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REGENTS BY TYPE

The NY Geometry Regents Exam Questions
from Spring 2014 to January 2020 Sorted by Type

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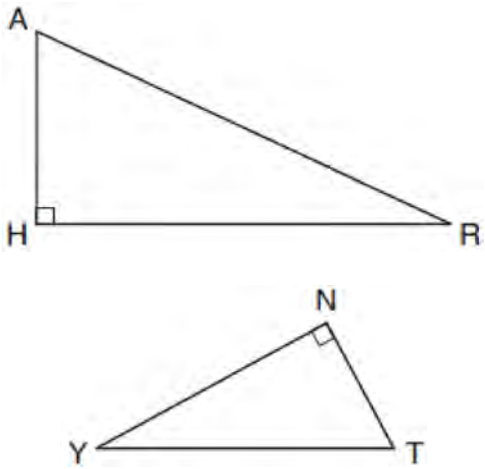
Geometry Multiple Choice Regents Exam Questions

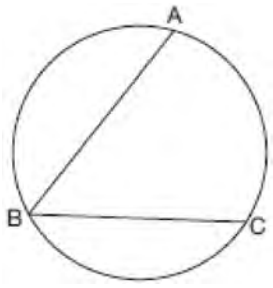
1 In the diagram below of $\triangle HAR$ and $\triangle NTY$, angles H and N are right angles, and $\triangle HAR \sim \triangle NTY$.



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°

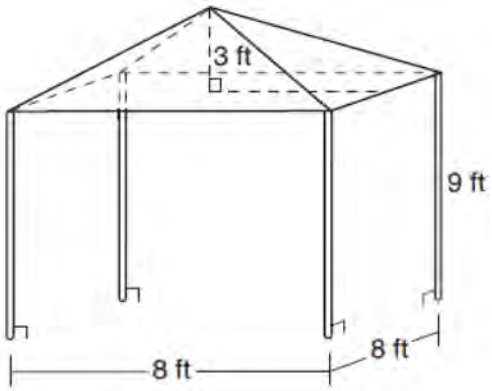
2 In the diagram below, $m\overset{\frown}{ABC} = 268°$.



What is the number of degrees in the measure of $\angle ABC$?

1) 134°
2) 92°
3) 68°
4) 46°

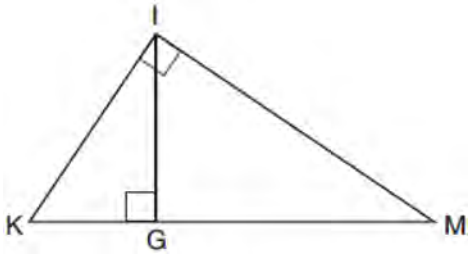
3 A vendor is using an 8-ft by 8-ft tent for a craft fair. The legs of the tent are 9 ft tall and the top forms a square pyramid with a height of 3 ft.



What is the volume, in cubic feet, of space the tent occupies?

1) 256
2) 640
3) 672
4) 768

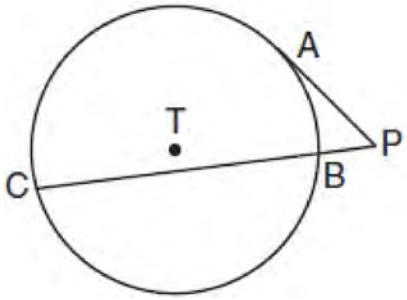
4 In the diagram below of right triangle KMI, altitude $\overline{IG}$ is drawn to hypotenuse $\overline{KM}$.



If $KG = 9$ and $IG = 12$, the length of $\overline{IM}$ is

1) 15
2) 16
3) 20
4) 25

5 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.



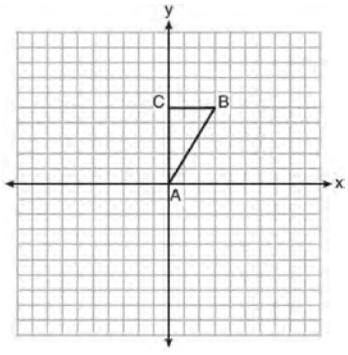
If $PB = 3$ and $BC = 15$, what is the length of $\overline{PA}$?

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

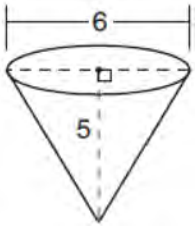
6 In circle O two secants, $\overline{ABP}$ and $\overline{CDP}$, are drawn to external point P. If $m\overset{\frown}{AC} = 72°$, and $m\overset{\frown}{BD} = 34°$, what is the measure of $\angle P$?

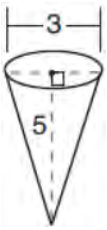
1) 19º
2) 38º
3) 53º
4) 106º

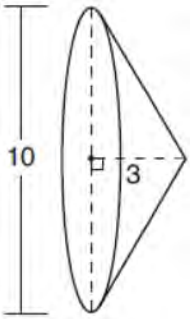
7 Triangle ABC, with vertices at $A(0,0)$, $B(3,5)$, and $C(0,5)$, is graphed on the set of axes shown below.

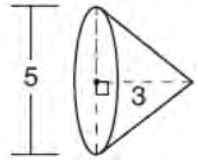


Which figure is formed when $\triangle ABC$ is rotated continuously about $\overline{BC}$?

1)


2)


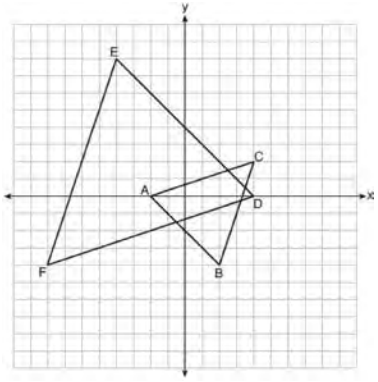
3)


4)


8 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

9 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 $D(4,0)$, $E(-4,8)$, $F(-8,-4)$.



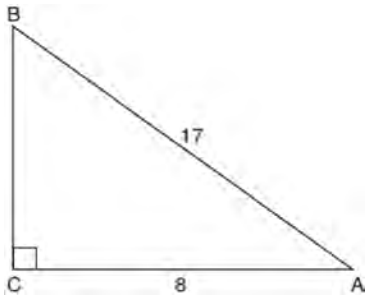
Which sequence of transformations will map $\triangle ABC$ onto $\triangle DEF$?

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

10 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

11 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) $\tan A = \frac{15}{8}$

12 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) $4\sqrt{40}$

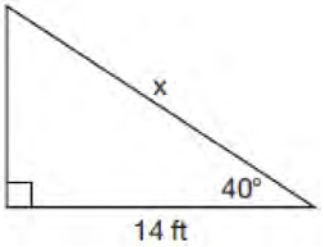
13 A regular decagon is rotated n degrees about its center, carrying the decagon onto itself. The value of n could be

1) 10°
2) 150°
3) 225°
4) 252°

14 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) $\tan B$

15 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

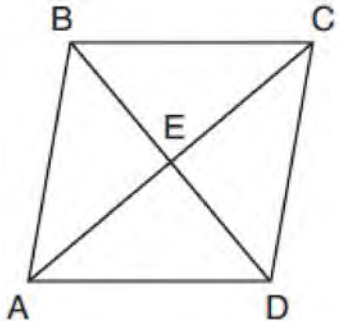
16 In a right triangle, $\sin(40 - x)° = \cos(3x)°$. What is the value of x?

1) 10
2) 15
3) 20
4) 25

17 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

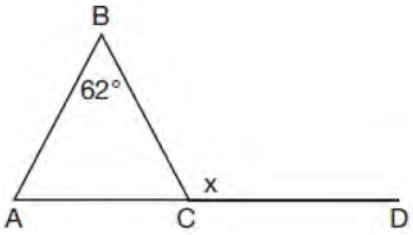
18 The diagram below shows parallelogram $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$ intersecting at E.



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 $\overline{BD}$.

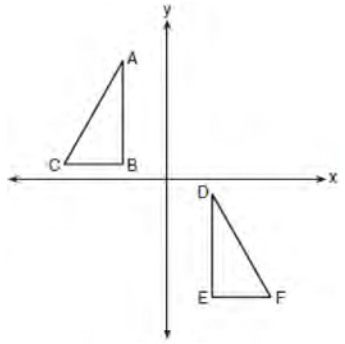
19 Given $\triangle ABC$ with $m\angle B = 62°$ and side $\overline{AC}$ extended to D, as shown below.



Which value of x makes $\overline{AB} \cong \overline{CB}$?

1) 59°
2) 62°
3) 118°
4) 121°

20 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

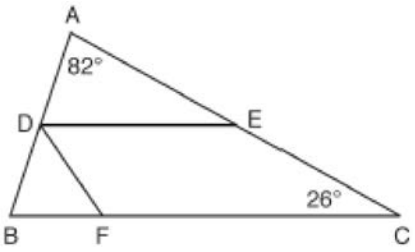
21 The coordinates of the endpoints of $\overline{QS}$ are $Q(-9,8)$ and $S(9,-4)$. Point R is on $\overline{QS}$ such that $QR{:}RS$ is in the ratio of 1:2. What are the coordinates of point R?

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

22 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

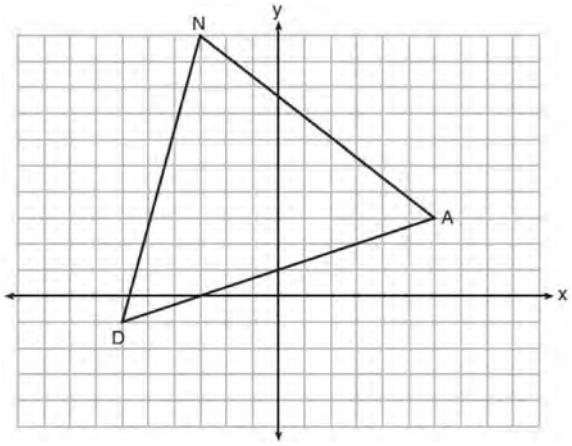
23 In the diagram below, $\overline{DE}$ divides $\overline{AB}$ and $\overline{AC}$ proportionally, $m\angle C = 26°$, $m\angle A = 82°$, and $\overline{DF}$ bisects $\angle BDE$.



The measure of angle DFB is

1) 36°
2) 54°
3) 72°
4) 82°

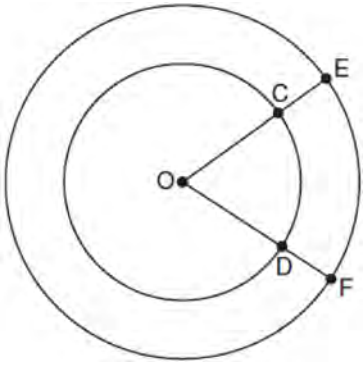
24 Triangle DAN is graphed on the set of axes below. The vertices of $\triangle DAN$ have coordinates $D(-6,-1)$, $A(6,3)$, and $N(-3,10)$.



What is the area of $\triangle DAN$?

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

25 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.

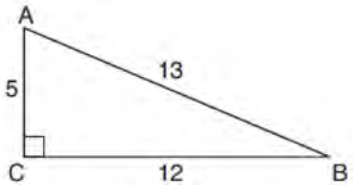
26 Which rotation about its center will carry a regular decagon onto itself?

1) 54°
2) 162°
3) 198°
4) 252°

27 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 $\overline{DE}$

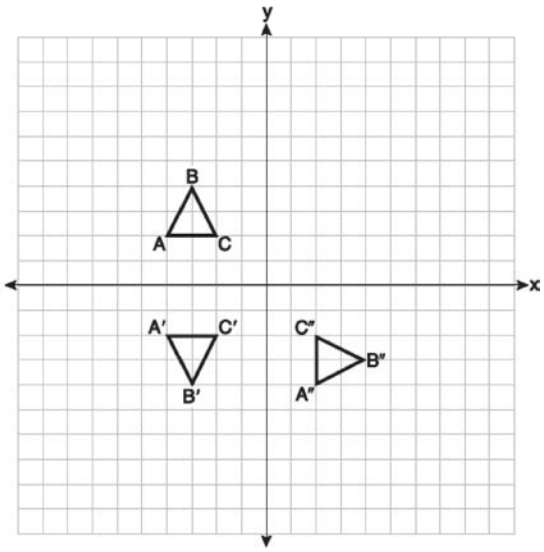
28 In $\triangle ABC$ below, angle C is a right angle.



Which statement must be true?

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

29 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.

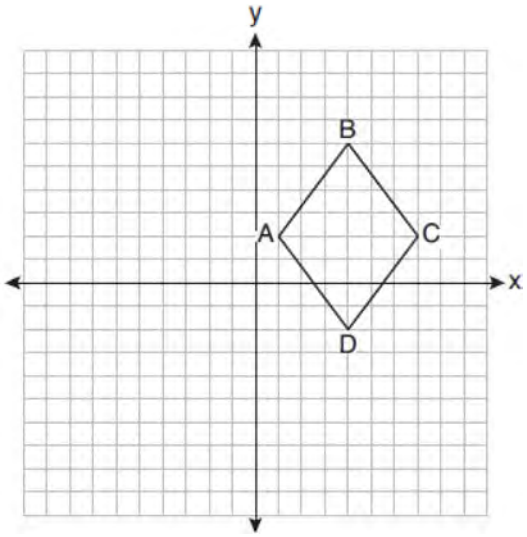


Identify which sequence of rigid motions maps $\triangle ABC$ onto $\triangle A'B'C'$ and then maps $\triangle A'B'C'$ onto $\triangle A''B''C''$.

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

30 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

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

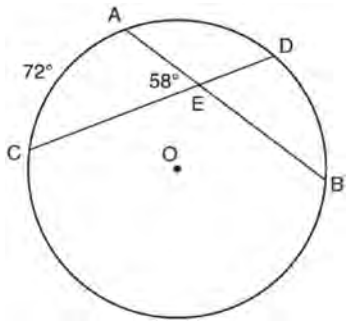


What is the area of rhombus *ABCD*?
1) 20
2) 24
3) 25
4) 48

32 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

33 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) $\angle MAT \cong \angle MHT$

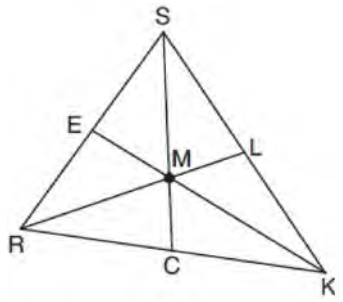
34 In the diagram below of circle *O*, chords $\overline{AB}$ and $\overline{CD}$ intersect at *E*.



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

35 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) $y = -2x + 3$

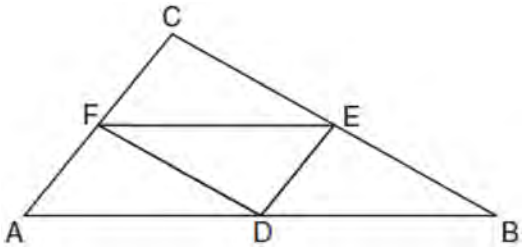
36 In triangle *SRK* below, medians $\overline{SC}$, $\overline{KE}$, and $\overline{RL}$ intersect at *M*.



Which statement must always be true?

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

37 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

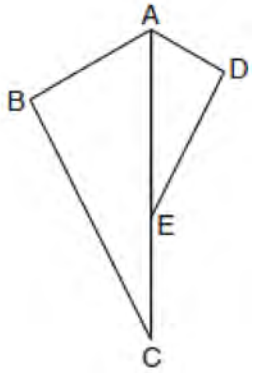
38 For the acute angles in a right triangle, $\sin(4x)° = \cos(3x + 13)°$. What is the number of degrees in the measure of the *smaller* angle?

1) 11°
2) 13°
3) 44°
4) 52°

39 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

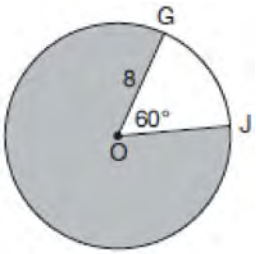
40 In the diagram below, $\triangle ADE$ is the image of $\triangle ABC$ after a reflection over the line *AC* followed by a dilation of scale factor $\frac{AE}{AC}$ centered at point *A*.



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) $m\angle ACB \cong \frac{1}{2} m\angle DAB$

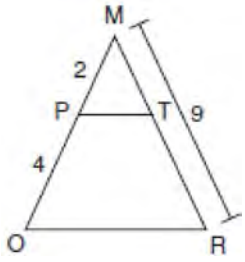
41 In the diagram below of circle O, $GO = 8$ and $m\angle GOJ = 60°$.



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) $\frac{160\pi}{3}$

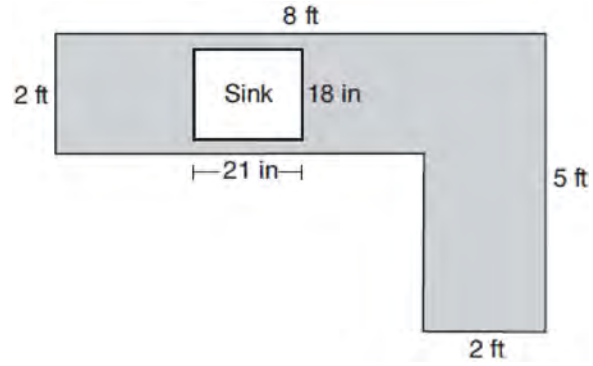
42 Given $\triangle MRO$ shown below, with trapezoid $PTRO$, $MR = 9$, $MP = 2$, and $PO = 4$.



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

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

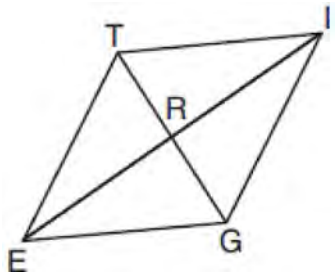
43 A countertop for a kitchen is modeled with the dimensions shown below. An 18-inch by 21-inch rectangle will be removed for the installation of the sink.



What is the area of the top of the installed countertop, to the *nearest square foot*?

1) 26
2) 23
3) 22
4) 19

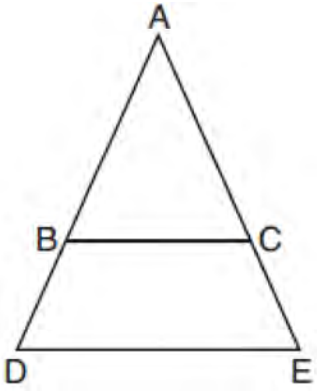
44 In rhombus $TIGE$, diagonals $\overline{TG}$ and $\overline{IE}$ intersect at R. The perimeter of $TIGE$ is 68, and $TG = 16$.



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

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

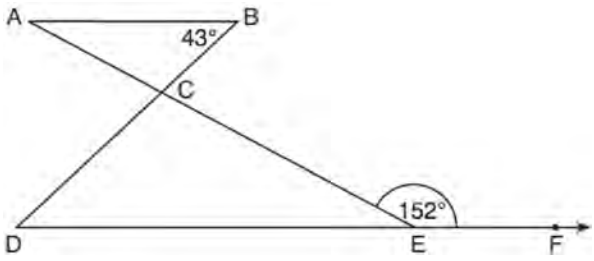
45 In the diagram below, $\overline{BC}$ connects points *B* and *C* on the congruent sides of isosceles triangle *ADE*, such that $\triangle ABC$ is isosceles with vertex angle *A*.



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

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

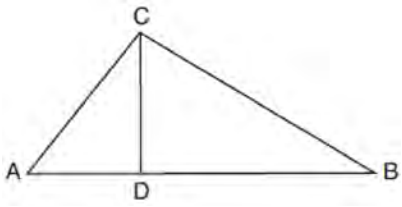
46 In the diagram below, $\overline{AB} \parallel \overrightarrow{DEF}$, $\overline{AE}$ and $\overline{BD}$ intersect at *C*, $m\angle B = 43°$, and $m\angle CEF = 152°$.



Which statement is true?

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

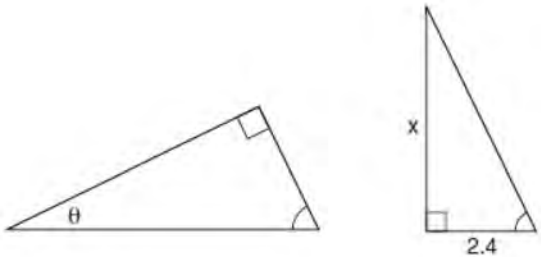
47 In the diagram below of right triangle *ABC*, altitude $\overline{CD}$ intersects hypotenuse $\overline{AB}$ at *D*.



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) $\frac{AD}{AC} = \frac{AC}{BD}$

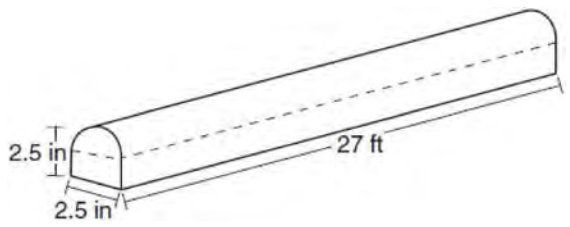
48 The diagram below shows two similar triangles.



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

49 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.



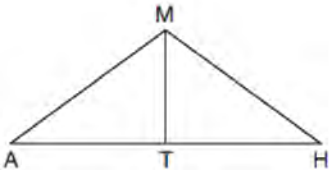
How much metal, to the *nearest cubic inch*, will the railing contain?
1) 151
2) 795
3) 1808
4) 2025

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

51 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

52 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°

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

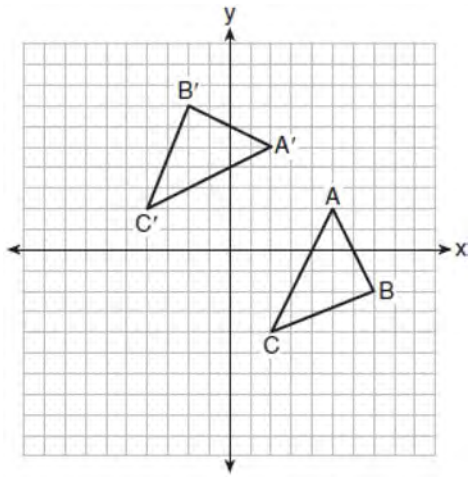


Which statement is *not* always true?
1) $\triangle MAH$ is isosceles.
2) $\triangle MAT$ is isosceles.
3) $\overline{MT}$ bisects $\angle AMH$.
4) $\angle A$ and $\angle TMH$ are complementary.

54 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)

55 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) $\angle G \cong \angle S$

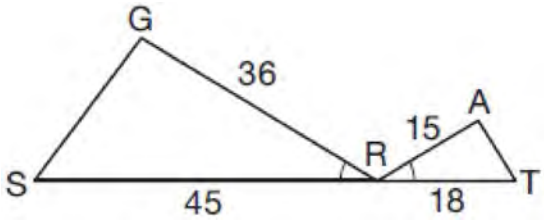
56 The graph below shows two congruent triangles, ABC and $A'B'C'$.



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 $y = x$

57 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 $\triangle ART$.

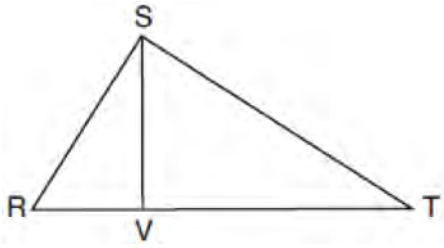
58 Line segment RW has endpoints $R(-4,5)$ and $W(6,20)$. Point P is on $\overline{RW}$ such that $RP{:}PW$ is 2:3. What are the coordinates of point P?

1) $(2,9)$
2) $(0,11)$
3) $(2,14)$
4) $(10,2)$

59 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) $\sin B$

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



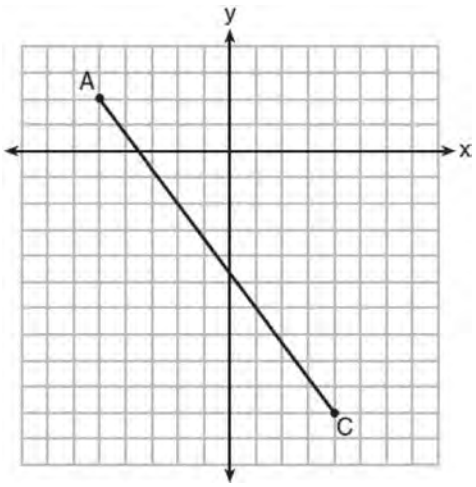
If $RV = 4.1$ and $TV = 10.2$, what is the length of $\overline{ST}$, to the *nearest tenth*?

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

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

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



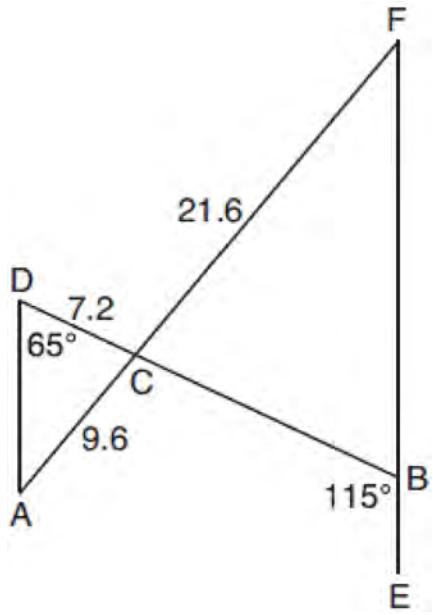
If B is a point on $\overline{AC}$ and $AB:BC = 1:2$, what are the coordinates of B?

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

63 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.

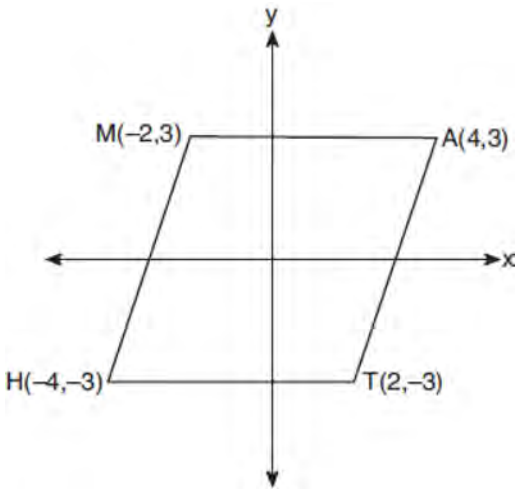
64 In the diagram below, $\overline{AF}$, and $\overline{DB}$ intersect at C, and $\overline{AD}$ and $\overline{FBE}$ are drawn such that $m\angle D = 65°$, $m\angle CBE = 115°$, $DC = 7.2$, $AC = 9.6$, and $FC = 21.6$.



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

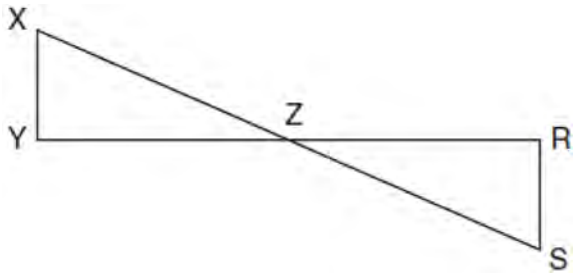
1) 3.2
2) 4.8
3) 16.2
4) 19.2

65 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

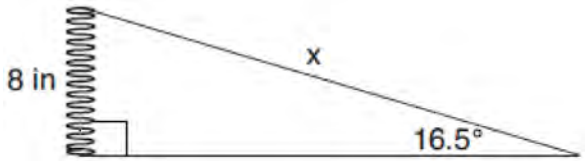
66 In the diagram below, $\overline{XS}$ and $\overline{YR}$ intersect at Z. Segments XY and RS are drawn perpendicular to $\overline{YR}$ to form triangles XYZ and SRZ.



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

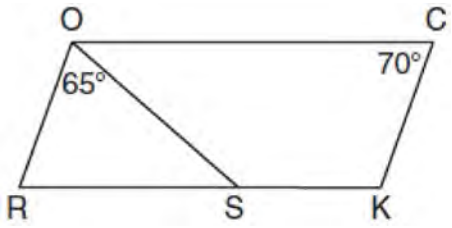
67 Line segment CD is the altitude drawn to hypotenuse $\overline{EF}$ in right triangle ECF. If $EC = 10$ and $EF = 24$, then, to the *nearest tenth*, ED is
1) 4.2
2) 5.4
3) 15.5
4) 21.8

68 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.



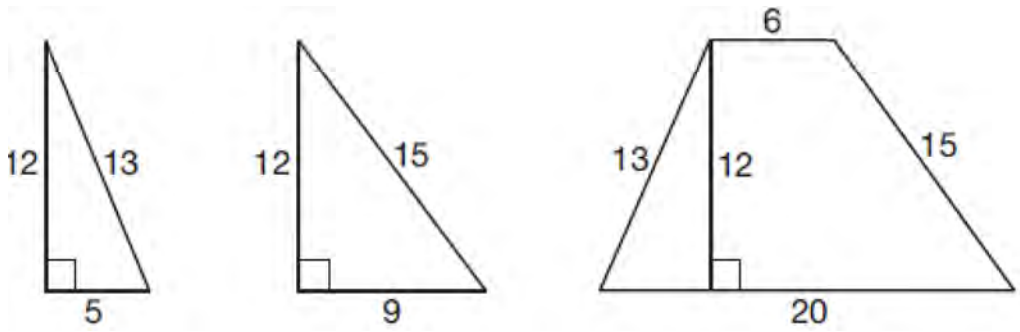
To the *nearest tenth of an inch*, what will be the length of the springboard, x?
1) 2.3
2) 8.3
3) 27.0
4) 28.2

69 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°

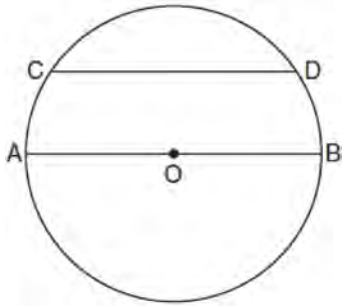
70 Francisco needs the three pieces of glass shown below to complete a stained glass window. The shapes, two triangles and a trapezoid, are measured in inches.



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

71 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

72 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) $y + 9 = \frac{2}{3}(x + 6)$

73 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) $(6.4,2.8)$

74 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

75 If $\sin(2x+7)^\circ = \cos(4x-7)^\circ$, what is the value of x?

1) 7
2) 15
3) 21
4) 30

76 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

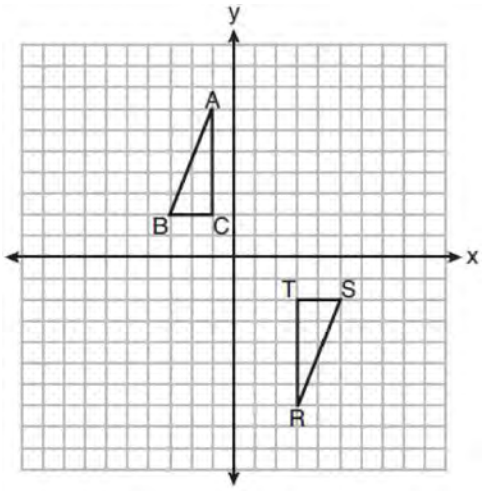
77 A plane intersects a hexagonal prism. The plane is perpendicular to the base of the prism. Which two-dimensional figure is the cross section of the plane intersecting the prism?

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

78 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) $(-3,-2)$

79 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 $y = 1$

80 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

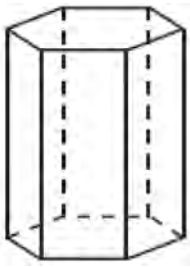
81 Under which transformation would $\triangle A'B'C'$, the image of $\triangle ABC$, *not* be congruent to $\triangle ABC$?

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

82 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

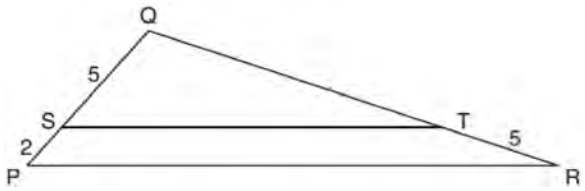
83 A right hexagonal prism is shown below. A two-dimensional cross section that is perpendicular to the base is taken from the prism.



Which figure describes the two-dimensional cross section?

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

84 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) $17\frac{1}{2}$

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

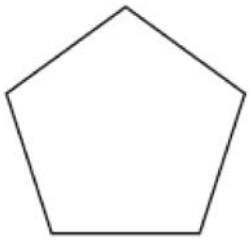
86 If the line represented by $y = -\frac{1}{4}x - 2$ is dilated by a scale factor of 4 centered at the origin, which statement about the image is true?

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.

87 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) $(4,0)$

88 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°

89 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 $\triangle DEF$

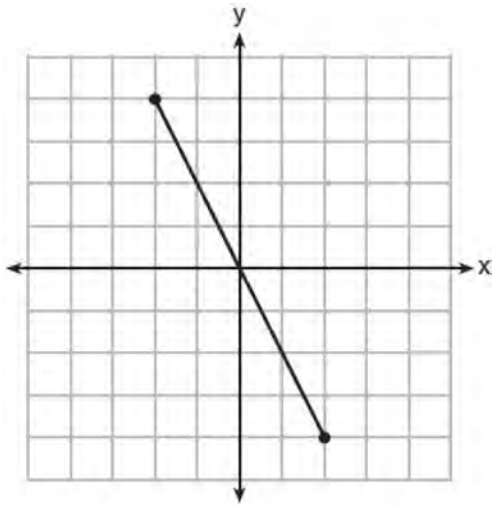
90 The expression $\sin 57°$ is equal to

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

91 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) $y = \frac{3}{2}x - 3$

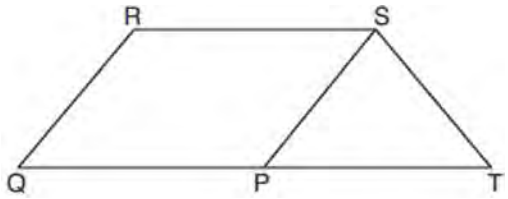
92 What is an equation of the perpendicular bisector of the line segment shown in the diagram below?



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

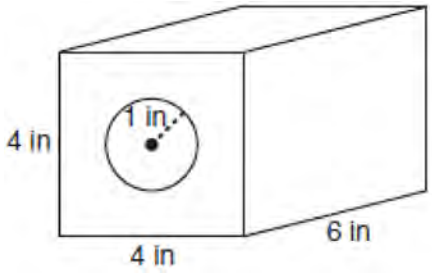
93 A parallelogram is always a rectangle if
1) the diagonals are congruent
2) the diagonals bisect each other
3) the diagonals intersect at right angles
4) the opposite angles are congruent

94 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°

95 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.

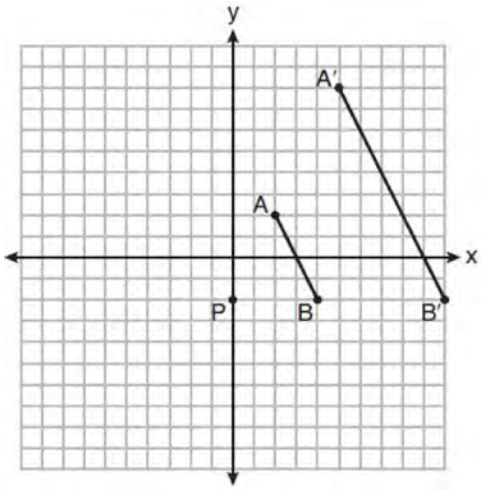


What is the approximate volume of the remaining solid, in cubic inches?
1) 19
2) 77
3) 93
4) 96

96 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

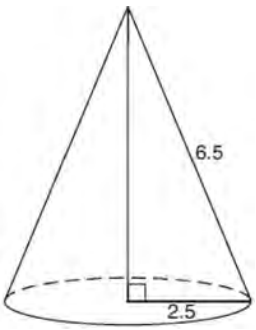
97 What is the volume, in cubic centimeters, of a right square pyramid with base edges that are 64 cm long and a slant height of 40 cm?
1) 8192.0
2) $13,653.\overline{3}$
3) $32,768.0$
4) $54,613.\overline{3}$

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



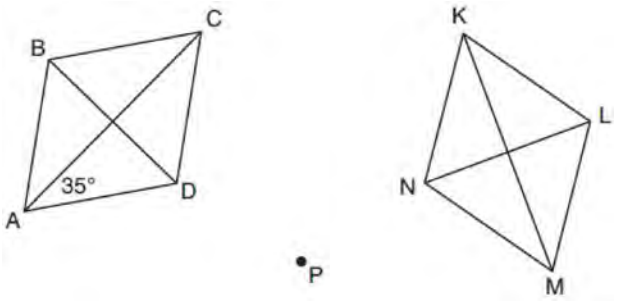
Which statement is always true?
1) $\overline{PA} \cong \overline{AA'}$
2) $\overline{AB} \parallel \overline{A'B'}$
3) $AB = A'B'$
4) $\frac{5}{2}(A'B') = AB$

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



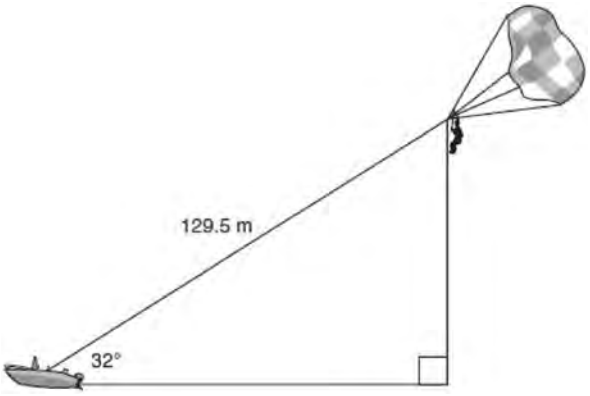
How many cubic centimeters are in the volume of the cone?
1) 12.5π
2) 13.5π
3) 30.0π
4) 37.5π

100 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°

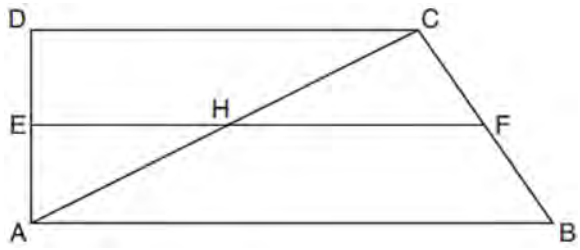
101 A man was parasailing above a lake at an angle of elevation of 32° from a boat, as modeled in the diagram below.



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

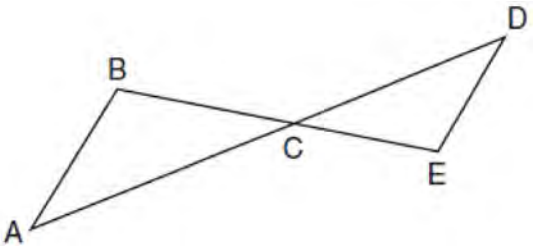
102 In quadrilateral *ABCD* below, $\overline{AB} \parallel \overline{CD}$, and *E*, *H*, and *F* are the midpoints of $\overline{AD}$, $\overline{AC}$, and $\overline{BC}$, respectively.



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

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

103 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

104 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) $\left(\frac{23}{3},8\right)$

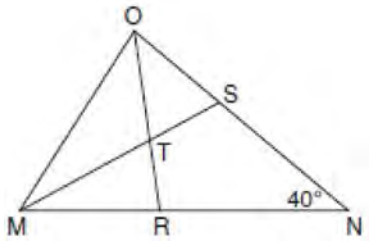
105 Given square *RSTV*, where $RS = 9$ cm. If square *RSTV* is dilated by a scale factor of 3 about a given center, what is the perimeter, in centimeters, of the image of *RSTV* after the dilation?

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

106 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) $4\sqrt{10}$

107 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 $m\angle N = 40°$.



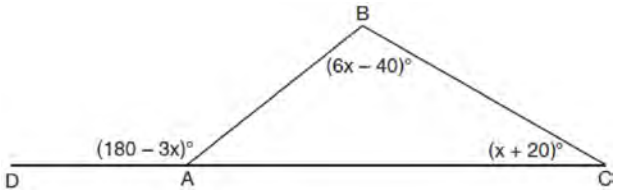
If $m\angle TMR = 28°$, the measure of angle *OTS* is

1) 40°
2) 50°
3) 60°
4) 70°

108 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) $24\frac{3}{4}$

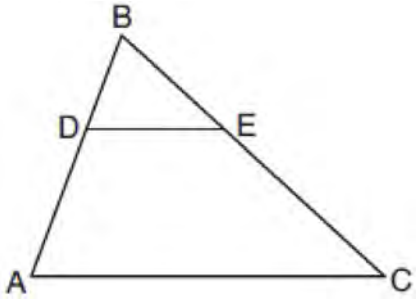
109 In $\triangle ABC$ shown below, side $\overline{AC}$ is extended to point *D* with $m\angle DAB = (180 - 3x)°$, $m\angle B = (6x - 40)°$, and $m\angle C = (x + 20)°$.



What is $m\angle BAC$?

1) 20°
2) 40°
3) 60°
4) 80°

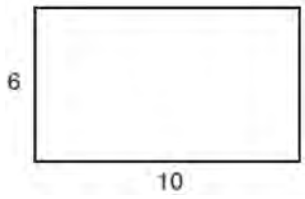
110 In the diagram below of $\triangle ABC$, *D* is a point on $\overline{BA}$, *E* is a point on $\overline{BC}$, and $\overline{DE}$ is drawn.



If $BD = 5$, $DA = 12$, and $BE = 7$, what is the length of $\overline{BC}$ so that $\overline{AC} \parallel \overline{DE}$?

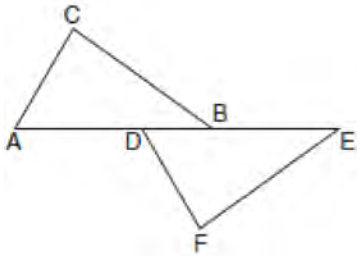
1) 23.8
2) 16.8
3) 15.6
4) 8.6

111 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

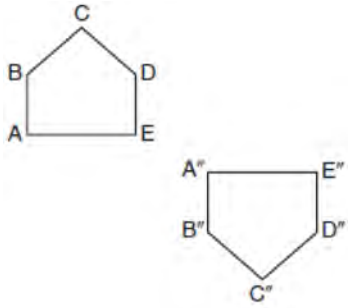
112 Kelly is completing a proof based on the figure below.



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

113 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

114 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

115 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*

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

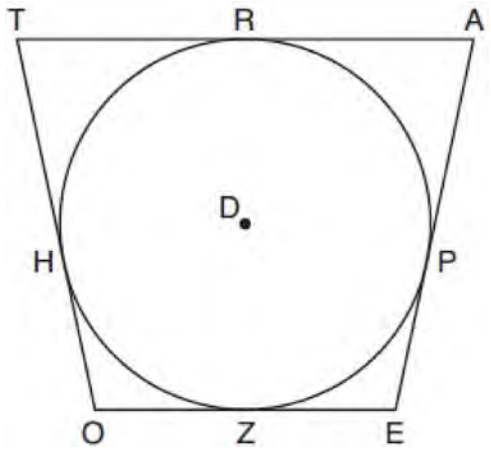
1) $y - 3 = -\frac{3}{2}(x - 1)$

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

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

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

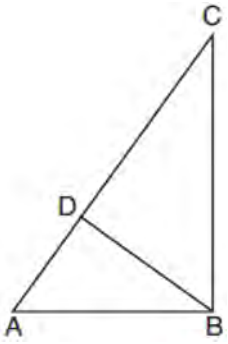
117 In the figure shown below, quadrilateral *TAEO* is circumscribed around circle *D*. The midpoint of $\overline{TA}$ is *R*, and $\overline{HO} \cong \overline{PE}$.



If $AP = 10$ and $EO = 12$, what is the perimeter of quadrilateral *TAEO*?

1) 56
2) 64
3) 72
4) 76

118 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) $\frac{AB}{BC} = \frac{BD}{AC}$

119 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

120 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*.

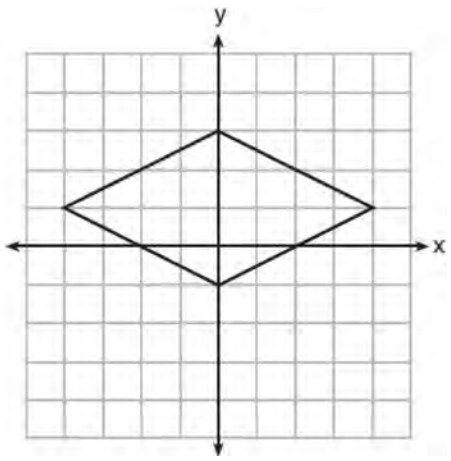
121 The endpoints of directed line segment *PQ* have coordinates of $P(-7,-5)$ and $Q(5,3)$. What are the coordinates of point *A*, on $\overline{PQ}$, that divide $\overline{PQ}$ into a ratio of 1:3?

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

122 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

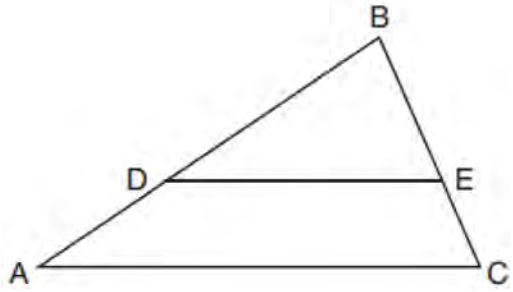
123 A rhombus is graphed on the set of axes below.



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 $x = 0$

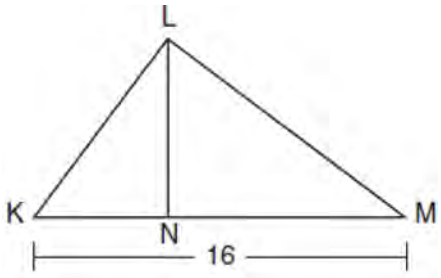
124 In triangle *ABC*, points *D* and *E* are on sides $\overline{AB}$ and $\overline{BC}$, respectively, such that $\overline{DE} \parallel \overline{AC}$, and $AD:DB = 3:5$.



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

125 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

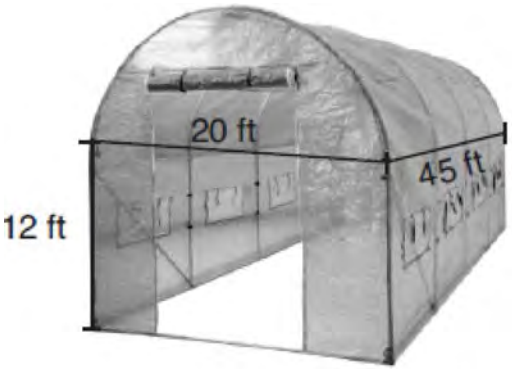
126 In circle *O*, secants $\overline{ADB}$ and $\overline{AEC}$ are drawn from external point *A* such that points *D*, *B*, *E*, and *C* are on circle *O*. If *AD* = 8, *AE* = 6, and *EC* is 12 more than *BD*, the length of $\overline{BD}$ is

1) 6
2) 22
3) 36
4) 48

127 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

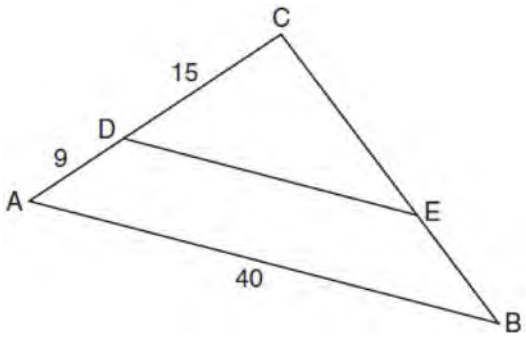
128 The greenhouse pictured below can be modeled as a rectangular prism with a half-cylinder on top. The rectangular prism is 20 feet wide, 12 feet high, and 45 feet long. The half-cylinder has a diameter of 20 feet.



To the *nearest cubic foot*, what is the volume of the greenhouse?

1) 17,869
2) 24,937
3) 39,074
4) 67,349

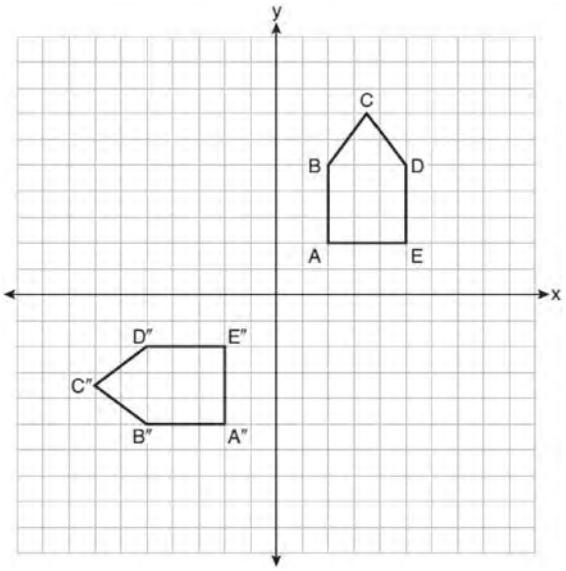
129 In the diagram of $\triangle ABC$ below, $\overline{DE}$ is parallel to $\overline{AB}$, *CD* = 15, *AD* = 9, and *AB* = 40.



The length of $\overline{DE}$ is

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

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



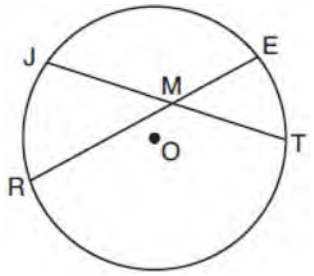
Which describes a sequence of rigid motions that maps *ABCDE* onto *A"B"C"D"E"*?

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

131 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) $(-8,5\sqrt{21})$

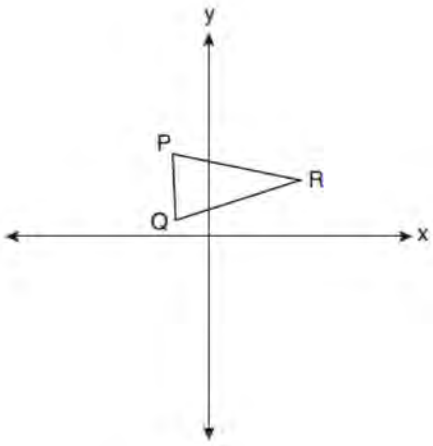
132 In the diagram below of circle *O*, chords $\overline{JT}$ and $\overline{ER}$ intersect at *M*.



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

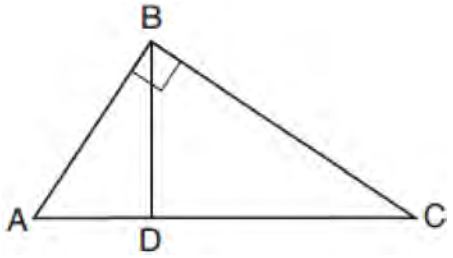
133 Triangle *PQR* is shown on the set of axes below.



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

134 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) $\frac{BC}{AC}$

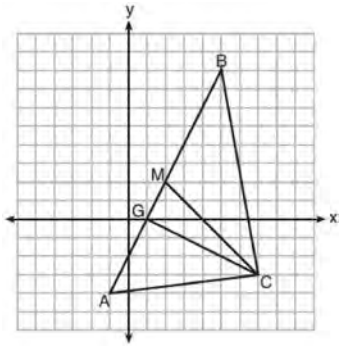
135 A standard-size golf ball has a diameter of 1.680 inches. The material used to make the golf ball weighs 0.6523 ounce per cubic inch. What is the weight, to the *nearest hundredth of an ounce*, of one golf ball?

1) 1.10
2) 1.62
3) 2.48
4) 3.81

136 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 $\overline{SA}$

137 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) $\frac{(GC)(AB)}{2}$

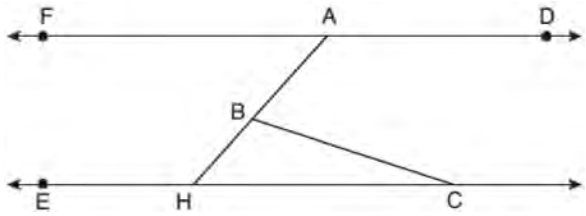
138 What are the coordinates of the center and the length of the radius of the circle whose equation is $x^2 + y^2 = 8x - 6y + 39$?

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

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

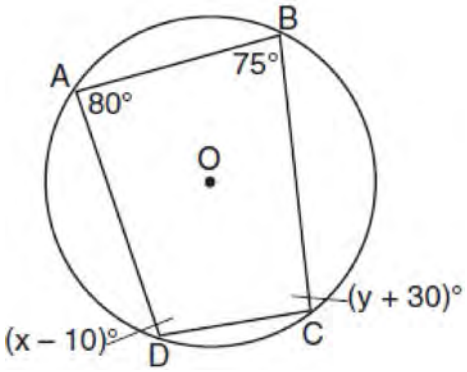
1) 523.7
2) 1047.4
3) 4189.6
4) 8379.2

140 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°

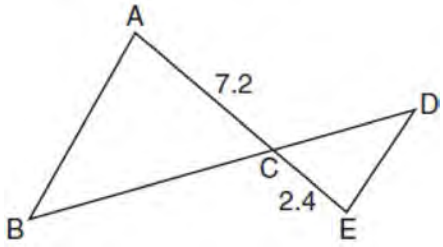
141 Quadrilateral $ABCD$ is inscribed in circle O, as shown below.



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 $y = 70$

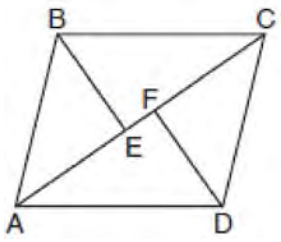
142 A regular hexagon is rotated about its center. Which degree measure will carry the regular hexagon onto itself?
1) 45°
2) 90°
3) 120°
4) 135°

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



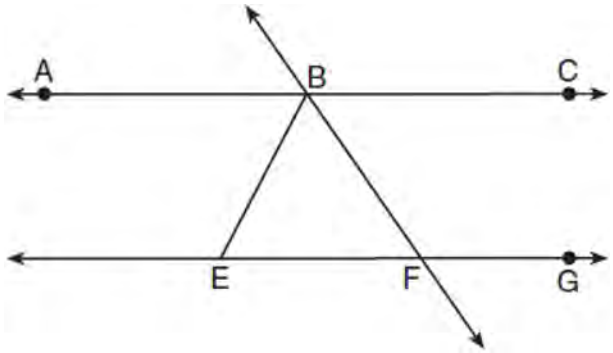
Which statement is *not* sufficient to prove $\triangle ABC \sim \triangle EDC$?
1) $\overline{AB} \parallel \overline{ED}$
2) $DE = 2.7$ and $AB = 8.1$
3) $CD = 3.6$ and $BC = 10.8$
4) $DE = 3.0$, $AB = 9.0$, $CD = 2.9$, and $BC = 8.7$

144 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

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

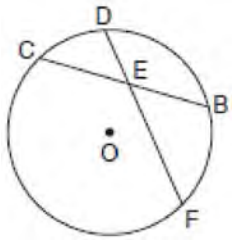


If m$\angle CBF = 42.5°$, then m$\angle EBF$ is
1) 42.5°
2) 68.75°
3) 95°
4) 137.5°

146 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

147 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.

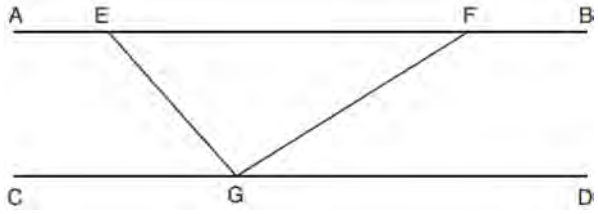
148 In the diagram below of circle O, chord $\overline{DF}$ bisects chord $\overline{BC}$ at E.



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

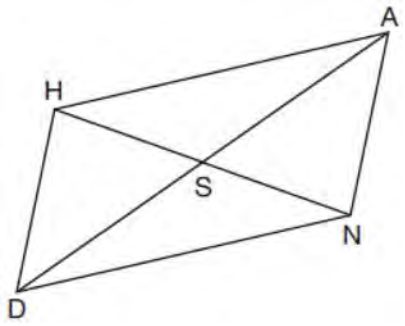
149 If a rectangle is continuously rotated around one of its sides, what is the three-dimensional figure formed?
1) rectangular prism
2) cylinder
3) sphere
4) cone

150 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) 11º
2) 43º
3) 75º
4) 105º

151 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) $\angle HDS \cong \angle NDS$

152 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) $(6,0)$

153 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 = $\sqrt{35}$

154 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

155 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

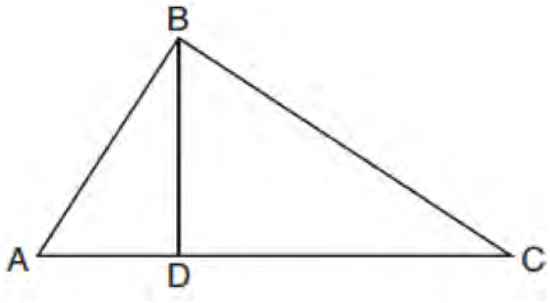
156 The coordinates of the endpoints of directed line segment *ABC* are $A(-8,7)$ and $C(7,-13)$. If $AB:BC = 3:2$, the coordinates of *B* are

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

157 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) $k = 4$

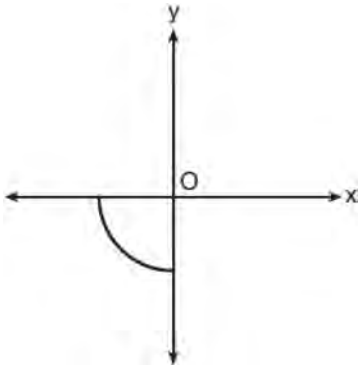
158 In the diagram below of right triangle *ABC*, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



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

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

159 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

160 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) $y = \frac{2}{3}x + 10$

161 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

162 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 $\frac{1}{3}$.

163 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

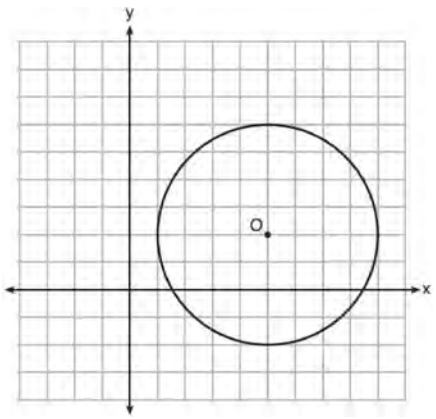
164 A two-dimensional cross section is taken of a three-dimensional object. If this cross section is a triangle, what can *not* be the three-dimensional object?

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

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

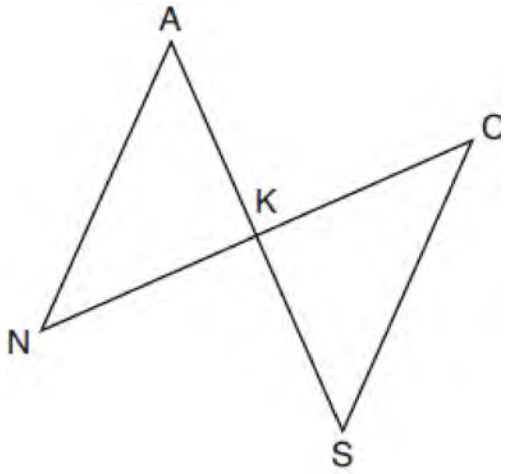
1) $y = \frac{4}{3}x + 8$
2) $y = \frac{3}{4}x + 8$
3) $y = -\frac{3}{4}x - 8$
4) $y = -\frac{4}{3}x - 8$

166 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) $x^2 - 10x + y^2 - 4y = -25$

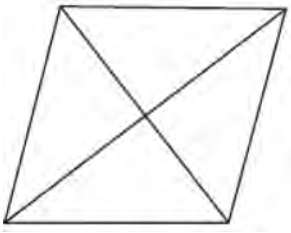
167 In the diagram below, $\overline{AKS}$, $\overline{NKC}$, $\overline{AN}$, and $\overline{SC}$ are drawn such that $\overline{AN} \cong \overline{SC}$.



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) $\overline{AN} \parallel \overline{SC}$

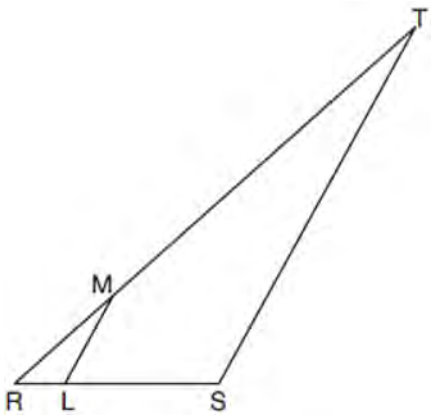
168 The figure below shows a rhombus with noncongruent diagonals.



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

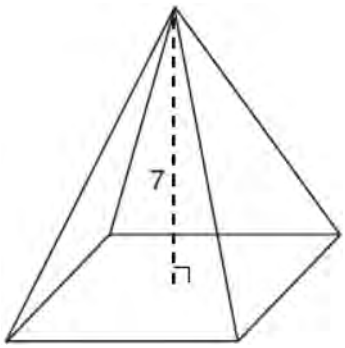
169 In the diagram below of $\triangle RST$, L is a point on $\overline{RS}$, and M is a point on $\overline{RT}$, such that $LM \parallel ST$.



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

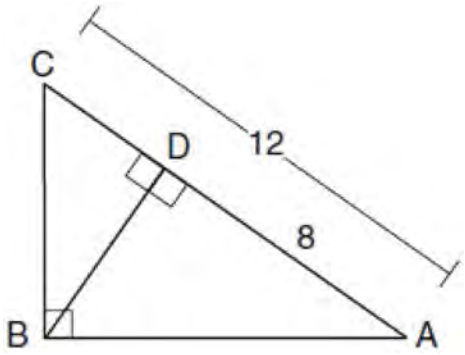
170 The pyramid shown below has a square base, a height of 7, and a volume of 84.



What is the length of the side of the base?

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

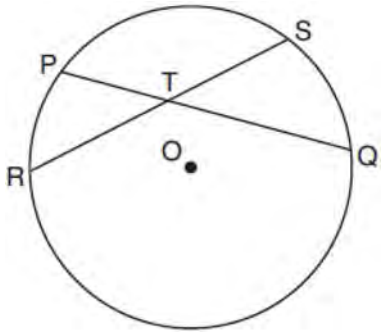
171 In the diagram below of $\triangle ABC$, $\angle ABC$ is a right angle, $AC = 12$, $AD = 8$, and altitude $\overline{BD}$ is drawn.



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

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

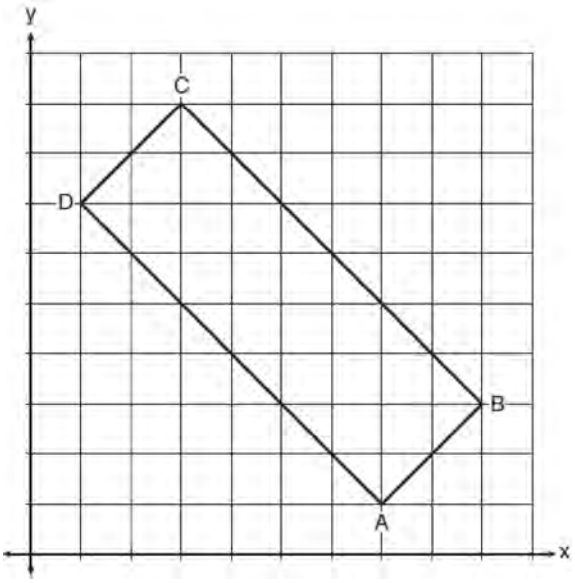
172 In the diagram below, chords $\overline{PQ}$ and $\overline{RS}$ of circle O intersect at T.



Which relationship must always be true?

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

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



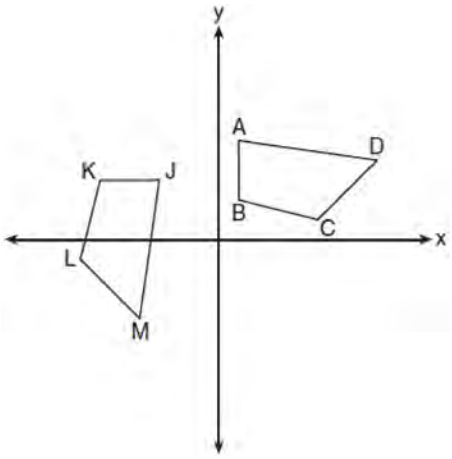
Which transformation will *not* carry the rectangle onto itself?

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 $(5,5)$

174 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

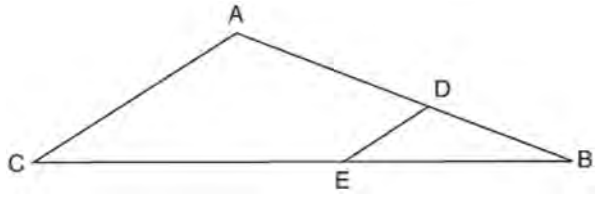
175 In the diagram below, a sequence of rigid motions maps *ABCD* onto *JKLM*.



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°

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



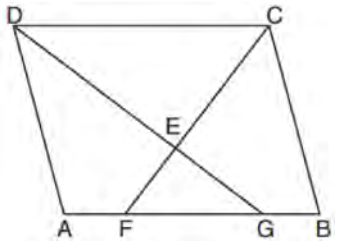
If *EB* is 3 more than *DB*, $AB = 14$, and $CB = 21$, what is the length of $\overline{AD}$?

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

177 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

178 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.



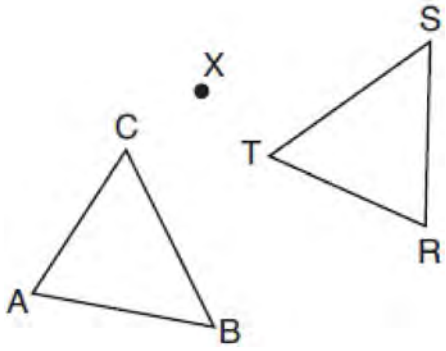
If $m\angle B = 75°$, then the measure of $\angle EFA$ is

1) 142.5°
2) 127.5°
3) 52.5°
4) 37.5°

179 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) $\frac{1}{3}$

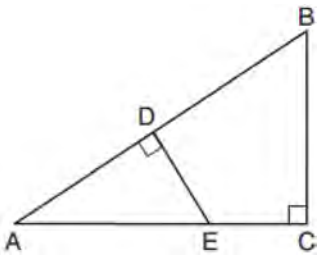
180 After a counterclockwise rotation about point X, scalene triangle ABC maps onto $\triangle RST$, as shown in the diagram below.



Which statement must be true?

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

181 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 $\overline{AB}$.



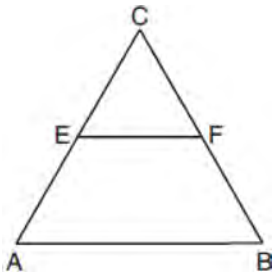
If $AB = 9$, $BC = 6$, and $DE = 4$, what is the length of $\overline{AE}$?

1) 5
2) 6
3) 7
4) 8

182 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 $\overline{QT} \parallel \overline{RS}$

183 In the diagram of equilateral triangle ABC shown below, E and F are the midpoints of $\overline{AC}$ and $\overline{BC}$, respectively.



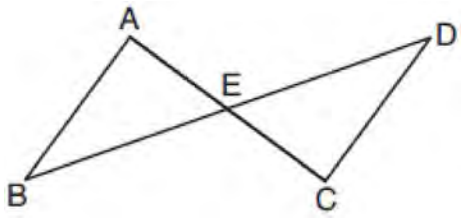
If $EF = 2x + 8$ and $AB = 7x - 2$, what is the perimeter of trapezoid $ABFE$?

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

184 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) $\frac{64\pi}{3}$

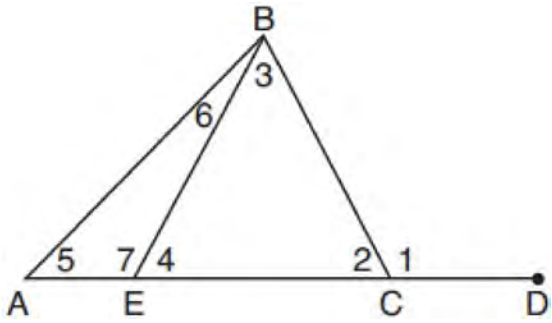
185 In the diagram below, $\overline{AC}$ and $\overline{BD}$ intersect at E.



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.

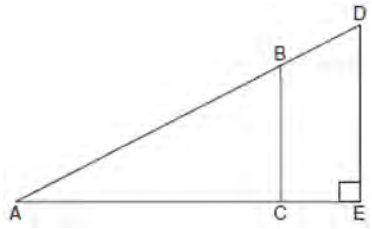
186 In the diagram below of triangle ABC, $\overline{AC}$ is extended through point C to point D, and $\overline{BE}$ is drawn to $\overline{AC}$.



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) $m\angle 7 = m\angle 3 + m\angle 2$

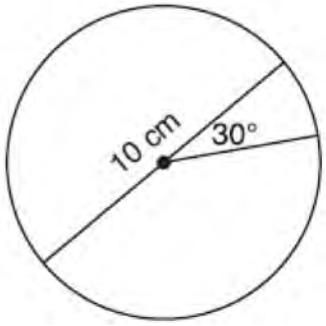
187 In the diagram of right triangle ADE below, $\overline{BC} \parallel \overline{DE}$.



Which ratio is always equivalent to the sine of $\angle A$?

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

188 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

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

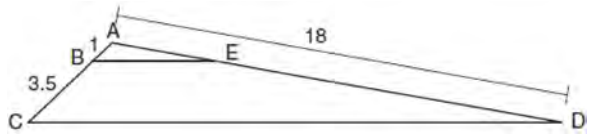
I. Diagonals are perpendicular bisectors of each other.

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

190 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

191 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) $(x,y) \rightarrow (x+2,y+3)$

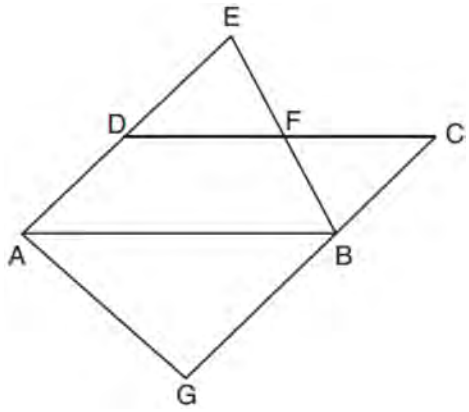
192 The 2010 U.S. Census populations and population densities are shown in the table below.

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

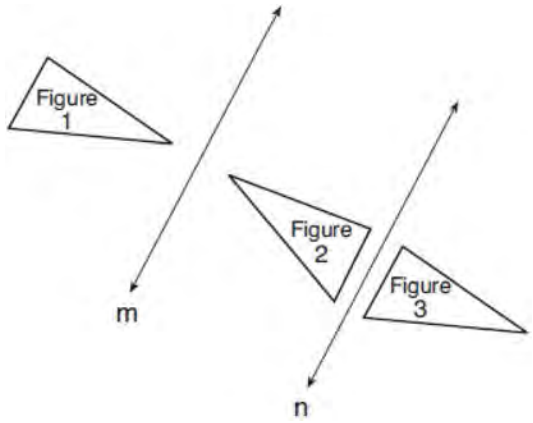
193 In the diagram below, $\overline{AB} \parallel \overline{DFC}$, $\overline{EDA} \parallel \overline{CBG}$, and $\overline{EFB}$ and $\overline{AG}$ are drawn.



Which statement is always true?

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

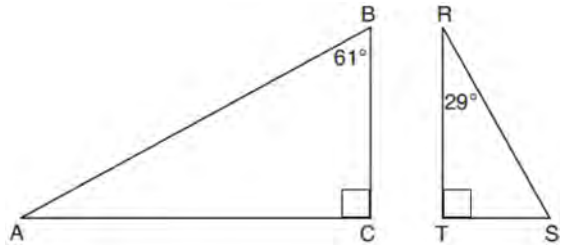
194 In the diagram below, line *m* is parallel to line *n*. Figure 2 is the image of Figure 1 after a reflection over line *m*. Figure 3 is the image of Figure 2 after a reflection over line *n*.



Which single transformation would carry Figure 1 onto Figure 3?

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

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



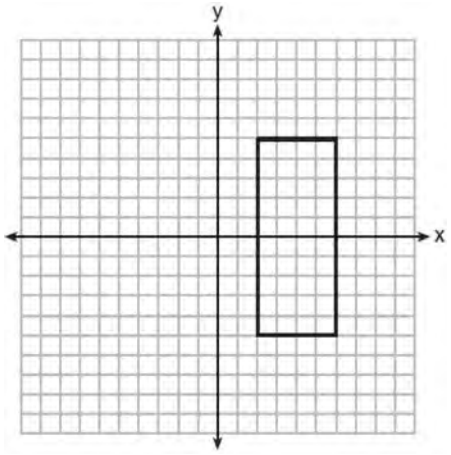
Which proportion in relation to $\triangle ABC$ and $\triangle RST$ is *not* correct?

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

196 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.

197 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 $(4,0)$

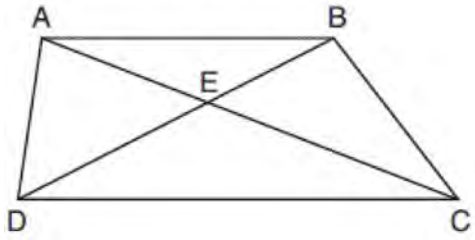
198 Triangle RJM has an area of 6 and a perimeter of 12. If the triangle is dilated by a scale factor of 3 centered at the origin, what are the area and perimeter of its image, triangle $R'J'M'$?

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

199 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

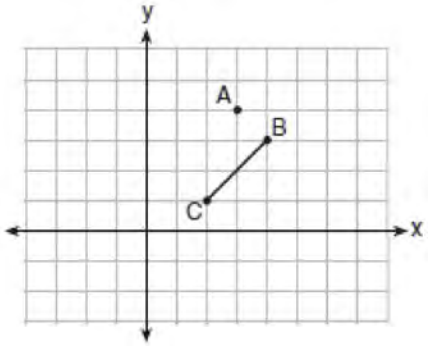
200 In trapezoid *ABCD* below, $\overline{AB} \parallel \overline{CD}$.



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

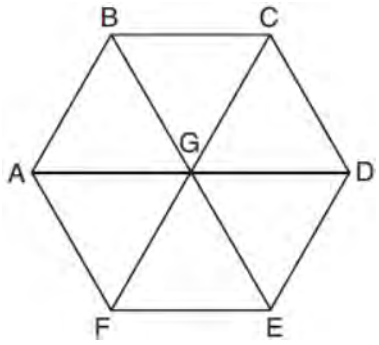
201 On the graph below, point $A(3,4)$ and $\overline{BC}$ with coordinates $B(4,3)$ and $C(2,1)$ are graphed.



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 $C'(3,0)$

202 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) $\triangle DEG$

203 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) $y = -6x + 6$

204 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°

205 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

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

207 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) $4x + 3y = 9$

208 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) $\overline{AB} \perp \overline{CD}$

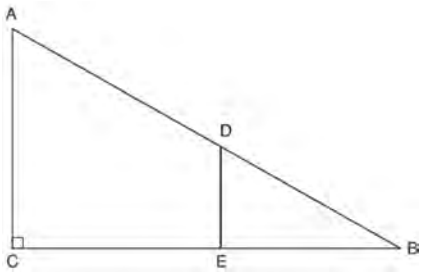
209 A 15-foot ladder leans against a wall and makes an angle of 65° with the ground. What is the horizontal distance from the wall to the base of the ladder, to the *nearest tenth of a foot*?

1) 6.3
2) 7.0
3) 12.9
4) 13.6

210 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 $\angle BCD$

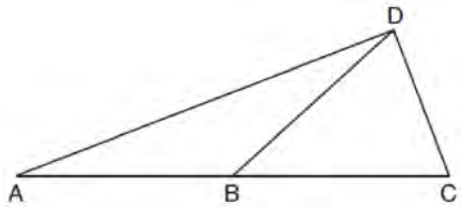
211 In right triangle *ABC* shown below, point *D* is on $\overline{AB}$ and point *E* is on $\overline{CB}$ such that $\overline{AC} \parallel \overline{DE}$.



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

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



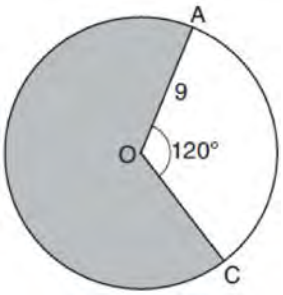
If m$\angle DAB = 32°$, what is m$\angle BDC$?
1) 32°
2) 52°
3) 58°
4) 64°

213 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

214 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.

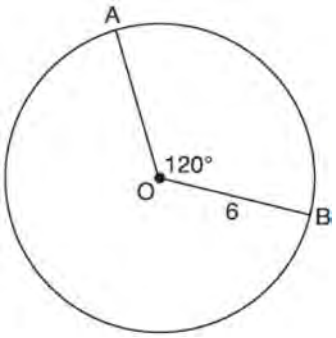
What is the angle of inclination, x, of this ramp, to the *nearest hundredth of a degree*?
1) 4.76
2) 4.78
3) 85.22
4) 85.24

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



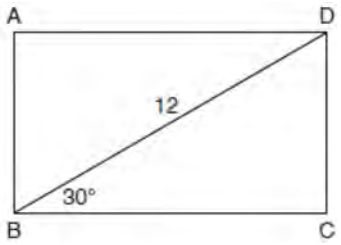
What is the area of the shaded sector of circle O?
1) 6π
2) 12π
3) 27π
4) 54π

216 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) $\frac{1}{3}(12\pi)$

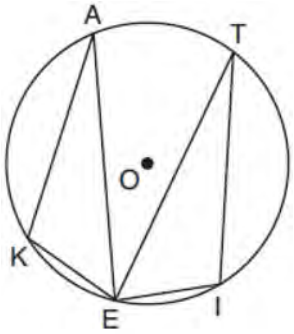
217 The diagram shows rectangle *ABCD*, with diagonal $\overline{BD}$.



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

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

218 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.

219 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?

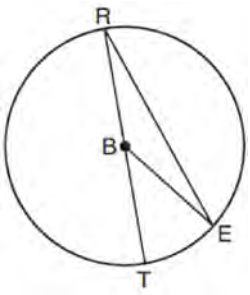
I. $\triangle ABC \cong \triangle A'B'C'$
II. $\triangle ABC \sim \triangle A'B'C'$
III. $\overline{AB} \parallel \overline{A'B'}$
IV. $AA' = BB'$

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

220 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

221 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

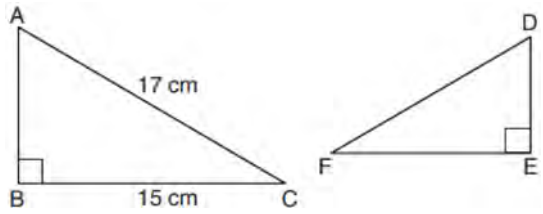
222 If the altitudes of a triangle meet at one of the triangle's vertices, then the triangle is
1) a right triangle
2) an acute triangle
3) an obtuse triangle
4) an equilateral triangle

223 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

224 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) $x^2 + 2x + y^2 + 8y = 83$

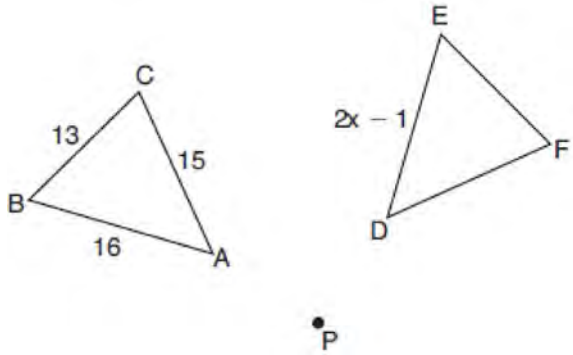
225 The line whose equation is $3x - 5y = 4$ is dilated by a scale factor of $\frac{5}{3}$ centered at the origin. Which statement is correct?
1) The image of the line has the same slope as the pre-image but a different *y*-intercept.
2) The image of the line has the same *y*-intercept as the pre-image 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.

226 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°

227 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

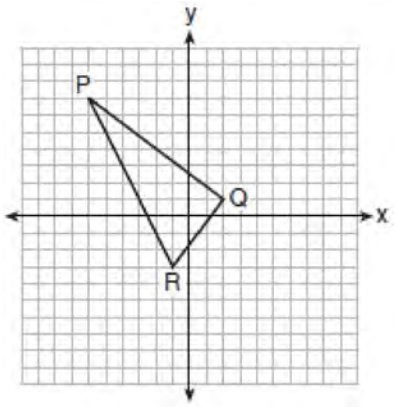
228 The equation of a circle is $x^2 + y^2 - 12y + 20 = 0$. What are the coordinates of the center and the length of the radius of the circle?

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

229 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

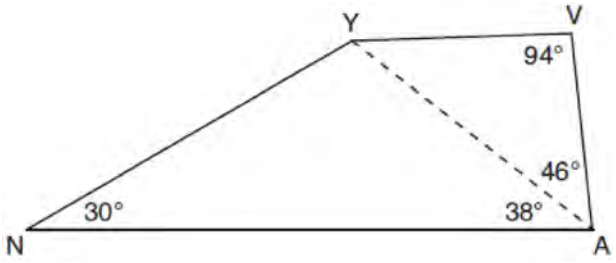
230 On the set of axes below, the vertices of $\triangle PQR$ have coordinates $P(-6,7)$, $Q(2,1)$, and $R(-1,-3)$.



What is the area of $\triangle PQR$?

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

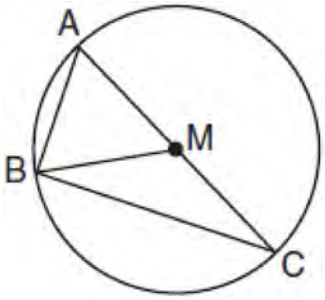
231 In the diagram of quadrilateral *NAVY* below, $m\angle YNA = 30°$, $m\angle YAN = 38°$, $m\angle AVY = 94°$, and $m\angle VAY = 46°$.



Which segment has the shortest length?

1) $\overline{AY}$
2) $\overline{NY}$
3) $\overline{VA}$
4) $\overline{VY}$

232 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) $m\overset{\frown}{AB} = \frac{1}{2} m\angle ACB$

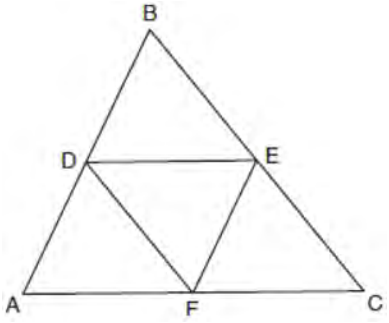
233 A ladder 20 feet long leans against a building, forming an angle of 71° with the level ground. To the *nearest foot*, how high up the wall of the building does the ladder touch the building?

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

234 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

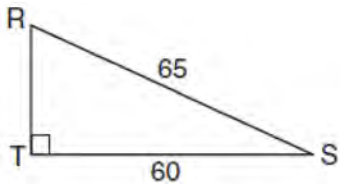
235 In the diagram below, $\overline{DE}$, $\overline{DF}$, and $\overline{EF}$ are midsegments of $\triangle ABC$.



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) $AB + AC$

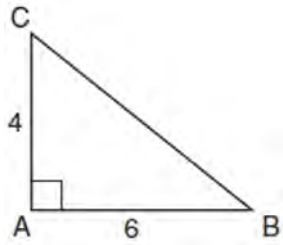
236 In the diagram of $\triangle RST$ below, $m\angle T = 90°$, $RS = 65$, and $ST = 60$.



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

1) 23°
2) 43°
3) 47°
4) 67°

237 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

238 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?

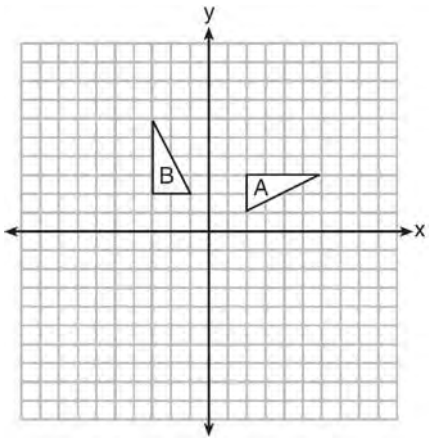
1) center $(-3, 1)$ and radius 4
2) center $(3, -1)$ and radius 4
3) center $(-3, 1)$ and radius 16
4) center $(3, -1)$ and radius 16

Geometry Multiple Choice Regents Exam Questions

239 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.

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

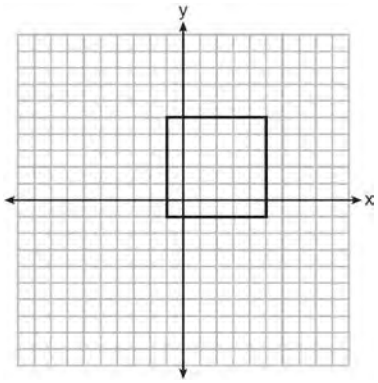


1) line reflection
2) rotation
3) dilation
4) translation

241 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

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



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

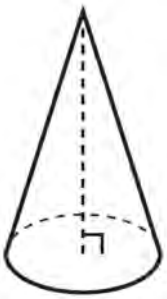
1) $x = 5$
2) $y = 2$
3) $y = x$
4) $x + y = 4$

243 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) $(x,y) \rightarrow (x+2,y-5)$

244 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

245 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) 

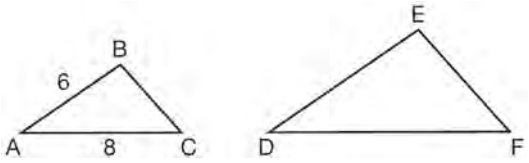
2) 

3) 

4) 

246 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

247 In the diagram below, $\triangle ABC \sim \triangle DEF$.

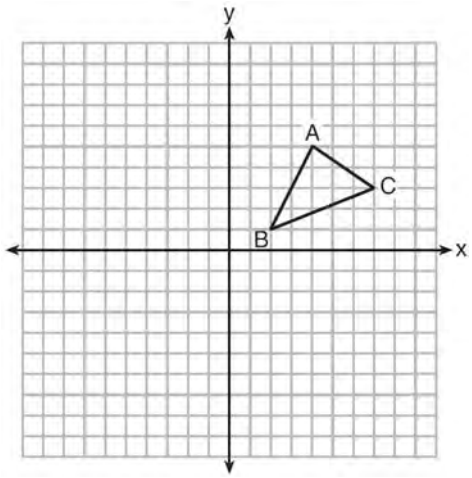


If $AB = 6$ and $AC = 8$, which statement will justify similarity by SAS?
1) $DE = 9$, $DF = 12$, and $\angle A \cong \angle D$
2) $DE = 8$, $DF = 10$, and $\angle A \cong \angle D$
3) $DE = 36$, $DF = 64$, and $\angle C \cong \angle F$
4) $DE = 15$, $DF = 20$, and $\angle C \cong \angle F$

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

249 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) $y = -x - 3$

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



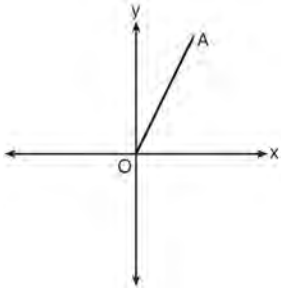
What is the slope of the altitude drawn from A to $\overline{BC}$?

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

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

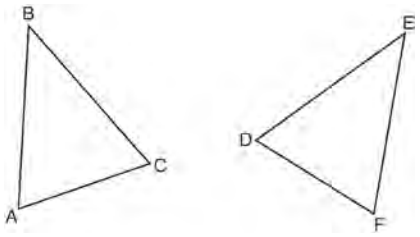
1) pyramid
2) rectangular prism
3) cone
4) cylinder

252 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

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

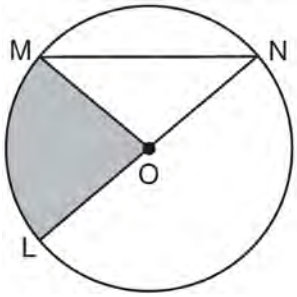


1) $AB = DE$ and $BC = EF$
2) $\angle D \cong \angle A$, $\angle B \cong \angle E$, $\angle C \cong \angle F$
3) There is a sequence of rigid motions that maps $\overline{AB}$ onto $\overline{DE}$, $\overline{BC}$ onto $\overline{EF}$, and $\overline{AC}$ onto $\overline{DF}$.
4) There is a sequence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

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

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

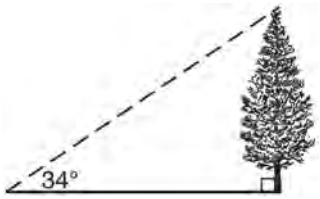
255 In the diagram below of circle O, the area of the shaded sector LOM is 2π cm^2.



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

1) 10º
2) 20º
3) 40º
4) 80º

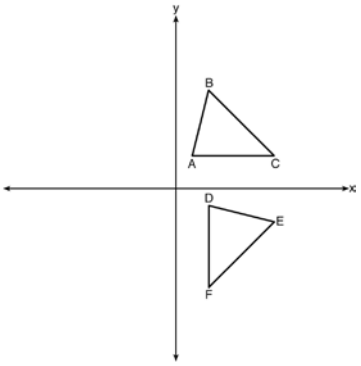
256 As shown in the diagram below, the angle of elevation from a point on the ground to the top of the tree is 34°.



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

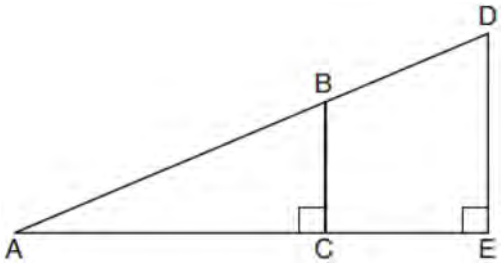
257 The image of $\triangle ABC$ after a rotation of 90º clockwise about the origin is $\triangle DEF$, as shown below.



Which statement is true?

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

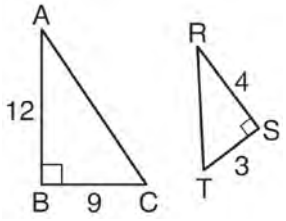
258 In the diagram below of right triangle AED, $\overline{BC} \parallel \overline{DE}$.

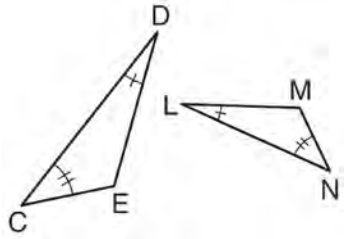


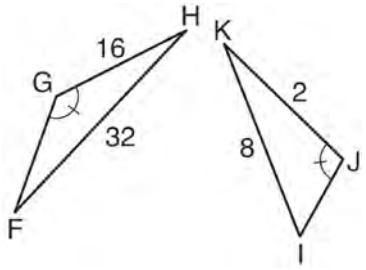
Which statement is always true?

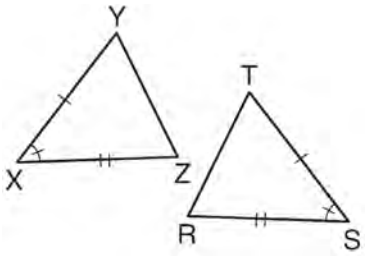
1) $\frac{AC}{BC} = \frac{DE}{AE}$
2) $\frac{AB}{AD} = \frac{BC}{DE}$
3) $\frac{AC}{CE} = \frac{BC}{DE}$
4) $\frac{DE}{BC} = \frac{DB}{AB}$

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

1) 

2) 

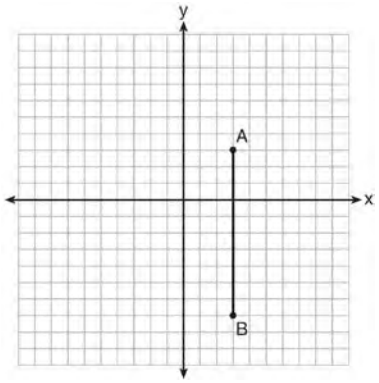
3) 

4) 

260 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) $3x - 2y = 5$

261 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) $(x-5)^2 + (y+2)^2 = 25$

262 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

263 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 $\angle DCB$

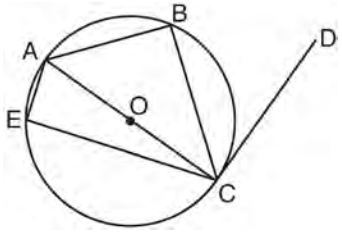
264 What are the coordinates of the point on the directed line segment from $K(-5,-4)$ to $L(5,1)$ that partitions the segment into a ratio of 3 to 2?

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

265 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) $3(m\angle C') = m\angle C$

266 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.



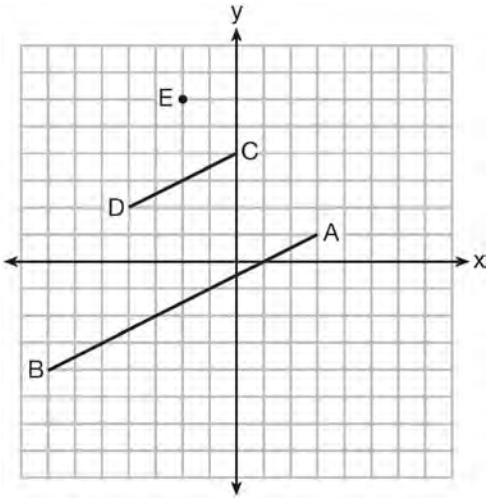
Which statement is *not* always true?

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

267 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

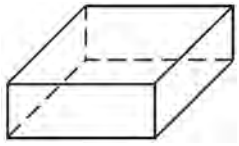
268 In the diagram below, $\overline{CD}$ is the image of $\overline{AB}$ after a dilation of scale factor k with center E.



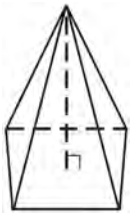
Which ratio is equal to the scale factor k of the dilation?

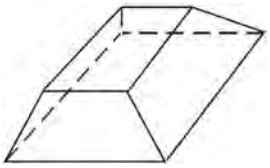
1) $\frac{EC}{EA}$
2) $\frac{BA}{EA}$
3) $\frac{EA}{BA}$
4) $\frac{EA}{EC}$

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

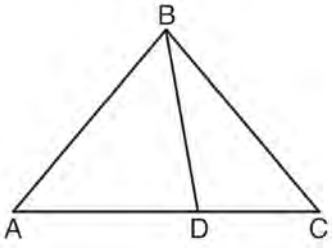
1) 

2) 

3) 

4) 

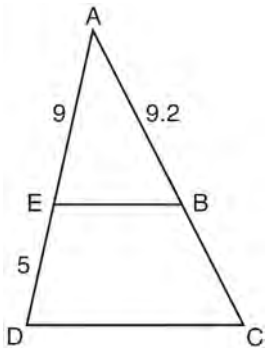
270 In the diagram below, m$\angle BDC = 100°$, m$\angle A = 50°$, and m$\angle DBC = 30°$.



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

271 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

272 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

273 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

274 Which transformation would *not* always produce an image that would be congruent to the original figure?
1) translation
2) dilation
3) rotation
4) reflection

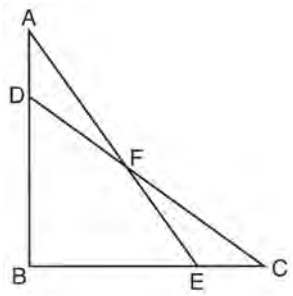
275 A company is creating an object from a wooden cube with an edge length of 8.5 cm. A right circular cone with a diameter of 8 cm and an altitude of 8 cm will be cut out of the cube. Which expression represents the volume of the remaining wood?
1) $(8.5)^3 - \pi(8)^2(8)$
2) $(8.5)^3 - \pi(4)^2(8)$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

276 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

277 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) $25\sqrt{2}$

278 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

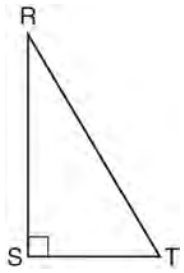
279 Given: $\triangle ABE$ and $\triangle CBD$ shown in the diagram below with $\overline{DB} \cong \overline{BE}$



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) $\overline{AE} \cong \overline{CD}$

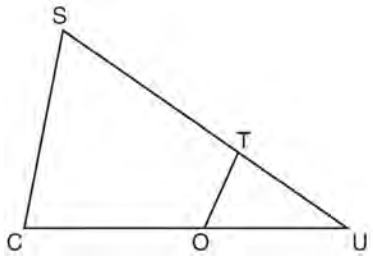
280 The equation of line h is $2x + y = 1$. Line m is the image of line h after a dilation of scale factor 4 with respect to the origin. What is the equation of the line m?
1) $y = -2x + 1$
2) $y = -2x + 4$
3) $y = 2x + 4$
4) $y = 2x + 1$

281 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

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

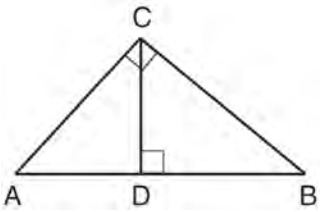


If $TU = 4$, $OU = 5$, and $OC = 7$, what is the length of $\overline{ST}$?
1) 5.6
2) 8.75
3) 11
4) 15

283 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) $y = 3x - 1$

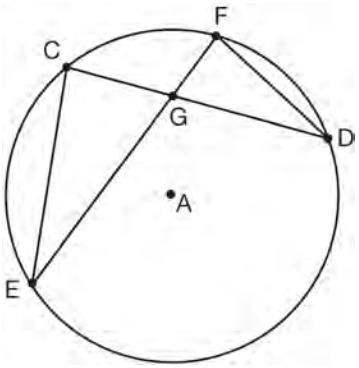
284 The line $y = 2x - 4$ is dilated by a scale factor of $\frac{3}{2}$ and centered at the origin. Which equation represents the image of the line after the dilation?
1) $y = 2x - 4$
2) $y = 2x - 6$
3) $y = 3x - 4$
4) $y = 3x - 6$

285 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 $AB = 17$

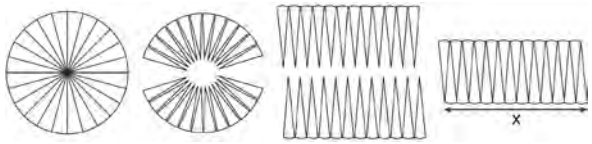
286 In the diagram of circle A shown below, chords $\overline{CD}$ and $\overline{EF}$ intersect at G, and chords $\overline{CE}$ and $\overline{FD}$ are drawn.



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) $\triangle CEG \sim \triangle FDG$

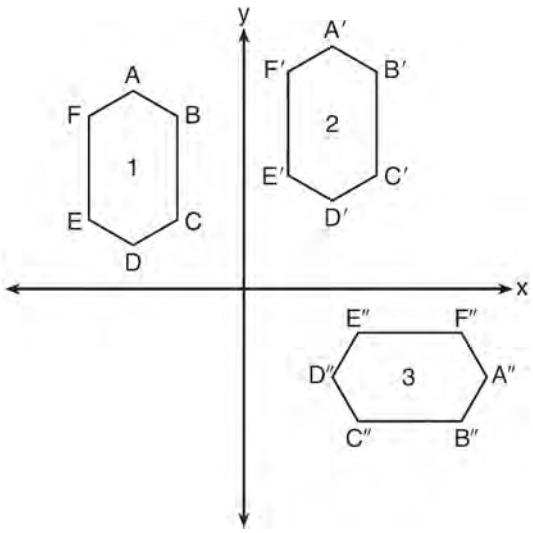
287 A circle with a radius of 5 was divided into 24 congruent sectors. The sectors were then rearranged, as shown in the diagram below.



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

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

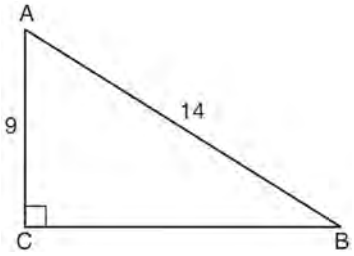
288 In the diagram below, congruent figures 1, 2, and 3 are drawn.



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

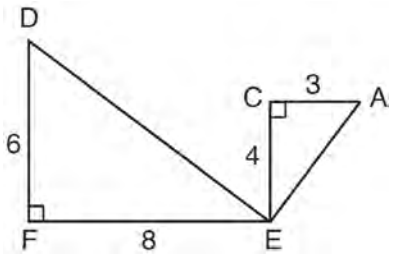
289 In the diagram of right triangle ABC shown below, $AB = 14$ and $AC = 9$.



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

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

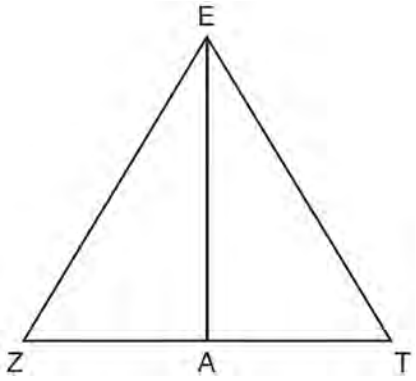
290 Given: $\triangle AEC$, $\triangle DEF$, and $\overline{FE} \perp \overline{CE}$



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

291 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.

292 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

293 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

294 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

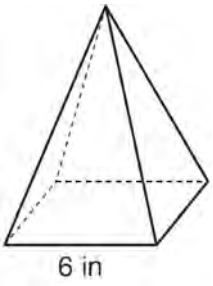
295 The ratio of similarity of $\triangle BOY$ to $\triangle GRL$ is 1:2. If $BO = x + 3$ and $GR = 3x - 1$, then the length of $\overline{GR}$ is

1) 5
2) 7
3) 10
4) 20

296 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

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



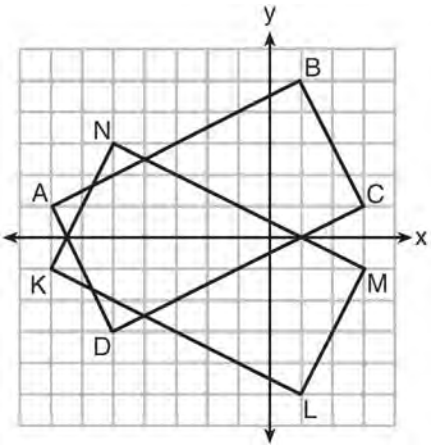
If the altitude of the pyramid measures 12 inches, its volume, in cubic inches, is

1) 72
2) 144
3) 288
4) 432

298 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*?

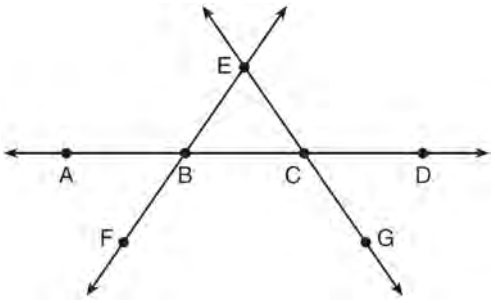
1) 16,336
2) 32,673
3) 130,690
4) 261,381

299 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

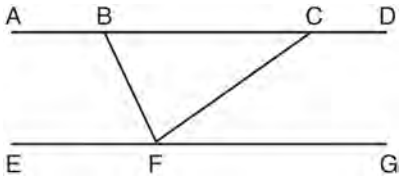
300 In the diagram below, $\overleftrightarrow{FE}$ bisects $\overline{AC}$ at *B*, and $\overleftrightarrow{GE}$ bisects $\overline{BD}$ at *C*.



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*.

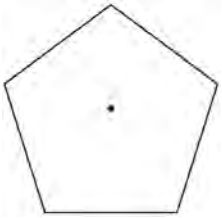
301 Steve drew line segments *ABCD*, *EFG*, *BF*, and *CF* as shown in the diagram below. Scalene $\triangle BFC$ is formed.



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) $\angle CBF \cong \angle GFC$

302 A regular pentagon is shown in the diagram below.



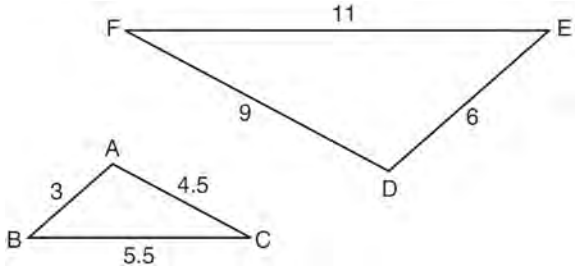
If the pentagon is rotated clockwise around its center, the minimum number of degrees it must be rotated to carry the pentagon onto itself is

1) 54°
2) 72°
3) 108°
4) 360°

303 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

304 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) $\frac{\text{m}\angle A}{\text{m}\angle D} = \frac{1}{2}$
2) $\frac{\text{m}\angle C}{\text{m}\angle F} = \frac{2}{1}$
3) $\frac{\text{m}\angle A}{\text{m}\angle C} = \frac{\text{m}\angle F}{\text{m}\angle D}$
4) $\frac{\text{m}\angle B}{\text{m}\angle E} = \frac{\text{m}\angle C}{\text{m}\angle F}$

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

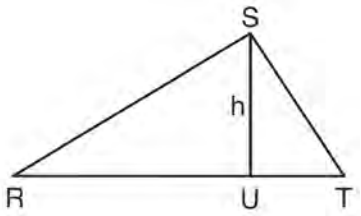
In which step did he make an error in his work?

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

306 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) $\frac{64\pi}{3}$

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



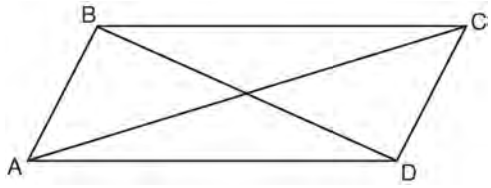
If $SU = h$, $UT = 12$, and $RT = 42$, which value of h will make $\triangle RST$ a right triangle with $\angle RST$ as a right angle?

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

308 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

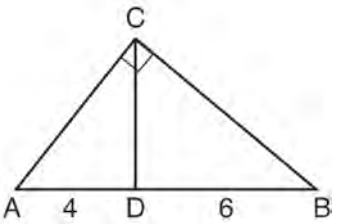
309 Quadrilateral $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$ is shown in the diagram below.



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

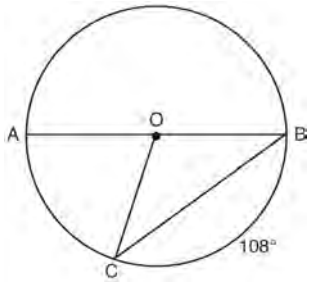
310 In the diagram of right triangle ABC, $\overline{CD}$ intersects hypotenuse $\overline{AB}$ at D.



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) $4\sqrt{2}$

311 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

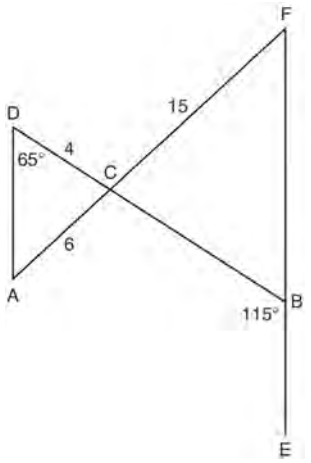
312 The diameter of a basketball is approximately 9.5 inches and the diameter of a tennis ball is approximately 2.5 inches. The volume of the basketball is about how many times greater than the volume of the tennis ball?

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

313 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) $(6,3)$

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



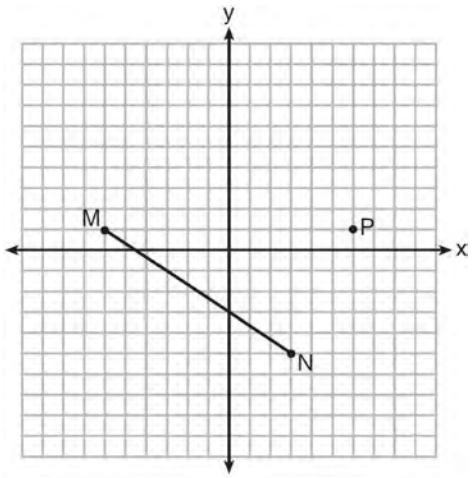
If $AC = 6$, $DC = 4$, $FC = 15$, $m\angle D = 65°$, and $m\angle CBE = 115°$, what is the length of $\overline{CB}$?

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

315 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

316 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 $\overline{MN}$?

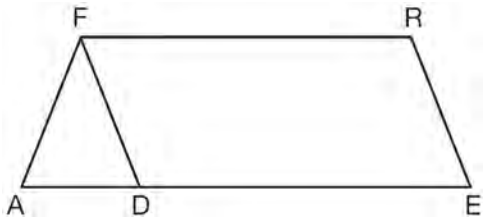


1) $y = -\frac{2}{3}x + 5$
2) $y = -\frac{2}{3}x - 3$
3) $y = \frac{3}{2}x + 7$
4) $y = \frac{3}{2}x - 8$

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

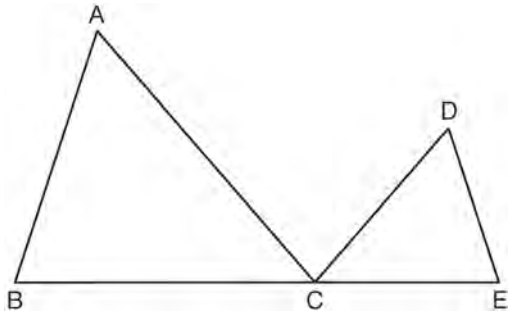
1) $\frac{\sqrt{21}}{5}$
2) $\frac{\sqrt{21}}{2}$
3) $\frac{2}{5}$
4) $\frac{5}{\sqrt{21}}$

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



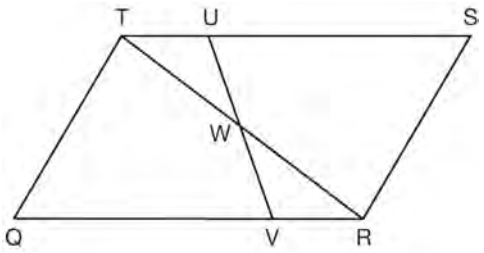
If $m\angle R = 124°$, what is $m\angle AFD$?
1) 124°
2) 112°
3) 68°
4) 56°

319 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

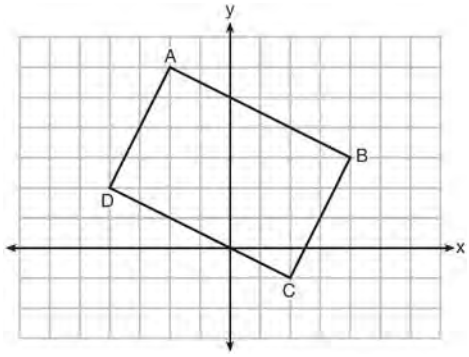
320 In parallelogram *QRST* shown below, diagonal $\overline{TR}$ is drawn, *U* and *V* are points on $\overline{TS}$ and $\overline{QR}$, respectively, and $\overline{UV}$ intersects $\overline{TR}$ at *W*.



If m∠*S* = 60°, m∠*SRT* = 83°, and m∠*TWU* = 35°, what is m∠*WVQ*?

1) 37°
2) 60°
3) 72°
4) 83°

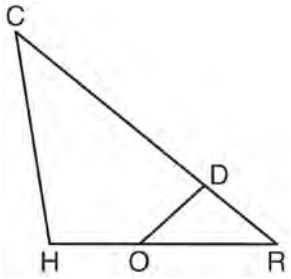
321 Quadrilateral *ABCD* is graphed on the set of axes below.



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 $B'(-3,4)$

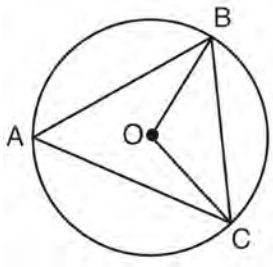
322 In triangle *CHR*, *O* is on $\overline{HR}$, and *D* is on $\overline{CR}$ so that ∠*H* ≅ ∠*RDO*.



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

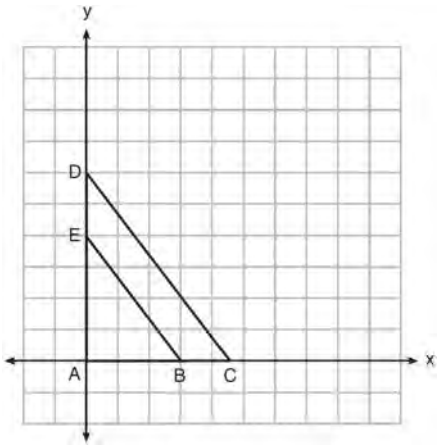
323 In the diagram below of circle *O*, $\overline{OB}$ and $\overline{OC}$ are radii, and chords $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$ are drawn.



Which statement must always be true?

1) ∠*BAC* ≅ ∠*BOC*
2) $m\angle BAC = \frac{1}{2} m\angle BOC$
3) $\triangle BAC$ and $\triangle BOC$ are isosceles.
4) The area of $\triangle BAC$ is twice the area of $\triangle BOC$.

324 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 $E(0,4)$.



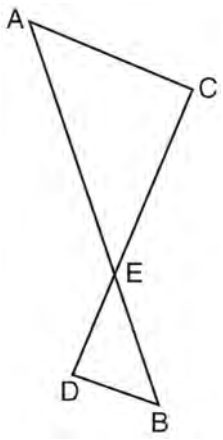
The ratio of the lengths of $\overline{BE}$ to $\overline{CD}$ is

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

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

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

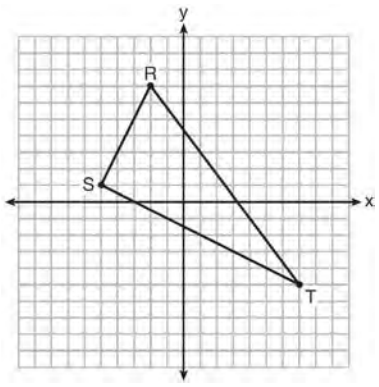
327 A line that passes through the points whose coordinates are $(1,1)$ and $(5,7)$ is dilated by a scale factor of 3 and centered at the origin. The image of the line

1) is perpendicular to the original line
2) is parallel to the original line
3) passes through the origin
4) is the original line

328 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

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



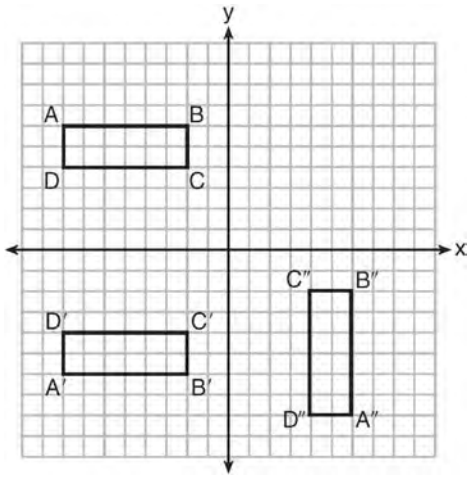
How many square units are in the area of $\triangle RST$?

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

330 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

331 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

332 What are the coordinates of the center and the length of the radius of the circle represented by the equation $x^2+y^2-4x+8y+11=0$?

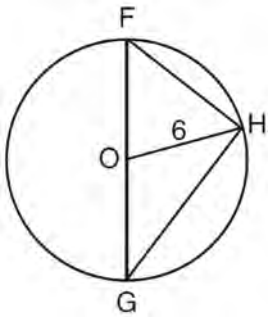
1) center $(2,-4)$ and radius 3
2) center $(-2,4)$ and radius 3
3) center $(2,-4)$ and radius 9
4) center $(-2,4)$ and radius 9

333 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

334 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

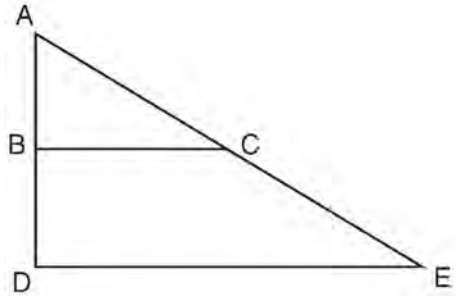
335 Triangle FGH is inscribed in circle O, the length of radius $\overline{OH}$ is 6, and $\overline{FH} \cong \overline{OG}$.



What is the area of the sector formed by angle FOH?
1) 2π
2) $\frac{3}{2}\pi$
3) 6π
4) 24π

336 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

337 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.

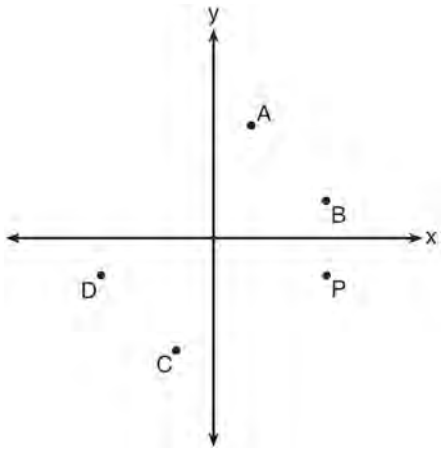


Which statement is always true?
1) $2\overline{AB} = \overline{AD}$
2) $\overline{AD} \perp \overline{DE}$
3) $\overline{AC} = \overline{CE}$
4) $\overline{BC} \parallel \overline{DE}$

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

339 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

340 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*

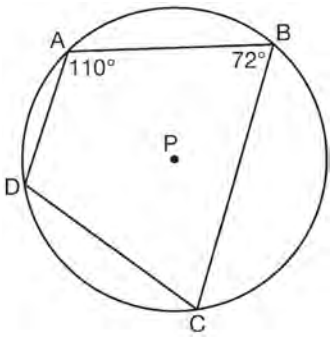
341 Molly wishes to make a lawn ornament in the form of a solid sphere. The clay being used to make the sphere weighs .075 pound per cubic inch. If the sphere's radius is 4 inches, what is the weight of the sphere, to the *nearest pound*?

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

342 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) $y = 2x + 6$

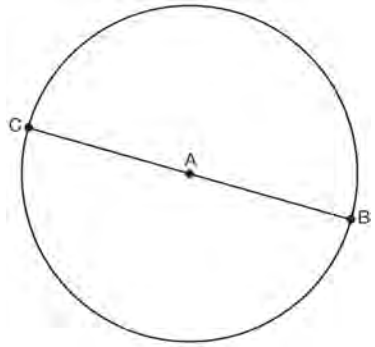
343 In the diagram below, quadrilateral *ABCD* is inscribed in circle *P*.



What is m∠*ADC*?

1) 70°
2) 72°
3) 108°
4) 110°

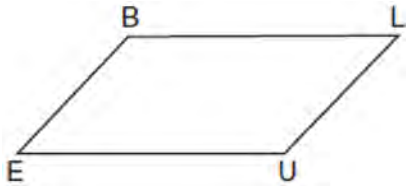
344 In the diagram below, $\overline{BC}$ is the diameter of circle *A*.



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

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

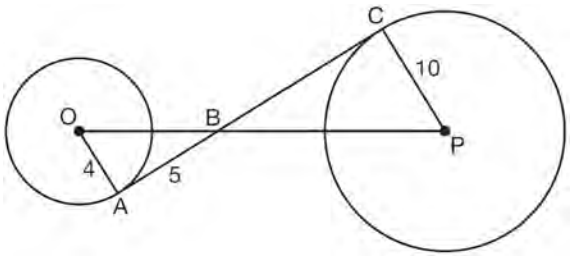
345 In quadrilateral *BLUE* shown below, $\overline{BE} \cong \overline{UL}$.



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) $\overline{LU} \cong \overline{EU}$

346 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

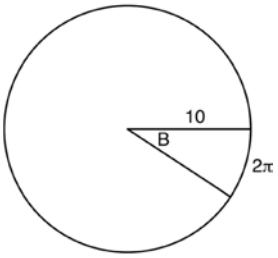
347 Which expression is always equivalent to $\sin x$ when $0° < x < 90°$?

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

348 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) $\overline{DE}, \overline{CE}$

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



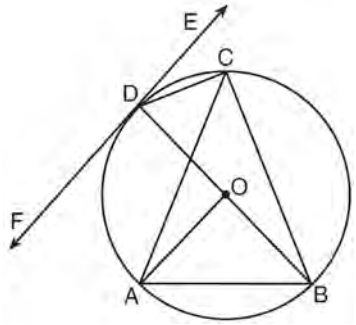
What is the measure of angle *B*, in radians?

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

350 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

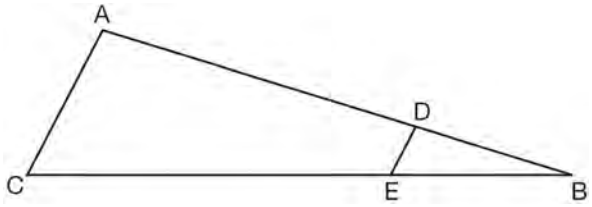
1) $y = -\frac{1}{2}x + 4$
2) $y = -\frac{1}{2}x - 1$
3) $y = 2x + 14$
4) $y = 2x - 16$

351 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) $\angle FDB$

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

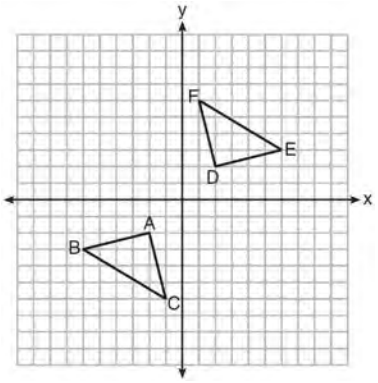


If $AD = 24$, $DB = 12$, and $DE = 4$, what is the length of $\overline{AC}$?
1) 8
2) 12
3) 16
4) 72

353 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

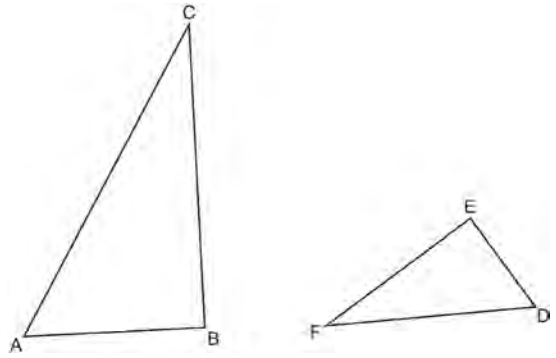
354 The coordinates of the vertices of $\triangle RST$ are $R(-2,-3)$, $S(8,2)$, and $T(4,5)$. Which type of triangle is $\triangle RST$?
1) right
2) acute
3) obtuse
4) equiangular

355 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

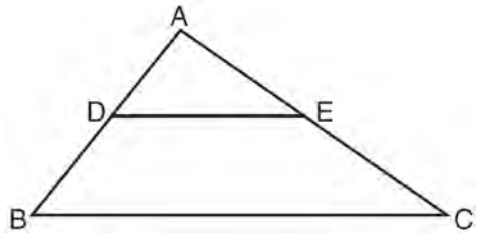
356 Triangles *ABC* and *DEF* are drawn below.



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

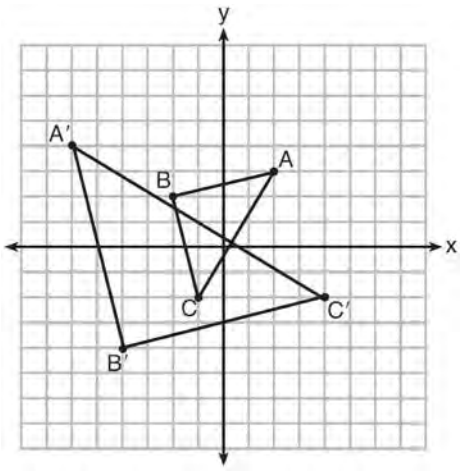
357 In the diagram below, $\triangle ABC \sim \triangle ADE$.



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 $AC = 15$

358 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

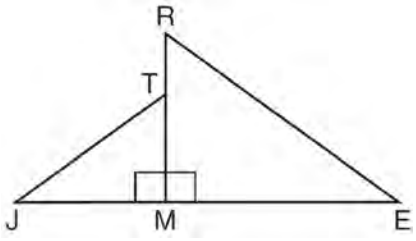
359 A quadrilateral has vertices with coordinates $(-3,1)$, $(0,3)$, $(5,2)$, and $(-1,-2)$. Which type of quadrilateral is this?

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

360 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) $y - 6 = -\frac{3}{4}(x - 8)$

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



Which statement is always true?

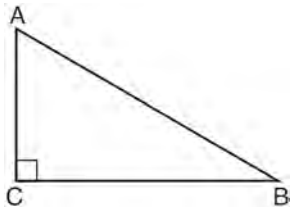
1) $\cos J = \frac{RM}{RE}$

2) $\cos R = \frac{JM}{JT}$

3) $\tan T = \frac{RM}{EM}$

4) $\tan E = \frac{TM}{JM}$

362 In scalene triangle ABC shown in the diagram below, $m\angle C = 90°$.



Which equation is always true?

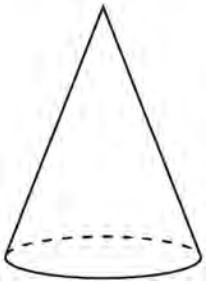
1) $\sin A = \sin B$

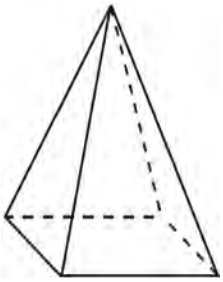
2) $\cos A = \cos B$

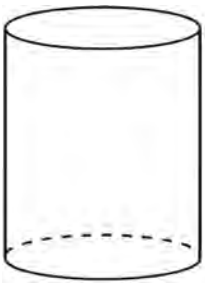
3) $\cos A = \sin C$

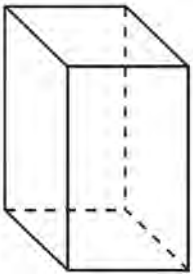
4) $\sin A = \cos B$

363 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?

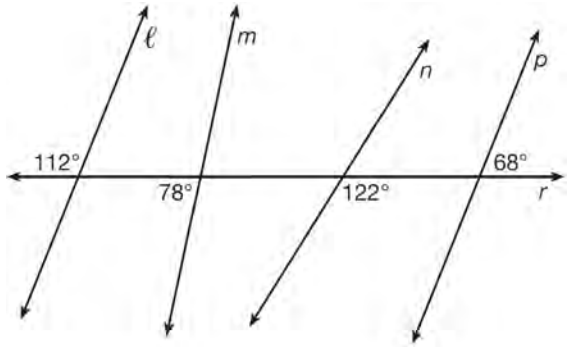
1) 

2) 

3) 

4) 

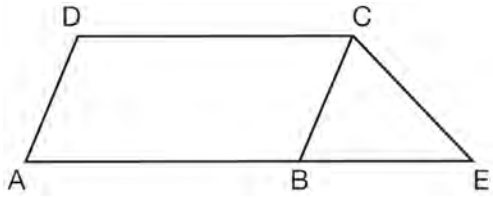
364 In the diagram below, lines ℓ, m, n, and p intersect line r.



Which statement is true?
1) $\ell \parallel n$
2) $\ell \parallel p$
3) $m \parallel p$
4) $m \parallel n$

365 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

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

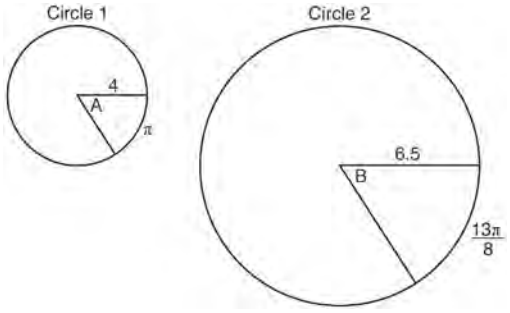


If $\overline{CE} \cong \overline{BE}$ and $m\angle D = 112°$, what is $m\angle E$?
1) 44°
2) 56°
3) 68°
4) 112°

367 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

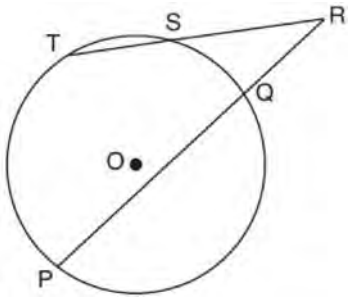
Geometry 2 Point Regents Exam Questions

368 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 $\frac{13\pi}{8}$.



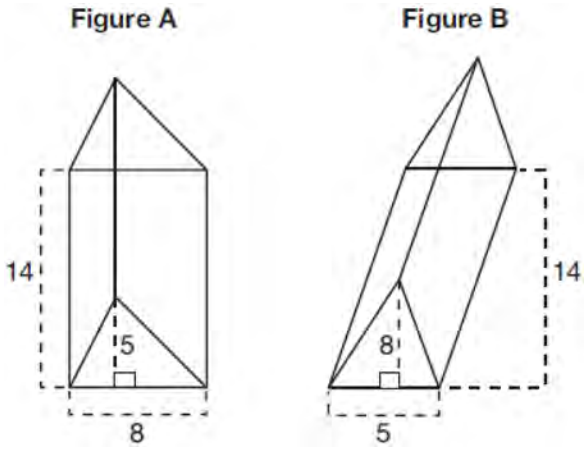
Dominic thinks that angles *A* and *B* have the same radian measure. State whether Dominic is correct or not. Explain why.

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



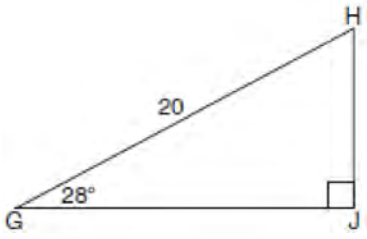
If $RS = 6$, $ST = 4$, and $RP = 15$, what is the length of $\overline{RQ}$?

370 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.



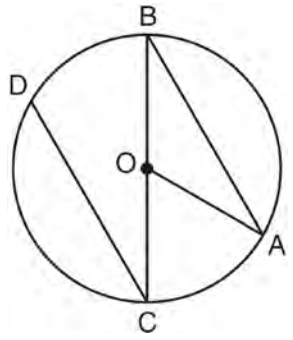
Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

371 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.



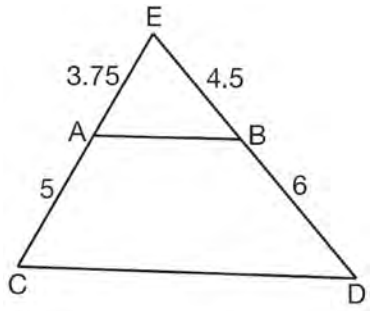
372 The endpoints of $\overline{DEF}$ are $D(1,4)$ and $F(16,14)$. Determine and state the coordinates of point E, if $DE:EF = 2:3$.

373 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$\angle AOB$.

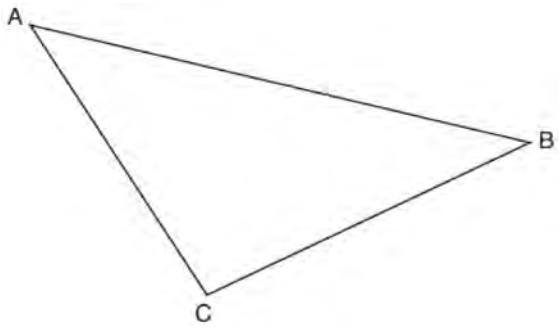
374 In $\triangle CED$ as shown below, points A and B are located on sides $\overline{CE}$ and $\overline{ED}$, respectively. Line segment AB is drawn such that $AE = 3.75$, $AC = 5$, $EB = 4.5$, and $BD = 6$.



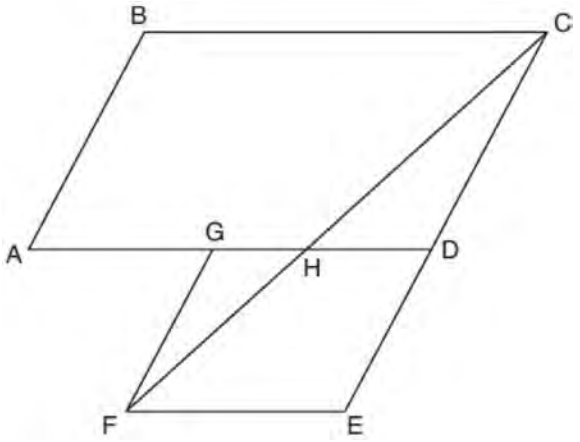
Explain why $\overline{AB}$ is parallel to $\overline{CD}$.

375 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.

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



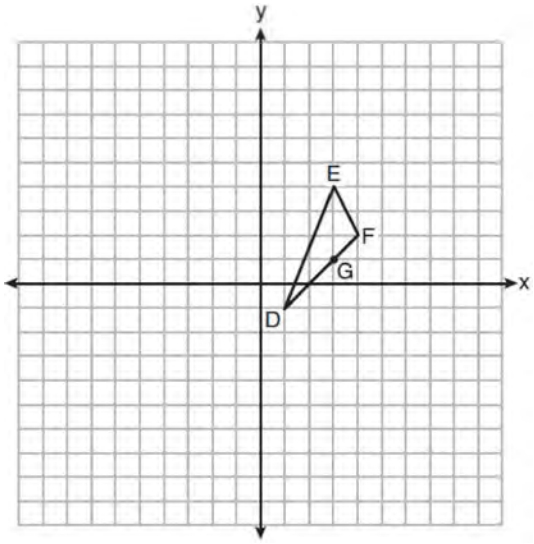
377 Parallelogram $ABCD$ is adjacent to rhombus $DEFG$, as shown below, and $\overline{FC}$ intersects $\overline{AGD}$ at H.



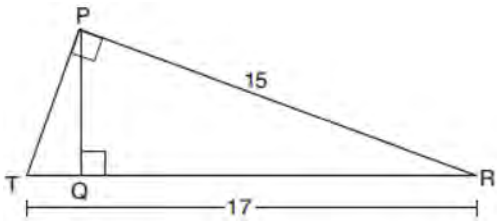
If m$\angle B = 118°$ and m$\angle AHC = 138°$, determine and state m$\angle GFH$.

378 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.

379 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.

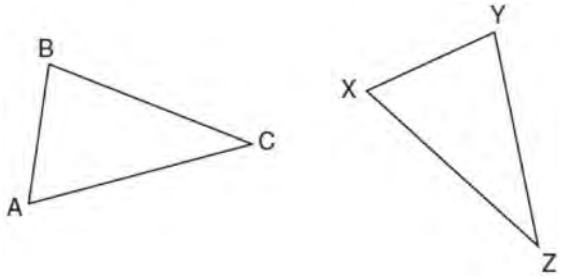


380 In right triangle PRT, $m\angle P = 90°$, altitude $\overline{PQ}$ is drawn to hypotenuse $\overline{RT}$, $RT = 17$, and $PR = 15$.



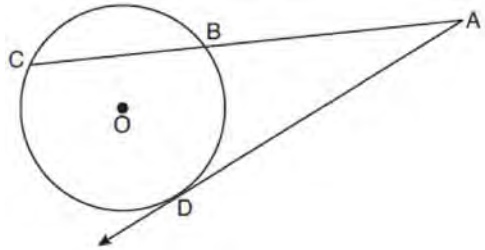
Determine and state, to the *nearest tenth*, the length of $\overline{RQ}$.

381 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.

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

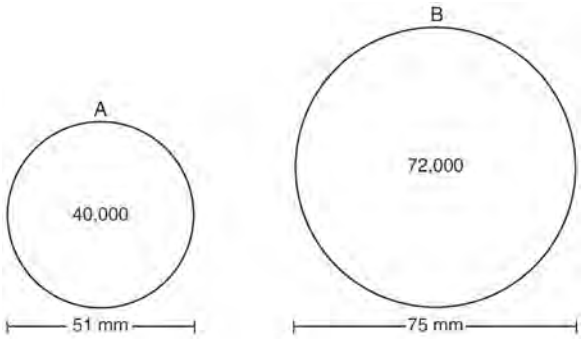


If $CA = 12.5$ and $CB = 4.5$, determine and state the length of $\overline{DA}$.

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

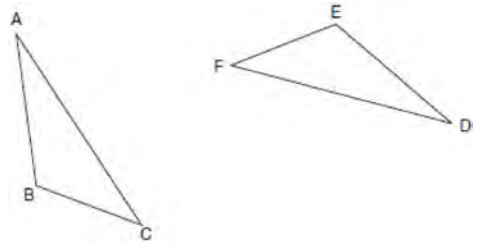
384 Explain why $\cos(x) = \sin(90 - x)$ for x such that $0 < x < 90$.

385 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.

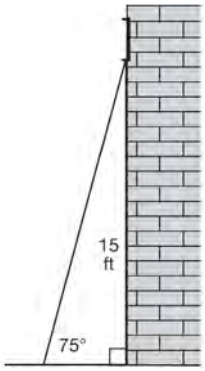
386 Triangle *ABC* and triangle *DEF* are drawn below.



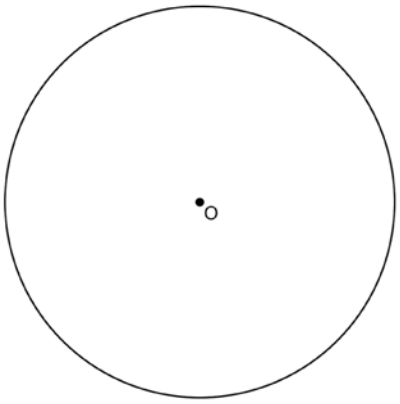
If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle *ABC* onto triangle *DEF*.

387 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*.

388 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*.



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

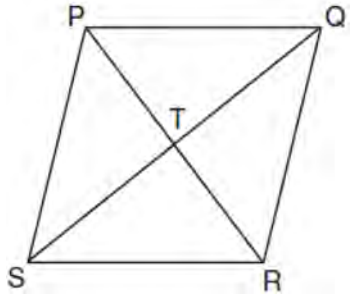


390 A machinist creates a solid steel part for a wind turbine engine. The part has a volume of 1015 cubic centimeters. Steel can be purchased for \$0.29 per kilogram, and has a density of 7.95 g/cm^3. If the machinist makes 500 of these parts, what is the cost of the steel, to the *nearest dollar*?

391 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

392 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*.

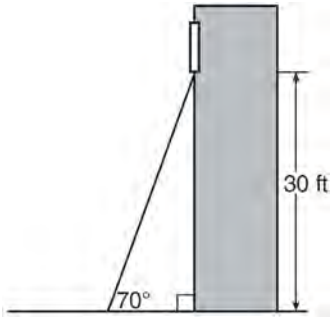


393 Determine and state an equation of the line perpendicular to the line $5x - 4y = 10$ and passing through the point $(5, 12)$.

394 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.

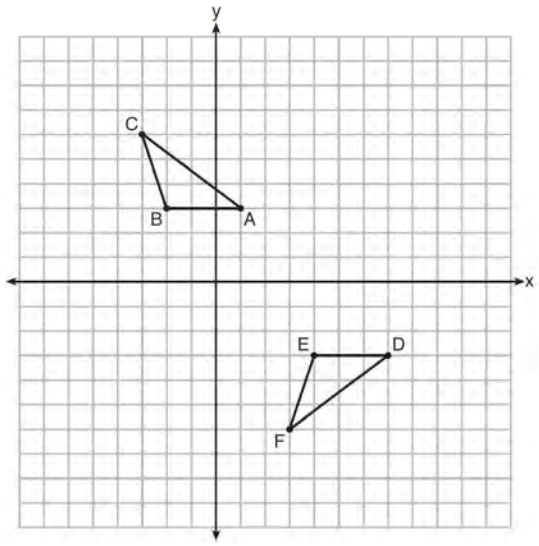
395 Write an equation of the line that is parallel to the line whose equation is $3y + 7 = 2x$ and passes through the point $(2, 6)$.

396 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.

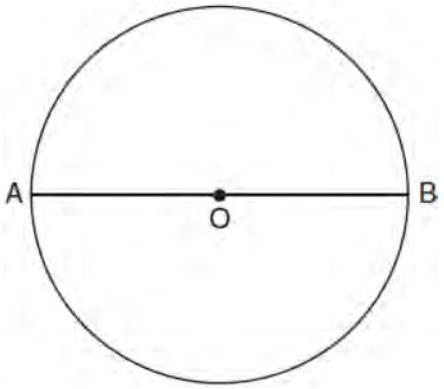


397 A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.

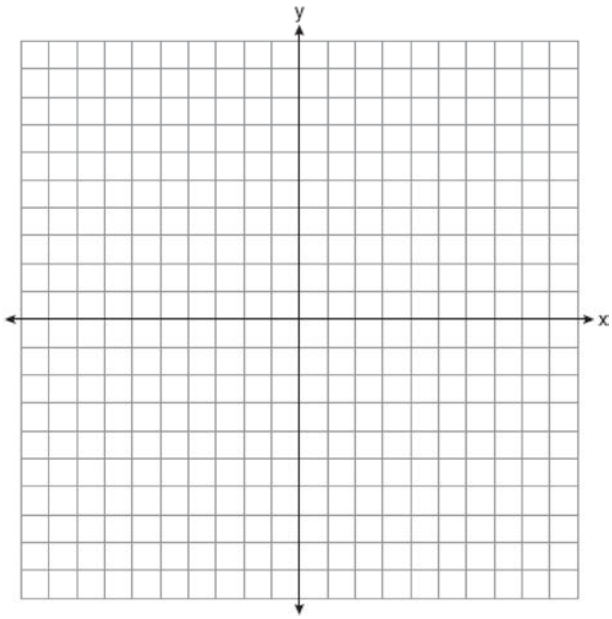
398 Describe a sequence of transformations that will map $\triangle ABC$ onto $\triangle DEF$ as shown below.



399 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.]

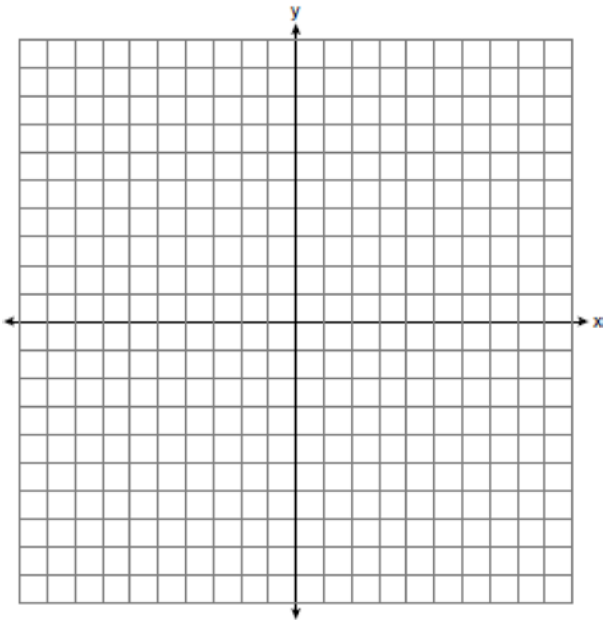


400 The coordinates of the endpoints of $\overline{AB}$ are $A(2,3)$ and $B(5,-1)$. Determine the length of $\overline{A'B'}$, the image of $\overline{AB}$, after a dilation of $\frac{1}{2}$ centered at the origin. [The use of the set of axes below is optional.]

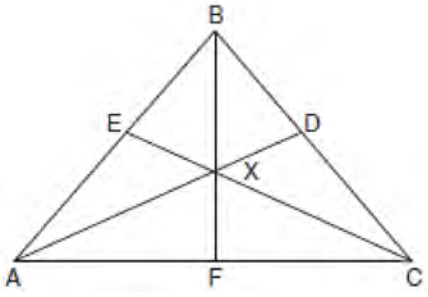


401 In isosceles $\triangle MNP$, line segment NO bisects vertex $\angle MNP$, as shown below. If $MP = 16$, find the length of $\overline{MO}$ and explain your answer.

402 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.]

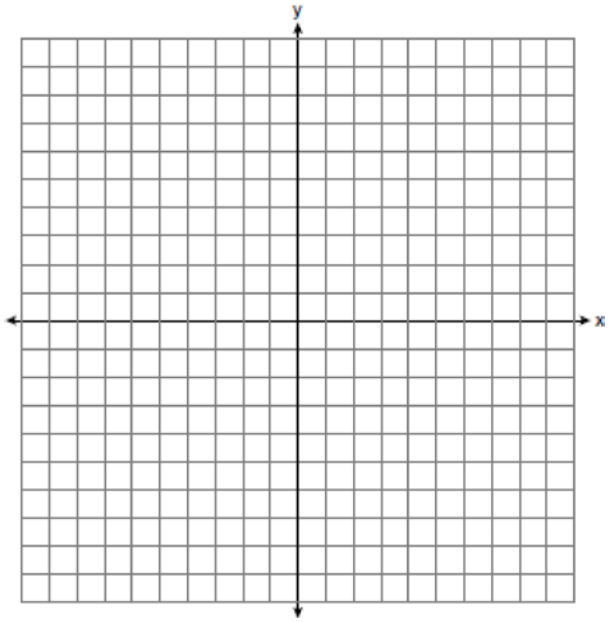


403 In the diagram below of isosceles triangle ABC, $\overline{AB} \cong \overline{CB}$ and angle bisectors $\overline{AD}$, $\overline{BF}$, and $\overline{CE}$ are drawn and intersect at X.

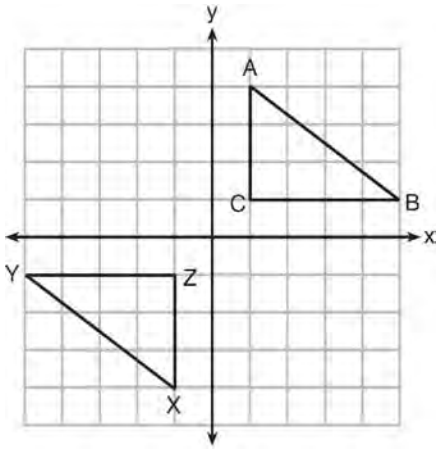


If $m\angle BAC = 50°$, find $m\angle AXC$.

404 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.]

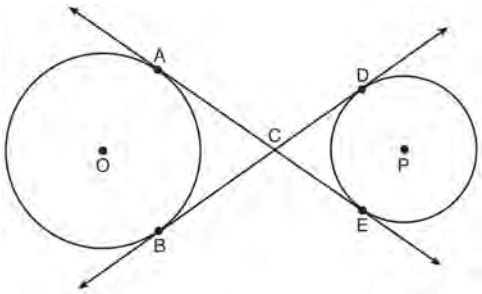


405 In the diagram below, $\triangle ABC$ and $\triangle XYZ$ are graphed.

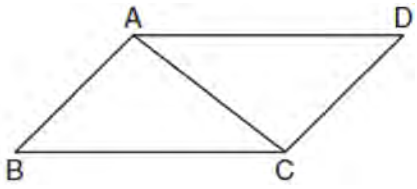


Use the properties of rigid motions to explain why $\triangle ABC \cong \triangle XYZ$.

406 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 $\overline{CD}$.

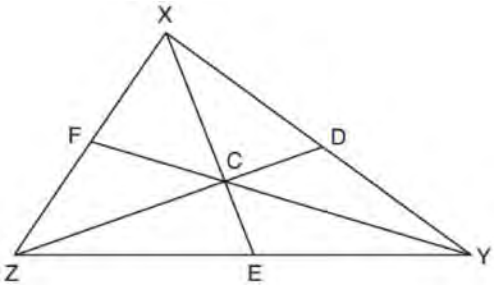


407 Given: Parallelogram $ABCD$ with diagonal $\overline{AC}$ drawn



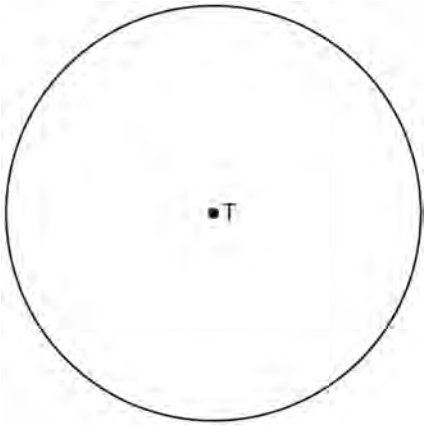
Prove: $\triangle ABC \cong \triangle CDA$

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

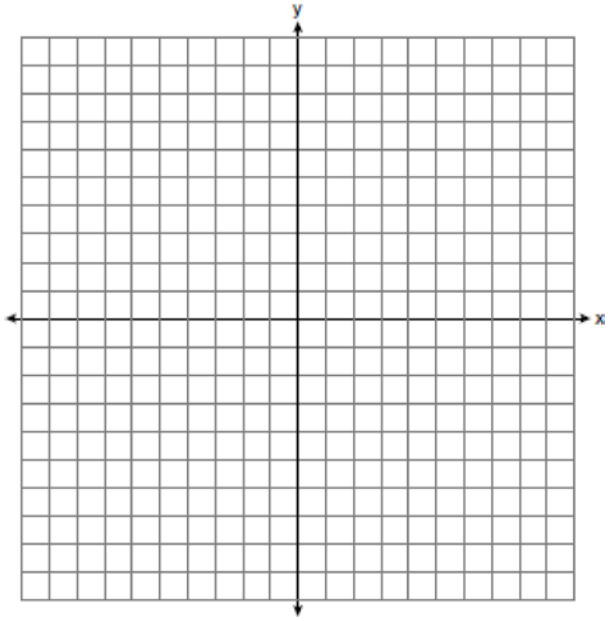


If $CE = 5$, $YF = 21$, and $XZ = 15$, determine and state the perimeter of triangle CFX.

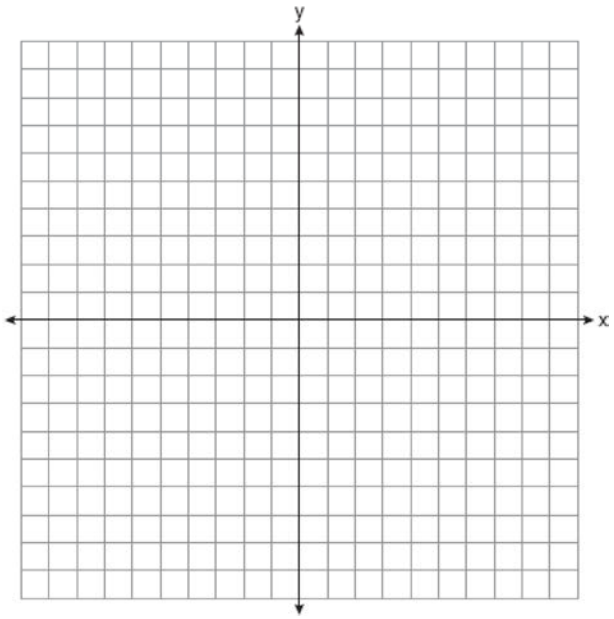
409 Use a compass and straightedge to construct an inscribed square in circle T shown below. [Leave all construction marks.]



410 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.]



411 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.

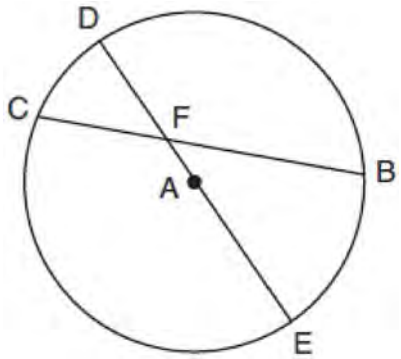


412 Find the value of R that will make the equation $\sin 73° = \cos R$ true when $0° < R < 90°$. Explain your answer.

413 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.

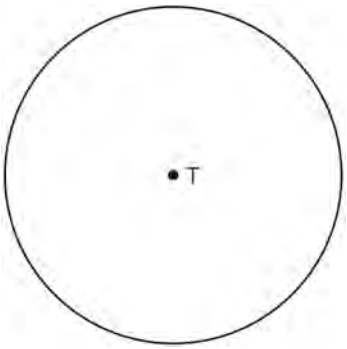
414 A circle has a center at $(1,-2)$ and radius of 4. Does the point $(3.4,1.2)$ lie on the circle? Justify your answer.

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



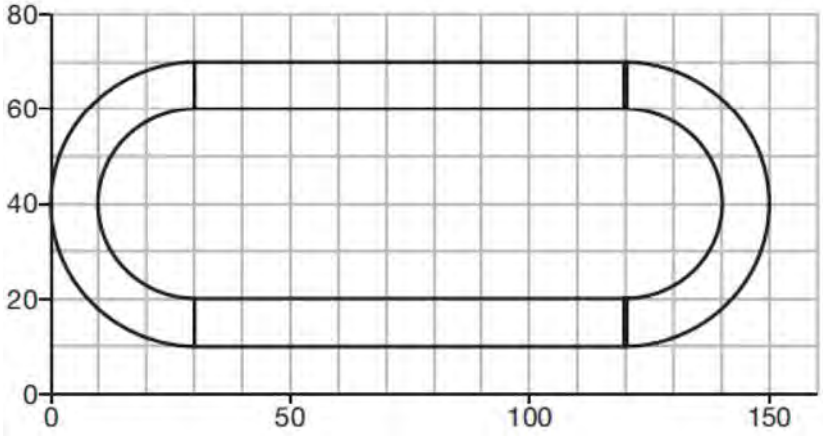
If $m\overset{\frown}{CD} = 46°$ and $m\overset{\frown}{DB} = 102°$, what is $m\angle CFE$?

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

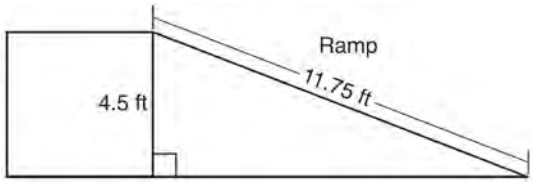


417 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in^3. After being fully inflated, its volume is approximately 294 in^3. To the *nearest tenth of an inch*, how much does the radius increase when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

418 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.



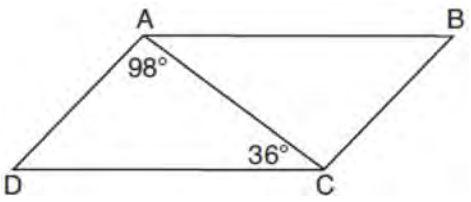
419 The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.



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

420 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.

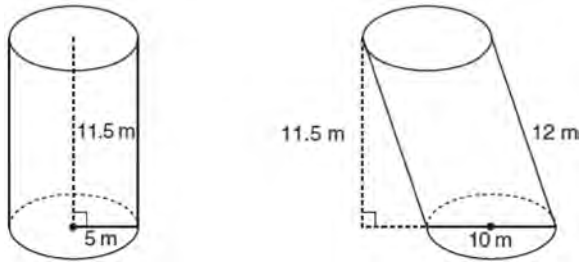
421 In parallelogram *ABCD* shown below, m∠*DAC* = 98° and m∠*ACD* = 36°.



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

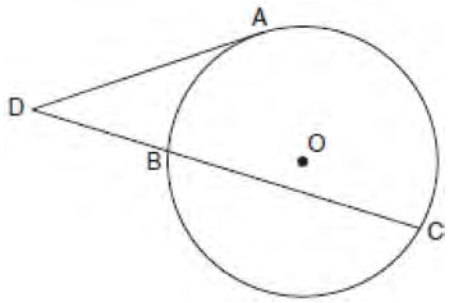
422 A flagpole casts a shadow 16.60 meters long. Tim stands at a distance of 12.45 meters from the base of the flagpole, such that the end of Tim's shadow meets the end of the flagpole's shadow. If Tim is 1.65 meters tall, determine and state the height of the flagpole to the *nearest tenth of a meter*.

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



Is Sue correct? Explain why.

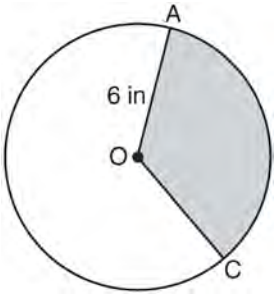
424 In the diagram below, tangent $\overline{DA}$ and secant $\overline{DBC}$ are drawn to circle O from external point D, such that $\overset{\frown}{AC} \cong \overset{\frown}{BC}$.



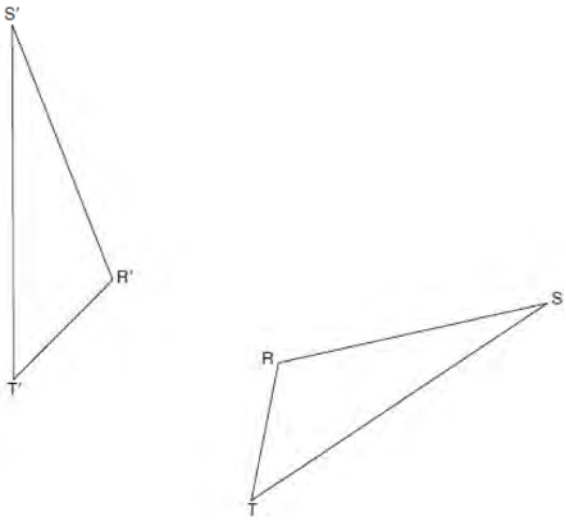
If $m\overset{\frown}{BC} = 152°$, determine and state $m\angle D$.

425 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 $1920\ \text{kg}/\text{m}^3$. The maximum capacity of the contractor's trailer is 900 kg. Can the trailer hold the weight of 500 bricks? Justify your answer.

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

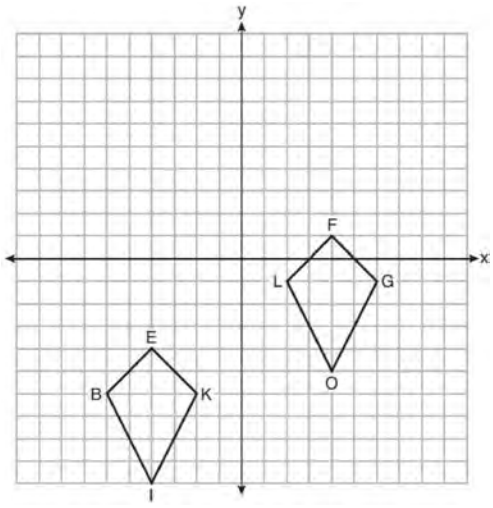


427 Using a compass and straightedge, construct the line of reflection over which triangle RST reflects onto triangle $R'S'T'$. [Leave all construction marks.]



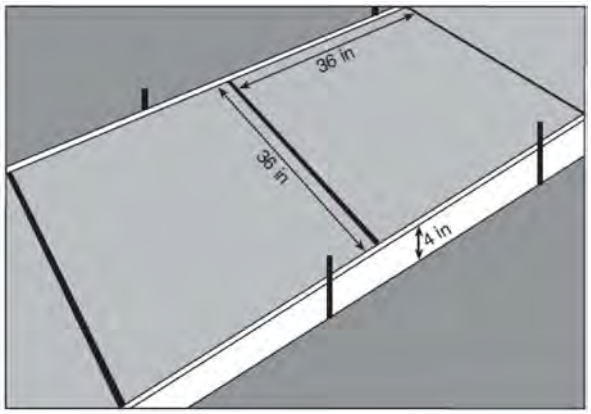
428 In right triangle ABC with the right angle at C, $\sin A = 2x + 0.1$ and $\cos B = 4x - 0.7$. Determine and state the value of x. Explain your answer.

429 Quadrilaterals *BIKE* and *GOLF* are graphed on the set of axes below.



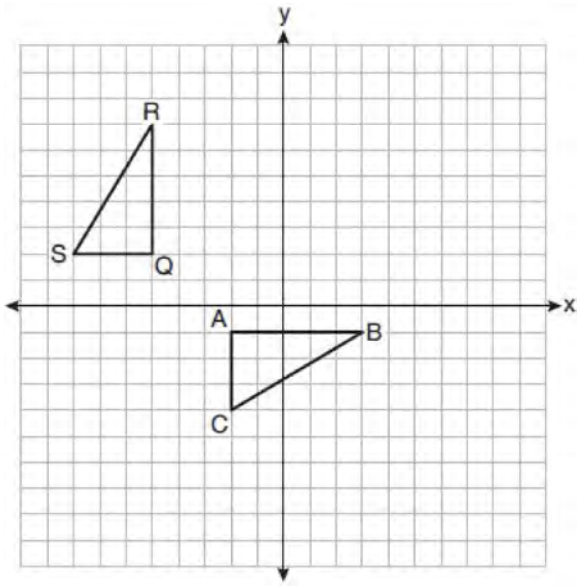
Describe a sequence of transformations that maps quadrilateral *BIKE* onto quadrilateral *GOLF*.

430 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.



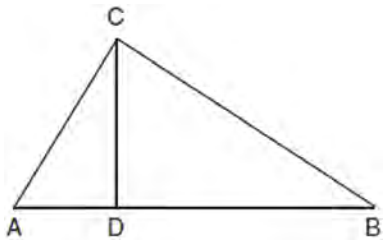
How much money will it cost Ian to replace the two concrete sections?

431 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 $S(-8,2)$.



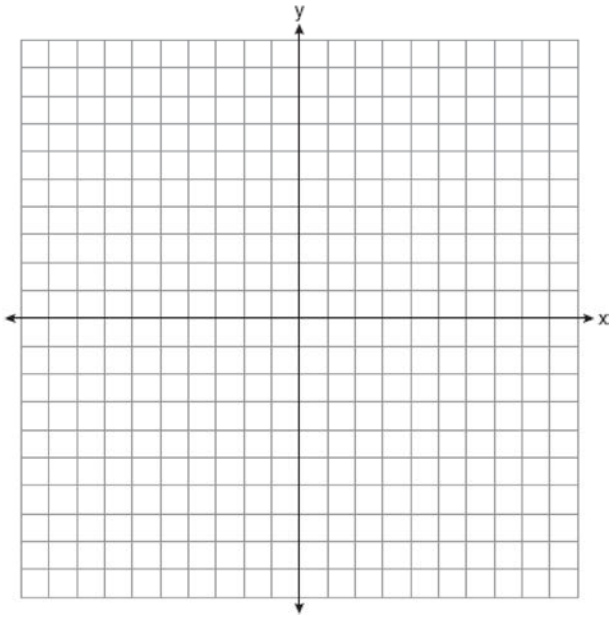
Describe a sequence of transformations that would map $\triangle ABC$ onto $\triangle QRS$.

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

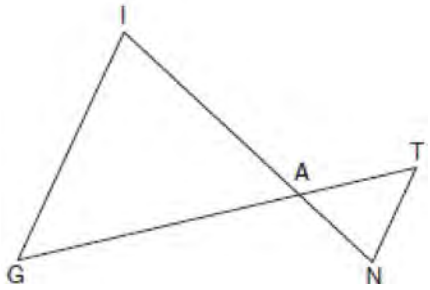


433 Aliyah says that when the line $4x + 3y = 24$ is dilated by a scale factor of 2 centered at the point $(3,4)$, the equation of the dilated line is $y = -\frac{4}{3}x + 16$. Is Aliyah correct? Explain why.

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

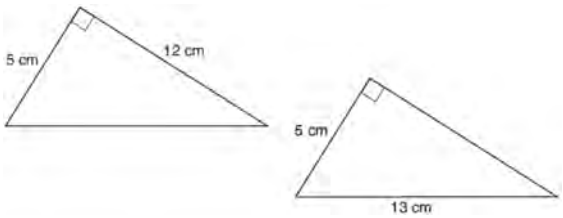


434 In the diagram below, $\overline{GI}$ is parallel to $\overline{NT}$, and $\overline{IN}$ intersects $\overline{GT}$ at A.



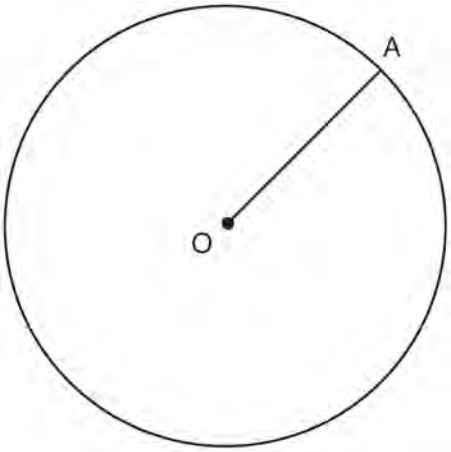
Prove: $\triangle GIA \sim \triangle TNA$

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



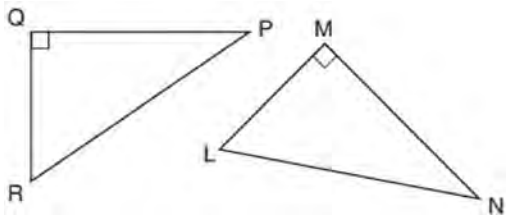
Are Skye and Margaret both correct? Explain why.

436 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.]



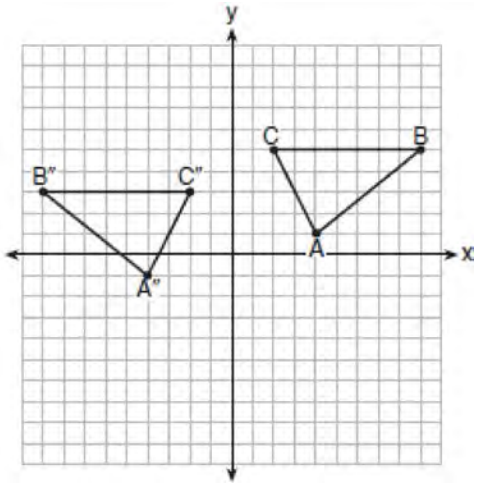
437 A ladder leans against a building. The top of the ladder touches the building 10 feet above the ground. The foot of the ladder is 4 feet from the building. Find, to the *nearest degree*, the angle that the ladder makes with the level ground.

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



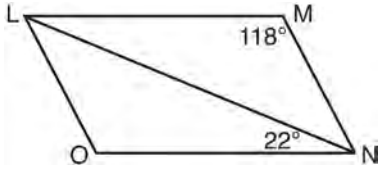
Write a set of three congruency statements that would show *ASA* congruency for these triangles.

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



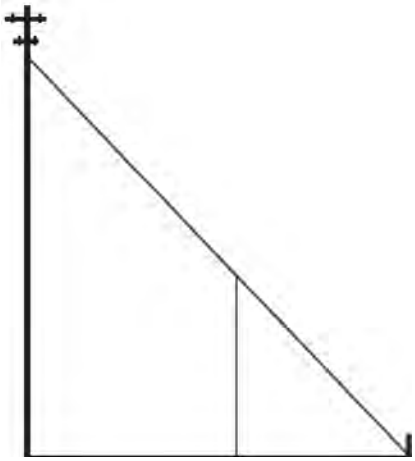
Describe a sequence of rigid motions which would map $\triangle ABC$ onto $\triangle A''B''C''$.

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



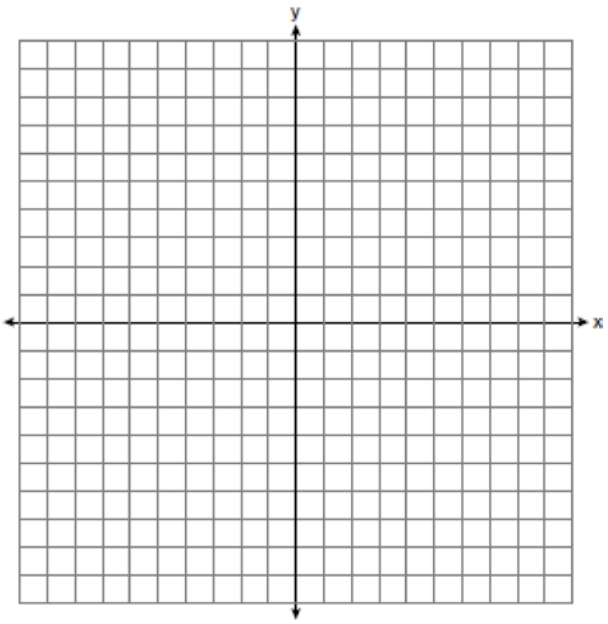
Explain why $m\angle NLO$ is 40 degrees.

441 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.

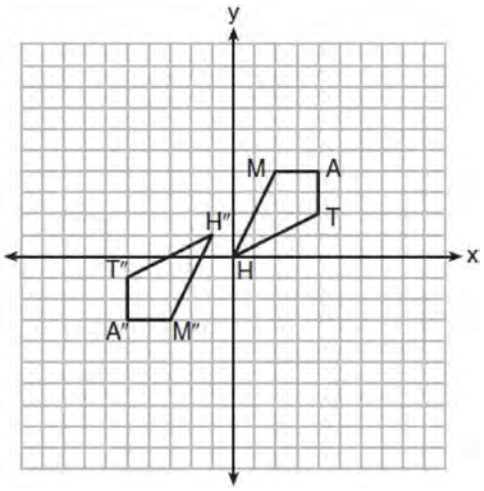


Jamal says he can approximate how high the support wire attaches to the telephone pole by using similar triangles. Explain why the triangles are similar.

442 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.]

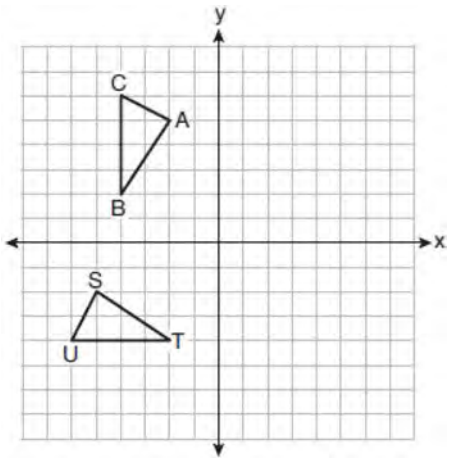


443 Quadrilateral $MATH$ and its image $M''A''T''H''$ are graphed on the set of axes below.



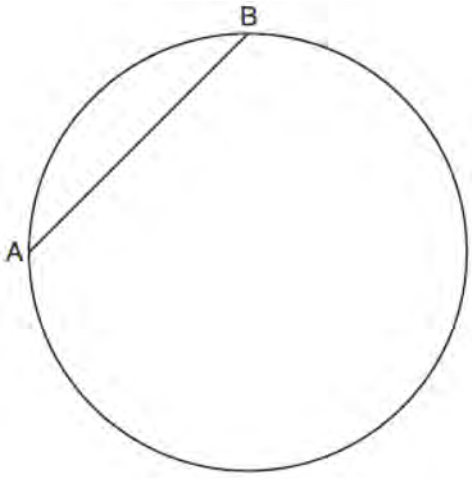
Describe a sequence of transformations that maps quadrilateral $MATH$ onto quadrilateral $M''A''T''H''$.

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

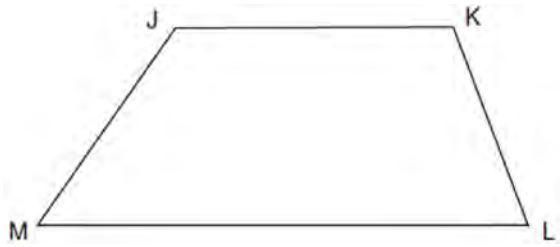


Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle STU$.

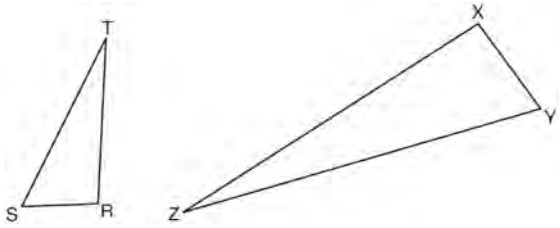
445 In the circle below, $\overline{AB}$ is a chord. Using a compass and straightedge, construct a diameter of the circle. [Leave all construction marks.]



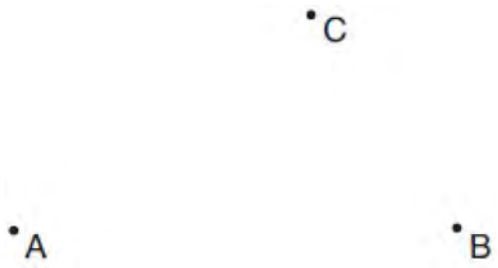
446 Given: Trapezoid $JKLM$ with $\overline{JK} \parallel \overline{ML}$
Using a compass and straightedge, construct the altitude from vertex J to $\overline{ML}$. [Leave all construction marks.]



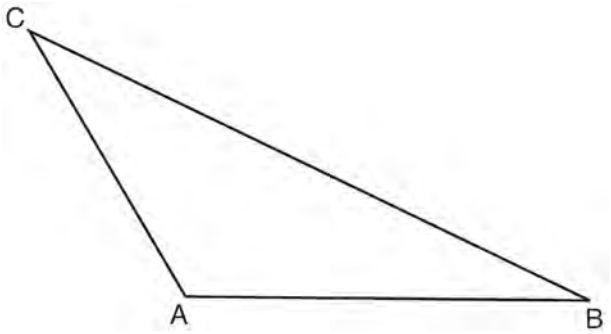
447 Triangles RST and XYZ are drawn below. If $RS = 6$, $ST = 14$, $XY = 9$, $YZ = 21$, and $\angle S \cong \angle Y$, is $\triangle RST$ similar to $\triangle XYZ$? Justify your answer.



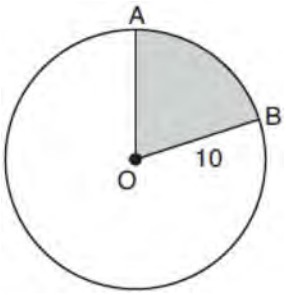
448 Given points A, B, and C, use a compass and straightedge to construct point D so that $ABCD$ is a parallelogram. [Leave all construction marks.]



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



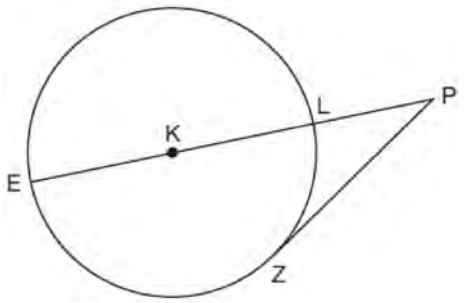
450 In the diagram below, circle O has a radius of 10.



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

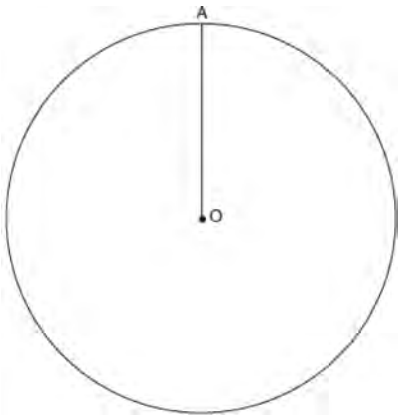
451 A rectangular tabletop will be made of maple wood that weighs 43 pounds per cubic foot. The tabletop will have a length of eight feet, a width of three feet, and a thickness of one inch. Determine and state the weight of the tabletop, in pounds.

452 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*.

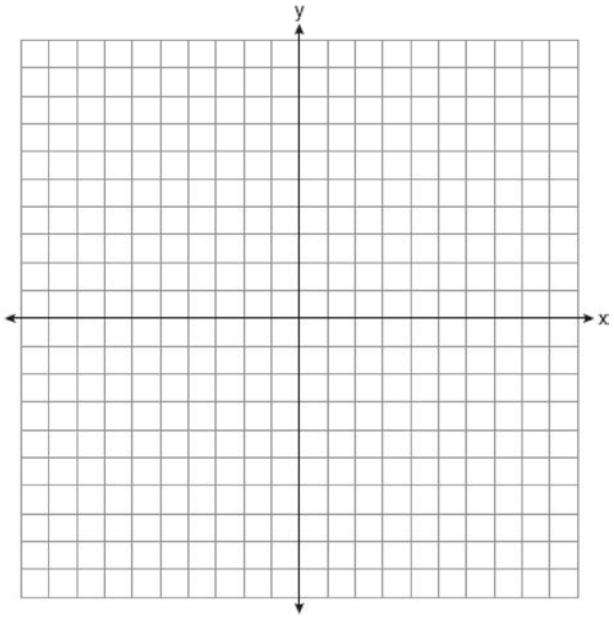
453 Given circle *O* with radius $\overline{OA}$, use a compass and straightedge to construct an equilateral triangle inscribed in circle *O*. [Leave all construction marks.]



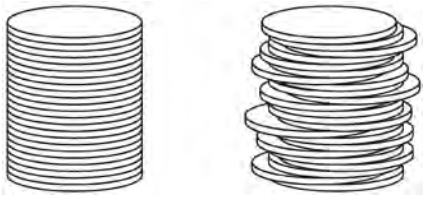
454 Randy's basketball is in the shape of a sphere with a maximum circumference of 29.5 inches. Determine and state the volume of the basketball, to the *nearest cubic inch*.

455 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*.

456 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.]

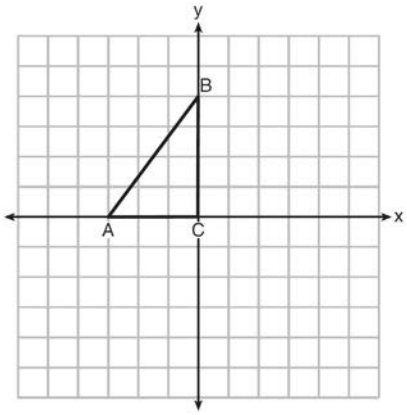


457 Two stacks of 23 quarters each are shown below. One stack forms a cylinder but the other stack does not form a cylinder.

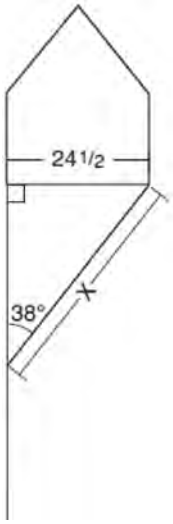


Use Cavelieri's principle to explain why the volumes of these two stacks of quarters are equal.

458 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 $x = 1$.

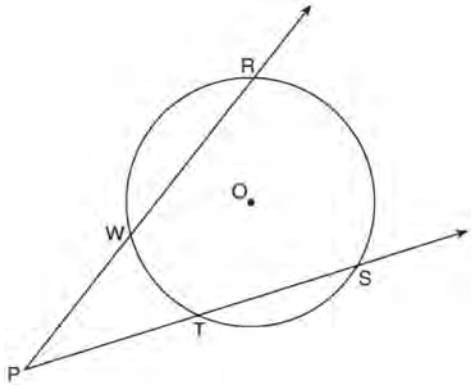


459 Diego needs to install a support beam to hold up his new birdhouse, as modeled below. The base of the birdhouse is $24\frac{1}{2}$ inches long. The support beam will form an angle of 38° with the vertical post. Determine and state the approximate length of the support beam, *x*, to the *nearest inch*.



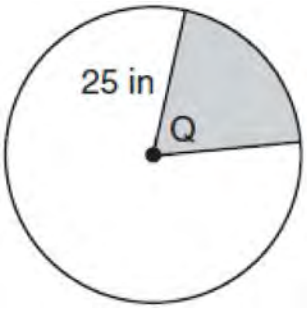
460 After a reflection over a line, $\triangle A'B'C'$ is the image of $\triangle ABC$. Explain why triangle *ABC* is congruent to triangle $\triangle A'B'C'$.

461 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 $m\overset{\frown}{WT}$.

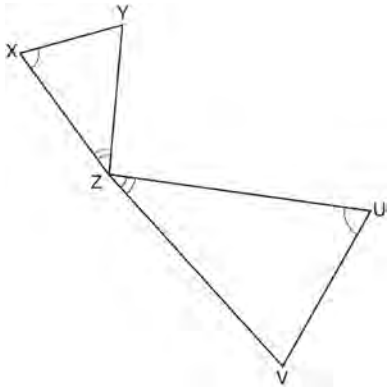
462 In the diagram below, the circle has a radius of 25 inches. The area of the *unshaded* sector is 500π in^2.



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

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

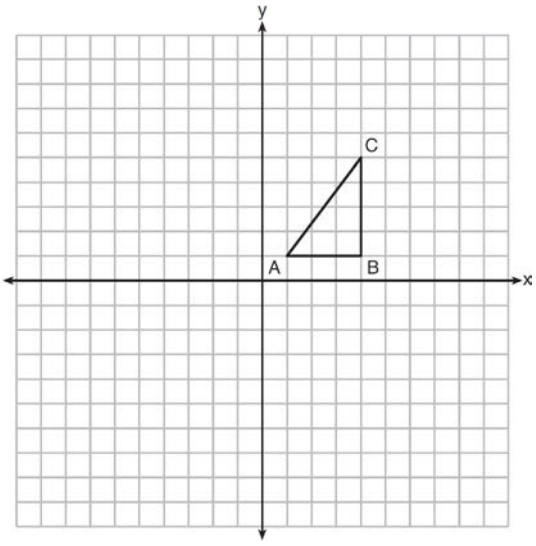
464 In the diagram below, triangles XYZ and UVZ are drawn such that $\angle X \cong \angle U$ and $\angle XZY \cong \angle UZV$.



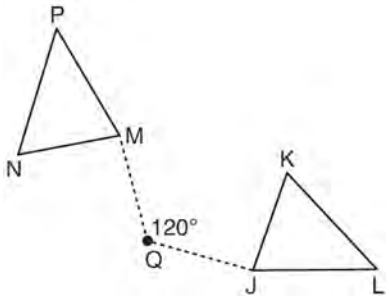
Describe a sequence of similarity transformations that shows $\triangle XYZ$ is similar to $\triangle UVZ$.

465 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.

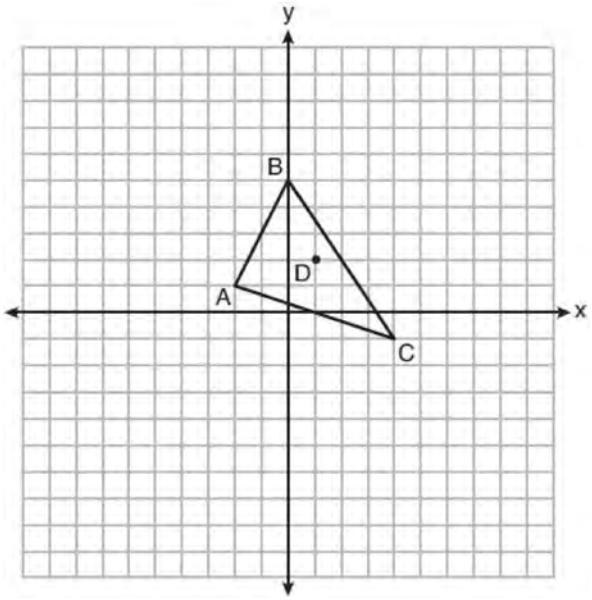
466 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A"B"C"$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.



467 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.

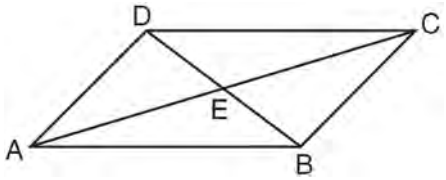


468 Triangle ABC and point $D(1,2)$ are graphed on the set of axes below.



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

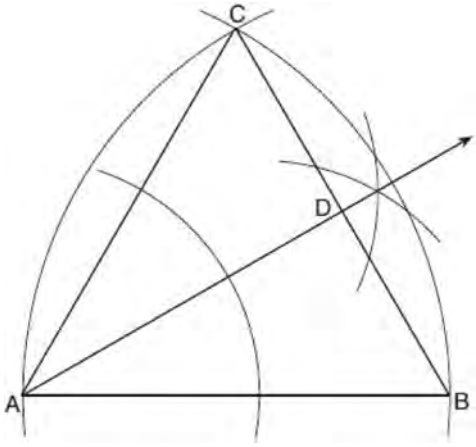
469 In parallelogram $ABCD$ shown below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E.



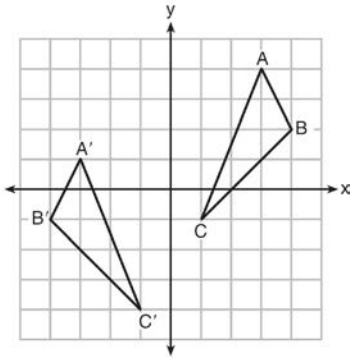
Prove: $\angle ACD \cong \angle CAB$

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

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

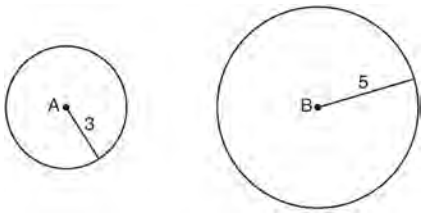


472 As graphed on the set of axes below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a sequence of transformations.



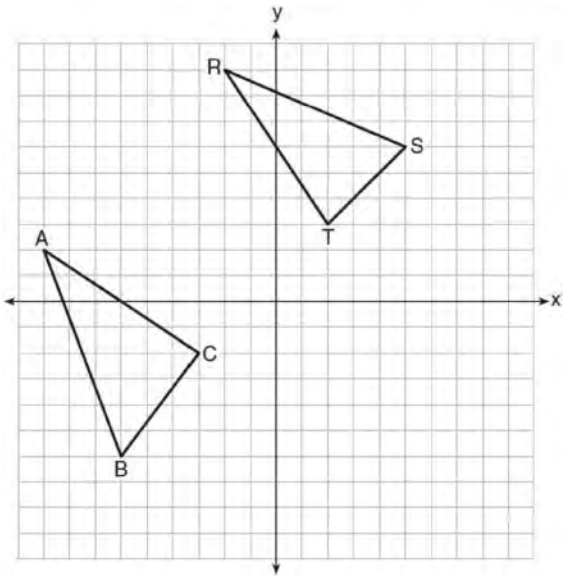
Is $\triangle A'B'C'$ congruent to $\triangle ABC$? Use the properties of rigid motion to explain your answer.

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



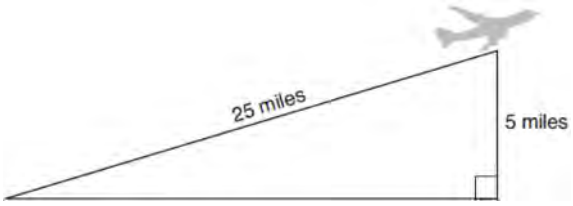
Use transformations to explain why circles *A* and *B* are similar.

474 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 $T(2,3)$.



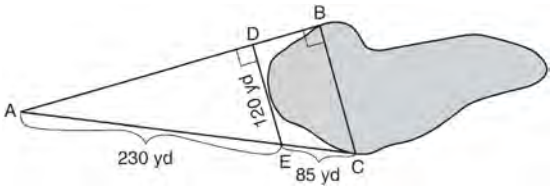
Is $\triangle ABC$ congruent to $\triangle RST$? Use the properties of rigid motions to explain your reasoning.

475 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.



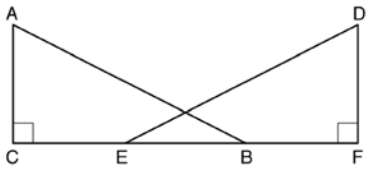
To the *nearest tenth of a degree*, what was the angle of elevation?

476 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.

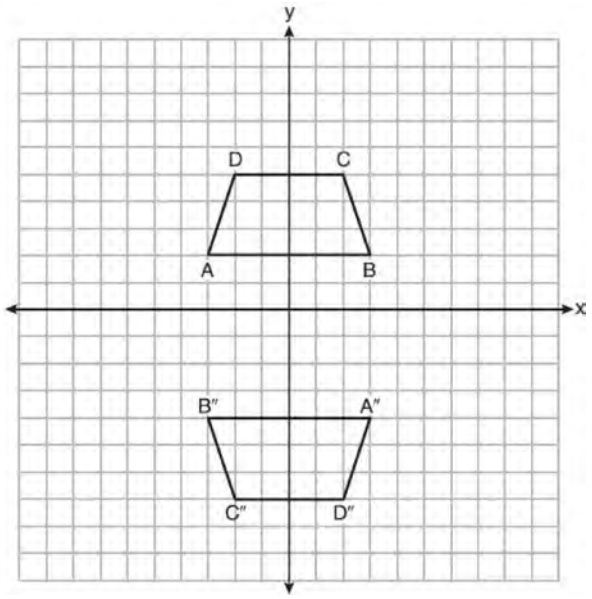


Use the surveyor's information to determine and state the distance from point *B* to point *C*, to the *nearest yard*.

477 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 $\triangle ABC \cong \triangle DEF$.

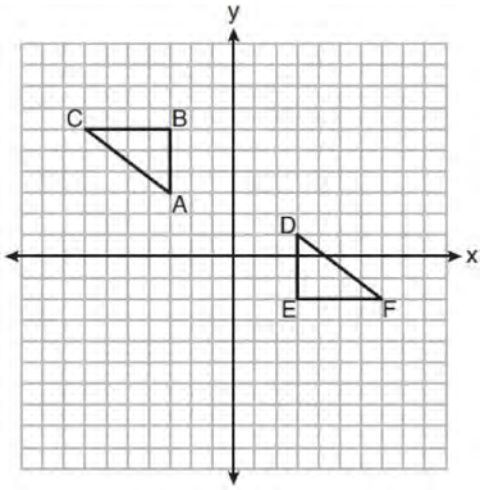


478 Trapezoids *ABCD* and *A"B"C"D"* are graphed on the set of axes below.



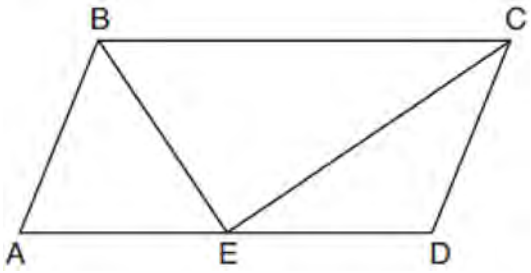
Describe a sequence of transformations that maps trapezoid *ABCD* onto trapezoid *A"B"C"D"*.

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



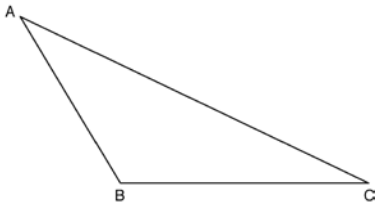
Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle DEF$.

480 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 $m\angle BEC$.

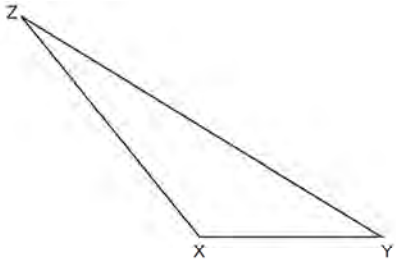
481 Using a compass and straightedge, construct an altitude of triangle *ABC* below. [Leave all construction marks.]



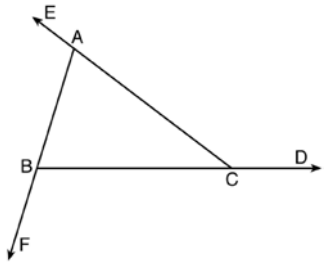
Geometry 4 Point Regents Exam Questions

482 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.

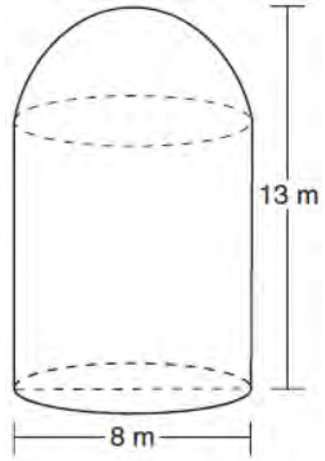
483 Triangle *XYZ* is shown below. Using a compass and straightedge, on the line below, construct and label $\triangle ABC$, such that $\triangle ABC \cong \triangle XYZ$. [Leave all construction marks.] Based on your construction, state the theorem that justifies why $\triangle ABC$ is congruent to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



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

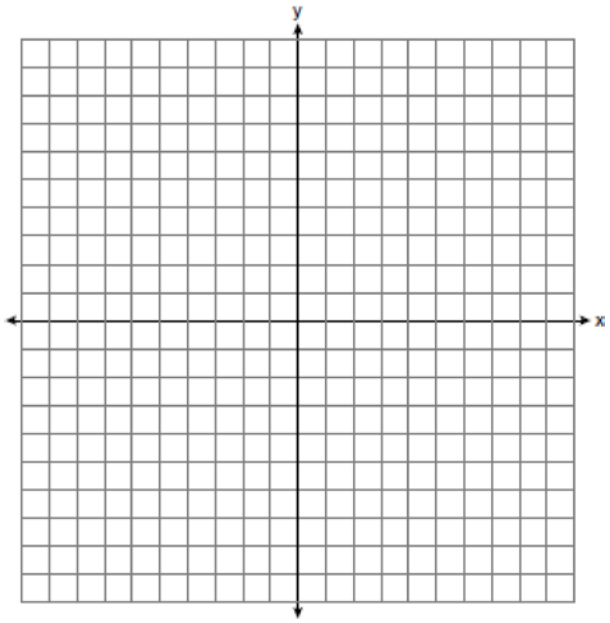


485 A storage tank is in the shape of a cylinder with a hemisphere on the top. The highest point on the inside of the storage tank is 13 meters above the floor of the storage tank, and the diameter inside the cylinder is 8 meters. Determine and state, to the *nearest cubic meter*, the total volume inside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

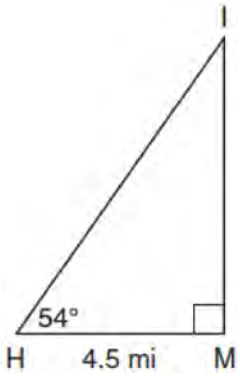


486 A barrel of fuel oil is a right circular cylinder where the inside measurements of the barrel are a diameter of 22.5 inches and a height of 33.5 inches. There are 231 cubic inches in a liquid gallon. Determine and state, to the *nearest tenth*, the gallons of fuel that are in a barrel of fuel oil.

487 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.]

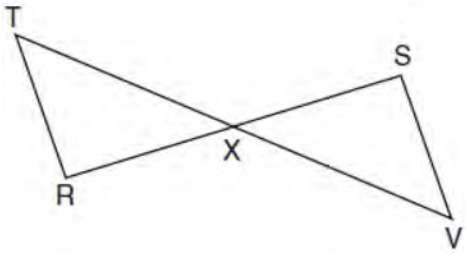


488 As shown in the diagram below, an island (I) is due north of a marina (M). A boat house (H) is 4.5 miles due west of the marina. From the boat house, the island is located at an angle of 54° from the marina.



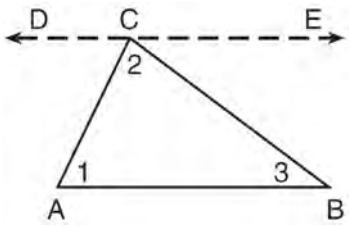
Determine and state, to the *nearest tenth of a mile*, the distance from the boat house (H) to the island (I). Determine and state, to the *nearest tenth of a mile*, the distance from the island (I) to the marina (M).

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



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

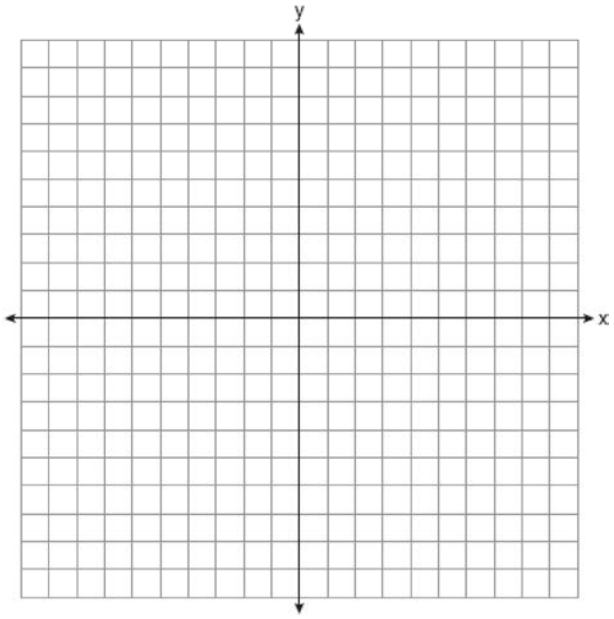
490 Given the theorem, "The sum of the measures of the interior angles of a triangle is 180°," complete the proof for this theorem.



Given: $\triangle ABC$
Prove: $m\angle 1 + m\angle 2 + m\angle 3 = 180°$
Fill in the missing reasons below.

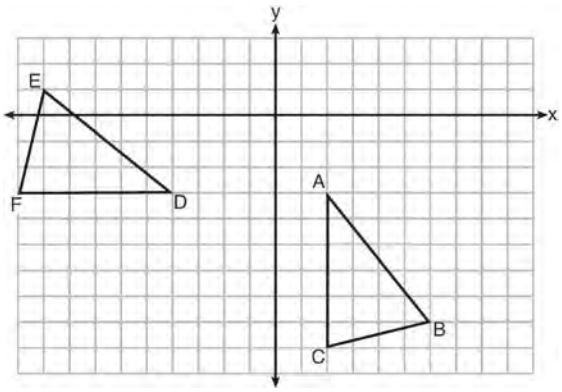
Statements	Reasons
(1) $\triangle ABC$	(1) Given
(2) Through point C, draw $\overleftrightarrow{DCE}$ parallel to $\overline{AB}$.	(2) _____
(3) $m\angle 1 = m\angle ACD$, $m\angle 3 = m\angle BCE$	(3) _____
(4) $m\angle ACD + m\angle 2 + m\angle BCE = 180°$	(4) _____
(5) $m\angle 1 + m\angle 2 + m\angle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

491 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.



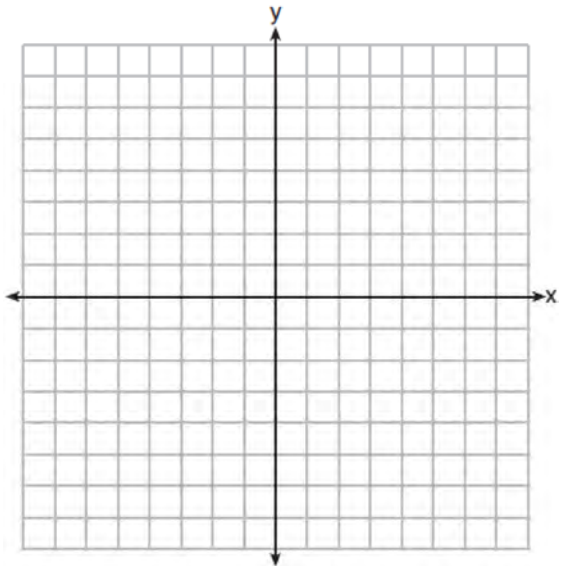
492 A bakery sells hollow chocolate spheres. The larger diameter of each sphere is 4 cm. The thickness of the chocolate of each sphere is 0.5 cm. Determine and state, to the *nearest tenth of a cubic centimeter*, the amount of chocolate in each hollow sphere. The bakery packages 8 of them into a box. 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.

493 The grid below shows $\triangle ABC$ and $\triangle DEF$.

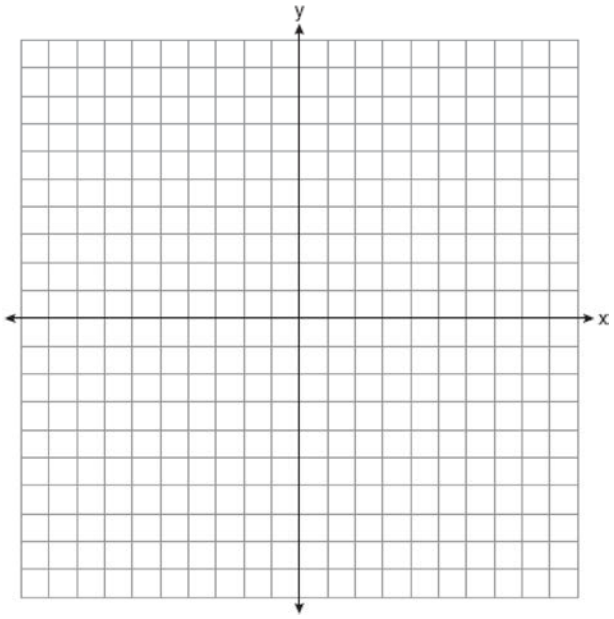


Let $\triangle A'B'C'$ be the image of $\triangle ABC$ after a rotation about point *A*. Determine and state the location of *B'* if the location of point *C'* is $(8,-3)$. Explain your answer. Is $\triangle DEF$ congruent to $\triangle A'B'C'$? Explain your answer.

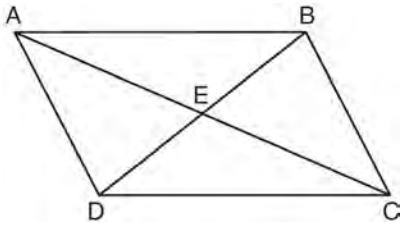
494 A triangle has vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$. Prove that $\triangle ABC$ is an isosceles right triangle. [The use of the set of axes below is optional.]



495 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 $\triangle ABC \cong \triangle DEF$.

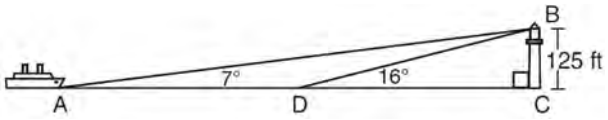


496 Given: Quadrilateral $ABCD$ is a parallelogram with diagonals $\overline{AC}$ and $\overline{BD}$ intersecting at E



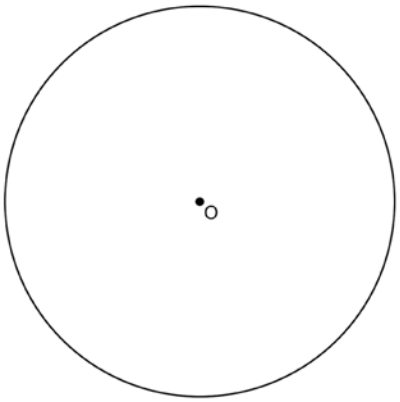
Prove: $\triangle AED \cong \triangle CEB$
Describe a single rigid motion that maps $\triangle AED$ onto $\triangle CEB$.

497 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°.



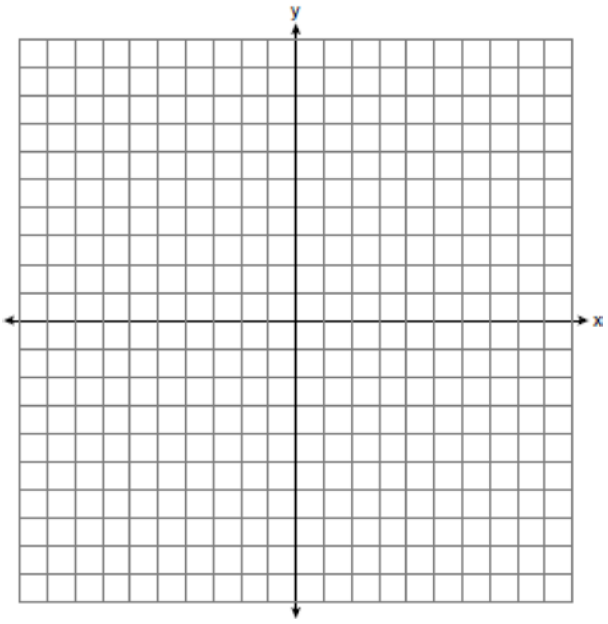
To the *nearest foot*, determine and state how far the ship traveled from point A to point D.

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

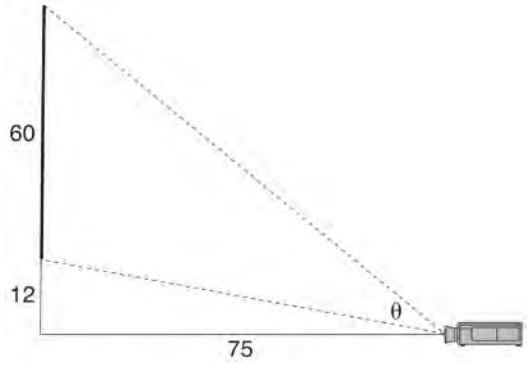


Determine the measure of the arc intercepted by two adjacent sides of the constructed square. Explain your reasoning.

499 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.]



500 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.

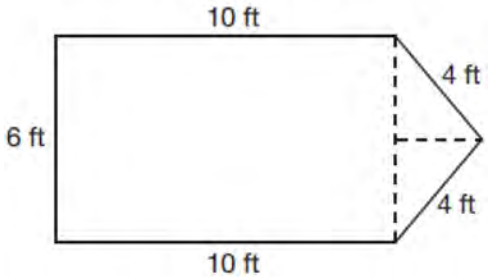


Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

501 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.

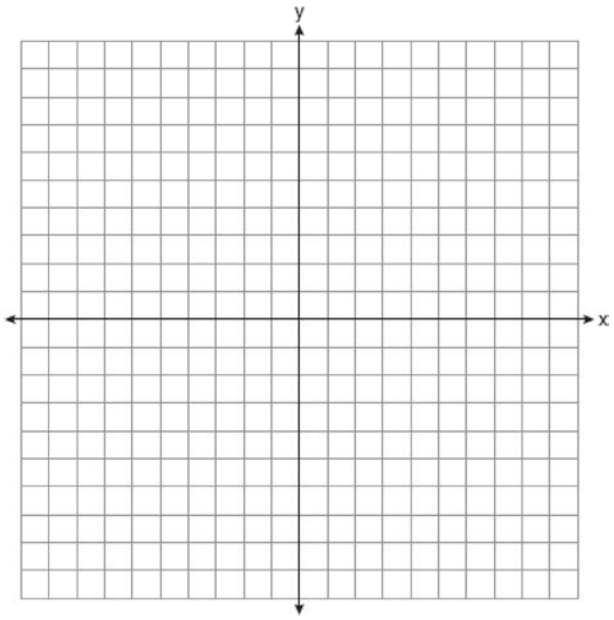
Cargo Trailer

Cargo Trailer Floor

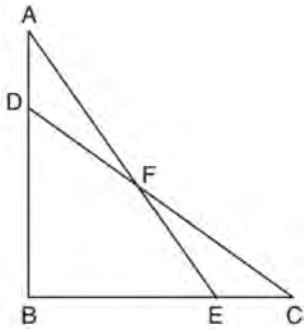


If the inside height of the trailer is 6.5 feet, what is the total volume of the inside of the trailer, to the *nearest cubic foot*?

502 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.]

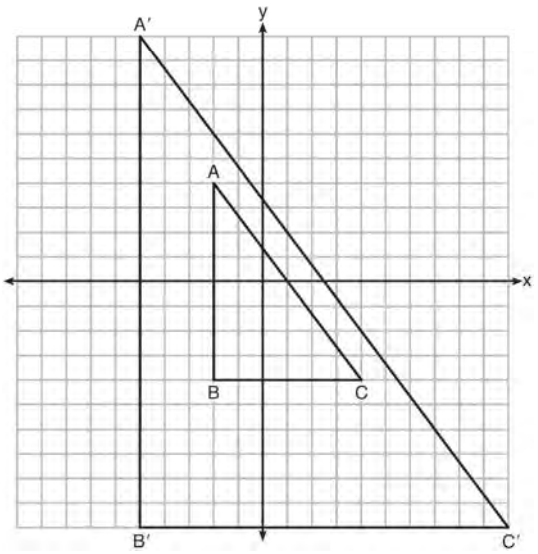


503 In the diagram below, $\triangle ABE \cong \triangle CBD$.



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

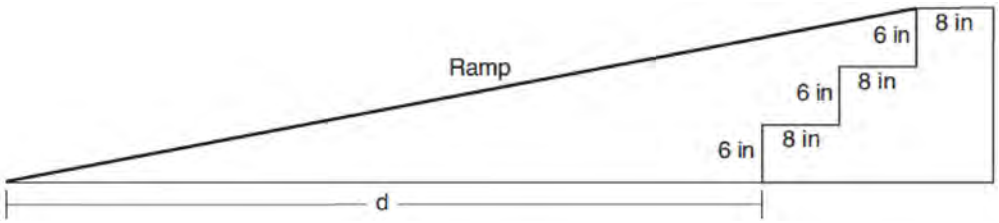
504 In the diagram below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a transformation.



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

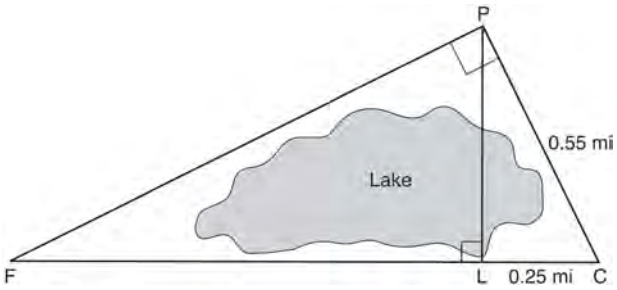
505 Trees that are cut down and stripped of their branches for timber are approximately cylindrical. A timber company specializes in a certain type of tree that has a typical diameter of 50 cm and a typical height of about 10 meters. The density of the wood is 380 kilograms per cubic meter, and the wood 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.

506 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.



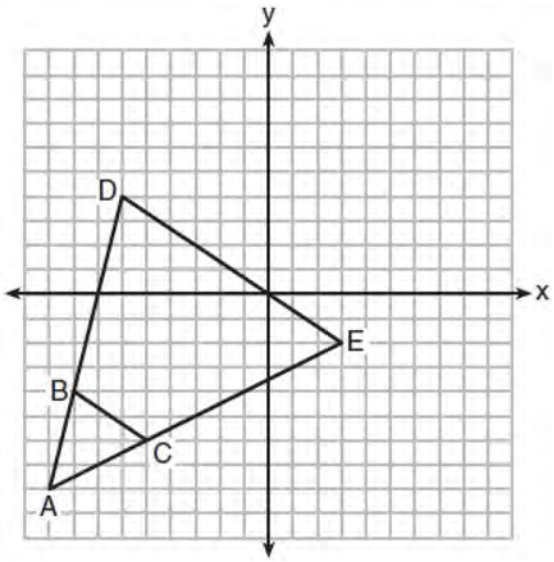
If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the *nearest tenth of a foot*. Determine and state, to the *nearest tenth of a foot*, the horizontal distance, *d*, from the bottom of the stairs to the bottom of the ramp.

507 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.



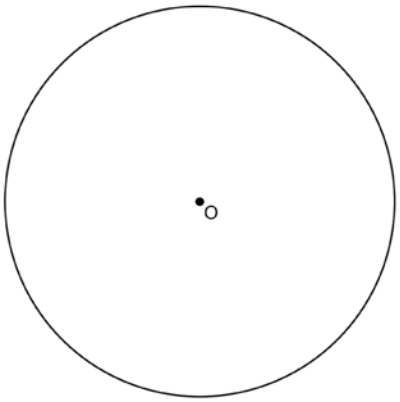
If the path from the park ranger station to the campground is 0.55 mile, determine and state, to the *nearest hundredth of a mile*, the distance between the park ranger station and the lifeguard chair. Gerald believes the distance from the first aid station to the campground is at least 1.5 miles. Is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

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



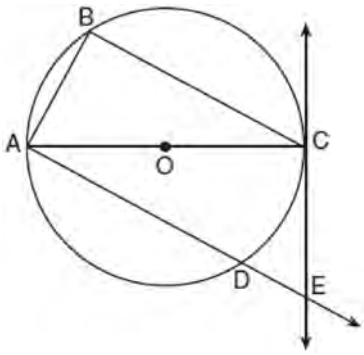
Describe a transformation that maps triangle *ABC* onto triangle *ADE*. Explain why this transformation makes triangle *ADE* similar to triangle *ABC*.

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



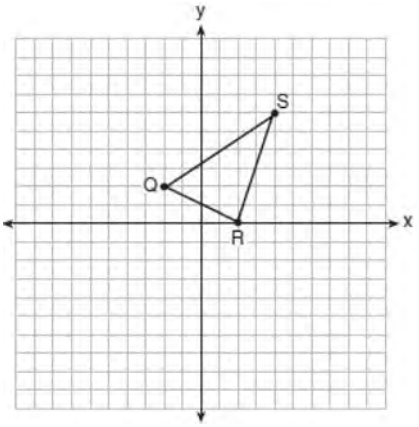
If chords $\overline{FB}$ and $\overline{FC}$ are drawn, which type of triangle, according to its angles, would $\triangle FBC$ be? Explain your answer.

510 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.



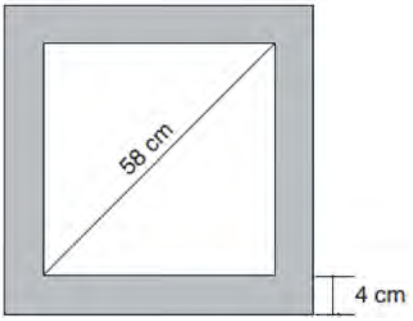
Prove: $\frac{BC}{CA} = \frac{AB}{EC}$

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



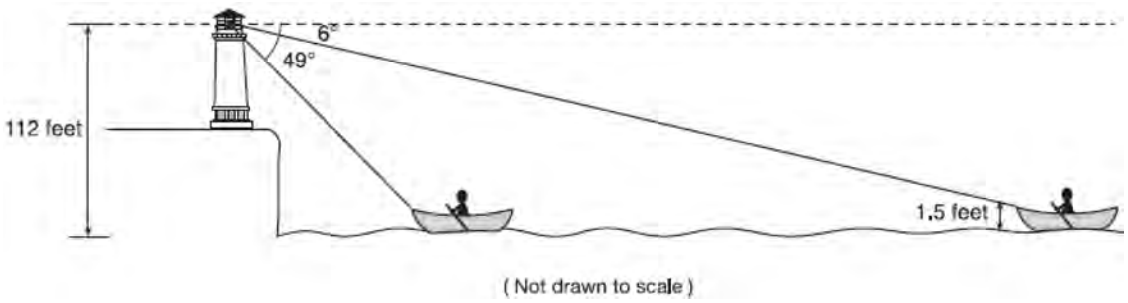
On the same set of axes, graph and label $\triangle Q'R'S'$, the image of $\triangle QRS$ after a dilation with a scale factor of $\frac{3}{2}$ centered at the origin. Use slopes to explain why $Q'R' \parallel QR$.

512 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.



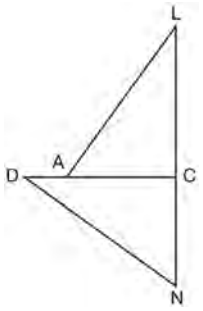
Determine and state the total area of the poster and frame to the *nearest tenth of a square centimeter*.

513 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.



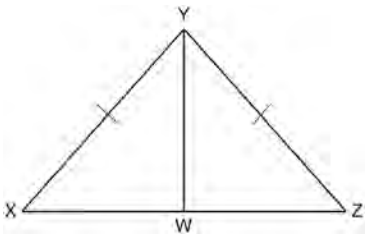
At 5:00, the observer in the lighthouse measured the angle of depression to the front of the canoe to be 6°. Five minutes later, the observer measured and saw the angle of depression to the front of the canoe had increased by 49°. Determine and state, to the *nearest foot per minute*, the average speed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

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

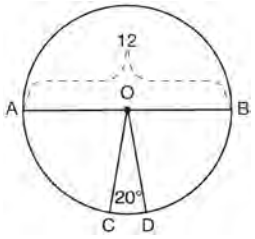


a) Prove that $\triangle LAC \cong \triangle DNC$.
b) Describe a sequence of rigid motions that will map $\triangle LAC$ onto $\triangle DNC$.

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

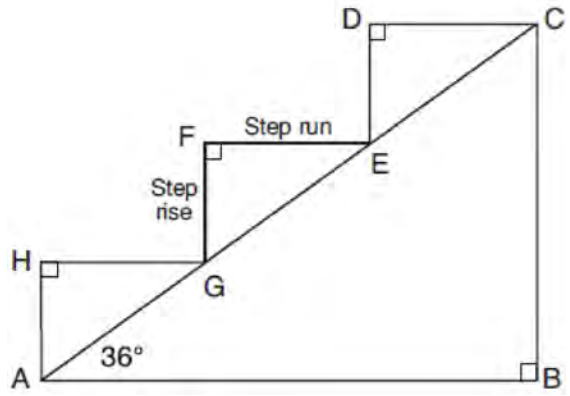


516 In the diagram below of circle O, diameter $\overline{AB}$ and radii $\overline{OC}$ and $\overline{OD}$ are drawn. The length of $\overline{AB}$ is 12 and the measure of $\angle COD$ is 20 degrees.



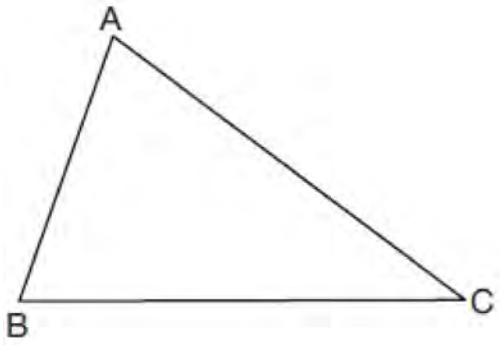
If $\overset{\frown}{AC} \cong \overset{\frown}{BD}$, find the area of sector BOD in terms of π.

517 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*.

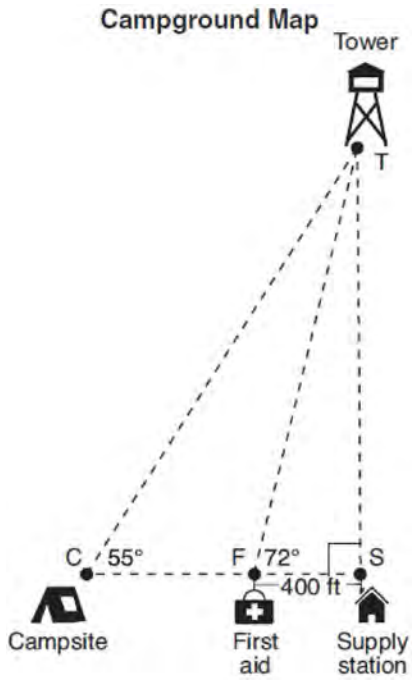
518 Triangle ABC is shown below. Using a compass and straightedge, construct the dilation of $\triangle ABC$ centered at B with a scale factor of 2. [Leave all construction marks.]



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

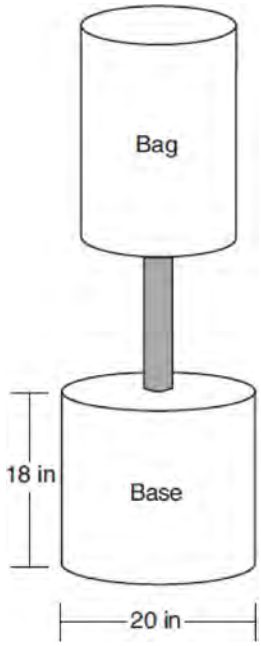
519 A child-sized swimming pool can be modeled by a cylinder. The pool has a diameter of $6\frac{1}{2}$ feet and a height of 12 inches. The pool is filled with water to $\frac{2}{3}$ of its height. Determine and state the volume of the water in the pool, to the *nearest cubic foot*. One cubic foot equals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

520 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°.



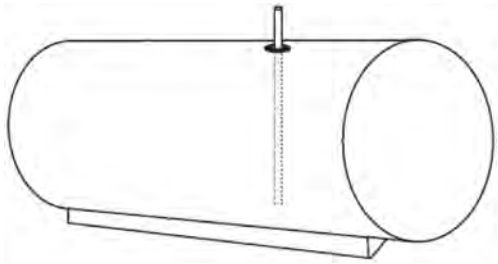
Determine and state, to the *nearest foot*, the distance from the campsite to the tower.

521 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.



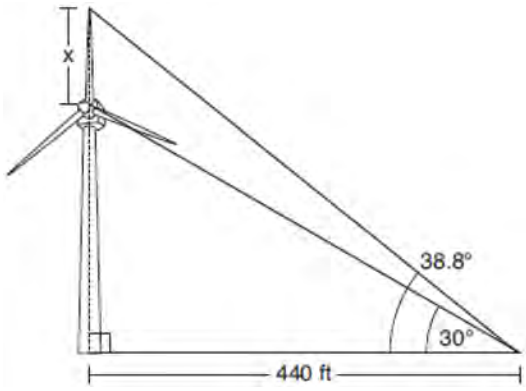
To the *nearest pound*, determine and state the total weight of the training equipment if the base is filled to 85% of its capacity.

522 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.



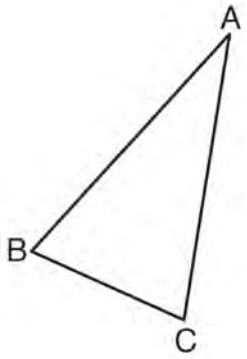
A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3=7.48 gallons]

523 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°.

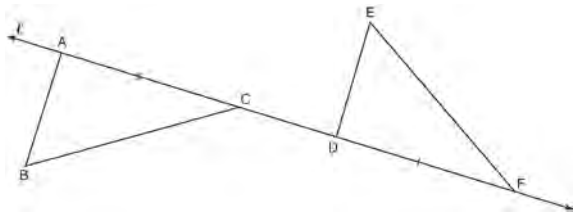


Determine and state a blade's length, *x*, to the *nearest foot*.

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

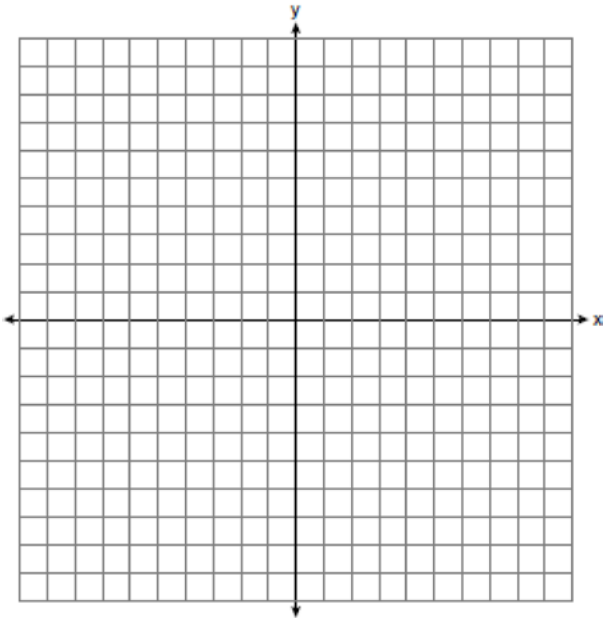


525 In the diagram below, $\overline{AC} \cong \overline{DF}$ and points *A*, *C*, *D*, and *F* are collinear on line ℓ.

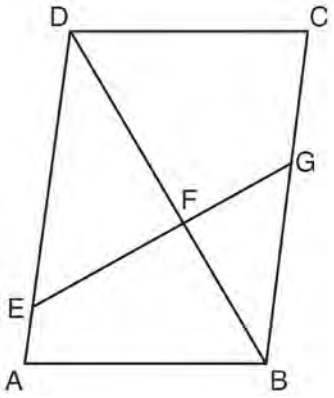


Let $\triangle D'E'F'$ be the image of $\triangle DEF$ after a translation along ℓ, such that point *D* is mapped onto point *A*. Determine and state the location of *F'*. Explain your answer. Let $\triangle D''E''F''$ be the image of $\triangle D'E'F'$ after a reflection across line ℓ. Suppose that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

526 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 $\overline{AH}$.

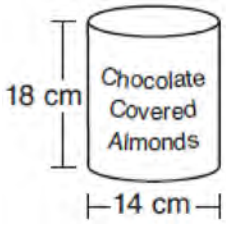


527 Given: Parallelogram *ABCD*, $\overline{EFG}$, and diagonal $\overline{DFB}$



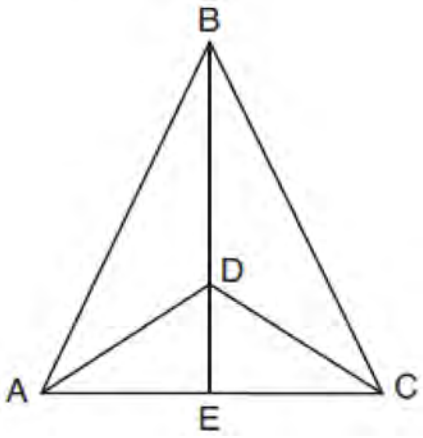
Prove: $\triangle DEF \sim \triangle BGF$

528 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.

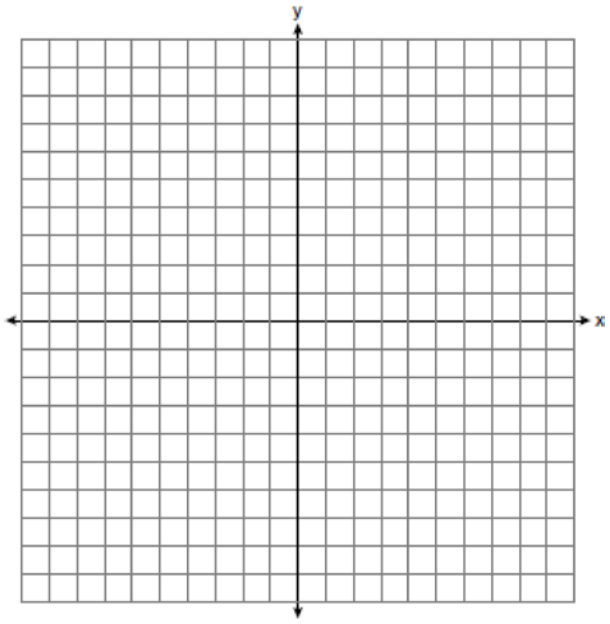
529 Given: $\triangle ABC$, $\overline{AEC}$, $\overline{BDE}$ with $\angle ABE \cong \angle CBE$, and $\angle ADE \cong \angle CDE$
Prove: $\overline{BDE}$ is the perpendicular bisector of $\overline{AC}$



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

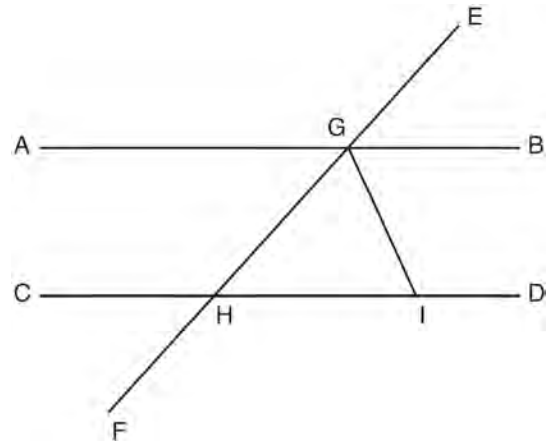
530 Triangle ABC has vertices with $A(x,3)$, $B(-3,-1)$, and $C(-1,-4)$. Determine and state a value of x that would make triangle ABC a right triangle. Justify why $\triangle ABC$ is a right triangle. [The use of the set of axes below is optional.]



531 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.

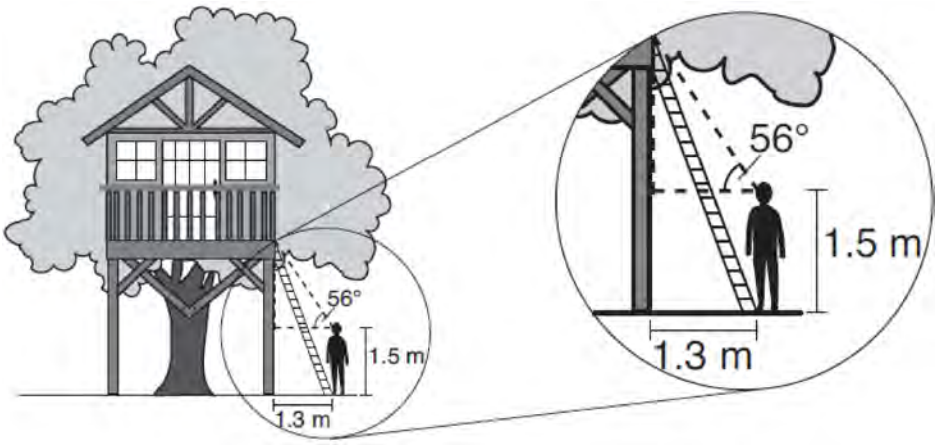
532 In the diagram below, $\overline{EF}$ intersects $\overline{AB}$ and $\overline{CD}$ at G and H, respectively, and $\overline{GI}$ is drawn such that $\overline{GH} \cong \overline{IH}$.



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

533 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]

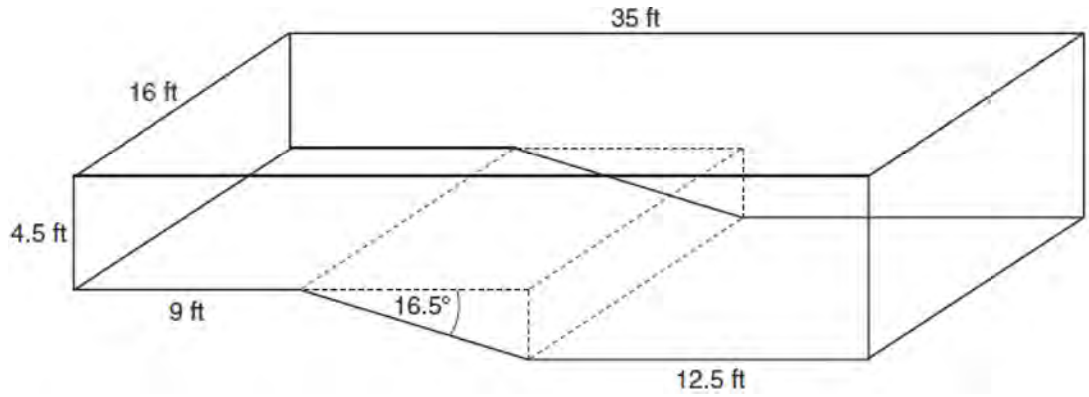
534 David has just finished building his treehouse and still needs to buy a ladder to be attached to the ledge of the treehouse and anchored at a point on the ground, as modeled below. David is standing 1.3 meters from the stilt supporting the treehouse. This is the point on the ground where he has decided 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.

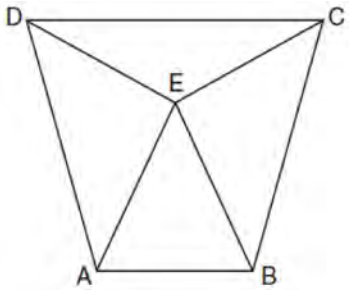
Geometry 6 Point Regents Exam Questions

535 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.



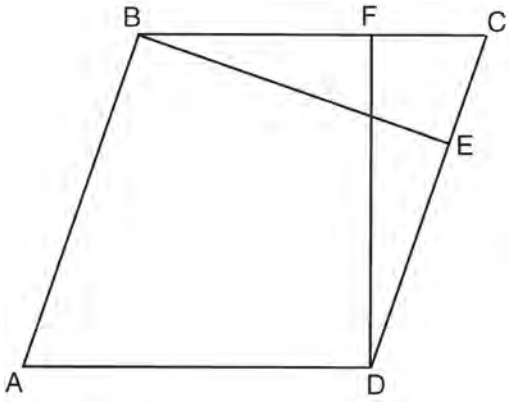
If the sloped floor has an angle of depression of 16.5 degrees, what is the depth of the pool at the deep end, to the *nearest tenth of a foot*? Find the volume of the inside of the pool to the *nearest cubic foot*. A garden hose is used to fill the pool. Water comes out of the hose at a rate of 10 .5 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]

536 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 $\overline{BE} \perp \overline{CE}$.



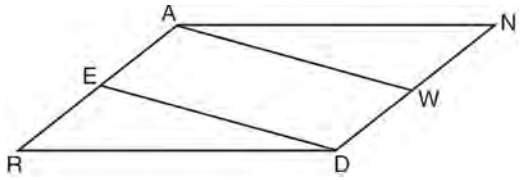
Prove $\triangle ADE \cong \triangle BCE$ and prove $\triangle AEB$ is an isosceles triangle.

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



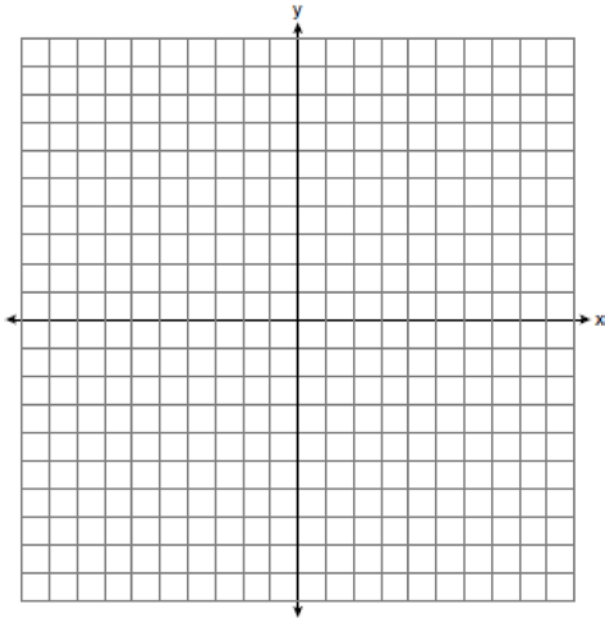
Prove *ABCD* is a rhombus.

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

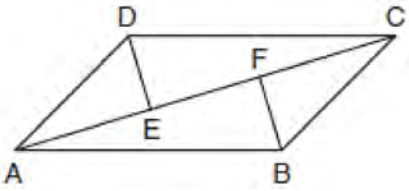


Prove that $\triangle ANW \cong \triangle DRE$. Prove that quadrilateral $AWDE$ is a parallelogram.

539 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.]

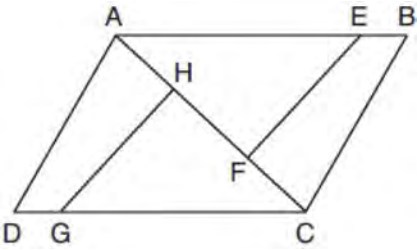


540 In quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$, $\overline{AB} \parallel \overline{CD}$, and $\overline{BF}$ and $\overline{DE}$ are perpendicular to diagonal $\overline{AC}$ at points F and E.



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

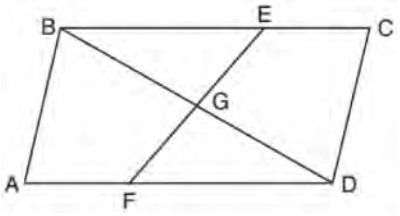
541 In the diagram of quadrilateral $ABCD$ with diagonal $\overline{AC}$ shown below, segments GH and EF are drawn, $\overline{AE} \cong \overline{CG}$, $\overline{BE} \cong \overline{DG}$, $\overline{AH} \cong \overline{CF}$, and $\overline{AD} \cong \overline{CB}$.



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

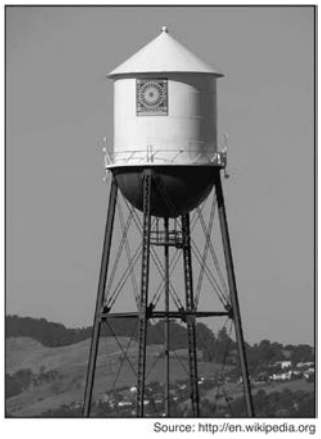
542 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, 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*.

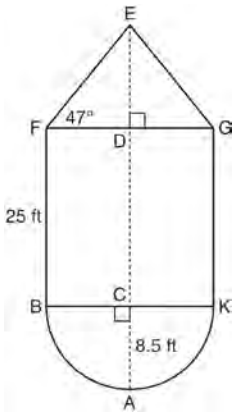
543 In quadrilateral *ABCD*, *E* and *F* are points on $\overline{BC}$ and $\overline{AD}$, respectively, and $\overline{BGD}$ and $\overline{EGF}$ are drawn such that $\angle ABG \cong \angle CDG$, $\overline{AB} \cong \overline{CD}$, and $\overline{CE} \cong \overline{AF}$.



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

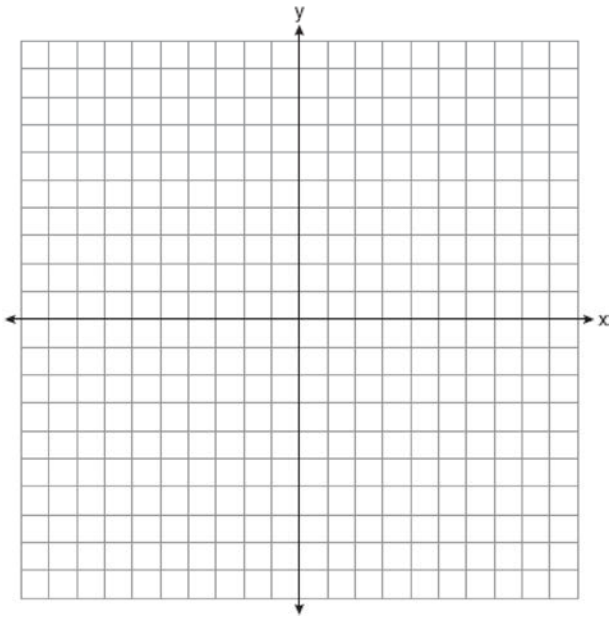
544 The water tower in the picture below is modeled by the two-dimensional figure beside it. The water tower is composed of a hemisphere, a cylinder, and a cone. Let *C* be the center of the hemisphere and let *D* be the center of the base of the cone.


Source: http://en.wikipedia.org

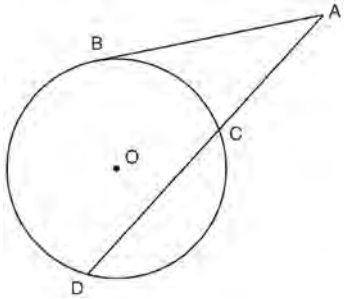


If $AC = 8.5$ feet, $BF = 25$ feet, and $m\angle EFD = 47°$, determine and state, to the *nearest cubic foot*, the volume of the water tower. The water tower was constructed to hold a maximum of 400,000 pounds of water. If water weighs 62.4 pounds per cubic foot, can the water tower be filled to 85%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

545 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.]

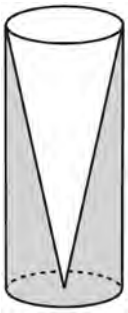


546 In the diagram below, secant $\overline{ACD}$ and tangent $\overline{AB}$ are drawn from external point *A* to circle *O*.



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

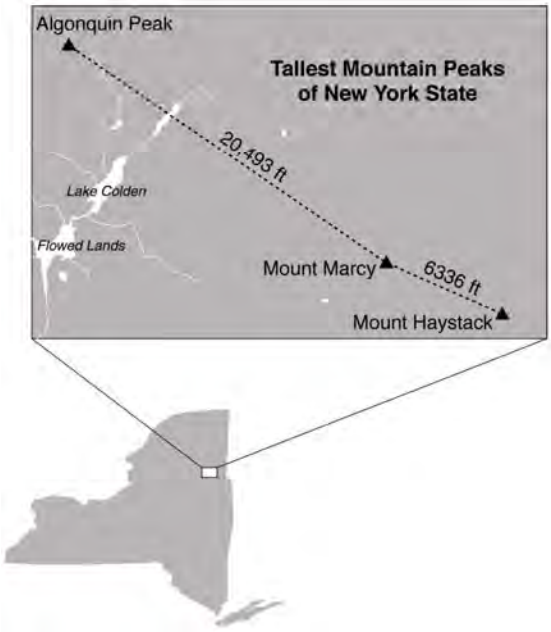
547 Walter wants to make 100 candles in the shape of a cone for his new candle business. The mold shown below will be used to make the candles. Each mold will have a height of 8 inches and a diameter of 3 inches. To the *nearest cubic inch*, what will be the total volume of 100 candles?



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?

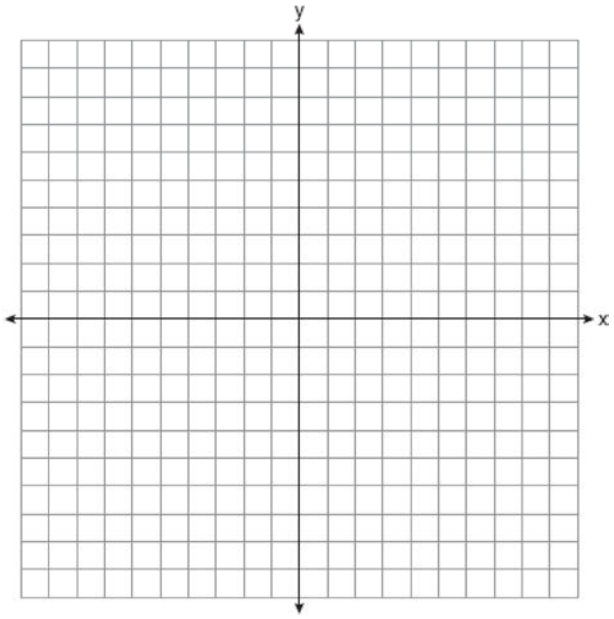
548 New streetlights will be installed along a section of the highway. The posts for the streetlights will be 7.5 m tall and made of aluminum. The city can choose to buy the posts shaped like cylinders or the posts shaped like rectangular prisms. The cylindrical posts have a hollow core, with aluminum 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?

549 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.

550 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.]

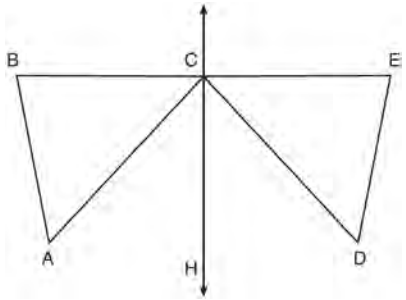


551 Given: *D* is the image of *A* after a reflection over $\overleftrightarrow{CH}$.

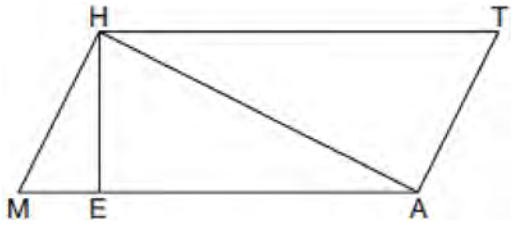
$\overleftrightarrow{CH}$ is the perpendicular bisector of $\overline{BCE}$

$\triangle ABC$ and $\triangle DEC$ are drawn

Prove: $\triangle ABC \cong \triangle DEC$

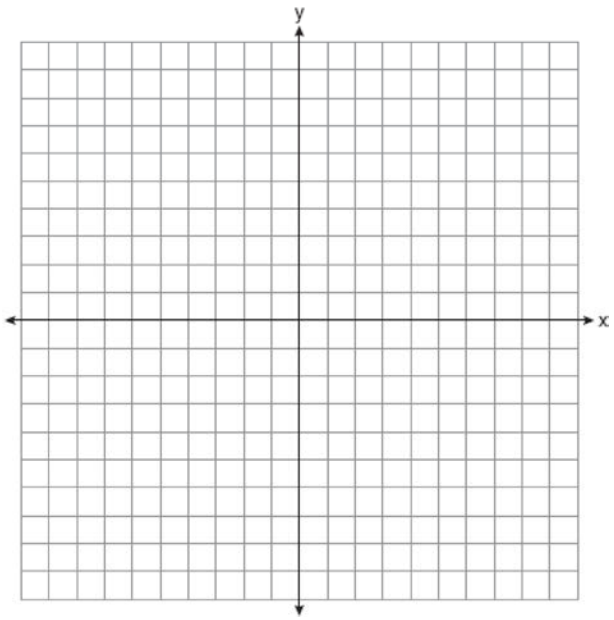


552 Given: Quadrilateral *MATH*, $\overline{HM} \cong \overline{AT}$, $\overline{HT} \cong \overline{AM}$, $\overline{HE} \perp \overline{MEA}$, and $\overline{HA} \perp \overline{AT}$

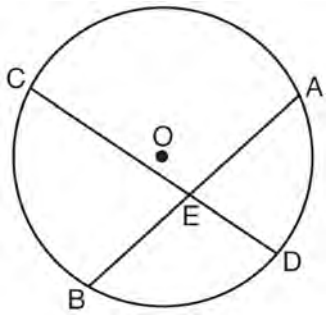


Prove: $TA \bullet HA = HE \bullet TH$

553 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.]

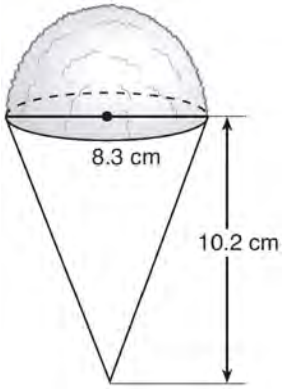


554 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E



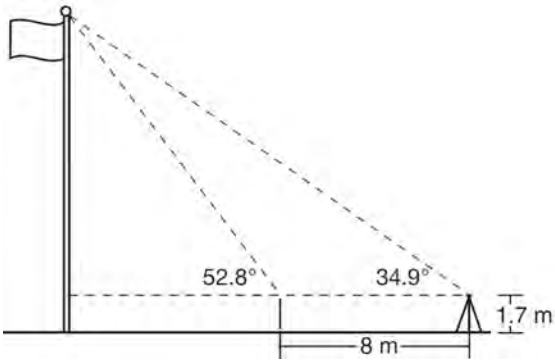
Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord. Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

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



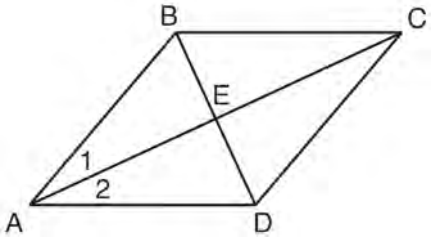
The desired density of the shaved ice is 0.697 g/cm^3, and the cost, per kilogram, of ice is \$3.83. Determine and state the cost of the ice needed to make 50 snow cones.

556 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.



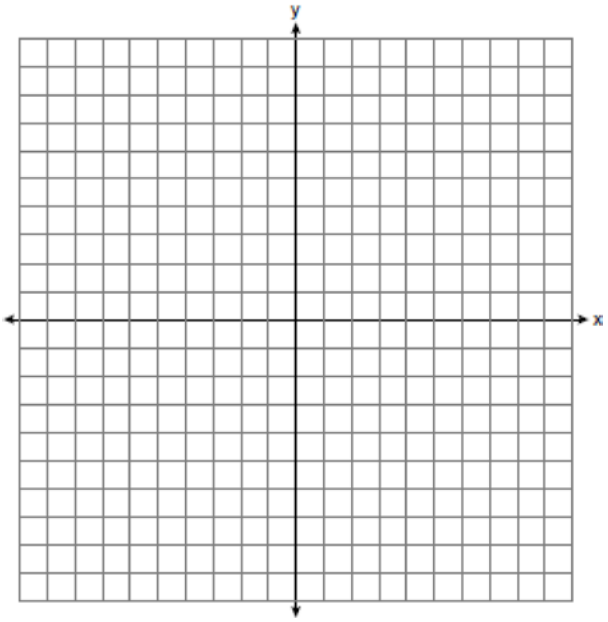
Determine and state, to the *nearest tenth of a meter*, the height of the flagpole.

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

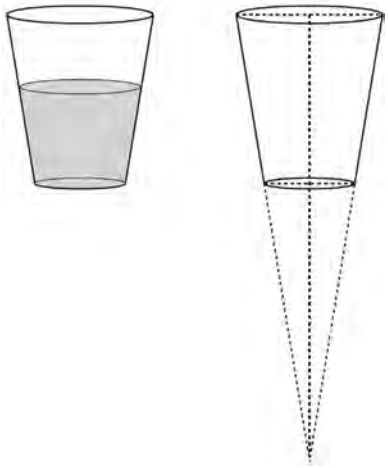


Prove: $\triangle ACD$ is an isosceles triangle and $\triangle AEB$ is a right triangle

558 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.]

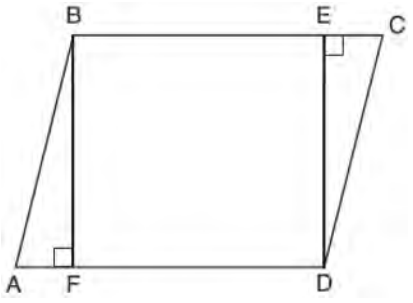


559 A water glass can be modeled by a truncated right cone (a cone which is cut parallel to its base) as shown below.



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.

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



Prove: $BEDF$ is a rectangle

Geometry Multiple Choice Regents Exam Questions
Answer Section

1 ANS: 1

$\cos x = \frac{12}{13}$

$x \approx 23$

PTS: 2 REF: 081809ai TOP: Using Trigonometry to Find an Angle

2 ANS: 4

$\frac{1}{2}(360 - 268) = 46$

PTS: 2 REF: 061704geo TOP: Chords, Secants and Tangents
KEY: inscribed

3 ANS: 2

$8 \times 8 \times 9 + \frac{1}{3}(8 \times 8 \times 3) = 640$

PTS: 2 REF: 011909geo TOP: Volume KEY: compositions

4 ANS: 3

$12^2 = 9 \cdot GM \quad IM^2 = 16 \cdot 25$

$GM = 16 \qquad IM = 20$

PTS: 2 REF: 011910geo TOP: Similarity KEY: leg

5 ANS: 2

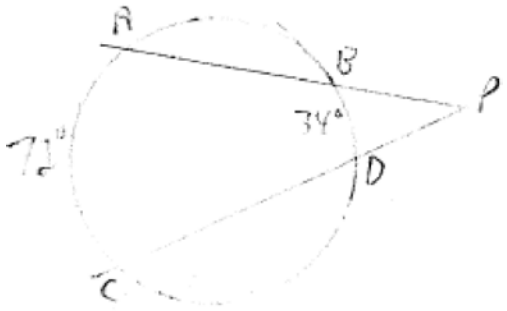
$x^2 = 3 \cdot 18$

$x = \sqrt{3 \cdot 3 \cdot 6}$

$x = 3\sqrt{6}$

PTS: 2 REF: 081712geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, length

6 ANS: 1



$$\frac{72-34}{2} = 19$$

PTS: 2 REF: 061918geo TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, angle

7 ANS: 3 PTS: 2 REF: 061816geo TOP: Rotations of Two-Dimensional Objects

8 ANS: 2

$$108\pi = \frac{6^2 \pi h}{3}$$

$$\frac{324\pi}{36\pi} = h$$

$$9 = h$$

PTS: 2 REF: 012002geo TOP: Volume KEY: cones

9 ANS: 3 PTS: 2 REF: 011903geo TOP: Compositions of Transformations
KEY: identify

10 ANS: 1

$$2x + 4 + 46 = 90$$

$$2x = 40$$

$$x = 20$$

PTS: 2 REF: 061808geo TOP: Cofunctions

11 ANS: 4

$$\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{15}{8}$$

PTS: 2 REF: 011917geo TOP: Using Trigonometry to Find an Angle

12 ANS: 3

$$4\sqrt{(-1--3)^2 + (5-1)^2} = 4\sqrt{20}$$

PTS: 2 REF: 081703geo TOP: Polygons in the Coordinate Plane

13 ANS: 4

$\frac{360°}{10} = 36°$ 252º is a multiple of 36º

PTS: 2 REF: 081722geo TOP: Mapping a Polygon onto Itself

14 ANS: 1 PTS: 2 REF: 011922geo TOP: Cofunctions

15 ANS: 3

$\cos 40 = \frac{14}{x}$

$x \approx 18$

PTS: 2 REF: 011712geo TOP: Using Trigonometry to Find a Side

16 ANS: 4

$40 - x + 3x = 90$

$2x = 50$

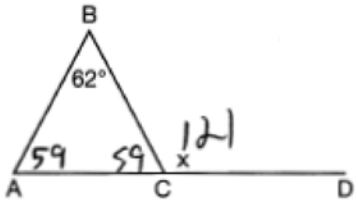
$x = 25$

PTS: 2 REF: 081721geo TOP: Cofunctions

17 ANS: 4 PTS: 2 REF: 081702geo TOP: Identifying Transformations
KEY: basic

18 ANS: 4 PTS: 2 REF: 061813geo TOP: Special Quadrilaterals

19 ANS: 4



PTS: 2 REF: 081711geo TOP: Exterior Angle Theorem

20 ANS: 2 PTS: 2 REF: 061701geo TOP: Compositions of Transformations
KEY: identify

21 ANS: 3

$-9 + \frac{1}{3}(9 - -9) = -9 + \frac{1}{3}(18) = -9 + 6 = -3$ $8 + \frac{1}{3}(-4 - 8) = 8 + \frac{1}{3}(-12) = 8 - 4 = 4$

PTS: 2 REF: 081903geo TOP: Directed Line Segments

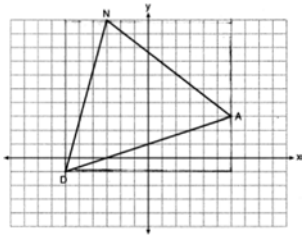
22 ANS: 3 PTS: 2 REF: 061912geo TOP: Parallelograms

23 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 TOP: Interior and Exterior Angles of Triangles

24 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 TOP: Polygons in the Coordinate Plane

25 ANS: 3

$\frac{s_L}{s_S} = \frac{6\theta}{4\theta} = 1.5$

PTS: 2 REF: 011824geo TOP: Arc Length KEY: arc length

26 ANS: 4

$\frac{360°}{10} = 36°$ 252º is a multiple of 36º

PTS: 2 REF: 011717geo TOP: Mapping a Polygon onto Itself

27 ANS: 3

NYSED has stated that all students should be awarded credit regardless of their answer to this question.

PTS: 2 REF: 061722geo TOP: Triangle Congruency

28 ANS: 1 PTS: 2 REF: 081919geo TOP: Cofunctions

29 ANS: 4 PTS: 2 REF: 061901geo TOP: Compositions of Transformations KEY: identify

30 ANS: 2

$\sqrt{8^2 + 6^2} = 10$ for one side

PTS: 2 REF: 011907geo TOP: Special Quadrilaterals

31 ANS: 2

Create two congruent triangles by drawing $\overline{BD}$, which has a length of 8. Each triangle has an area of $\frac{1}{2}(8)(3) = 12$.

PTS: 2 REF: 012018geo TOP: Polygons in the Coordinate Plane

32 ANS: 2

$V = \frac{1}{3}\left(\frac{60}{12}\right)^2\left(\frac{84}{12}\right) \approx 58$

PTS: 2 REF: 081819geo TOP: Volume KEY: pyramids

33 ANS: 4 PTS: 2 REF: 081813geo TOP: Parallelograms

34 ANS: 3

$\frac{x+72}{2} = 58$

$x + 72 = 116$

$x = 44$

PTS: 2 REF: 061817geo TOP: Chords, Secants and Tangents
KEY: intersecting chords, angle

35 ANS: 3

$y = mx + b$

$2 = \frac{1}{2}(-2) + b$

$3 = b$

PTS: 2 REF: 011701geo TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

36 ANS: 1

M is a centroid, and cuts each median 2:1.

PTS: 2 REF: 061818geo TOP: Centroid, Orthocenter, Incenter and Circumcenter

37 ANS: 4 PTS: 2 REF: 081716geo TOP: Midsegments

38 ANS: 3

$4x + 3x + 13 = 90$ $4(11) < 3(11) + 13$

$7x = 77$ $44 < 46$

$x = 11$

PTS: 2 REF: 012021geo TOP: Cofunctions

39 ANS: 2

$V = \frac{1}{3}(8)^2 \cdot 6 = 128$

PTS: 2 REF: 061906geo TOP: Volume KEY: pyramids

40 ANS: 2 PTS: 2 REF: 011702geo TOP: Compositions of Transformations
KEY: grids

41 ANS: 4

$\frac{300}{360} \cdot 8^2\pi = \frac{160\pi}{3}$

PTS: 2 REF: 011721geo TOP: Sectors

42 ANS: 4

$$\frac{2}{4} = \frac{9-x}{x}$$

$$36 - 4x = 2x$$

$$x = 6$$

PTS: 2 REF: 061705geo TOP: Side Splitter Theorem

43 ANS: 4

$$(8 \times 2) + (3 \times 2) - \left(\frac{18}{12} \times \frac{21}{12}\right) \approx 19$$

PTS: 2 REF: 081917geo TOP: Compositions of Polygons and Circles
KEY: area

44 ANS: 2

$$ER = \sqrt{17^2 - 8^2} = 15$$

PTS: 2 REF: 061917geo TOP: Special Quadrilaterals

45 ANS: 3

$$\frac{10}{x} = \frac{15}{12}$$

$$x = 8$$

PTS: 2 REF: 081918geo TOP: Similarity KEY: basic

46 ANS: 3 PTS: 2 REF: 061802geo TOP: Lines and Angles

47 ANS: 1 PTS: 2 REF: 081916geo TOP: Similarity
KEY: leg

48 ANS: 2

$$\tan\theta = \frac{2.4}{x}$$

$$\frac{3}{7} = \frac{2.4}{x}$$

$$x = 5.6$$

PTS: 2 REF: 011707geo TOP: Using Trigonometry to Find a Side

49 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 TOP: Volume KEY: compositions

50 ANS: 1

$m = \frac{-A}{B} = \frac{-3}{2} \quad m_{\perp} = \frac{2}{3}$

PTS: 2 REF: 081908geo TOP: Parallel and Perpendicular Lines
KEY: identify perpendicular lines

51 ANS: 2

$\tan 11.87 = \frac{x}{0.5(5280)}$

$x \approx 555$

PTS: 2 REF: 011913geo TOP: Using Trigonometry to Find a Side

52 ANS: 2

$\frac{x}{360}(15)^2 \pi = 75\pi$

$x = 120$

PTS: 2 REF: 011914geo TOP: Sectors

53 ANS: 2 PTS: 2 REF: 012012geo TOP: Medians, Altitudes and Bisectors

54 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 TOP: Directed Line Segments

55 ANS: 2 PTS: 2 REF: 012003geo TOP: Similarity
KEY: basic

56 ANS: 4 PTS: 2 REF: 011803geo TOP: Identifying Transformations
KEY: graphics

57 ANS: 4

$\frac{36}{45} \neq \frac{15}{18}$

$\frac{4}{5} \neq \frac{5}{6}$

PTS: 2 REF: 081709geo STA: G.G.44 TOP: Similarity Proofs

58 ANS: 2

$-4 + \frac{2}{5}(6 - -4) = -4 + \frac{2}{5}(10) = -4 + 4 = 0 \quad 5 + \frac{2}{5}(20 - 5) = 5 + \frac{2}{5}(15) = 5 + 6 = 11$

PTS: 2 REF: 061715geo TOP: Directed Line Segments

59 ANS: 3 PTS: 2 REF: 061703geo TOP: Cofunctions

60 ANS: 4

$x^2 = 10.2 \times 14.3$

$x \approx 12.1$

PTS: 2 REF: 012016geo TOP: Similarity KEY: leg

61 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 TOP: Parallel and Perpendicular Lines
KEY: identify perpendicular lines

62 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 TOP: Directed Line Segments

63 ANS: 2 PTS: 2 REF: 011912geo TOP: Parallelograms

64 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 TOP: Similarity KEY: basic

65 ANS: 4 PTS: 2 REF: 061904geo TOP: Mapping a Polygon onto Itself

66 ANS: 4 PTS: 2 REF: 011817geo TOP: Similarity
KEY: basic

67 ANS: 1

$24x = 10^2$

$24x = 100$

$x \approx 4.2$

PTS: 2 REF: 061823geo TOP: Similarity KEY: leg

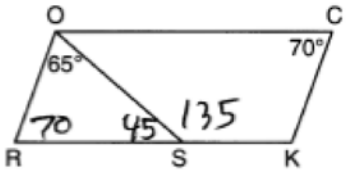
68 ANS: 4

$\sin 16.5 = \frac{8}{x}$

$x \approx 28.2$

PTS: 2 REF: 081806ai TOP: Using Trigonometry to Find a Side

69 ANS: 4



PTS: 2 REF: 081708geo TOP: Interior and Exterior Angles of Polygons

70 ANS: 1 PTS: 2 REF: 011918geo TOP: Compositions of Polygons and Circles
KEY: area

71 ANS: 1

Parallel chords intercept congruent arcs. $\frac{180-130}{2}=25$

PTS: 2 REF: 081704geo TOP: Chords, Secants and Tangents
KEY: parallel lines

72 ANS: 1

$m=\frac{-4}{-6}=\frac{2}{3}$

$m_{\perp}=-\frac{3}{2}$

PTS: 2 REF: 011820geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

73 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 TOP: Directed Line Segments

74 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 TOP: Density

75 ANS: 2

$2x+7+4x-7=90$

$6x=90$

$x=15$

PTS: 2 REF: 081824geo TOP: Cofunctions

76 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 TOP: Volume KEY: cones

77 ANS: 4 PTS: 2 REF: 011723geo
TOP: Cross-Sections of Three-Dimensional Objects

78 ANS: 3

$M_x = \frac{-5+-1}{2} = -\frac{6}{2} = -3 \; M_y = \frac{5+-1}{2} = \frac{4}{2} = 2.$

PTS: 2 REF: 081902geo TOP: Quadrilaterals in the Coordinate Plane
KEY: general

79 ANS: 2 PTS: 2 REF: 081909geo TOP: Compositions of Transformations
KEY: identify

80 ANS: 1
Distance and angle measure are preserved after a reflection and translation.

PTS: 2 REF: 081802geo TOP: Properties of Transformations
KEY: basic

81 ANS: 4 PTS: 2 REF: 011706geo TOP: Identifying Transformations
KEY: basic

82 ANS: 4

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

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

PTS: 2 REF: 081821geo TOP: Equations of Circles
KEY: completing the square

83 ANS: 2 PTS: 2 REF: 011805geo
TOP: Cross-Sections of Three-Dimensional Objects

84 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 TOP: Side Splitter Theorem

85 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 TOP: Equations of Circles
KEY: other

86 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 TOP: Line Dilations

87 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 TOP: Directed Line Segments

88 ANS: 3

$\frac{360°}{5}=72°$ 216º is a multiple of 72º

PTS: 2 REF: 061819geo TOP: Mapping a Polygon onto Itself

89 ANS: 1 PTS: 2 REF: 011703geo TOP: Triangle Congruency

90 ANS: 2

$90-57=33$

PTS: 2 REF: 061909geo TOP: Cofunctions

91 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 TOP: Line Dilations

92 ANS: 4

The segment's midpoint is the origin and slope is –2. The slope of a perpendicular line is $\frac{1}{2}$. $y=\frac{1}{2}x+0$

$2y=x$

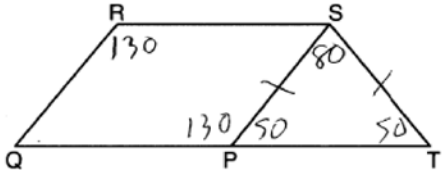
$2y-x=0$

PTS: 2 REF: 081724geo TOP: Parallel and Perpendicular Lines

KEY: perpendicular bisector

93 ANS: 1 PTS: 2 REF: 011716geo TOP: Special Quadrilaterals

94 ANS: 2



PTS: 2 REF: 061921geo TOP: Interior and Exterior Angles of Polygons

95 ANS: 2

$4 \times 4 \times 6 - \pi(1)^2(6) \approx 77$

PTS: 2 REF: 011711geo TOP: Volume KEY: compositions

96 ANS: 4 PTS: 2 REF: 011819geo TOP: Special Quadrilaterals

97 ANS: 3

$\sqrt{40^2 - \left(\frac{64}{2}\right)^2} = 24 \quad V = \frac{1}{3}(64)^2 \cdot 24 = 32768$

PTS: 2 REF: 081921geo TOP: Volume KEY: pyramids

98 ANS: 2 PTS: 2 REF: 081901geo TOP: Line Dilations

99 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 TOP: Volume KEY: cones

100 ANS: 4

$90 - 35 = 55 \quad 55 \times 2 = 110$

PTS: 2 REF: 012015geo TOP: Properties of Transformations
KEY: basic

101 ANS: 1

$\sin 32 = \frac{O}{129.5}$

$O \approx 68.6$

PTS: 2 REF: 011804geo TOP: Using Trigonometry to Find a Side

102 ANS: 3

$\frac{1}{2} \times 24 = 12$

PTS: 2 REF: 012009geo TOP: Midsegments

103 ANS: 4

$\frac{6.6}{x} = \frac{4.2}{5.25}$

$4.2x = 34.65$

$x = 8.25$

PTS: 2 REF: 081705geo TOP: Similarity KEY: basic

104 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 TOP: Directed Line Segments

105 ANS: 4

$9 \cdot 3 = 27,\ 27 \cdot 4 = 108$

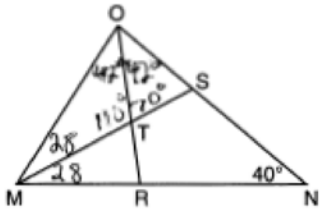
PTS: 2 REF: 061805geo TOP: Dilations

106 ANS: 4

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

PTS: 2 REF: 081808geo TOP: Polygons in the Coordinate Plane

107 ANS: 4



PTS: 2 REF: 061717geo TOP: Interior and Exterior Angles of Triangles

108 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 TOP: Volume KEY: cones

109 ANS: 3

$6x - 40 + x + 20 = 180 - 3x$ $\text{m}\angle BAC = 180 - (80 + 40) = 60$

$$10x = 200$$

$$x = 20$$

PTS: 2 REF: 011809geo TOP: Exterior Angle Theorem

110 ANS: 1

$5x = 12 \cdot 7$ $16.8 + 7 = 23.8$

$5x = 84$

$x = 16.8$

PTS: 2 REF: 061911geo TOP: Side Splitter Theorem

111 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 TOP: Rotations of Two-Dimensional Objects

112 ANS: 2 PTS: 2 REF: 061709geo TOP: Triangle Proofs
KEY: statements

113 ANS: 3 PTS: 2 REF: 081805geo
TOP: Cross-Sections of Three-Dimensional Objects

114 ANS: 3 PTS: 2 REF: 011710geo TOP: Compositions of Transformations
KEY: identify

115 ANS: 1

$$\frac{\frac{1}{3}\pi(2)^2\left(\frac{1}{2}\right)}{\frac{1}{3}\pi(1)^2(1)} = 2$$

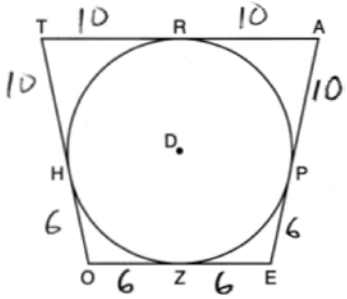
PTS: 2 REF: 012010geo TOP: Volume KEY: cones

116 ANS: 2

$$m = \frac{-(-2)}{3} = \frac{2}{3}$$

PTS: 2 REF: 061916geo TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

117 ANS: 2



PTS: 2 REF: 081814geo TOP: Chords, Secants and Tangents
KEY: tangents drawn from common point, length

118 ANS: 2

$\overline{AB} = 10$ since $\triangle ABC$ is a 6-8-10 triangle. $6^2 = 10x$

$3.6 = x$

PTS: 2 REF: 081820geo TOP: Similarity KEY: leg

119 ANS: 4 PTS: 2 REF: 081822geo TOP: Medians, Altitudes and Bisectors

120 ANS: 1 PTS: 2 REF: 011811geo TOP: Dilations

121 ANS: 4

$-7+\frac{1}{4}(5--7)=-7+\frac{1}{4}(12)=-7+3=-4$ $-5+\frac{1}{4}(3--5)=-5+\frac{1}{4}(8)=-5+2=-3$

PTS: 2 REF: 012005geo TOP: Directed Line Segments

122 ANS: 3 PTS: 2 REF: 011911geo TOP: Rotations of Two-Dimensional Objects

123 ANS: 4 PTS: 2 REF: 081923geo TOP: Mapping a Polygon onto Itself

124 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 TOP: Side Splitter Theorem

125 ANS: 2

$12^2=9\cdot 16$

$144=144$

PTS: 2 REF: 081718geo TOP: Similarity KEY: leg

126 ANS: 2

$8(x+8)=6(x+18)$

$8x+64=6x+108$

$2x=44$

$x=22$

PTS: 2 REF: 011715geo TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

127 ANS: 2

$18^2=12(x+12)$

$324=12(x+12)$

$27=x+12$

$x=15$

PTS: 2 REF: 081920geo TOP: Similarity KEY: leg

128 ANS: 1

$20\cdot 12\cdot 45+\frac{1}{2}\pi(10)^2(45)\approx 17869$

PTS: 2 REF: 061807geo TOP: Volume KEY: compositions

129 ANS: 3

$$\frac{24}{40} = \frac{15}{x}$$

$$24x = 600$$

$$x = 25$$

PTS: 2 REF: 011813geo TOP: Side Splitter Theorem

130 ANS: 2 PTS: 1 REF: 012017geo TOP: Compositions of Transformations
KEY: identify

131 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 TOP: Circles in the Coordinate Plane

132 ANS: 3

$$8 \cdot 15 = 16 \cdot 7.5$$

PTS: 2 REF: 061913geo TOP: Chords, Secants and Tangents
KEY: intersecting chords, length

133 ANS: 1 PTS: 2 REF: 012022geo TOP: Compositions of Transformations
KEY: grids

134 ANS: 2

$$\triangle ABC \sim \triangle BDC$$

$$\cos A = \frac{AB}{AC} = \frac{BD}{BC}$$

PTS: 2 REF: 012023geo TOP: Trigonometric Ratios

135 ANS: 2

$$\frac{4}{3}\pi \times \left(\frac{1.68}{2}\right)^3 \times 0.6523 \approx 1.62$$

PTS: 2 REF: 081914geo TOP: Density

136 ANS: 4

d) is SSA

PTS: 2 REF: 061914geo TOP: Triangle Congruency

137 ANS: 4 PTS: 2 REF: 011921geo TOP: Triangles in the Coordinate Plane

138 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 TOP: Equations of Circles
KEY: completing the square

139 ANS: 1

$$V = \frac{1}{2} \times \frac{4}{3} \pi r^3 = \frac{1}{2} \times \frac{4}{3} \pi \cdot \left(\frac{12.6}{2} \right)^3 \approx 523.7$$

PTS: 2 REF: 061910geo TOP: Volume KEY: spheres

140 ANS: 3

$180 - (48 + 66) = 180 - 114 = 66$

PTS: 2 REF: 012001geo TOP: Lines and Angles

141 ANS: 4

Opposite angles of an inscribed quadrilateral are supplementary.

PTS: 2 REF: 011821geo TOP: Inscribed Quadrilaterals

142 ANS: 3

$(6-2)180 = 720 \quad \frac{720}{6} = 120$

PTS: 2 REF: 012011geo TOP: Mapping a Polygon onto Itself

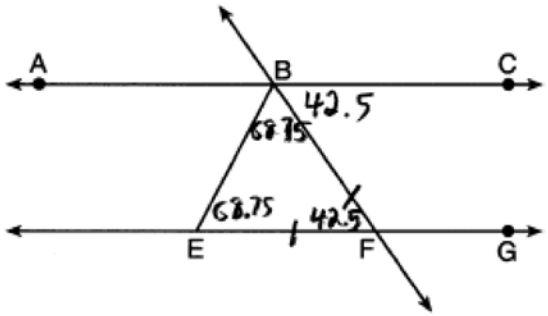
143 ANS: 2

(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 TOP: Similarity KEY: basic

144 ANS: 4 PTS: 2 REF: 011705geo TOP: Special Quadrilaterals

145 ANS: 2



PTS: 2 REF: 011818geo TOP: Lines and Angles

146 ANS: 2

$$V = \frac{1}{3} \left(\frac{36}{4} \right)^2 \cdot 15 = 405$$

PTS: 2 REF: 011822geo TOP: Volume KEY: pyramids

147 ANS: 3 PTS: 2 REF: 061924geo TOP: Special Quadrilaterals

148 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 TOP: Chords, Secants and Tangents
KEY: intersecting chords, length

149 ANS: 2 PTS: 2 REF: 061903geo TOP: Rotations of Two-Dimensional Objects

150 ANS: 4 PTS: 2 REF: 081801geo TOP: Lines and Angles

151 ANS: 2 PTS: 2 REF: 011802geo TOP: Parallelograms

152 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 TOP: Directed Line Segments

153 ANS: 1

$x^2 + y^2 - 6y + 9 = -1 + 9$

$x^2 + (y-3)^2 = 8$

PTS: 2 REF: 011718geo TOP: Equations of Circles
KEY: completing the square

154 ANS: 1

$\sin 32 = \frac{x}{6.2}$

$x \approx 3.3$

PTS: 2 REF: 081719geo TOP: Using Trigonometry to Find a Side

155 ANS: 1 PTS: 2 REF: 061707geo TOP: Mapping a Polygon onto Itself

156 ANS: 1

$-8 + \frac{3}{5}(7 - -8) = -8 + 9 = 1 \;\; 7 + \frac{3}{5}(-13-7) = 7 - 12 = -5$

PTS: 2 REF: 081815geo TOP: Directed Line Segments

157 ANS: 1

$y = \frac{1}{2}x + 4 \;\; \frac{2}{4} = \frac{1}{2}$

$y = \frac{1}{2}x + 2$

PTS: 2 REF: 012008geo TOP: Line Dilations

158 ANS: 3

$x(x-6)=4^2$

$x^2-6x-16=0$

$(x-8)(x+2)=0$

$x=8$

PTS: 2 REF: 081807geo TOP: Similarity KEY: altitude

159 ANS: 4 PTS: 2 REF: 011810geo TOP: Rotations of Two-Dimensional Objects

160 ANS: 2

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

$m_{\perp}=-\frac{2}{3}$ $1=4+b$

$-3=b$

PTS: 2 REF: 061719geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

161 ANS: 4

$\frac{18}{4.5}=4$

PTS: 2 REF: 011901geo TOP: Line Dilations

162 ANS: 3

$\frac{7-1}{0-2}=\frac{6}{-2}=-3$ The diagonals of a rhombus are perpendicular.

PTS: 2 REF: 011719geo TOP: Quadrilaterals in the Coordinate Plane

163 ANS: 1

$\frac{64}{4}=16$ $16^2=256$ $2w+2(w+2)=64$ $15\times17=255$ $2w+2(w+4)=64$ $14\times18=252$ $2w+2(w+6)=64$

$w=15$ $w=14$ $w=13$

$13\times19=247$

PTS: 2 REF: 011708geo TOP: Area of Polygons

164 ANS: 2 PTS: 2 REF: 081701geo
TOP: Cross-Sections of Three-Dimensional Objects

165 ANS: 2

The slope of $-3x+4y=8$ is $\frac{3}{4}$.

PTS: 2 REF: 061907geo TOP: Line Dilations

166 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 TOP: Equations of Circles
KEY: write equation, given graph

167 ANS: 4 PTS: 2 REF: 081810geo TOP: Triangle Proofs
KEY: statements

168 ANS: 3 PTS: 2 REF: 011904geo TOP: Mapping a Polygon onto Itself

169 ANS: 4

$\frac{2}{4}=\frac{8}{x+2}$ $14+2=16$

$2x+4=32$

$x=14$

PTS: 2 REF: 012024geo TOP: Side Splitter Theorem

170 ANS: 1

$84=\frac{1}{3}\cdot s^2\cdot 7$

$6=s$

PTS: 2 REF: 061716geo TOP: Volume KEY: pyramids

171 ANS: 2

$x^2=12(12-8)$

$x^2=48$

$x=4\sqrt{3}$

PTS: 2 REF: 011823geo TOP: Similarity KEY: leg

172 ANS: 4 PTS: 2 REF: 081922geo TOP: Chords, Secants and Tangents
KEY: intersecting chords, length

173 ANS: 3 PTS: 2 REF: 081817geo TOP: Mapping a Polygon onto Itself

174 ANS: 4

$\sin x=\frac{10}{12}$

$x\approx 56$

PTS: 2 REF: 061922geo TOP: Using Trigonometry to Find an Angle

175 ANS: 1

$360-(82+104+121)=53$

PTS: 2 REF: 011801geo TOP: Properties of Transformations
KEY: graph

176 ANS: 2

$\frac{x}{x+3} = \frac{14}{21}$ $14 - 6 = 8$

$21x = 14x + 42$

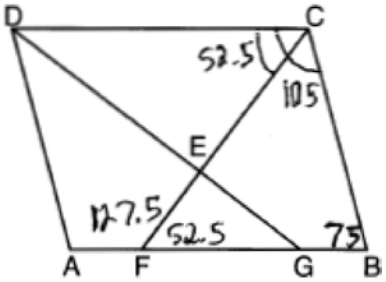
$7x = 42$

$x = 6$

PTS: 2 REF: 081812geo TOP: Side Splitter Theorem

177 ANS: 4 PTS: 2 REF: 081803geo TOP: Rotations of Two-Dimensional Objects

178 ANS: 2



PTS: 2 REF: 081907geo TOP: Interior and Exterior Angles of Polygons

179 ANS: 1

$\frac{9}{6} = \frac{3}{2}$

PTS: 2 REF: 061905geo TOP: Line Dilations

180 ANS: 1 PTS: 2 REF: 061801geo TOP: Properties of Transformations
KEY: graphics

181 ANS: 2

$\frac{4}{x} = \frac{6}{9}$

$x = 6$

PTS: 2 REF: 061915geo TOP: Similarity KEY: basic

182 ANS: 3 PTS: 2 REF: 081913geo TOP: Special Quadrilaterals

183 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,

$4x + 16 = 7x - 2$

$18 = 3x$

$6 = x$

$AE = BF = \frac{40}{2} = 20$. $40 + 20 + 20 + 20 = 100$

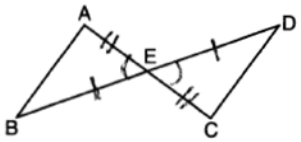
PTS: 2 REF: 061923geo TOP: Midsegments

184 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 TOP: Sectors

185 ANS: 4



PTS: 2 REF: 061908geo TOP: Triangle Proofs
KEY: statements

186 ANS: 4 PTS: 2 REF: 011916geo TOP: Exterior Angle Theorem

187 ANS: 3 PTS: 2 REF: 011714geo TOP: Trigonometric Ratios

188 ANS: 2

$$\frac{30}{360}(5)^2(\pi) \approx 6.5$$

PTS: 2 REF: 081818geo TOP: Sectors

189 ANS: 4 PTS: 2 REF: 061711geo TOP: Special Quadrilaterals

190 ANS: 4

$$\frac{1}{3.5} = \frac{x}{18-x}$$

$$3.5x = 18 - x$$

$$4.5x = 18$$

$$x = 4$$

PTS: 2 REF: 081707geo TOP: Side Splitter Theorem

191 ANS: 4 PTS: 2 REF: 011808geo
TOP: Analytical Representations of Transformations KEY: basic

192 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 TOP: Density

193 ANS: 4

AA

PTS: 2 REF: 061809geo TOP: Similarity Proofs

194 ANS: 4 PTS: 2 REF: 061803geo TOP: Identifying Transformations
KEY: graphics
195 ANS: 1
$\triangle ABC \sim \triangle RST$

PTS: 2 REF: 011908geo TOP: Similarity KEY: basic
196 ANS: 3 PTS: 2 REF: 061706geo TOP: Line Dilations
197 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 TOP: Mapping a Polygon onto Itself
198 ANS: 3
$6 \cdot 3^2 = 54 \;\; 12 \cdot 3 = 36$

PTS: 2 REF: 081823geo TOP: Dilations
199 ANS: 4
$x^2 + 8x + 16 + y^2 - 12y + 36 = 144 + 16 + 36$

$(x + 4)^2 + (y - 6)^2 = 196$

PTS: 2 REF: 061920geo TOP: Equations of Circles
KEY: completing the square
200 ANS: 1
$\frac{6.5}{10.5} = \frac{5.2}{x}$

$x = 8.4$

PTS: 2 REF: 012006geo TOP: Trapezoids
201 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 TOP: Line Dilations
202 ANS: 1 PTS: 2 REF: 081804geo TOP: Compositions of Transformations
KEY: grids
203 ANS: 2
The line $y = -3x + 6$ passes through the center of dilation, so the dilated line is not distinct.

PTS: 2 REF: 061824geo TOP: Line Dilations
204 ANS: 2
$\cos B = \frac{17.6}{26}$

$B \approx 47$

PTS: 2 REF: 061806geo TOP: Using Trigonometry to Find an Angle

205 ANS: 1

$82.8 = \frac{1}{3}(4.6)(9)h$

$h = 6$

PTS: 2 REF: 061810geo TOP: Volume KEY: pyramids

206 ANS: 2

$m = \frac{3}{2}$

$m_{\perp} = -\frac{2}{3}$

PTS: 2 REF: 061812geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

207 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 TOP: Line Dilations

208 ANS: 3

In (1) and (2), *ABCD* could be a rectangle with non-congruent sides. (4) is not possible

PTS: 2 REF: 081714geo TOP: Special Quadrilaterals

209 ANS: 1

$\cos 65 = \frac{x}{15}$

$x \approx 6.3$

PTS: 2 REF: 081924geo TOP: Using Trigonometry to Find a Side

210 ANS: 1 PTS: 2 REF: 012004geo TOP: Special Quadrilaterals

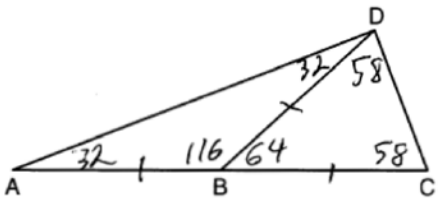
211 ANS: 2

$\frac{x}{15} = \frac{5}{12}$

$x = 6.25$

PTS: 2 REF: 011906geo TOP: Side Splitter Theorem

212 ANS: 3



PTS: 2 REF: 081905geo TOP: Exterior Angle Theorem

213 ANS: 4 PTS: 2 REF: 012019geo
TOP: Cross-Sections of Three-Dimensional Objects

214 ANS: 1

$\tan x = \frac{1}{12}$

$x \approx 4.76$

PTS: 2 REF: 081715geo TOP: Using Trigonometry to Find an Angle

215 ANS: 4

$\left(\frac{360-120}{360}\right)(\pi)\left(9^2\right) = 54\pi$

PTS: 2 REF: 081912geo TOP: Sectors

216 ANS: 4

$C = 12\pi \quad \frac{120}{360}(12\pi) = \frac{1}{3}(12\pi)$

PTS: 2 REF: 061822geo TOP: Arc Length KEY: arc length

217 ANS: 2

$6 + 6\sqrt{3} + 6 + 6\sqrt{3} \approx 32.8$

PTS: 2 REF: 011709geo TOP: 30-60-90 Triangles

218 ANS: 4 PTS: 2 REF: 011905geo TOP: Chords, Secants and Tangents
KEY: inscribed

219 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 TOP: Compositions of Transformations
KEY: basic

220 ANS: 4 PTS: 2 REF: 081911geo TOP: Rotations of Two-Dimensional Objects

221 ANS: 3

$\frac{150}{360} \cdot 9^2\pi = 33.75\pi$

PTS: 2 REF: 012013geo TOP: Sectors

222 ANS: 1 PTS: 2 REF: 081904geo
TOP: Centroid, Orthocenter, Incenter and Circumcenter

223 ANS: 3 PTS: 2 REF: 011815geo TOP: Mapping a Polygon onto Itself

224 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 TOP: Equations of Circles
KEY: write equation, given center and radius

225 ANS: 1 PTS: 2 REF: 011814geo TOP: Line Dilations

226 ANS: 1

$$\cos C=\frac{15}{17}$$

$$C\approx 28$$

PTS: 2 REF: 012007geo TOP: Using Trigonometry to Find an Angle

227 ANS: 4

$$2x-1=16$$

$$x=8.5$$

PTS: 2 REF: 011902geo TOP: Properties of Transformations
KEY: graphics

228 ANS: 1

$$x^2+y^2-12y+36=-20+36$$

$$x^2+(y-6)^2=16$$

PTS: 2 REF: 061712geo TOP: Equations of Circles
KEY: completing the square

229 ANS: 1

$$8\times 3.5\times 2.25\times 1.055=66.465$$

PTS: 2 REF: 012014geo TOP: Density

230 ANS: 3 PTS: 2 REF: 061702geo TOP: Polygons in the Coordinate Plane

231 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 TOP: Angle Side Relationship

232 ANS: 4 PTS: 2 REF: 011816geo TOP: Chords, Secants and Tangents
KEY: inscribed

233 ANS: 4

$\sin 71 = \frac{x}{20}$

$x = 20 \sin 71 \approx 19$

PTS: 2 REF: 061721geo TOP: Using Trigonometry to Find a Side
KEY: without graphics

234 ANS: 2

$\tan 36 = \frac{x}{8} \quad 5.8 + 1.5 \approx 7$

$x \approx 5.8$

PTS: 2 REF: 081915geo TOP: Using Trigonometry to Find a Side

235 ANS: 4 PTS: 2 REF: 011704geo TOP: Midsegments

236 ANS: 1

$\cos S = \frac{60}{65}$

$S \approx 23$

PTS: 2 REF: 061713geo TOP: Using Trigonometry to Find an Angle

237 ANS: 1

$V = \frac{1}{3}\pi(4)^2(6) = 32\pi$

PTS: 2 REF: 061718geo TOP: Rotations of Two-Dimensional Objects

238 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 TOP: Equations of Circles
KEY: completing the square

Geometry Multiple Choice Regents Exam Questions
Answer Section

239 ANS: 1

$3^2 = 9$

PTS: 2 REF: 081520geo TOP: Dilations

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

241 ANS: 1

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

$x \approx 34.1$

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

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

243 ANS: 3 PTS: 2 REF: 011605geo
TOP: Analytical Representations of Transformations KEY: basic

244 ANS: 3

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

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

PTS: 2 REF: 081509geo TOP: Equations of Circles
KEY: completing the square

245 ANS: 1 PTS: 2 REF: 011601geo
TOP: Cross-Sections of Three-Dimensional Objects

246 ANS: 2 PTS: 2 REF: 081501geo TOP: Special Quadrilaterals

247 ANS: 1

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

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

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

249 ANS: 1

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

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

$-1 = b$

PTS: 2 REF: 081614geo TOP: Quadrilaterals in the Coordinate Plane
KEY: general

250 ANS: 4

The slope of $\overline{BC}$ is $\frac{2}{5}$. Altitude is perpendicular, so its slope is $-\frac{5}{2}$.

PTS: 2 REF: 061614geo TOP: Triangles in the Coordinate Plane

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

252 ANS: 1 PTS: 2 REF: 061604geo TOP: Identifying Transformations
KEY: graphics

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

254 ANS: 1

$\frac{360°}{45°} = 8$

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

255 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 TOP: Sectors

256 ANS: 3

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

$T \approx 13.5$

PTS: 2 REF: 061505geo TOP: Using Trigonometry to Find a Side
KEY: graphics

257 ANS: 4

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

PTS: 2 REF: fall1402geo TOP: Properties of Transformations
KEY: graphics

258 ANS: 2

$\triangle ACB \sim \triangle AED$

PTS: 2 REF: 061811geo TOP: Similarity KEY: basic

259 ANS: 3

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

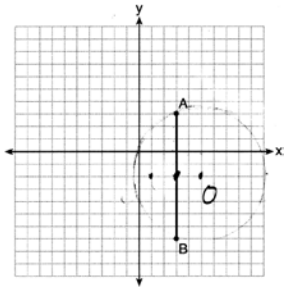
PTS: 2 REF: 061605geo TOP: Similarity KEY: basic

260 ANS: 1

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

PTS: 2 REF: 061522geo TOP: Line Dilations

261 ANS: 1



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

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

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

262 ANS: 1

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

PTS: 2 REF: 011623geo TOP: Circumference

263 ANS: 1

1) opposite sides; 2) adjacent sides; 3) perpendicular diagonals; 4) diagonal bisects angle

PTS: 2 REF: 061609geo TOP: Special Quadrilaterals

264 ANS: 4

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

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

$-5 + 6$ $-4 + 3$

1 -1

PTS: 2 REF: spr1401geo TOP: Directed Line Segments

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

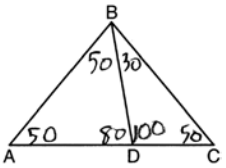
266 ANS: 1 PTS: 2 REF: 061520geo TOP: Chords, Secants and Tangents
KEY: mixed

267 ANS: 3 PTS: 2 REF: 081613geo
TOP: Cross-Sections of Three-Dimensional Objects

268 ANS: 1 PTS: 2 REF: 061518geo TOP: Line Dilations

269 ANS: 2 PTS: 2 REF: 061506geo
TOP: Cross-Sections of Three-Dimensional Objects

270 ANS: 2



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

271 ANS: 2

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

PTS: 2 REF: 011604geo TOP: Volume KEY: prisms

272 ANS: 3

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

$9x = 46$

$x \approx 5.1$

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

273 ANS: 3 PTS: 2 REF: 081502geo TOP: Identifying Transformations
KEY: basic

274 ANS: 2 PTS: 2 REF: 081602geo TOP: Identifying Transformations
KEY: basic

275 ANS: 4 PTS: 2 REF: 061606geo TOP: Volume
KEY: compositions

276 ANS: 3

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

PTS: 2 REF: 081608geo TOP: 30-60-90 Triangles

277 ANS: 2

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

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

278 ANS: 2

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

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

PTS: 2 REF: 061514geo TOP: Equations of Circles
KEY: completing the square

279 ANS: 3 PTS: 2 REF: 081622geo TOP: Triangle Proofs
KEY: statements

280 ANS: 2

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

PTS: 2 REF: spr1403geo TOP: Line Dilations

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

282 ANS: 3

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

$x = 15$

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

283 ANS: 4

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

PTS: 2 REF: 081524geo TOP: Line Dilations

284 ANS: 2

The line $y = 2x - 4$ does not pass through the center of dilation, so the dilated line will be distinct from $y = 2x - 4$. Since a dilation preserves parallelism, the line $y = 2x - 4$ and its image will be parallel, with slopes of 2. To obtain the *y*-intercept of the dilated line, the scale factor of the dilation, $\frac{3}{2}$, can be applied to the *y*-intercept, $(0,-4)$. Therefore, $\left(0 \cdot \frac{3}{2}, -4 \cdot \frac{3}{2}\right) \rightarrow (0,-6)$. So the equation of the dilated line is $y = 2x - 6$.

PTS: 2 REF: fall1403geo TOP: Line Dilations

285 ANS: 2

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

PTS: 2 REF: 011622geo TOP: Similarity KEY: altitude

286 ANS: 1 PTS: 2 REF: 061508geo TOP: Chords, Secants and Tangents
KEY: inscribed

287 ANS: 2

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

PTS: 2 REF: 061523geo TOP: Circumference

288 ANS: 4 PTS: 2 REF: 061504geo TOP: Compositions of Transformations
KEY: identify

289 ANS: 3

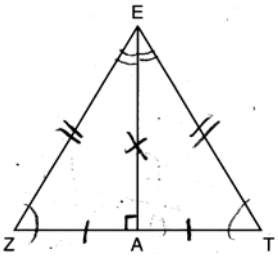
$\cos A = \frac{9}{14}$

$A \approx 50°$

PTS: 2 REF: 011616geo TOP: Using Trigonometry to Find an Angle

290 ANS: 4 PTS: 2 REF: 081609geo TOP: Compositions of Transformations
KEY: grids

291 ANS: 2



PTS: 2 REF: 061619geo TOP: Triangle Proofs

292 ANS: 2

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

$2s^2 = 49$

$s^2 = 24.5$

$s \approx 4.9$

PTS: 2 REF: 081511geo TOP: Inscribed Quadrilaterals

293 ANS: 4

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

$230 \approx s$

PTS: 2 REF: 081521geo TOP: Volume KEY: pyramids

294 ANS: 3

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

$W = 408 \cdot 0.25 = 102$

PTS: 2 REF: 061507geo TOP: Density

295 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 TOP: Similarity KEY: basic

296 ANS: 4

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

$x \approx 18.8$

PTS: 2 REF: 061611geo TOP: Using Trigonometry to Find a Side
KEY: without graphics

297 ANS: 2

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

PTS: 2 REF: 011607geo TOP: Volume KEY: pyramids

298 ANS: 1

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

PTS: 2 REF: 061620geo TOP: Density

299 ANS: 3 PTS: 2 REF: 061616geo TOP: Identifying Transformations
KEY: graphics

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

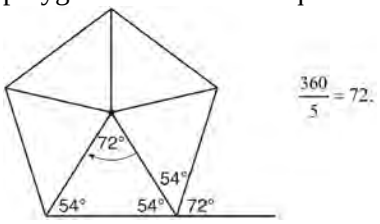
301 ANS: 1

Alternate interior angles

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

302 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 TOP: Mapping a Polygon onto Itself

303 ANS: 2

$\frac{1\,\text{l}}{1.2\,\text{oz}}\left(\frac{16\,\text{oz}}{1\,\text{lb}}\right) = \frac{13.\overline{3}\,\text{l}}{\text{lb}} \quad \frac{13.\overline{3}\,\text{l}}{\text{lb}}\left(\frac{1\,\text{g}}{3.785\,\text{l}}\right) \approx \frac{3.5\,\text{g}}{1\,\text{lb}}$

PTS: 2 REF: 061618geo TOP: Density

304 ANS: 4 PTS: 2 REF: 081514geo TOP: Compositions of Transformations
KEY: grids

305 ANS: 2 PTS: 2 REF: 061603geo TOP: Equations of Circles
KEY: find center and radius | completing the square

306 ANS: 3

$$\frac{60}{360} \cdot 8^2 \pi = \frac{1}{6} \cdot 64\pi = \frac{32\pi}{3}$$

PTS: 2 REF: 061624geo TOP: Sectors

307 ANS: 2

$$h^2 = 30 \cdot 12$$

$$h^2 = 360$$

$$h = 6\sqrt{10}$$

PTS: 2 REF: 061613geo TOP: Similarity KEY: altitude

308 ANS: 1

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

PTS: 2 REF: 081516geo TOP: Density

309 ANS: 3

(3) Could be a trapezoid.

PTS: 2 REF: 081607geo TOP: Parallelograms

310 ANS: 2

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

$$x = \sqrt{40}$$

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

PTS: 2 REF: 081610geo TOP: Similarity KEY: leg

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

312 ANS: 3

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

PTS: 2 REF: 011614geo TOP: Volume KEY: spheres

313 ANS: 3

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

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

$a = 6$

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

314 ANS: 1

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

$f = 10$

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

315 ANS: 4

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

PTS: 2 REF: 081621geo TOP: Line Dilations

316 ANS: 1

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

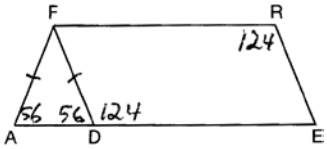
$1 = -4 + b$

$5 = b$

PTS: 2 REF: 081510geo TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

317 ANS: 1 PTS: 2 REF: 081606geo TOP: Cofunctions

318 ANS: 3



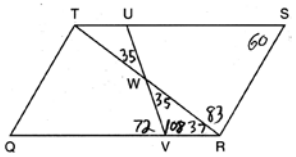
PTS: 2 REF: 081508geo TOP: Interior and Exterior Angles of Polygons

319 ANS: 4

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

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

320 ANS: 3



PTS: 2 REF: 011603geo TOP: Interior and Exterior Angles of Polygons

321 ANS: 4 PTS: 2 REF: 011611geo TOP: Properties of Transformations
KEY: graphics

322 ANS: 3

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

$x = 15$

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

323 ANS: 2 PTS: 2 REF: 061610geo TOP: Chords, Secants and Tangents
KEY: inscribed

324 ANS: 1

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

PTS: 2 REF: 081523geo TOP: Dilations

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

326 ANS: 2 PTS: 2 REF: 081519geo TOP: Similarity
KEY: basic

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

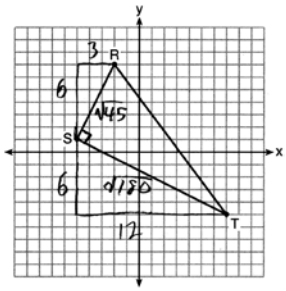
328 ANS: 2

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

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

PTS: 2 REF: 061519geo TOP: Surface Area

329 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 TOP: Polygons in the Coordinate Plane

330 ANS: 4

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

PTS: 2 REF: 081620geo TOP: Volume KEY: cylinders

331 ANS: 1 PTS: 2 REF: 081507geo TOP: Compositions of Transformations
KEY: identify

332 ANS: 1

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

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

PTS: 2 REF: 081616geo TOP: Equations of Circles
KEY: completing the square

333 ANS: 4

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

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

PTS: 2 REF: 011617geo TOP: Equations of Circles
KEY: completing the square

334 ANS: 4

$3 \times 6 = 18$

PTS: 2 REF: 061602geo TOP: Line Dilations

335 ANS: 3

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

PTS: 2 REF: 081518geo TOP: Sectors

336 ANS: 4 PTS: 2 REF: 061502geo TOP: Identifying Transformations
KEY: basic

337 ANS: 4 PTS: 2 REF: 081506geo TOP: Dilations

338 ANS: 4

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

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

339 ANS: 3

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

PTS: 2 REF: 061503geo TOP: Circles in the Coordinate Plane

340 ANS: 1 PTS: 2 REF: 081605geo TOP: Rotations
KEY: grids

341 ANS: 2

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

PTS: 2 REF: 011619geo TOP: Density

342 ANS: 1

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

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

PTS: 2 REF: 061509geo TOP: Parallel and Perpendicular Lines
KEY: identify perpendicular lines

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

344 ANS: 1

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

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

345 ANS: 2 PTS: 2 REF: 061720geo TOP: Parallelograms

346 ANS: 3

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

PTS: 2 REF: 081512geo TOP: Chords, Secants and Tangents
KEY: common tangents

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

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

349 ANS: 3

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

PTS: 2 REF: fall1404geo TOP: Arc Length KEY: angle

350 ANS: 4

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

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

$-16 = b$

PTS: 2 REF: 011602geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

351 ANS: 3 PTS: 2 REF: 011621geo TOP: Chords, Secants and Tangents
KEY: inscribed

352 ANS: 2

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

$12x = 144$

$x = 12$

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

353 ANS: 3

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

PTS: 2 REF: 061607geo TOP: Triangle Proofs
KEY: statements

354 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 TOP: Triangles in the Coordinate Plane

355 ANS: 1 PTS: 2 REF: 011608geo TOP: Compositions of Transformations
KEY: identify

356 ANS: 3

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

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

$90 = 90$

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

357 ANS: 4

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

PTS: 2 REF: 081517geo TOP: Side Splitter Theorem

358 ANS: 4 PTS: 2 REF: 061608geo TOP: Compositions of Transformations
KEY: grids

359 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 TOP: Quadrilaterals in the Coordinate Plane
KEY: general

360 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 TOP: Parallel and Perpendicular Lines
KEY: perpendicular bisector

361 ANS: 4 PTS: 2 REF: 061615geo TOP: Trigonometric Ratios

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

363 ANS: 3 PTS: 2 REF: 061601geo TOP: Rotations of Two-Dimensional Objects

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

365 ANS: 2

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

$4.5 = \pi d$

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

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

PTS: 2 REF: 081617geo TOP: Density

366 ANS: 1

$180 - (68 \cdot 2)$

PTS: 2 REF: 081624geo TOP: Interior and Exterior Angles of Polygons

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

Geometry 2 Point Regents Exam Questions
Answer Section

368 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 TOP: Arc Length KEY: arc length

369 ANS:

$10 \cdot 6 = 15x$

$x = 4$

PTS: 2 REF: 061828geo TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

370 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 TOP: Volume

371 ANS:

Yes, because 28º and 62º angles are complementary. The sine of an angle equals the cosine of its complement.

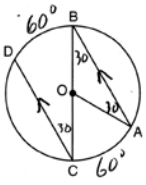
PTS: 2 REF: 011727geo TOP: Cofunctions

372 ANS:

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

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

373 ANS:



$180 - 2(30) = 120$

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

374 ANS:

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

$39.375 = 39.375$

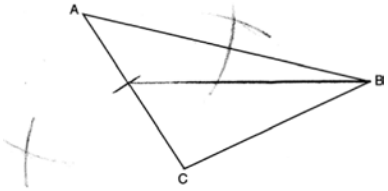
PTS: 2 REF: 061627geo TOP: Side Splitter Theorem

375 ANS:

$\frac{40}{360} \cdot \pi(4.5)^2 = 2.25\pi$

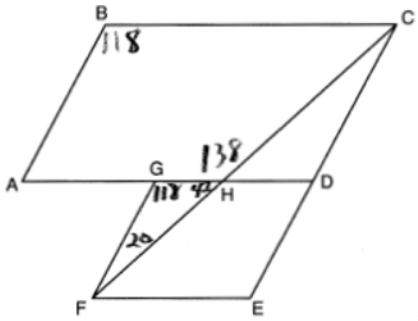
PTS: 2 REF: 061726geo TOP: Sectors

376 ANS:



PTS: 2 REF: 061829geo TOP: Constructions
KEY: line bisector

377 ANS:



20°

PTS: 2 REF: 011926geo TOP: Interior and Exterior Angles of Polygons

378 ANS:

No, because dilations do not preserve distance.

PTS: 2 REF: 061925geo TOP: Dilations

379 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 TOP: Triangles in the Coordinate Plane

380 ANS:

$17x = 15^2$

$17x = 225$

$x \approx 13.2$

PTS: 2 REF: 061930geo TOP: Similarity KEY: leg

381 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 TOP: Triangle Congruency

382 ANS:

$x^2 = 8 \times 12.5$

$x = 10$

PTS: 2 REF: 012028geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, length

383 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 TOP: Equations of Circles
KEY: completing the square

384 ANS:

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

PTS: 2 REF: spr1407geo TOP: Cofunctions

385 ANS:

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

PTS: 2 REF: 011630geo TOP: Density

386 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 TOP: Compositions of Transformations
KEY: identify

387 ANS:

$\cos 68 = \frac{10}{x}$

$x \approx 27$

PTS: 2 REF: 061927geo TOP: Using Trigonometry to Find a Side

388 ANS:

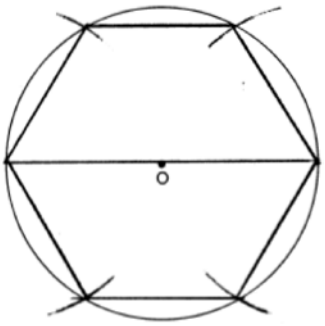
$\sin 75 = \frac{15}{x}$

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

$x \approx 15.5$

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

389 ANS:



PTS: 2 REF: 081728geo TOP: Constructions

390 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 TOP: Density

391 ANS:

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

PTS: 2 REF: 081525geo TOP: Density

392 ANS:

The four small triangles are 8-15-17 triangles. $4 \times 17 = 68$

PTS: 2 REF: 081726geo TOP: Special Quadrilaterals

393 ANS:

$m = \frac{5}{4}; m_{\perp} = -\frac{4}{5} \quad y - 12 = -\frac{4}{5}(x - 5)$

PTS: 2 REF: 012031geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

394 ANS:

Yes, as translations do not change angle measurements.

PTS: 2 REF: 061825geo TOP: Properties of Transformations
KEY: basic

395 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 TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

396 ANS:

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

$L \approx 32$

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

397 ANS:

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

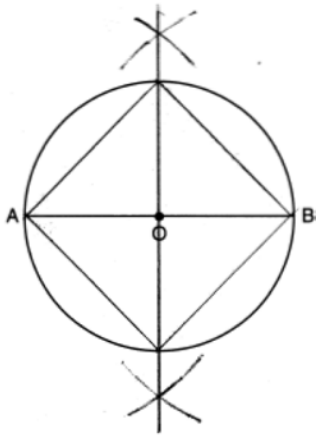
PTS: 2 REF: 081627geo TOP: Mapping a Polygon onto Itself

398 ANS:

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

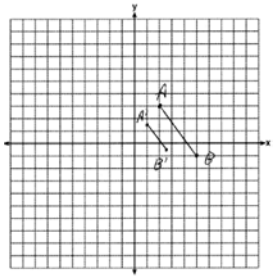
PTS: 2 REF: 061625geo TOP: Compositions of Transformations
KEY: identify

399 ANS:



PTS: 2 REF: 011826geo TOP: Constructions

400 ANS:



$\sqrt{(2.5-1)^2+(-.5-1.5)^2} = \sqrt{2.25+4} = 2.5$

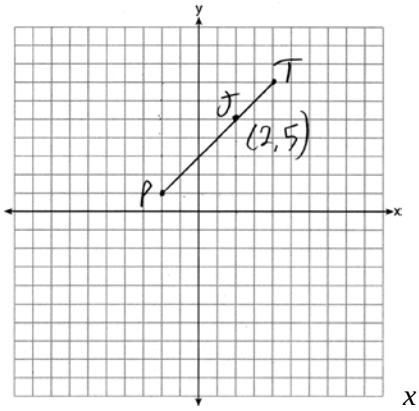
PTS: 2 REF: 081729geo TOP: Line Dilations

401 ANS:

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

PTS: 2 REF: fall1405geo TOP: Medians, Altitudes and Bisectors

402 ANS:



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

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

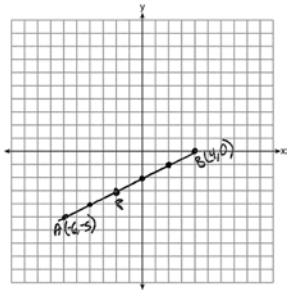
PTS: 2 REF: 011627geo TOP: Directed Line Segments

403 ANS:

$180 - 2(25) = 130$

PTS: 2 REF: 011730geo TOP: Centroid, Orthocenter, Incenter and Circumcenter

404 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 TOP: Directed Line Segments

405 ANS:

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

PTS: 2 REF: 081530geo TOP: Triangle Congruency

406 ANS:

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

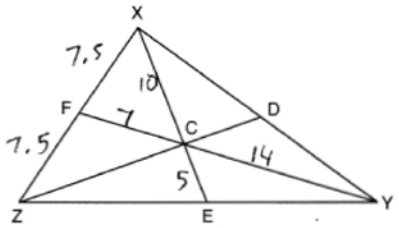
PTS: 2 REF: 081625geo TOP: Chords, Secants and Tangents
KEY: common tangents

407 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 TOP: Quadrilateral Proofs

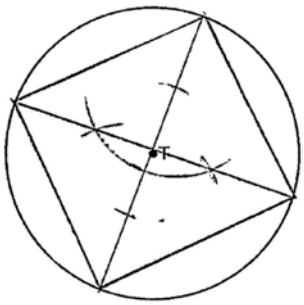
408 ANS:



$7.5 + 7 + 10 = 24.5$

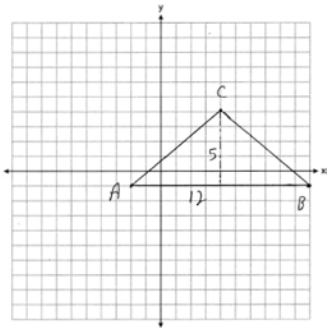
PTS: 2 REF: 012030geo STA: G.G.43
TOP: Centroid, Orthocenter, Incenter and Circumcenter

409 ANS:



PTS: 2 REF: 061525geo TOP: Constructions

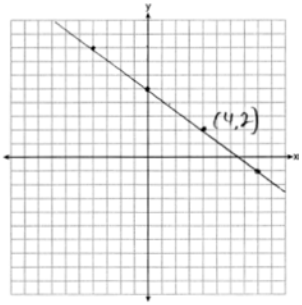
410 ANS:



$\frac{1}{2}(5)(12) = 30$

PTS: 2 REF: 081928geo TOP: Polygons in the Coordinate Plane

411 ANS:



The line is on the center of dilation, so the line does not change. $p: 3x + 4y = 20$

PTS: 2 REF: 061731geo TOP: Line Dilations

412 ANS:

$73 + R = 90$ Equal cofunctions are complementary.

$R = 17$

PTS: 2 REF: 061628geo TOP: Cofunctions

413 ANS:

$\cos W = \frac{6}{18}$

$W \approx 71$

PTS: 2 REF: 011831geo TOP: Using Trigonometry to Find an Angle

414 ANS:

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

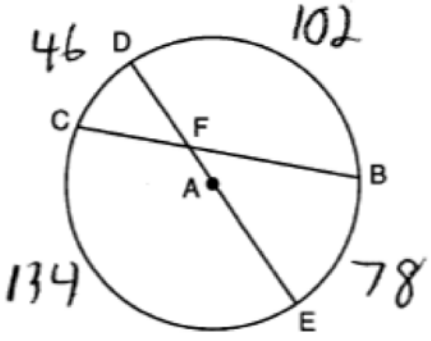
$(3.4-1)^2 + (1.2+2)^2 = 16$

$5.76 + 10.24 = 16$

$16 = 16$

PTS: 2 REF: 081630geo TOP: Circles in the Coordinate Plane

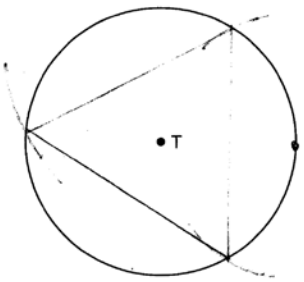
415 ANS:



$\frac{134 + 102}{2} = 118$

PTS: 2 REF: 081827geo TOP: Chords, Secants and Tangents
KEY: intersecting chords, angle

416 ANS:



PTS: 2 REF: 081526geo TOP: Constructions

417 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 TOP: Volume KEY: spheres

418 ANS:

$2 \times (90 \times 10) + (\pi)(30^2) - (\pi)(20^2) \approx 3371$

PTS: 2 REF: 011931geo TOP: Compositions of Polygons and Circles
KEY: area

419 ANS:

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

$x \approx 23$

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

420 ANS:

$$\left(\frac{2.5}{3}\right)(\pi)\left(\frac{8.25}{2}\right)^2(3) \approx 134$$

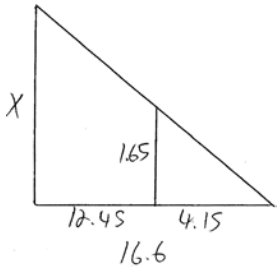
PTS: 2 REF: 081931geo TOP: Volume KEY: cylinders

421 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 TOP: Interior and Exterior Angles of Polygons

422 ANS:



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

$$4.15x = 27.39$$

$$x = 6.6$$

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

423 ANS:

Yes. The bases of the cylinders have the same area and the cylinders have the same height.

PTS: 2 REF: 081725geo TOP: Volume

424 ANS:

$$\frac{152 - 56}{2} = 48$$

PTS: 2 REF: 011728geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

425 ANS:

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

$528{,}003\,\text{cm}^3 \times \frac{1\,\text{m}^3}{1000000\,\text{cm}^3} = 0.528003\,\text{m}^3$. $\frac{1920\,\text{kg}}{\text{m}^3} \times 0.528003\,\text{m}^3 \approx 1013\,\text{kg}$.

PTS: 2 REF: fall1406geo TOP: Density

426 ANS:

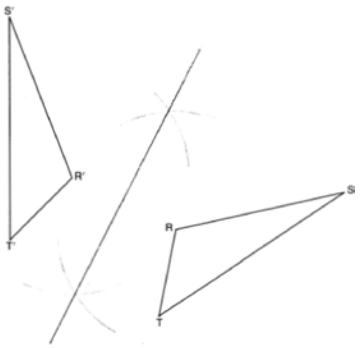
$A = 6^2\pi = 36\pi$ $36\pi \cdot \frac{x}{360} = 12\pi$

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

$$x = 120$$

PTS: 2 REF: 061529geo TOP: Sectors

427 ANS:



PTS: 2 REF: 011725geo TOP: Constructions
KEY: line bisector

428 ANS:

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

$2x = 0.8$

$x = 0.4$

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

PTS: 2 REF: fall1407geo TOP: Cofunctions

429 ANS:

Reflection across the y-axis, then translation up 5.

PTS: 2 REF: 061827geo TOP: Compositions of Transformations
KEY: identify

430 ANS:

$2\left(\frac{36}{12} \times \frac{36}{12} \times \frac{4}{12}\right) \times 3.25 = 19.50$

PTS: 2 REF: 081831geo TOP: Volume KEY: prisms

431 ANS:

$R_{(-5,2),90^\circ} \circ T_{-3,1} \circ r_{\text{x-axis}}$

PTS: 2 REF: 011928geo TOP: Compositions of Transformations
KEY: identify

432 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 TOP: Similarity KEY: altitude

433 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 TOP: Line Dilations

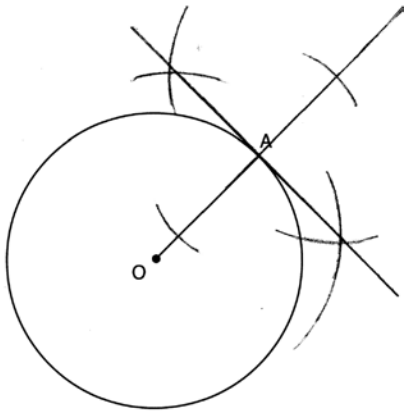
434 ANS:
$\overline{GI}$ is parallel to $\overline{NT}$, and $\overline{IN}$ intersects at A (given); $\angle I \cong \angle N$, $\angle G \cong \angle T$ (paralleling lines cut by a transversal form congruent alternate interior angles); $\triangle GIA \sim \triangle TNA$ (AA).

PTS: 2 REF: 011729geo TOP: Similarity Proofs

435 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 TOP: Triangle Congruency

436 ANS:



PTS: 2 REF: 061631geo TOP: Constructions
KEY: parallel and perpendicular lines

437 ANS:
$\tan x = \frac{10}{4}$

$x \approx 68$

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

438 ANS:
$\angle Q \cong \angle M$ $\angle P \cong \angle N$ $\overline{QP} \cong \overline{MN}$

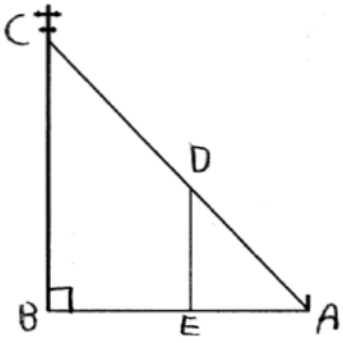
PTS: 2 REF: 012025geo TOP: Triangle Congruency

439 ANS:
$T_{0,-2} \circ r_{y\text{-axis}}$

PTS: 2 REF: 011726geo TOP: Compositions of Transformations
KEY: identify

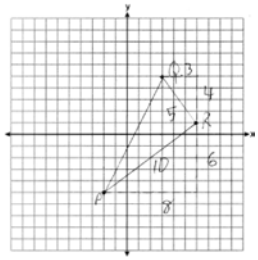
440 ANS:
Opposite angles in a parallelogram are congruent, so m$\angle O = 118°$. The interior angles of a triangle equal 180°. $180 - (118 + 22) = 40$.

PTS: 2 REF: 061526geo TOP: Interior and Exterior Angles of Polygons

441 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 TOP: Similarity KEY: basic

442 ANS:

$\frac{1}{2}(5)(10) = 25$

PTS: 2 REF: 061926geo TOP: Polygons in the Coordinate Plane

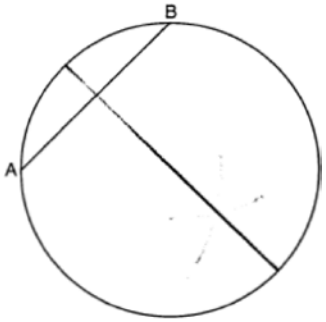
443 ANS:
$R_{180°}$ about $\left(-\frac{1}{2}, \frac{1}{2}\right)$

PTS: 2 REF: 081727geo TOP: Compositions of Transformations
KEY: identify

444 ANS:
$R_{90°}$ or $T_{2,-6} \circ R_{(-4,2),90°}$ or $R_{270°} \circ r_{\text{x-axis}} \circ r_{y\text{-axis}}$

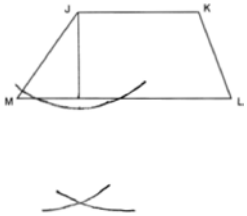
PTS: 2 REF: 061929geo TOP: Compositions of Transformations
KEY: identify

445 ANS:



PTS: 2 REF: 081825geo TOP: Constructions
KEY: parallel and perpendicular lines

446 ANS:



PTS: 2 REF: 061725geo TOP: Constructions
KEY: parallel and perpendicular lines

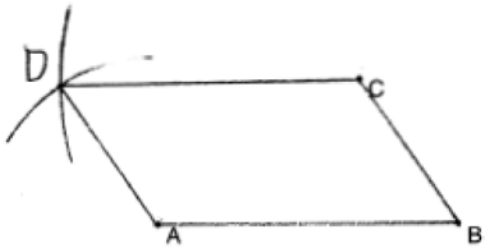
447 ANS:

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

$126 = 126$

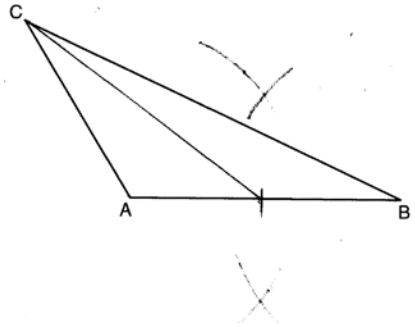
PTS: 2 REF: 081529geo TOP: Similarity KEY: basic

448 ANS:



PTS: 2 REF: 011929geo TOP: Constructions
KEY: equilateral triangles

449 ANS:



PTS: 2 REF: 081628geo TOP: Constructions
KEY: line bisector

450 ANS:

$\frac{72}{360}(\pi)\left(10^2\right) = 20\pi$

PTS: 2 REF: 061928geo TOP: Sectors

451 ANS:

$8 \times 3 \times \frac{1}{12} \times 43 = 86$

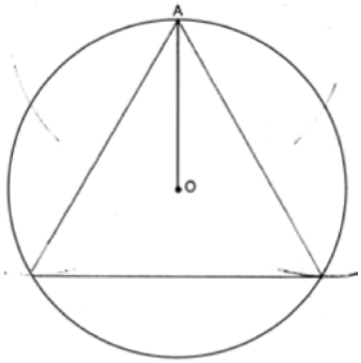
PTS: 2 REF: 012027geo TOP: Density

452 ANS:

$\frac{124 - 56}{2} = 34$

PTS: 2 REF: 081930geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

453 ANS:



PTS: 2 REF: 061931geo TOP: Constructions

454 ANS:

$29.5 = 2\pi r \quad V = \frac{4}{3}\pi \cdot \left(\frac{29.5}{2\pi}\right)^3 \approx 434$

$r = \frac{29.5}{2\pi}$

PTS: 2 REF: 061831geo TOP: Volume KEY: spheres

455 ANS:

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

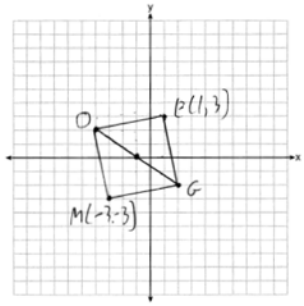
$4 + \frac{4}{9}(18) \qquad 2 + \frac{4}{9}(0)$

$4 + 8 \qquad 2 + 0$

$12 \qquad 2$

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

456 ANS:



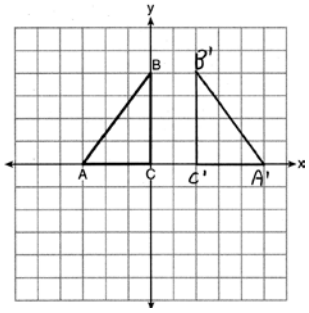
PTS: 2 REF: 011731geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

457 ANS:

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

PTS: 2 REF: spr1405geo TOP: Volume

458 ANS:



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

459 ANS:

$\sin 38 = \frac{24.5}{x}$

$x \approx 40$

PTS: 2 REF: 012026geo TOP: Using Trigonometry to Find a Side
KEY: graphics

460 ANS:

Reflections are rigid motions that preserve distance.

PTS: 2 REF: 061530geo TOP: Triangle Congruency

461 ANS:

$\frac{121 - x}{2} = 35$

$121 - x = 70$

$x = 51$

PTS: 2 REF: 011927geo TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, angle

462 ANS:

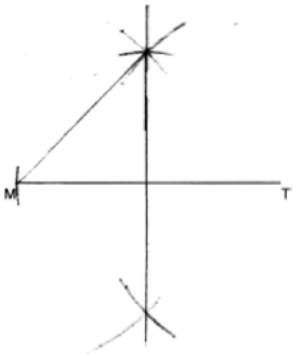
$\frac{Q}{360}(\pi)\left(25^2\right) = (\pi)\left(25^2\right) - 500\pi$

$Q = \frac{125\pi(360)}{625\pi}$

$Q = 72$

PTS: 2 REF: 011828geo TOP: Sectors

463 ANS:



PTS: 2 REF: 012029geo TOP: Constructions
KEY: parallel and perpendicular lines

464 ANS:

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

PTS: 2 REF: spr1406geo TOP: Compositions of Transformations
KEY: grids

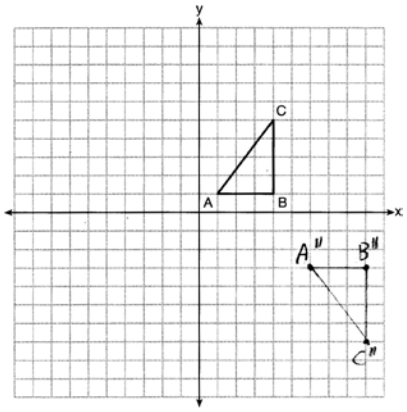
465 ANS:

$\ell: y = 3x - 4$

$m: y = 3x - 8$

PTS: 2 REF: 011631geo TOP: Line Dilations

466 ANS:



PTS: 2 REF: 081626geo TOP: Compositions of Transformations
KEY: grids

467 ANS:

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

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

468 ANS:

$A(-2,1) \rightarrow (-3,-1) \rightarrow (-6,-2) \rightarrow (-5,0)$, $B(0,5) \rightarrow (-1,3) \rightarrow (-2,6) \rightarrow (-1,8)$,
$C(4,-1) \rightarrow (3,-3) \rightarrow (6,-6) \rightarrow (7,-4)$

PTS: 2 REF: 061826geo TOP: Dilations

469 ANS:

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

PTS: 2 REF: 081528geo TOP: Quadrilateral Proofs

470 ANS:
$\cos B$ increases because $\angle A$ and $\angle B$ are complementary and $\sin A = \cos B$.

PTS: 2 REF: 011827geo TOP: Cofunctions

471 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 TOP: Constructions
KEY: equilateral triangles

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

PTS: 2 REF: 011628geo TOP: Triangle Congruency

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

PTS: 2 REF: spr1404geo TOP: Similarity Proofs

474 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 TOP: Triangle Congruency

475 ANS:
$\sin^{-1}\left(\frac{5}{25}\right) \approx 11.5$

PTS: 2 REF: 081926geo TOP: Using Trigonometry to Find an Angle

476 ANS:
$\frac{120}{230} = \frac{x}{315}$

$x = 164$

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

477 ANS:
Translate $\triangle ABC$ along $\overline{CF}$ such that point C maps onto point F, resulting in image $\triangle A'B'C'$. Then reflect $\triangle A'B'C'$ over $\overline{DF}$ such that $\triangle A'B'C'$ maps onto $\triangle DEF$.
or
Reflect $\triangle ABC$ over the perpendicular bisector of $\overline{EB}$ such that $\triangle ABC$ maps onto $\triangle DEF$.

PTS: 2 REF: fall1408geo TOP: Triangle Congruency

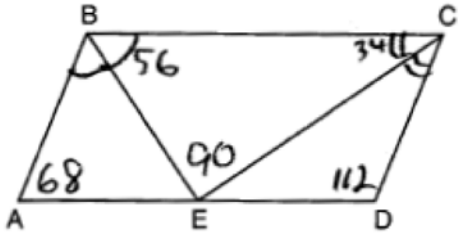
478 ANS:
rotation 180º about the origin, translation 2 units down; rotation 180º about *B*, translation 6 units down and 6 units left; or reflection over *x*-axis, translation 2 units down, reflection over *y*-axis

PTS: 2 REF: 081828geo TOP: Compositions of Transformations
KEY: identify

479 ANS:
$r_{y=2} \circ r_{y\text{-axis}}$

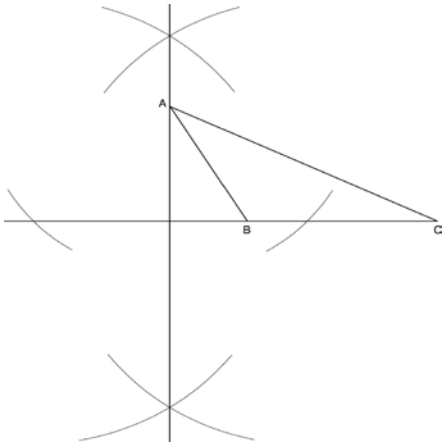
PTS: 2 REF: 081927geo TOP: Compositions of Transformations
KEY: identify

480 ANS:



PTS: 2 REF: 081826geo TOP: Parallelograms

481 ANS:



PTS: 2 REF: fall1409geo TOP: Constructions
KEY: parallel and perpendicular lines

Geometry 4 Point Regents Exam Questions
Answer Section

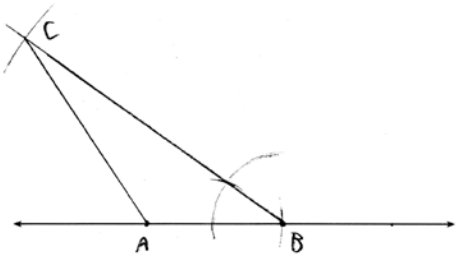
482 ANS:

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

$x \approx 36.6$

PTS: 4 REF: 011632geo TOP: Similarity KEY: basic

483 ANS:



SAS ≅ SAS

PTS: 4 REF: 011634geo TOP: Constructions
KEY: congruent and similar figures

484 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 TOP: Triangle Proofs

485 ANS:

$V = (\pi)(4^2)(9) + \left(\frac{1}{2}\right)\left(\frac{4}{3}\right)(\pi)\left(4^3\right) \approx 586$

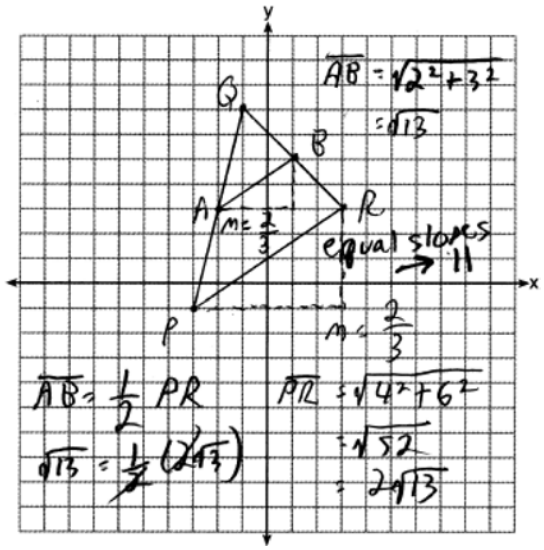
PTS: 4 REF: 011833geo TOP: Volume KEY: compositions

486 ANS:

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

PTS: 4 REF: 061632geo TOP: Volume KEY: cylinders

487 ANS:



PTS: 4 REF: 081732geo TOP: Triangles in the Coordinate Plane

488 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 TOP: Using Trigonometry to Find a Side

489 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); $\overline{TR} \parallel \overline{SV}$ (a transversal that creates congruent alternate interior angles cuts parallel lines).

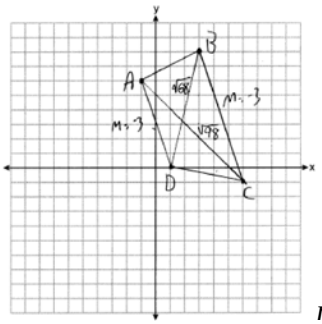
PTS: 4 REF: 061733geo TOP: Triangle Proofs
KEY: proof

490 ANS:

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

PTS: 4 REF: 011633geo TOP: Triangle Proofs

491 ANS:



$m_{\overline{AD}} = \dfrac{0-6}{1--1} = -3$ $\overline{AD} \parallel \overline{BC}$ because their slopes are equal. *ABCD* is a trapezoid

$$m_{\overline{BC}} = \frac{-1-8}{6-3} = -3$$

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 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

492 ANS:

$\dfrac{4\pi}{3}(2^3 - 1.5^3) \approx 19.4$ $19.4 \cdot 1.308 \cdot 8 \approx 203$

PTS: 4 REF: 081834geo TOP: Density

493 ANS:

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

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

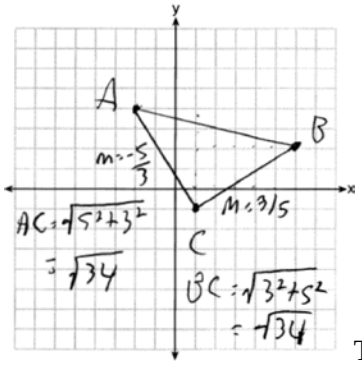
$B(6,-8) - (2,-3) = (4,-5) \rightarrow (5,4) + (2,-3) = B'(7,1)$

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

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

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

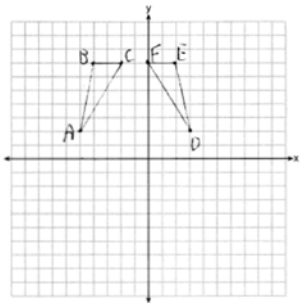
494 ANS:



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 TOP: Triangles in the Coordinate Plane

495 ANS:



$r_{x=-1}$ Reflections are rigid motions that preserve distance, so $\triangle ABC \cong \triangle DEF$.

PTS: 4 REF: 061732geo TOP: Identifying Transformations
KEY: graphics

496 ANS:

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

PTS: 4 REF: 061533geo TOP: Quadrilateral Proofs

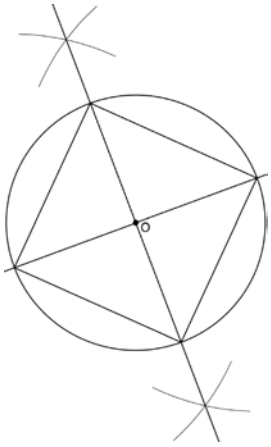
497 ANS:

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

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

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

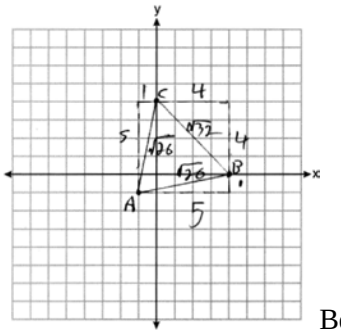
498 ANS:



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

PTS: 4 REF: fall1412geo TOP: Constructions

499 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 TOP: Triangles in the Coordinate Plane

500 ANS:

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

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

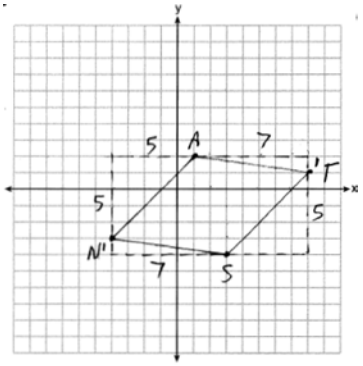
PTS: 4 REF: 081634geo TOP: Using Trigonometry to Find an Angle

501 ANS:

$\left((10 \times 6) + \sqrt{7(7-6)(7-4)(7-4)}\right)(6.5) \approx 442$

PTS: 4 REF: 081934geo TOP: Volume KEY: compositions

502 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 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

503 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 TOP: Triangle Proofs
KEY: proof

504 ANS:

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

PTS: 4 REF: 061634geo TOP: Similarity Proofs

505 ANS:

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

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

PTS: 4 REF: spr1412geo TOP: Density

506 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 TOP: Using Trigonometry to Find a Side

507 ANS:

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

$.9604 = y$

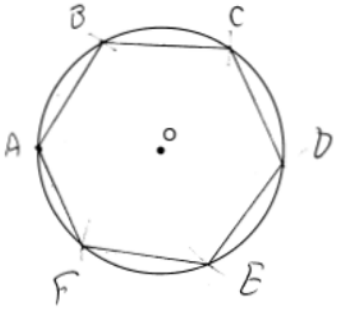
PTS: 4 REF: 061534geo TOP: Similarity KEY: leg

508 ANS:

A dilation of 3 centered at *A*. A dilation preserves angle measure, so the triangles are similar.

PTS: 4 REF: 011832geo TOP: Dilations

509 ANS:



Right triangle because $\angle CBF$ is inscribed in a semi-circle.

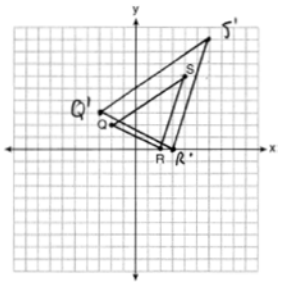
PTS: 4 REF: 011733geo TOP: Constructions

510 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 TOP: Circle Proofs

511 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 TOP: Dilations KEY: grids

512 ANS:

$x^2 + x^2 = 58^2$ $\quad A = (\sqrt{1682} + 8)^2 \approx 2402.2$

$2x^2 = 3364$

$x = \sqrt{1682}$

PTS: 4 REF: 081734geo TOP: Area of Polygons

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

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

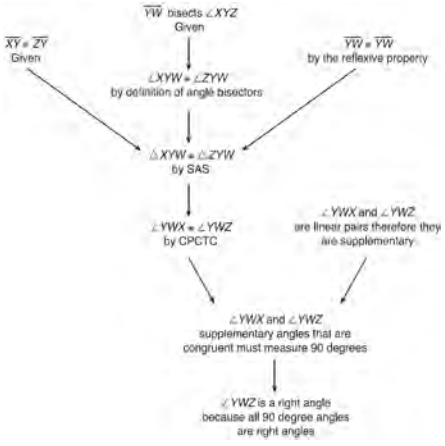
PTS: 4 REF: spr1409geo TOP: Using Trigonometry to Find a Side
KEY: advanced

514 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 TOP: Triangle Congruency

515 ANS:



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

PTS: 4 REF: spr1411geo TOP: Triangle Proofs

516 ANS:

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

PTS: 4 REF: spr1410geo TOP: Sectors

517 ANS:

$$\tan 36 = \frac{x}{10} \quad \cos 36 = \frac{10}{y} \quad 12.3607 \times 3 \approx 37$$

$$x \approx 7.3 \quad y \approx 12.3607$$

PTS: 4 REF: 081833geo TOP: Using Trigonometry to Find a Side

518 ANS:

Yes, because a dilation preserves angle measure.

PTS: 4 REF: 081932geo TOP: Constructions
KEY: congruent and similar figures

519 ANS:

$$V = \frac{2}{3}\pi\left(\frac{6.5}{2}\right)^2(1) \approx 22 \quad 22 \cdot 7.48 \approx 165$$

PTS: 4 REF: 061933geo TOP: Volume KEY: cylinders

520 ANS:

$$\tan 72 = \frac{x}{400} \qquad \sin 55 = \frac{400\tan 72}{y}$$

$$x = 400\tan 72 \qquad y = \frac{400\tan 72}{\sin 55} \approx 1503$$

PTS: 4 REF: 061833geo TOP: Using Trigonometry to Find a Side
KEY: advanced

521 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 TOP: Density

522 ANS:

$$20000 \text{ g}\left(\frac{1 \text{ ft}^3}{7.48 \text{ g}}\right) = 2673.8 \text{ ft}^3 \quad 2673.8 = \pi r^2(34.5) \quad 9.9 + 1 = 10.9$$

$$r \approx 4.967$$

$$d \approx 9.9$$

PTS: 4 REF: 061734geo TOP: Volume KEY: cylinders

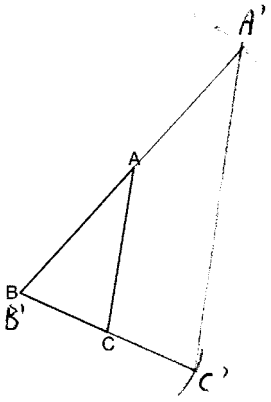
523 ANS:

$\tan 30 = \frac{y}{440}$ $\tan 38.8 = \frac{h}{440}$ $353.8 - 254 \approx 100$

$y \approx 254$ $h \approx 353.8$

PTS: 4 REF: 061934geo TOP: Using Trigonometry to Find a Side
KEY: advanced

524 ANS:



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

PTS: 4 REF: 081632geo TOP: Constructions
KEY: congruent and similar figures

525 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 TOP: Triangle Congruency

526 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 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

527 ANS:

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

PTS: 4 REF: 061633geo TOP: Similarity Proofs

528 ANS:

$(7^2)18\pi = 16x^2$ $\frac{80}{13.2} \approx 6.1$ $\frac{60}{13.2} \approx 4.5$ $6 \times 4 = 24$

$13.2 \approx x$

PTS: 4 REF: 012034geo TOP: Volume KEY: cylinders

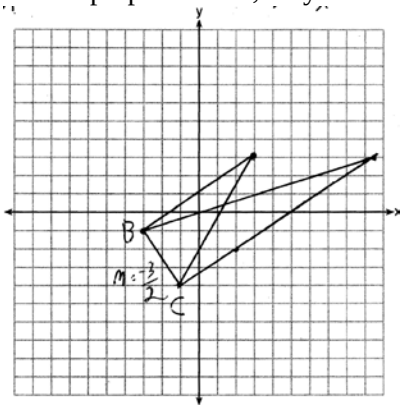
529 ANS:

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 TOP: Triangle Proofs
KEY: proof

530 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 TOP: Triangles in the Coordinate Plane

531 ANS:

$C = 2\pi r$ $V = \frac{1}{3}\pi \cdot 5^2 \cdot 13 \approx 340$

$31.416 = 2\pi r$

$5 \approx r$

PTS: 4 REF: 011734geo TOP: Volume KEY: cones

532 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 TOP: Lines and Angles

533 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 TOP: Volume KEY: cylinders

534 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 TOP: Using Trigonometry to Find a Side
KEY: advanced

Geometry 6 Point Regents Exam Questions
Answer Section

535 ANS:

$\tan 16.5 = \frac{x}{13.5}$ $9 \times 16 \times 4.5 = 648$ $3752 - (35 \times 16 \times .5) = 3472$

$x \approx 4$ $13.5 \times 16 \times 4.5 = 972$ $3472 \times 7.48 \approx 25971$

$4 + 4.5 = 8.5$ $\frac{1}{2} \times 13.5 \times 16 \times 4 = 432$ $\frac{25971}{10.5} \approx 2473.4$

$12.5 \times 16 \times 8.5 = 1700$ $\frac{2473.4}{60} \approx 41$

3752

PTS: 6 REF: 081736geo TOP: Volume KEY: compositions

536 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 TOP: Quadrilateral Proofs

537 ANS:

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

PTS: 6 REF: 081535geo TOP: Quadrilateral Proofs

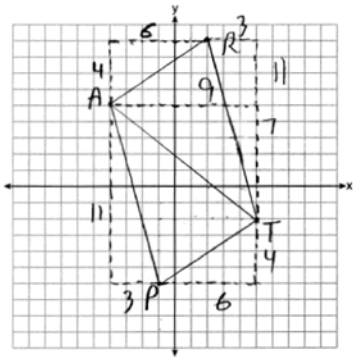
538 ANS:

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

PTS: 6 REF: 011635geo TOP: Quadrilateral Proofs

539 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 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

540 ANS:

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 (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). $\overline{AD} \parallel \overline{BC}$ (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 TOP: Quadrilateral Proofs

541 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 TOP: Quadrilateral Proofs

542 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 TOP: Using Trigonometry to Find a Side
KEY: advanced

543 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 TOP: Quadrilateral Proofs

544 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 $7650 \cdot 62.4 = 477{,}360$

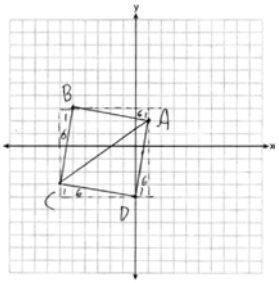
$477{,}360 \cdot .85 = 405{,}756$, which is greater than 400,000.

PTS: 6 REF: 061535geo TOP: Density

545 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 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

546 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 TOP: Circle Proofs

547 ANS:

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

PTS: 6 REF: 081536geo TOP: Density

548 ANS:

C: $V = \pi(26.7)^2(750) - \pi(24.2)^2(750) = 95,437.5\pi$

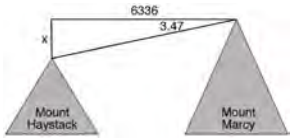
$95,437.5\pi \text{ cm}^3\left(\frac{2.7\text{ g}}{\text{cm}^3}\right)\left(\frac{1\text{ kg}}{1000\text{ g}}\right)\left(\frac{\$0.38}{\text{kg}}\right) = \$307.62$

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 TOP: Density

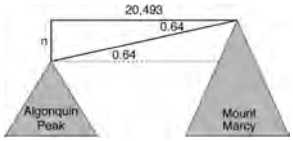
549 ANS:



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

$M \approx 384$

$4960 + 384 = 5344$



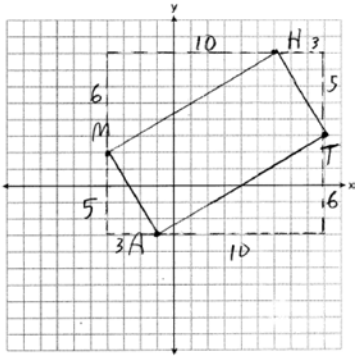
$\tan 0.64 = \frac{A}{20,493}$

$A \approx 229$

$5344 - 229 = 5115$

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

550 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 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

551 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 TOP: Triangle Congruency

552 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).

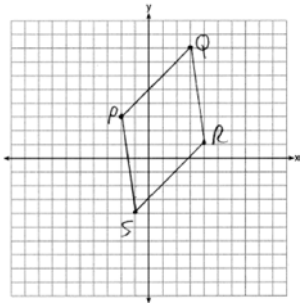
PTS: 6 REF: 061935geo TOP: Quadrilateral Proofs

553 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 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

554 ANS:

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

PTS: 6 REF: 081635geo TOP: Circle Proofs

555 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 TOP: Density

556 ANS:

$\tan 52.8 = \frac{h}{x}$ $h = x\tan 52.8$ $\tan 34.9 = \frac{h}{x+8}$ $h = (x+8)\tan 34.9$

$x\tan 52.8 = x\tan 34.9 + 8\tan 34.9$ $x\tan 52.8 - x\tan 34.9 = 8\tan 34.9$ $x(\tan 52.8 - \tan 34.9) = 8\tan 34.9$ $x = \frac{8\tan 34.9}{\tan 52.8 - \tan 34.9}$ $x \approx 9$

$\tan 52.8 \approx \frac{h}{9}$ $x \approx 11.86$ $11.86 + 1.7 \approx 13.6$

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

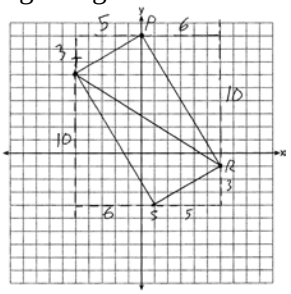
557 ANS:

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

PTS: 6 REF: 061635geo TOP: Quadrilateral Proofs

558 ANS:

$m_{\overline{TS}} = \frac{-10}{6} = -\frac{5}{3}$ $m_{\overline{SR}} = \frac{3}{5}$ Since the slopes of $\overline{TS}$ and $\overline{SR}$ are opposite reciprocals, they are perpendicular and form a right angle. $\triangle RST$ is a right triangle because $\angle S$ is a right angle. $P(0,9)$ $m_{\overline{RP}} = \frac{-10}{6} = -\frac{5}{3}$ $m_{\overline{PT}} = \frac{3}{5}$ Since the slopes of all four adjacent sides ($\overline{TS}$ and $\overline{SR}$, $\overline{SR}$ and $\overline{RP}$, $\overline{PT}$ and $\overline{TS}$, $\overline{RP}$ and $\overline{PT}$) are opposite reciprocals, they are perpendicular and form right angles. Quadrilateral *RSTP* is a rectangle because it has four right angles.



PTS: 6 REF: 061536geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

559 ANS:

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

$$x + 5 = 1.5x$$
$$5 = .5x$$
$$10 = x$$
$$10 + 5 = 15$$

PTS: 6 REF: 061636geo TOP: Volume KEY: cones

560 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 TOP: Quadrilateral Proofs