the origin
4) a rotation of 180° about the point $(4, 0)$

190 The pyramid shown below has a square base, a height of 7, and a volume of 84.



What is the length of the side of the base?

1) 6
2) 12
3) 18
4) 36

Geometry Regents Exam Questions at Random Worksheet # 41 NAME:_____
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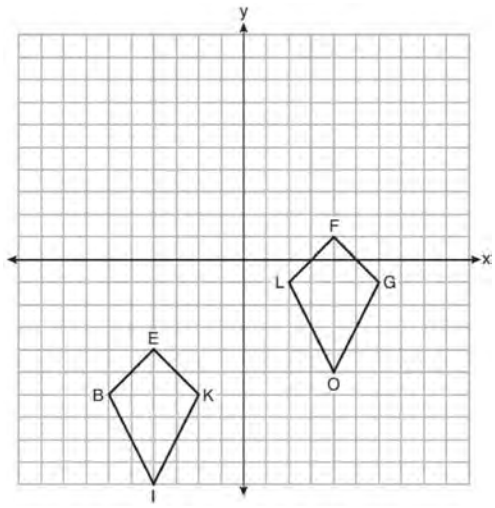
191 Quadrilaterals *BIKE* and *GOLF* are graphed on the set of axes below.



Describe a sequence of transformations that maps quadrilateral *BIKE* onto quadrilateral *GOLF*.

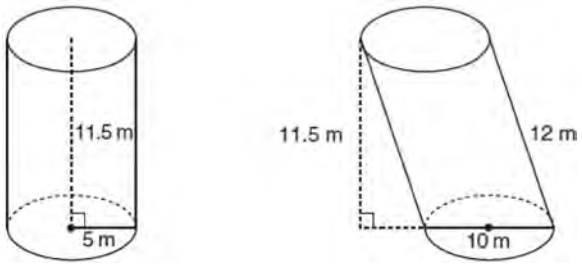
192 Which equation represents a line that is perpendicular to the line represented by $y = \frac{2}{3}x + 1$?

1) $3x + 2y = 12$
2) $3x - 2y = 12$
3) $y = \frac{3}{2}x + 2$
4) $y = -\frac{2}{3}x + 4$

193 Line segment *CD* is the altitude drawn to hypotenuse $\overline{EF}$ in right triangle *ECF*. If *EC* = 10 and *EF* = 24, then, to the *nearest tenth*, *ED* is

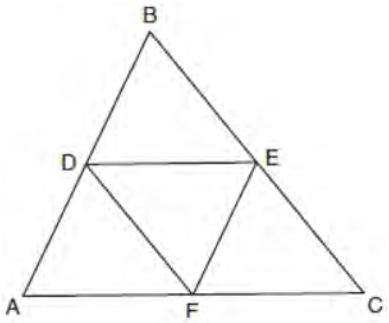
1) 4.2
2) 5.4
3) 15.5
4) 21.8

194 Sue believes that the two cylinders shown in the diagram below have equal volumes.



Is Sue correct? Explain why.

195 In the diagram below, $\overline{DE}$, $\overline{DF}$, and $\overline{EF}$ are midsegments of $\triangle ABC$.



The perimeter of quadrilateral *ADEF* is equivalent to

1) $AB + BC + AC$
2) $\frac{1}{2}AB + \frac{1}{2}AC$
3) $2AB + 2AC$
4) $AB + AC$

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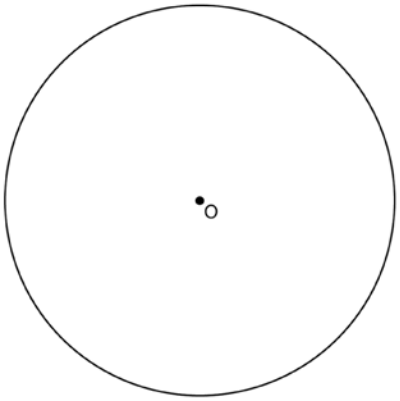
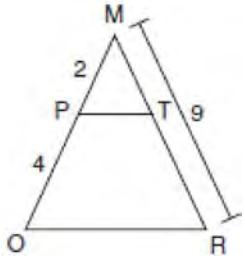
196 Using a compass and straightedge, construct a regular hexagon inscribed in circle *O* below. Label it *ABCDEF*. [Leave all construction marks.]



If chords $\overline{FB}$ and $\overline{FC}$ are drawn, which type of triangle, according to its angles, would $\triangle FBC$ be? Explain your answer.

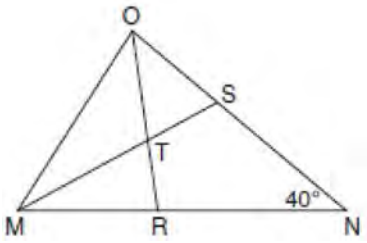
197 Given $\triangle MRO$ shown below, with trapezoid *PTRO*, $MR = 9$, $MP = 2$, and $PO = 4$.



What is the length of $\overline{TR}$?

1) 4.5
2) 5
3) 3
4) 6

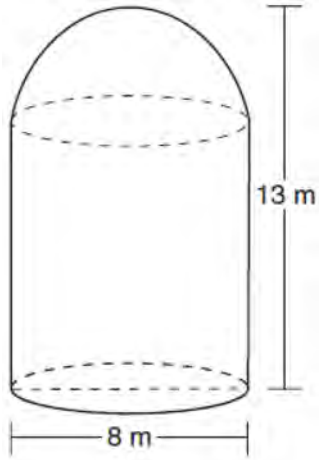
198 In the diagram below of triangle *MNO*, $\angle M$ and $\angle O$ are bisected by $\overline{MS}$ and $\overline{OR}$, respectively. Segments *MS* and *OR* intersect at *T*, and $m\angle N = 40°$.



If $m\angle TMR = 28°$, the measure of angle *OTS* is

1) 40º
2) 50º
3) 60º
4) 70º

199 A storage tank is in the shape of a cylinder with a hemisphere on the top. The highest point on the inside of the storage tank is 13 meters above the floor of the storage tank, and the diameter inside the cylinder is 8 meters. Determine and state, to the *nearest cubic meter*, the total volume inside the storage tank.



Geometry Regents Exam Questions at Random Worksheet # 43 NAME:_____
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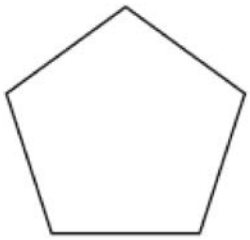
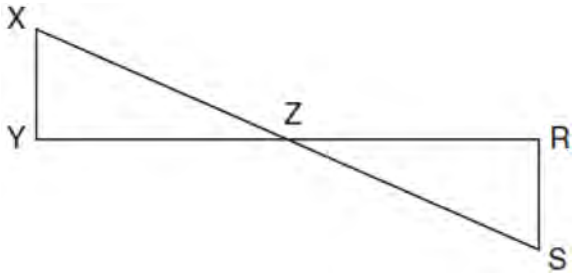
200 The regular polygon below is rotated about its center.



Which angle of rotation will carry the figure onto itself?

1) 60°
2) 108°
3) 216°
4) 540°

201 In the diagram below, $\overline{XS}$ and $\overline{YR}$ intersect at Z. Segments XY and RS are drawn perpendicular to $\overline{YR}$ to form triangles XYZ and SRZ.



Which statement is always true?

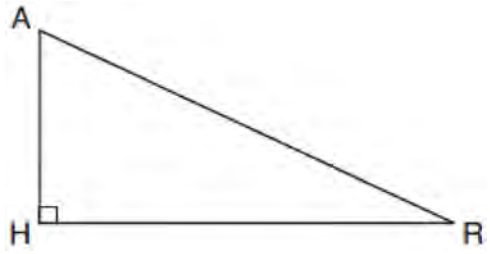
1) $(XY)(SR) = (XZ)(RZ)$
2) $\triangle XYZ \cong \triangle SRZ$
3) $\overline{XS} \cong \overline{YR}$
4) $\frac{XY}{SR} = \frac{YZ}{RZ}$

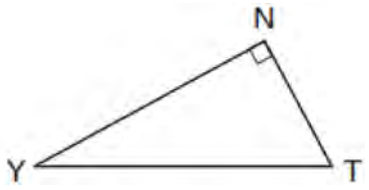
202 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in^3. After being fully inflated, its volume is approximately 294 in^3. To the *nearest tenth of an inch*, how much does the radius increase when the volleyball is fully inflated?

203 Rhombus $STAR$ has vertices $S(-1,2)$, $T(2,3)$, $A(3,0)$, and $R(0,-1)$. What is the perimeter of rhombus $STAR$?

1) $\sqrt{34}$
2) $4\sqrt{34}$
3) $\sqrt{10}$
4) $4\sqrt{10}$

204 In the diagram below of $\triangle HAR$ and $\triangle NTY$, angles H and N are right angles, and $\triangle HAR \sim \triangle NTY$.





If $AR = 13$ and $HR = 12$, what is the measure of angle Y, to the *nearest degree*?

1) 23°
2) 25°
3) 65°
4) 67°

Geometry Regents Exam Questions at Random Worksheet # 44 NAME:_____
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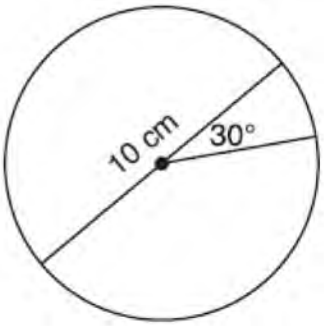
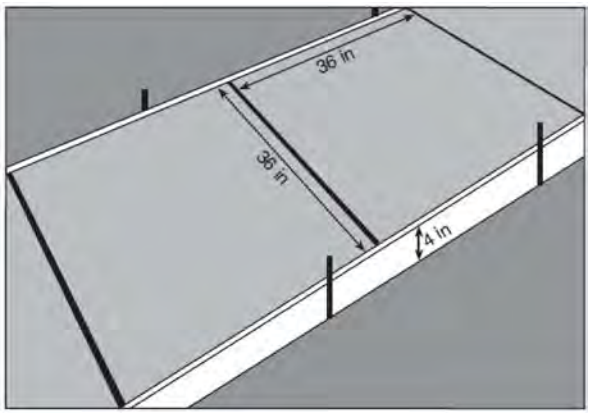
205 A circle with a diameter of 10 cm and a central angle of 30° is drawn below.



What is the area, to the *nearest tenth of a square centimeter*, of the sector formed by the 30° angle?

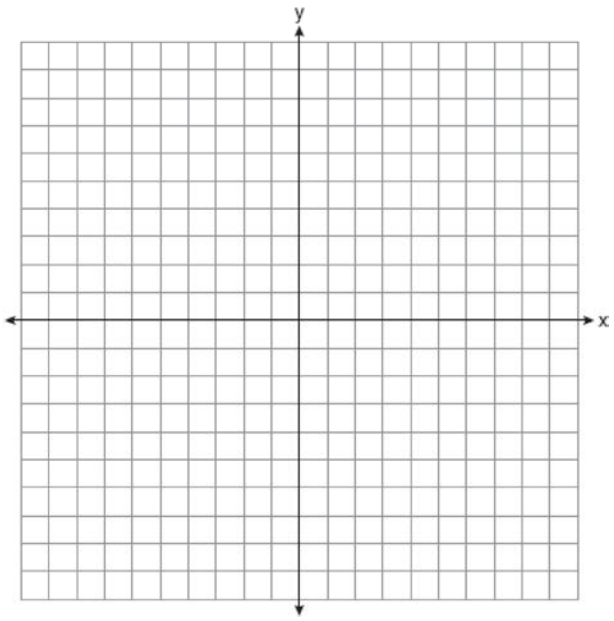
1) 5.2
2) 6.5
3) 13.1
4) 26.2

206 Ian needs to replace two concrete sections in his sidewalk, as modeled below. Each section is 36 inches by 36 inches and 4 inches deep. He can mix his own concrete for $3.25 per cubic foot.



How much money will it cost Ian to replace the two concrete sections?

207 The coordinates of the endpoints of $\overline{AB}$ are $A(2,3)$ and $B(5,-1)$. Determine the length of $\overline{A'B'}$, the image of $\overline{AB}$, after a dilation of $\frac{1}{2}$ centered at the origin. [The use of the set of axes below is optional.]



208 A regular pyramid has a square base. The perimeter of the base is 36 inches and the height of the pyramid is 15 inches. What is the volume of the pyramid in cubic inches?

1) 180
2) 405
3) 540
4) 1215

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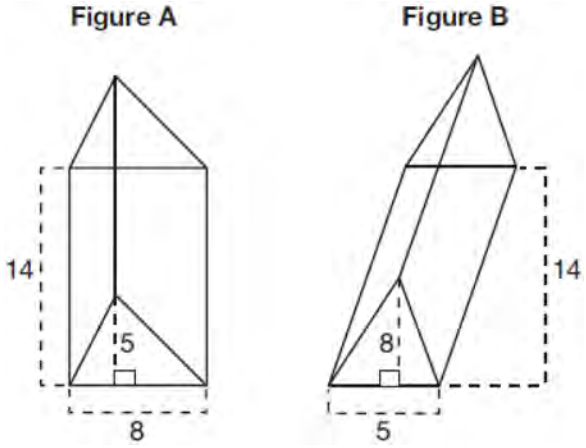
209 The diagram below shows two figures. Figure *A* is a right triangular prism and figure *B* is an oblique triangular prism. The base of figure *A* has a height of 5 and a length of 8 and the height of prism *A* is 14. The base of figure *B* has a height of 8 and a length of 5 and the height of prism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



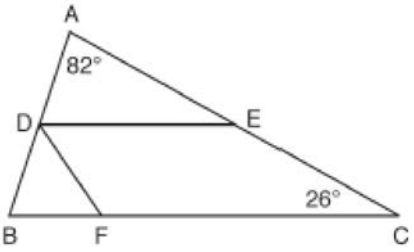
Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

210 Triangle $A'B'C'$ is the image of $\triangle ABC$ after a dilation followed by a translation. Which statement(s) would always be true with respect to this sequence of transformations?

I. $\triangle ABC \cong \triangle A'B'C'$
II. $\triangle ABC \sim \triangle A'B'C'$
III. $\overline{AB} \parallel \overline{A'B'}$
IV. $AA' = BB'$

1) II, only
2) I and II
3) II and III
4) II, III, and IV

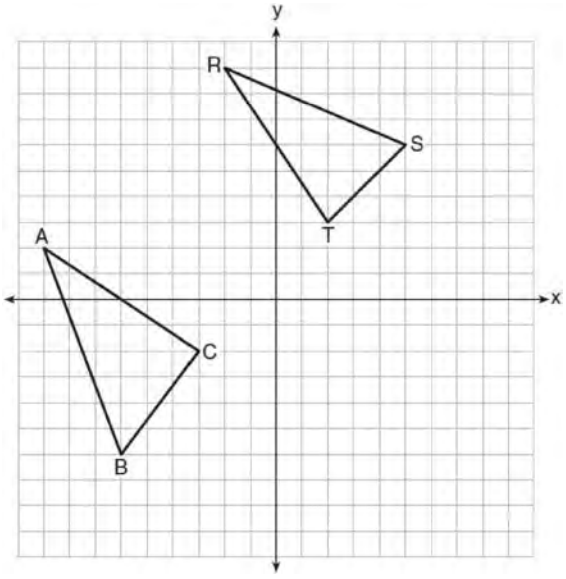
211 In the diagram below, $\overline{DE}$ divides $\overline{AB}$ and $\overline{AC}$ proportionally, $m\angle C = 26°$, $m\angle A = 82°$, and $\overline{DF}$ bisects $\angle BDE$.



The measure of angle *DFB* is

1) 36°
2) 54°
3) 72°
4) 82°

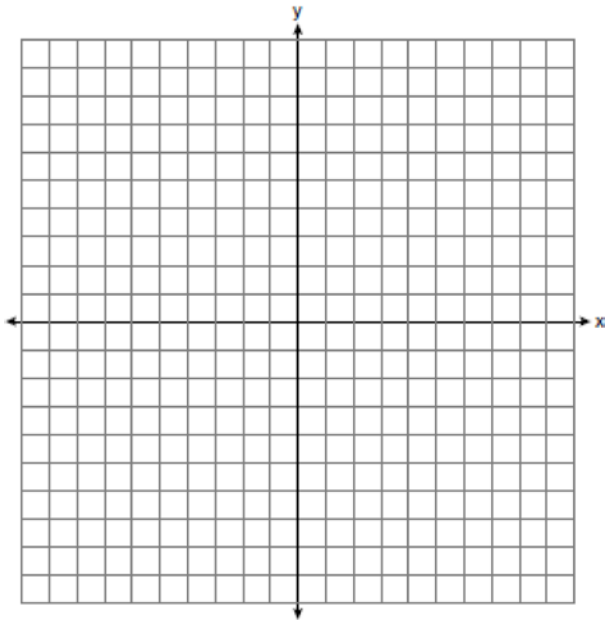
212 In the graph below, $\triangle ABC$ has coordinates $A(-9,2)$, $B(-6,-6)$, and $C(-3,-2)$, and $\triangle RST$ has coordinates $R(-2,9)$, $S(5,6)$, and $T(2,3)$.



Is $\triangle ABC$ congruent to $\triangle RST$? Use the properties of rigid motions to explain your reasoning.

Geometry Regents at Random Worksheets

213 Determine and state the area of triangle PQR, whose vertices have coordinates $P(-2,-5)$, $Q(3,5)$, and $R(6,1)$. [The use of the set of axes below is optional.]



214 Lou has a solid clay brick in the shape of a rectangular prism with a length of 8 inches, a width of 3.5 inches, and a height of 2.25 inches. If the clay weighs 1.055 oz/in^3, how much does Lou's brick weigh, to the *nearest ounce*?

1) 66
2) 64
3) 63
4) 60

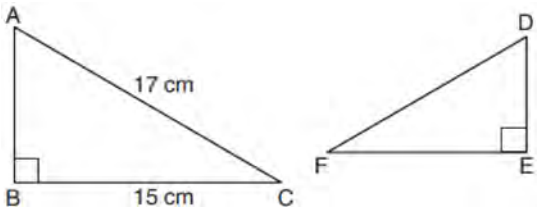
215 The area of a sector of a circle with a radius measuring 15 cm is 75π cm^2. What is the measure of the central angle that forms the sector?

1) 72°
2) 120°
3) 144°
4) 180°

216 What are the coordinates of the center and the length of the radius of the circle whose equation is $x^2 + y^2 = 8x - 6y + 39$?

1) center $(-4,3)$ and radius 64
2) center $(4,-3)$ and radius 64
3) center $(-4,3)$ and radius 8
4) center $(4,-3)$ and radius 8

217 Kayla was cutting right triangles from wood to use for an art project. Two of the right triangles she cut are shown below.



If $\triangle ABC \sim \triangle DEF$, with right angles B and E, $BC = 15$ cm, and $AC = 17$ cm, what is the measure of $\angle F$, to the *nearest degree*?

1) 28°
2) 41°
3) 62°
4) 88°

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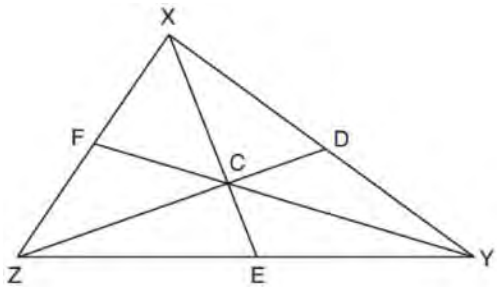
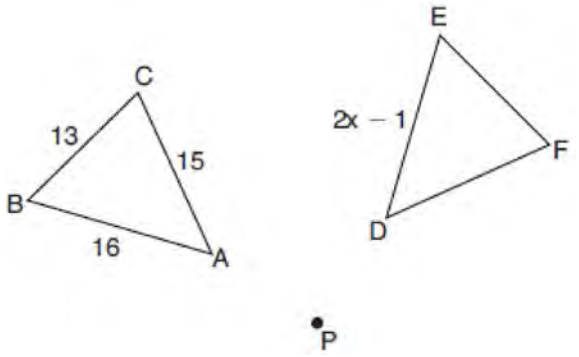
218 In $\triangle XYZ$, shown below, medians $\overline{XE}$, $\overline{YF}$, and $\overline{ZD}$ intersect at C.



If $CE = 5$, $YF = 21$, and $XZ = 15$, determine and state the perimeter of triangle CFX.

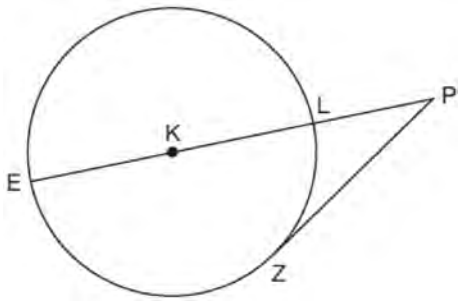
219 In the diagram below, $\triangle ABC$ with sides 13, 15, and 16, is mapped onto $\triangle DEF$ after a clockwise rotation of 90° about point P.



If $DE = 2x - 1$, what is the value of x?

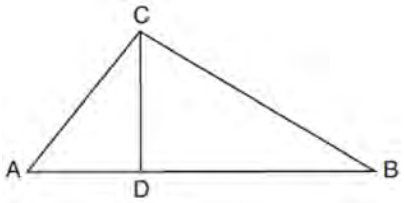
1) 7
2) 7.5
3) 8
4) 8.5

220 In the diagram below of circle K, secant $\overline{PLKE}$ and tangent $\overline{PZ}$ are drawn from external point P.



If $m\overset{\frown}{LZ} = 56°$, determine and state the degree measure of angle P.

221 In the diagram below of right triangle ABC, altitude $\overline{CD}$ intersects hypotenuse $\overline{AB}$ at D.



Which equation is always true?

1) $\frac{AD}{AC} = \frac{CD}{BC}$
2) $\frac{AD}{CD} = \frac{BD}{CD}$
3) $\frac{AC}{CD} = \frac{BC}{CD}$
4) $\frac{AD}{AC} = \frac{AC}{BD}$

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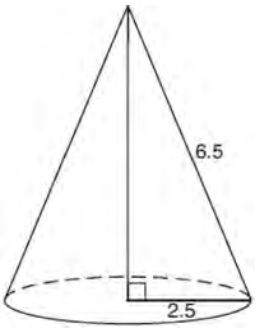
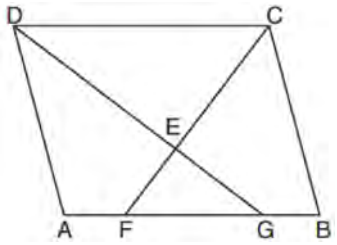
222 As shown in the diagram below, the radius of a cone is 2.5 cm and its slant height is 6.5 cm.



How many cubic centimeters are in the volume of the cone?

1) 12.5π
2) 13.5π
3) 30.0π
4) 37.5π

223 In the diagram below of parallelogram *ABCD*, $\overline{AFGB}$, $\overline{CF}$ bisects $\angle DCB$, $\overline{DG}$ bisects $\angle ADC$, and $\overline{CF}$ and $\overline{DG}$ intersect at *E*.

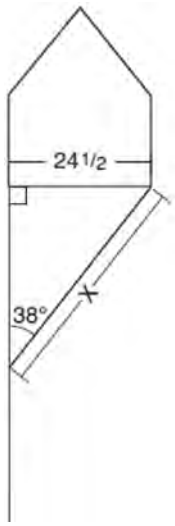


If m$\angle B = 75°$, then the measure of $\angle EFA$ is

1) 142.5°
2) 127.5°
3) 52.5°
4) 37.5°

224 Theresa has a rectangular pool 30 ft long, 15 ft wide, and 4 ft deep. Theresa fills her pool using city water at a rate of $3.95 per 100 gallons of water. Nancy has a circular pool with a diameter of 24 ft and a depth of 4 ft. Nancy fills her pool with a water delivery service at a rate of $200 per 6000 gallons. If Theresa and Nancy both fill their pools 6 inches from the top of the pool, determine and state who paid more to fill her pool.
[$1ft^3$ water = 7.48 gallons]

225 Diego needs to install a support beam to hold up his new birdhouse, as modeled below. The base of the birdhouse is $24\frac{1}{2}$ inches long. The support beam will form an angle of 38° with the vertical post. Determine and state the approximate length of the support beam, *x*, to the *nearest inch*.



Geometry Regents Exam Questions at Random Worksheet # 49 NAME:_____
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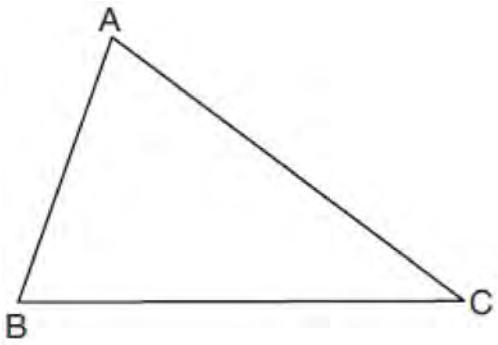
226 What is an equation of the image of the line $y = \frac{3}{2}x - 4$ after a dilation of a scale factor of $\frac{3}{4}$ centered at the origin?

1) $y = \frac{9}{8}x - 4$
2) $y = \frac{9}{8}x - 3$
3) $y = \frac{3}{2}x - 4$
4) $y = \frac{3}{2}x - 3$

227 Triangle *ABC* is shown below. Using a compass and straightedge, construct the dilation of $\triangle ABC$ centered at *B* with a scale factor of 2. [Leave all construction marks.]

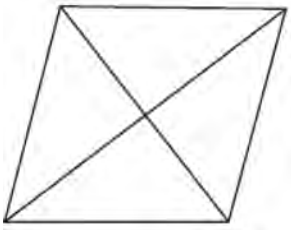


Is the image of $\triangle ABC$ similar to the original triangle? Explain why.

228 What is the volume, in cubic centimeters, of a right square pyramid with base edges that are 64 cm long and a slant height of 40 cm?

1) 8192.0
2) $13,653.\overline{3}$
3) 32,768.0
4) $54,613.\overline{3}$

229 The figure below shows a rhombus with noncongruent diagonals.



Which transformation would *not* carry this rhombus onto itself?

1) a reflection over the shorter diagonal
2) a reflection over the longer diagonal
3) a clockwise rotation of 90° about the intersection of the diagonals
4) a counterclockwise rotation of 180° about the intersection of the diagonals

230 In rhombus *VENU*, diagonals $\overline{VN}$ and $\overline{EU}$ intersect at *S*. If *VN* = 12 and *EU* = 16, what is the perimeter of the rhombus?

1) 80
2) 40
3) 20
4) 10

Geometry Regents Exam Questions at Random Worksheet # 50 NAME:_____
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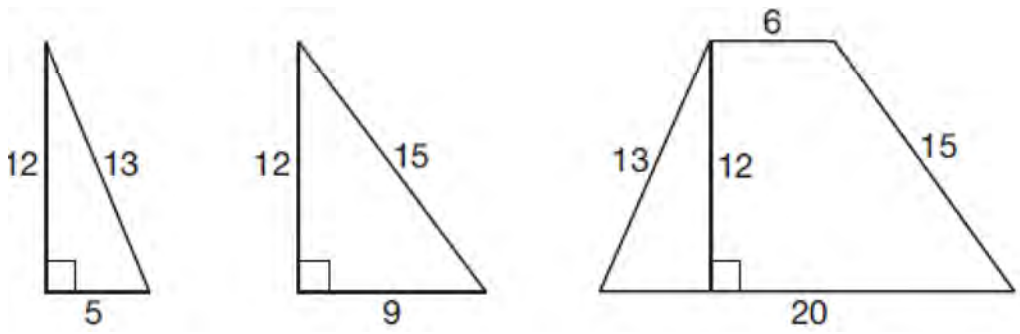
231 Francisco needs the three pieces of glass shown below to complete a stained glass window. The shapes, two triangles and a trapezoid, are measured in inches.



Glass can be purchased in rectangular sheets that are 12 inches wide. What is the minimum length of a sheet of glass, in inches, that Francisco must purchase in order to have enough to complete the window?

1) 20
2) 25
3) 29
4) 34

232 What are the coordinates of point C on the directed segment from $A(-8,4)$ to $B(10,-2)$ that partitions the segment such that $AC{:}CB$ is 2:1?

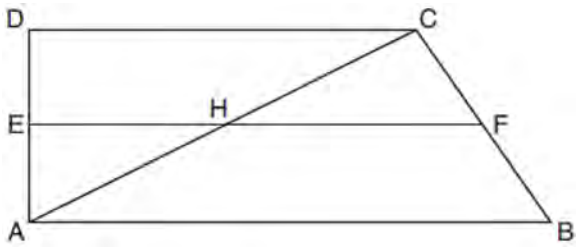
1) $(1,1)$
2) $(-2,2)$
3) $(2,-2)$
4) $(4,0)$

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

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

234 Write an equation of the line that is parallel to the line whose equation is $3y + 7 = 2x$ and passes through the point $(2,6)$.

235 In quadrilateral $ABCD$ below, $\overline{AB} \parallel \overline{CD}$, and E, H, and F are the midpoints of $\overline{AD}$, $\overline{AC}$, and $\overline{BC}$, respectively.



If $AB = 24$, $CD = 18$, and $AH = 10$, then FH is

1) 9
2) 10
3) 12
4) 21

Geometry Regents Exam Questions at Random Worksheet # 51 NAME:_____
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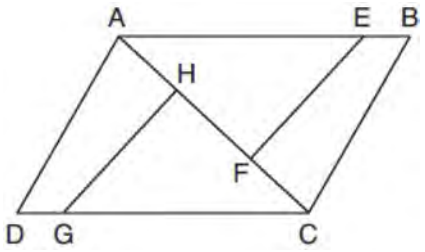
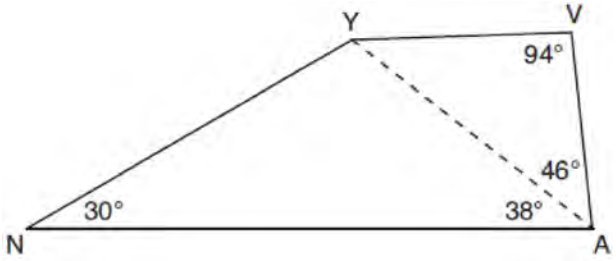
236 In the diagram of quadrilateral *ABCD* with diagonal $\overline{AC}$ shown below, segments *GH* and *EF* are drawn, $\overline{AE} \cong \overline{CG}$, $\overline{BE} \cong \overline{DG}$, $\overline{AH} \cong \overline{CF}$, and $\overline{AD} \cong \overline{CB}$.



Prove: $\overline{EF} \cong \overline{GH}$

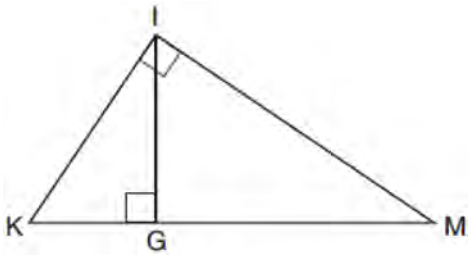
237 In the diagram of quadrilateral *NAVY* below, m∠*YNA* = 30°, m∠*YAN* = 38°, m∠*AVY* = 94°, and m∠*VAY* = 46°.



Which segment has the shortest length?
1) $\overline{AY}$
2) $\overline{NY}$
3) $\overline{VA}$
4) $\overline{VY}$

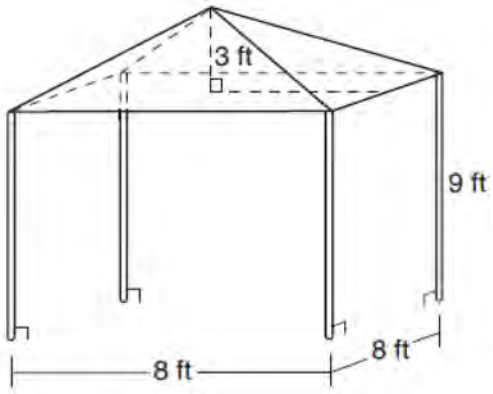
238 Determine and state an equation of the line perpendicular to the line $5x - 4y = 10$ and passing through the point (5, 12).

239 In the diagram below of right triangle *KMI*, altitude $\overline{IG}$ is drawn to hypotenuse $\overline{KM}$.



If *KG* = 9 and *IG* = 12, the length of $\overline{IM}$ is
1) 15
2) 16
3) 20
4) 25

240 A vendor is using an 8-ft by 8-ft tent for a craft fair. The legs of the tent are 9 ft tall and the top forms a square pyramid with a height of 3 ft.



What is the volume, in cubic feet, of space the tent occupies?
1) 256
2) 640
3) 672
4) 768

Geometry Regents Exam Questions at Random Worksheet # 52 NAME:_____
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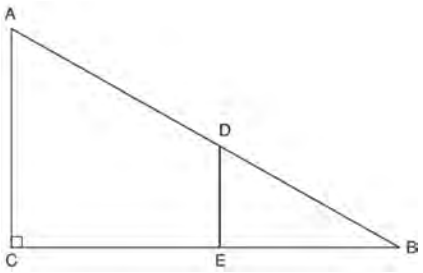
241 The coordinates of the vertices of parallelogram $CDEH$ are $C(-5,5)$, $D(2,5)$, $E(-1,-1)$, and $H(-8,-1)$. What are the coordinates of P, the point of intersection of diagonals $\overline{CE}$ and $\overline{DH}$?

1) $(-2,3)$
2) $(-2,2)$
3) $(-3,2)$
4) $(-3,-2)$

242 In right triangle ABC shown below, point D is on $\overline{AB}$ and point E is on $\overline{CB}$ such that $\overline{AC} \parallel \overline{DE}$.



If $AB = 15$, $BC = 12$, and $EC = 7$, what is the length of $\overline{BD}$?

1) 8.75
2) 6.25
3) 5
4) 4

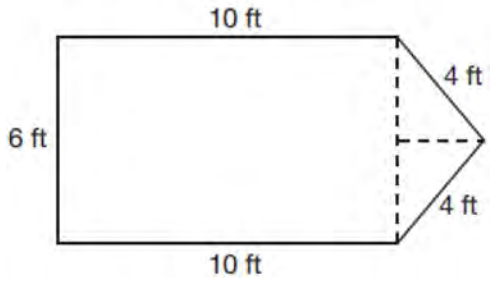
243 What is an equation of a line that is perpendicular to the line whose equation is $2y + 3x = 1$?

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

244 A cargo trailer, pictured below, can be modeled by a rectangular prism and a triangular prism. Inside the trailer, the rectangular prism measures 6 feet wide and 10 feet long. The walls that form the triangular prism each measure 4 feet wide inside the trailer. The diagram below is of the floor, showing the inside measurements of the trailer.

Cargo Trailer

Cargo Trailer Floor

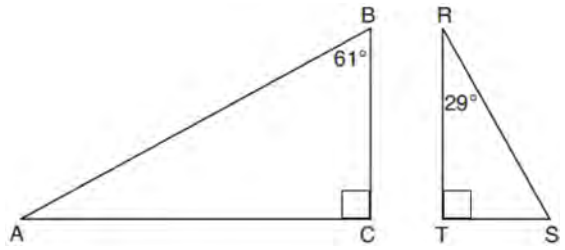


If the inside height of the trailer is 6.5 feet, what is the total volume of the inside of the trailer, to the *nearest cubic foot*?

245 A large water basin is in the shape of a right cylinder. The inside of the basin has a diameter of $8\frac{1}{4}$ feet and a height of 3 feet. Determine and state, to the *nearest cubic foot*, the number of cubic feet of water that it will take to fill the basin to a level of $\frac{1}{2}$ foot from the top.

Geometry Regents Exam Questions at Random Worksheet # 53 NAME:_____
www.jmap.org

246 Given right triangle ABC with a right angle at C, $m\angle B = 61°$. Given right triangle RST with a right angle at T, $m\angle R = 29°$.



Which proportion in relation to $\triangle ABC$ and $\triangle RST$ is *not* correct?

1) $\frac{AB}{RS} = \frac{RT}{AC}$
2) $\frac{BC}{ST} = \frac{AB}{RS}$
3) $\frac{BC}{ST} = \frac{AC}{RT}$
4) $\frac{AB}{AC} = \frac{RS}{RT}$

247 Which information is *not* sufficient to prove that a parallelogram is a square?

1) The diagonals are both congruent and perpendicular.
2) The diagonals are congruent and one pair of adjacent sides are congruent.
3) The diagonals are perpendicular and one pair of adjacent sides are congruent.
4) The diagonals are perpendicular and one pair of adjacent sides are perpendicular.

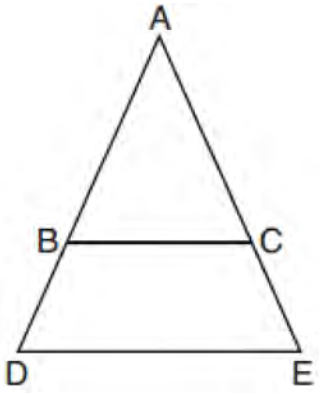
248 A cone has a volume of 108π and a base diameter of 12. What is the height of the cone?

1) 27
2) 9
3) 3
4) 4

249 In quadrilateral $QRST$, diagonals $\overline{QS}$ and $\overline{RT}$ intersect at M. Which statement would always prove quadrilateral $QRST$ is a parallelogram?

1) $\angle TQR$ and $\angle QRS$ are supplementary.
2) $\overline{QM} \cong \overline{SM}$ and $\overline{QT} \cong \overline{RS}$
3) $\overline{QR} \cong \overline{TS}$ and $\overline{QT} \cong \overline{RS}$
4) $\overline{QR} \cong \overline{TS}$ and $\overline{QT} \parallel \overline{RS}$

250 In the diagram below, $\overline{BC}$ connects points B and C on the congruent sides of isosceles triangle ADE, such that $\triangle ABC$ is isosceles with vertex angle A.



If $AB = 10$, $BD = 5$, and $DE = 12$, what is the length of $\overline{BC}$?

1) 6
2) 7
3) 8
4) 9

251 A 12-foot ladder leans against a building and reaches a window 10 feet above ground. What is the measure of the angle, to the *nearest degree*, that the ladder forms with the ground?

1) 34
2) 40
3) 50
4) 56

Geometry Regents Exam Questions at Random Worksheet # 54 NAME:_____
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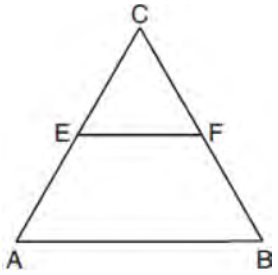
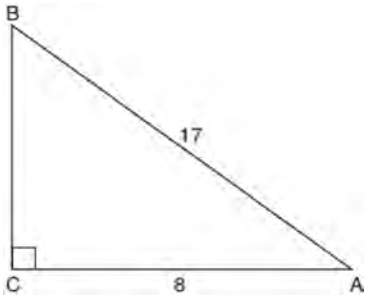
252 In the diagram of equilateral triangle ABC shown below, E and F are the midpoints of $\overline{AC}$ and $\overline{BC}$, respectively.



If $EF = 2x + 8$ and $AB = 7x - 2$, what is the perimeter of trapezoid $ABFE$?

1) 36
2) 60
3) 100
4) 120

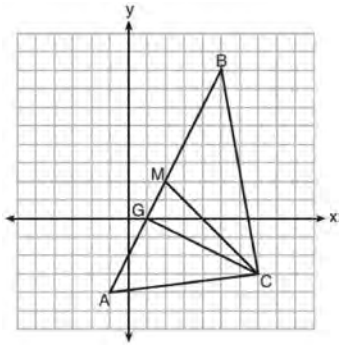
253 In the diagram below of right triangle ABC, $AC = 8$, and $AB = 17$.



Which equation would determine the value of angle A?

1) $\sin A = \frac{8}{17}$
2) $\tan A = \frac{8}{15}$
3) $\cos A = \frac{15}{17}$
4) $\tan A = \frac{15}{8}$

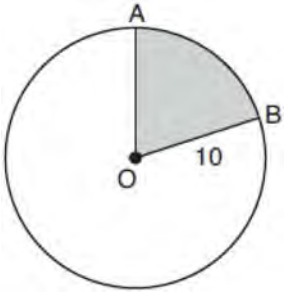
254 On the set of axes below, $\triangle ABC$, altitude $\overline{CG}$, and median $\overline{CM}$ are drawn.



Which expression represents the area of $\triangle ABC$?

1) $\frac{(BC)(AC)}{2}$
2) $\frac{(GC)(BC)}{2}$
3) $\frac{(CM)(AB)}{2}$
4) $\frac{(GC)(AB)}{2}$

255 In the diagram below, circle O has a radius of 10.



If $m\overset{\frown}{AB} = 72°$, find the area of shaded sector AOB, in terms of π.

Geometry Regents Exam Questions at Random Worksheet # 55 NAME:_____
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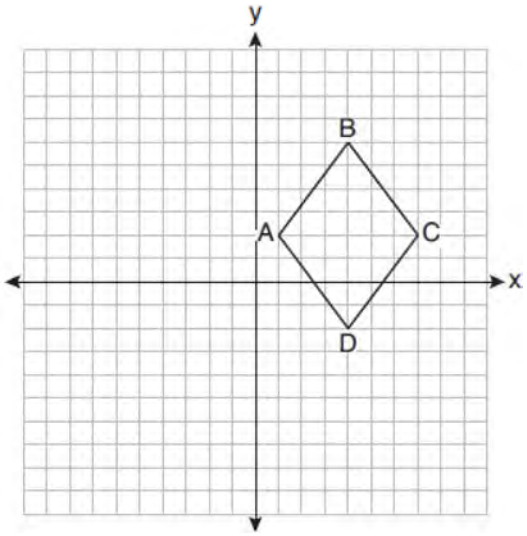
256 If the line represented by $y = -\frac{1}{4}x - 2$ is dilated by a scale factor of 4 centered at the origin, which statement about the image is true?

1) The slope is $-\frac{1}{4}$ and the y-intercept is -8.
2) The slope is $-\frac{1}{4}$ and the y-intercept is -2.
3) The slope is -1 and the y-intercept is -8.
4) The slope is -1 and the y-intercept is -2.

257 On the set of axes below, rhombus $ABCD$ has vertices whose coordinates are $A(1,2)$, $B(4,6)$, $C(7,2)$, and $D(4,-2)$.



What is the area of rhombus $ABCD$?

1) 20
2) 24
3) 25
4) 48

258 The expression $\sin 57°$ is equal to

1) $\tan 33°$
2) $\cos 33°$
3) $\tan 57°$
4) $\cos 57°$

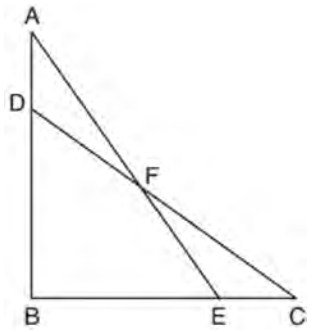
259 What is the volume of a hemisphere that has a diameter of 12.6 cm, to the *nearest tenth of a cubic centimeter*?

1) 523.7
2) 1047.4
3) 4189.6
4) 8379.2

260 In circle O two secants, $\overline{ABP}$ and $\overline{CDP}$, are drawn to external point P. If $m\overset{\frown}{AC} = 72°$, and $m\overset{\frown}{BD} = 34°$, what is the measure of $\angle P$?

1) 19º
2) 38º
3) 53º
4) 106º

261 In the diagram below, $\triangle ABE \cong \triangle CBD$.



Prove: $\triangle AFD \cong \triangle CFE$

Geometry Regents Exam Questions at Random Worksheet # 56 NAME:_____
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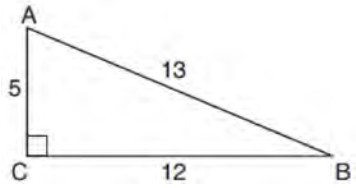
262 Chelsea is sitting 8 feet from the foot of a tree. From where she is sitting, the angle of elevation of her line of sight to the top of the tree is 36°. If her line of sight starts 1.5 feet above ground, how tall is the tree, to the *nearest foot*?

1) 8
2) 7
3) 6
4) 4

263 The coordinates of the endpoints of $\overline{QS}$ are $Q(-9,8)$ and $S(9,-4)$. Point R is on $\overline{QS}$ such that $QR{:}RS$ is in the ratio of 1:2. What are the coordinates of point R?

1) $(0,2)$
2) $(3,0)$
3) $(-3,4)$
4) $(-6,6)$

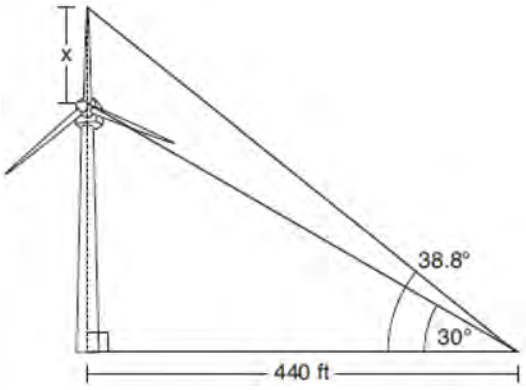
264 In $\triangle ABC$ below, angle C is a right angle.



Which statement must be true?

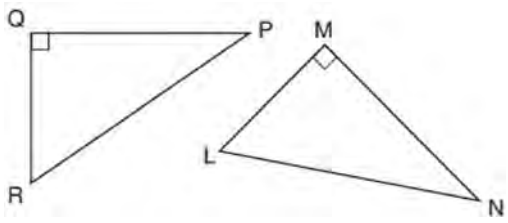
1) $\sin A = \cos B$
2) $\sin A = \tan B$
3) $\sin B = \tan A$
4) $\sin B = \cos B$

265 Nick wanted to determine the length of one blade of the windmill pictured below. He stood at a point on the ground 440 feet from the windmill's base. Using surveyor's tools, Nick measured the angle between the ground and the highest point reached by the top blade and found it was 38.8°. He also measured the angle between the ground and the lowest point of the top blade, and found it was 30°.



Determine and state a blade's length, *x*, to the *nearest foot*.

266 In the diagram below, right triangle PQR is transformed by a sequence of rigid motions that maps it onto right triangle NML.



Write a set of three congruency statements that would show *ASA* congruency for these triangles.

Geometry Regents Exam Questions at Random Worksheet # 57 NAME:_____
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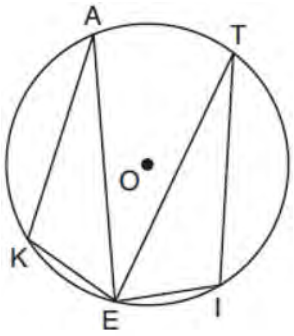
267 In the diagram below of circle O, points K, A, T, I, and E are on the circle, $\triangle KAE$ and $\triangle ITE$ are drawn, $\overset{\frown}{KE} \cong \overset{\frown}{EI}$, and $\angle EKA \cong \angle EIT$.



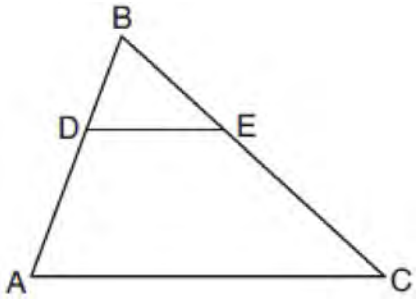
Which statement about $\triangle KAE$ and $\triangle ITE$ is always true?
1) They are neither congruent nor similar.
2) They are similar but not congruent.
3) They are right triangles.
4) They are congruent.

268 Which figure(s) below can have a triangle as a two-dimensional cross section?
I. cone
II. cylinder
III. cube
IV. square pyramid
1) I, only
2) IV, only
3) I, II, and IV, only
4) I, III, and IV, only

269 If the altitudes of a triangle meet at one of the triangle's vertices, then the triangle is
1) a right triangle
2) an acute triangle
3) an obtuse triangle
4) an equilateral triangle

270 Which equation represents a line parallel to the line whose equation is $-2x + 3y = -4$ and passes through the point $(1,3)$?
1) $y - 3 = -\frac{3}{2}(x - 1)$
2) $y - 3 = \frac{2}{3}(x - 1)$
3) $y + 3 = -\frac{3}{2}(x + 1)$
4) $y + 3 = \frac{2}{3}(x + 1)$

271 In the diagram below of $\triangle ABC$, D is a point on $\overline{BA}$, E is a point on $\overline{BC}$, and $\overline{DE}$ is drawn.

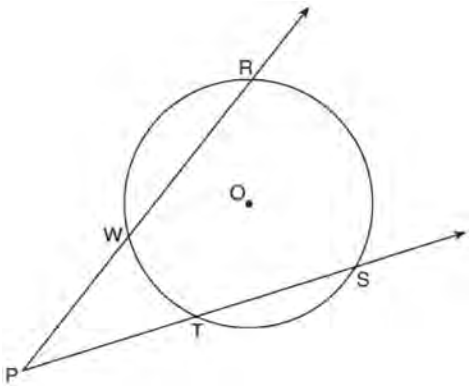


If $BD = 5$, $DA = 12$, and $BE = 7$, what is the length of $\overline{BC}$ so that $\overline{AC} \parallel \overline{DE}$?
1) 23.8
2) 16.8
3) 15.6
4) 8.6

272 For the acute angles in a right triangle, $\sin(4x)° = \cos(3x + 13)°$. What is the number of degrees in the measure of the *smaller* angle?
1) 11°
2) 13°
3) 44°
4) 52°

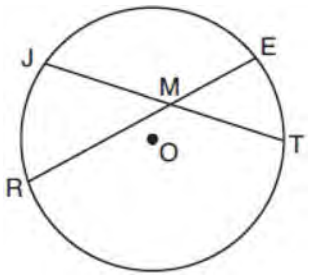
Geometry Regents Exam Questions at Random Worksheet # 58 NAME:_____
www.jmap.org

273 As shown in the diagram below, secants $\overrightarrow{PWR}$ and $\overrightarrow{PTS}$ are drawn to circle O from external point P.



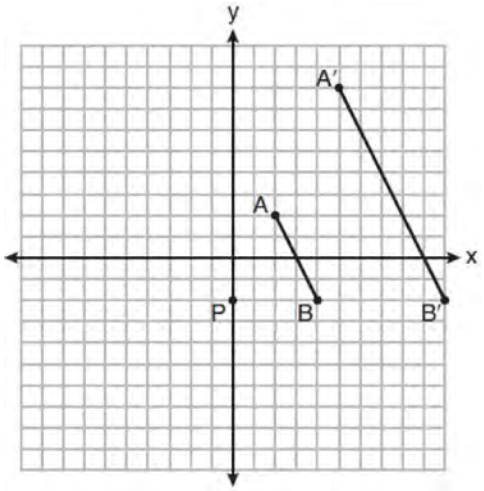
If $m\angle RPS = 35°$ and $m\overset{\frown}{RS} = 121°$, determine and state $m\overset{\frown}{WT}$.

274 In the diagram below of circle O, chords $\overline{JT}$ and $\overline{ER}$ intersect at M.



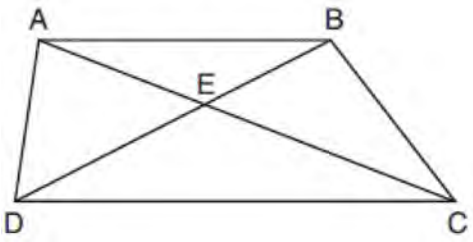
If $EM = 8$ and $RM = 15$, the lengths of $\overline{JM}$ and $\overline{TM}$ could be
1) 12 and 9.5
2) 14 and 8.5
3) 16 and 7.5
4) 18 and 6.5

275 On the set of axes below, $\overline{AB}$ is dilated by a scale factor of $\frac{5}{2}$ centered at point P.



Which statement is always true?
1) $\overline{PA} \cong \overline{AA'}$
2) $\overline{AB} \parallel \overline{A'B'}$
3) $AB = A'B'$
4) $\frac{5}{2}(A'B') = AB$

276 In trapezoid $ABCD$ below, $\overline{AB} \parallel \overline{CD}$.



If $AE = 5.2$, $AC = 11.7$, and $CD = 10.5$, what is the length of $\overline{AB}$, to the *nearest tenth*?
1) 4.7
2) 6.5
3) 8.4
4) 13.1

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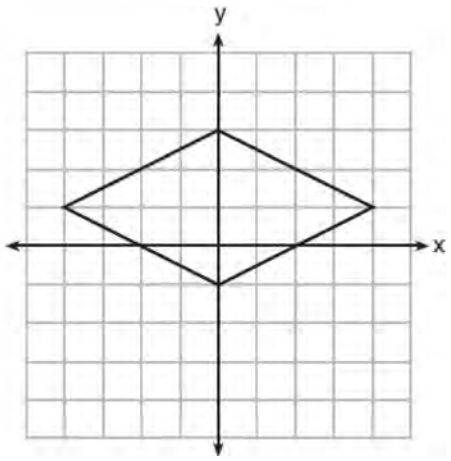
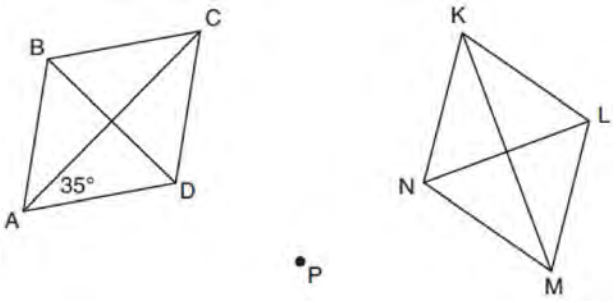
277 A rhombus is graphed on the set of axes below.



Which transformation would carry the rhombus onto itself?

1) 180° rotation counterclockwise about the origin
2) reflection over the line $y = \frac{1}{2}x + 1$
3) reflection over the line $y = 0$
4) reflection over the line $x = 0$

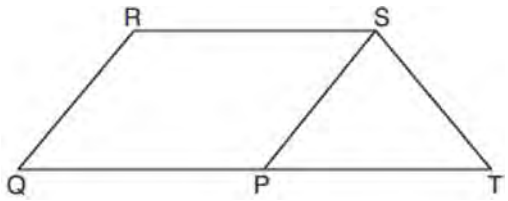
278 Rhombus *ABCD* can be mapped onto rhombus *KLMN* by a rotation about point *P*, as shown below.



What is the measure of $\angle KNM$ if the measure of $\angle CAD = 35$?

1) 35°
2) 55°
3) 70°
4) 110°

279 In parallelogram *PQRS*, $\overline{QP}$ is extended to point *T* and $\overline{ST}$ is drawn.



If $\overline{ST} \cong \overline{SP}$ and $m\angle R = 130°$, what is $m\angle PST$?

1) 130°
2) 80°
3) 65°
4) 50°

280 The line $-3x + 4y = 8$ is transformed by a dilation centered at the origin. Which linear equation could represent its image?

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

281 Which three-dimensional figure will result when a rectangle 6 inches long and 5 inches wide is continuously rotated about the longer side?

1) a rectangular prism with a length of 6 inches, width of 6 inches, and height of 5 inches
2) a rectangular prism with a length of 6 inches, width of 5 inches, and height of 5 inches
3) a cylinder with a radius of 5 inches and a height of 6 inches
4) a cylinder with a radius of 6 inches and a height of 5 inches

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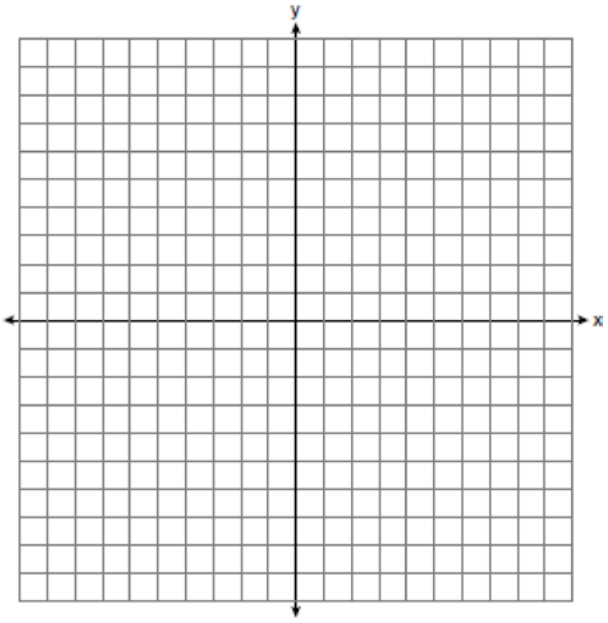
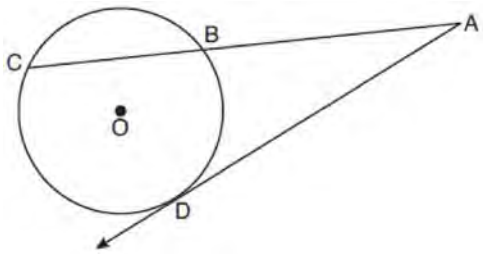
282 The vertices of $\triangle ABC$ have coordinates $A(-2,-1)$, $B(10,-1)$, and $C(4,4)$. Determine and state the area of $\triangle ABC$. [The use of the set of axes below is optional.]



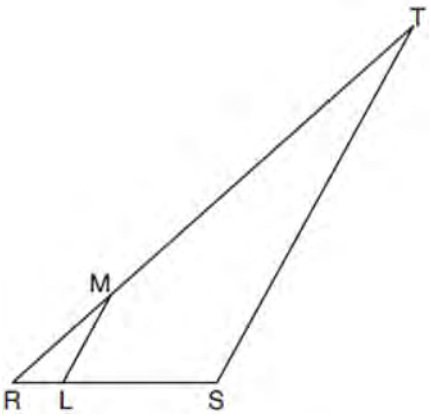
283 In the diagram below of circle O, secant $\overline{ABC}$ and tangent $\overline{AD}$ are drawn.



If $CA = 12.5$ and $CB = 4.5$, determine and state the length of $\overline{DA}$.

284 Jaden is comparing two cones. The radius of the base of cone A is twice as large as the radius of the base of cone B. The height of cone B is twice the height of cone A. The volume of cone A is
1) twice the volume of cone B
2) four times the volume of cone B
3) equal to the volume of cone B
4) equal to half the volume of cone B

285 In the diagram below of $\triangle RST$, L is a point on $\overline{RS}$, and M is a point on $\overline{RT}$, such that $LM \parallel ST$.



If $RL = 2$, $LS = 6$, $LM = 4$, and $ST = x + 2$, what is the length of $\overline{ST}$?
1) 10
2) 12
3) 14
4) 16

286 Square $MATH$ has a side length of 7 inches. Which three-dimensional object will be formed by continuously rotating square $MATH$ around side $\overline{AT}$?
1) a right cone with a base diameter of 7 inches
2) a right cylinder with a diameter of 7 inches
3) a right cone with a base radius of 7 inches
4) a right cylinder with a radius of 7 inches

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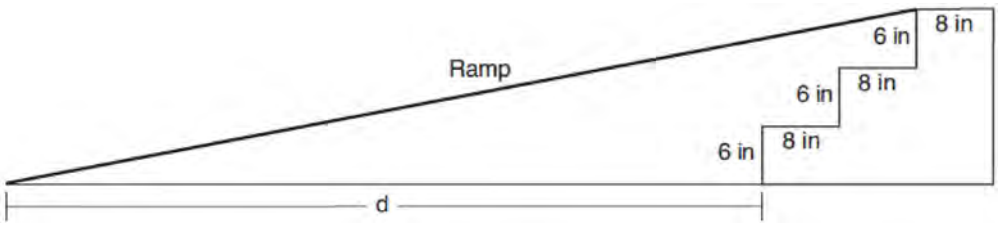
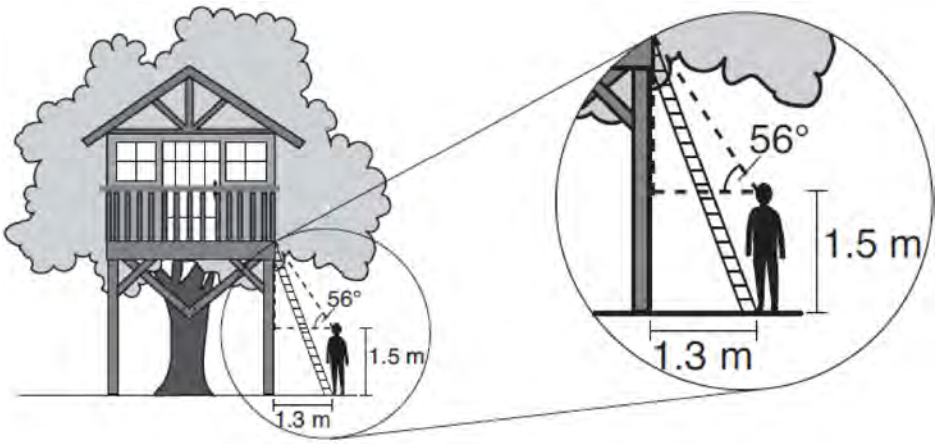
287 As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep.



If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the *nearest tenth of a foot*. Determine and state, to the *nearest tenth of a foot*, the horizontal distance, *d*, from the bottom of the stairs to the bottom of the ramp.

288 David has just finished building his treehouse and still needs to buy a ladder to be attached to the ledge of the treehouse and anchored at a point on the ground, as modeled below. David is standing 1.3 meters from the stilt supporting the treehouse. This is the point on the ground where he has decided to anchor the ladder. The angle of elevation from his eye level to the bottom of the treehouse is 56 degrees. David's eye level is 1.5 meters above the ground.



Determine and state the minimum length of a ladder, to the *nearest tenth of a meter*, that David will need to buy for his treehouse.

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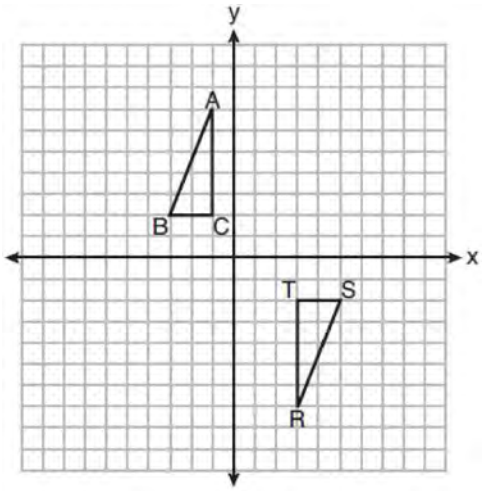
289 A quadrilateral must be a parallelogram if
1) one pair of sides is parallel and one pair of angles is congruent
2) one pair of sides is congruent and one pair of angles is congruent
3) one pair of sides is both parallel and congruent
4) the diagonals are congruent

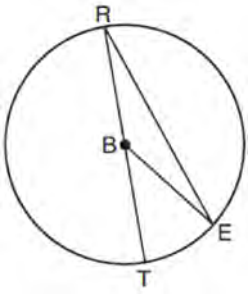
290 Triangles *ABC* and *RST* are graphed on the set of axes below.



Which sequence of rigid motions will prove $\triangle ABC \cong \triangle RST$?
1) a line reflection over $y = x$
2) a rotation of 180° centered at (1,0)
3) a line reflection over the *x*-axis followed by a translation of 6 units right
4) a line reflection over the *x*-axis followed by a line reflection over $y = 1$

291 A 15-foot ladder leans against a wall and makes an angle of 65° with the ground. What is the horizontal distance from the wall to the base of the ladder, to the *nearest tenth of a foot*?
1) 6.3
2) 7.0
3) 12.9
4) 13.6

292 In circle *B* below, diameter $\overline{RT}$, radius $\overline{BE}$, and chord $\overline{RE}$ are drawn.



If $m\angle TRE = 15°$ and $BE = 9$, then the area of sector *EBR* is
1) 3.375π
2) 6.75π
3) 33.75π
4) 37.125π

293 From a point on the ground one-half mile from the base of a historic monument, the angle of elevation to its top is 11.87°. To the *nearest foot*, what is the height of the monument?
1) 543
2) 555
3) 1086
4) 1110

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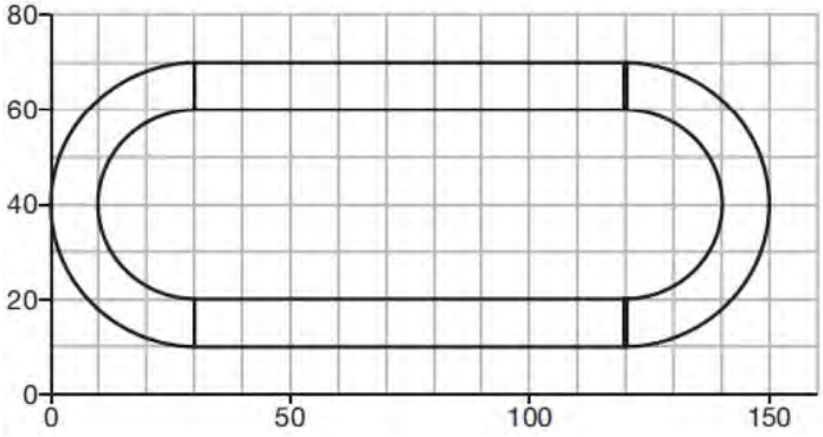
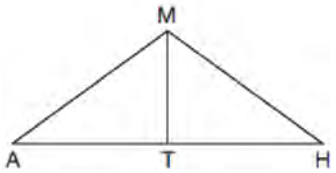
294 A walking path at a local park is modeled on the grid below, where the length of each grid square is 10 feet. The town needs to submit paperwork to pave the walking path. Determine and state, to the *nearest square foot*, the area of the walking path.



295 In triangle MAH below, $\overline{MT}$ is the perpendicular bisector of $\overline{AH}$.



Which statement is *not* always true?

1) $\triangle MAH$ is isosceles.
2) $\triangle MAT$ is isosceles.
3) $\overline{MT}$ bisects $\angle AMH$.
4) $\angle A$ and $\angle TMH$ are complementary.

296 A regular hexagon is rotated about its center. Which degree measure will carry the regular hexagon onto itself?

1) 45°
2) 90°
3) 120°
4) 135°

297 A tent is in the shape of a right pyramid with a square floor. The square floor has side lengths of 8 feet. If the height of the tent at its center is 6 feet, what is the volume of the tent, in cubic feet?

1) 48
2) 128
3) 192
4) 384

298 The line represented by $2y = x + 8$ is dilated by a scale factor of k centered at the origin, such that the image of the line has an equation of $y - \frac{1}{2}x = 2$.

What is the scale factor?

1) $k = \frac{1}{2}$
2) $k = 2$
3) $k = \frac{1}{4}$
4) $k = 4$

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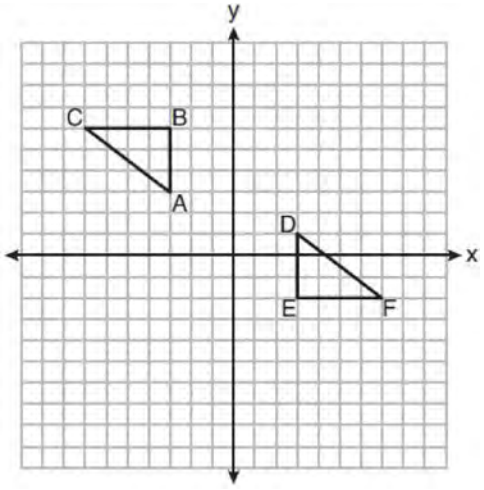
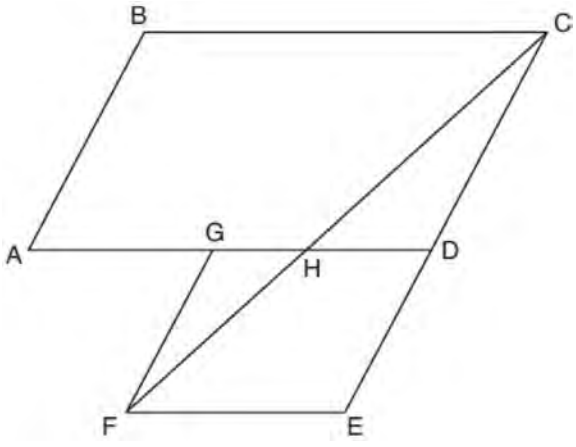
299 On the set of axes below, $\triangle ABC \cong \triangle DEF$.



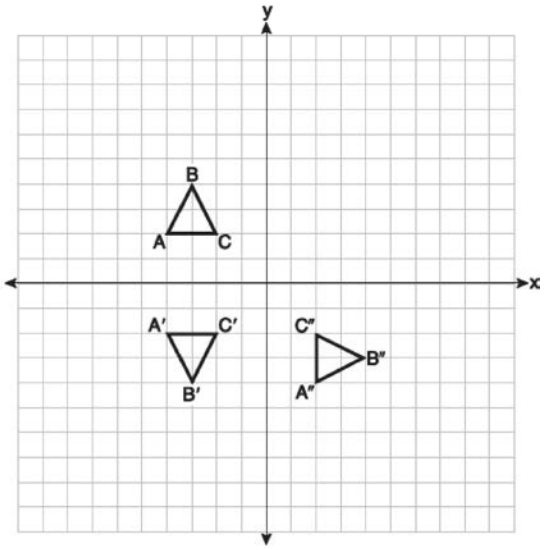
Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle DEF$.

300 Parallelogram *ABCD* is adjacent to rhombus *DEFG*, as shown below, and $\overline{FC}$ intersects $\overline{AGD}$ at *H*.



If m$\angle B$ = 118° and m$\angle AHC$ = 138°, determine and state m$\angle GFH$.

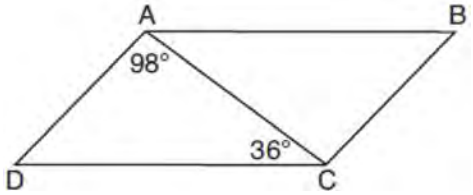
301 On the set of axes below, triangle *ABC* is graphed. Triangles $A'B'C'$ and $A''B''C''$, the images of triangle *ABC*, are graphed after a sequence of rigid motions.



Identify which sequence of rigid motions maps $\triangle ABC$ onto $\triangle A'B'C'$ and then maps $\triangle A'B'C'$ onto $\triangle A''B''C''$.

1) a rotation followed by another rotation
2) a translation followed by a reflection
3) a reflection followed by a translation
4) a reflection followed by a rotation

302 In parallelogram *ABCD* shown below, m$\angle DAC$ = 98° and m$\angle ACD$ = 36°.



What is the measure of angle *B*? Explain why.

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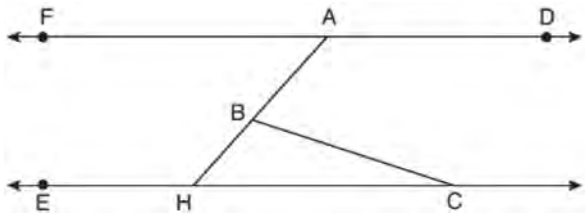
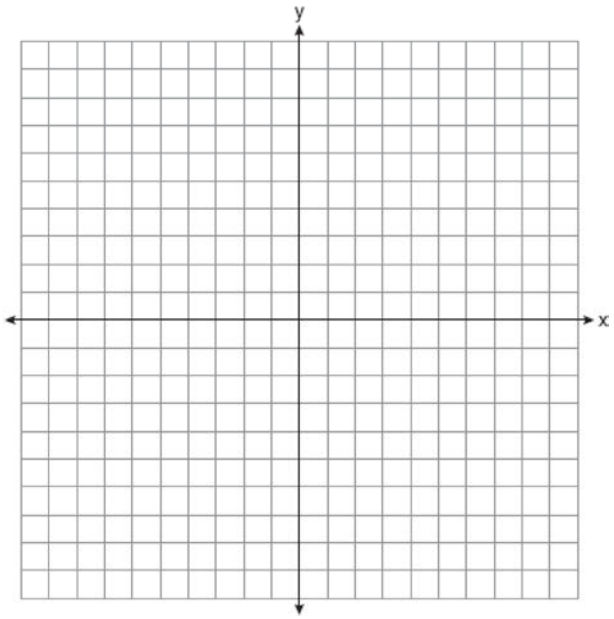
303 In the diagram below, $\overline{FAD} \parallel \overline{EHC}$, and $\overline{ABH}$ and $\overline{BC}$ are drawn.



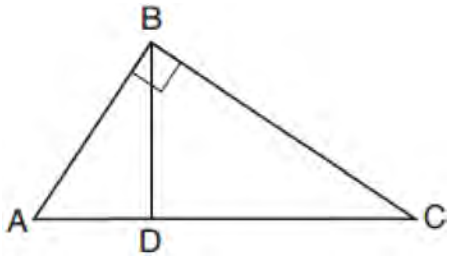
If $m\angle FAB = 48°$ and $m\angle ECB = 18°$, what is $m\angle ABC$?

1) 18°
2) 48°
3) 66°
4) 114°

304 Riley plotted $A(-1,6)$, $B(3,8)$, $C(6,-1)$, and $D(1,0)$ to form a quadrilateral. Prove that Riley's quadrilateral $ABCD$ is a trapezoid. [The use of the set of axes on the next page is optional.] Riley defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Riley's definition to prove that $ABCD$ is *not* an isosceles trapezoid.



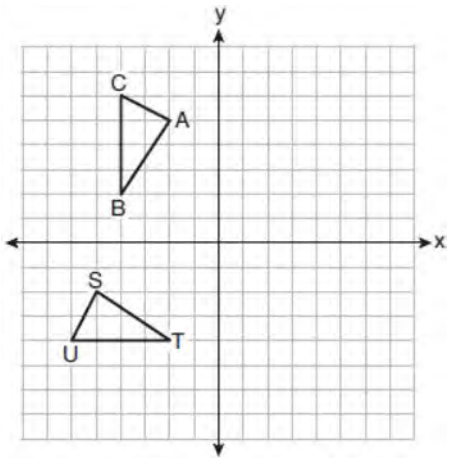
305 In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn.



Which ratio is always equivalent to $\cos A$?

1) $\frac{AB}{BC}$
2) $\frac{BD}{BC}$
3) $\frac{BD}{AB}$
4) $\frac{BC}{AC}$

306 On the set of axes below, $\triangle ABC \cong \triangle STU$.



Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle STU$.

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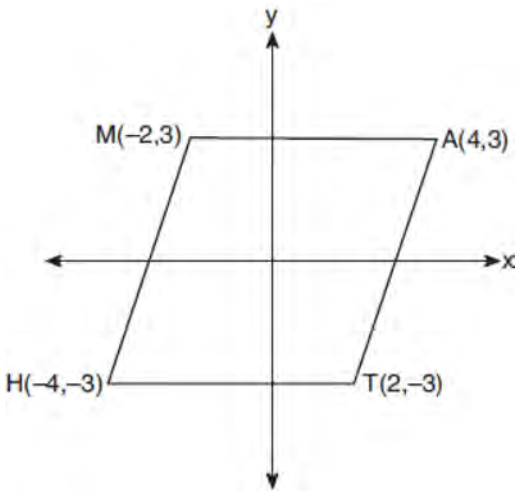
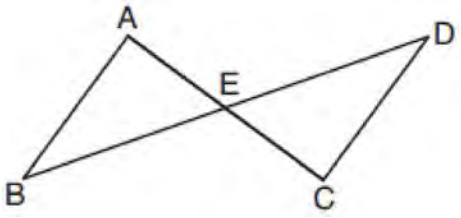
307 Which transformation carries the parallelogram below onto itself?



1) a reflection over $y = x$
2) a reflection over $y = -x$
3) a rotation of 90° counterclockwise about the origin
4) a rotation of 180° counterclockwise about the origin

308 Given $\overline{MT}$ below, use a compass and straightedge to construct a 45° angle whose vertex is at point M. [Leave all construction marks.]

309 In the diagram below, $\overline{AC}$ and $\overline{BD}$ intersect at E.



Which information is always sufficient to prove $\triangle ABE \cong \triangle CDE$?

1) $\overline{AB} \parallel \overline{CD}$
2) $\overline{AB} \cong \overline{CD}$ and $\overline{BE} \cong \overline{DE}$
3) E is the midpoint of $\overline{AC}$.
4) $\overline{BD}$ and $\overline{AC}$ bisect each other.

310 Point M divides $\overline{AB}$ so that $AM:MB = 1:2$. If A has coordinates $(-1,-3)$ and B has coordinates $(8,9)$, the coordinates of M are

1) $(2,1)$
2) $\left(\frac{5}{3},0\right)$
3) $(5,5)$
4) $\left(\frac{23}{3},8\right)$

311 The equation of a circle is $x^2 + 8x + y^2 - 12y = 144$. What are the coordinates of the center and the length of the radius of the circle?

1) center $(4,-6)$ and radius 12
2) center $(-4,6)$ and radius 12
3) center $(4,-6)$ and radius 14
4) center $(-4,6)$ and radius 14

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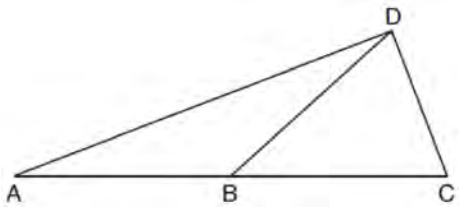
312 A support wire reaches from the top of a pole to a clamp on the ground. The pole is perpendicular to the level ground and the clamp is 10 feet from the base of the pole. The support wire makes a 68° angle with the ground. Find the length of the support wire to the *nearest foot*.

313 In right triangle ABC, $m\angle C = 90°$ and $AC \neq BC$. Which trigonometric ratio is equivalent to $\sin B$?
1) $\cos A$
2) $\cos B$
3) $\tan A$
4) $\tan B$

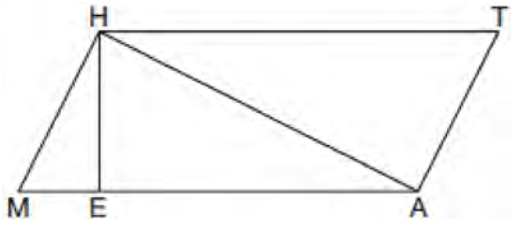
314 In the diagram below of $\triangle ACD$, $\overline{DB}$ is a median to $\overline{AC}$, and $\overline{AB} \cong \overline{DB}$.



If $m\angle DAB = 32°$, what is $m\angle BDC$?
1) 32°
2) 52°
3) 58°
4) 64°

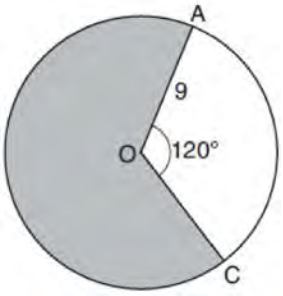
315 What is an equation of a circle whose center is (1,4) and diameter is 10?
1) $x^2 - 2x + y^2 - 8y = 8$
2) $x^2 + 2x + y^2 + 8y = 8$
3) $x^2 - 2x + y^2 - 8y = 83$
4) $x^2 + 2x + y^2 + 8y = 83$

316 Given: Quadrilateral $MATH$, $\overline{HM} \cong \overline{AT}$, $\overline{HT} \cong \overline{AM}$, $\overline{HE} \perp \overline{MEA}$, and $\overline{HA} \perp \overline{AT}$



Prove: $TA \bullet HA = HE \bullet TH$

317 Circle O with a radius of 9 is drawn below. The measure of central angle AOC is 120°.



What is the area of the shaded sector of circle O?
1) 6π
2) 12π
3) 27π
4) 54π

318 The endpoints of directed line segment PQ have coordinates of $P(-7,-5)$ and $Q(5,3)$. What are the coordinates of point A, on $\overline{PQ}$, that divide $\overline{PQ}$ into a ratio of 1:3?
1) $A(-1,-1)$
2) $A(2,1)$
3) $A(3,2)$
4) $A(-4,-3)$

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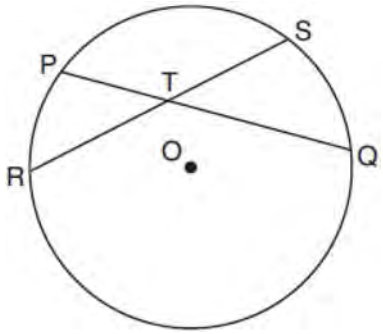
319 The table below shows the population and land area, in square miles, of four counties in New York State at the turn of the century.

County	**2000 Census Population**	**2000 Land Area** $\left(\text{mi}^2\right)$
Broome	200,536	706.82
Dutchess	280,150	801.59
Niagara	219,846	522.95
Saratoga	200,635	811.84

Which county had the greatest population density?

1) Broome
2) Dutchess
3) Niagara
4) Saratoga

320 In the diagram below, chords $\overline{PQ}$ and $\overline{RS}$ of circle O intersect at T.

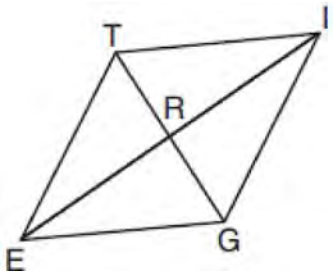


Which relationship must always be true?

1) $RT = TQ$
2) $RT = TS$
3) $RT + TS = PT + TQ$
4) $RT \times TS = PT \times TQ$

321 A rectangular tabletop will be made of maple wood that weighs 43 pounds per cubic foot. The tabletop will have a length of eight feet, a width of three feet, and a thickness of one inch. Determine and state the weight of the tabletop, in pounds.

322 In rhombus $TIGE$, diagonals $\overline{TG}$ and $\overline{IE}$ intersect at R. The perimeter of $TIGE$ is 68, and $TG = 16$.



What is the length of diagonal $\overline{IE}$?

1) 15
2) 30
3) 34
4) 52

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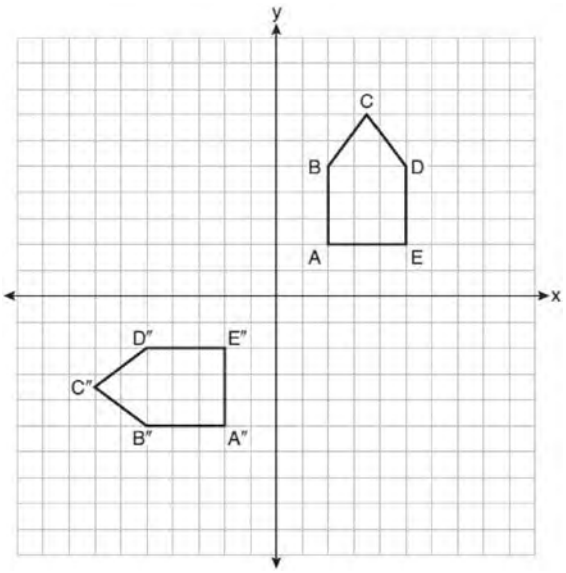
323 On the set of axes below, pentagon *ABCDE* is congruent to *A"B"C"D"E"*.



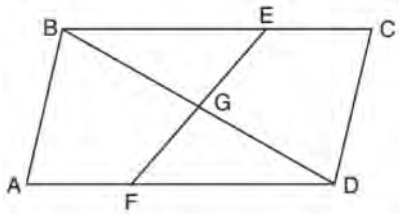
Which describes a sequence of rigid motions that maps *ABCDE* onto *A"B"C"D"E"*?

1) a rotation of 90° counterclockwise about the origin followed by a reflection over the *x*-axis
2) a rotation of 90° counterclockwise about the origin followed by a translation down 7 units
3) a reflection over the *y*-axis followed by a reflection over the *x*-axis
4) a reflection over the *x*-axis followed by a rotation of 90° counterclockwise about the origin

324 What is an equation of a circle whose center is at (2,–4) and is tangent to the line $x = -2$?

1) $(x-2)^2 + (y+4)^2 = 4$
2) $(x-2)^2 + (y+4)^2 = 16$
3) $(x+2)^2 + (y-4)^2 = 4$
4) $(x+2)^2 + (y-4)^2 = 16$

325 In quadrilateral *ABCD*, *E* and *F* are points on $\overline{BC}$ and $\overline{AD}$, respectively, and $\overline{BGD}$ and $\overline{EGF}$ are drawn such that $\angle ABG \cong \angle CDG$, $\overline{AB} \cong \overline{CD}$, and $\overline{CE} \cong \overline{AF}$.



Prove: $\overline{FG} \cong \overline{EG}$

326 If a rectangle is continuously rotated around one of its sides, what is the three-dimensional figure formed?

1) rectangular prism
2) cylinder
3) sphere
4) cone

327 Given points *A*, *B*, and *C*, use a compass and straightedge to construct point *D* so that *ABCD* is a parallelogram. [Leave all construction marks.]

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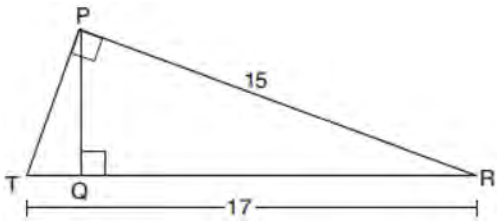
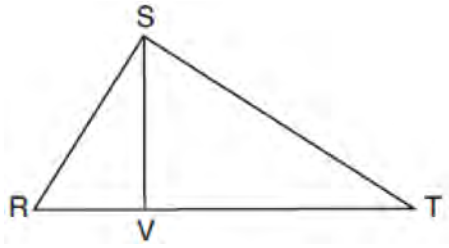
328 In right triangle PRT, m$\angle P = 90°$, altitude $\overline{PQ}$ is drawn to hypotenuse $\overline{RT}$, $RT = 17$, and $PR = 15$.



Determine and state, to the *nearest tenth*, the length of $\overline{RQ}$.

329 In right triangle RST below, altitude $\overline{SV}$ is drawn to hypotenuse $\overline{RT}$.



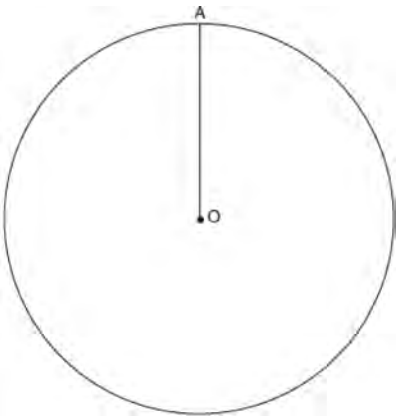
If $RV = 4.1$ and $TV = 10.2$, what is the length of $\overline{ST}$, to the *nearest tenth*?

1) 6.5
2) 7.7
3) 11.0
4) 12.1

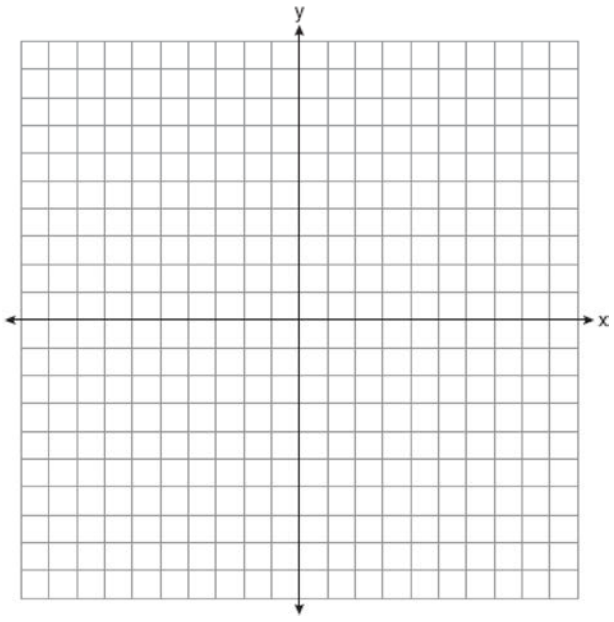
330 Triangles JOE and SAM are drawn such that $\angle E \cong \angle M$ and $\overline{EJ} \cong \overline{MS}$. Which mapping would *not* always lead to $\triangle JOE \cong \triangle SAM$?

1) $\angle J$ maps onto $\angle S$
2) $\angle O$ maps onto $\angle A$
3) $\overline{EO}$ maps onto $\overline{MA}$
4) $\overline{JO}$ maps onto $\overline{SA}$

331 Given circle O with radius $\overline{OA}$, use a compass and straightedge to construct an equilateral triangle inscribed in circle O. [Leave all construction marks.]



332 Quadrilateral $NATS$ has coordinates $N(-4,-3)$, $A(1,2)$, $T(8,1)$, and $S(3,-4)$. Prove quadrilateral $NATS$ is a rhombus. [The use of the set of axes below is optional.]



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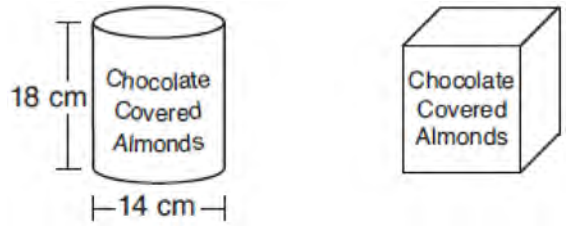
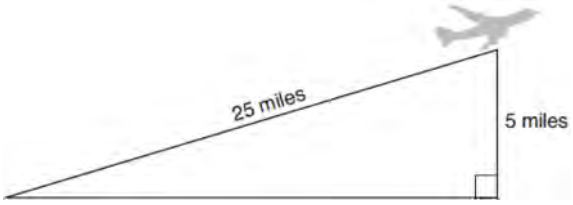
333 A manufacturer is designing a new container for their chocolate-covered almonds. Their original container was a cylinder with a height of 18 cm and a diameter of 14 cm. The new container can be modeled by a rectangular prism with a square base and will contain the same amount of chocolate-covered almonds.



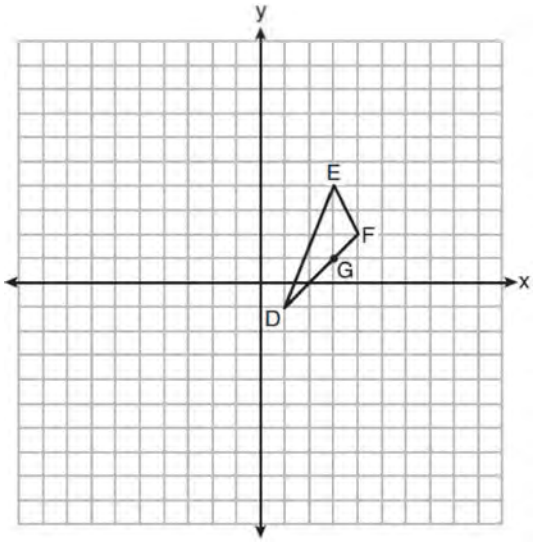
If the new container's height is 16 cm, determine and state, to the *nearest tenth of a centimeter*, the side length of the new container if both containers contain the same amount of almonds. A store owner who sells the chocolate-covered almonds displays them on a shelf whose dimensions are 80 cm long and 60 cm wide. The shelf can only hold one layer of new containers when each new container sits on its square base. Determine and state the maximum number of new containers the store owner can fit on the shelf.

334 An airplane took off at a constant angle of elevation. After the plane traveled for 25 miles, it reached an altitude of 5 miles, as modeled below.

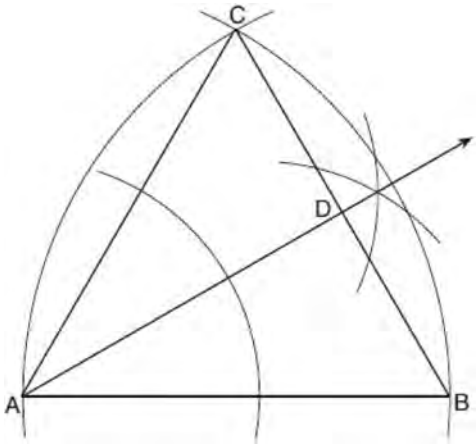


To the *nearest tenth of a degree*, what was the angle of elevation?

335 On the set of axes below, $\triangle DEF$ has vertices at the coordinates $D(1,-1)$, $E(3,4)$, and $F(4,2)$, and point G has coordinates $(3,1)$. Owen claims the median from point E must pass through point G. Is Owen correct? Explain why.



336 Using the construction below, state the degree measure of $\angle CAD$. Explain why.



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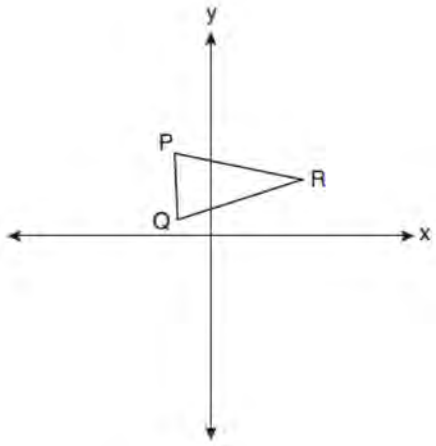
337 Triangle PQR is shown on the set of axes below.



Which quadrant will contain point R'', the image of point R, after a 90° clockwise rotation centered at (0,0) followed by a reflection over the x-axis?

1) I
2) II
3) III
4) IV

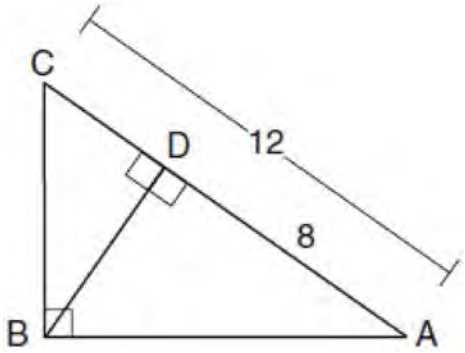
338 Which statement about parallelograms is always true?

1) The diagonals are congruent.
2) The diagonals bisect each other.
3) The diagonals are perpendicular.
4) The diagonals bisect their respective angles.

339 In right triangle RST, altitude $\overline{TV}$ is drawn to hypotenuse $\overline{RS}$. If $RV = 12$ and $RT = 18$, what is the length of $\overline{SV}$?

1) $6\sqrt{5}$
2) 15
3) $6\sqrt{6}$
4) 27

340 In the diagram below of $\triangle ABC$, $\angle ABC$ is a right angle, $AC = 12$, $AD = 8$, and altitude $\overline{BD}$ is drawn.



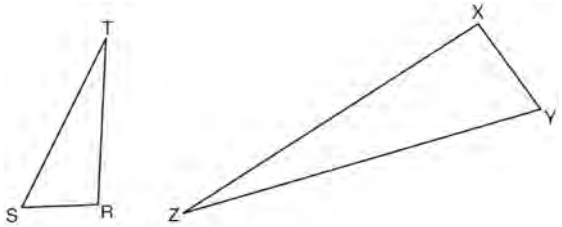
What is the length of $\overline{BC}$?

1) $4\sqrt{2}$
2) $4\sqrt{3}$
3) $4\sqrt{5}$
4) $4\sqrt{6}$

341 Triangle JGR is similar to triangle MST. Which statement is *not* always true?

1) $\angle J \cong \angle M$
2) $\angle G \cong \angle T$
3) $\angle R \cong \angle T$
4) $\angle G \cong \angle S$

342 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.



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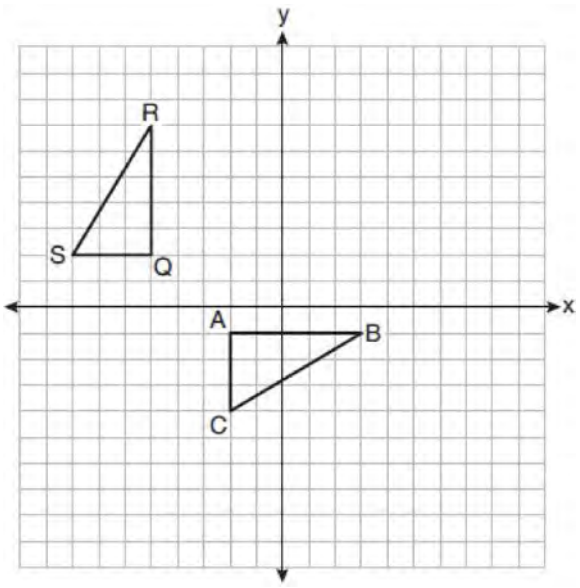
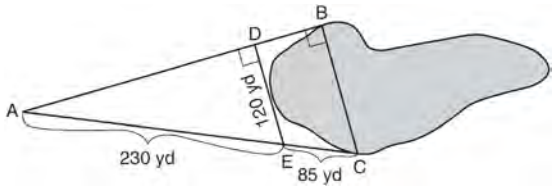
343 On the set of axes below, $\triangle ABC$ is graphed with coordinates $A(-2,-1)$, $B(3,-1)$, and $C(-2,-4)$. Triangle QRS, the image of $\triangle ABC$, is graphed with coordinates $Q(-5,2)$, $R(-5,7)$, and $S(-8,2)$.



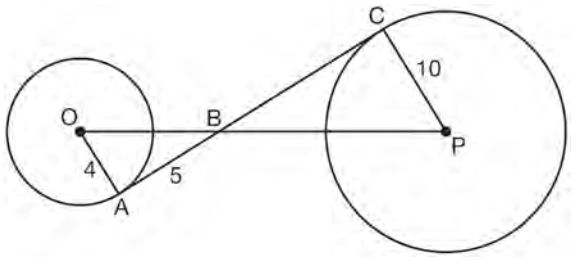
Describe a sequence of transformations that would map $\triangle ABC$ onto $\triangle QRS$.

344 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*.

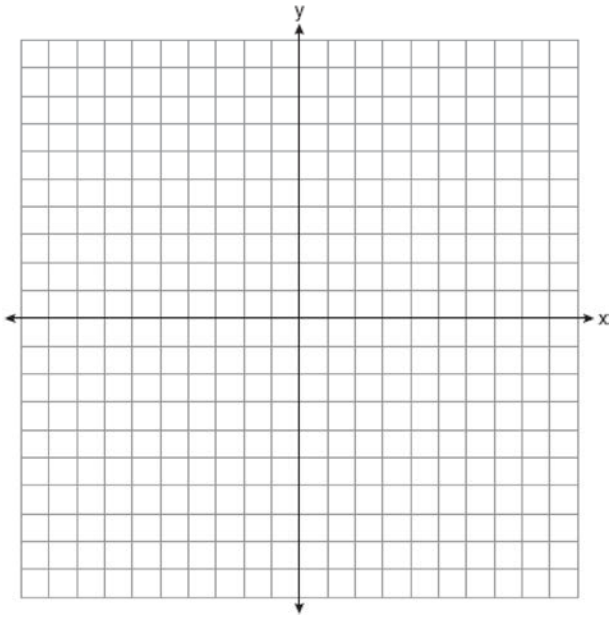
345 In the diagram shown below, $\overline{AC}$ is tangent to circle O at A and to circle P at C, $\overline{OP}$ intersects $\overline{AC}$ at B, $OA = 4$, $AB = 5$, and $PC = 10$.



What is the length of $\overline{BC}$?

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

346 The coordinates of the vertices of $\triangle ABC$ are $A(1,2)$, $B(-5,3)$, and $C(-6,-3)$. Prove that $\triangle ABC$ is isosceles. State the coordinates of point D such that quadrilateral $ABCD$ is a square. Prove that your quadrilateral $ABCD$ is a square. [The use of the set of axes below is optional.]



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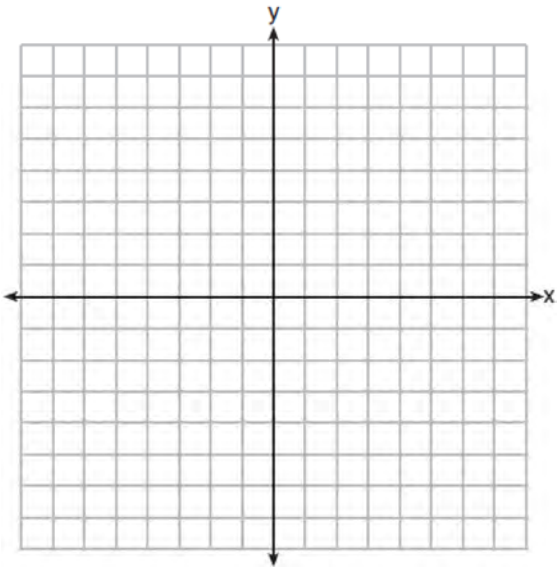
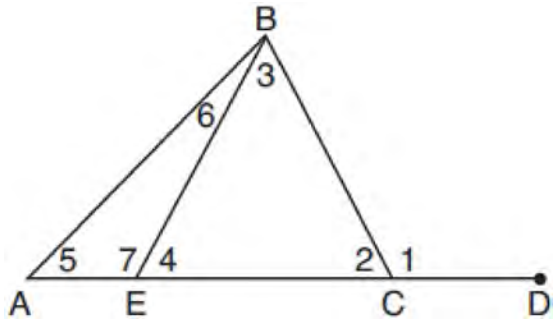
347 A triangle has vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$. Prove that $\triangle ABC$ is an isosceles right triangle. [The use of the set of axes below is optional.]



348 In the diagram below of triangle ABC, $\overline{AC}$ is extended through point C to point D, and $\overline{BE}$ is drawn to $\overline{AC}$.

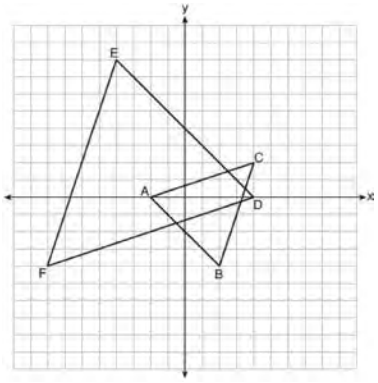


Which equation is always true?

1) $m\angle 1 = m\angle 3 + m\angle 2$
2) $m\angle 5 = m\angle 3 - m\angle 2$
3) $m\angle 6 = m\angle 3 - m\angle 2$
4) $m\angle 7 = m\angle 3 + m\angle 2$

349 A child-sized swimming pool can be modeled by a cylinder. The pool has a diameter of $6\frac{1}{2}$ feet and a height of 12 inches. The pool is filled with water to $\frac{2}{3}$ of its height. Determine and state the volume of the water in the pool, to the *nearest cubic foot*. One cubic foot equals 7.48 gallons of water. Determine and state, to the *nearest gallon*, the number of gallons of water in the pool.

350 On the set of axes below, $\triangle ABC$ has vertices at $A(-2,0)$, $B(2,-4)$, $C(4,2)$, and $\triangle DEF$ has vertices at $D(4,0)$, $E(-4,8)$, $F(-8,-4)$.



Which sequence of transformations will map $\triangle ABC$ onto $\triangle DEF$?

1) a dilation of $\triangle ABC$ by a scale factor of 2 centered at point A
2) a dilation of $\triangle ABC$ by a scale factor of $\frac{1}{2}$ centered at point A
3) a dilation of $\triangle ABC$ by a scale factor of 2 centered at the origin, followed by a rotation of 180° about the origin
4) a dilation of $\triangle ABC$ by a scale factor of $\frac{1}{2}$ centered at the origin, followed by a rotation of 180° about the origin

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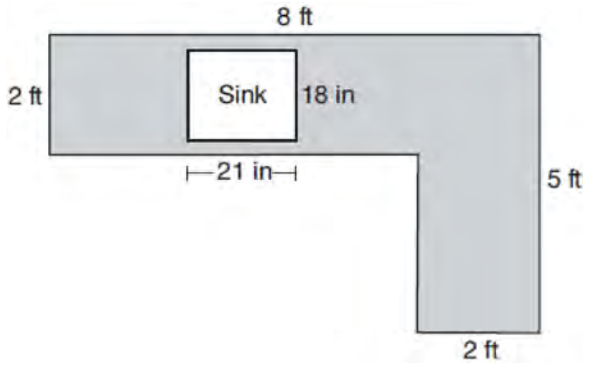
351 A countertop for a kitchen is modeled with the dimensions shown below. An 18-inch by 21-inch rectangle will be removed for the installation of the sink.



What is the area of the top of the installed countertop, to the *nearest square foot*?
1) 26
2) 23
3) 22
4) 19

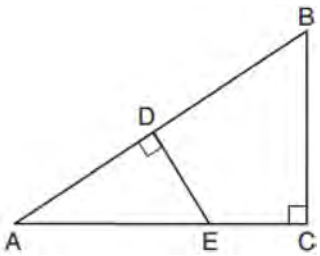
352 In parallelogram *ABCD*, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E*. Which statement proves *ABCD* is a rectangle?
1) $\overline{AC} \cong \overline{BD}$
2) $\overline{AB} \perp \overline{BD}$
3) $\overline{AC} \perp \overline{BD}$
4) $\overline{AC}$ bisects $\angle BCD$

353 Triangle *A'B'C'* is the image of triangle *ABC* after a dilation with a scale factor of $\frac{1}{2}$ and centered at point *A*. Is triangle *ABC* congruent to triangle *A'B'C'*? Explain your answer.

354 After a dilation centered at the origin, the image of $\overline{CD}$ is $\overline{C'D'}$. If the coordinates of the endpoints of these segments are $C(6,-4)$, $D(2,-8)$, $C'(9,-6)$, and $D'(3,-12)$, the scale factor of the dilation is
1) $\frac{3}{2}$
2) $\frac{2}{3}$
3) 3
4) $\frac{1}{3}$

355 A standard-size golf ball has a diameter of 1.680 inches. The material used to make the golf ball weighs 0.6523 ounce per cubic inch. What is the weight, to the *nearest hundredth of an ounce*, of one golf ball?
1) 1.10
2) 1.62
3) 2.48
4) 3.81

356 In $\triangle ABC$ shown below, $\angle ACB$ is a right angle, *E* is a point on $\overline{AC}$, and $\overline{ED}$ is drawn perpendicular to hypotenuse $\overline{AB}$.



If $AB = 9$, $BC = 6$, and $DE = 4$, what is the length of $\overline{AE}$?
1) 5
2) 6
3) 7
4) 8

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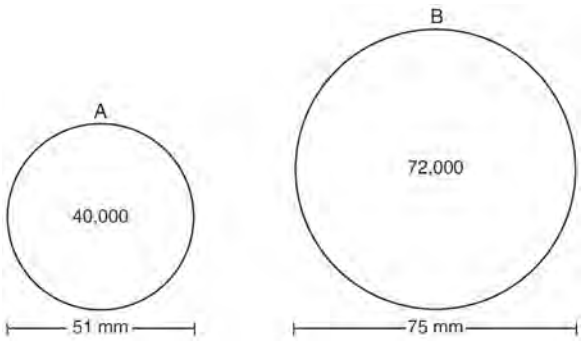
357 A fish tank in the shape of a rectangular prism has dimensions of 14 inches, 16 inches, and 10 inches. The tank contains 1680 cubic inches of water. What percent of the fish tank is empty?

1) 10
2) 25
3) 50
4) 75

358 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.

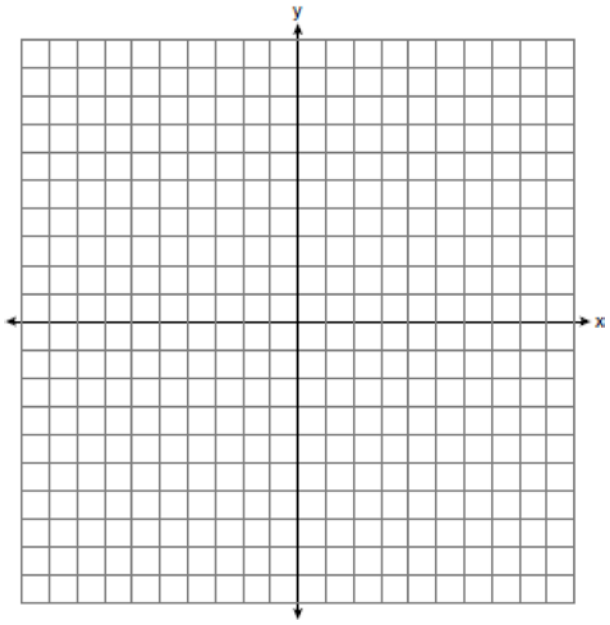


Determine and state which petri dish has the greater population density of bacteria at the end of the first hour.

359 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

360 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.]



361 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

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

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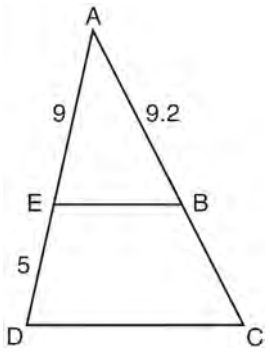
363 Line ℓ is mapped onto line m by a dilation centered at the origin with a scale factor of 2. The equation of line ℓ is $3x - y = 4$. Determine and state an equation for line m.

364 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

365 In the diagram of $\triangle ADC$ below, $\overline{EB} \parallel \overline{DC}$, $AE = 9$, $ED = 5$, and $AB = 9.2$.



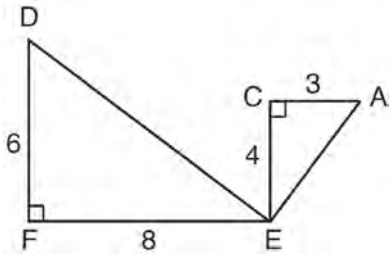
What is the length of $\overline{AC}$, to the *nearest tenth*?
1) 5.1
2) 5.2
3) 14.3
4) 14.4

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

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

368 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) $(1,-1)$

369 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

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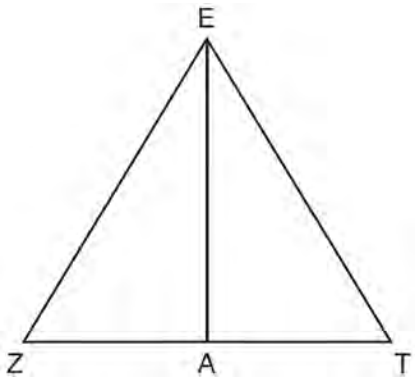
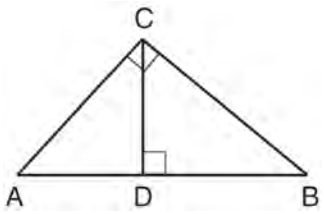
370 Line segment *EA* is the perpendicular bisector of $\overline{ZT}$, and $\overline{ZE}$ and $\overline{TE}$ are drawn.



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*.

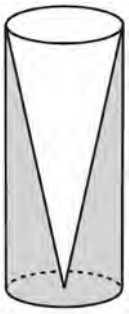
371 In the diagram below, $\overline{CD}$ is the altitude drawn to the hypotenuse $\overline{AB}$ of right triangle *ABC*.



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

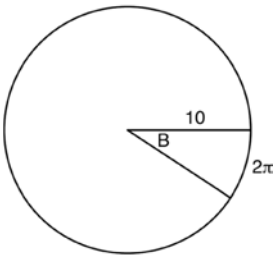
1) *AD* = 2 and *DB* = 36
2) *AD* = 3 and *AB* = 24
3) *AD* = 6 and *DB* = 12
4) *AD* = 8 and *AB* = 17

372 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?

373 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) $\frac{5}{\pi}$

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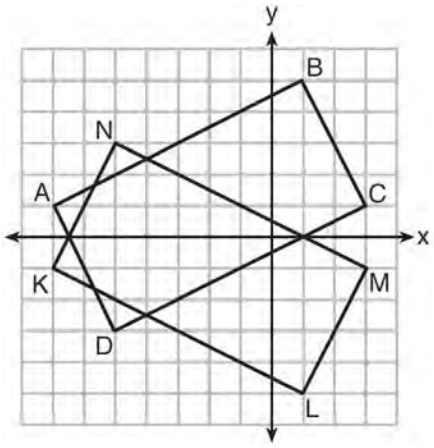
374 The line $y = 2x - 4$ is dilated by a scale factor of $\frac{3}{2}$ and centered at the origin. Which equation represents the image of the line after the dilation?

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

375 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

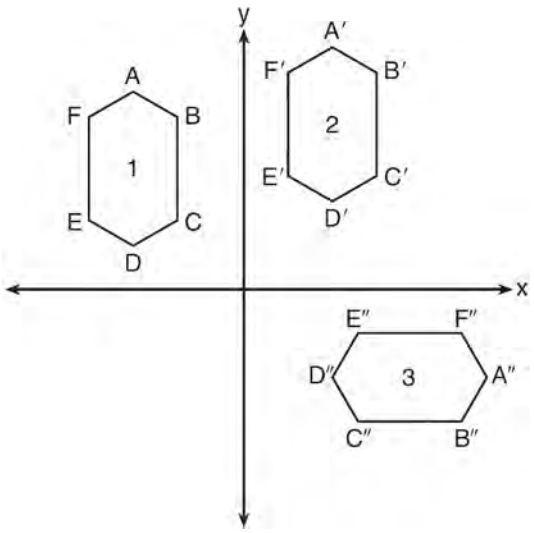
376 Which transformation would result in the perimeter of a triangle being different from the perimeter of its image?

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

377 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

378 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

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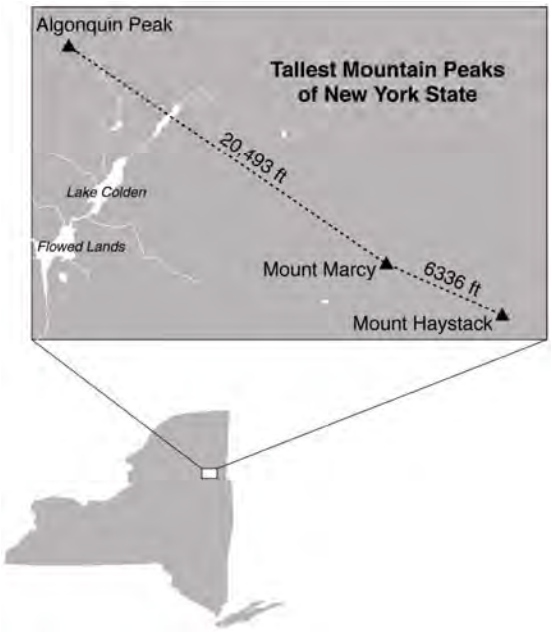
379 The map below shows the three tallest mountain peaks in New York State: Mount Marcy, Algonquin Peak, and Mount Haystack. Mount Haystack, the shortest peak, is 4960 feet tall. Surveyors have determined the horizontal distance between Mount Haystack and Mount Marcy is 6336 feet and the horizontal distance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

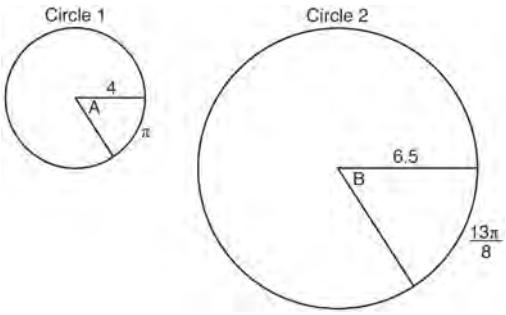


The angle of depression from the peak of Mount Marcy to the peak of Mount Haystack is 3.47 degrees. The angle of elevation from the peak of Algonquin Peak to the peak of Mount Marcy is 0.64 degrees. What are the heights, to the *nearest foot*, of Mount Marcy and Algonquin Peak? Justify your answer.

380 A quadrilateral has vertices with coordinates $(-3,1)$, $(0,3)$, $(5,2)$, and $(-1,-2)$. Which type of quadrilateral is this?

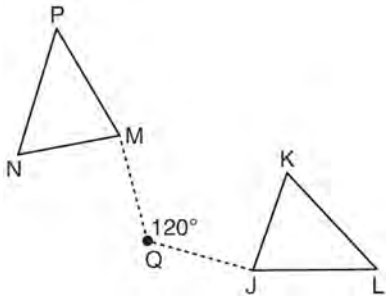
1) rhombus
2) rectangle
3) square
4) trapezoid

381 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.

382 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.



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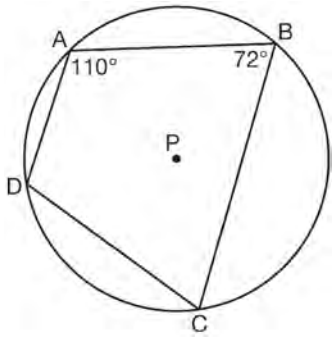
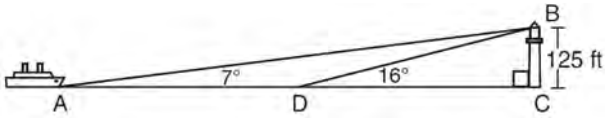
383 A barrel of fuel oil is a right circular cylinder where the inside measurements of the barrel are a diameter of 22.5 inches and a height of 33.5 inches. There are 231 cubic inches in a liquid gallon. Determine and state, to the *nearest tenth*, the gallons of fuel that are in a barrel of fuel oil.

384 In the diagram below, quadrilateral *ABCD* is inscribed in circle *P*.



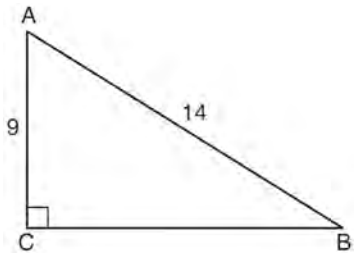
What is m∠*ADC*?
1) 70°
2) 72°
3) 108°
4) 110°

385 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°.



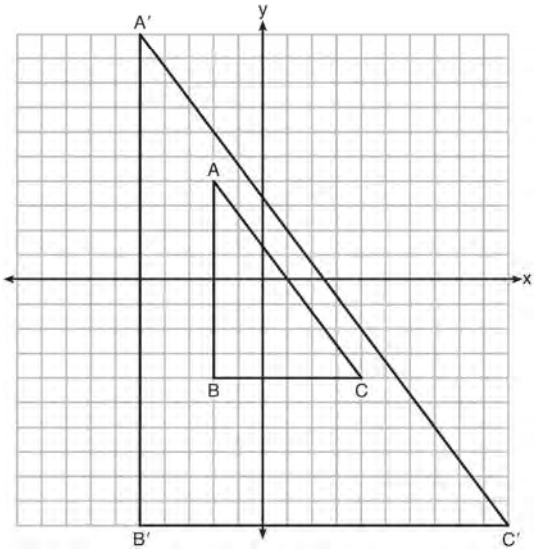
To the *nearest foot*, determine and state how far the ship traveled from point *A* to point *D*.

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



What is the measure of ∠*A*, to the *nearest degree*?
1) 33
2) 40
3) 50
4) 57

387 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 $\triangle A'B'C' \sim \triangle ABC$.

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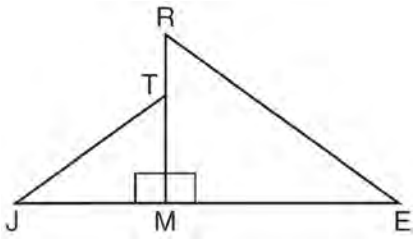
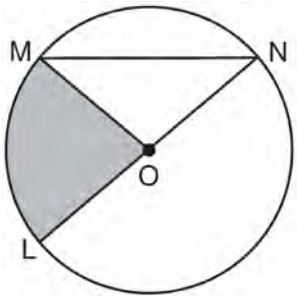
388 In the diagram below, $\triangle ERM \sim \triangle JTM$.



Which statement is always true?

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

389 In the diagram below of circle O, the area of the shaded sector LOM is 2π cm^2.



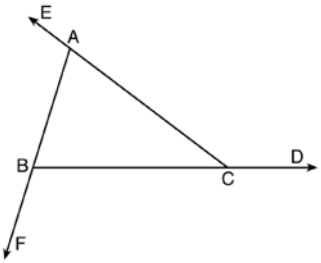
If the length of $\overline{NL}$ is 6 cm, what is $m\angle N$?

1) 10°
2) 20°
3) 40°
4) 80°

390 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

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



392 Which expression is always equivalent to $\sin x$ when $0° < x < 90°$?

1) $\cos(90° - x)$
2) $\cos(45° - x)$
3) $\cos(2x)$
4) $\cos x$

393 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*.

Geometry Regents Exam Questions at Random Worksheet # 83 NAME:_____
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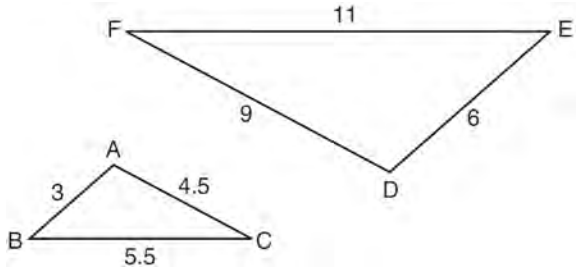
394 In the diagram below, $\triangle DEF$ is the image of $\triangle ABC$ after a clockwise rotation of 180° and a dilation where $AB = 3$, $BC = 5.5$, $AC = 4.5$, $DE = 6$, $FD = 9$, and $EF = 11$.



Which relationship must always be true?

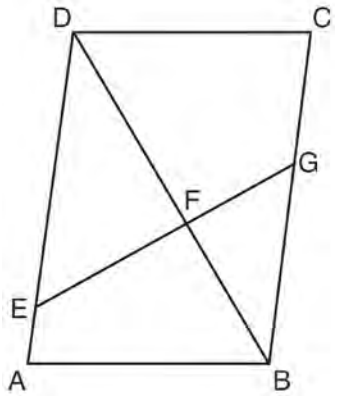
1) $\frac{m\angle A}{m\angle D} = \frac{1}{2}$

2) $\frac{m\angle C}{m\angle F} = \frac{2}{1}$

3) $\frac{m\angle A}{m\angle C} = \frac{m\angle F}{m\angle D}$

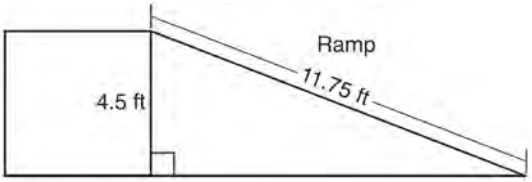
4) $\frac{m\angle B}{m\angle E} = \frac{m\angle C}{m\angle F}$

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



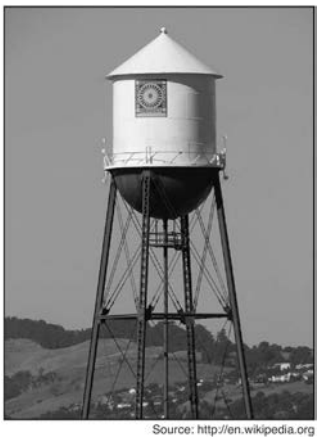
Prove: $\triangle DEF \sim \triangle BGF$

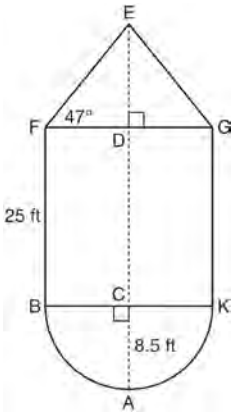
396 The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.



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

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





If $AC = 8.5$ feet, $BF = 25$ feet, and $m\angle EFD = 47°$, 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.

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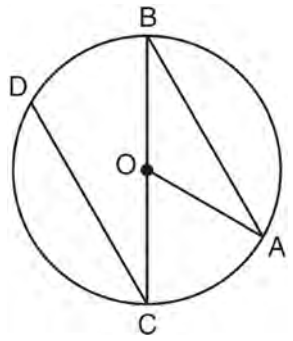
398 Quadrilateral *ABCD* has diagonals $\overline{AC}$ and $\overline{BD}$. Which information is *not* sufficient to prove *ABCD* is a parallelogram?

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

399 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

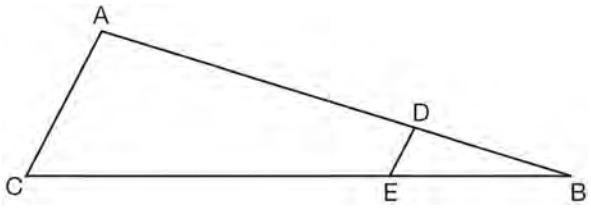
400 In the diagram below of circle *O* with diameter $\overline{BC}$ and radius $\overline{OA}$, chord $\overline{DC}$ is parallel to chord $\overline{BA}$.



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

401 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.

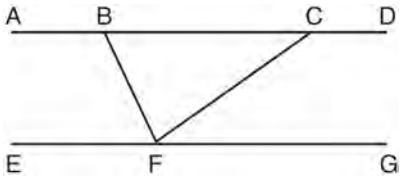
402 In the diagram of $\triangle ABC$, points *D* and *E* are on $\overline{AB}$ and $\overline{CB}$, respectively, such that $\overline{AC} \parallel \overline{DE}$.



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

1) 8
2) 12
3) 16
4) 72

403 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) $\angle CBF \cong \angle GFC$

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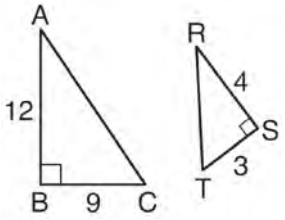
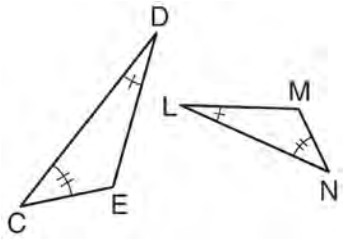
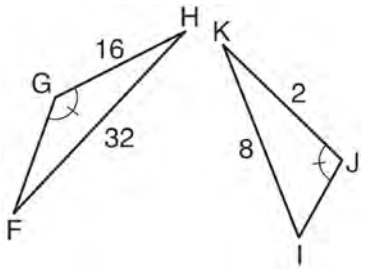
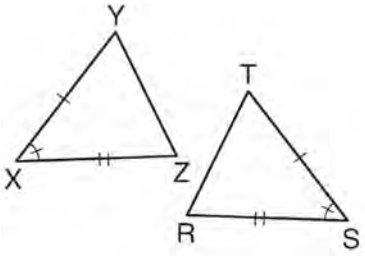
404 Using the information given below, which set of triangles can *not* be proven similar?

1) 

2) 

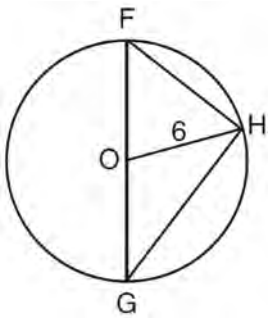
3) 

4) 

405 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

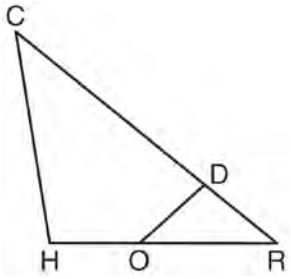
406 Triangle *FGH* is inscribed in circle *O*, the length of radius $\overline{OH}$ is 6, and $\overline{FH} \cong \overline{OG}$.



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

1) 2π
2) $\frac{3}{2}\pi$
3) 6π
4) 24π

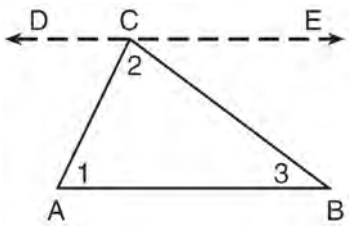
407 In triangle *CHR*, *O* is on $\overline{HR}$, and *D* is on $\overline{CR}$ so that $\angle H \cong \angle RDO$.



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

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

408 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: $m\angle 1 + m\angle 2 + m\angle 3 = 180°$
Fill in the missing reasons below.

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

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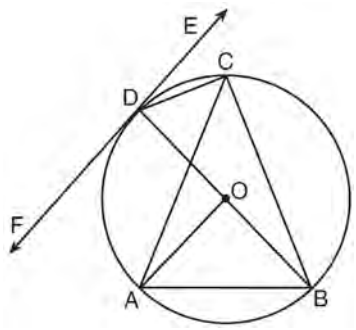
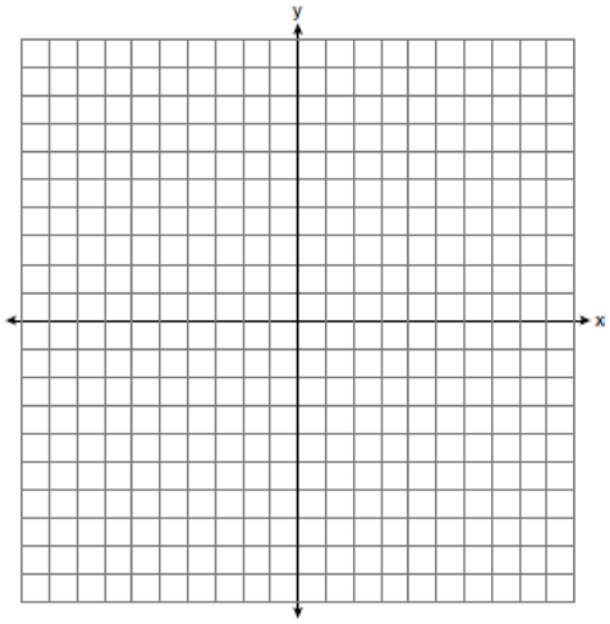
409 In the diagram below, $\overline{DC}$, $\overline{AC}$, $\overline{DOB}$, $\overline{CB}$, and $\overline{AB}$ are chords of circle O, $\overleftrightarrow{FDE}$ is tangent at point D, and radius $\overline{AO}$ is drawn. Sam decides to apply this theorem to the diagram: "An angle inscribed in a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



Which angle is Sam referring to?
1) $\angle AOB$
2) $\angle BAC$
3) $\angle DCB$
4) $\angle FDB$

410 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.

411 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 $\overline{AH}$.



412 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

Geometry Regents Exam Questions at Random Worksheet # 88 NAME:_____
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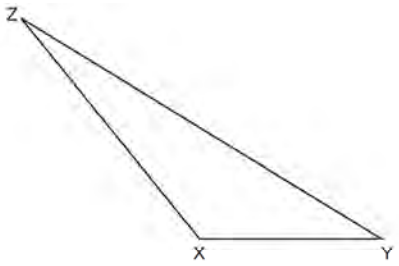
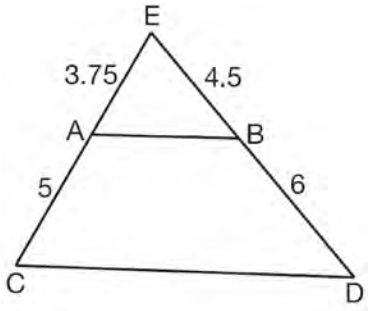
413 Triangle *XYZ* is shown below. Using a compass and straightedge, on the line below, construct and label $\triangle ABC$, such that $\triangle ABC \cong \triangle XYZ$. [Leave all construction marks.] Based on your construction, state the theorem that justifies why $\triangle ABC$ is congruent to $\triangle XYZ$.



414 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*?

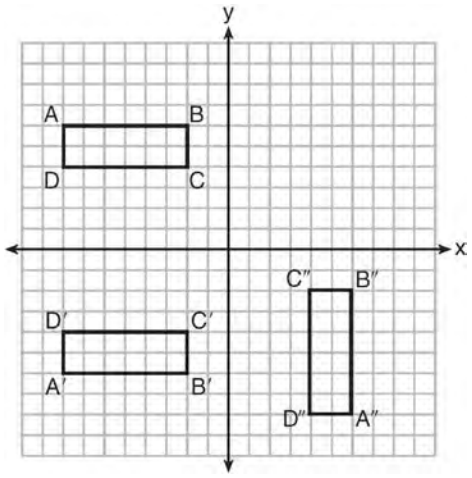
1) 16,336
2) 32,673
3) 130,690
4) 261,381

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



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

416 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

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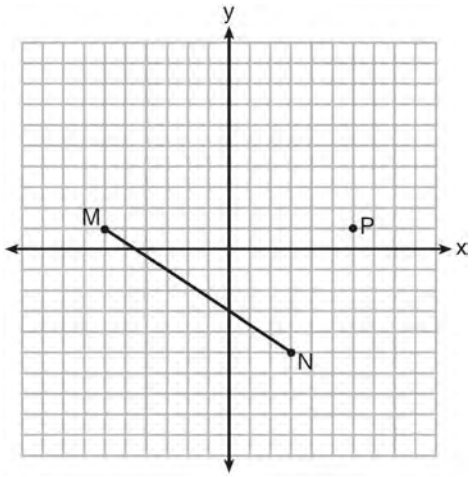
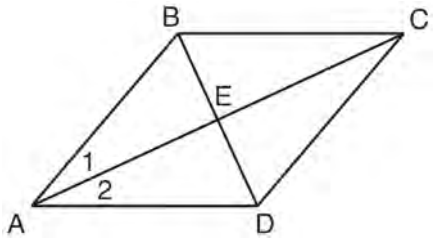
417 Given $\overline{MN}$ shown below, with $M(-6,1)$ and $N(3,-5)$, what is an equation of the line that passes through point $P(6,1)$ and is parallel to $\overline{MN}$?



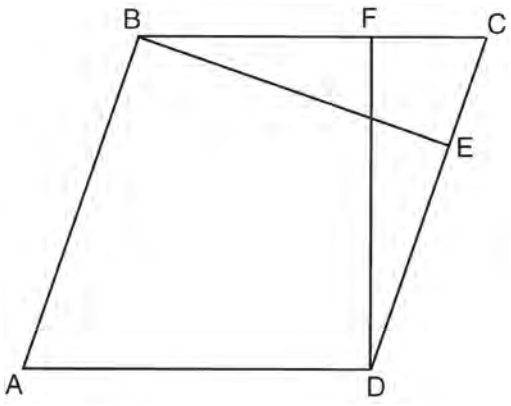
1) $y = -\frac{2}{3}x + 5$
2) $y = -\frac{2}{3}x - 3$
3) $y = \frac{3}{2}x + 7$
4) $y = \frac{3}{2}x - 8$

418 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

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



Prove *ABCD* is a rhombus.

420 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 $\angle DCB$

421 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

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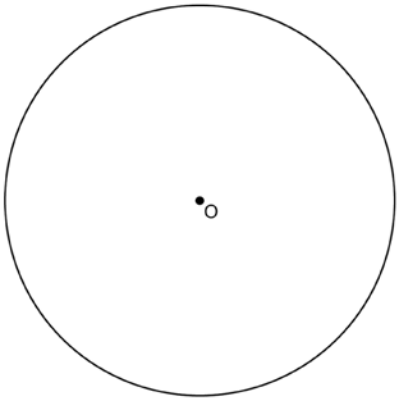
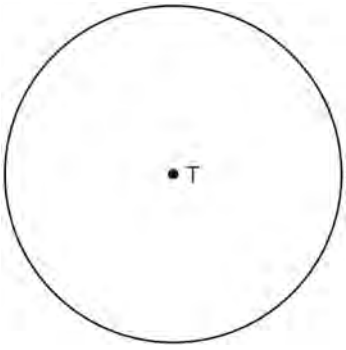
422 Using a straightedge and compass, construct a square inscribed in circle *O* below. [Leave all construction marks.]



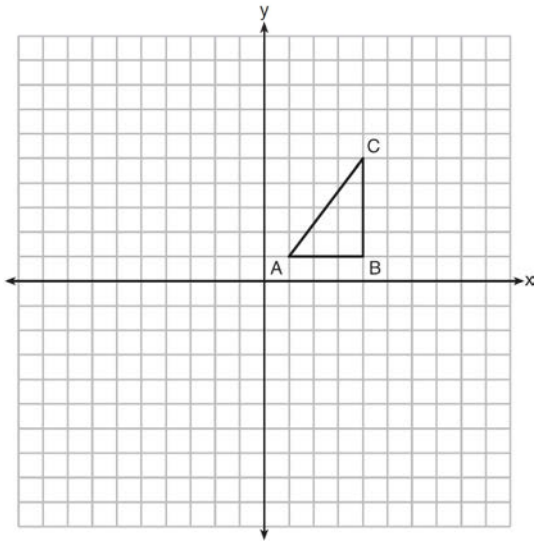
Determine the measure of the arc intercepted by two adjacent sides of the constructed square. Explain your reasoning.

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



424 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.

425 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 $y = 0$.



426 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) $y = 2x + 1$

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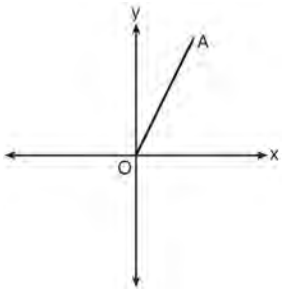
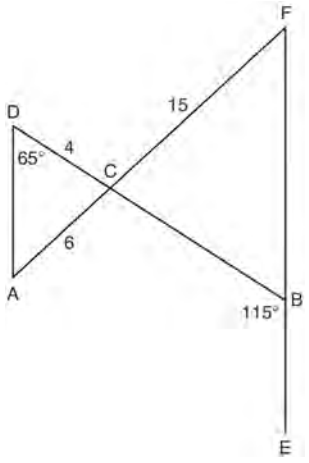
427 Which transformation of $\overline{OA}$ would result in an image parallel to $\overline{OA}$?



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

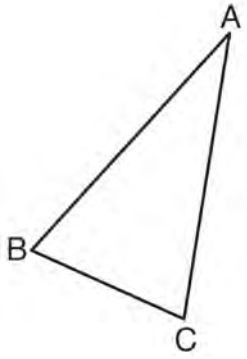
428 In the diagram below, $\overline{DB}$ and $\overline{AF}$ intersect at point *C*, and $\overline{AD}$ and $\overline{FBE}$ are drawn.



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

1) 10
2) 12
3) 17
4) 22.5

429 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 $\overline{A'C'}$.



430 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) $\sin\angle A = \cos\angle B$

431 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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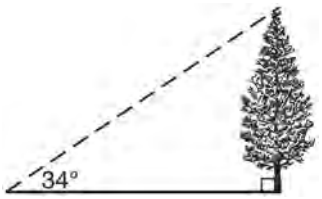
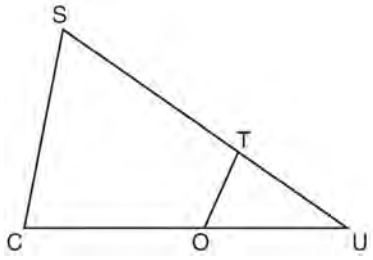
432 As shown in the diagram below, the angle of elevation from a point on the ground to the top of the tree is 34°.



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

433 In $\triangle SCU$ shown below, points T and O are on $\overline{SU}$ and $\overline{CU}$, respectively. Segment 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

434 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

435 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

436 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) $(6,3)$

437 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

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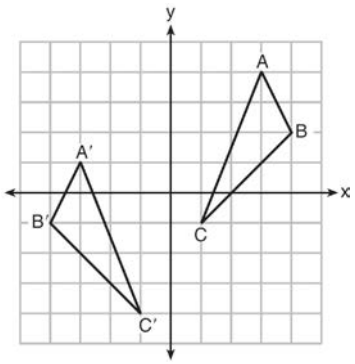
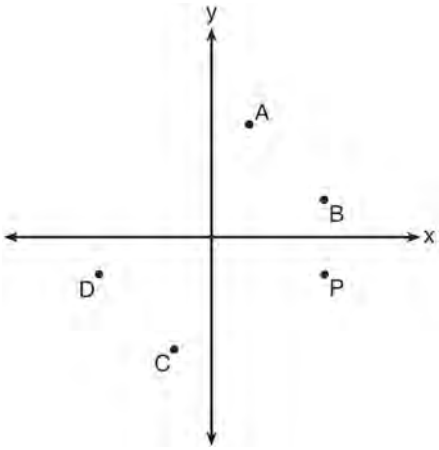
438 As graphed on the set of axes below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a sequence of transformations.



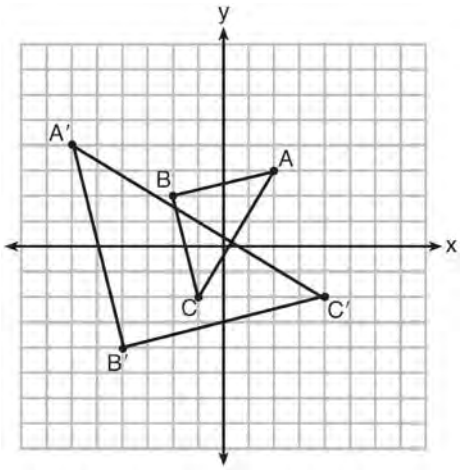
Is $\triangle A'B'C'$ congruent to $\triangle ABC$? Use the properties of rigid motion to explain your answer.

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



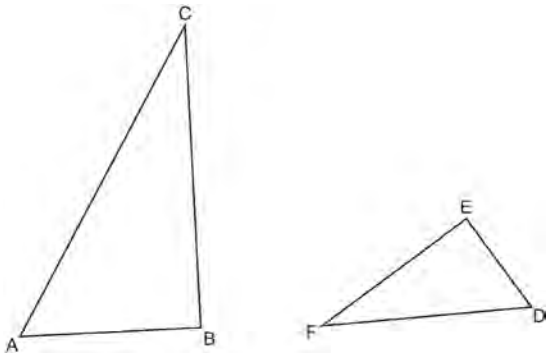
1) *A*
2) *B*
3) *C*
4) *D*

440 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

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

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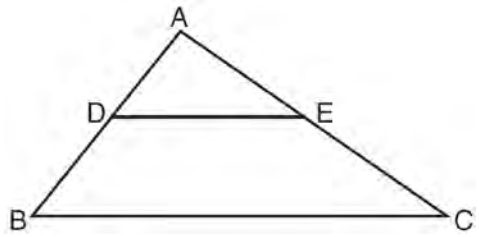
442 The ratio of similarity of $\triangle BOY$ to $\triangle GRL$ is $1:2$. If $BO = x + 3$ and $GR = 3x - 1$, then the length of $\overline{GR}$ is
1) 5
2) 7
3) 10
4) 20

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

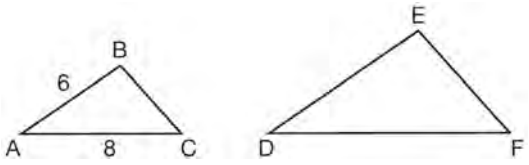


Which measurements are justified by this similarity?
1) $AD = 3$, $AB = 6$, $AE = 4$, and $AC = 12$
2) $AD = 5$, $AB = 8$, $AE = 7$, and $AC = 10$
3) $AD = 3$, $AB = 9$, $AE = 5$, and $AC = 10$
4) $AD = 2$, $AB = 6$, $AE = 5$, and $AC = 15$

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

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

446 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 $\angle C \cong \angle F$

447 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

448 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

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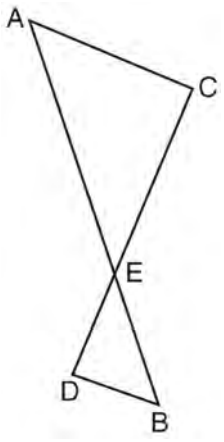
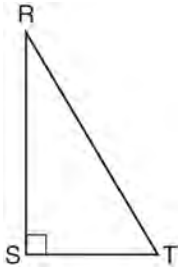
449 As shown in the diagram below, $\overline{AB}$ and $\overline{CD}$ intersect at E, and $\overline{AC} \parallel \overline{BD}$.



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) $\frac{ED}{EC} = \frac{AC}{BD}$

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



1) a pyramid with a square base
2) an isosceles triangle
3) a right triangle
4) a cone

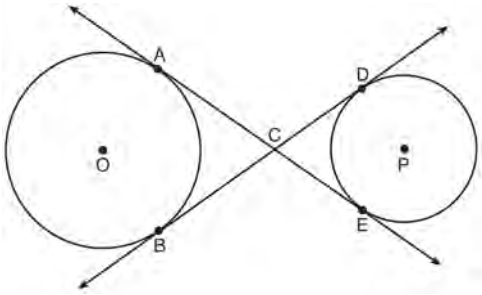
451 The center of circle Q has coordinates $(3,-2)$. If circle Q passes through $R(7,1)$, what is the length of its diameter?

1) 50
2) 25
3) 10
4) 5

452 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

453 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 $\overline{CD}$.



454 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

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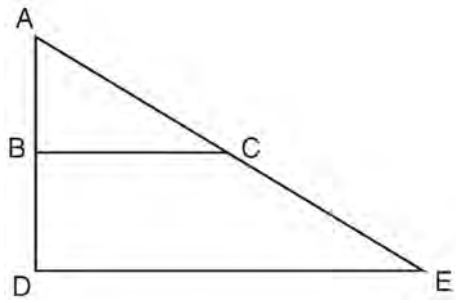
455 The image of $\triangle ABC$ after a dilation of scale factor k centered at point A is $\triangle ADE$, as shown in the diagram below.



Which statement is always true?

1) $2AB = AD$
2) $\overline{AD} \perp \overline{DE}$
3) $AC = CE$
4) $\overline{BC} \parallel \overline{DE}$

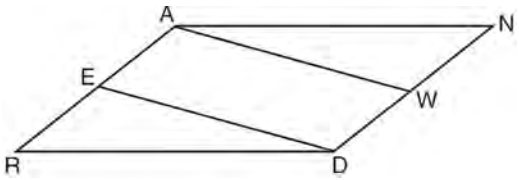
456 The line $3y = -2x + 8$ is transformed by a dilation centered at the origin. Which linear equation could be its image?

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

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

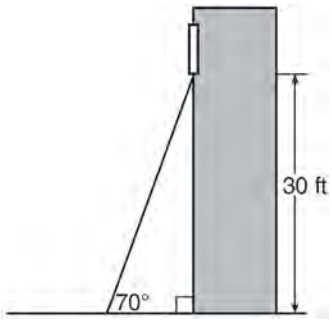
1) $y + 1 = \frac{4}{3}(x + 3)$
2) $y + 1 = -\frac{3}{4}(x + 3)$
3) $y - 6 = \frac{4}{3}(x - 8)$
4) $y - 6 = -\frac{3}{4}(x - 8)$

458 Given: Parallelogram $ANDR$ with $\overline{AW}$ and $\overline{DE}$ bisecting $\overline{NWD}$ and $\overline{REA}$ at points W and E, respectively



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

459 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.



460 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

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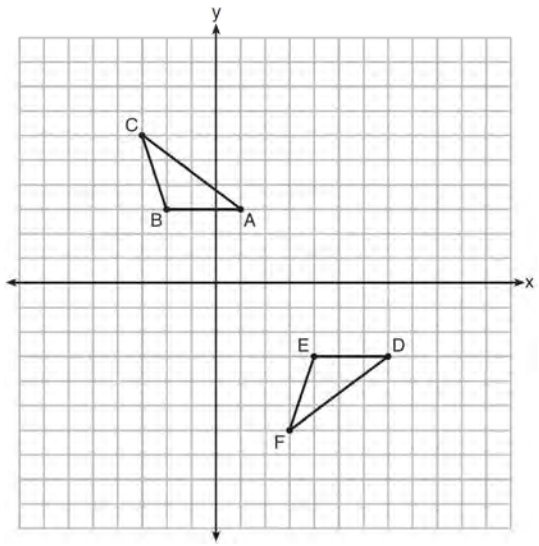
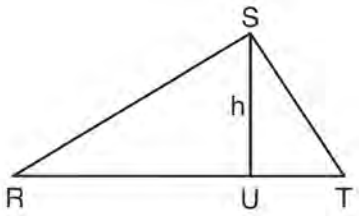
461 Describe a sequence of transformations that will map $\triangle ABC$ onto $\triangle DEF$ as shown below.



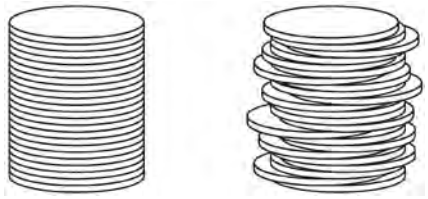
462 In $\triangle RST$ shown below, altitude $\overline{SU}$ is drawn to $\overline{RT}$ at U.



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?

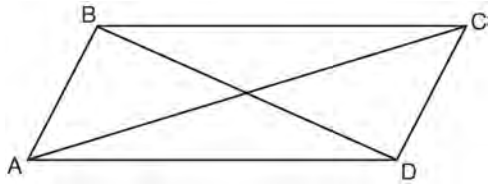
1) $6\sqrt{3}$
2) $6\sqrt{10}$
3) $6\sqrt{14}$
4) $6\sqrt{35}$

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



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

464 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 $\overline{BC} \parallel \overline{AD}$

465 Which transformation would *not* always produce an image that would be congruent to the original figure?

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

Geometry Regents Exam Questions at Random Worksheet # 98 NAME:_____
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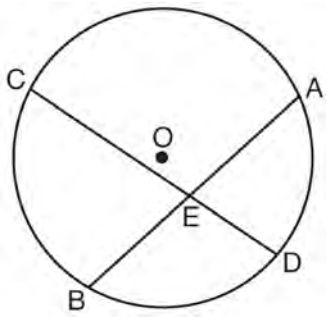
466 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E



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 $AE \cdot EB = CE \cdot ED$.

467 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) $y = 3x - 1$

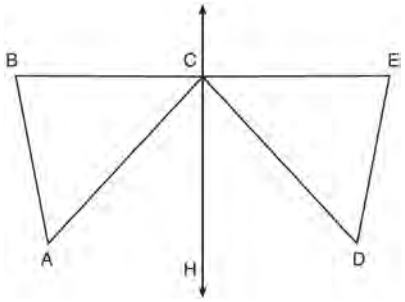
468 What are the coordinates of the center and length of the radius of the circle whose equation is $x^2 + 6x + y^2 - 4y = 23$?
1) $(3,-2)$ and 36
2) $(3,-2)$ and 6
3) $(-3,2)$ and 36
4) $(-3,2)$ and 6

469 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.

470 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

471 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

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



473 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.

Geometry Regents Exam Questions at Random Worksheet # 99 NAME:_____
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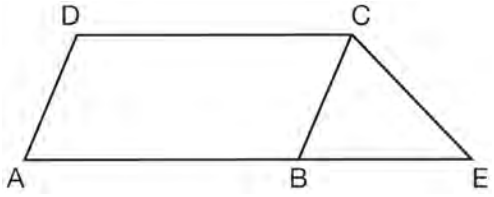
474 Segment CD is the perpendicular bisector of $\overline{AB}$ at E. Which pair of segments does *not* have to be congruent?
1) $\overline{AD}, \overline{BD}$
2) $\overline{AC}, \overline{BC}$
3) $\overline{AE}, \overline{BE}$
4) $\overline{DE}, \overline{CE}$

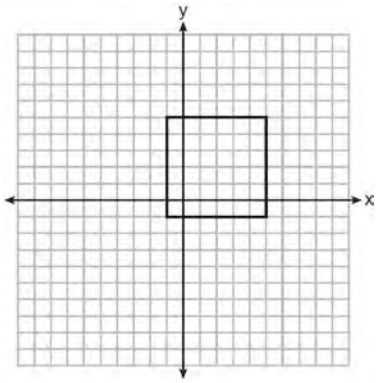
475 The diameter of a basketball is approximately 9.5 inches and the diameter of a tennis ball is approximately 2.5 inches. The volume of the basketball is about how many times greater than the volume of the tennis ball?
1) 3591
2) 65
3) 55
4) 4

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



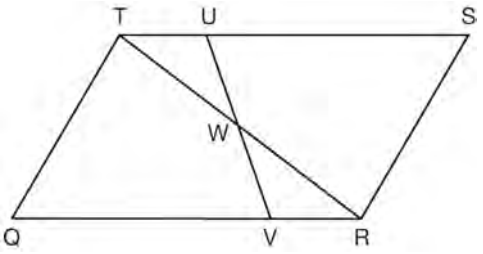
If $\overline{CE} \cong \overline{BE}$ and m$\angle D = 112°$, what is m$\angle E$?
1) 44°
2) 56°
3) 68°
4) 112°

477 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) $x + y = 4$

478 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$\angle S = 60°$, m$\angle SRT = 83°$, and m$\angle TWU = 35°$, what is m$\angle WVQ$?
1) 37º
2) 60º
3) 72º
4) 83º

Geometry Regents Exam Questions at Random Worksheet #100 NAME:_____
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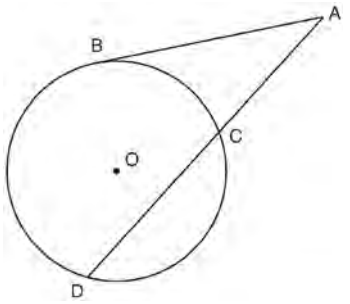
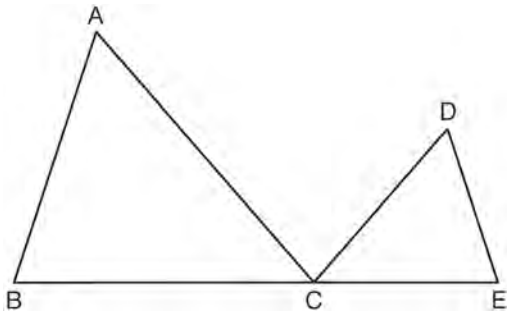
479 In the diagram below, secant $\overline{ACD}$ and tangent $\overline{AB}$ are drawn from external point A to circle O.



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

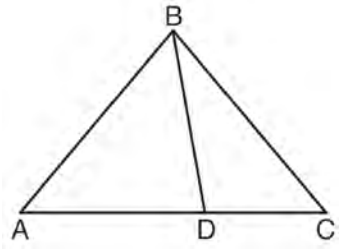
480 In the diagram below, $\triangle ABC \sim \triangle DEC$.



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

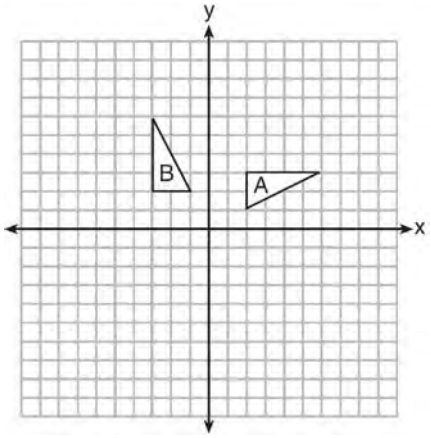
481 In the diagram below, $m\angle BDC = 100°$, $m\angle A = 50°$, and $m\angle DBC = 30°$.



Which statement is true?

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

482 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

Geometry Regents Exam Questions at Random Worksheet #101 NAME:_____
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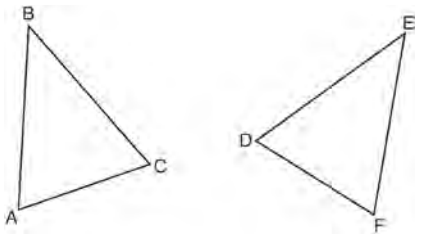
483 In $\triangle ABC$, where $\angle C$ is a right angle, $\cos A = \frac{\sqrt{21}}{5}$. What is $\sin B$?

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

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

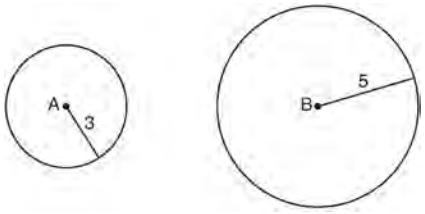


1) $AB = DE$ and $BC = EF$
2) $\angle D \cong \angle A$, $\angle B \cong \angle E$, $\angle C \cong \angle F$
3) There is a sequence of rigid motions that maps $\overline{AB}$ onto $\overline{DE}$, $\overline{BC}$ onto $\overline{EF}$, and $\overline{AC}$ onto $\overline{DF}$.
4) There is a sequence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

485 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) $y = 2x - 16$

486 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.

487 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

Geometry Regents Exam Questions at Random Worksheet #102 NAME:_____
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488 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 *EM*?

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

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

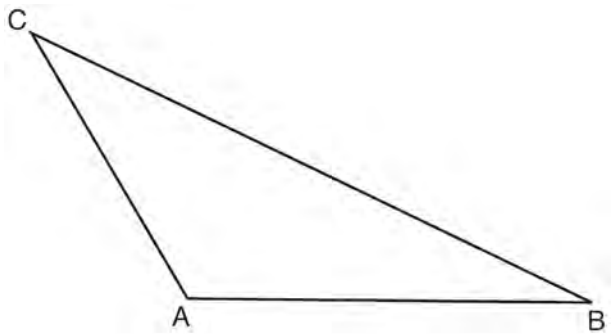
STEP 3 $(x+2)^2 = -y^2 + 20 - 4$

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

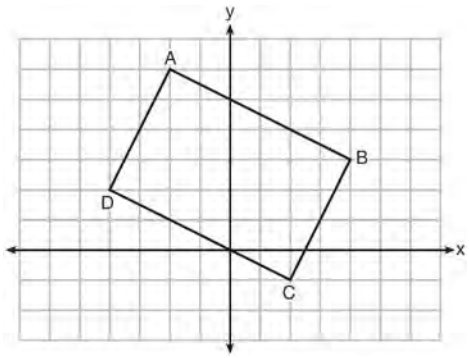
In which step did he make an error in his work?

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

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



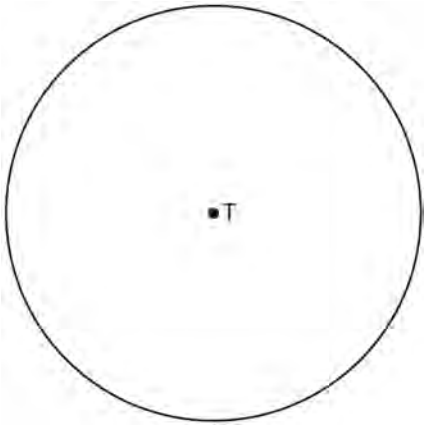
491 Quadrilateral *ABCD* is graphed on the set of axes below.



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 $B'(-3,4)$

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



Geometry Regents Exam Questions at Random Worksheet #103 NAME:_____
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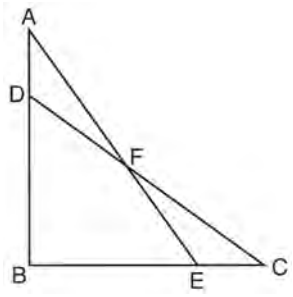
493 A wooden cube has an edge length of 6 centimeters and a mass of 137.8 grams. Determine the density of the cube, to the *nearest thousandth*. State which type of wood the cube is made of, using the density table below.

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

494 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) $\overline{AE} \cong \overline{CD}$

495 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

496 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

Geometry Regents Exam Questions at Random Worksheet #104 NAME:_____
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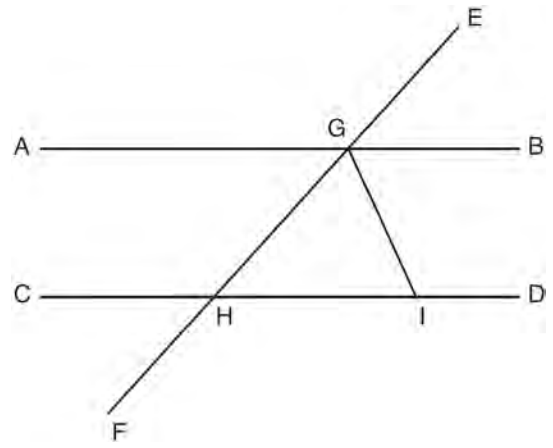
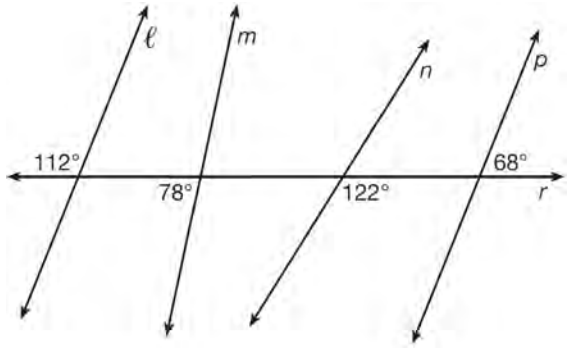
497 In the diagram below, $\overline{EF}$ intersects $\overline{AB}$ and $\overline{CD}$ at G and H, respectively, and $\overline{GI}$ is drawn such that $\overline{GH} \cong \overline{IH}$.



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

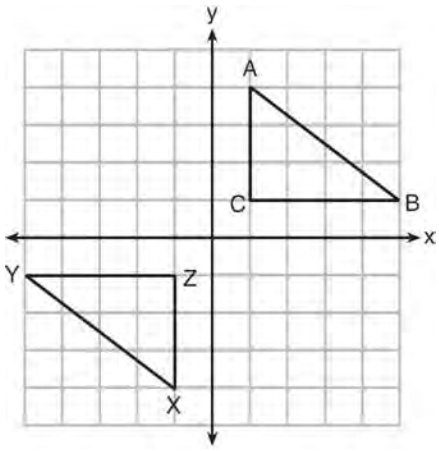
498 In the diagram below, lines ℓ, m, n, and p intersect line r.



Which statement is true?

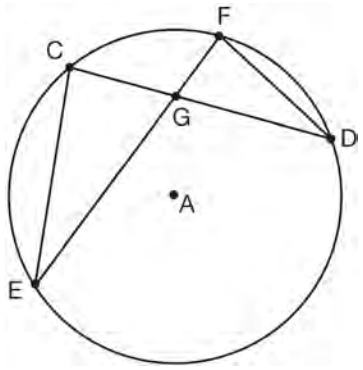
1) $\ell \parallel n$
2) $\ell \parallel p$
3) $m \parallel p$
4) $m \parallel n$

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



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

500 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) $\triangle CEG \sim \triangle FDG$

Geometry Regents Exam Questions at Random Worksheet #105 NAME:_____
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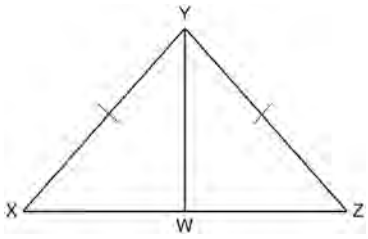
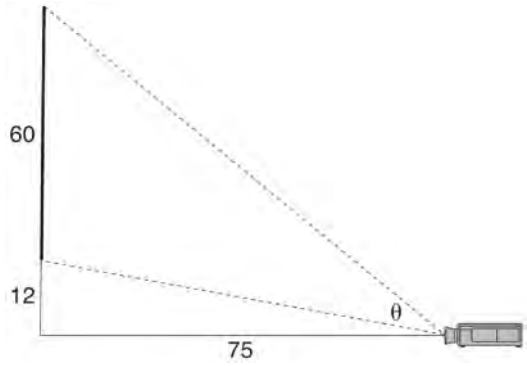
501 Given: $\triangle XYZ$, $\overline{XY} \cong \overline{ZY}$, and $\overline{YW}$ bisects $\angle XYZ$
Prove that $\angle YWZ$ is a right angle.



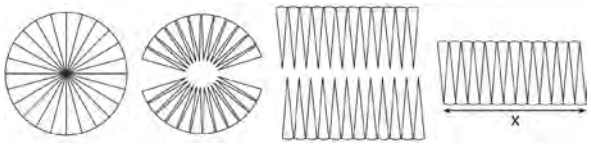
502 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.



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

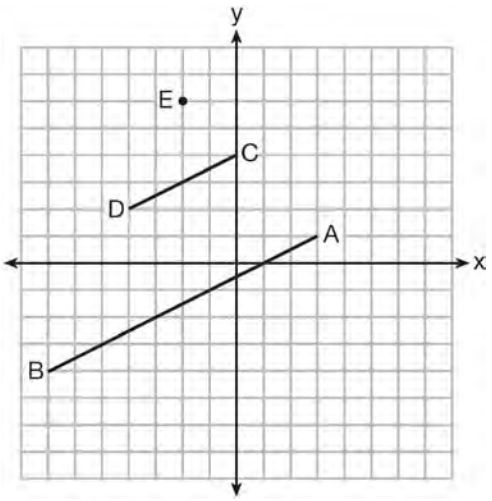
503 A ladder leans against a building. The top of the ladder touches the building 10 feet above the ground. The foot of the ladder is 4 feet from the building. Find, to the *nearest degree*, the angle that the ladder makes with the level ground.

504 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

505 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) $\frac{EA}{EC}$

Geometry Regents Exam Questions at Random Worksheet #106 NAME:_____
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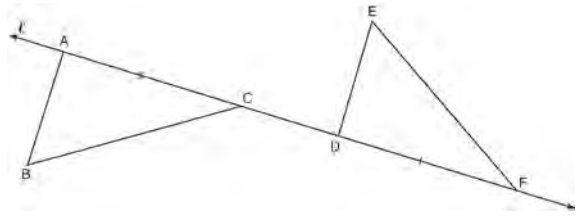
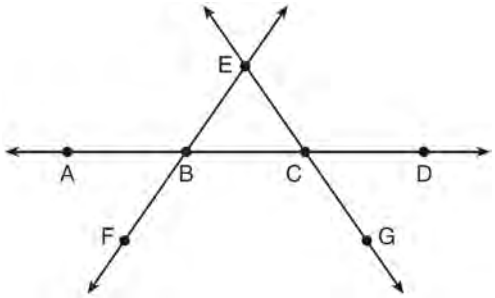
506 In the diagram below, $\overline{AC} \cong \overline{DF}$ and points *A*, *C*, *D*, and *F* are collinear on line ℓ.



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.

507 In the diagram below, $\overleftrightarrow{FE}$ bisects $\overline{AC}$ at *B*, and $\overleftrightarrow{GE}$ bisects $\overline{BD}$ at *C*.

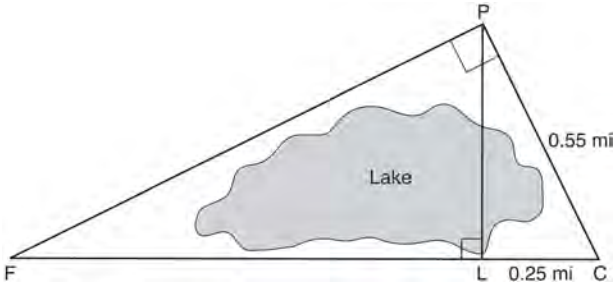


Which statement is always true?

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

508 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.

509 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 Regents Exam Questions at Random Worksheet #107 NAME:_____
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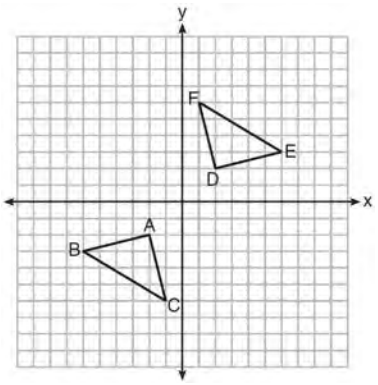
510 Triangle *ABC* and triangle *DEF* are graphed on the set of axes below.

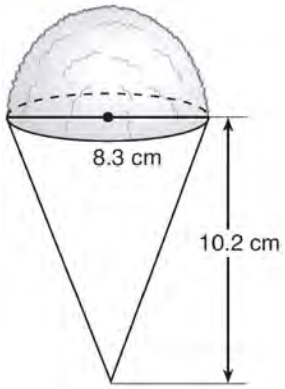


Which sequence of transformations maps triangle *ABC* onto triangle *DEF*?

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

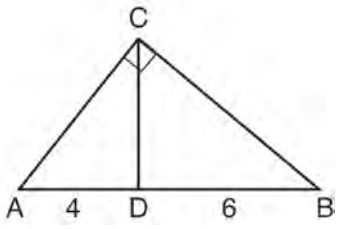
511 In isosceles $\triangle MNP$, line segment *NO* bisects vertex $\angle MNP$, as shown below. If $MP = 16$, find the length of $\overline{MO}$ and explain your answer.

512 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 $0.697\ \text{g/cm}^3$, and the cost, per kilogram, of ice is \$3.83. Determine and state the cost of the ice needed to make 50 snow cones.

513 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) $4\sqrt{2}$

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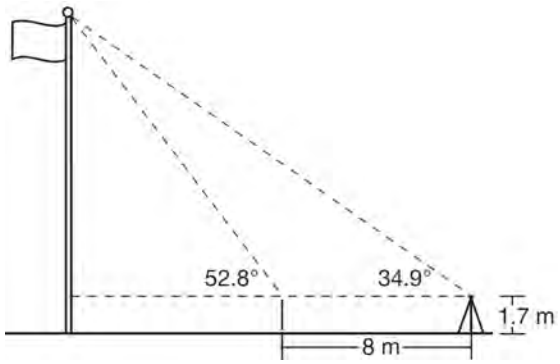
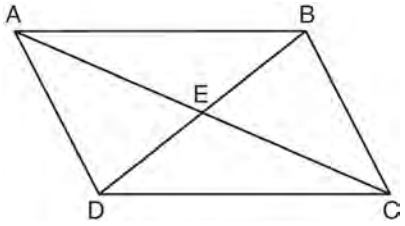
514 Cathy wants to determine the height of the flagpole shown in the diagram below. She uses a survey instrument to measure the angle of elevation to the top of the flagpole, and determines it to be 34.9°. She walks 8 meters closer and determines the new measure of the angle of elevation to be 52.8°.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



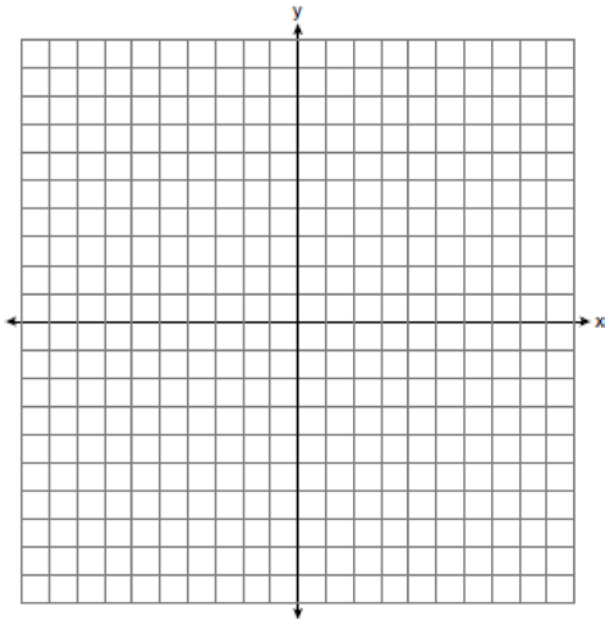
Determine and state, to the *nearest tenth of a meter*, the height of the flagpole.

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

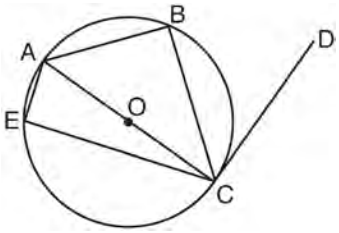


Prove: $\triangle AED \cong \triangle CEB$
Describe a single rigid motion that maps $\triangle AED$ onto $\triangle CEB$.

516 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.]



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



Which statement is *not* always true?
1) $\angle ACB \cong \angle BCD$
2) $\angle ABC \cong \angle ACD$
3) $\angle BAC \cong \angle DCB$
4) $\angle CBA \cong \angle AEC$

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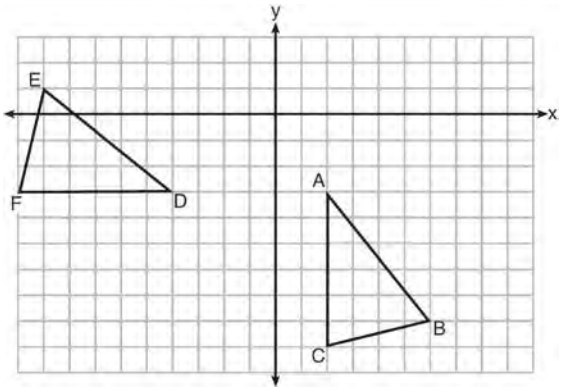
518 The endpoints of one side of a regular pentagon are $(-1,4)$ and $(2,3)$. What is the perimeter of the pentagon?

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

519 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.

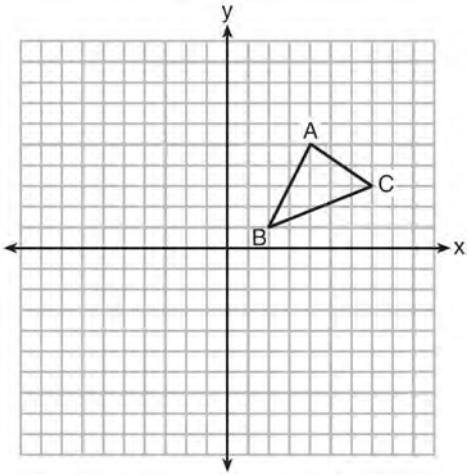
520 Which equation represents a line that is perpendicular to the line represented by $2x - y = 7$?

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

521 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) $3(m\angle C') = m\angle C$

522 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) $-\frac{5}{2}$

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

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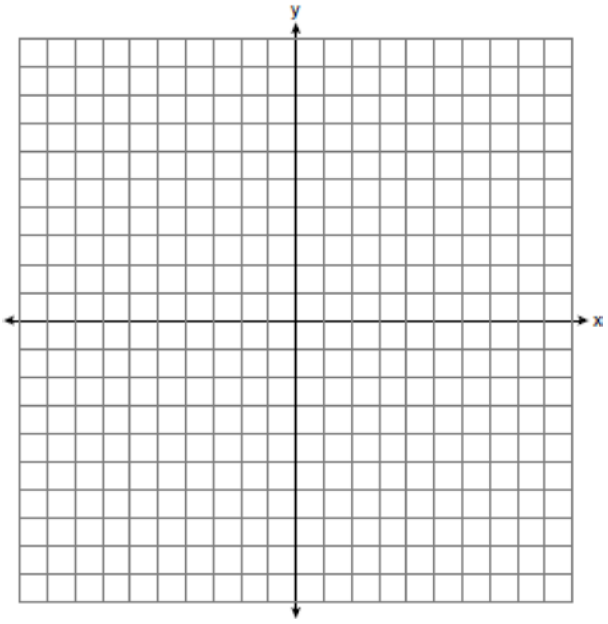
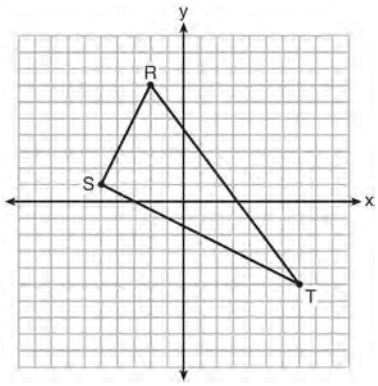
524 Directed line segment PT has endpoints whose coordinates are $P(-2,1)$ and $T(4,7)$. Determine the coordinates of point J that divides the segment in the ratio 2 to 1. [The use of the set of axes below is optional.]



525 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) $(8.5)^3 - \frac{1}{3}\pi(4)^2(8)$

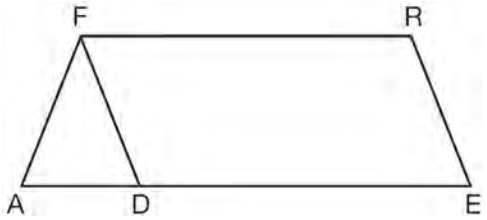
526 Triangle RST is graphed on the set of axes below.



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

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



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

1) 124°
2) 112°
3) 68°
4) 56°

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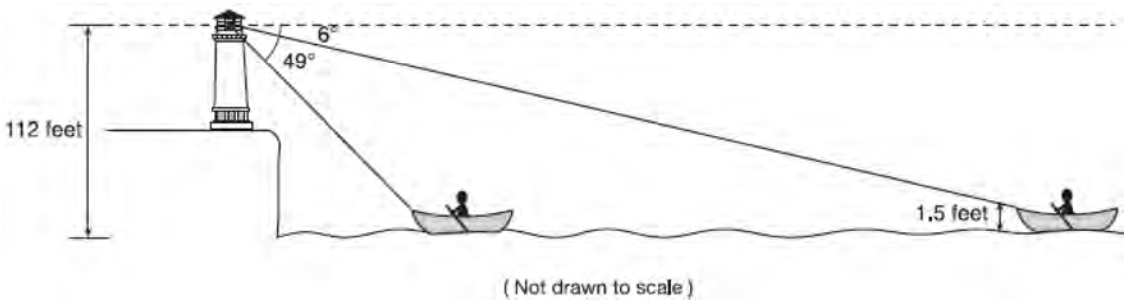
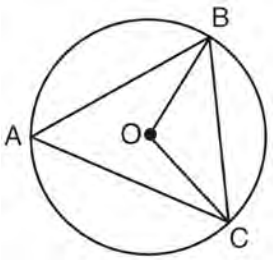
528 As shown below, a canoe is approaching a lighthouse on the coastline of a lake. The front of the canoe is 1.5 feet above the water and an observer in the lighthouse is 112 feet above the water.



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.

529 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.

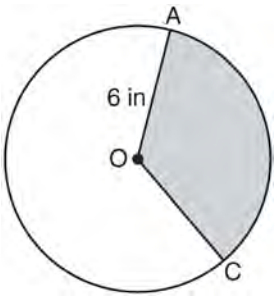


Which statement must always be true?

1) $\angle BAC \cong \angle BOC$
2) $\text{m}\angle BAC = \frac{1}{2}\,\text{m}\angle BOC$
3) $\triangle BAC$ and $\triangle BOC$ are isosceles.
4) The area of $\triangle BAC$ is twice the area of $\triangle BOC$.

530 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.

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



532 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.

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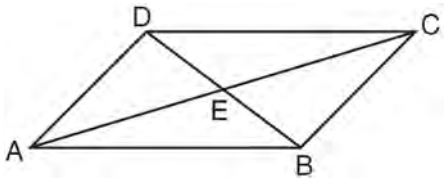
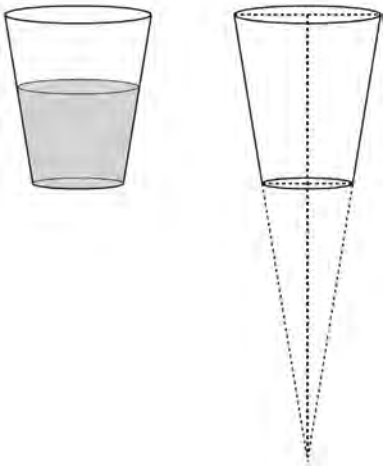
533 In parallelogram *ABCD* shown below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E*.



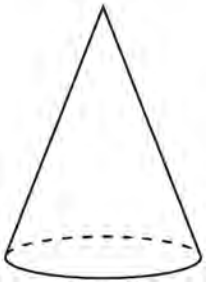
Prove: $\angle ACD \cong \angle CAB$

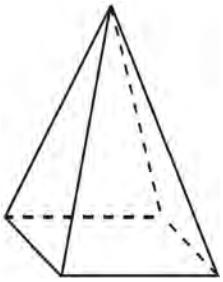
534 A water glass can be modeled by a truncated right cone (a cone which is cut parallel to its base) as shown below.

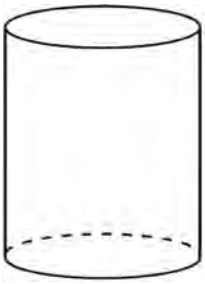


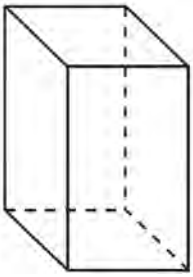
The diameter of the top of the glass is 3 inches, the diameter at the bottom of the glass is 2 inches, and the height of the glass is 5 inches. The base with a diameter of 2 inches must be parallel to the base with a diameter of 3 inches in order to find the height of the cone. Explain why. Determine 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.

535 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?

1) 

2) 

3) 

4) 

536 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

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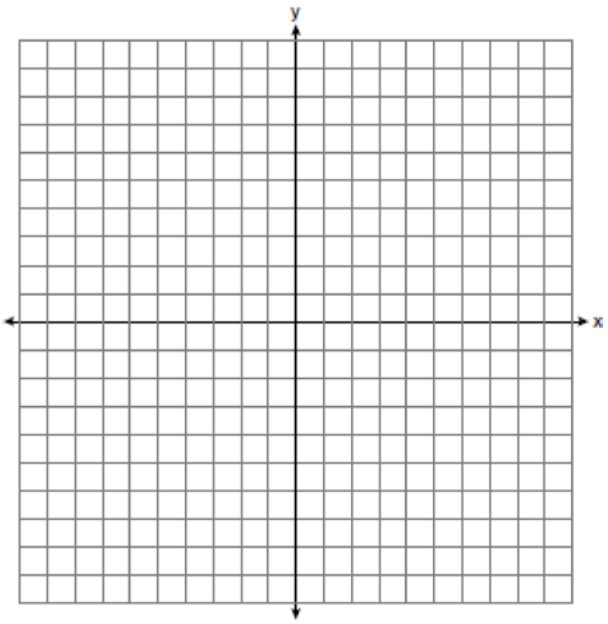
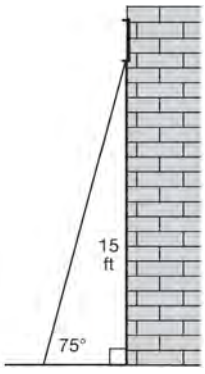
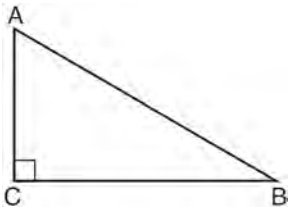
537 Triangle ABC has vertices with $A(x,3)$, $B(-3,-1)$, and $C(-1,-4)$. Determine and state a value of x that would make triangle ABC a right triangle. Justify why $\triangle ABC$ is a right triangle. [The use of the set of axes below is optional.]



538 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*.



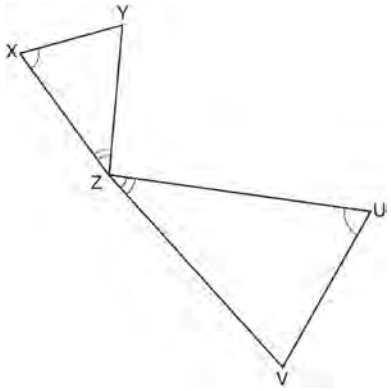
539 In scalene triangle ABC shown in the diagram below, $m\angle C = 90°$.



Which equation is always true?

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

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



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

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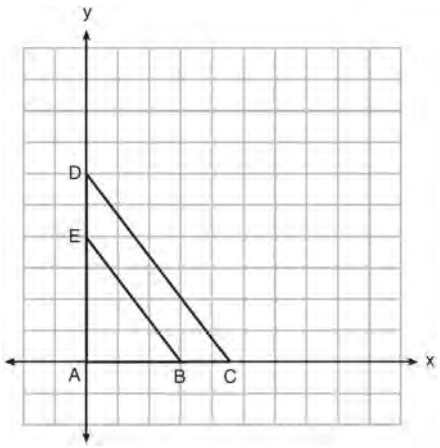
541 In the diagram below, $\triangle ABE$ is the image of $\triangle ACD$ after a dilation centered at the origin. The coordinates of the vertices are $A(0,0)$, $B(3,0)$, $C(4.5,0)$, $D(0,6)$, and $E(0,4)$.



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) $\frac{4}{3}$

542 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°?

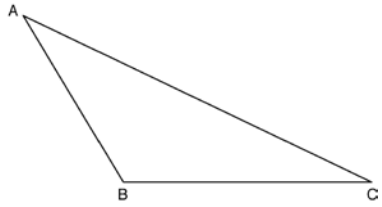
1) $\frac{8\pi}{3}$

2) $\frac{16\pi}{3}$

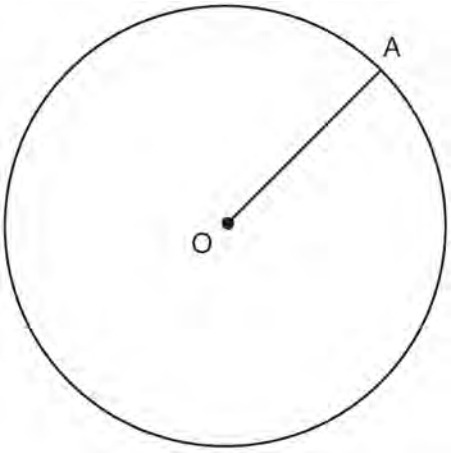
3) $\frac{32\pi}{3}$

4) $\frac{64\pi}{3}$

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



544 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.]



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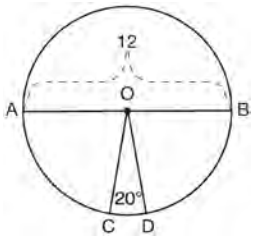
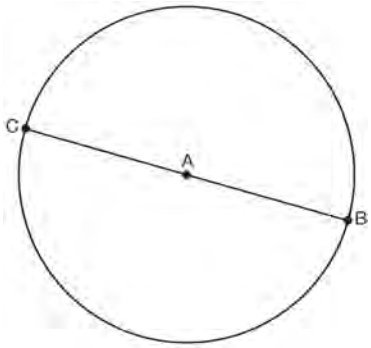
545 In the diagram below of circle O, diameter $\overline{AB}$ and radii $\overline{OC}$ and $\overline{OD}$ are drawn. The length of $\overline{AB}$ is 12 and the measure of $\angle COD$ is 20 degrees.



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

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



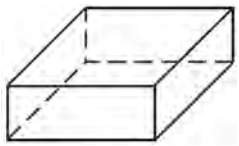
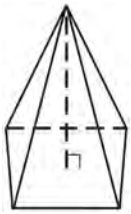
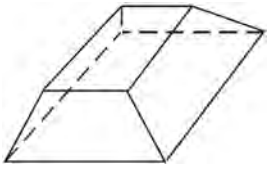
Point D, which is unique from points B and C, is plotted on circle A. Which statement must always be true?

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.

547 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

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

1) 
2) 
3) 
4) 

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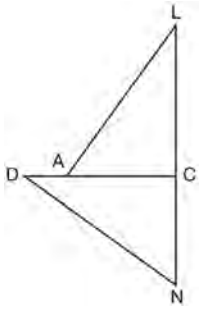
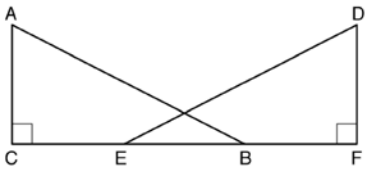
549 In the diagram of $\triangle LAC$ and $\triangle DNC$ below, $\overline{LA} \cong \overline{DN}$, $\overline{CA} \cong \overline{CN}$, and $\overline{DAC} \perp \overline{LCN}$.



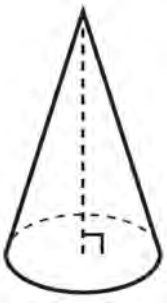
a) Prove that $\triangle LAC \cong \triangle DNC$.
b) Describe a sequence of rigid motions that will map $\triangle LAC$ onto $\triangle DNC$.

550 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

551 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 $\triangle ABC \cong \triangle DEF$.



552 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) 

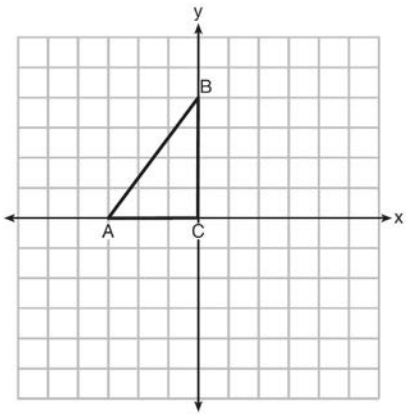
4) 

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

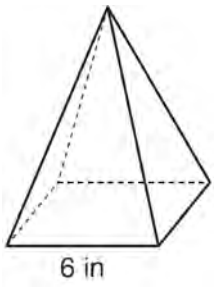
1) pyramid
2) rectangular prism
3) cone
4) cylinder

Geometry Regents Exam Questions at Random Worksheet #117 NAME:_____
www.jmap.org

554 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 $x = 1$.



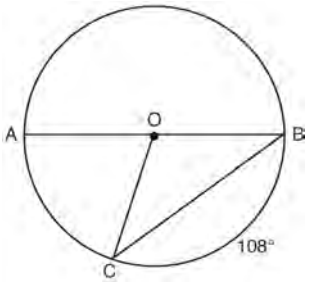
555 As shown in the diagram below, a regular pyramid has a square base whose side measures 6 inches.



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

1) 72
2) 144
3) 288
4) 432

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

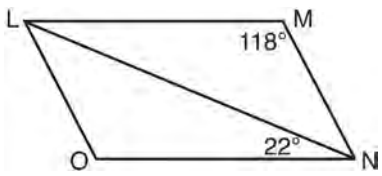
Carl $\frac{3}{10} \cdot \pi \cdot (\frac{1}{2} AB)^2$

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

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



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

Geometry Regents Exam Questions at Random Worksheet #118 NAME:_____
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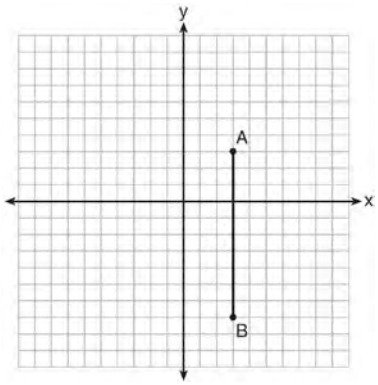
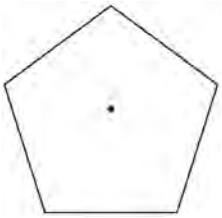
558 The graph below shows $\overline{AB}$, which is a chord of circle O. The coordinates of the endpoints of $\overline{AB}$ are $A(3,3)$ and $B(3,-7)$. The distance from the midpoint of $\overline{AB}$ to the center of circle O is 2 units.



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) $(x-5)^2+(y+2)^2=25$

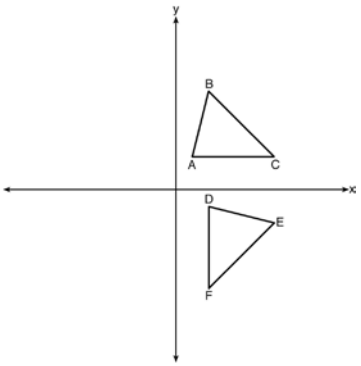
559 A regular pentagon is shown in the diagram below.



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°

560 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) $\angle A \cong \angle D$

Geometry Regents at Random Worksheets
Answer Section

1 ANS: 1

$\cos S = \frac{60}{65}$

$S \approx 23$

PTS: 2 REF: 061713geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

2 ANS:

Parallelogram *ABCD* with diagonal $\overline{AC}$ drawn (given). $\overline{AC} \cong \overline{AC}$ (reflexive property). $\overline{AD} \cong \overline{CB}$ and $\overline{BA} \cong \overline{DC}$ (opposite sides of a parallelogram are congruent). $\triangle ABC \cong \triangle CDA$ (SSS).

PTS: 2 REF: 011825geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

3 ANS: 4 PTS: 2 REF: 081803geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

4 ANS: 1

Parallel chords intercept congruent arcs. $\frac{180 - 130}{2} = 25$

PTS: 2 REF: 081704geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: parallel lines

5 ANS: 4

$\frac{36}{45} \neq \frac{15}{18}$

$\frac{4}{5} \neq \frac{5}{6}$

PTS: 2 REF: 081709geo NAT: G.SRT.A.3 TOP: Similarity Proofs

6 ANS: 2

$12^2 = 9 \cdot 16$

$144 = 144$

PTS: 2 REF: 081718geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

7 ANS: 1

$20 \cdot 12 \cdot 45 + \frac{1}{2}\pi(10)^2(45) \approx 17869$

PTS: 2 REF: 061807geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

8 ANS: 4

$\frac{1}{2}(360 - 268) = 46$

PTS: 2 REF: 061704geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: inscribed

9 ANS: 3 PTS: 2 REF: 011714geo NAT: G.SRT.C.6
TOP: Trigonometric Ratios

10 ANS: 2

The line $y = -3x + 6$ passes through the center of dilation, so the dilated line is not distinct.

PTS: 2 REF: 061824geo NAT: G.SRT.A.1 TOP: Line Dilations

11 ANS:

Yes. The triangles are congruent because of SSS $\left(5^2 + 12^2 = 13^2\right)$. All congruent triangles are similar.

PTS: 2 REF: 061830geo NAT: G.SRT.B.5 TOP: Triangle Congruency

12 ANS:

$\frac{152 - 56}{2} = 48$

PTS: 2 REF: 011728geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

13 ANS: 2

$\frac{x}{x+3} = \frac{14}{21}$ $\quad 14 - 6 = 8$

$21x = 14x + 42$

$7x = 42$

$x = 6$

PTS: 2 REF: 081812geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

14 ANS: 3

$\sqrt{(-5)^2 + 12^2} = \sqrt{169}$ $\quad \sqrt{11^2 + (2\sqrt{12})^2} = \sqrt{121 + 48} = \sqrt{169}$

PTS: 2 REF: 011722geo NAT: G.GPE.B.4 TOP: Circles in the Coordinate Plane

15 ANS: 2 PTS: 2 REF: 081701geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

16 ANS: 1

$82.8 = \frac{1}{3}(4.6)(9)h$

$h = 6$

PTS: 2 REF: 061810geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

17 ANS: 2

$m = \frac{3}{2}$

$m_{\perp} = -\frac{2}{3}$

PTS: 2 REF: 061812geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

18 ANS: 1

$x^2 + y^2 - 12y + 36 = -20 + 36$

$x^2 + (y-6)^2 = 16$

PTS: 2 REF: 061712geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

19 ANS: 2

$-4 + \frac{2}{5}(1 - -4) = -4 + \frac{2}{5}(5) = -4 + 2 = -2 \quad -2 + \frac{2}{5}(8 - -2) = -2 + \frac{2}{5}(10) = -2 + 4 = 2$

PTS: 2 REF: 061814geo NAT: G.GPE.B.6 TOP: Directed Line Segments

20 ANS: 4

$\frac{6.6}{x} = \frac{4.2}{5.25}$

$4.2x = 34.65$

$x = 8.25$

PTS: 2 REF: 081705geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

21 ANS: 3 PTS: 2 REF: 061702geo NAT: G.GPE.B.7
TOP: Polygons in the Coordinate Plane

22 ANS: 1

M is a centroid, and cuts each median 2:1.

PTS: 2 REF: 061818geo NAT: G.CO.C.10
TOP: Centroid, Orthocenter, Incenter and Circumcenter

23 ANS: 4

$\frac{300}{360} \cdot 8^2 \pi = \frac{160\pi}{3}$

PTS: 2 REF: 011721geo NAT: G.C.B.5 TOP: Sectors

24 ANS:

Yes, as translations do not change angle measurements.

PTS: 2 REF: 061825geo NAT: G.CO.B.6 TOP: Properties of Transformations
KEY: basic

25 ANS: 4 PTS: 2 REF: 081810geo NAT: G.SRT.B.5
TOP: Triangle Proofs KEY: statements

26 ANS: 4

$\sin 71 = \frac{x}{20}$

$x = 20 \sin 71 \approx 19$

PTS: 2 REF: 061721geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: without graphics

27 ANS:
rotation 180º about the origin, translation 2 units down; rotation 180º about *B*, translation 6 units down and 6 units left; or reflection over *x*-axis, translation 2 units down, reflection over *y*-axis

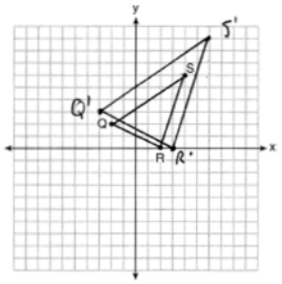
PTS: 2 REF: 081828geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

28 ANS: 4 PTS: 2 REF: 081716geo NAT: G.CO.C.10
TOP: Midsegments

29 ANS: 2
$\triangle ACB \sim \triangle AED$

PTS: 2 REF: 061811geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

30 ANS:



A dilation preserves slope, so the slopes of $\overline{QR}$ and $\overline{Q'R'}$ are equal. Because the slopes are equal, $Q'R' \parallel QR$.

PTS: 4 REF: 011732geo NAT: G.SRT.A.2 TOP: Dilations
KEY: grids

31 ANS: 1 PTS: 2 REF: 011811geo NAT: G.SRT.A.2
TOP: Dilations

32 ANS: 1

$\sin 32 = \frac{O}{129.5}$

$O \approx 68.6$

PTS: 2 REF: 011804geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

33 ANS: 1

$2x + 4 + 46 = 90$

$2x = 40$

$x = 20$

PTS: 2 REF: 061808geo NAT: G.SRT.C.7 TOP: Cofunctions

34 ANS: 3

$\frac{s_L}{s_S} = \frac{6\theta}{4\theta} = 1.5$

PTS: 2 REF: 011824geo NAT: G.C.B.5 TOP: Arc Length
KEY: arc length

35 ANS:

$x^2 - 6x + 9 + y^2 + 8y + 16 = 56 + 9 + 16$ $(3,-4)$; $r = 9$

$(x-3)^2 + (y+4)^2 = 81$

PTS: 2 REF: 081731geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

36 ANS:

Quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$, $\overline{AB} \| \overline{CD}$, and $\overline{BF}$ and $\overline{DE}$ are perpendicular to diagonal $\overline{AC}$ at points F and E (given). $\angle AED$ and $\angle CFB$ are right angles (perpendicular lines form right angles). $\angle AED \cong \angle CFB$ (All right angles are congruent). $ABCD$ is a parallelogram (A quadrilateral with one pair of sides congruent and parallel is a parallelogram). $\overline{AD} \| \overline{BC}$ (Opposite sides of a parallelogram are parallel). $\angle DAE \cong \angle BCF$ (Parallel lines cut by a transversal form congruent alternate interior angles). $\overline{DA} \cong \overline{BC}$ (Opposite sides of a parallelogram are congruent). $\triangle ADE \cong \triangle CBF$ (AAS). $\overline{AE} \cong \overline{CF}$ (CPCTC).

PTS: 6 REF: 011735geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

37 ANS: 1

$V = \frac{1}{3}\pi\left(\frac{1.5}{2}\right)^2\left(\frac{4}{2}\right) \approx 1.2$

PTS: 2 REF: 011724geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

38 ANS:

$\overline{RS}$ and $\overline{TV}$ bisect each other at point X; $\overline{TR}$ and $\overline{SV}$ are drawn (given); $\overline{TX} \cong \overline{XV}$ and $\overline{RX} \cong \overline{XS}$ (segment bisectors create two congruent segments); $\angle TXR \cong \angle VXS$ (vertical angles are congruent); $\triangle TXR \cong \triangle VXS$ (SAS); $\angle T \cong \angle V$ (CPCTC); $\overline{TR} \| \overline{SV}$ (a transversal that creates congruent alternate interior angles cuts parallel lines).

PTS: 4 REF: 061733geo NAT: G.SRT.B.5 TOP: Triangle Proofs
KEY: proof

39 ANS:
Yes, because 28º and 62º angles are complementary. The sine of an angle equals the cosine of its complement.

PTS: 2 REF: 011727geo NAT: G.SRT.C.7 TOP: Cofunctions

40 ANS:
Isosceles trapezoid $ABCD$, $\angle CDE \cong \angle DCE$, $\overline{AE} \perp \overline{DE}$, and $\overline{BE} \perp \overline{CE}$ (given); $\overline{AD} \cong \overline{BC}$ (congruent legs of isosceles trapezoid); $\angle DEA$ and $\angle CEB$ are right angles (perpendicular lines form right angles); $\angle DEA \cong \angle CEB$ (all right angles are congruent); $\angle CDA \cong \angle DCB$ (base angles of an isosceles trapezoid are congruent); $\angle CDA - \angle CDE \cong \angle DCB - \angle DCE$ (subtraction postulate); $\triangle ADE \cong \triangle BCE$ (AAS); $\overline{EA} \cong \overline{EB}$ (CPCTC); $\angle EDA \cong \angle ECB$
$\triangle AEB$ is an isosceles triangle (an isosceles triangle has two congruent sides).

PTS: 6 REF: 081735geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

41 ANS:
$\cos W = \frac{6}{18}$

$W \approx 71$

PTS: 2 REF: 011831geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

42 ANS: 3 PTS: 2 REF: 011710geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

43 ANS: 1
B: $(4-3, 3-4) \rightarrow (1,-1) \rightarrow (2,-2) \rightarrow (2+3, -2+4)$
C: $(2-3, 1-4) \rightarrow (-1,-3) \rightarrow (-2,-6) \rightarrow (-2+3, -6+4)$

PTS: 2 REF: 011713geo NAT: G.SRT.A.1 TOP: Line Dilations

44 ANS: 2 PTS: 2 REF: 011702geo NAT: G.SRT.A.2
TOP: Compositions of Transformations KEY: grids

45 ANS: 1
$m = \frac{-4}{-6} = \frac{2}{3}$

$m_{\perp} = -\frac{3}{2}$

PTS: 2 REF: 011820geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

46 ANS: 4 PTS: 2 REF: 011816geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: inscribed

47 ANS:
$R_{180°}$ about $\left(-\frac{1}{2}, \frac{1}{2}\right)$

PTS: 2 REF: 081727geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

48 ANS: 3

$\frac{24}{40} = \frac{15}{x}$

$24x = 600$

$x = 25$

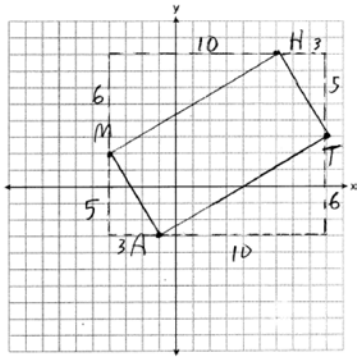
PTS: 2 REF: 011813geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

49 ANS: 4

Opposite angles of an inscribed quadrilateral are supplementary.

PTS: 2 REF: 011821geo NAT: G.C.A.3 TOP: Inscribed Quadrilaterals

50 ANS:



$m_{\overline{MH}} = \frac{6}{10} = \frac{3}{5}$, $m_{\overline{AT}} = \frac{6}{10} = \frac{3}{5}$, $m_{\overline{MA}} = -\frac{5}{3}$, $m_{\overline{HT}} = -\frac{5}{3}$; $\overline{MH} \parallel \overline{AT}$ and $\overline{MA} \parallel \overline{HT}$.

MATH is a parallelogram since both sides of opposite sides are parallel. $m_{\overline{MA}} = -\frac{5}{3}$, $m_{\overline{AT}} = \frac{3}{5}$. Since the slopes are negative reciprocals, $\overline{MA} \perp \overline{AT}$ and $\angle A$ is a right angle. *MATH* is a rectangle because it is a parallelogram with a right angle.

PTS: 6 REF: 081835geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

51 ANS:

Circle *O*, tangent $\overline{EC}$ to diameter $\overline{AC}$, chord $\overline{BC} \parallel$ secant $\overline{ADE}$, and chord $\overline{AB}$ (given); $\angle B$ is a right angle (an angle inscribed in a semi-circle is a right angle); $\overleftrightarrow{EC} \perp \overline{OC}$ (a radius drawn to a point of tangency is perpendicular to the tangent); $\angle ECA$ is a right angle (perpendicular lines form right angles); $\angle B \cong \angle ECA$ (all right angles are congruent); $\angle BCA \cong \angle CAE$ (the transversal of parallel lines creates congruent alternate interior angles); $\triangle ABC \sim \triangle ECA$ (AA); $\frac{BC}{CA} = \frac{AB}{EC}$ (Corresponding sides of similar triangles are in proportion).

PTS: 4 REF: 081733geo NAT: G.SRT.B.5 TOP: Circle Proofs

52 ANS: 1

$\frac{64}{4} = 16$ $16^2 = 256$ $2w + 2(w+2) = 64$ $15 \times 17 = 255$ $2w + 2(w+4) = 64$ $14 \times 18 = 252$ $2w + 2(w+6) = 64$

$w = 15$ $w = 14$ $w = 13$

$13 \times 19 = 247$

PTS: 2 REF: 011708geo NAT: G.MG.A.3 TOP: Area of Polygons

53 ANS: 2

$\overline{AB} = 10$ since $\triangle ABC$ is a 6-8-10 triangle. $6^2 = 10x$

$3.6 = x$

PTS: 2 REF: 081820geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

54 ANS: 3 PTS: 2 REF: 011815geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

55 ANS: 3

$2.5 \times 1.25 \times (27 \times 12) + \frac{1}{2}\pi(1.25)^2(27 \times 12) \approx 1808$

PTS: 2 REF: 061723geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

56 ANS: 2

$V = \frac{1}{3}\left(\frac{60}{12}\right)^2\left(\frac{84}{12}\right) \approx 58$

PTS: 2 REF: 081819geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

57 ANS: 3

$4\sqrt{(-1--3)^2 + (5-1)^2} = 4\sqrt{20}$

PTS: 2 REF: 081703geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

58 ANS:

$500 \times 1015\,\text{cc} \times \frac{\$0.29}{\text{kg}} \times \frac{7.95\,\text{g}}{\text{cc}} \times \frac{1\,\text{kg}}{1000\,\text{g}} = \$1170$

PTS: 2 REF: 011829geo NAT: G.MG.A.2 TOP: Density

59 ANS: 3

$v = \pi r^2 h$ (1) $6^2 \cdot 10 = 360$

$150\pi = \pi r^2 h$ (2) $10^2 \cdot 6 = 600$

$150 = r^2 h$ (3) $5^2 \cdot 6 = 150$

(4) $3^2 \cdot 10 = 900$

PTS: 2 REF: 081713geo NAT: G.GMD.B.4 TOP: Rotations of Two-Dimensional Objects

60 ANS:

$$\frac{Q}{360}(\pi)\left(25^2\right) = (\pi)\left(25^2\right) - 500\pi$$

$$Q = \frac{125\pi(360)}{625\pi}$$

$$Q = 72$$

PTS: 2 REF: 011828geo NAT: G.C.B.5 TOP: Sectors

61 ANS:

$\tan 16.5 = \frac{x}{13.5}$ $9 \times 16 \times 4.5 = 648$ $3752 - (35 \times 16 \times .5) = 3472$

$x \approx 4$ $13.5 \times 16 \times 4.5 = 972$ $3472 \times 7.48 \approx 25971$

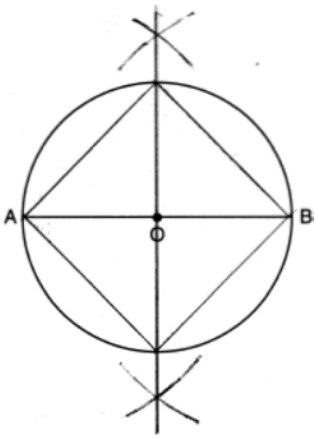
$4 + 4.5 = 8.5$ $\frac{1}{2} \times 13.5 \times 16 \times 4 = 432$ $\frac{25971}{10.5} \approx 2473.4$

$12.5 \times 16 \times 8.5 = \underline{1700}$ $\frac{2473.4}{60} \approx 41$

3752

PTS: 6 REF: 081736geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

62 ANS:

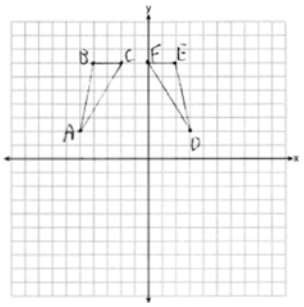


PTS: 2 REF: 011826geo NAT: G.CO.D.13 TOP: Constructions

63 ANS: 4
AA

PTS: 2 REF: 061809geo NAT: G.SRT.A.3 TOP: Similarity Proofs

64 ANS:



$r_{x=-1}$ Reflections are rigid motions that preserve distance, so $\triangle ABC \cong \triangle DEF$.

PTS: 4 REF: 061732geo NAT: G.CO.A.2 TOP: Identifying Transformations
KEY: graphics

65 ANS: 4 PTS: 2 REF: 081801geo NAT: G.CO.C.9
TOP: Lines and Angles

66 ANS: 2

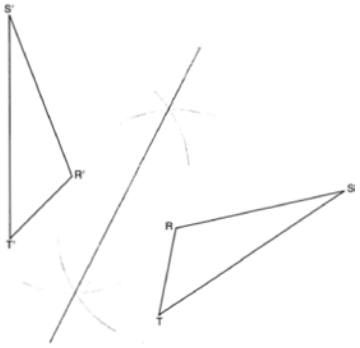
$$(x-5)^2 + (y-2)^2 = 16$$

$$x^2 - 10x + 25 + y^2 - 4y + 4 = 16$$

$$x^2 - 10x + y^2 - 4y = -13$$

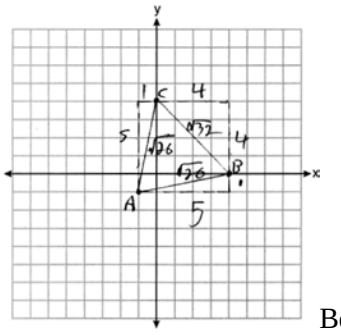
PTS: 2 REF: 061820geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: write equation, given graph

67 ANS:



PTS: 2 REF: 011725geo NAT: G.CO.D.12 TOP: Constructions
KEY: line bisector

68 ANS:



Because $\overline{AB} \cong \overline{AC}$, $\triangle ABC$ has two congruent sides and is isosceles. Because $\overline{AB} \cong \overline{BC}$ is not true, $\triangle ABC$ has sides that are not congruent and $\triangle ABC$ is not equilateral.

PTS: 4 REF: 061832geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

69 ANS: 4 PTS: 2 REF: 011723geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

70 ANS: 1

Since a dilation preserves parallelism, the line $4y = 3x + 7$ and its image $3x - 4y = 9$ are parallel, with slopes of $\frac{3}{4}$.

PTS: 2 REF: 081710geo NAT: G.SRT.A.1 TOP: Line Dilations

71 ANS:

C: $V = \pi(26.7)^2(750) - \pi(24.2)^2(750) = 95,437.5\pi$

$$95,437.5\pi \text{ cm}^3\left(\frac{2.7 \text{ g}}{\text{cm}^3}\right)\left(\frac{1 \text{ kg}}{1000 \text{ g}}\right)\left(\frac{\$0.38}{\text{kg}}\right) = \$307.62$$

P: $V = 40^2(750) - 35^2(750) = 281,250$ $\$307.62 - 288.56 = \$19.06$

$$281,250 \text{ cm}^3\left(\frac{2.7 \text{ g}}{\text{cm}^3}\right)\left(\frac{1 \text{ kg}}{1000 \text{ g}}\right)\left(\frac{\$0.38}{\text{kg}}\right) = \$288.56$$

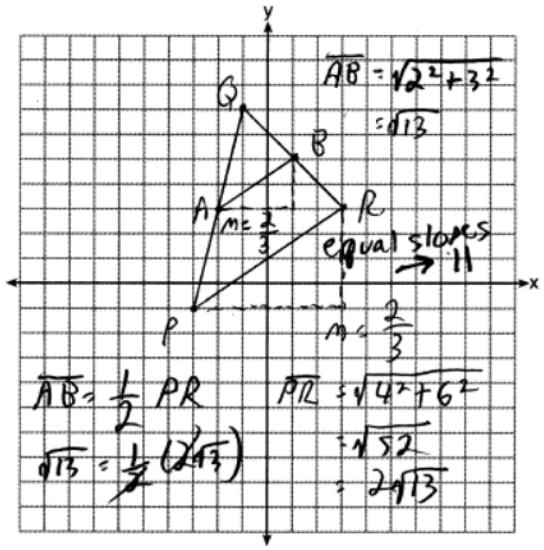
PTS: 6 REF: 011736geo NAT: G.MG.A.2 TOP: Density

72 ANS:

A dilation of 3 centered at *A*. A dilation preserves angle measure, so the triangles are similar.

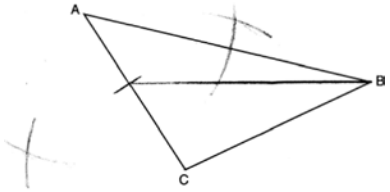
PTS: 4 REF: 011832geo NAT: G.SRT.A.2 TOP: Dilations

73 ANS:



PTS: 4 REF: 081732geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

74 ANS:



PTS: 2 REF: 061829geo NAT: G.CO.D.12 TOP: Constructions
KEY: line bisector

75 ANS:

$T_{0,-2} \circ r_{y\text{-axis}}$

PTS: 2 REF: 011726geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

76 ANS:

$\tan 15 = \frac{6250}{x}$ $\tan 52 = \frac{6250}{y}$ $23325.3 - 4883 = 18442$ $\frac{18442 \text{ ft}}{1 \text{ min}} \left(\frac{1 \text{ mi}}{5280 \text{ ft}} \right) \left(\frac{60 \text{ min}}{1 \text{ h}} \right) \approx 210$

$x \approx 23325.3$ $y \approx 4883$

PTS: 6 REF: 061736geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

77 ANS: 4

$\frac{360°}{10} = 36°$ 252º is a multiple of 36º

PTS: 2 REF: 081722geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

78 ANS: 2

$x^2 = 3 \cdot 18$

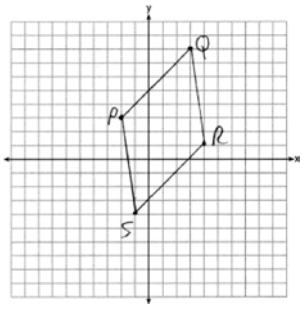
$x = \sqrt{3 \cdot 3 \cdot 6}$

$x = 3\sqrt{6}$

PTS: 2 REF: 081712geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, length

79 ANS:

$\overline{PQ}\ \sqrt{(8-3)^2 + (3--2)^2} = \sqrt{50}$ $\overline{QR}\ \sqrt{(1-8)^2 + (4-3)^2} = \sqrt{50}$ $\overline{RS}\ \sqrt{(-4-1)^2 + (-1-4)^2} = \sqrt{50}$
$\overline{PS}\ \sqrt{(-4-3)^2 + (-1--2)^2} = \sqrt{50}$ *PQRS* is a rhombus because all sides are congruent. $m_{\overline{PQ}} = \frac{8-3}{3--2} = \frac{5}{5} = 1$
$m_{\overline{QR}} = \frac{1-8}{4-3} = -7$ Because the slopes of adjacent sides are not opposite reciprocals, they are not perpendicular and do not form a right angle. Therefore *PQRS* is not a square.



PTS: 6 REF: 061735geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

80 ANS: 1

$360 - (82 + 104 + 121) = 53$

PTS: 2 REF: 011801geo NAT: G.CO.B.6 TOP: Properties of Transformations
KEY: graph

81 ANS: 3 PTS: 2 REF: 061802geo NAT: G.CO.C.9
TOP: Lines and Angles

82 ANS: 2 PTS: 2 REF: 011802geo NAT: G.CO.C.11
TOP: Parallelograms

83 ANS: 4 PTS: 2 REF: 081813geo NAT: G.CO.C.11
TOP: Parallelograms

84 ANS: 3 PTS: 2 REF: 061816geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

85 ANS: 3

$$V = \frac{1}{3}\pi r^2 h$$

$$54.45\pi = \frac{1}{3}\pi(3.3)^2 h$$

$$h = 15$$

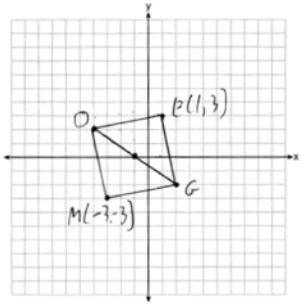
PTS: 2 REF: 011807geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

86 ANS: 1

Illinois: $\frac{12830632}{231.1} \approx 55520$ Florida: $\frac{18801310}{350.6} \approx 53626$ New York: $\frac{19378102}{411.2} \approx 47126$ Pennsylvania: $\frac{12702379}{283.9} \approx 44742$

PTS: 2 REF: 081720geo NAT: G.MG.A.2 TOP: Density

87 ANS:



PTS: 2 REF: 011731geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

88 ANS: 1 PTS: 2 REF: 061801geo NAT: G.CO.B.6
TOP: Properties of Transformations KEY: graphics

89 ANS: 1

$3 + \frac{2}{5}(8-3) = 3 + \frac{2}{5}(5) = 3 + 2 = 5$ $5 + \frac{2}{5}(-5-5) = 5 + \frac{2}{5}(-10) = 5 - 4 = 1$

PTS: 2 REF: 011720geo NAT: G.GPE.B.6 TOP: Directed Line Segments

90 ANS: 4 PTS: 2 REF: 011803geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: graphics

91 ANS: 2

$$8(x+8) = 6(x+18)$$

$$8x + 64 = 6x + 108$$

$$2x = 44$$

$$x = 22$$

PTS: 2 REF: 011715geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

92 ANS: 4 PTS: 2 REF: 061813geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

93 ANS: 4

The segment's midpoint is the origin and slope is –2. The slope of a perpendicular line is $\frac{1}{2}$. $y = \frac{1}{2}x + 0$

$$2y = x$$

$$2y - x = 0$$

PTS: 2 REF: 081724geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: perpendicular bisector

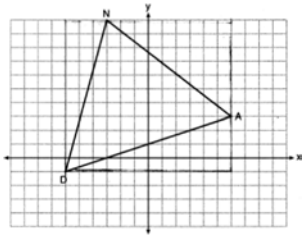
94 ANS: 4

$$\sin 16.5 = \frac{8}{x}$$

$$x \approx 28.2$$

PTS: 2 REF: 081806ai NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

95 ANS: 1



$$(12 \cdot 11) - \left(\frac{1}{2}(12 \cdot 4) + \frac{1}{2}(7 \cdot 9) + \frac{1}{2}(11 \cdot 3)\right) = 60$$

PTS: 2 REF: 061815geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

96 ANS: 4

$$\frac{5}{7} = \frac{x}{x+5} \quad 12\frac{1}{2} + 5 = 17\frac{1}{2}$$

$$5x + 25 = 7x$$

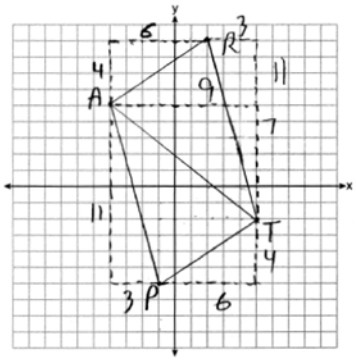
$$2x = 25$$

$$x = 12\frac{1}{2}$$

PTS: 2 REF: 061821geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

97 ANS:

$\triangle PAT$ is an isosceles triangle because sides $\overline{AP}$ and $\overline{AT}$ are congruent ($\sqrt{3^2+11^2} = \sqrt{7^2+9^2} = \sqrt{130}$). $R(2,9)$. Quadrilateral $PART$ is a parallelogram because the opposite sides are parallel since they have equal slopes



($m_{\overline{AR}} = \frac{4}{6} = \frac{2}{3}$; $m_{\overline{PT}} = \frac{4}{6} = \frac{2}{3}$; $m_{\overline{PA}} = -\frac{11}{3}$; $m_{\overline{RT}} = -\frac{11}{3}$)

PTS: 6 REF: 011835geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

98 ANS:

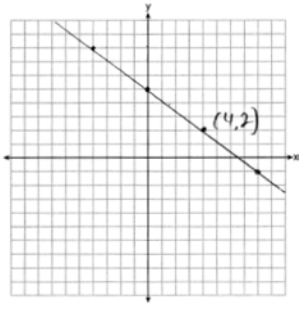
The four small triangles are 8-15-17 triangles. $4 \times 17 = 68$

PTS: 2 REF: 081726geo NAT: G.CO.C.11 TOP: Special Quadrilaterals

99 ANS: 3 PTS: 2 REF: 081817geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

100 ANS: 4 PTS: 2 REF: 061711geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

101 ANS:



The line is on the center of dilation, so the line does not change. $p: 3x + 4y = 20$

PTS: 2 REF: 061731geo NAT: G.SRT.A.1 TOP: Line Dilations

102 ANS: 2

(1) AA; (3) SAS; (4) SSS. NYSED has stated that all students should be awarded credit regardless of their answer to this question.

PTS: 2 REF: 061724geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

103 ANS:

$\overline{GI}$ is parallel to $\overline{NT}$, and $\overline{IN}$ intersects at A (given); $\angle I \cong \angle N$, $\angle G \cong \angle T$ (paralleling lines cut by a transversal form congruent alternate interior angles); $\triangle GIA \sim \triangle TNA$ (AA).

PTS: 2 REF: 011729geo NAT: G.SRT.A.3 TOP: Similarity Proofs

104 ANS: 1

$\tan x = \frac{1}{12}$

$x \approx 4.76$

PTS: 2 REF: 081715geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

105 ANS: 4

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

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

PTS: 2 REF: 081821geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

106 ANS: 3 PTS: 2 REF: 061703geo NAT: G.SRT.C.7
TOP: Cofunctions

107 ANS: 3

$\frac{x}{6.3} = \frac{3}{5}$ $\frac{y}{9.4} = \frac{6.3}{6.3 + 3.78}$

$x = 3.78$ $y \approx 5.9$

PTS: 2 REF: 081816geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

108 ANS: 1 PTS: 2 REF: 061707geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

109 ANS: 1 PTS: 2 REF: 011814geo NAT: G.SRT.A.1
TOP: Line Dilations

110 ANS: 4 PTS: 2 REF: 011808geo NAT: G.CO.A.2
TOP: Analytical Representations of Transformations KEY: basic

111 ANS: 3

$x(x-6) = 4^2$

$x^2 - 6x - 16 = 0$

$(x-8)(x+2) = 0$

$x = 8$

PTS: 2 REF: 081807geo NAT: G.SRT.B.5 TOP: Similarity
KEY: altitude

112 ANS: 2 PTS: 2 REF: 061701geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

113 ANS: 4 PTS: 2 REF: 081702geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: basic

114 ANS: 1

$-8 + \frac{3}{5}(7 - -8) = -8 + 9 = 1$ $7 + \frac{3}{5}(-13 - 7) = 7 - 12 = -5$

PTS: 2 REF: 081815geo NAT: G.GPE.B.6 TOP: Directed Line Segments

115 ANS: 3 PTS: 2 REF: 081805geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

116 ANS:

$C = 2\pi r \quad V = \frac{1}{3}\pi \cdot 5^2 \cdot 13 \approx 340$

$31.416 = 2\pi r$

$5 \approx r$

PTS: 4 REF: 011734geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

117 ANS:
If an altitude is drawn to the hypotenuse of a triangle, it divides the triangle into two right triangles similar to each other and the original triangle.

PTS: 2 REF: 061729geo NAT: G.SRT.B.5 TOP: Similarity
KEY: altitude

118 ANS: 4 PTS: 2 REF: 011706geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: basic

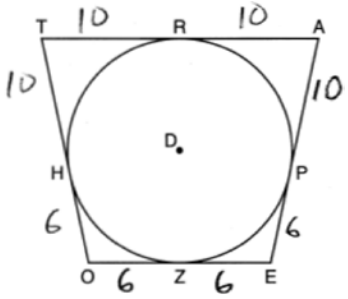
119 ANS:

$\frac{4\pi}{3}(2^3 - 1.5^3) \approx 19.4 \quad 19.4 \cdot 1.308 \cdot 8 \approx 203$

PTS: 4 REF: 081834geo NAT: G.MG.A.2 TOP: Density

120 ANS: 4 PTS: 2 REF: 011810geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

121 ANS: 2



PTS: 2 REF: 081814geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: tangents drawn from common point, length

122 ANS: 2

$x^2 + y^2 - 6x + 2y = 6$

$x^2 - 6x + 9 + y^2 + 2y + 1 = 6 + 9 + 1$

$(x-3)^2 + (y+1)^2 = 16$

PTS: 2 REF: 011812geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

123 ANS: 3

$6 \cdot 3^2 = 54 \quad 12 \cdot 3 = 36$

PTS: 2 REF: 081823geo NAT: G.SRT.A.2 TOP: Dilations

124 ANS: 2

$\cos B = \frac{17.6}{26}$

$B \approx 47$

PTS: 2 REF: 061806geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

125 ANS: 2 PTS: 2 REF: 061709geo NAT: G.SRT.B.5
TOP: Triangle Proofs KEY: statements

126 ANS: 1 PTS: 2 REF: 011703geo NAT: G.SRT.B.5
TOP: Triangle Congruency

127 ANS:

$V = \pi(10)^2(18) = 1800\pi \text{ in}^3 \quad 1800\pi \text{ in}^3 \left(\frac{1 \text{ ft}^3}{12^3 \text{ in}^3} \right) = \frac{25}{24}\pi \text{ ft}^3 \quad \frac{25}{24}\pi(95.46)(0.85) \approx 266 \quad 266 + 270 = 536$

PTS: 4 REF: 061834geo NAT: G.MG.A.2 TOP: Density

128 ANS: 3

$\triangle CFB \sim \triangle CAD \quad \frac{CB}{CF} = \frac{CD}{CA}$

$\frac{x}{21.6} = \frac{7.2}{9.6}$

$x = 16.2$

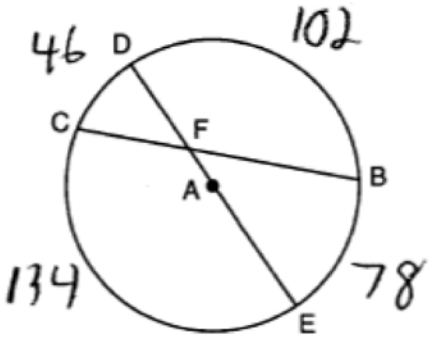
PTS: 2 REF: 061804geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

129 ANS:

Rotate $\triangle ABC$ clockwise about point C until $\overline{DF} \parallel \overline{AC}$. Translate $\triangle ABC$ along $\overline{CF}$ so that C maps onto F.

PTS: 2 REF: 061730geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

130 ANS:



$\frac{134+102}{2} = 118$

PTS: 2 REF: 081827geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: intersecting chords, angle

131 ANS:
$A(-2,1) \to (-3,-1) \to (-6,-2) \to (-5,0)$, $B(0,5) \to (-1,3) \to (-2,6) \to (-1,8)$,
$C(4,-1) \to (3,-3) \to (6,-6) \to (7,-4)$

PTS: 2 REF: 061826geo NAT: G.SRT.A.2 TOP: Dilations

132 ANS:

$20000\,\text{g}\left(\frac{1\,\text{ft}^3}{7.48\,\text{g}}\right) = 2673.8\,\text{ft}^3$ $2673.8 = \pi r^2(34.5)$ $9.9 + 1 = 10.9$

$r \approx 4.967$

$d \approx 9.9$

PTS: 4 REF: 061734geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

133 ANS:
$10 \cdot 6 = 15x$

$x = 4$

PTS: 2 REF: 061828geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

134 ANS:
$\cos B$ increases because $\angle A$ and $\angle B$ are complementary and $\sin A = \cos B$.

PTS: 2 REF: 011827geo NAT: G.SRT.C.7 TOP: Cofunctions

135 ANS: 4

$\frac{1}{3.5} = \frac{x}{18-x}$

$3.5x = 18 - x$

$4.5x = 18$

$x = 4$

PTS: 2 REF: 081707geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

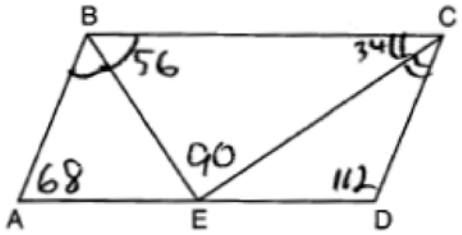
136 ANS:

$\cos 54 = \frac{4.5}{m}$ $\tan 54 = \frac{h}{4.5}$

$m \approx 7.7$ $h \approx 6.2$

PTS: 4 REF: 011834geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

137 ANS:



PTS: 2 REF: 081826geo NAT: G.CO.C.11 TOP: Parallelograms

138 ANS: 3 PTS: 2 REF: 061706geo NAT: G.SRT.A.1
TOP: Line Dilations

139 ANS: 1

$\sin 32 = \frac{x}{6.2}$

$x \approx 3.3$

PTS: 2 REF: 081719geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

140 ANS: 2

$\tan \theta = \frac{2.4}{x}$

$\frac{3}{7} = \frac{2.4}{x}$

$x = 5.6$

PTS: 2 REF: 011707geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

141 ANS:

$180 - 2(25) = 130$

PTS: 2 REF: 011730geo NAT: G.CO.C.10
TOP: Centroid, Orthocenter, Incenter and Circumcenter

142 ANS:

$29.5 = 2\pi r$ $V = \frac{4}{3}\pi \cdot \left(\frac{29.5}{2\pi}\right)^3 \approx 434$

$r = \frac{29.5}{2\pi}$

PTS: 2 REF: 061831geo NAT: G.GMD.A.3 TOP: Volume
KEY: spheres

143 ANS: 4
$9 \cdot 3 = 27,\ 27 \cdot 4 = 108$

PTS: 2 REF: 061805geo NAT: G.SRT.A.2 TOP: Dilations

144 ANS:
No, The line $4x + 3y = 24$ passes through the center of dilation, so the dilated line is not distinct.
$4x + 3y = 24$

$3y = -4x + 24$

$y = -\frac{4}{3}x + 8$

PTS: 2 REF: 081830geo NAT: G.SRT.A.1 TOP: Line Dilations

145 ANS:
$\frac{40}{360} \cdot \pi(4.5)^2 = 2.25\pi$

PTS: 2 REF: 061726geo NAT: G.C.B.5 TOP: Sectors

146 ANS:
2 Reflexive; 4 $\angle BDA \cong \angle BDC$; 6 CPCTC; 7 If points B and D are equidistant from the endpoints of $\overline{AC}$, then B and D are on the perpendicular bisector of $\overline{AC}$.

PTS: 4 REF: 081832geo NAT: G.SRT.B.5 TOP: Triangle Proofs
KEY: proof

147 ANS: 4 PTS: 2 REF: 061803geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: graphics

148 ANS: 1
$x^2 + y^2 - 6y + 9 = -1 + 9$

$x^2 + (y - 3)^2 = 8$

PTS: 2 REF: 011718geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

149 ANS: 4
$40 - x + 3x = 90$

$2x = 50$

$x = 25$

PTS: 2 REF: 081721geo NAT: G.SRT.C.7 TOP: Cofunctions

150 ANS: 3
$6x - 40 + x + 20 = 180 - 3x$ $m\angle BAC = 180 - (80 + 40) = 60$

$10x = 200$

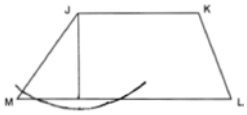
$x = 20$

PTS: 2 REF: 011809geo NAT: G.CO.C.10 TOP: Exterior Angle Theorem

151 ANS: 2 PTS: 2 REF: 011805geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

152 ANS: 4 PTS: 2 REF: 011705geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

153 ANS:



PTS: 2 REF: 061725geo NAT: G.CO.D.12 TOP: Constructions
KEY: parallel and perpendicular lines

154 ANS: 2

$2x + 7 + 4x - 7 = 90$

$6x = 90$

$x = 15$

PTS: 2 REF: 081824geo NAT: G.SRT.C.7 TOP: Cofunctions

155 ANS: 4

$\frac{360°}{10} = 36°$ 252º is a multiple of 36º

PTS: 2 REF: 011717geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

156 ANS: 3

$\cos 40 = \frac{14}{x}$

$x \approx 18$

PTS: 2 REF: 011712geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

157 ANS:

Yes. $\angle A \cong \angle X$, $\angle C \cong \angle Z$, $\overline{AC} \cong \overline{XZ}$ after a sequence of rigid motions which preserve distance and angle measure, so $\triangle ABC \cong \triangle XYZ$ by ASA. $\overline{BC} \cong \overline{YZ}$ by CPCTC.

PTS: 2 REF: 081730geo NAT: G.CO.B.7 TOP: Triangle Congruency

158 ANS: 1

$x = -5 + \frac{1}{3}(4 - -5) = -5 + 3 = -2 \quad y = 2 + \frac{1}{3}(-10 - 2) = 2 - 4 = -2$

PTS: 2 REF: 011806geo NAT: G.GPE.B.6 TOP: Directed Line Segments

159 ANS: 3

$y = mx + b$

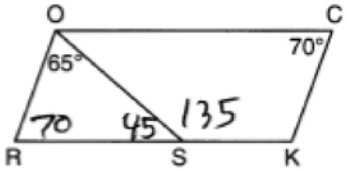
$2 = \frac{1}{2}(-2) + b$

$3 = b$

PTS: 2 REF: 011701geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

160 ANS: 4 PTS: 2 REF: 081822geo NAT: G.CO.C.10
TOP: Medians, Altitudes and Bisectors

161 ANS: 4



PTS: 2 REF: 081708geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

162 ANS: 2

$$\frac{\frac{512\pi}{3}}{\left(\frac{32}{2}\right)^2\pi} \cdot 2\pi = \frac{4\pi}{3}$$

PTS: 2 REF: 081723geo NAT: G.C.B.5 TOP: Sectors

163 ANS: 1 PTS: 2 REF: 011716geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

164 ANS:

$x^2 + x^2 = 58^2$ $A = (\sqrt{1682} + 8)^2 \approx 2402.2$

$2x^2 = 3364$

$x = \sqrt{1682}$

PTS: 4 REF: 081734geo NAT: G.MG.A.3 TOP: Area of Polygons

165 ANS: 2 PTS: 2 REF: 061720geo NAT: G.CO.C.11
TOP: Parallelograms

166 ANS:

$\tan 72 = \frac{x}{400}$ $\sin 55 = \frac{400\tan 72}{y}$

$x = 400\tan 72$ $y = \frac{400\tan 72}{\sin 55} \approx 1503$

PTS: 4 REF: 061833geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

167 ANS: 3

$\frac{7-1}{0-2} = \frac{6}{-2} = -3$ The diagonals of a rhombus are perpendicular.

PTS: 2 REF: 011719geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane

168 ANS: 3

In (1) and (2), *ABCD* could be a rectangle with non-congruent sides. (4) is not possible

PTS: 2 REF: 081714geo NAT: G.CO.C.11 TOP: Special Quadrilaterals

169 ANS:

$\tan 36 = \frac{x}{10}$ $\cos 36 = \frac{10}{y}$ $12.3607 \times 3 \approx 37$

$x \approx 7.3$ $y \approx 12.3607$

PTS: 4 REF: 081833geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

170 ANS: 4 PTS: 2 REF: 011819geo NAT: G.CO.C.11 TOP: Special Quadrilaterals

171 ANS: 1

Distance and angle measure are preserved after a reflection and translation.

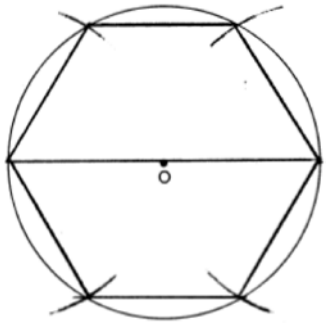
PTS: 2 REF: 081802geo NAT: G.CO.B.6 TOP: Properties of Transformations KEY: basic

172 ANS:

Parallelogram *ABCD*, $\overline{BF} \perp \overline{AFD}$, and $\overline{DE} \perp \overline{BEC}$ (given); $\overline{BC} \parallel \overline{AD}$ (opposite sides of a $\square$ are $\parallel$); $\overline{BE} \parallel \overline{FD}$ (parts of $\parallel$ lines are $\parallel$); $\overline{BF} \parallel \overline{DE}$ (two lines $\perp$ to the same line are $\parallel$); *BEDF* is $\square$ (a quadrilateral with both pairs of opposite sides $\parallel$ is a $\square$); $\angle DEB$ is a right $\angle$ ($\perp$ lines form right $\angle$s); *BEDF* is a rectangle (a $\square$ with one right $\angle$ is a rectangle).

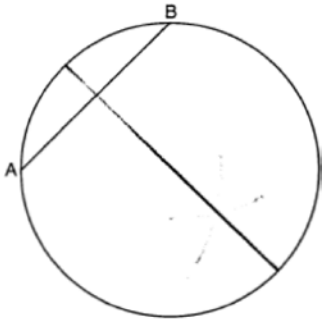
PTS: 6 REF: 061835geo NAT: G.CO.C.11 TOP: Quadrilateral Proofs

173 ANS:



PTS: 2 REF: 081728geo NAT: G.CO.D.13 TOP: Constructions

174 ANS:



PTS: 2 REF: 081825geo NAT: G.CO.D.12 TOP: Constructions
KEY: parallel and perpendicular lines

175 ANS: 2

$6 \cdot 6 = x(x-5)$

$36 = x^2 - 5x$

$0 = x^2 - 5x - 36$

$0 = (x-9)(x+4)$

$x = 9$

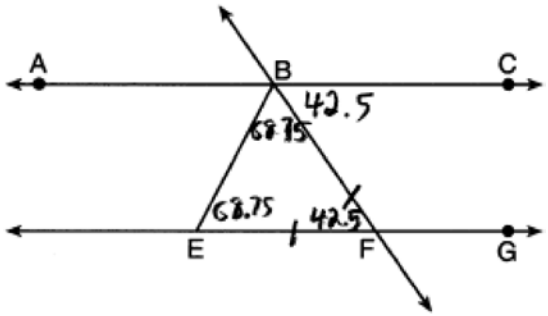
PTS: 2 REF: 061708geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: intersecting chords, length

176 ANS: 1

$V = \frac{1}{3}\pi(4)^2(6) = 32\pi$

PTS: 2 REF: 061718geo NAT: G.GMD.B.4 TOP: Rotations of Two-Dimensional Objects

177 ANS: 2



PTS: 2 REF: 011818geo NAT: G.CO.C.9 TOP: Lines and Angles

178 ANS: 1 PTS: 2 REF: 081804geo NAT: G.SRT.A.2
TOP: Compositions of Transformations KEY: grids

179 ANS: 3

$\frac{x+72}{2} = 58$

$x + 72 = 116$

$x = 44$

PTS: 2 REF: 061817geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: intersecting chords, angle

180 ANS: 1

$-8 + \frac{3}{8}(16 - -8) = -8 + \frac{3}{8}(24) = -8 + 9 = 1$ $-2 + \frac{3}{8}(6 - -2) = -2 + \frac{3}{8}(8) = -2 + 3 = 1$

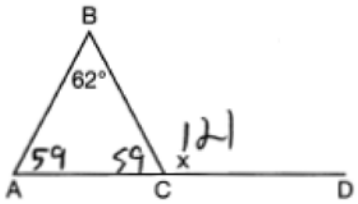
PTS: 2 REF: 081717geo NAT: G.GPE.B.6 TOP: Directed Line Segments

181 ANS: 2

$-4 + \frac{2}{5}(6 - -4) = -4 + \frac{2}{5}(10) = -4 + 4 = 0$ $5 + \frac{2}{5}(20 - 5) = 5 + \frac{2}{5}(15) = 5 + 6 = 11$

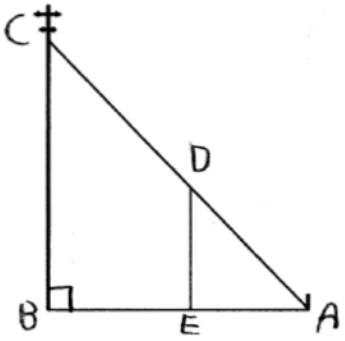
PTS: 2 REF: 061715geo NAT: G.GPE.B.6 TOP: Directed Line Segments

182 ANS: 4



PTS: 2 REF: 081711geo NAT: G.CO.C.10 TOP: Exterior Angle Theorem

183 ANS:



$\triangle ABC \sim \triangle AED$ by AA. $\angle DAE \cong \angle CAB$ because they are the same $\angle$. $\angle DEA \cong \angle CBA$ because they are both right $\angle$s.

PTS: 2 REF: 081829geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

184 ANS: 3

NYSED has stated that all students should be awarded credit regardless of their answer to this question.

PTS: 2 REF: 061722geo NAT: G.CO.B.7 TOP: Triangle Congruency

185 ANS: 4

$C = 12\pi \quad \frac{120}{360}(12\pi) = \frac{1}{3}(12\pi)$

PTS: 2 REF: 061822geo NAT: G.C.B.5 TOP: Arc Length
KEY: arc length

186 ANS: 2

$6 + 6\sqrt{3} + 6 + 6\sqrt{3} \approx 32.8$

PTS: 2 REF: 011709geo NAT: G.SRT.C.8 TOP: 30-60-90 Triangles

187 ANS: 2

$4 \times 4 \times 6 - \pi(1)^2(6) \approx 77$

PTS: 2 REF: 011711geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

188 ANS: 2

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

$m_{\perp} = -\frac{2}{3} \quad 1 = 4 + b$

$-3 = b$

PTS: 2 REF: 061719geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

189 ANS: 3

The x-axis and line $x = 4$ are lines of symmetry and $(4,0)$ is a point of symmetry.

PTS: 2 REF: 081706geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

190 ANS: 1

$84 = \frac{1}{3} \cdot s^2 \cdot 7$

$6 = s$

PTS: 2 REF: 061716geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

191 ANS:

Reflection across the y-axis, then translation up 5.

PTS: 2 REF: 061827geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

192 ANS: 1

The slope of $3x + 2y = 12$ is $-\frac{3}{2}$, which is the opposite reciprocal of $\frac{2}{3}$.

PTS: 2 REF: 081811geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: identify perpendicular lines

193 ANS: 1

$24x = 10^2$

$24x = 100$

$x \approx 4.2$

PTS: 2 REF: 061823geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

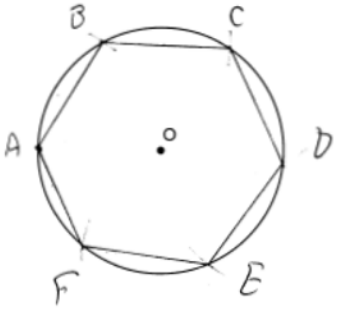
194 ANS:

Yes. The bases of the cylinders have the same area and the cylinders have the same height.

PTS: 2 REF: 081725geo NAT: G.GMD.A.1 TOP: Volume

195 ANS: 4 PTS: 2 REF: 011704geo NAT: G.CO.C.10
TOP: Midsegments

196 ANS:



Right triangle because $\angle CBF$ is inscribed in a semi-circle.

PTS: 4 REF: 011733geo NAT: G.CO.D.13 TOP: Constructions

197 ANS: 4

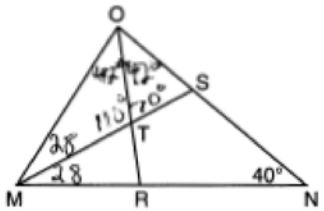
$\frac{2}{4} = \frac{9-x}{x}$

$36 - 4x = 2x$

$x = 6$

PTS: 2 REF: 061705geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

198 ANS: 4



PTS: 2 REF: 061717geo NAT: G.CO.C.10 TOP: Interior and Exterior Angles of Triangles

199 ANS:

$V = (\pi)(4^2)(9) + \left(\frac{1}{2}\right)\left(\frac{4}{3}\right)(\pi)\left(4^3\right) \approx 586$

PTS: 4 REF: 011833geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

200 ANS: 3

$\frac{360°}{5} = 72°$ 216º is a multiple of 72º

PTS: 2 REF: 061819geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

201 ANS: 4 PTS: 2 REF: 011817geo NAT: G.SRT.B.5
TOP: Similarity KEY: basic

202 ANS:

$\sqrt[3]{\frac{3V_f}{4\pi}} - \sqrt[3]{\frac{3V_p}{4\pi}} = \sqrt[3]{\frac{3(294)}{4\pi}} - \sqrt[3]{\frac{3(180)}{4\pi}} \approx 0.6$

PTS: 2 REF: 061728geo NAT: G.GMD.A.3 TOP: Volume
KEY: spheres

203 ANS: 4

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

PTS: 2 REF: 081808geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

204 ANS: 1

$\cos x = \frac{12}{13}$

$x \approx 23$

PTS: 2 REF: 081809ai NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

205 ANS: 2

$\frac{30}{360}(5)^2(\pi) \approx 6.5$

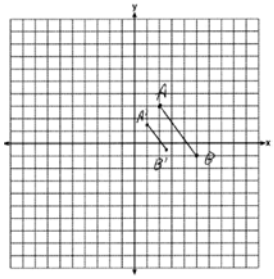
PTS: 2 REF: 081818geo NAT: G.C.B.5 TOP: Sectors

206 ANS:

$2\left(\frac{36}{12} \times \frac{36}{12} \times \frac{4}{12}\right) \times 3.25 = 19.50$

PTS: 2 REF: 081831geo NAT: G.GMD.A.3 TOP: Volume
KEY: prisms

207 ANS:



$\sqrt{(2.5-1)^2+(-.5-1.5)^2} = \sqrt{2.25+4} = 2.5$

PTS: 2 REF: 081729geo NAT: G.SRT.A.1 TOP: Line Dilations

208 ANS: 2

$V = \frac{1}{3}\left(\frac{36}{4}\right)^2 \cdot 15 = 405$

PTS: 2 REF: 011822geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

209 ANS:

Each triangular prism has the same base area. Therefore, each corresponding cross-section of the prisms will have the same area. Since the two prisms have the same height of 14, the two volumes must be the same.

PTS: 2 REF: 061727geo NAT: G.GMD.A.1 TOP: Volume

210 ANS: 1

NYSED accepts either (1) or (3) as a correct answer. Statement III is not true if *A, B, A'* and *B'* are collinear.

PTS: 2 REF: 061714geo NAT: G.SRT.A.2 TOP: Compositions of Transformations
KEY: basic

211 ANS: 2

$\angle B = 180-(82+26) = 72$; $\angle DEC = 180-26 = 154$; $\angle EDB = 360-(154+26+72) = 108$; $\angle BDF = \frac{108}{2} = 54$; $\angle DFB = 180-(54+72) = 54$

PTS: 2 REF: 061710geo NAT: G.CO.C.10 TOP: Interior and Exterior Angles of Triangles

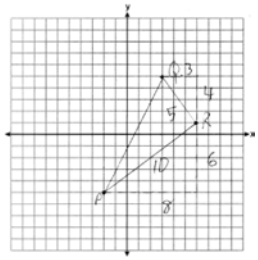
212 ANS:

No. Since $\overline{BC} = 5$ and $\overline{ST} = \sqrt{18}$ are not congruent, the two triangles are not congruent. Since rigid motions preserve distance, there is no rigid motion that maps $\triangle ABC$ onto $\triangle RST$.

PTS: 2 REF: 011830geo NAT: G.CO.B.7 TOP: Triangle Congruency

Geometry Regents at Random Worksheets
Answer Section

213 ANS:



$\frac{1}{2}(5)(10) = 25$

PTS: 2 REF: 061926geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

214 ANS: 1

$8 \times 3.5 \times 2.25 \times 1.055 = 66.465$

PTS: 2 REF: 012014geo NAT: G.MG.A.2 TOP: Density

215 ANS: 2

$\frac{x}{360}(15)^2 \pi = 75\pi$

$x = 120$

PTS: 2 REF: 011914geo NAT: G.C.B.5 TOP: Sectors

216 ANS: 4

$x^2 - 8x + y^2 + 6y = 39$

$x^2 - 8x + 16 + y^2 + 6y + 9 = 39 + 16 + 9$

$(x-4)^2 + (y+3)^2 = 64$

PTS: 2 REF: 081906geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

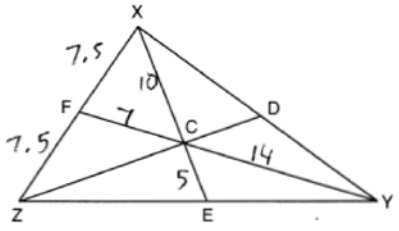
217 ANS: 1

$\cos C = \frac{15}{17}$

$C \approx 28$

PTS: 2 REF: 012007geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

218 ANS:



$7.5 + 7 + 10 = 24.5$

PTS: 2 REF: 012030geo NAT: G.CO.C.10
TOP: Centroid, Orthocenter, Incenter and Circumcenter

219 ANS: 4

$2x - 1 = 16$

$x = 8.5$

PTS: 2 REF: 011902geo NAT: G.CO.B.6 TOP: Properties of Transformations
KEY: graphics

220 ANS:

$\frac{124 - 56}{2} = 34$

PTS: 2 REF: 081930geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

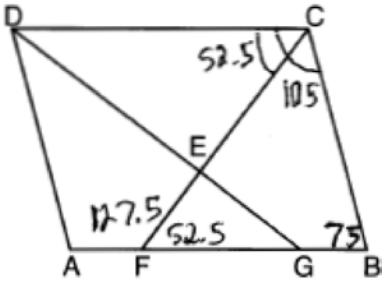
221 ANS: 1 PTS: 2 REF: 081916geo NAT: G.SRT.B.5
TOP: Similarity KEY: leg

222 ANS: 1

$h = \sqrt{6.5^2 - 2.5^2} = 6, V = \frac{1}{3}\pi(2.5)^2 6 = 12.5\pi$

PTS: 2 REF: 011923geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

223 ANS: 2



PTS: 2 REF: 081907geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

224 ANS:

Theresa. $(30 \times 15 \times (4 - 0.5))\ \text{ft}^3 \times \frac{7.48\ \text{g}}{1\ \text{ft}^3} \times \frac{\$3.95}{100\ \text{g}} = \$465.35,\ (\pi \times 12^2 \times (4 - 0.5))\ \text{ft}^3 \times \frac{7.48\ \text{g}}{1\ \text{ft}^3} \times \frac{\$200}{6000\ \text{g}} = \$394.79$

PTS: 4 REF: 011933geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

225 ANS:

$\sin 38 = \frac{24.5}{x}$

$x \approx 40$

PTS: 2 REF: 012026geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: graphics

226 ANS: 4

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

PTS: 2 REF: 011924geo NAT: G.SRT.A.1 TOP: Line Dilations

227 ANS:

Yes, because a dilation preserves angle measure.

PTS: 4 REF: 081932geo NAT: G.CO.D.12 TOP: Constructions
KEY: congruent and similar figures

228 ANS: 3

$\sqrt{40^2 - \left(\frac{64}{2}\right)^2} = 24\ \ V = \frac{1}{3}(64)^2 \cdot 24 = 32768$

PTS: 2 REF: 081921geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

229 ANS: 3 PTS: 2 REF: 011904geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

230 ANS: 2

$\sqrt{8^2 + 6^2} = 10$ for one side

PTS: 2 REF: 011907geo NAT: G.CO.C.11 TOP: Special Quadrilaterals

231 ANS: 1 PTS: 2 REF: 011918geo NAT: G.MG.A.3
TOP: Compositions of Polygons and Circles KEY: area

232 ANS: 4

$-8+\frac{2}{3}(10--8)=-8+\frac{2}{3}(18)=-8+12=4$ $4+\frac{2}{3}(-2-4)=4+\frac{2}{3}(-6)=4-4=0$

PTS: 2 REF: 061919geo NAT: G.GPE.B.6 TOP: Directed Line Segments

233 ANS: 4

$\frac{18}{4.5}=4$

PTS: 2 REF: 011901geo NAT: G.SRT.A.1 TOP: Line Dilations

234 ANS:

$3y+7=2x \quad y-6=\frac{2}{3}(x-2)$

$3y=2x-7$

$y=\frac{2}{3}x-\frac{7}{3}$

PTS: 2 REF: 011925geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

235 ANS: 3

$\frac{1}{2}\times 24=12$

PTS: 2 REF: 012009geo NAT: G.CO.C.10 TOP: Midsegments

236 ANS:

Quadrilateral $ABCD$ with diagonal $\overline{AC}$, segments GH and EF, $\overline{AE}\cong\overline{CG}$, $\overline{BE}\cong\overline{DG}$, $\overline{AH}\cong\overline{CF}$, and $\overline{AD}\cong\overline{CB}$ (given); $\overline{HF}\cong\overline{HF}$, $\overline{AC}\cong\overline{AC}$ (reflexive property); $\overline{AH}+\overline{HF}\cong\overline{CF}+\overline{HF}$, $\overline{AE}+\overline{BE}\cong\overline{CG}+\overline{DG}$ (segment addition); $\overline{AF}\cong\overline{CH}$ $\overline{AB}\cong\overline{CD}$ $\triangle ABC\cong\triangle CDA$ (SSS); $\angle EAF\cong\angle GCH$ (CPCTC); $\triangle AEF\cong\triangle CGH$ (SAS); $\overline{EF}\cong\overline{GH}$ (CPCTC).

PTS: 6 REF: 011935geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

237 ANS: 3

$\angle N$ is the smallest angle in $\triangle NYA$, so side $\overline{AY}$ is the shortest side of $\triangle NYA$. $\angle VYA$ is the smallest angle in $\triangle VYA$, so side $\overline{VA}$ is the shortest side of both triangles.

PTS: 2 REF: 011919geo NAT: G.CO.C.10 TOP: Angle Side Relationship

238 ANS:

$m=\frac{5}{4}$; $m_{\perp}=-\frac{4}{5}$ $y-12=-\frac{4}{5}(x-5)$

PTS: 2 REF: 012031geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

239 ANS: 3

$12^2 = 9 \cdot GM \quad IM^2 = 16 \cdot 25$

$GM = 16 \qquad IM = 20$

PTS: 2 REF: 011910geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

240 ANS: 2

$8 \times 8 \times 9 + \frac{1}{3}(8 \times 8 \times 3) = 640$

PTS: 2 REF: 011909geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

241 ANS: 3

$M_x = \frac{-5 + -1}{2} = -\frac{6}{2} = -3 \quad M_y = \frac{5 + -1}{2} = \frac{4}{2} = 2.$

PTS: 2 REF: 081902geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: general

242 ANS: 2

$\frac{x}{15} = \frac{5}{12}$

$x = 6.25$

PTS: 2 REF: 011906geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

243 ANS: 1

$m = \frac{-A}{B} = \frac{-3}{2} \quad m_{\perp} = \frac{2}{3}$

PTS: 2 REF: 081908geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: identify perpendicular lines

244 ANS:

$\left((10 \times 6) + \sqrt{7(7-6)(7-4)(7-4)}\right)(6.5) \approx 442$

PTS: 4 REF: 081934geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

245 ANS:

$\left(\frac{2.5}{3}\right)(\pi)\left(\frac{8.25}{2}\right)^2(3) \approx 134$

PTS: 2 REF: 081931geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

246 ANS: 1
$\triangle ABC \sim \triangle RST$

PTS: 2 REF: 011908geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

247 ANS: 3 PTS: 2 REF: 061924geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

248 ANS: 2

$$108\pi = \frac{6^2 \pi h}{3}$$

$$\frac{324\pi}{36\pi} = h$$

$$9 = h$$

PTS: 2 REF: 012002geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

249 ANS: 3 PTS: 2 REF: 081913geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

250 ANS: 3

$$\frac{10}{x} = \frac{15}{12}$$

$$x = 8$$

PTS: 2 REF: 081918geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

251 ANS: 4

$$\sin x = \frac{10}{12}$$

$$x \approx 56$$

PTS: 2 REF: 061922geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

252 ANS: 3

$2(2x + 8) = 7x - 2$ $AB = 7(6) - 2 = 40$. Since $\overline{EF}$ is a midsegment, $EF = \frac{40}{2} = 20$. Since $\triangle ABC$ is equilateral,

$$4x + 16 = 7x - 2$$

$$18 = 3x$$

$$6 = x$$

$AE = BF = \frac{40}{2} = 20$. $40 + 20 + 20 + 20 = 100$

PTS: 2 REF: 061923geo NAT: G.CO.C.10 TOP: Midsegments

253 ANS: 4

$\tan A = \dfrac{\text{opposite}}{\text{adjacent}} = \dfrac{15}{8}$

PTS: 2 REF: 011917geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

254 ANS: 4 PTS: 2 REF: 011921geo NAT: G.GPE.B.4
TOP: Triangles in the Coordinate Plane

255 ANS:

$\dfrac{72}{360}(\pi)\left(10^2\right) = 20\pi$

PTS: 2 REF: 061928geo NAT: G.C.B.5 TOP: Sectors

256 ANS: 1

A dilation by a scale factor of 4 centered at the origin preserves parallelism and $(0,-2) \rightarrow (0,-8)$.

PTS: 2 REF: 081910geo NAT: G.SRT.A.1 TOP: Line Dilations

257 ANS: 2

Create two congruent triangles by drawing $\overline{BD}$, which has a length of 8. Each triangle has an area of $\dfrac{1}{2}(8)(3) = 12$.

PTS: 2 REF: 012018geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

258 ANS: 2

$90 - 57 = 33$

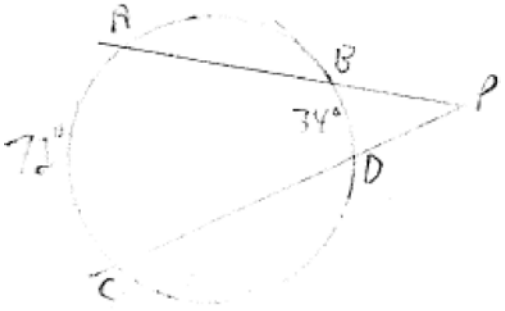
PTS: 2 REF: 061909geo NAT: G.SRT.C.7 TOP: Cofunctions

259 ANS: 1

$V = \dfrac{1}{2} \times \dfrac{4}{3}\pi r^3 = \dfrac{1}{2} \times \dfrac{4}{3}\pi \cdot \left(\dfrac{12.6}{2}\right)^3 \approx 523.7$

PTS: 2 REF: 061910geo NAT: G.GMD.A.3 TOP: Volume
KEY: spheres

260 ANS: 1



$\dfrac{72 - 34}{2} = 19$

PTS: 2 REF: 061918geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, angle

261 ANS:
$\triangle ABE \cong \triangle CBD$ (given); $\angle A \cong \angle C$ (CPCTC); $\angle AFD \cong \angle CFE$ (vertical angles are congruent); $\overline{AB} \cong \overline{CB}$, $\overline{DB} \cong \overline{EB}$ (CPCTC); $\overline{AD} \cong \overline{CE}$ (segment subtraction); $\triangle AFD \cong \triangle CFE$ (AAS)

PTS: 4 REF: 081933geo NAT: G.SRT.B.5 TOP: Triangle Proofs
KEY: proof

262 ANS: 2

$\tan 36 = \frac{x}{8} \quad 5.8 + 1.5 \approx 7$

$x \approx 5.8$

PTS: 2 REF: 081915geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

263 ANS: 3

$-9 + \frac{1}{3}(9 - -9) = -9 + \frac{1}{3}(18) = -9 + 6 = -3 \quad 8 + \frac{1}{3}(-4 - 8) = 8 + \frac{1}{3}(-12) = 8 - 4 = 4$

PTS: 2 REF: 081903geo NAT: G.GPE.B.6 TOP: Directed Line Segments

264 ANS: 1 PTS: 2 REF: 081919geo NAT: G.SRT.C.7
TOP: Cofunctions

265 ANS:

$\tan 30 = \frac{y}{440} \quad \tan 38.8 = \frac{h}{440} \quad 353.8 - 254 \approx 100$

$y \approx 254 \qquad h \approx 353.8$

PTS: 4 REF: 061934geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

266 ANS:
$\angle Q \cong \angle M \quad \angle P \cong \angle N \quad \overline{QP} \cong \overline{MN}$

PTS: 2 REF: 012025geo NAT: G.CO.B.7 TOP: Triangle Congruency

267 ANS: 4 PTS: 2 REF: 011905geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: inscribed

268 ANS: 4 PTS: 2 REF: 012019geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

269 ANS: 1 PTS: 2 REF: 081904geo NAT: G.CO.C.10
TOP: Centroid, Orthocenter, Incenter and Circumcenter

270 ANS: 2

$m = \frac{-(-2)}{3} = \frac{2}{3}$

PTS: 2 REF: 061916geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

271 ANS: 1

$5x = 12 \cdot 7 \quad 16.8 + 7 = 23.8$

$5x = 84$

$x = 16.8$

PTS: 2 REF: 061911geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

272 ANS: 3

$4x + 3x + 13 = 90 \quad 4(11) < 3(11) + 13$

$7x = 77 \qquad 44 < 46$

$x = 11$

PTS: 2 REF: 012021geo NAT: G.SRT.C.7 TOP: Cofunctions

273 ANS:

$\frac{121 - x}{2} = 35$

$121 - x = 70$

$x = 51$

PTS: 2 REF: 011927geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, angle

274 ANS: 3

$8 \cdot 15 = 16 \cdot 7.5$

PTS: 2 REF: 061913geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: intersecting chords, length

275 ANS: 2 PTS: 2 REF: 081901geo NAT: G.SRT.A.1
TOP: Line Dilations

276 ANS: 1

$\frac{6.5}{10.5} = \frac{5.2}{x}$

$x = 8.4$

PTS: 2 REF: 012006geo NAT: G.CO.C.11 TOP: Trapezoids

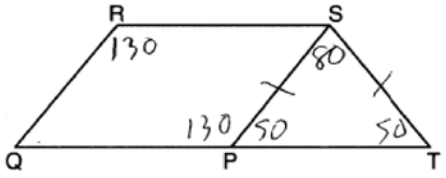
277 ANS: 4 PTS: 2 REF: 081923geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

278 ANS: 4

$90 - 35 = 55 \quad 55 \times 2 = 110$

PTS: 2 REF: 012015geo NAT: G.CO.B.6 TOP: Properties of Transformations
KEY: basic

279 ANS: 2



PTS: 2 REF: 061921geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

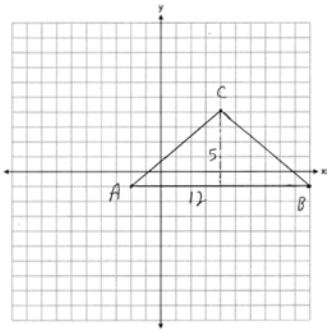
280 ANS: 2

The slope of $-3x + 4y = 8$ is $\frac{3}{4}$.

PTS: 2 REF: 061907geo NAT: G.SRT.A.1 TOP: Line Dilations

281 ANS: 3 PTS: 2 REF: 011911geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

282 ANS:



$\frac{1}{2}(5)(12) = 30$

PTS: 2 REF: 081928geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

283 ANS:

$x^2 = 8 \times 12.5$

$x = 10$

PTS: 2 REF: 012028geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, length

284 ANS: 1

$$\frac{\frac{1}{3}\pi(2)^2\left(\frac{1}{2}\right)}{\frac{1}{3}\pi(1)^2(1)} = 2$$

PTS: 2 REF: 012010geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

285 ANS: 4

$\frac{2}{4} = \frac{8}{x+2}$ $14+2=16$

$2x+4=32$

$x=14$

PTS: 2 REF: 012024geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

286 ANS: 4 PTS: 2 REF: 081911geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

287 ANS:

$\sin 4.76 = \frac{1.5}{x}$ $\tan 4.76 = \frac{1.5}{x}$ $18 - \frac{16}{12} \approx 16.7$

$x \approx 18.1$ $x \approx 18$

PTS: 4 REF: 011934geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

288 ANS:

$\tan 56 = \frac{x}{1.3}$ $\sqrt{(1.3\tan 56)^2 + 1.5^2} \approx 3.7$

$x = 1.3\tan 56$

PTS: 4 REF: 012033geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

289 ANS: 3 PTS: 2 REF: 061912geo NAT: G.CO.C.11
TOP: Parallelograms

290 ANS: 2 PTS: 2 REF: 081909geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

291 ANS: 1

$\cos 65 = \frac{x}{15}$

$x \approx 6.3$

PTS: 2 REF: 081924geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

292 ANS: 3

$\frac{150}{360} \cdot 9^2\pi = 33.75\pi$

PTS: 2 REF: 012013geo NAT: G.C.B.5 TOP: Sectors

293 ANS: 2

$\tan 11.87 = \frac{x}{0.5(5280)}$

$x \approx 555$

PTS: 2 REF: 011913geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

294 ANS:

$2 \times (90 \times 10) + (\pi)(30^2) - (\pi)(20^2) \approx 3371$

PTS: 2 REF: 011931geo NAT: G.MG.A.3 TOP: Compositions of Polygons and Circles
KEY: area

295 ANS: 2 PTS: 2 REF: 012012geo NAT: G.CO.C.10
TOP: Medians, Altitudes and Bisectors

296 ANS: 3

$(6-2)180 = 720 \quad \frac{720}{6} = 120$

PTS: 2 REF: 012011geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

297 ANS: 2

$V = \frac{1}{3}(8)^2 \cdot 6 = 128$

PTS: 2 REF: 061906geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

298 ANS: 1

$y = \frac{1}{2}x + 4 \quad \frac{2}{4} = \frac{1}{2}$

$y = \frac{1}{2}x + 2$

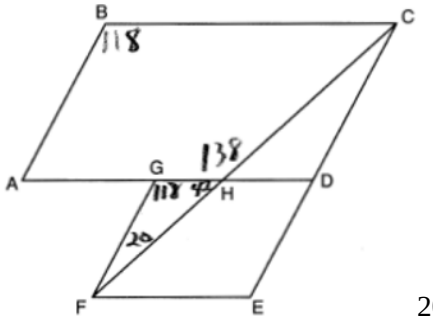
PTS: 2 REF: 012008geo NAT: G.SRT.A.1 TOP: Line Dilations

299 ANS:

$r_{y=2} \circ r_{y\text{-axis}}$

PTS: 2 REF: 081927geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

300 ANS:



20º

PTS: 2 REF: 011926geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

301 ANS: 4 PTS: 2 REF: 061901geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

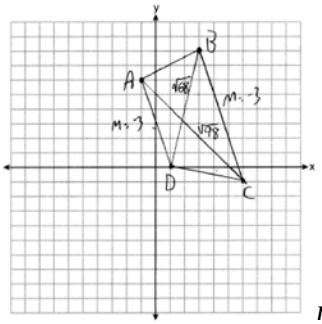
302 ANS:
$\angle D = 46°$ because the angles of a triangle equal 180°. $\angle B = 46°$ because opposite angles of a parallelogram are congruent.

PTS: 2 REF: 081925geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

303 ANS: 3
$180 - (48 + 66) = 180 - 114 = 66$

PTS: 2 REF: 012001geo NAT: G.CO.C.9 TOP: Lines and Angles

304 ANS:



$m_{\overline{AD}} = \dfrac{0-6}{1--1} = -3$ $\overline{AD} \parallel \overline{BC}$ because their slopes are equal. *ABCD* is a trapezoid

$m_{\overline{BC}} = \dfrac{-1-8}{6-3} = -3$

because it has a pair of parallel sides. $AC = \sqrt{(-1-6)^2 + (6--1)^2} = \sqrt{98}$ *ABCD* is not an isosceles trapezoid

$$BD = \sqrt{(8-0)^2 + (3-1)^2} = \sqrt{68}$$

because its diagonals are not congruent.

PTS: 4 REF: 061932geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

305 ANS: 2
$\triangle ABC \sim \triangle BDC$

$\cos A = \dfrac{AB}{AC} = \dfrac{BD}{BC}$

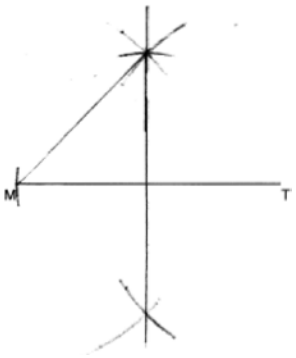
PTS: 2 REF: 012023geo NAT: G.SRT.C.6 TOP: Trigonometric Ratios

306 ANS:
$R_{90°}$ or $T_{2,-6} \circ R_{(-4,2),90°}$ or $R_{270°} \circ r_{\text{x-axis}} \circ r_{y\text{-axis}}$

PTS: 2 REF: 061929geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

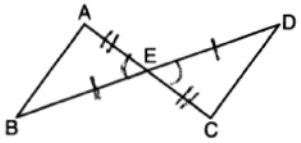
307 ANS: 4 PTS: 2 REF: 061904geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

308 ANS:



PTS: 2 REF: 012029geo NAT: G.CO.D.12 TOP: Constructions
KEY: parallel and perpendicular lines

309 ANS: 4



PTS: 2 REF: 061908geo NAT: G.SRT.B.5 TOP: Triangle Proofs
KEY: statements

310 ANS: 1

$-1+\frac{1}{3}(8--1)=-1+\frac{1}{3}(9)=-1+3=2 \quad -3+\frac{1}{3}(9--3)=-3+\frac{1}{3}(12)=-3+4=1$

PTS: 2 REF: 011915geo NAT: G.GPE.B.6 TOP: Directed Line Segments

311 ANS: 4

$x^2+8x+16+y^2-12y+36=144+16+36$

$(x+4)^2+(y-6)^2=196$

PTS: 2 REF: 061920geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

312 ANS:

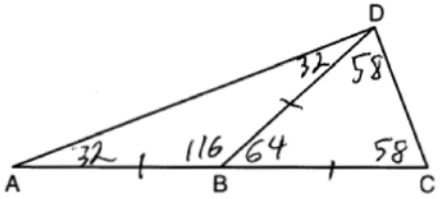
$\cos 68=\frac{10}{x}$

$x\approx 27$

PTS: 2 REF: 061927geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

313 ANS: 1 PTS: 2 REF: 011922geo NAT: G.SRT.C.7
TOP: Cofunctions

314 ANS: 3



PTS: 2 REF: 081905geo NAT: G.CO.C.10 TOP: Exterior Angle Theorem

315 ANS: 1

$$(x-1)^2+(y-4)^2=\left(\frac{10}{2}\right)^2$$

$$x^2-2x+1+y^2-8y+16=25$$

$$x^2-2x+y^2-8y=8$$

PTS: 2 REF: 011920geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: write equation, given center and radius

316 ANS:

Quadrilateral $MATH$, $\overline{HM}\cong\overline{AT}$, $\overline{HT}\cong\overline{AM}$, $\overline{HE}\perp\overline{MEA}$, and $\overline{HA}\perp\overline{AT}$ (given); $\angle HEA$ and $\angle TAH$ are right angles (perpendicular lines form right angles); $\angle HEA\cong\angle TAH$ (all right angles are congruent); $MATH$ is a parallelogram (a quadrilateral with two pairs of congruent opposite sides is a parallelogram); $\overline{MA}\parallel\overline{TH}$ (opposite sides of a parallelogram are parallel); $\angle THA\cong\angle EAH$ (alternate interior angles of parallel lines and a transversal are congruent); $\triangle HEA\sim\triangle TAH$ (AA); $\frac{HA}{TH}=\frac{HE}{TA}$ (corresponding sides of similar triangles are in proportion); $TA\bullet HA=HE\bullet TH$ (product of means equals product of extremes).

PTS: 6 REF: 061935geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

317 ANS: 4

$$\left(\frac{360-120}{360}\right)(\pi)\left(9^2\right)=54\pi$$

PTS: 2 REF: 081912geo NAT: G.C.B.5 TOP: Sectors

318 ANS: 4

$$-7+\frac{1}{4}(5--7)=-7+\frac{1}{4}(12)=-7+3=-4\quad -5+\frac{1}{4}(3--5)=-5+\frac{1}{4}(8)=-5+2=-3$$

PTS: 2 REF: 012005geo NAT: G.GPE.B.6 TOP: Directed Line Segments

319 ANS: 3

Broome: $\frac{200536}{706.82}\approx 284$ Dutchess: $\frac{280150}{801.59}\approx 349$ Niagara: $\frac{219846}{522.95}\approx 420$ Saratoga: $\frac{200635}{811.84}\approx 247$

PTS: 2 REF: 061902geo NAT: G.MG.A.2 TOP: Density

320 ANS: 4 PTS: 2 REF: 081922geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: intersecting chords, length

321 ANS:

$8 \times 3 \times \frac{1}{12} \times 43 = 86$

PTS: 2 REF: 012027geo NAT: G.MG.A.2 TOP: Density

322 ANS: 2

$ER = \sqrt{17^2 - 8^2} = 15$

PTS: 2 REF: 061917geo NAT: G.CO.C.11 TOP: Special Quadrilaterals

323 ANS: 2 PTS: 1 REF: 012017geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

324 ANS: 2

The line $x = -2$ will be tangent to the circle at $(-2, -4)$. A segment connecting this point and $(2, -4)$ is a radius of the circle with length 4.

PTS: 2 REF: 012020geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: other

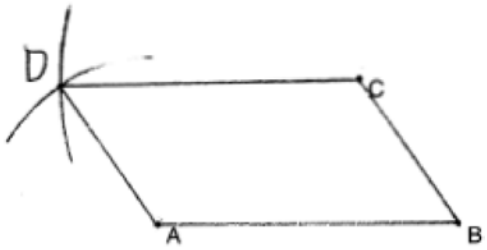
325 ANS:

Quadrilateral $ABCD$, E and F are points on $\overline{BC}$ and $\overline{AD}$, respectively, and $\overline{BGD}$ and $\overline{EGF}$ are drawn such that $\angle ABG \cong \angle CDG$, $\overline{AB} \cong \overline{CD}$, and $\overline{CE} \cong \overline{AF}$ (given); $\overline{BD} \cong \overline{BD}$ (reflexive); $\triangle ABD \cong \triangle CDB$ (SAS); $\overline{BC} \cong \overline{DA}$ (CPCTC); $\overline{BE} + \overline{CE} \cong \overline{AF} + \overline{DF}$ (segment addition); $\overline{BE} \cong \overline{DF}$ (segment subtraction); $\angle BGE \cong \angle DGF$ (vertical angles are congruent); $\angle CBD \cong \angle ADB$ (CPCTC); $\triangle EBG \cong \triangle FDG$ (AAS); $\overline{FG} \cong \overline{EG}$ (CPCTC).

PTS: 6 REF: 012035geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

326 ANS: 2 PTS: 2 REF: 061903geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

327 ANS:



PTS: 2 REF: 011929geo NAT: G.CO.D.12 TOP: Constructions
KEY: equilateral triangles

328 ANS:

$17x = 15^2$

$17x = 225$

$x \approx 13.2$

PTS: 2 REF: 061930geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

329 ANS: 4

$x^2 = 10.2 \times 14.3$

$x \approx 12.1$

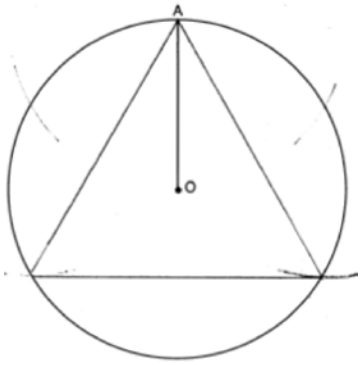
PTS: 2 REF: 012016geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

330 ANS: 4

d) is SSA

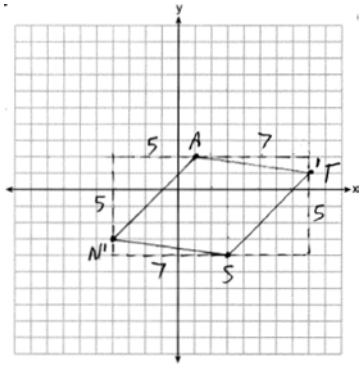
PTS: 2 REF: 061914geo NAT: G.CO.B.7 TOP: Triangle Congruency

331 ANS:



PTS: 2 REF: 061931geo NAT: G.CO.D.13 TOP: Constructions

332 ANS:



$\overline{AN} \cong \overline{AT} \cong \overline{TS} \cong \overline{SN}$ Quadrilateral *NATS* is a rhombus

$\sqrt{5^2+5^2} = \sqrt{7^2+1^2} = \sqrt{5^2+5^2} = \sqrt{7^2+1^2}$

$\sqrt{50} = \sqrt{50} = \sqrt{50} = \sqrt{50}$

because all four sides are congruent.

PTS: 4 REF: 012032geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

333 ANS:

$(7^2)18\pi = 16x^2 \quad \frac{80}{13.2} \approx 6.1 \quad \frac{60}{13.2} \approx 4.5 \quad 6 \times 4 = 24$

$13.2 \approx x$

PTS: 4 REF: 012034geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

334 ANS:

$\sin^{-1}\left(\frac{5}{25}\right) \approx 11.5$

PTS: 2 REF: 081926geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

335 ANS:

No. The midpoint of $\overline{DF}$ is $\left(\frac{1+4}{2}, \frac{-1+2}{2}\right) = (2.5, 0.5)$. A median from point E must pass through the midpoint.

PTS: 2 REF: 011930geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

336 ANS:

30° $\triangle CAD$ is an equilateral triangle, so $\angle CAB = 60°$. Since $\overrightarrow{AD}$ is an angle bisector, $\angle CAD = 30°$.

PTS: 2 REF: 081929geo NAT: G.CO.D.12 TOP: Constructions
KEY: equilateral triangles

337 ANS: 1 PTS: 2 REF: 012022geo NAT: G.SRT.A.2
TOP: Compositions of Transformations KEY: grids

338 ANS: 2 PTS: 2 REF: 011912geo NAT: G.CO.C.11
TOP: Parallelograms

339 ANS: 2

$18^2 = 12(x + 12)$

$324 = 12(x + 12)$

$27 = x + 12$

$x = 15$

PTS: 2 REF: 081920geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

340 ANS: 2

$x^2 = 12(12 - 8)$

$x^2 = 48$

$x = 4\sqrt{3}$

PTS: 2 REF: 011823geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

341 ANS: 2 PTS: 2 REF: 012003geo NAT: G.SRT.B.5
TOP: Similarity KEY: basic

342 ANS:

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

$126 = 126$

PTS: 2 REF: 081529geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

343 ANS:

$R_{(-5,2),90°} \circ T_{-3,1} \circ r_{\text{x-axis}}$

PTS: 2 REF: 011928geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

344 ANS:

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

$x = 164$

PTS: 2 REF: 081527geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

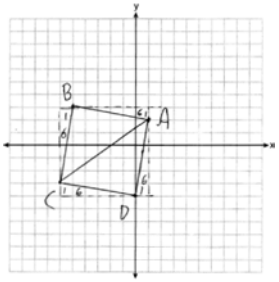
345 ANS: 3

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

PTS: 2 REF: 081512geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: common tangents

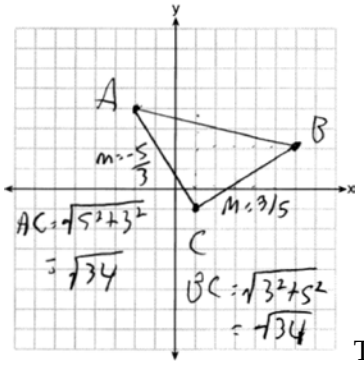
346 ANS:

$AB = \sqrt{(-5-1)^2 + (3-2)^2} = \sqrt{37}$, $BC = \sqrt{(-5--6)^2 + (3--3)^2} = \sqrt{37}$ (because $AB = BC$, $\triangle ABC$ is isosceles). $(0,-4)$. $AD = \sqrt{(1-0)^2 + (2--4)^2} = \sqrt{37}$, $CD = \sqrt{(-6-0)^2 + (-3--4)^2} = \sqrt{37}$, $m_{\overline{AB}} = \frac{3-2}{-5-1} = -\frac{1}{6}$, $m_{\overline{CB}} = \frac{3--3}{-5--6} = 6$ ($ABCD$ is a square because all four sides are congruent, consecutive sides are perpendicular since slopes are opposite reciprocals and so $\angle B$ is a right angle).



PTS: 6 REF: 081935geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

347 ANS:



Triangle with vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$ (given); $m_{\overline{AC}} = -\frac{5}{3}$, $m_{\overline{BC}} = \frac{3}{5}$, definition of slope; Because the slopes of the legs of the triangle are opposite reciprocals, the legs are perpendicular (definition of perpendicular); $\angle C$ is a right angle (definition of right angle); $\triangle ABC$ is a right triangle (if a triangle has a right angle, it is a right triangle); $\overline{AC} \cong \overline{BC} = \sqrt{34}$ (distance formula); $\triangle ABC$ is an isosceles triangle (an isosceles triangle has two congruent sides).

PTS: 4 REF: 011932geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

348 ANS: 4 PTS: 2 REF: 011916geo NAT: G.CO.C.10
TOP: Exterior Angle Theorem

349 ANS:

$V = \frac{2}{3}\pi\left(\frac{6.5}{2}\right)^2(1) \approx 22 \;\; 22 \cdot 7.48 \approx 165$

PTS: 4 REF: 061933geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

350 ANS: 3 PTS: 2 REF: 011903geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

351 ANS: 4

$(8 \times 2) + (3 \times 2) - \left(\frac{18}{12} \times \frac{21}{12}\right) \approx 19$

PTS: 2 REF: 081917geo NAT: G.MG.A.3 TOP: Compositions of Polygons and Circles
KEY: area

352 ANS: 1 PTS: 2 REF: 012004geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

353 ANS:
No, because dilations do not preserve distance.

PTS: 2 REF: 061925geo NAT: G.SRT.A.2 TOP: Dilations

354 ANS: 1

$\frac{9}{6} = \frac{3}{2}$

PTS: 2 REF: 061905geo NAT: G.SRT.A.1 TOP: Line Dilations

355 ANS: 2

$$\frac{4}{3}\pi \times \left(\frac{1.68}{2}\right)^3 \times 0.6523 \approx 1.62$$

PTS: 2 REF: 081914geo NAT: G.MG.A.2 TOP: Density

356 ANS: 2

$$\frac{4}{x} = \frac{6}{9}$$

$$x = 6$$

PTS: 2 REF: 061915geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

Geometry Regents at Random Worksheets
Answer Section

357 ANS: 2

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

PTS: 2 REF: 011604geo NAT: G.GMD.A.3 TOP: Volume
KEY: prisms

358 ANS:

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

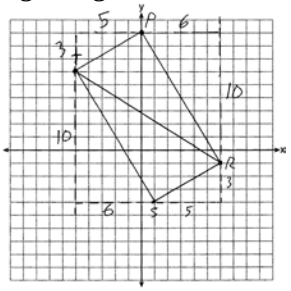
PTS: 2 REF: 011630geo NAT: G.MG.A.2 TOP: Density

359 ANS: 1 PTS: 2 REF: 081603geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

360 ANS:

$m_{\overline{TS}} = \frac{-10}{6} = -\frac{5}{3} \quad m_{\overline{SR}} = \frac{3}{5}$ 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. $P(0,9) \quad m_{\overline{RP}} = \frac{-10}{6} = -\frac{5}{3} \quad m_{\overline{PT}} = \frac{3}{5}$

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 NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

361 ANS: 4

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

$x \approx 18.8$

PTS: 2 REF: 061611geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: without graphics

362 ANS:

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

PTS: 2 REF: 081531geo NAT: G.GPE.B.6 TOP: Directed Line Segments

363 ANS:

$\ell: y = 3x - 4$

$m: y = 3x - 8$

PTS: 2 REF: 011631geo NAT: G.SRT.A.1 TOP: Line Dilations

364 ANS: 3

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

PTS: 2 REF: 081608geo NAT: G.SRT.C.8 TOP: 30-60-90 Triangles

365 ANS: 3

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

$9x = 46$

$x \approx 5.1$

PTS: 2 REF: 061511geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

366 ANS:

Reflections are rigid motions that preserve distance.

PTS: 2 REF: 061530geo NAT: G.CO.B.7 TOP: Triangle Congruency

367 ANS: 1

$\frac{360°}{45°} = 8$

PTS: 2 REF: 061510geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

368 ANS: 4

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

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

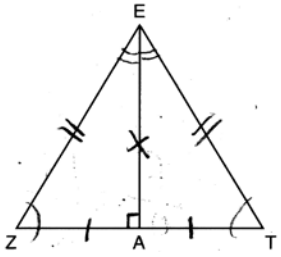
$-5 + 6 \qquad -4 + 3$

$1 \qquad -1$

PTS: 2 REF: spr1401geo NAT: G.GPE.B.6 TOP: Directed Line Segments

369 ANS: 4 PTS: 2 REF: 081609geo NAT: G.SRT.A.2
TOP: Compositions of Transformations KEY: grids

370 ANS: 2



PTS: 2 REF: 061619geo NAT: G.CO.C.10 TOP: Triangle Proofs

371 ANS: 2

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

PTS: 2 REF: 011622geo NAT: G.SRT.B.5 TOP: Similarity
KEY: altitude

372 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 NAT: G.MG.A.2 TOP: Density

373 ANS: 3

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

PTS: 2 REF: fall1404geo NAT: G.C.B.5 TOP: Arc Length
KEY: angle

374 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 NAT: G.SRT.A.1 TOP: Line Dilations

375 ANS: 3 PTS: 2 REF: 061616geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: graphics

376 ANS: 3 PTS: 2 REF: 011605geo NAT: G.CO.A.2
TOP: Analytical Representations of Transformations KEY: basic

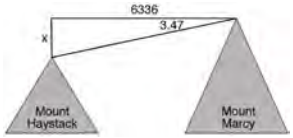
377 ANS: 1

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

PTS: 2 REF: 061620geo NAT: G.MG.A.2 TOP: Density

378 ANS: 4 PTS: 2 REF: 061504geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

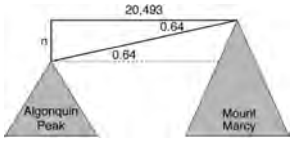
379 ANS:



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

$M \approx 384$

$4960 + 384 = 5344$



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

$A \approx 229$

$5344 - 229 = 5115$

PTS: 6 REF: fall1413geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

380 ANS: 4

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

PTS: 2 REF: 081522geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: general

381 ANS:

$s = \theta \cdot r$ $s = \theta \cdot r$ Yes, both angles are equal.

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

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

PTS: 2 REF: 061629geo NAT: G.C.B.5 TOP: Arc Length
KEY: arc length

382 ANS:

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

PTS: 2 REF: 081629geo NAT: G.CO.B.6 TOP: Properties of Transformations

383 ANS:

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

PTS: 4 REF: 061632geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

384 ANS: 3 PTS: 2 REF: 081515geo NAT: G.C.A.3
TOP: Inscribed Quadrilaterals

385 ANS:

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

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

PTS: 4 REF: 081532geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

386 ANS: 3

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

$A \approx 50°$

PTS: 2 REF: 011616geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

387 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 NAT: G.SRT.A.3 TOP: Similarity Proofs

388 ANS: 4 PTS: 2 REF: 061615geo NAT: G.SRT.C.6
TOP: Trigonometric Ratios

389 ANS: 3

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

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

PTS: 2 REF: 011612geo NAT: G.C.B.5 TOP: Sectors

390 ANS: 3

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

$W = 408 \cdot 0.25 = 102$

PTS: 2 REF: 061507geo NAT: G.MG.A.2 TOP: Density

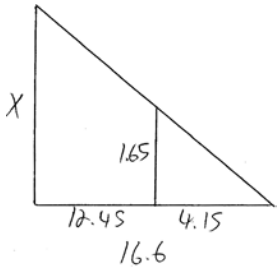
391 ANS:

As the sum of the measures of the angles of a triangle is 180°, $m\angle ABC + m\angle BCA + m\angle CAB = 180°$. Each interior angle of the triangle and its exterior angle form a linear pair. Linear pairs are supplementary, so $m\angle ABC + m\angle FBC = 180°$, $m\angle BCA + m\angle DCA = 180°$, and $m\angle CAB + m\angle EAB = 180°$. 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 NAT: G.CO.C.10 TOP: Triangle Proofs

392 ANS: 1 PTS: 2 REF: 081504geo NAT: G.SRT.C.7
TOP: Cofunctions

393 ANS:



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

$$4.15x = 27.39$$

$$x = 6.6$$

PTS: 2 REF: 061531geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

394 ANS: 4 PTS: 2 REF: 081514geo NAT: G.SRT.A.2
TOP: Compositions of Transformations KEY: grids

395 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 NAT: G.SRT.A.3 TOP: Similarity Proofs

396 ANS:

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

$$x \approx 23$$

PTS: 2 REF: 061528geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

397 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:

$x \approx 9.115$

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

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

PTS: 6 REF: 061535geo NAT: G.MG.A.2 TOP: Density

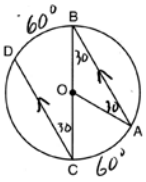
398 ANS: 4 PTS: 2 REF: 061513geo NAT: G.CO.C.11
TOP: Parallelograms

399 ANS: 2

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

PTS: 2 REF: 011619geo NAT: G.MG.A.2 TOP: Density

400 ANS:



$180 - 2(30) = 120$

PTS: 2 REF: 011626geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: parallel lines

401 ANS:

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

$528{,}003\,\text{cm}^3 \times \dfrac{1\,\text{m}^3}{1000000\ \text{cm}^3} = 0.528003\,\text{m}^3$. $\dfrac{1920\,\text{kg}}{\text{m}^3} \times 0.528003\,\text{m}^3 \approx 1013\,\text{kg}$.

PTS: 2 REF: fall1406geo NAT: G.MG.A.2 TOP: Density

402 ANS: 2

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

$12x = 144$

$x = 12$

PTS: 2 REF: 061621geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

403 ANS: 1

Alternate interior angles

PTS: 2 REF: 061517geo NAT: G.CO.C.9 TOP: Lines and Angles

404 ANS: 3

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

PTS: 2 REF: 061605geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

405 ANS: 4

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

PTS: 2 REF: 081620geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

406 ANS: 3

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

PTS: 2 REF: 081518geo NAT: G.C.B.5 TOP: Sectors

407 ANS: 3

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

$x = 15$

PTS: 2 REF: 081612geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

408 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 NAT: G.CO.C.10 TOP: Triangle Proofs

409 ANS: 3 PTS: 2 REF: 011621geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: inscribed

410 ANS: 1

$3^2 = 9$

PTS: 2 REF: 081520geo NAT: G.SRT.A.2 TOP: Dilations

411 ANS:

$M\left(\frac{4+0}{2}, \frac{6-1}{2}\right) = M\left(2, \frac{5}{2}\right)$ $m = \frac{6--1}{4-0} = \frac{7}{4}$ $m_{\perp} = -\frac{4}{7}$ $y - 2.5 = -\frac{4}{7}(x-2)$ The diagonals, $\overline{MT}$ and $\overline{AH}$, of rhombus *MATH* are perpendicular bisectors of each other.

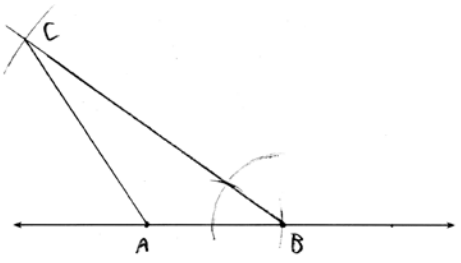
PTS: 4 REF: fall1411geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

412 ANS: 4

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

PTS: 2 REF: 081621geo NAT: G.SRT.A.1 TOP: Line Dilations

413 ANS:



SAS ≅ SAS

PTS: 4 REF: 011634geo NAT: G.CO.D.12 TOP: Constructions
KEY: congruent and similar figures

414 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 NAT: G.MG.A.2 TOP: Density

415 ANS:

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

$39.375 = 39.375$

PTS: 2 REF: 061627geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

416 ANS: 1 PTS: 2 REF: 081507geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

417 ANS: 1

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

$1 = -4 + b$

$5 = b$

PTS: 2 REF: 081510geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

418 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 NAT: G.CO.C.11 TOP: Quadrilateral Proofs

419 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 NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

420 ANS: 1

1) opposite sides; 2) adjacent sides; 3) perpendicular diagonals; 4) diagonal bisects angle

PTS: 2 REF: 061609geo NAT: G.CO.C.11 TOP: Special Quadrilaterals

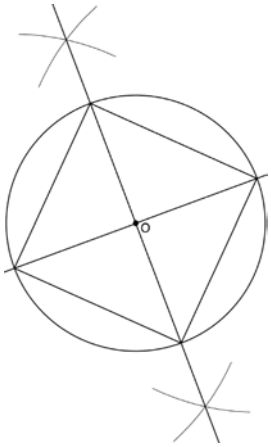
421 ANS: 2

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

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

PTS: 2 REF: 061519geo NAT: G.MG.A.3 TOP: Surface Area

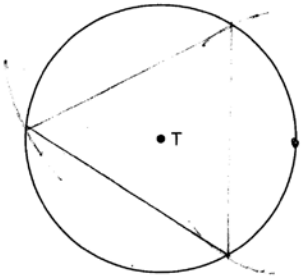
422 ANS:



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 NAT: G.CO.D.13 TOP: Constructions

423 ANS:



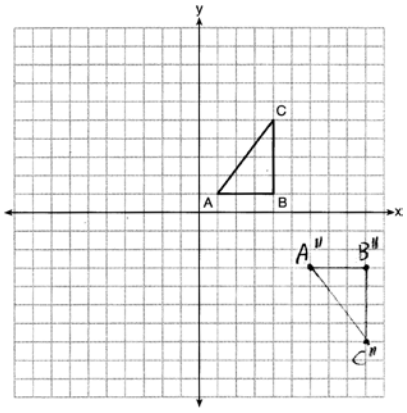
PTS: 2 REF: 081526geo NAT: G.CO.D.13 TOP: Constructions

424 ANS:

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

PTS: 2 REF: 081627geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

425 ANS:



PTS: 2 REF: 081626geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: grids

426 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 NAT: G.SRT.A.1 TOP: Line Dilations

427 ANS: 1 PTS: 2 REF: 061604geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: graphics

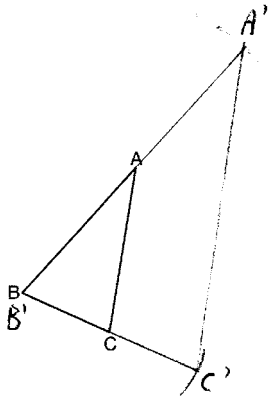
428 ANS: 1

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

$$f = 10$$

PTS: 2 REF: 061617geo NAT: G.CO.C.9 TOP: Lines and Angles

429 ANS:



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

PTS: 4 REF: 081632geo NAT: G.CO.D.12 TOP: Constructions
KEY: congruent and similar figures

430 ANS: 4 PTS: 2 REF: 011609geo NAT: G.SRT.C.7
TOP: Cofunctions

431 ANS: 1

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

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

PTS: 2 REF: 081616geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

432 ANS: 3

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

$T \approx 13.5$

PTS: 2 REF: 061505geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: graphics

433 ANS: 3

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

$x = 15$

PTS: 2 REF: 011624geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

434 ANS: 2

$\frac{1\,\text{l}}{1.2\,\text{oz}}\left(\frac{16\,\text{oz}}{1\,\text{lb}}\right) = \frac{13.\overline{3}\,\text{l}}{\text{lb}}$ $\frac{13.\overline{3}\,\text{l}}{\text{lb}}\left(\frac{1\,\text{g}}{3.785\,\text{l}}\right) \approx \frac{3.5\,\text{g}}{1\,\text{lb}}$

PTS: 2 REF: 061618geo NAT: G.MG.A.2 TOP: Density

435 ANS: 1

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

PTS: 2 REF: 011623geo NAT: G.GMD.A.1 TOP: Circumference

436 ANS: 3

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

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

$a = 6$

PTS: 2 REF: 081615geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

437 ANS: 2

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

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

PTS: 2 REF: 061514geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

438 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 NAT: G.CO.B.7 TOP: Triangle Congruency

439 ANS: 1 PTS: 2 REF: 081605geo NAT: G.CO.A.5
TOP: Rotations KEY: grids

440 ANS: 4 PTS: 2 REF: 061608geo NAT: G.SRT.A.2
TOP: Compositions of Transformations KEY: grids

441 ANS: 3

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

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

$90 = 90$

PTS: 2 REF: 061515geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

442 ANS: 4

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

$3x - 1 = 2x + 6$

$x = 7$

PTS: 2 REF: 011620geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

443 ANS: 4

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

PTS: 2 REF: 081517geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

444 ANS: 4

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

PTS: 2 REF: 081618geo NAT: G.GPE.B.6 TOP: Directed Line Segments

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

$R = 17$

PTS: 2 REF: 061628geo NAT: G.SRT.C.7 TOP: Cofunctions

446 ANS: 1
$\frac{6}{8} = \frac{9}{12}$

PTS: 2 REF: 011613geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

447 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 NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

448 ANS: 3 PTS: 2 REF: 081502geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: basic

449 ANS: 2 PTS: 2 REF: 081519geo NAT: G.SRT.B.5
TOP: Similarity KEY: basic

450 ANS: 4 PTS: 2 REF: 061501geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

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

PTS: 2 REF: 061503geo NAT: G.GPE.B.4 TOP: Circles in the Coordinate Plane

452 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 NAT: G.MG.A.2 TOP: Density

453 ANS:
$\frac{3}{8} \cdot 56 = 21$

PTS: 2 REF: 081625geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: common tangents

454 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 NAT: G.SRT.B.5 TOP: Triangle Proofs
KEY: statements

455 ANS: 4 PTS: 2 REF: 081506geo NAT: G.SRT.A.2
TOP: Dilations

456 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 NAT: G.SRT.A.1 TOP: Line Dilations

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

PTS: 2 REF: 061612geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: perpendicular bisector

458 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 NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

459 ANS:
$\sin 70 = \frac{30}{L}$

$L \approx 32$

PTS: 2 REF: 011629geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: graphics

460 ANS: 3
$x^2 + 4x + 4 + y^2 - 6y + 9 = 12 + 4 + 9$

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

PTS: 2 REF: 081509geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

461 ANS:
$T_{6,0} \circ r_{x\text{-axis}}$

PTS: 2 REF: 061625geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

462 ANS: 2
$h^2 = 30 \cdot 12$

$h^2 = 360$

$h = 6\sqrt{10}$

PTS: 2 REF: 061613geo NAT: G.SRT.B.5 TOP: Similarity
KEY: altitude

463 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 NAT: G.GMD.A.1 TOP: Volume

464 ANS: 3
(3) Could be a trapezoid.

PTS: 2 REF: 081607geo NAT: G.CO.C.11 TOP: Parallelograms

465 ANS: 2 PTS: 2 REF: 081602geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: basic

466 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 NAT: G.SRT.B.5 TOP: Circle Proofs

467 ANS: 4
The line $y = 3x - 1$ passes through the center of dilation, so the dilated line is not distinct.

PTS: 2 REF: 081524geo NAT: G.SRT.A.1 TOP: Line Dilations

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

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

PTS: 2 REF: 011617geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

469 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 NAT: G.SRT.C.7 TOP: Cofunctions

470 ANS: 3 PTS: 2 REF: 081613geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

471 ANS: 1

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

PTS: 2 REF: 011618geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

472 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 $\overline{BCE}$ 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 NAT: G.CO.B.7 TOP: Triangle Congruency

473 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 NAT: G.GPE.B.4 TOP: Circles in the Coordinate Plane

474 ANS: 4 PTS: 2 REF: 081611geo NAT: G.CO.C.9
TOP: Lines and Angles

475 ANS: 3

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

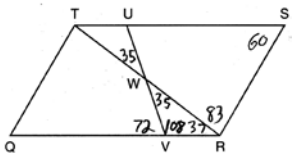
PTS: 2 REF: 011614geo NAT: G.GMD.A.3 TOP: Volume
KEY: spheres

476 ANS: 1
$180 - (68 \cdot 2)$

PTS: 2 REF: 081624geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

477 ANS: 1 PTS: 2 REF: 081505geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

478 ANS: 3



PTS: 2 REF: 011603geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

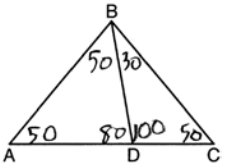
479 ANS:
Circle O, secant $\overline{ACD}$, tangent $\overline{AB}$ (Given). Chords $\overline{BC}$ and $\overline{BD}$ are drawn (Auxiliary lines). $\angle A \cong \angle A$, $\overset{\frown}{BC} \cong \overset{\frown}{BC}$ (Reflexive property). $\text{m}\angle BDC = \frac{1}{2}\text{m}\overset{\frown}{BC}$ (The measure of an inscribed angle is half the measure of the intercepted arc). $\text{m}\angle CBA = \frac{1}{2}\text{m}\overset{\frown}{BC}$ (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 NAT: G.SRT.B.5 TOP: Circle Proofs

480 ANS: 4
$\frac{7}{12} \cdot 30 = 17.5$

PTS: 2 REF: 061521geo NAT: G.SRT.B.5 TOP: Similarity
KEY: perimeter and area

481 ANS: 2



PTS: 2 REF: 081604geo NAT: G.CO.C.10 TOP: Interior and Exterior Angles of Triangles

482 ANS: 2 PTS: 2 REF: 081513geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: graphics

483 ANS: 1 PTS: 2 REF: 081606geo NAT: G.SRT.C.7
TOP: Cofunctions

484 ANS: 3 PTS: 2 REF: 061524geo NAT: G.CO.B.7
TOP: Triangle Congruency

485 ANS: 4

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

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

$-16 = b$

PTS: 2 REF: 011602geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

486 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 NAT: G.C.A.1 TOP: Similarity Proofs

487 ANS: 4

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

$230 \approx s$

PTS: 2 REF: 081521geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

488 ANS: 1

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

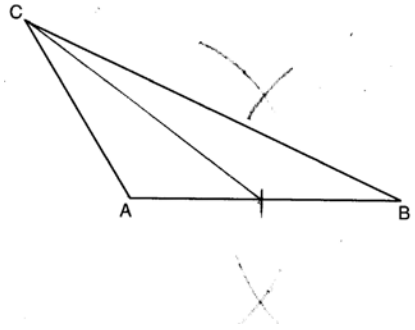
$m_{\overline{EM}} = 1$ $1 = 1(2) + b$

$-1 = b$

PTS: 2 REF: 081614geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: general

489 ANS: 2 PTS: 2 REF: 061603geo NAT: G.GPE.A.1
TOP: Equations of Circles KEY: find center and radius | completing the square

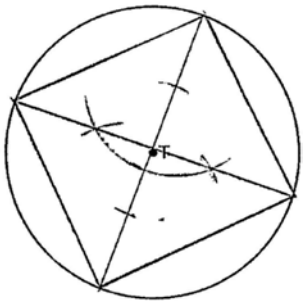
490 ANS:



PTS: 2 REF: 081628geo NAT: G.CO.D.12 TOP: Constructions
KEY: line bisector

491 ANS: 4 PTS: 2 REF: 011611geo NAT: G.CO.B.6
TOP: Properties of Transformations KEY: graphics

492 ANS:



PTS: 2 REF: 061525geo NAT: G.CO.D.13 TOP: Constructions

493 ANS:

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

PTS: 2 REF: 081525geo NAT: G.MG.A.2 TOP: Density

494 ANS: 3 PTS: 2 REF: 081622geo NAT: G.SRT.B.5
TOP: Triangle Proofs KEY: statements

495 ANS: 4 PTS: 2 REF: 061502geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: basic

496 ANS: 2 PTS: 2 REF: 011610geo NAT: G.SRT.A.1
TOP: Line Dilations

497 ANS:

Since linear angles are supplementary, $m\angle GIH = 65°$. Since $\overline{GH} \cong \overline{IH}$, $m\angle GHI = 50°$ $(180 - (65 + 65))$. 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 NAT: G.CO.C.9 TOP: Lines and Angles

498 ANS: 2 PTS: 2 REF: 081601geo NAT: G.CO.C.9
TOP: Lines and Angles

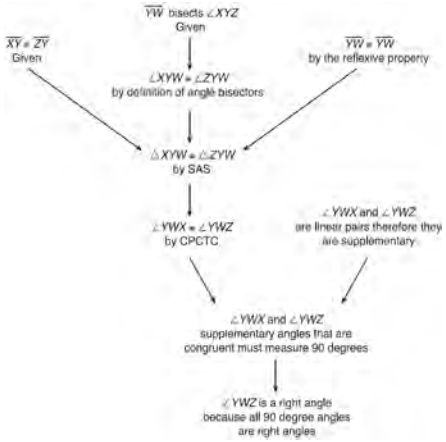
499 ANS:

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

PTS: 2 REF: 081530geo NAT: G.CO.B.7 TOP: Triangle Congruency

500 ANS: 1 PTS: 2 REF: 061508geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: inscribed

501 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 NAT: G.CO.C.10 TOP: Triangle Proofs

502 ANS:

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

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

PTS: 4 REF: 081634geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

503 ANS:

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

$x \approx 68$

PTS: 2 REF: 061630geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

504 ANS: 2

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

PTS: 2 REF: 061523geo NAT: G.GMD.A.1 TOP: Circumference

505 ANS: 1 PTS: 2 REF: 061518geo NAT: G.SRT.A.1
TOP: Line Dilations

506 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 $\overline{AC} \cong \overline{DF}$ and points are collinear on line ℓ and a reflection preserves distance.

PTS: 4 REF: 081534geo NAT: G.CO.B.7 TOP: Triangle Congruency

507 ANS: 1 PTS: 2 REF: 011606geo NAT: G.CO.C.9
TOP: Lines and Angles

508 ANS:

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

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

PTS: 4 REF: spr1412geo NAT: G.MG.A.2 TOP: Density

509 ANS:

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

$.9604 = y$

PTS: 4 REF: 061534geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

510 ANS: 1 PTS: 2 REF: 011608geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

511 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 NAT: G.CO.C.10 TOP: Medians, Altitudes and Bisectors

512 ANS:

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

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

PTS: 6 REF: 081636geo NAT: G.MG.A.2 TOP: Density

513 ANS: 2

$x^2 = 4 \cdot 10$

$x = \sqrt{40}$

$x = 2\sqrt{10}$

PTS: 2 REF: 081610geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

514 ANS:

$\tan 52.8 = \frac{h}{x}$ $\quad x\tan 52.8 = x\tan 34.9 + 8\tan 34.9$ $\quad \tan 52.8 \approx \frac{h}{9}$ $\quad 11.86 + 1.7 \approx 13.6$

$h = x\tan 52.8 \quad x\tan 52.8 - x\tan 34.9 = 8\tan 34.9 \quad x \approx 11.86$

$x(\tan 52.8 - \tan 34.9) = 8\tan 34.9$

$\tan 34.9 = \frac{h}{x+8}$

$x = \frac{8\tan 34.9}{\tan 52.8 - \tan 34.9}$

$h = (x+8)\tan 34.9$

$x \approx 9$

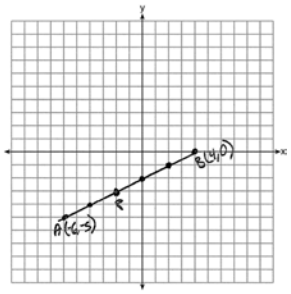
PTS: 6 REF: 011636geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

515 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 NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

516 ANS:



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

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

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

$-2 \qquad -3$

PTS: 2 REF: 061527geo NAT: G.GPE.B.6 TOP: Directed Line Segments

517 ANS: 1 PTS: 2 REF: 061520geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: mixed

518 ANS: 2

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

PTS: 2 REF: 011615geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

519 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 NAT: G.CO.A.5 TOP: Rotations
KEY: grids

520 ANS: 1

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

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

PTS: 2 REF: 061509geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: identify perpendicular lines

521 ANS: 2 PTS: 2 REF: 061516geo NAT: G.SRT.A.2
TOP: Dilations

522 ANS: 4

The slope of $\overline{BC}$ is $\dfrac{2}{5}$. Altitude is perpendicular, so its slope is $-\dfrac{5}{2}$.

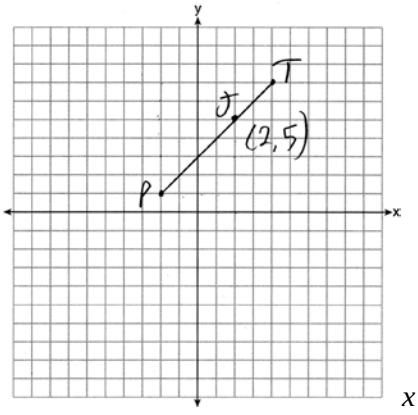
PTS: 2 REF: 061614geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

523 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 NAT: G.SRT.C.7 TOP: Cofunctions

524 ANS:



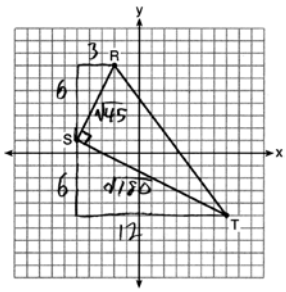
$x = \dfrac{2}{3}(4 - -2) = 4 \quad -2 + 4 = 2 \quad J(2,5)$

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

PTS: 2 REF: 011627geo NAT: G.GPE.B.6 TOP: Directed Line Segments

525 ANS: 4 PTS: 2 REF: 061606geo NAT: G.GMD.A.3
TOP: Volume KEY: compositions

526 ANS: 3

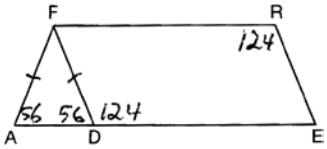


$\sqrt{45} = 3\sqrt{5}$ $a = \frac{1}{2}\left(3\sqrt{5}\right)\left(6\sqrt{5}\right) = \frac{1}{2}(18)(5) = 45$

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

PTS: 2 REF: 061622geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

527 ANS: 3



PTS: 2 REF: 081508geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

528 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 NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

529 ANS: 2 PTS: 2 REF: 061610geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: inscribed

530 ANS:

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

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

$4 + 8$ $2 + 0$

12 2

PTS: 2 REF: 061626geo NAT: G.GPE.B.6 TOP: Directed Line Segments

531 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 NAT: G.C.B.5 TOP: Sectors

532 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 NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

533 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 NAT: G.CO.C.11 TOP: Quadrilateral Proofs

534 ANS:

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

$x + 5 = 1.5x$

$5 = .5x$

$10 = x$

$10 + 5 = 15$

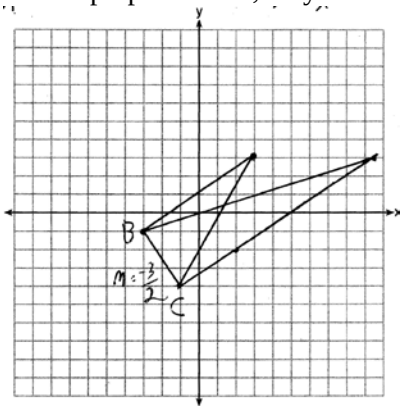
PTS: 6 REF: 061636geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

535 ANS: 3 PTS: 2 REF: 061601geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

536 ANS: 2 PTS: 2 REF: 081501geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

537 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 $-4 = \frac{2}{3}(-1) + b$



$m_{\perp} = \frac{2}{3}$

$-1 = -2 + b$

$1 = b$

$3 = \frac{2}{3}x + 1$

$2 = \frac{2}{3}x$

$3 = x$

$\frac{-12}{3} = \frac{-2}{3} + b$

$-\frac{10}{3} = b$

$3 = \frac{2}{3}x - \frac{10}{3}$

$9 = 2x - 10$

$19 = 2x$

$9.5 = x$

PTS: 4 REF: 081533geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

538 ANS:

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

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

$x \approx 15.5$

PTS: 2 REF: 081631geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: graphics

539 ANS: 4 PTS: 2 REF: 061512geo NAT: G.SRT.C.7
TOP: Cofunctions

540 ANS:

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

PTS: 2 REF: spr1406geo NAT: G.SRT.A.2 TOP: Compositions of Transformations
KEY: grids

541 ANS: 1

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

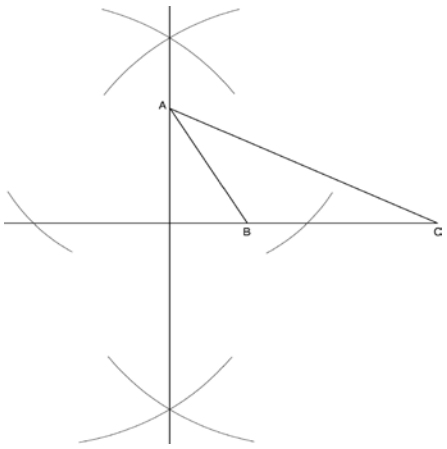
PTS: 2 REF: 081523geo NAT: G.SRT.A.2 TOP: Dilations

542 ANS: 3

$$\frac{60}{360} \cdot 8^2\pi = \frac{1}{6} \cdot 64\pi = \frac{32\pi}{3}$$

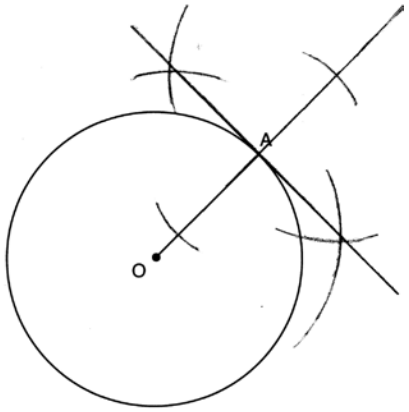
PTS: 2 REF: 061624geo NAT: G.C.B.5 TOP: Sectors

543 ANS:



PTS: 2 REF: fall1409geo NAT: G.CO.D.12 TOP: Constructions
KEY: parallel and perpendicular lines

544 ANS:



PTS: 2 REF: 061631geo NAT: G.CO.D.12 TOP: Constructions
KEY: parallel and perpendicular lines

545 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 NAT: G.C.B.5 TOP: Sectors

546 ANS: 1

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

PTS: 2 REF: 081623geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: inscribed

547 ANS: 2

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

$$2s^2 = 49$$

$$s^2 = 24.5$$

$$s \approx 4.9$$

PTS: 2 REF: 081511geo NAT: G.C.A.3 TOP: Inscribed Quadrilaterals

548 ANS: 2 PTS: 2 REF: 061506geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

549 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 90º about point C such that point L maps onto point D.

PTS: 4 REF: spr1408geo NAT: G.CO.B.8 TOP: Triangle Congruency

550 ANS: 4
$3 \times 6 = 18$

PTS: 2 REF: 061602geo NAT: G.SRT.A.1 TOP: Line Dilations

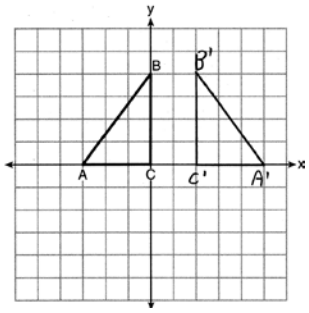
551 ANS:
Translate $\triangle ABC$ along $\overline{CF}$ such that point C maps onto point F, resulting in image $\triangle A'B'C'$. Then reflect $\triangle A'B'C'$ over $\overline{DF}$ such that $\triangle A'B'C'$ maps onto $\triangle DEF$.
or
Reflect $\triangle ABC$ over the perpendicular bisector of $\overline{EB}$ such that $\triangle ABC$ maps onto $\triangle DEF$.

PTS: 2 REF: fall1408geo NAT: G.CO.B.7 TOP: Triangle Congruency

552 ANS: 1 PTS: 2 REF: 011601geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

553 ANS: 4 PTS: 2 REF: 081503geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

554 ANS:



PTS: 2 REF: 011625geo NAT: G.CO.A.5 TOP: Reflections
KEY: grids

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

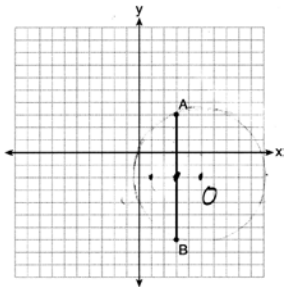
PTS: 2 REF: 011607geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

556 ANS: 2 PTS: 2 REF: 081619geo NAT: G.C.B.5
TOP: Sectors

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

PTS: 2 REF: 061526geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

558 ANS: 1



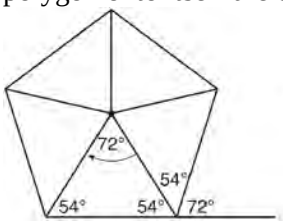
Since the midpoint of $\overline{AB}$ is $(3,-2)$, the center must be either $(5,-2)$ or $(1,-2)$.

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

PTS: 2 REF: 061623geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: other

559 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.



$\frac{360}{5} = 72.$

PTS: 2 REF: spr1402geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

560 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 NAT: G.CO.B.6 TOP: Properties of Transformations
KEY: graphics