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REGENTS BY TYPE

The NY Geometry Regents Exam Questions
from Spring 2014 to January 2025 Sorted by Type

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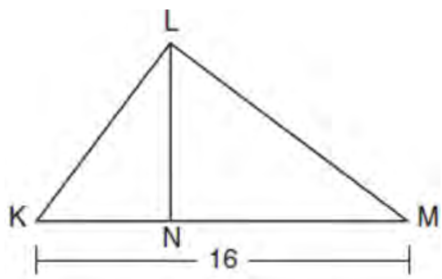
Geometry Multiple Choice Regents Exam Questions

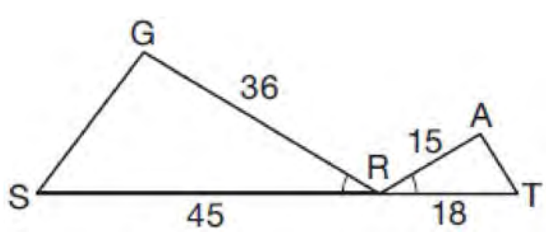
1 A two-dimensional cross section is taken of a three-dimensional object. If this cross section is a triangle, what can *not* be the three-dimensional object?
1) cone
2) cylinder
3) pyramid
4) rectangular prism

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



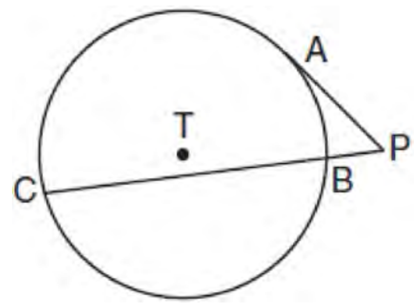
Which lengths would make triangle KLM a right triangle?
1) $LM = 13$ and $KN = 6$
2) $LM = 12$ and $NM = 9$
3) $KL = 11$ and $KN = 7$
4) $LN = 8$ and $NM = 10$

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



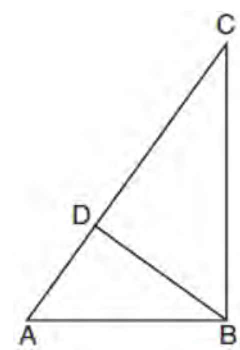
Which triangle similarity statement is correct?
1) $\triangle GRS \sim \triangle ART$ by AA.
2) $\triangle GRS \sim \triangle ART$ by SAS.
3) $\triangle GRS \sim \triangle ART$ by SSS.
4) $\triangle GRS$ is not similar to $\triangle ART$.

4 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.



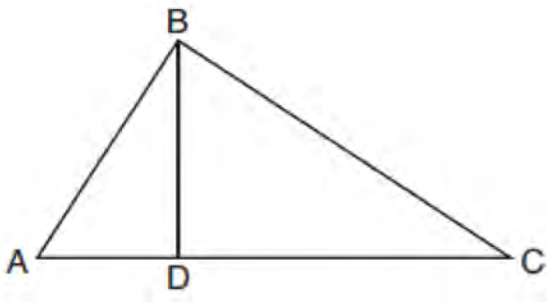
If $PB = 3$ and $BC = 15$, what is the length of $\overline{PA}$?
1) $3\sqrt{5}$
2) $3\sqrt{6}$
3) 3
4) 9

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

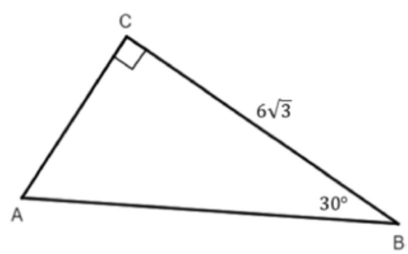
6 In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



If $BD = 4$, $AD = x - 6$, and $CD = x$, what is the length of $\overline{CD}$?
1) 5
2) 2
3) 8
4) 11

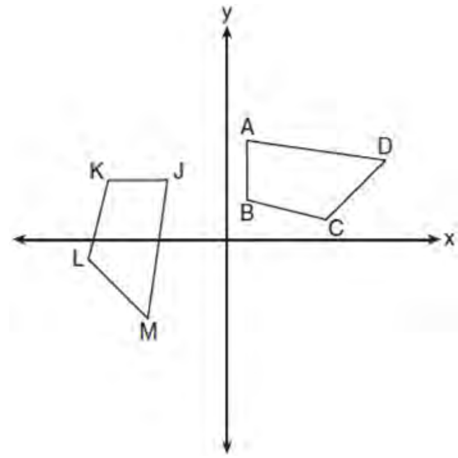
7 Given $\triangle PQR$ and $\triangle LMN$ with $\overline{PQ} \cong \overline{LM}$, which additional statement is sufficient to always prove $\triangle PQR \cong \triangle LMN$?
1) $\overline{QR} \cong \overline{MN}$ and $\angle R \cong \angle N$
2) $\overline{QR} \cong \overline{MN}$ and $\angle Q \cong \angle M$
3) $\overline{QR} \cong \overline{MN}$ and $\angle P \cong \angle L$
4) $\overline{QR} \cong \overline{MN}$ and $\angle P \cong \angle M$

8 In right triangle ABC below, $m\angle C = 90°$, $m\angle B = 30°$, and $CB = 6\sqrt{3}$.



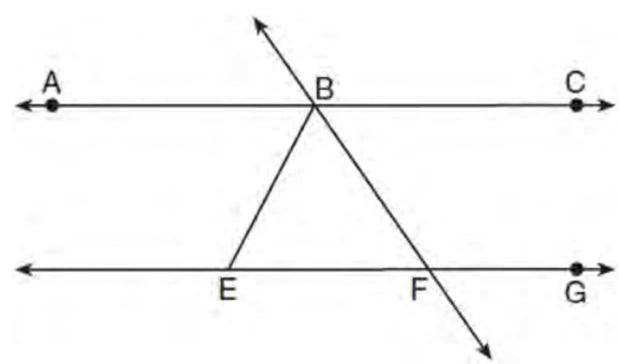
The length of $\overline{AB}$ is
1) $3\sqrt{3}$
2) 9
3) 12
4) $12\sqrt{3}$

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



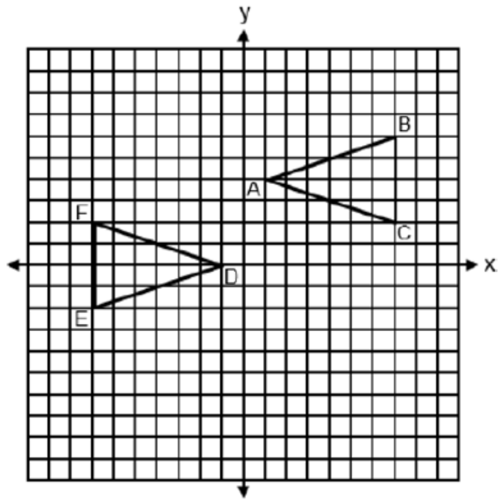
If $m\angle A = 82°$, $m\angle B = 104°$, and $m\angle L = 121°$, the measure of $\angle M$ is
1) 53°
2) 82°
3) 104°
4) 121°

10 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°

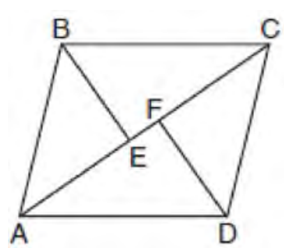
11 Triangles *ABC* and *DEF* are graphed on the set of axes below.



Which sequence of rigid motions maps $\triangle ABC$ onto $\triangle DEF$?

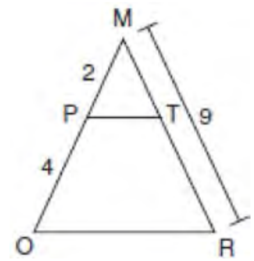
1) A reflection over $y = -x + 2$.
2) A point reflection through $(0,2)$.
3) A translation 2 units left followed by a reflection over the *x*-axis.
4) A translation 4 units down followed by a reflection over the *y*-axis.

12 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

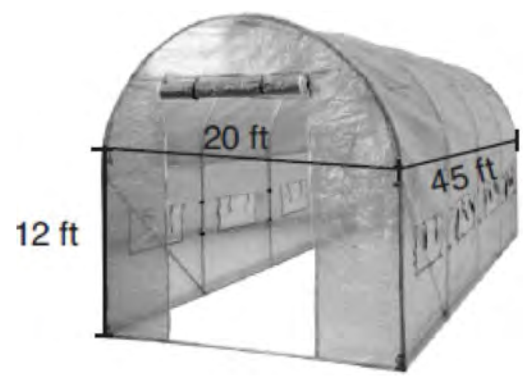
13 Given $\triangle MRO$ shown below, with trapezoid *PTRO*, $MR = 9$, $MP = 2$, and $PO = 4$.



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

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

14 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

15 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 $ABCD$.

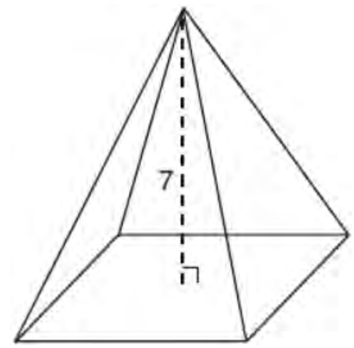
16 Which equation represents the line that passes through the point $(-2,2)$ and is parallel to $y=\frac{1}{2}x+8$?

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

17 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.

18 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

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

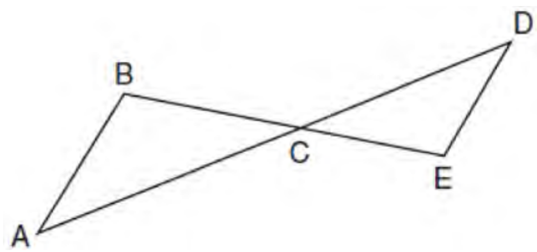
1) $\sqrt{34}$
2) $4\sqrt{34}$
3) $\sqrt{10}$
4) $4\sqrt{10}$

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

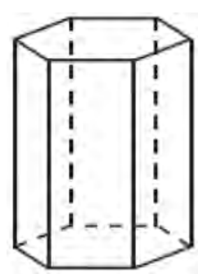
21 Line segment CD is the altitude drawn to hypotenuse $\overline{EF}$ in right triangle ECF. If $EC = 10$ and $EF = 24$, then, to the *nearest tenth*, ED is
1) 4.2
2) 5.4
3) 15.5
4) 21.8

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



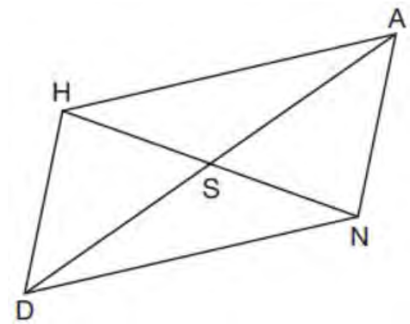
If $CD = 6.6$ cm, $DE = 3.4$ cm, $CE = 4.2$ cm, and $BC = 5.25$ cm, what is the length of $\overline{AC}$, to the *nearest hundredth of a centimeter*?
1) 2.70
2) 3.34
3) 5.28
4) 8.25

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



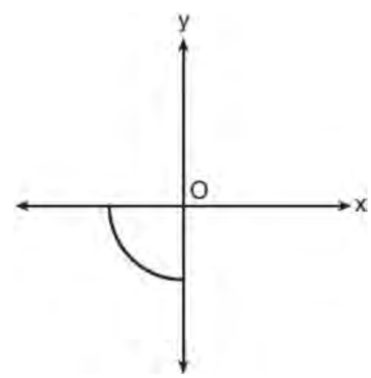
Which figure describes the two-dimensional cross section?
1) triangle
2) rectangle
3) pentagon
4) hexagon

24 Parallelogram $HAND$ is drawn below with diagonals $\overline{HN}$ and $\overline{AD}$ intersecting at S.



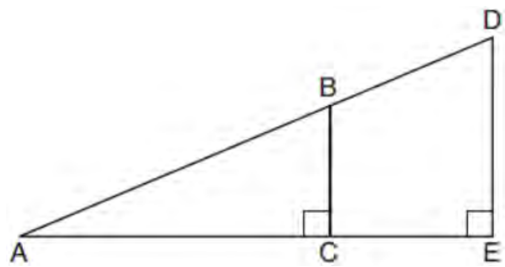
Which statement is always true?
1) $AN = \frac{1}{2}AD$
2) $AS = \frac{1}{2}AD$
3) $\angle AHS \cong \angle ANS$
4) $\angle HDS \cong \angle NDS$

25 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

26 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) $\frac{DE}{BC} = \frac{DB}{AB}$

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

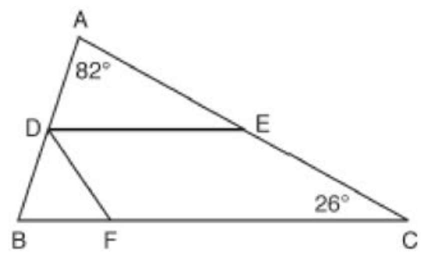
28 A regular pyramid has a square base. The perimeter of the base is 36 inches and the height of the pyramid is 15 inches. What is the volume of the pyramid in cubic inches?

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

29 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

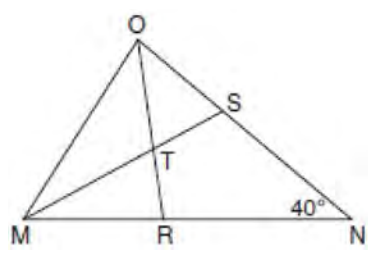
30 In the diagram below, $\overline{DE}$ divides $\overline{AB}$ and $\overline{AC}$ proportionally, $m\angle C = 26°$, $m\angle A = 82°$, and $\overline{DF}$ bisects $\angle BDE$.



The measure of angle DFB is

1) 36°
2) 54°
3) 72°
4) 82°

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



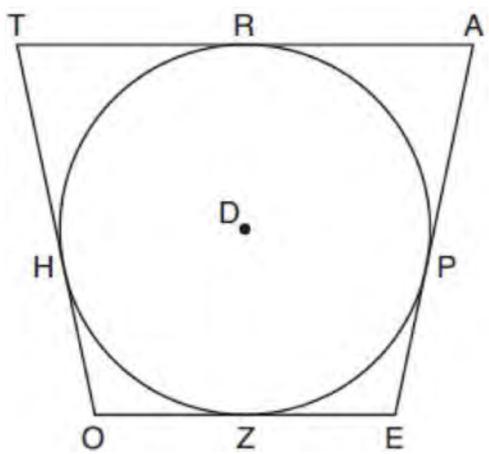
If $m\angle TMR = 28°$, the measure of angle OTS is

1) 40º
2) 50º
3) 60º
4) 70º

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

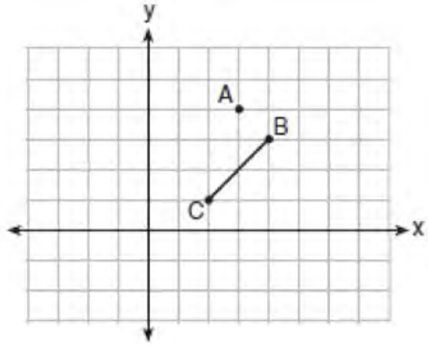
33 In the figure shown below, quadrilateral *TAEO* is circumscribed around circle *D*. The midpoint of $\overline{TA}$ is *R*, and $\overline{HO} \cong \overline{PE}$.



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

34 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) $(3,-6)$

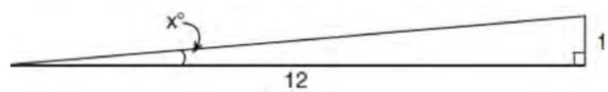
35 On the graph below, point $A(3,4)$ and $\overline{BC}$ with coordinates $B(4,3)$ and $C(2,1)$ are graphed.



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 $C'(3,0)$

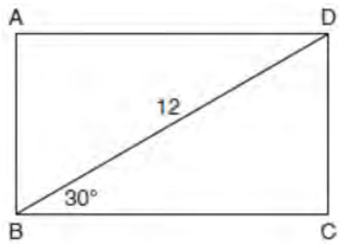
36 Under which transformation would $\triangle A'B'C'$, the image of $\triangle ABC$, *not* be congruent to $\triangle ABC$?
1) reflection over the *y*-axis
2) rotation of 90° clockwise about the origin
3) translation of 3 units right and 2 units down
4) dilation with a scale factor of 2 centered at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

37 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

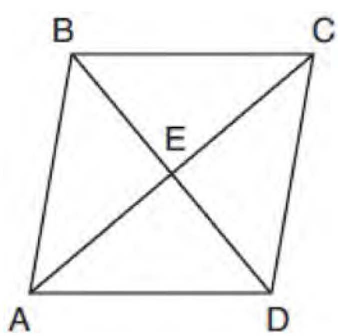
38 The diagram shows rectangle *ABCD*, with diagonal $\overline{BD}$.



What is the perimeter of rectangle *ABCD*, to the *nearest tenth*?
1) 28.4
2) 32.8
3) 48.0
4) 62.4

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

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

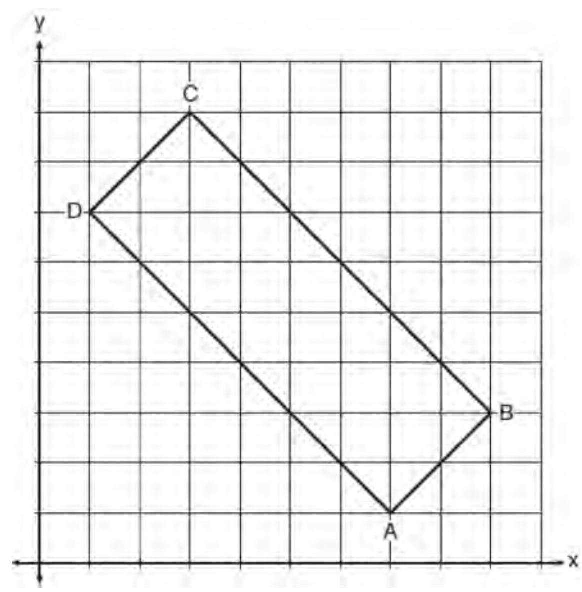


What additional information is sufficient to prove that parallelogram *ABCD* is also a rhombus?
1) $\overline{BD}$ bisects $\overline{AC}$.
2) $\overline{AB}$ is parallel to $\overline{CD}$.
3) $\overline{AC}$ is congruent to $\overline{BD}$.
4) $\overline{AC}$ is perpendicular to $\overline{BD}$.

41 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) $(6,0)$

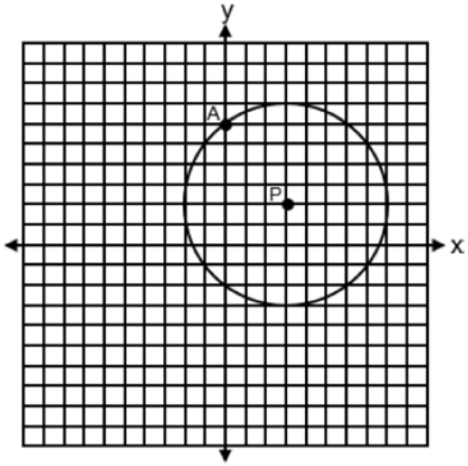
42 Quadrilateral *MATH* has both pairs of opposite sides congruent and parallel. Which statement about quadrilateral *MATH* is always true?
1) $\overline{MT} \cong \overline{AH}$
2) $\overline{MT} \perp \overline{AH}$
3) $\angle MHT \cong \angle ATH$
4) $\angle MAT \cong \angle MHT$

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



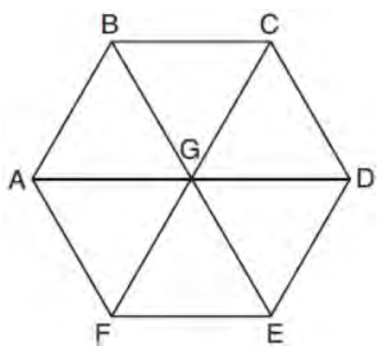
Which transformation will *not* carry the rectangle onto itself?
1) a reflection over the line $y = x$
2) a reflection over the line $y = -x + 10$
3) a rotation of 180° about the point $(6,6)$
4) a rotation of 180° about the point $(5,5)$

44 Circle P with center at $(3,2)$ and passing through $A(0,6)$ is graphed on the set of axes below.



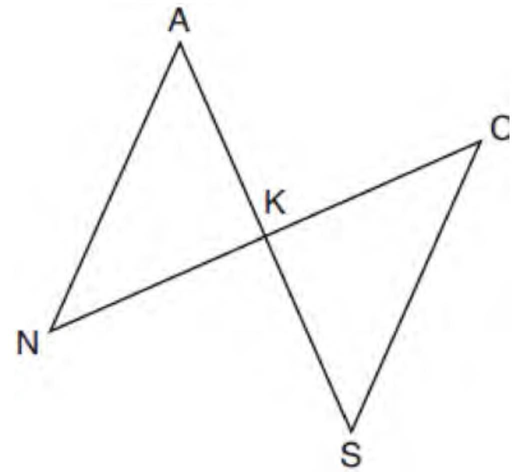
An equation of circle P is
1) $(x+3)^2+(y+2)^2=5$
2) $(x+3)^2+(y+2)^2=25$
3) $(x-3)^2+(y-2)^2=5$
4) $(x-3)^2+(y-2)^2=25$

45 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) $\triangle DEG$

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

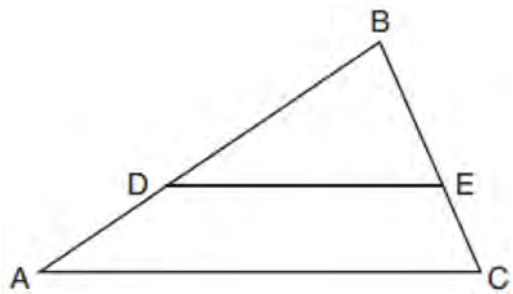


Which additional statement is sufficient to prove $\triangle KAN \cong \triangle KSC$ by AAS?
1) $\overline{AS}$ and $\overline{NC}$ bisect each other.
2) K is the midpoint of $\overline{NC}$.
3) $\overline{AS} \perp \overline{CN}$
4) $\overline{AN} \parallel \overline{SC}$

47 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

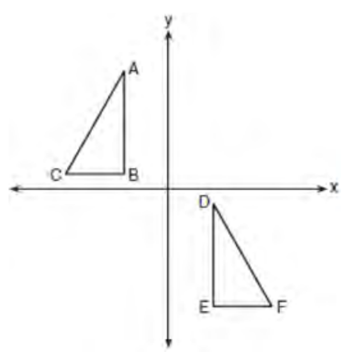
48 The coordinates of the endpoints of $\overline{AB}$ are $A(-8,-2)$ and $B(16,6)$. Point P is on $\overline{AB}$. What are the coordinates of point P, such that $AP:PB$ is 3:5?
1) $(1,1)$
2) $(7,3)$
3) $(9.6,3.6)$
4) $(6.4,2.8)$

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



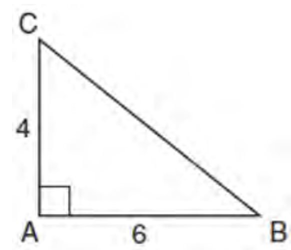
If $DB = 6.3$ and $AC = 9.4$, what is the length of $\overline{DE}$, to the *nearest tenth*?
1) 3.8
2) 5.6
3) 5.9
4) 15.7

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



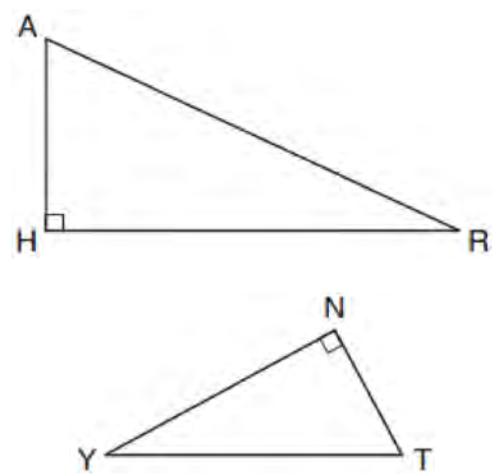
Which sequence of transformations maps $\triangle ABC$ onto $\triangle DEF$?
1) a reflection over the x-axis followed by a translation
2) a reflection over the y-axis followed by a translation
3) a rotation of 180° about the origin followed by a translation
4) a counterclockwise rotation of 90° about the origin followed by a translation

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



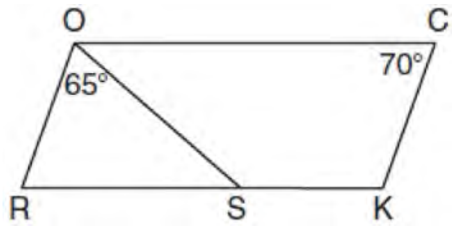
What is the volume of the three-dimensional object formed by continuously rotating the right triangle around $\overline{AB}$?
1) 32π
2) 48π
3) 96π
4) 144π

52 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°

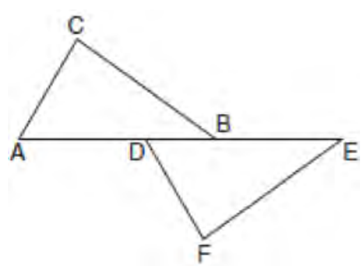
53 In the diagram below of parallelogram *ROCK*, m$\angle C$ is 70° and m$\angle ROS$ is 65°.



What is m$\angle KSO$?
1) 45º
2) 110º
3) 115º
4) 135º

54 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

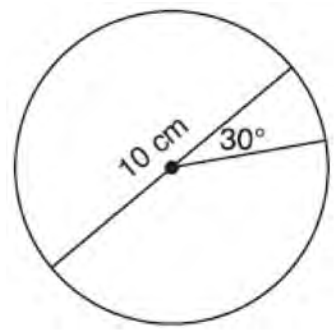
55 Kelly is completing a proof based on the figure below.



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

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

57 A circle with a diameter of 10 cm and a central angle of 30° is drawn below.

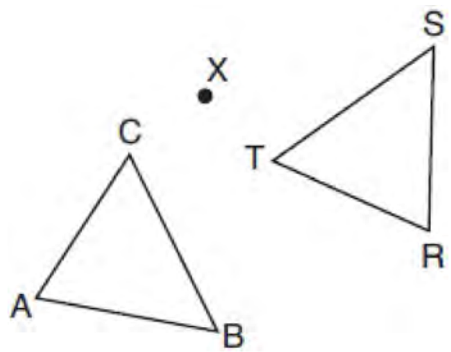


What is the area, to the *nearest tenth of a square centimeter*, of the sector formed by the 30° angle?
1) 5.2
2) 6.5
3) 13.1
4) 26.2

58 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

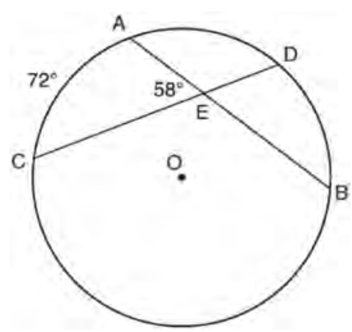
59 A right cylinder is cut perpendicular to its base. The shape of the cross section is a
1) circle
2) cylinder
3) rectangle
4) triangular prism

60 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) $\overline{CA} \cong \overline{TS}$

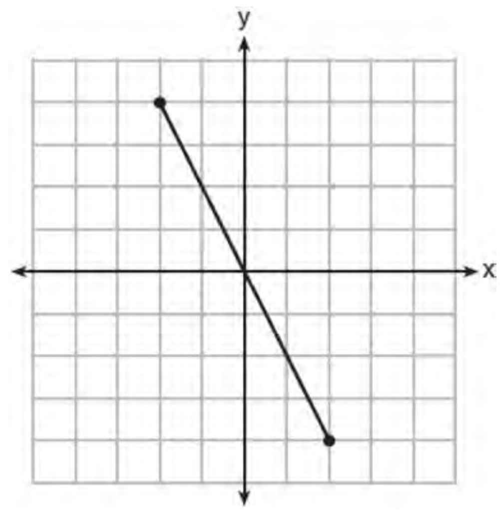
61 In the diagram below of circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E.



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

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

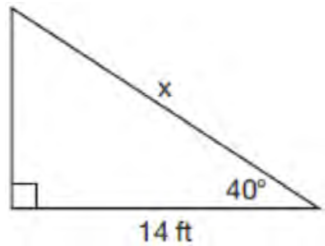
63 What is an equation of the perpendicular bisector of the line segment shown in the diagram below?



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

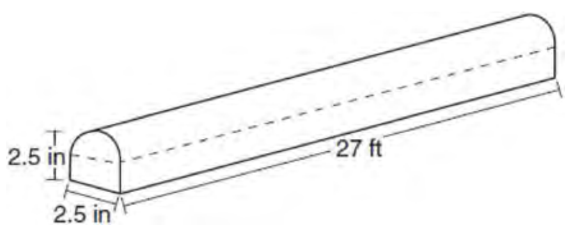
64 In right triangle ABC, hypotenuse $\overline{AB}$ has a length of 26 cm, and side $\overline{BC}$ has a length of 17.6 cm. What is the measure of angle B, to the *nearest degree*?
1) 48°
2) 47°
3) 43°
4) 34°

65 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

66 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.

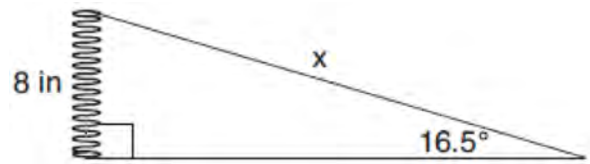


How much metal, to the *nearest cubic inch*, will the railing contain?
1) 151
2) 795
3) 1808
4) 2025

67 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

68 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

69 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

70 Line segment PAQ has endpoints whose coordinates are $P(-2,6)$ and $Q(3,-4)$. What are the coordinates of point A, such that $PA:AQ = 2:3$?
1) $(1,0)$
2) $(2,-2)$
3) $(-1,4)$
4) $(0,2)$

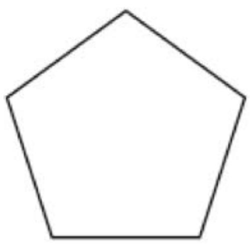
71 An equation of circle O is $x^2 + y^2 + 4x - 8y = -16$. The statement that best describes circle O is the
1) center is $(2,-4)$ and is tangent to the x-axis
2) center is $(2,-4)$ and is tangent to the y-axis
3) center is $(-2,4)$ and is tangent to the x-axis
4) center is $(-2,4)$ and is tangent to the y-axis

72 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

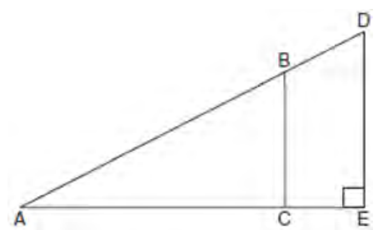
73 The regular polygon below is rotated about its center.



Which angle of rotation will carry the figure onto itself?
1) 60°
2) 108°
3) 216°
4) 540°

74 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 $\triangle DEF$

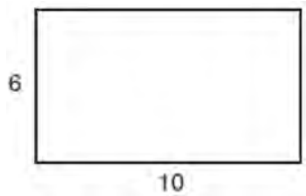
75 In the diagram of right triangle ADE below, $\overline{BC} \parallel \overline{DE}$.



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

76 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

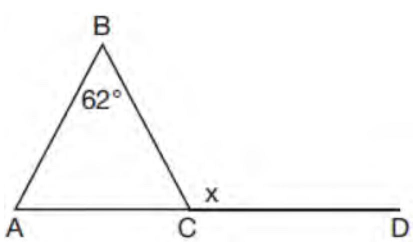
77 A rectangle whose length and width are 10 and 6, respectively, is shown below. The rectangle is continuously rotated around a straight line to form an object whose volume is 150π.



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

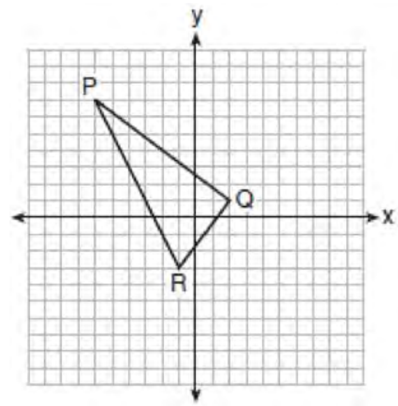
78 Line MN is dilated by a scale factor of 2 centered at the point $(0,6)$. If $\overleftrightarrow{MN}$ is represented by $y=-3x+6$, which equation can represent $\overleftrightarrow{M'N'}$, the image of $\overleftrightarrow{MN}$?
1) $y=-3x+12$
2) $y=-3x+6$
3) $y=-6x+12$
4) $y=-6x+6$

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



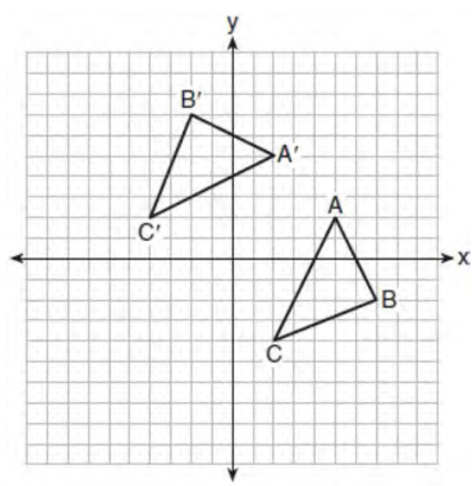
Which value of x makes $\overline{AB}\cong\overline{CB}$?
1) 59º
2) 62º
3) 118º
4) 121º

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



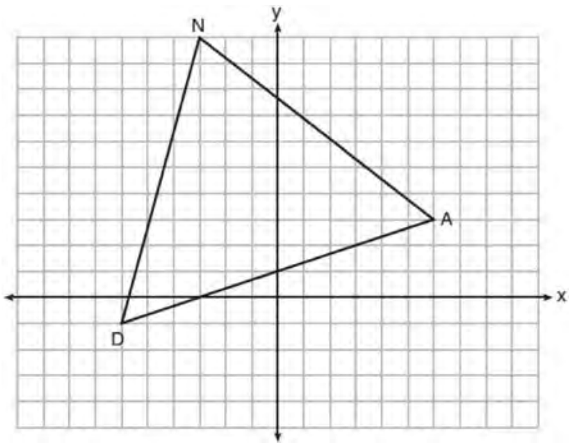
What is the area of $\triangle PQR$?
1) 10
2) 20
3) 25
4) 50

81 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 $y=x$

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

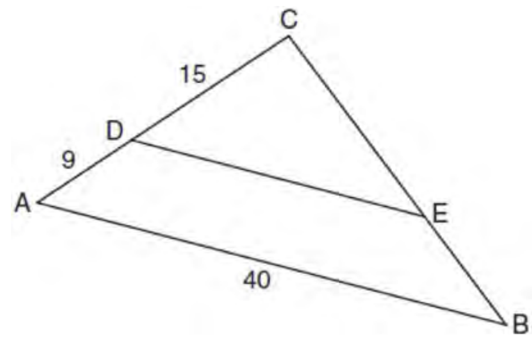


What is the area of $\triangle DAN$?
1) 60
2) 120
3) $20\sqrt{13}$
4) $40\sqrt{13}$

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

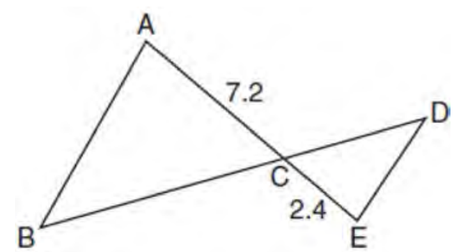
84 Parallelogram $ABCD$ has coordinates $A(0,7)$ and $C(2,1)$. Which statement would prove that $ABCD$ is a rhombus?
1) The midpoint of $\overline{AC}$ is $(1,4)$.
2) The length of $\overline{BD}$ is $\sqrt{40}$.
3) The slope of $\overline{BD}$ is $\frac{1}{3}$.
4) The slope of $\overline{AB}$ is $\frac{1}{3}$.

85 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

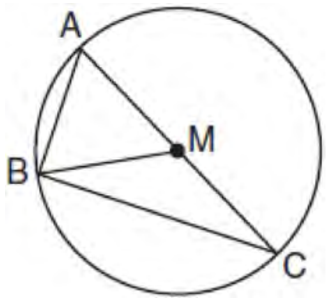
86 In the diagram below, $AC = 7.2$ and $CE = 2.4$.



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 $BC = 8.7$

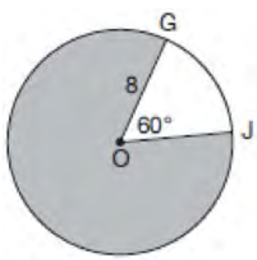
87 Directed line segment DE has endpoints $D(-4,-2)$ and $E(1,8)$. Point F divides $\overline{DE}$ such that $DF:FE$ is 2:3. What are the coordinates of F?
1) (-3.0)
2) $(-2,2)$
3) $(-1,4)$
4) $(2,4)$

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

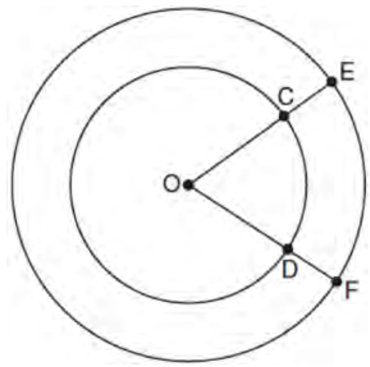
89 In the diagram below of circle O, $GO = 8$ and $m\angle GOJ = 60°$.



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

90 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

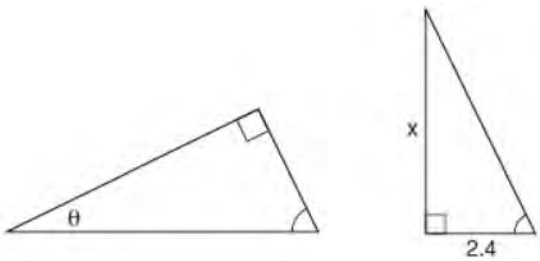
91 In the diagram below, two concentric circles with center O, and radii $\overline{OC}$, $\overline{OD}$, $\overline{OGE}$, and $\overline{ODF}$ are drawn.



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.

92 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) $4\sqrt{40}$

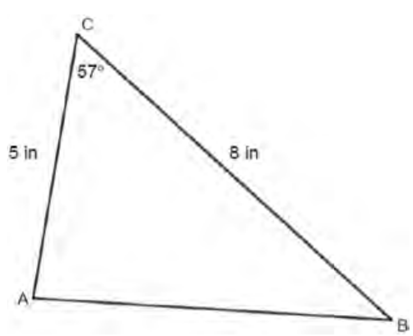
93 The diagram below shows two similar triangles.



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

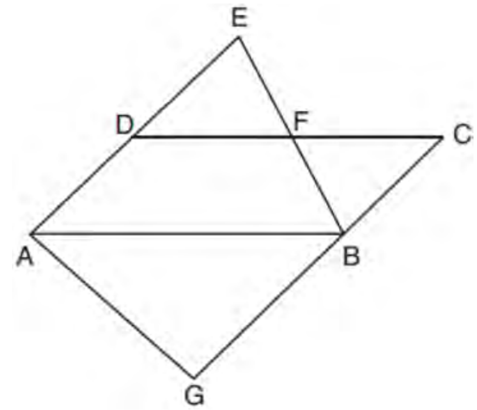
94 The line represented by the equation $4y = 3x + 7$ is transformed by a dilation centered at the origin. Which linear equation could represent its image?
1) $3x - 4y = 9$
2) $3x + 4y = 9$
3) $4x - 3y = 9$
4) $4x + 3y = 9$

95 In non-right triangle ABC shown below, $AC = 5$ in, $BC = 8$ in, and $m\angle C = 57°$.



What is the area of $\triangle ABC$, to the *nearest tenth of a square inch*?
1) 10.9
2) 16.8
3) 21.8
4) 33.5

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

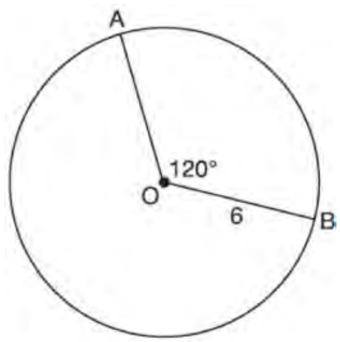


Which statement is always true?
1) $\triangle DEF \cong \triangle CBF$
2) $\triangle BAG \cong \triangle BAE$
3) $\triangle BAG \sim \triangle AEB$
4) $\triangle DEF \sim \triangle AEB$

97 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

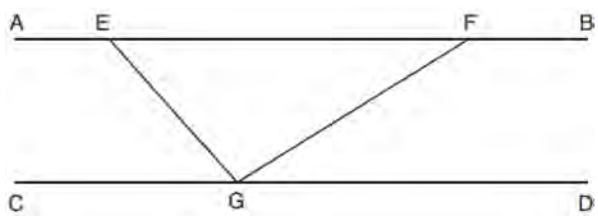
98 What are the coordinates of the point on the directed line segment from $K(-5,-4)$ to $L(5,1)$ that partitions the segment into a ratio of 3 to 2?
1) $(-3,-3)$
2) $(-1,-2)$
3) $\left(0,-\frac{3}{2}\right)$
4) $(1,-1)$

99 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.



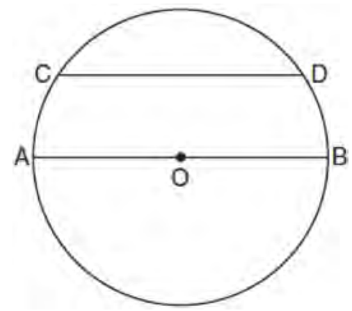
Which expression represents the length of arc AB, in inches?
1) $\frac{120}{360}(6\pi)$
2) 120(6)
3) $\frac{1}{3}(36\pi)$
4) $\frac{1}{3}(12\pi)$

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



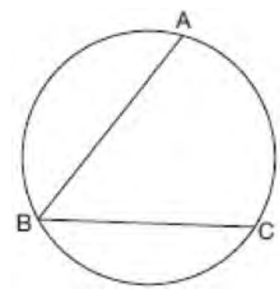
If $m\angle EFG = 32°$ and $m\angle AEG = 137°$, what is $m\angle EGF$?
1) 11º
2) 43º
3) 75º
4) 105º

101 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

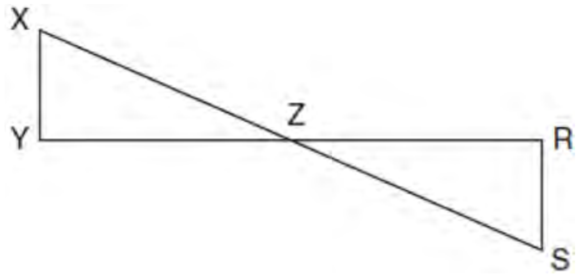
102 In the diagram below, $m\overset{\frown}{ABC} = 268°$.



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

103 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

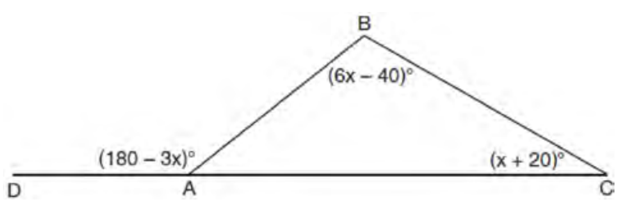
104 In the diagram below, $\overline{XS}$ and $\overline{YR}$ intersect at Z. Segments XY and RS are drawn perpendicular to $\overline{YR}$ to form triangles XYZ and SRZ.



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

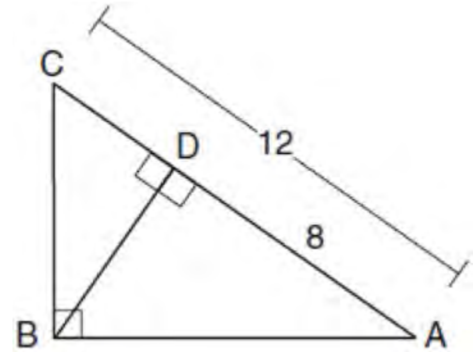
105 Given square $RSTV$, where $RS = 9$ cm. If square $RSTV$ is dilated by a scale factor of 3 about a given center, what is the perimeter, in centimeters, of the image of $RSTV$ after the dilation?
1) 12
2) 27
3) 36
4) 108

106 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) 20º
2) 40º
3) 60º
4) 80º

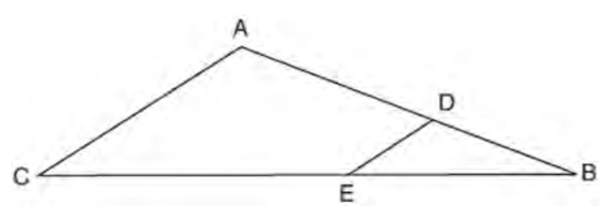
107 In the diagram below of $\triangle ABC$, $\angle ABC$ is a right angle, $AC = 12$, $AD = 8$, and altitude $\overline{BD}$ is drawn.



What is the length of $\overline{BC}$?
1) $4\sqrt{2}$
2) $4\sqrt{3}$
3) $4\sqrt{5}$
4) $4\sqrt{6}$

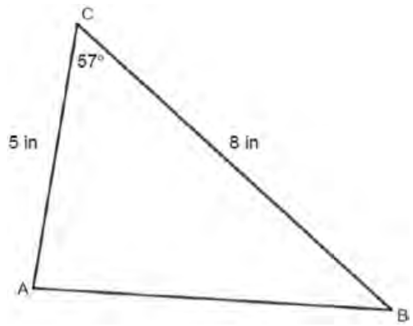
108 The equation of a circle is $x^2 + y^2 - 12y + 20 = 0$. What are the coordinates of the center and the length of the radius of the circle?
1) center $(0,6)$ and radius 4
2) center $(0,-6)$ and radius 4
3) center $(0,6)$ and radius 16
4) center $(0,-6)$ and radius 16

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



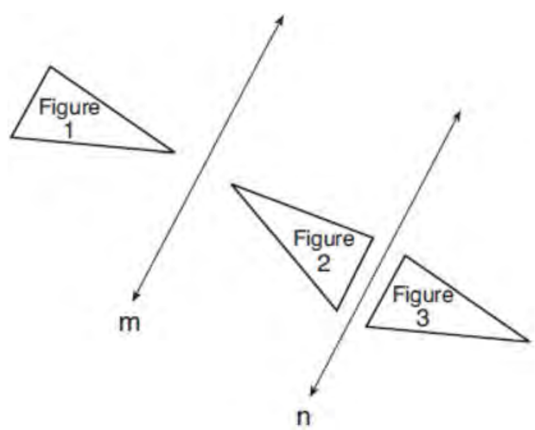
If EB is 3 more than DB, $AB = 14$, and $CB = 21$, what is the length of $\overline{AD}$?
1) 6
2) 8
3) 9
4) 12

110 In non-right triangle ABC shown below, $AC = 5$ in, $BC = 8$ in, and $m\angle C = 57°$.



What is the area of $\triangle ABC$, to the *nearest tenth of a square inch*?
1) 10.9
2) 16.8
3) 21.8
4) 33.5

111 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*.

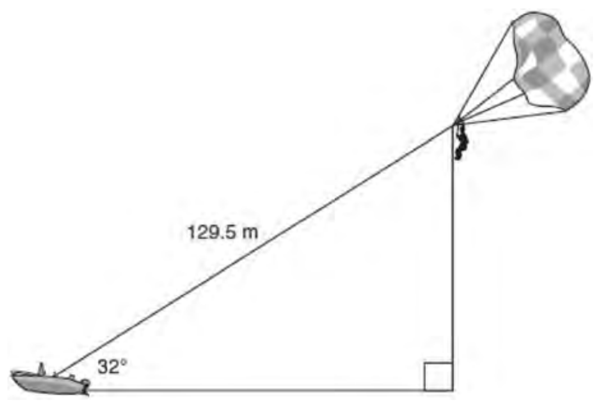


Which single transformation would carry Figure 1 onto Figure 3?
1) a dilation
2) a rotation
3) a reflection
4) a translation

112 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

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

114 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

115 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

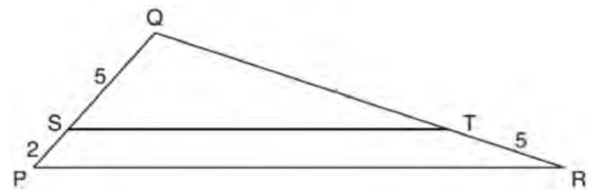
116 An ice cream waffle cone can be modeled by a right circular cone with a base diameter of 6.6 centimeters and a volume of 54.45π cubic centimeters. What is the number of centimeters in the height of the waffle cone?
1) $3\frac{3}{4}$
2) 5
3) 15
4) $24\frac{3}{4}$

117 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

118 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

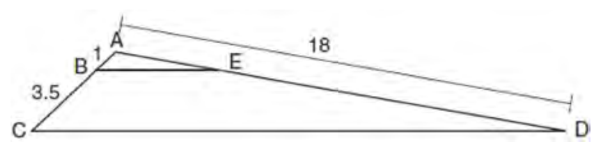
119 The equation of a circle is $x^2 + 6y = 4x - y^2 + 12$. What are the coordinates of the center and the length of the radius?
1) center $(2,-3)$ and radius 5
2) center $(-2,3)$ and radius 5
3) center $(2,-3)$ and radius 25
4) center $(-2,3)$ and radius 25

120 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) $17\frac{1}{2}$

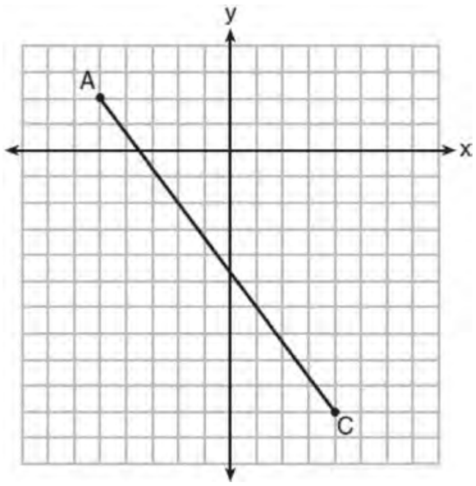
121 In the diagram below, triangle ACD has points B and E on sides $\overline{AC}$ and $\overline{AD}$, respectively, such that $\overline{BE} \parallel \overline{CD}$, $AB = 1$, $BC = 3.5$, and $AD = 18$.



What is the length of $\overline{AE}$, to the *nearest tenth*?
1) 14.0
2) 5.1
3) 3.3
4) 4.0

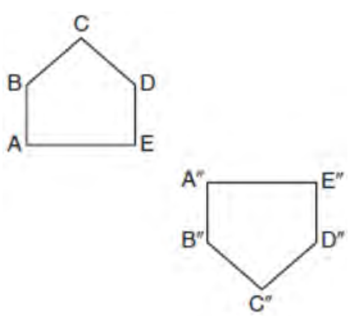
122 Which set of statements would describe a parallelogram that can always be classified as a rhombus?
I. Diagonals are perpendicular bisectors of each other.
II. Diagonals bisect the angles from which they are drawn.
III. Diagonals form four congruent isosceles right triangles.
1) I and II
2) I and III
3) II and III
4) I, II, and III

123 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) $(1,-6)$

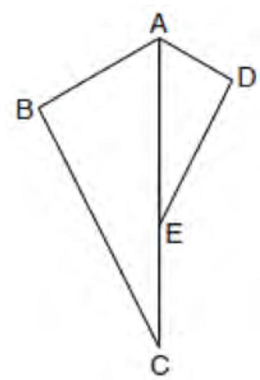
124 Identify which sequence of transformations could map pentagon $ABCDE$ onto pentagon $A''B''C''D''E''$, as shown below.



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

125 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 $= \sqrt{35}$

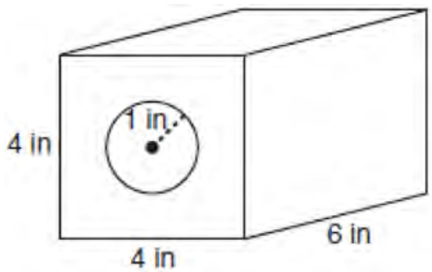
126 In the diagram below, $\triangle ADE$ is the image of $\triangle ABC$ after a reflection over the line AC followed by a dilation of scale factor $\frac{AE}{AC}$ centered at point A.



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

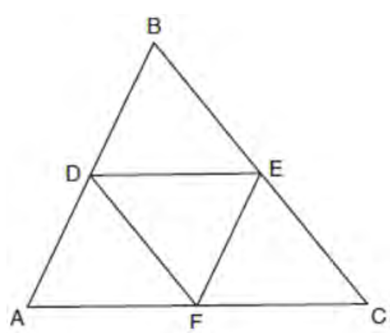
127 If $\triangle ABC$ is mapped onto $\triangle DEF$ after a line reflection and $\triangle DEF$ is mapped onto $\triangle XYZ$ after a translation, the relationship between $\triangle ABC$ and $\triangle XYZ$ is that they are always
1) congruent and similar
2) congruent but not similar
3) similar but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

128 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.



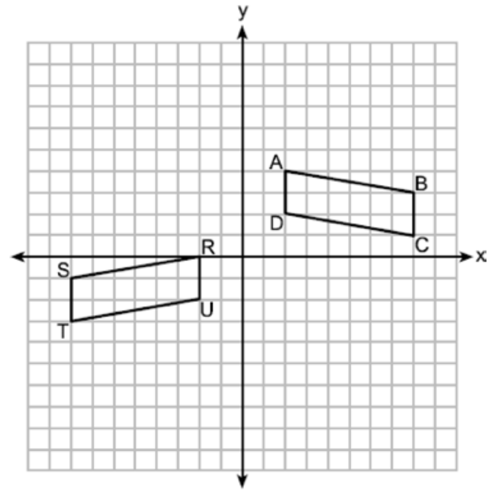
What is the approximate volume of the remaining solid, in cubic inches?
1) 19
2) 77
3) 93
4) 96

129 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) $AB + AC$

130 On the set of axes below, congruent parallelograms $ABCD$ and $RSTU$ are graphed.

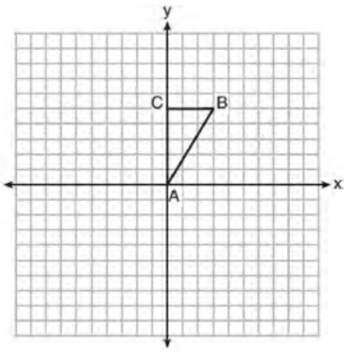


Which sequence of transformations maps $ABCD$ onto RSTU?
1) a reflection over the x-axis followed by a translation ten units to the left and one unit up
2) a translation four units down followed by a reflection over the y-axis
3) a reflection over the y-axis followed by a translation of two units down
4) a translation ten units to the left followed by a reflection over the x-axis

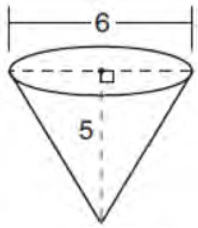
131 In right triangle ABC, $m\angle C = 90°$. If $\cos B = \frac{5}{13}$, which function also equals $\frac{5}{13}$?
1) $\tan A$
2) $\tan B$
3) $\sin A$
4) $\sin B$

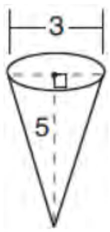
132 In circle O, secants $\overline{ADB}$ and $\overline{AEC}$ are drawn from external point A such that points D, B, E, and C are on circle O. If $AD = 8$, $AE = 6$, and EC is 12 more than BD, the length of $\overline{BD}$ is
1) 6
2) 22
3) 36
4) 48

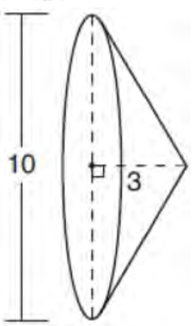
133 Triangle ABC, with vertices at $A(0,0)$, $B(3,5)$, and $C(0,5)$, is graphed on the set of axes shown below.

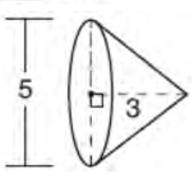


Which figure is formed when $\triangle ABC$ is rotated continuously about $\overline{BC}$?

1) 

2) 

3) 

4) 

134 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

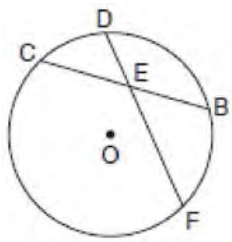
135 If $\sin(2x + 7)° = \cos(4x - 7)°$, what is the value of x?
1) 7
2) 15
3) 21
4) 30

136 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) $(10,2)$

137 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

138 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

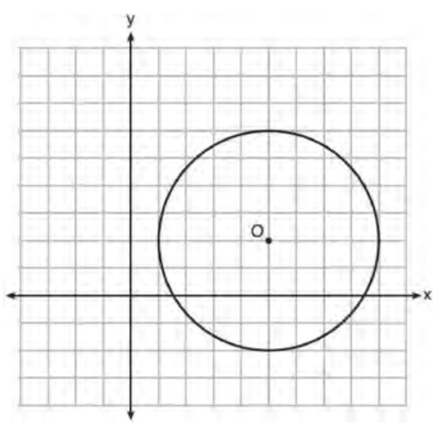
139 In the diagram below of circle O, chord $\overline{DF}$ bisects chord $\overline{BC}$ at E.



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

140 Triangle ABC has a right angle at C. If $AC = 7.7$ and $m\angle B = 24°$, what is AB, to the *nearest tenth*?
1) 18.9
2) 17.3
3) 8.4
4) 3.1

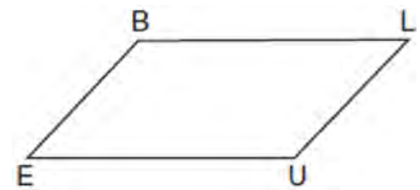
141 What is an equation of circle O shown in the graph below?



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

142 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°

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



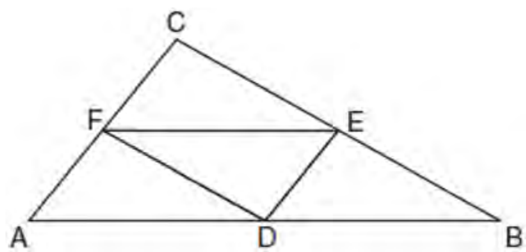
Which information would be sufficient to prove quadrilateral $BLUE$ is a parallelogram?
1) $\overline{BL} \parallel \overline{EU}$
2) $\overline{LU} \parallel \overline{BE}$
3) $\overline{BE} \cong \overline{BL}$
4) $\overline{LU} \cong \overline{EU}$

144 In $\triangle ABC$, $m\angle A = 120$, $b = 10$, and $c = 18$. What is the area of $\triangle ABC$ to the *nearest square inch*?
1) 52
2) 78
3) 90
4) 156

145 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.

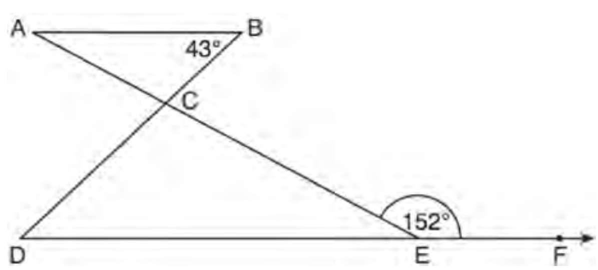
146 A circle whose center is the origin passes through the point $(-5,12)$. Which point also lies on this circle?
1) $(10,3)$
2) $(-12,13)$
3) $(11,2\sqrt{12})$
4) $(-8,5\sqrt{21})$

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



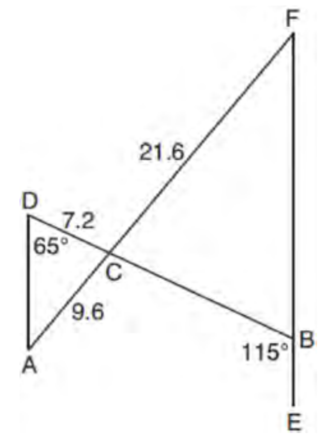
What is the ratio of the area of $\triangle CFE$ to the area of $\triangle CAB$?
1) 1:1
2) 1:2
3) 1:3
4) 1:4

148 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) $m\angle BCE = 109°$

149 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 $FC = 21.6$.

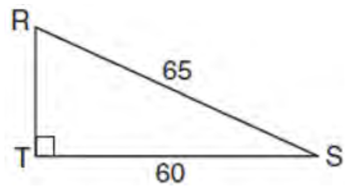


What is the length of $\overline{CB}$?
1) 3.2
2) 4.8
3) 16.2
4) 19.2

150 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 $\overline{DE}$

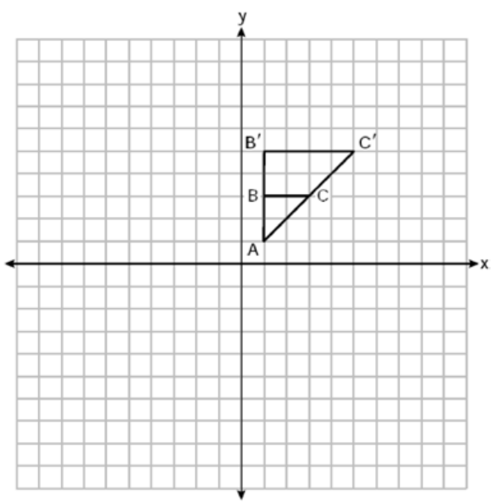
151 The vertices of $\triangle PQR$ have coordinates $P(2,3)$, $Q(3,8)$, and $R(7,3)$. Under which transformation of $\triangle PQR$ are distance and angle measure preserved?
1) $(x,y) \rightarrow (2x,3y)$
2) $(x,y) \rightarrow (x+2,3y)$
3) $(x,y) \rightarrow (2x,y+3)$
4) $(x,y) \rightarrow (x+2,y+3)$

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



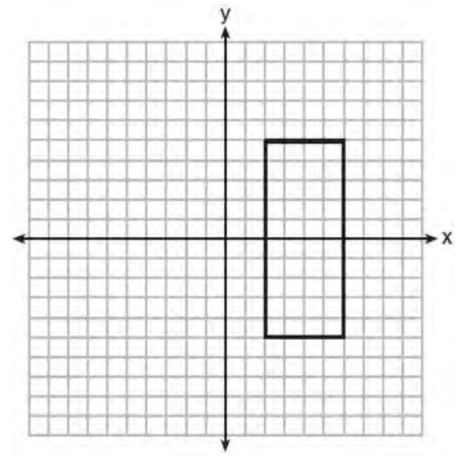
What is the measure of $\angle S$, to the *nearest degree*?
1) 23º
2) 43º
3) 47º
4) 67º

153 On the set of axes below, $\triangle AB'C'$ is the image of $\triangle ABC$.



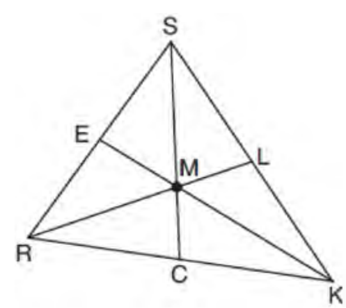
What is the scale factor and center of dilation that maps $\triangle ABC$ onto $\triangle AB'C'$?
1) $\frac{1}{2}$ and the origin
2) 2 and the origin
3) $\frac{1}{2}$ and vertex A
4) 2 and vertex A

154 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 $(4,0)$

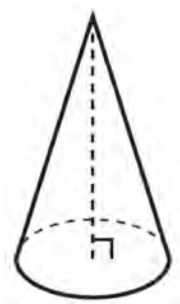
155 In triangle SRK below, medians $\overline{SC}$, $\overline{KE}$, and $\overline{RL}$ intersect at M.



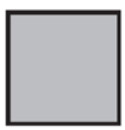
Which statement must always be true?
1) $3(MC) = SC$
2) $MC = \frac{1}{3}(SM)$
3) $RM = 2MC$
4) $SM = KM$

Geometry Multiple Choice Regents Exam Questions

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



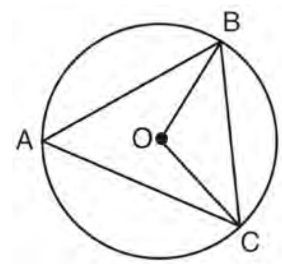
Which drawing can *not* be a cross section of a cone?

1) 
2) 
3) 
4) 

157 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) $y = 3x - 6$

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



Which statement must always be true?

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

159 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) $y = -x - 3$

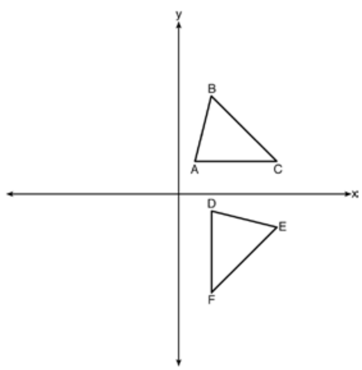
160 The diameter of a basketball is approximately 9.5 inches and the diameter of a tennis ball is approximately 2.5 inches. The volume of the basketball is about how many times greater than the volume of the tennis ball?

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

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

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



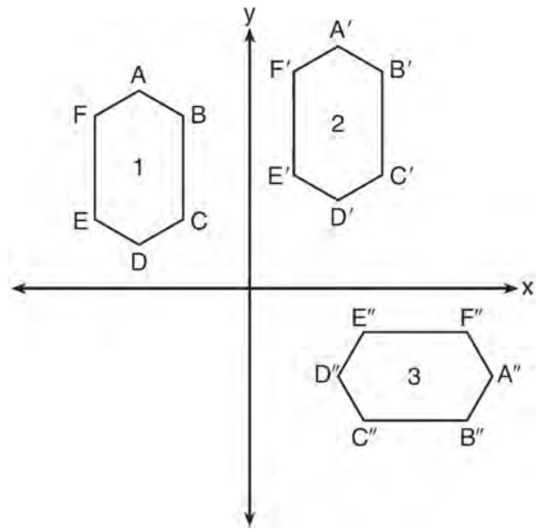
Which statement is true?

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

163 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

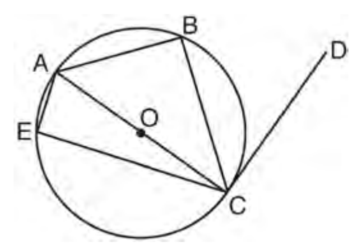
164 In the diagram below, congruent figures 1, 2, and 3 are drawn.



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

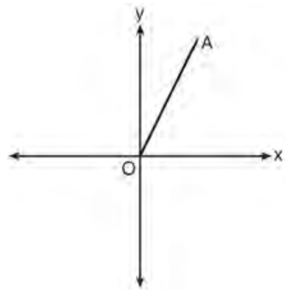
165 In circle O shown below, diameter $\overline{AC}$ is perpendicular to $\overline{CD}$ at point C, and chords $\overline{AB}$, $\overline{BC}$, $\overline{AE}$, and $\overline{CE}$ are drawn.



Which statement is *not* always true?

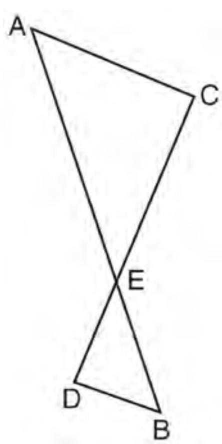
1) $\angle ACB \cong \angle BCD$
2) $\angle ABC \cong \angle ACD$
3) $\angle BAC \cong \angle DCB$
4) $\angle CBA \cong \angle AEC$

166 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

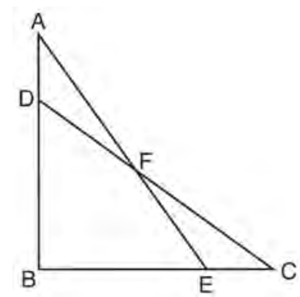
167 As shown in the diagram below, $\overline{AB}$ and $\overline{CD}$ intersect at E, and $\overline{AC} \parallel \overline{BD}$.



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

168 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

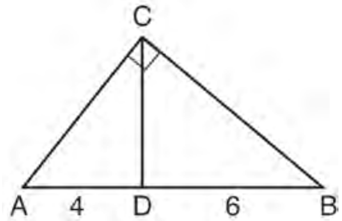
169 Given: $\triangle ABE$ and $\triangle CBD$ shown in the diagram below with $\overline{DB} \cong \overline{BE}$



Which statement is needed to prove $\triangle ABE \cong \triangle CBD$ using only SAS ≅ SAS?
1) $\angle CDB \cong \angle AEB$
2) $\angle AFD \cong \angle EFC$
3) $\overline{AD} \cong \overline{CE}$
4) $\overline{AE} \cong \overline{CD}$

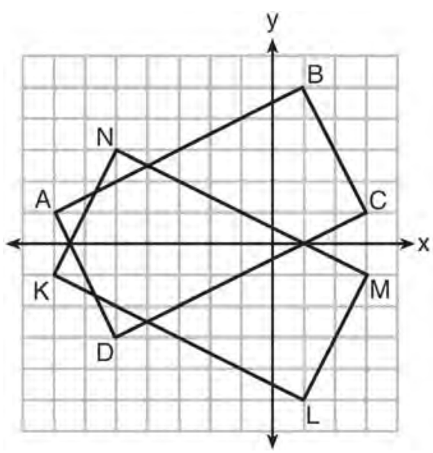
170 The density of the American white oak tree is 752 kilograms per cubic meter. If the trunk of an American white oak tree has a circumference of 4.5 meters and the height of the trunk is 8 meters, what is the approximate number of kilograms of the trunk?
1) 13
2) 9694
3) 13,536
4) 30,456

171 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) $4\sqrt{2}$

172 On the set of axes below, rectangle $ABCD$ can be proven congruent to rectangle $KLMN$ using which transformation?

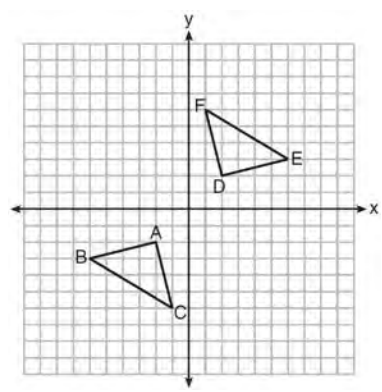


1) rotation
2) translation
3) reflection over the x-axis
4) reflection over the y-axis

173 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

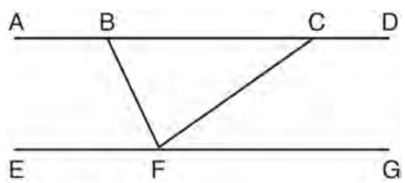
174 Which transformation would *not* always produce an image that would be congruent to the original figure?
1) translation
2) dilation
3) rotation
4) reflection

175 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

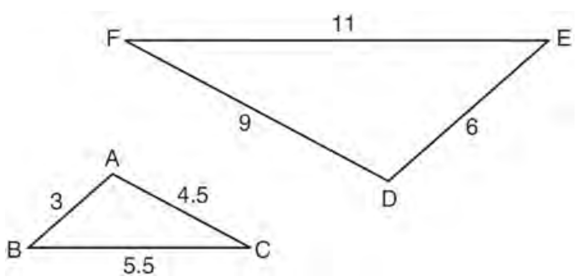
176 Steve drew line segments *ABCD*, *EFG*, *BF*, and *CF* as shown in the diagram below. Scalene $\triangle BFC$ is formed.



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) $\angle CBF \cong \angle GFC$

177 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 $EF = 11$.



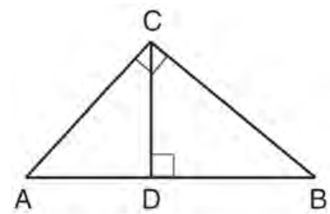
Which relationship must always be true?

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

178 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

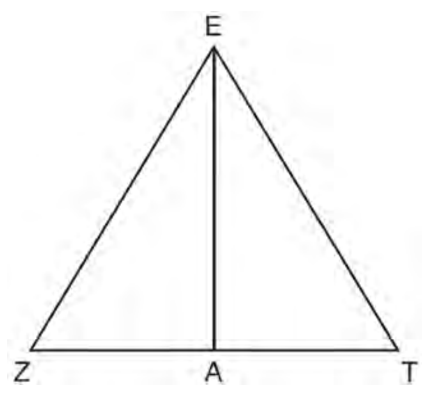
179 In the diagram below, $\overline{CD}$ is the altitude drawn to the hypotenuse $\overline{AB}$ of right triangle *ABC*.



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 $AB = 17$

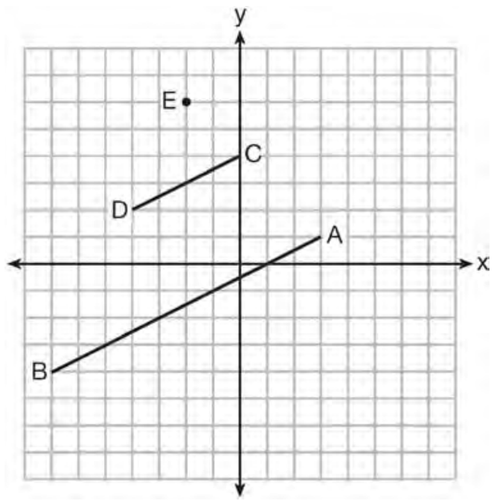
180 Line segment *EA* is the perpendicular bisector of $\overline{ZT}$, and $\overline{ZE}$ and $\overline{TE}$ are drawn.



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*.

181 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) $\frac{EA}{EC}$

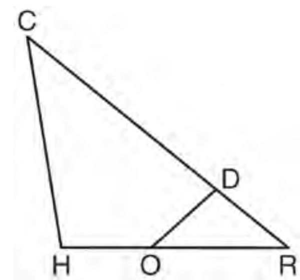
182 Line $y = 3x - 1$ is transformed by a dilation with a scale factor of 2 and centered at (3,8). The line's image is

1) $y = 3x - 8$
2) $y = 3x - 4$
3) $y = 3x - 2$
4) $y = 3x - 1$

183 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

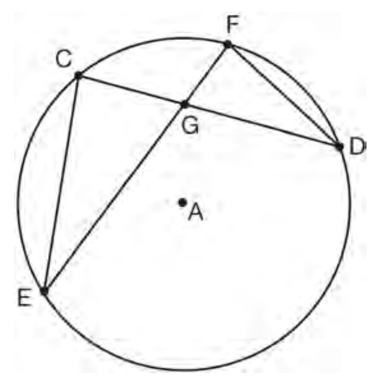
184 In triangle CHR, O is on $\overline{HR}$, and D is on $\overline{CR}$ so that $\angle H \cong \angle RDO$.



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

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

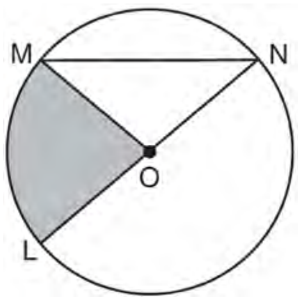
185 In the diagram of circle A shown below, chords $\overline{CD}$ and $\overline{EF}$ intersect at G, and chords $\overline{CE}$ and $\overline{FD}$ are drawn.



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) $\triangle CEG \sim \triangle FDG$

186 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

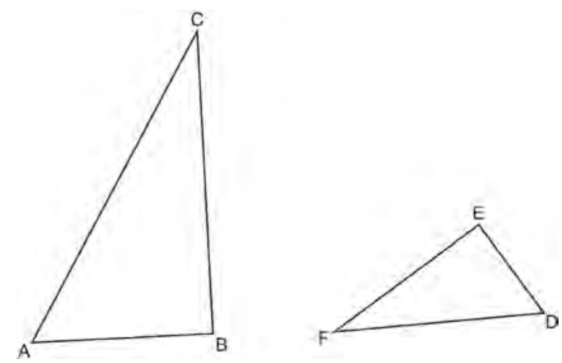
187 Line k is represented by the equation $4y + 3 = 7x$. Which equation represents a line that is perpendicular to line k and passes through the point $(-5,2)$?
1) $y + 2 = \frac{4}{7}(x - 5)$
2) $y - 2 = \frac{4}{7}(x + 5)$
3) $y + 2 = -\frac{4}{7}(x - 5)$
4) $y - 2 = -\frac{4}{7}(x + 5)$

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

189 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

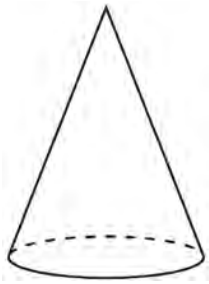
190 Molly wishes to make a lawn ornament in the form of a solid sphere. The clay being used to make the sphere weighs .075 pound per cubic inch. If the sphere's radius is 4 inches, what is the weight of the sphere, to the *nearest pound*?
1) 34
2) 20
3) 15
4) 4

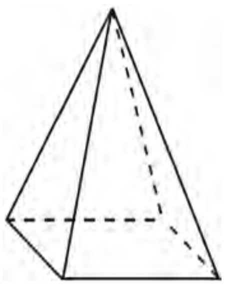
191 Triangles ABC and DEF are drawn below.

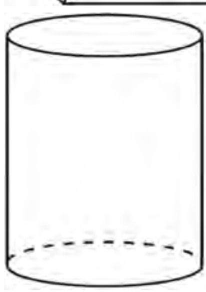


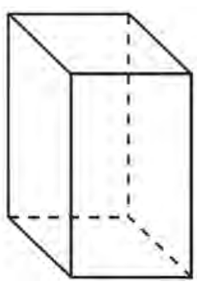
If $AB = 9$, $BC = 15$, $DE = 6$, $EF = 10$, and $\angle B \cong \angle E$, which statement is true?
1) $\angle CAB \cong \angle DEF$
2) $\frac{AB}{CB} = \frac{FE}{DE}$
3) $\triangle ABC \sim \triangle DEF$
4) $\frac{AB}{DE} = \frac{FE}{CB}$

192 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) 

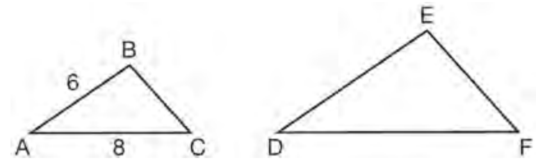
2) 

3) 

4) 

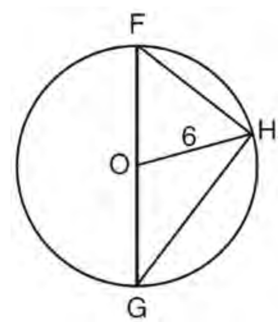
193 The Great Pyramid of Giza was constructed as a regular pyramid with a square base. It was built with an approximate volume of 2,592,276 cubic meters and a height of 146.5 meters. What was the length of one side of its base, to the *nearest meter*?
1) 73
2) 77
3) 133
4) 230

194 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 $\angle C \cong \angle F$

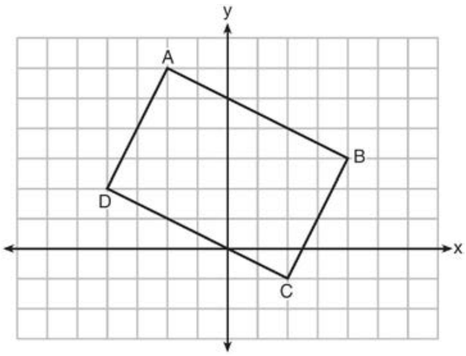
195 Triangle FGH is inscribed in circle O, the length of radius $\overline{OH}$ is 6, and $\overline{FH} \cong \overline{OG}$.



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

196 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

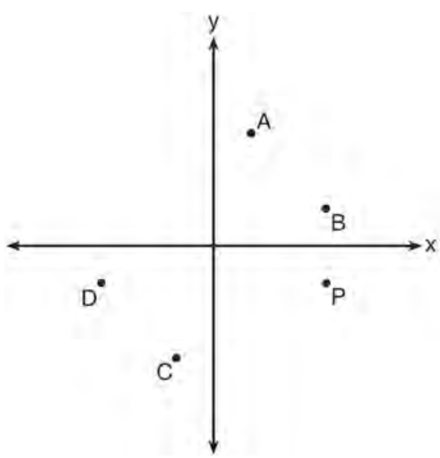
197 Quadrilateral $ABCD$ is graphed on the set of axes below.



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?

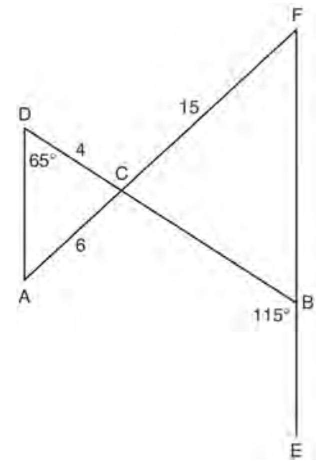
1) no and $C'(1,2)$
2) no and $D'(2,4)$
3) yes and $A'(6,2)$
4) yes and $B'(-3,4)$

198 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

199 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

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

201 A square with a side length of 3 is continuously rotated about one of its sides. The resulting three-dimensional object is a

1) cube with a volume of 9.
2) cube with a volume of 27.
3) cylinder with a volume of 27π.
4) cylinder with a volume of 54π.

202 If $x^2 + 4x + y^2 - 6y - 12 = 0$ is the equation of a circle, the length of the radius is

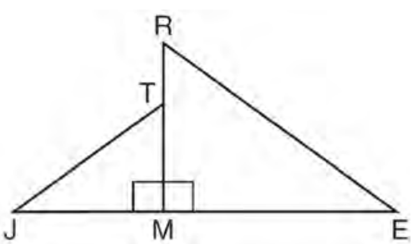
1) 25
2) 16
3) 5
4) 4

203 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) $(6,3)$

204 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

205 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

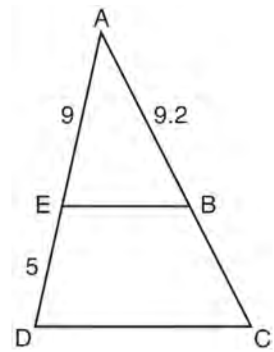
206 In the diagram below, $\triangle ERM \sim \triangle JTM$.



Which statement is always true?
1) $\cos J = \frac{RM}{RE}$
2) $\cos R = \frac{JM}{JT}$
3) $\tan T = \frac{RM}{EM}$
4) $\tan E = \frac{TM}{JM}$

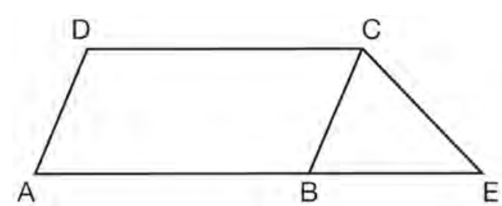
207 If $\triangle ABC$ is dilated by a scale factor of 3, which statement is true of the image $\triangle A'B'C'$?
1) $3A'B' = AB$
2) $B'C' = 3BC$
3) $m\angle A' = 3(m\angle A)$
4) $3(m\angle C') = m\angle C$

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



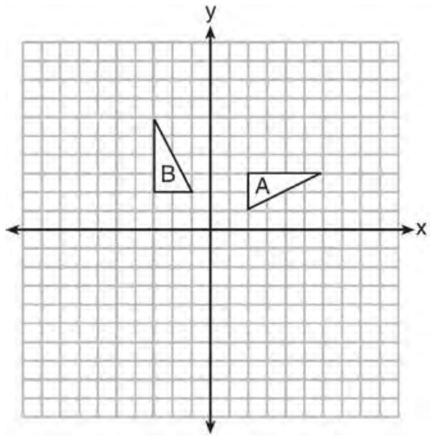
What is the length of $\overline{AC}$, to the *nearest tenth*?
1) 5.1
2) 5.2
3) 14.3
4) 14.4

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



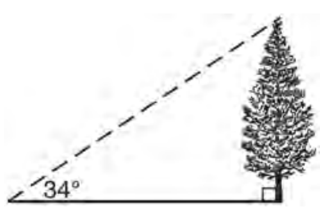
If $\overline{CE} \cong \overline{BE}$ and $m\angle D = 112°$, what is $m\angle E$?
1) 44°
2) 56°
3) 68°
4) 112°

210 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

211 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

212 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

213 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) $25\sqrt{2}$

214 Kevin's work for deriving the equation of a circle is shown below.

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

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

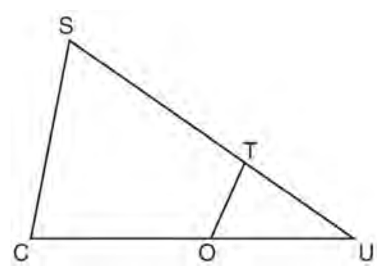
STEP 2 $x^2 + 4x + 4 = -y^2 + 20 - 4$

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

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

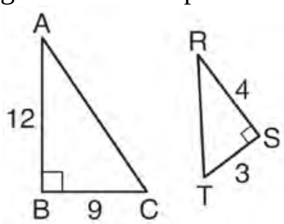


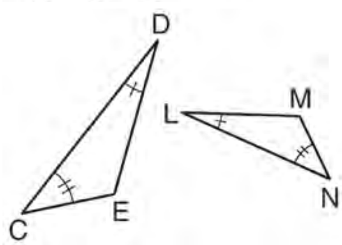
If $TU = 4$, $OU = 5$, and $OC = 7$, what is the length of $\overline{ST}$?
1) 5.6
2) 8.75
3) 11
4) 15

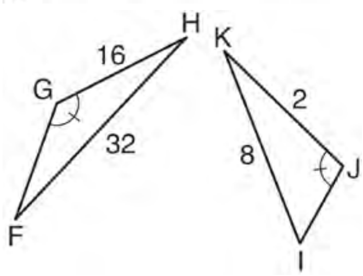
216 A shipping container is in the shape of a right rectangular prism with a length of 12 feet, a width of 8.5 feet, and a height of 4 feet. The container is completely filled with contents that weigh, on average, 0.25 pound per cubic foot. What is the weight, in pounds, of the contents in the container?

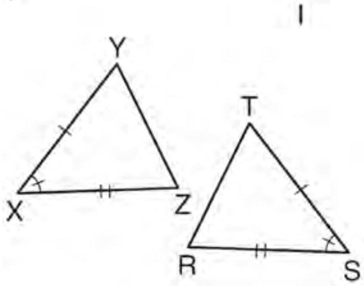
1) 1,632
2) 408
3) 102
4) 92

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

1) 

2) 

3) 

4) 

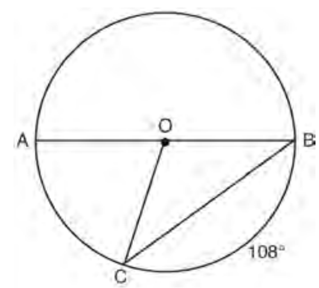
218 A line that passes through the points whose coordinates are $(1,1)$ and $(5,7)$ is dilated by a scale factor of 3 and centered at the origin. The image of the line

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

219 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

220 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 $\frac{3}{10} \cdot \pi \cdot (\frac{1}{2} AB)^2$

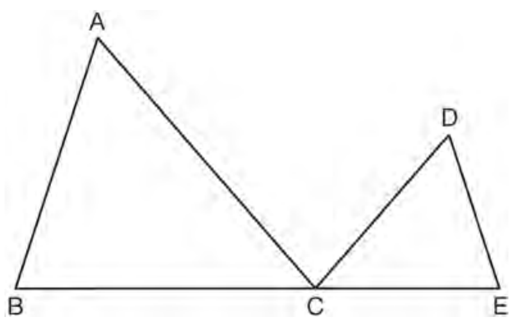
Dex $\frac{108}{360} \cdot \pi \cdot \frac{1}{2} (AB)^2$

Which students wrote correct formulas?

1) Amy and Dex
2) Beth and Carl
3) Carl and Amy
4) Dex and Beth

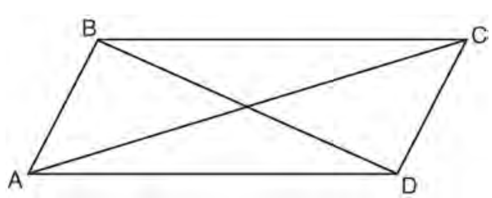
221 A gallon of paint will cover approximately 450 square feet. An artist wants to paint all the outside surfaces of a cube measuring 12 feet on each edge. What is the *least* number of gallons of paint he must buy to paint the cube?
1) 1
2) 2
3) 3
4) 4

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



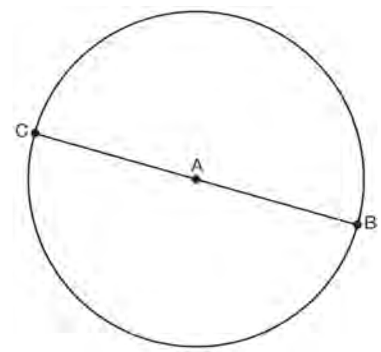
If $AC = 12$, $DC = 7$, $DE = 5$, and the perimeter of $\triangle ABC$ is 30, what is the perimeter of $\triangle DEC$?
1) 12.5
2) 14.0
3) 14.8
4) 17.5

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

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

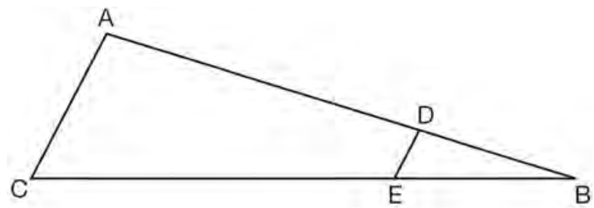


Point *D*, which is unique from points *B* and *C*, is plotted on circle *A*. Which statement must always be true?
1) $\triangle BCD$ is a right triangle.
2) $\triangle BCD$ is an isosceles triangle.
3) $\triangle BAD$ and $\triangle CBD$ are similar triangles.
4) $\triangle BAD$ and $\triangle CAD$ are congruent triangles.

225 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) $y = 2x - 16$

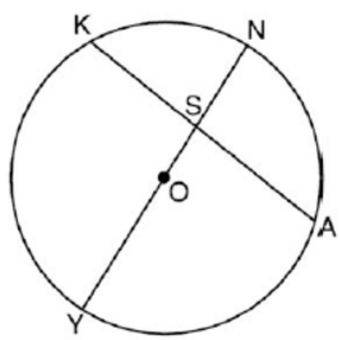
226 Tennis balls are sold in cylindrical cans with the balls stacked one on top of the other. A tennis ball has a diameter of 6.7 cm. To the *nearest cubic centimeter*, what is the minimum volume of the can that holds a stack of 4 tennis balls?
1) 236
2) 282
3) 564
4) 945

227 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

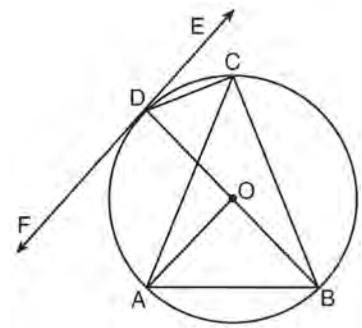
228 In circle O, chord $\overline{KA}$ intersects diameter $\overline{YN}$ at S.



If $m\overset{\frown}{YK} = 120°$ and $m\overset{\frown}{YA} = 105°$, what is $m\angle ASN$?
1) 22.5º
2) 75º
3) 97.5º
4) 120º

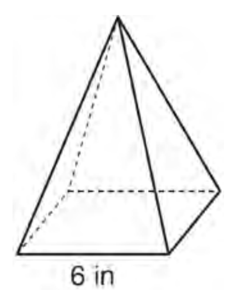
229 The line $3y = -2x + 8$ is transformed by a dilation centered at the origin. Which linear equation could be its image?
1) $2x + 3y = 5$
2) $2x - 3y = 5$
3) $3x + 2y = 5$
4) $3x - 2y = 5$

230 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."



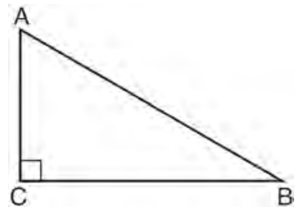
Which angle is Sam referring to?
1) $\angle AOB$
2) $\angle BAC$
3) $\angle DCB$
4) $\angle FDB$

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



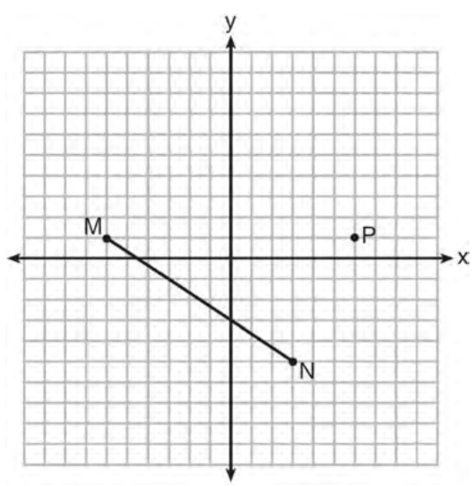
If the altitude of the pyramid measures 12 inches, its volume, in cubic inches, is
1) 72
2) 144
3) 288
4) 432

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



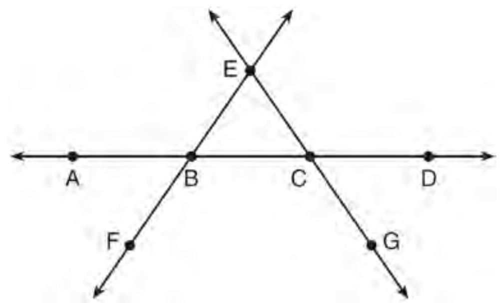
Which equation is always true?
1) $\sin A = \sin B$
2) $\cos A = \cos B$
3) $\cos A = \sin C$
4) $\sin A = \cos B$

233 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 $\overline{MN}$?



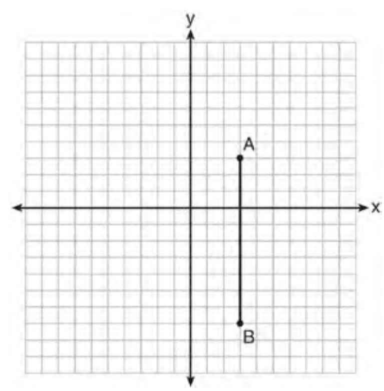
1) $y = -\frac{2}{3}x + 5$
2) $y = -\frac{2}{3}x - 3$
3) $y = \frac{3}{2}x + 7$
4) $y = \frac{3}{2}x - 8$

234 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.

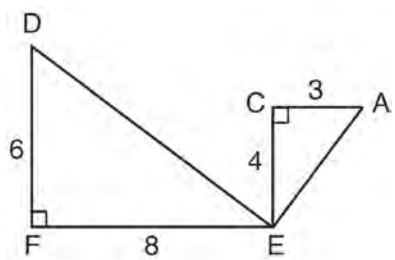
235 The graph below shows $\overline{AB}$, which is a chord of circle O. The coordinates of the endpoints of $\overline{AB}$ are $A(3,3)$ and $B(3,-7)$. The distance from the midpoint of $\overline{AB}$ to the center of circle O is 2 units.



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

236 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

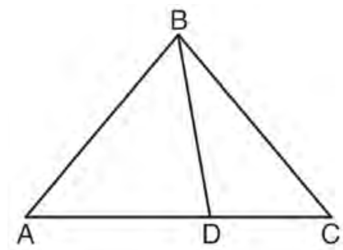
237 Given: $\triangle AEC$, $\triangle DEF$, and $\overline{FE} \perp \overline{CE}$



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

238 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

239 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.

240 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

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 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) $y = 2x + 1$

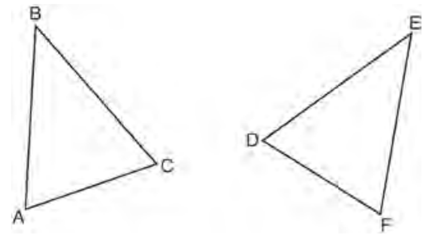
243 Which expression is always equivalent to $\sin x$ when $0° < x < 90°$?
1) $\cos(90° - x)$
2) $\cos(45° - x)$
3) $\cos(2x)$
4) $\cos x$

244 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.

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

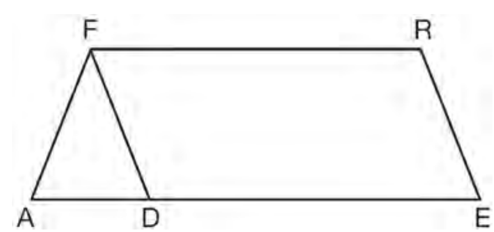
246 If $\triangle A'B'C'$ is the image of $\triangle ABC$, under which transformation will the triangles *not* be congruent?
1) reflection over the x-axis
2) translation to the left 5 and down 4
3) dilation centered at the origin with scale factor 2
4) rotation of 270° counterclockwise about the origin

247 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 $\angle E$.

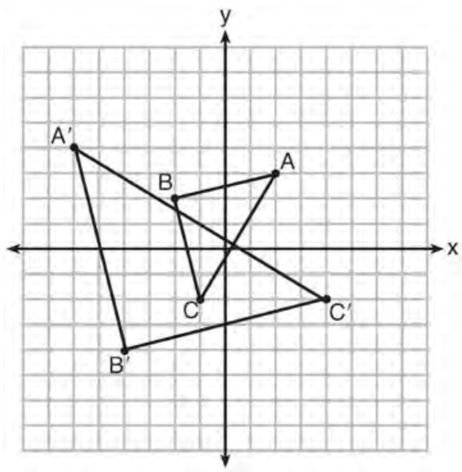
248 In the diagram of parallelogram $FRED$ shown below, $\overline{ED}$ is extended to A, and $\overline{AF}$ is drawn such that $\overline{AF} \cong \overline{DF}$.



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

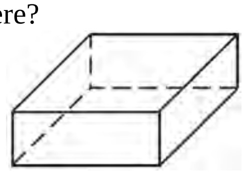
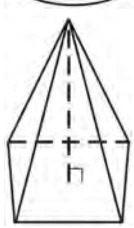
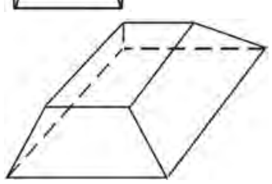
249 A 20-foot support post leans against a wall, making a 70° angle with the ground. To the *nearest tenth of a foot*, how far up the wall will the support post reach?
1) 6.8
2) 6.9
3) 18.7
4) 18.8

250 Which sequence of transformations will map $\triangle ABC$ onto $\triangle A'B'C'$?

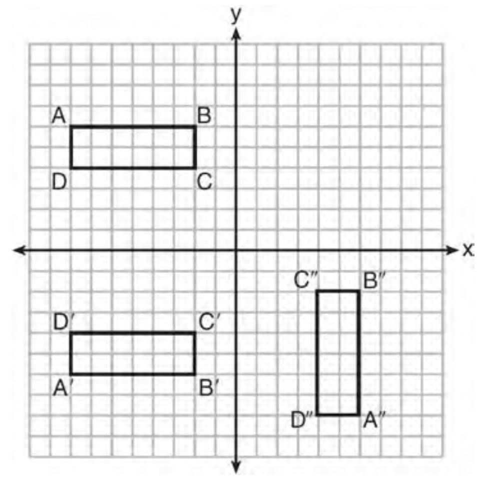


1) reflection and translation
2) rotation and reflection
3) translation and dilation
4) dilation and rotation

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

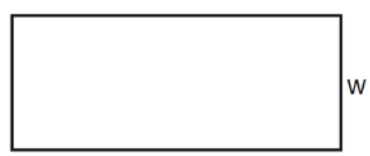
1) 
2) 
3) 
4) 

252 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

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

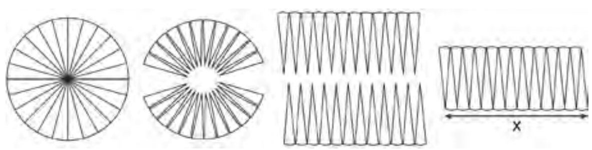


1) pyramid
2) rectangular prism
3) cone
4) cylinder

254 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

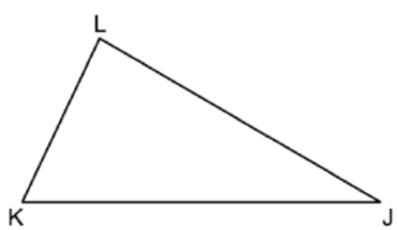
255 Seawater contains approximately 1.2 ounces of salt per liter on average. How many gallons of seawater, to the *nearest tenth of a gallon*, would contain 1 pound of salt?
1) 3.3
2) 3.5
3) 4.7
4) 13.3

256 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

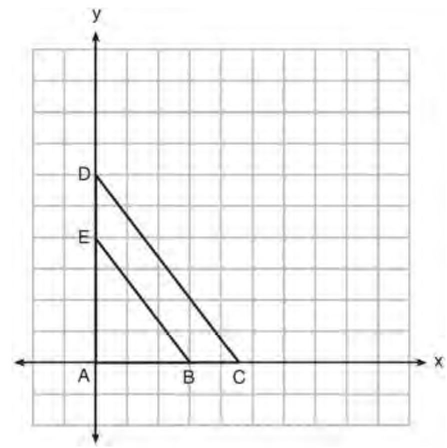
257 Scalene triangle JKL is drawn below.



If median $\overline{LM}$ is drawn to side $\overline{KJ}$, which statement is always true?
1) $LM = KM$
2) $KM = \frac{1}{2}KJ$
3) $\overline{LM} \perp \overline{KJ}$
4) $\angle KLM \cong \angle JLM$

258 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

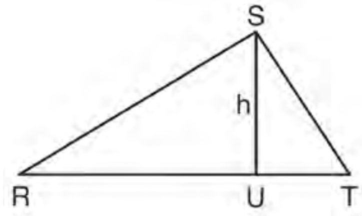
259 In the diagram below, $\triangle ABE$ is the image of $\triangle ACD$ after a dilation centered at the origin. The coordinates of the vertices are $A(0,0)$, $B(3,0)$, $C(4.5,0)$, $D(0,6)$, and $E(0,4)$.



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) $\frac{4}{3}$

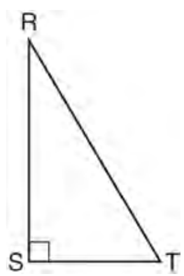
260 A company is creating an object from a wooden cube with an edge length of 8.5 cm. A right circular cone with a diameter of 8 cm and an altitude of 8 cm will be cut out of the cube. Which expression represents the volume of the remaining wood?
1) $(8.5)^3 - \pi(8)^2(8)$
2) $(8.5)^3 - \pi(4)^2(8)$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

261 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) $6\sqrt{35}$

262 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

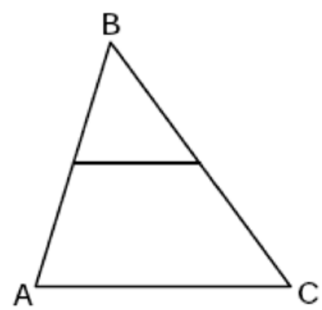
263 In parallelogram $ABCD$, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E. Which statement does *not* prove parallelogram $ABCD$ is a rhombus?
1) $\overline{AC} \cong \overline{DB}$
2) $\overline{AB} \cong \overline{BC}$
3) $\overline{AC} \perp \overline{DB}$
4) $\overline{AC}$ bisects $\angle DCB$

264 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

265 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

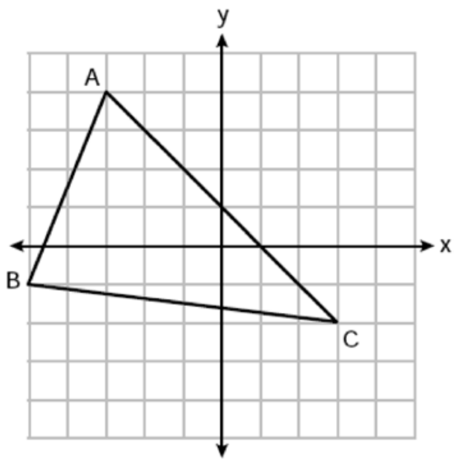
266 Which regular polygon has a minimum rotation of 45° to carry the polygon onto itself?
1) octagon
2) decagon
3) hexagon
4) pentagon

267 In $\triangle ABC$ below, $\overline{DE}$ is a midsegment, and $\overline{BD} \cong \overline{DE}$.



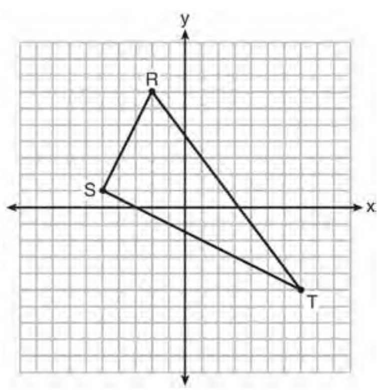
Which statement is always true?
1) $\triangle ABC$ is isosceles
2) $\triangle ABC$ is scalene
3) $\overline{BD} \cong \overline{BE}$
4) $\overline{DA} \cong \overline{EC}$

268 Triangle ABC is graphed on the set of axes below. The vertices of $\triangle ABC$ have coordinates $A(-3,4)$, $B(-5,-1)$, and $C(3,-2)$.



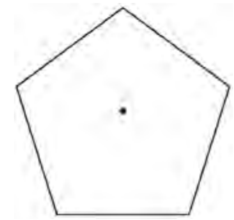
What is the area of $\triangle ABC$?
1) 16
2) 20
3) 21
4) 24

269 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

270 A regular pentagon is shown in the diagram below.



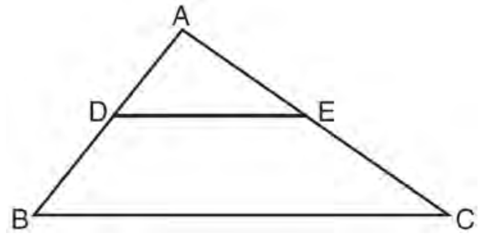
If the pentagon is rotated clockwise around its center, the minimum number of degrees it must be rotated to carry the pentagon onto itself is
1) 54º
2) 72º
3) 108º
4) 360º

271 In $\triangle RST$, $m\angle S = 135$, $r = 27$, and $t = 19$. What is the area of $\triangle RST$ to the *nearest tenth of a square unit*?
1) 90.7
2) 181.4
3) 256.5
4) 362.7

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

273 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) $\frac{5}{\sqrt{21}}$

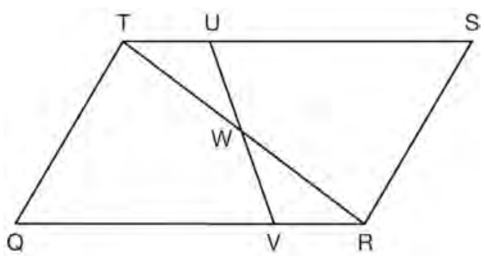
274 In the diagram below, $\triangle ABC \sim \triangle ADE$.



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 $AC = 15$

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



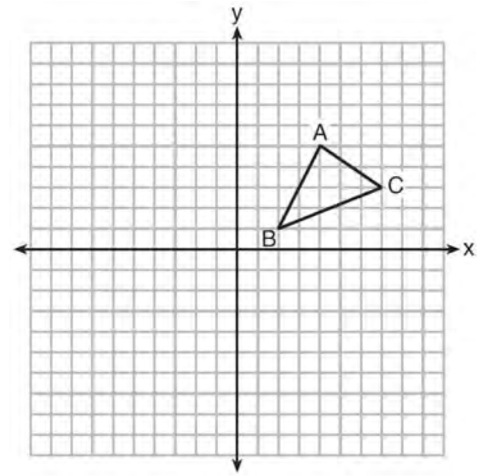
If $m\angle S = 60°$, $m\angle SRT = 83°$, and $m\angle TWU = 35°$, what is $m\angle WVQ$?

1) 37º
2) 60º
3) 72º
4) 83º

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

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

277 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) $-\frac{5}{2}$

278 Which equation represents a line that is perpendicular to the line represented by $2x - y = 7$?

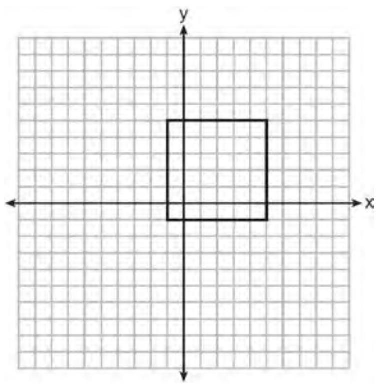
1) $y = -\frac{1}{2}x + 6$
2) $y = \frac{1}{2}x + 6$
3) $y = -2x + 6$
4) $y = 2x + 6$

279 What is the best approximation for the area of a triangle with consecutive sides of 4 and 5 and an included angle of 59º?

1) 5.0
2) 8.6
3) 10.0
4) 17.1

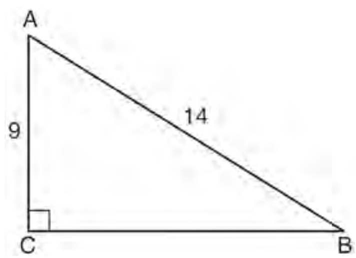
280 The ratio of similarity of $\triangle BOY$ to $\triangle GRL$ is 1:2. If $BO = x + 3$ and $GR = 3x - 1$, then the length of $\overline{GR}$ is
1) 5
2) 7
3) 10
4) 20

281 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) $x + y = 4$

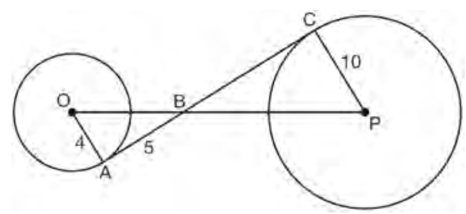
282 In the diagram of right triangle ABC shown below, $AB = 14$ and $AC = 9$.



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

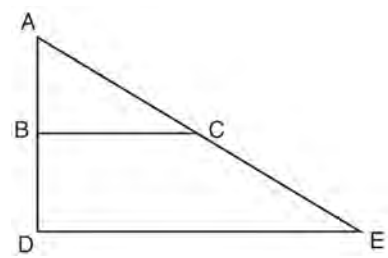
283 What is the area of a sector of a circle with a radius of 8 inches and formed by a central angle that measures 60°?
1) $\frac{8\pi}{3}$
2) $\frac{16\pi}{3}$
3) $\frac{32\pi}{3}$
4) $\frac{64\pi}{3}$

284 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

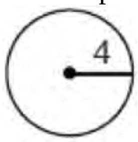
285 The image of $\triangle ABC$ after a dilation of scale factor k centered at point A is $\triangle ADE$, as shown in the diagram below.

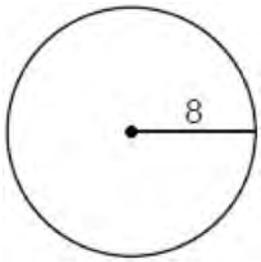


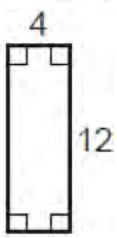
Which statement is always true?
1) $2AB = AD$
2) $\overline{AD} \perp \overline{DE}$
3) $AC = CE$
4) $\overline{BC} \parallel \overline{DE}$

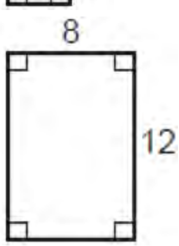
Geometry Multiple Choice Regents Exam Questions

286 A right circular cylinder has a diameter of 8 inches and a height of 12 inches. Which two-dimensional figure shows a cross section that is perpendicular to the base and passes through the center of the base?

1) 

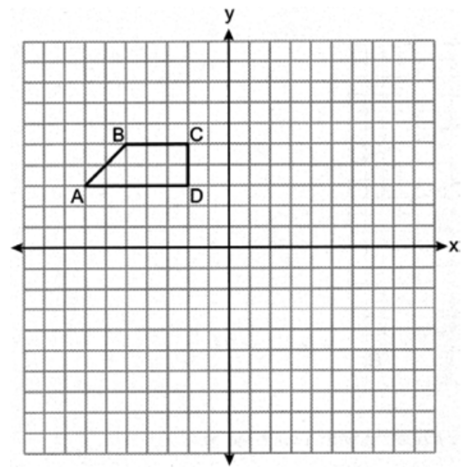
2) 

3) 

4) 

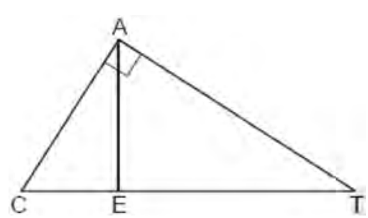
287 The equation of a circle is $x^2 + y^2 + 12x = -27$. What are the coordinates of the center and the length of the radius of the circle?
1) center $(6,0)$ and radius 3
2) center $(6,0)$ and radius 9
3) center $(-6,0)$ and radius 3
4) center $(-6,0)$ and radius 9

288 Trapezoid $ABCD$ is graphed on the set of axes below.



Which transformation would map point A onto $A'(3,-7)$?
1) reflection over $y = x$
2) reflection over the y-axis
3) rotation of 180° about $(0,0)$
4) rotation of 90° counterclockwise about $(0,0)$

289 In the diagram of $\triangle CAT$ below, $m\angle A = 90°$ and altitude $\overline{AE}$ is drawn from vertex A.

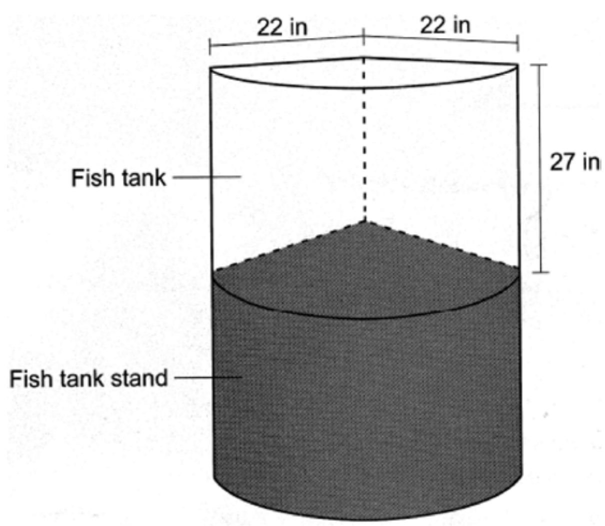


Which statement is always true?
1) $\frac{CE}{AE} = \frac{AE}{ET}$
2) $\frac{AE}{CE} = \frac{AE}{ET}$
3) $\frac{AC}{CE} = \frac{AT}{ET}$
4) $\frac{CE}{AC} = \frac{AC}{ET}$

290 A jewelry company makes copper heart pendants. Each heart uses 0.75 in^3 of copper and there is 0.323 pound of copper per cubic inch. If copper costs $3.68 per pound, what is the total cost for 24 copper hearts?
1) $5.81
2) $21.40
3) $66.24
4) $205.08

291 A right cylinder is cut parallel to its base. The shape of this cross section is a
1) cone
2) circle
3) triangle
4) rectangle

292 A glass fish tank is designed to be placed on a stand in the corner of a room with perpendicular walls. The tank can be modeled using part of a cylinder, as shown below. The inner length of the fish tank along the wall is 22 inches, and the height of the tank is 27 inches.



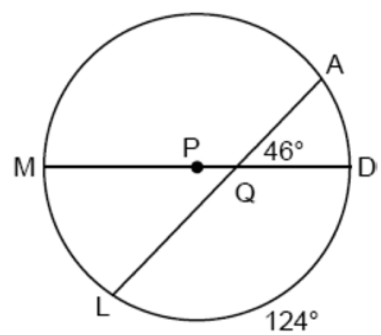
How much water, to the *nearest gallon*, does the fish tank hold? $[1 \text{ gal} = 231 \text{ in}^3]$
1) 44
2) 59
3) 89
4) 178

293 Parallelogram $EATK$ has diagonals $\overline{ET}$ and $\overline{AK}$. Which information is always sufficient to prove $EATK$ is a rhombus?
1) $\overline{EA} \perp \overline{AT}$
2) $\overline{EA} \cong \overline{AT}$
3) $\overline{ET} \cong \overline{AK}$
4) $\overline{ET} \cong \overline{AT}$

294 Which regular polygon will carry onto itself after a 135° rotation about its center?
1) triangle
2) pentagon
3) hexagon
4) octagon

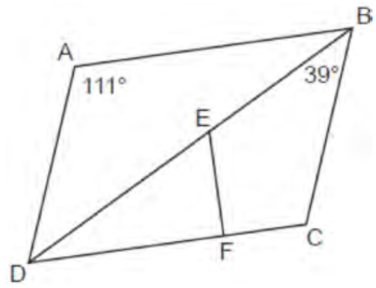
295 Right triangle ACT has $m\angle A = 90°$. Which expression is always equivalent to $\cos T$?
1) $\cos C$
2) $\sin C$
3) $\tan T$
4) $\sin T$

296 In the diagram below of circle P, diameter $\overline{MD}$ and chord $\overline{AL}$ intersect at Q, $m\angle AQD = 46°$, and $m\overset{\frown}{LD} = 124°$.



What is $m\overset{\frown}{AD}$?
1) 36º
2) 46º
3) 51º
4) 92º

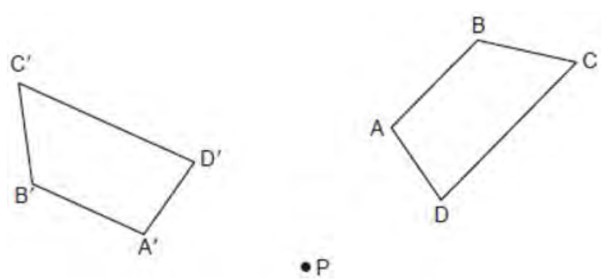
297 In the diagram below of parallelogram $ABCD$, diagonal $\overline{BED}$ and $\overline{EF}$ are drawn, $\overline{EF} \perp \overline{DFC}$, $m\angle DAB = 111°$, and $m\angle DBC = 39°$.



What is $m\angle DEF$?
1) 30º
2) 51º
3) 60º
4) 120º

298 In right triangle DAN, $m\angle A = 90°$. Which statement must always be true?
1) $\cos D = \cos N$
2) $\cos D = \sin N$
3) $\sin A = \cos N$
4) $\cos A = \tan N$

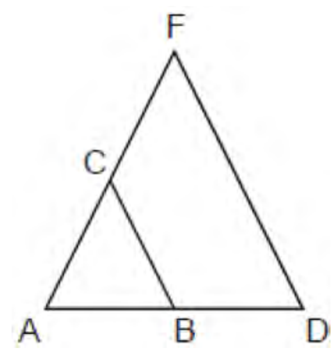
299 Trapezoid $ABCD$ is drawn such that $\overline{AB} \parallel \overline{DC}$. Trapezoid $A'B'C'D'$ is the image of trapezoid $ABCD$ after a rotation of 110° counterclockwise about point P.



Which statement is always true?
1) $\angle A \cong \angle D'$
2) $\overline{AC} \cong \overline{B'D'}$
3) $\overline{A'B'} \parallel \overline{D'C'}$
4) $\overline{B'A'} \cong \overline{C'D'}$

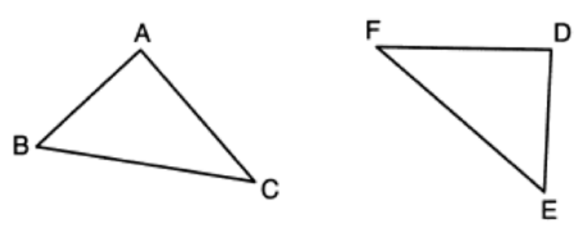
300 In $\triangle ABC$, side $\overline{BC}$ is extended through C to D. If $m\angle A = 30°$ and $m\angle ACD = 110°$, what is the longest side of $\triangle ABC$?
1) $\overline{AC}$
2) $\overline{BC}$
3) $\overline{AB}$
4) $\overline{CD}$

301 Triangle ADF is drawn and $\overline{BC} \parallel \overline{DF}$.



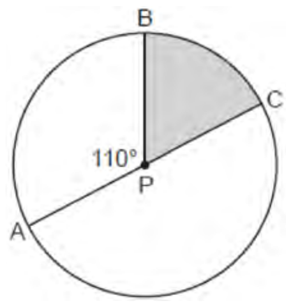
Which statement must be true?
1) $\frac{AB}{BC} = \frac{BD}{DF}$
2) $BC = \frac{1}{2}DF$
3) $AB:AD = AC:CF$
4) $\angle ACB \cong \angle AFD$

302 In the diagram below, a line reflection followed by a rotation maps $\triangle ABC$ onto $\triangle DEF$.



Which statement is always true?
1) $\overline{BC} \cong \overline{EF}$
2) $\overline{AC} \cong \overline{DE}$
3) $\angle A \cong \angle F$
4) $\angle B \cong \angle D$

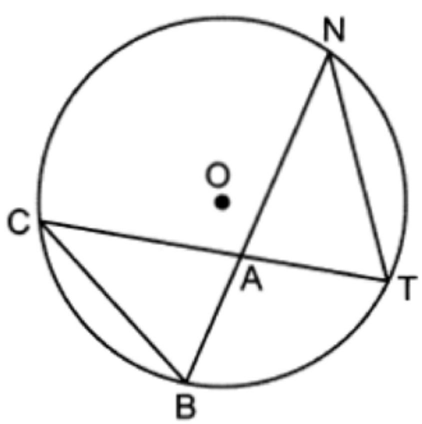
303 In circle P below, diameter $\overline{AC}$ and radius $\overline{BP}$ are drawn such that m$\angle APB = 110°$.



If $AC = 12$, what is the area of shaded sector BPC?

1) $\frac{7}{6}\pi$
2) 7π
3) 11π
4) 28π

304 In circle O below, chords $\overline{CT}$ and $\overline{BN}$ intersect at point A. Chords $\overline{CB}$ and $\overline{NT}$ are drawn.



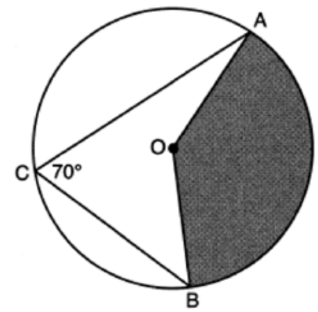
Which statement is always true?

1) $\frac{NT}{TA} = \frac{CB}{BA}$
2) $\angle BAC \cong \angle ATN$
3) $\frac{NA}{AB} = \frac{TA}{AC}$
4) $\angle BCA \cong \angle NTA$

305 Which regular polygon would carry onto itself after a rotation of 300° about its center?

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

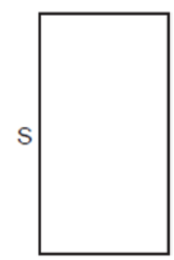
306 In the diagram below of circle O, $\overline{AC}$ and $\overline{BC}$ are chords, and m$\angle ACB = 70°$.



If $OA = 9$, the area of the shaded sector AOB is

1) 3.5π
2) 7π
3) 15.75π
4) 31.5π

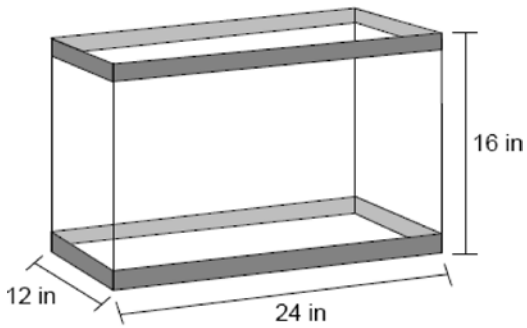
307 The rectangle drawn below is continuously rotated about side S.



Which three-dimensional figure is formed by this rotation?

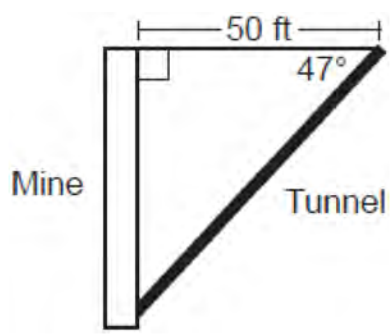
1) rectangular prism
2) square pyramid
3) cylinder
4) cone

308 A rectangular fish tank measures 24 inches long, 12 inches wide, and 16 inches high, as modeled in the diagram below.



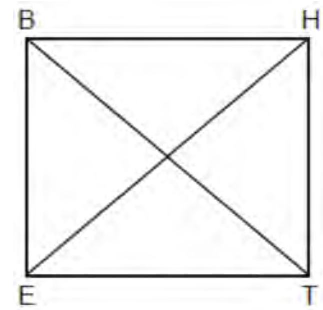
If the empty tank weighs 25 pounds and the fish tank is filled with water to a height of 14 inches, what is the approximate weight of the tank and water? [27.7 in.^{3}=1 pound of water]
1) 146
2) 166
3) 171
4) 191

309 A vertical mine shaft is modeled in the diagram below. At a point on the ground 50 feet from the top of the mine, a ventilation tunnel is dug at an angle of 47°.



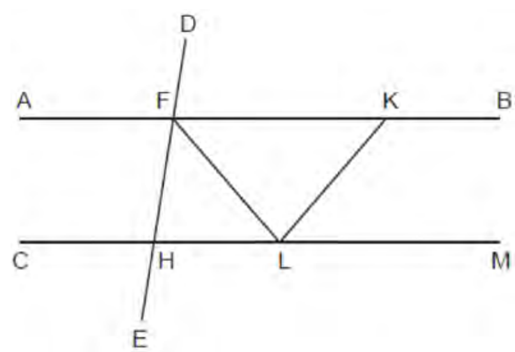
What is the length of the tunnel, to the *nearest foot*?
1) 47
2) 54
3) 68
4) 73

310 Parallelogram *BETH*, with diagonals $\overline{BT}$ and $\overline{HE}$, is drawn below.



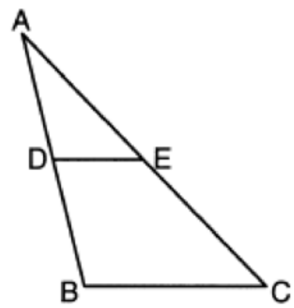
What additional information is sufficient to prove that *BETH* is a rectangle?
1) $\overline{BT} \perp \overline{HE}$
2) $\overline{BE} \parallel \overline{HT}$
3) $\overline{BT} \cong \overline{HE}$
4) $\overline{BE} \cong \overline{ET}$

311 In the diagram below, $\overline{AFKB} \parallel \overline{CHLM}$, $\overline{FH} \cong \overline{LH}$, $\overline{FL} \cong \overline{KL}$, and $\overline{LF}$ bisects $\angle HFK$.



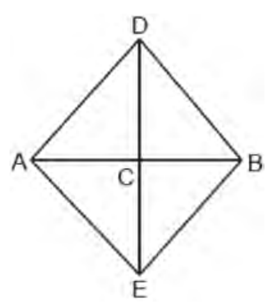
Which statement is always true?
1) $2(m\angle HLF) = m\angle CHE$
2) $2(m\angle FLK) = m\angle LKB$
3) $m\angle AFD = m\angle BKL$
4) $m\angle DFK = m\angle KLF$

312 In $\triangle ABC$ below, $\overline{DE}$ is drawn such that D and E are on $\overline{AB}$ and $\overline{AC}$, respectively.



If $\overline{DE} \parallel \overline{BC}$, which equation will always be true?
1) $\frac{AD}{DE} = \frac{DB}{BC}$
2) $\frac{AD}{DE} = \frac{AB}{BC}$
3) $\frac{AD}{BC} = \frac{DE}{DB}$
4) $\frac{AD}{BC} = \frac{DE}{AB}$

313 In the diagram below of quadrilateral $ADBE$, $\overline{DE}$ is the perpendicular bisector of $\overline{AB}$.

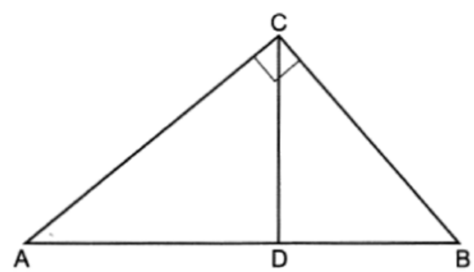


Which statement is always true?
1) $\angle ADC \cong \angle BDC$
2) $\angle EAC \cong \angle DAC$
3) $\overline{AD} \cong \overline{BE}$
4) $\overline{AE} \cong \overline{AD}$

314 The line whose equation is $6x + 3y = 3$ is dilated by a scale factor of 2 centered at the point $(0,0)$. An equation of its image is
1) $y = -2x + 1$
2) $y = -2x + 2$
3) $y = -4x + 1$
4) $y = -4x + 2$

315 Which quadrilateral has diagonals that are always perpendicular?
1) rectangle
2) rhombus
3) trapezoid
4) parallelogram

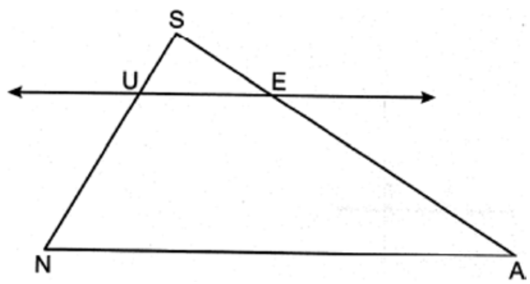
316 In the diagram shown below, altitude $\overline{CD}$ is drawn to the hypotenuse of right triangle ABC.



Which equation can always be used to find the length of $\overline{AC}$?
1) $\frac{AC}{CD} = \frac{CD}{AD}$
2) $\frac{CD}{AC} = \frac{AC}{AB}$
3) $\frac{AC}{CD} = \frac{CD}{BC}$
4) $\frac{AB}{AC} = \frac{AC}{AD}$

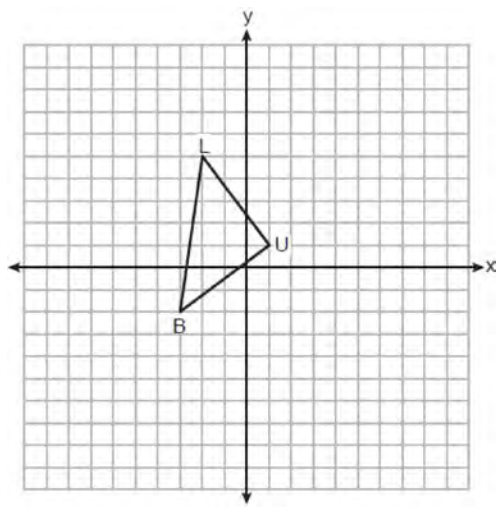
317 What are the coordinates of the center and length of the radius of the circle whose equation is $x^2 + y^2 + 2x - 16y + 49 = 0$?
1) center $(1,-8)$ and radius 4
2) center $(-1,8)$ and radius 4
3) center $(1,-8)$ and radius 16
4) center $(-1,8)$ and radius 16

318 In $\triangle SNA$ below, $\overleftrightarrow{UE} \parallel \overline{NA}$.



If $SU = 3$, $SN = 11$, and $EA = 13$, what is the length of $\overline{SE}$, to the *nearest tenth*?
1) 2.5
2) 3.5
3) 4.9
4) 17.9

319 On the set of axes below, $\triangle BLU$ has vertices with coordinates $B(-3,-2)$, $L(-2,5)$, and $U(1,1)$.

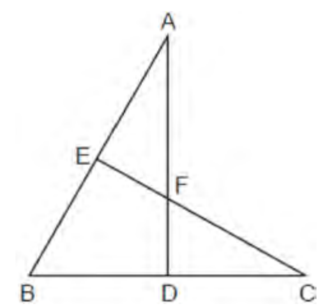


What is the area of $\triangle BLU$?
1) 11
2) 12.5
3) 14
4) 17.1

320 Which expression is equal to $\sin 30°$?
1) $\tan 30°$
2) $\sin 60°$
3) $\cos 60°$
4) $\cos 30°$

321 A rectangle has a width of 3 and a length of 4. The rectangle is dilated by a scale factor of 1.8. What is the area of its image, to the *nearest tenth*?
1) 3.7
2) 6.7
3) 21.6
4) 38.9

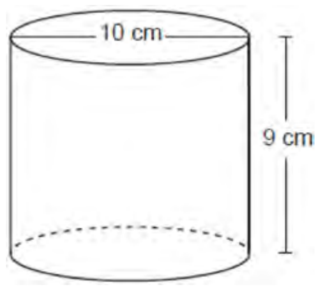
322 In the diagram of triangles ABD and CBE below, sides $\overline{AD}$ and $\overline{CE}$ intersect at F, and $\angle ADB \cong \angle CEB$.



Which statement can *not* be proven?
1) $\triangle ADB \cong \triangle CEB$
2) $\angle EAF \cong \angle DCF$
3) $\triangle ADB \sim \triangle CEB$
4) $\triangle EAF \sim \triangle DCF$

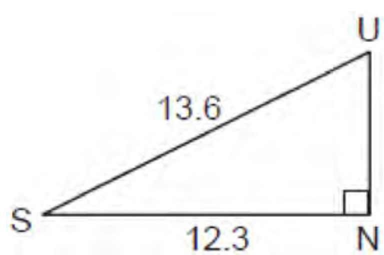
323 Which equation represents the line that passes through the point $(2,-7)$ and is perpendicular to the line whose equation is $y = \frac{3}{4}x + 4$?
1) $y + 7 = \frac{3}{4}(x - 2)$
2) $y - 7 = \frac{3}{4}(x + 2)$
3) $y + 7 = -\frac{4}{3}(x - 2)$
4) $y - 7 = -\frac{4}{3}(x + 2)$

324 Darnell models a cup with the cylinder below. He measured the diameter of the cup to be 10 cm and the height to be 9 cm.



If Darnell fills the cup with water to a height of 8 cm, what is the volume of the water in the cup, to the *nearest cubic centimeter*?
1) 628
2) 707
3) 2513
4) 2827

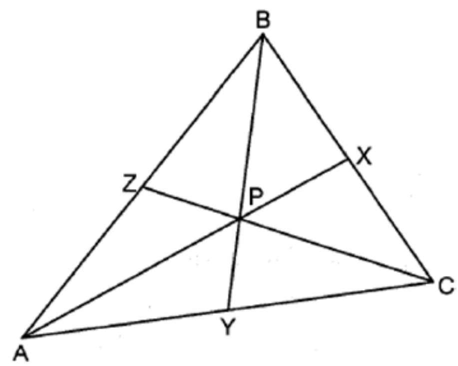
325 In the diagram below of right triangle *SUN*, where $\angle N$ is a right angle, $SU = 13.6$ and $SN = 12.3$.



What is $\angle S$, to the *nearest degree*?
1) 25°
2) 42°
3) 48°
4) 65°

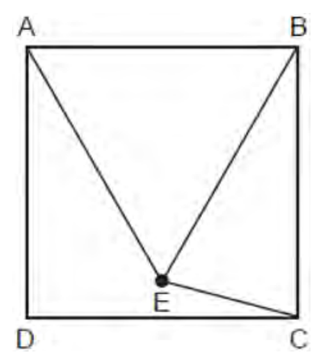
326 A regular pyramid with a square base is made of solid glass. It has a base area of 36 cm^2 and a height of 10 cm. If the density of glass is 2.7 grams per cubic centimeter, the mass of the pyramid, in grams, is
1) 120
2) 324
3) 360
4) 972

327 In the diagram below, $\triangle ABC$ has medians $\overline{AX}$, $\overline{BY}$, and $\overline{CZ}$ that intersect at point *P*.



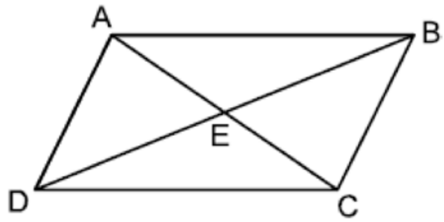
If $AB = 26$, $AC = 28$, and $PC = 16$, what is the perimeter of $\triangle CZA$?
1) 57
2) 65
3) 70
4) 73

328 In the diagram below, point *E* is located inside square *ABCD* such that $\triangle ABE$ is equilateral, and $\overline{CE}$ is drawn.



What is $m\angle BEC$?
1) 30°
2) 60°
3) 75°
4) 90°

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



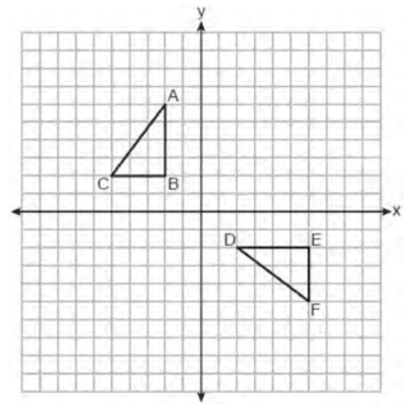
Which transformation would map $\triangle ABC$ onto $\triangle CDA$?
1) a reflection over $\overline{AC}$
2) a reflection over $\overline{DB}$
3) a clockwise rotation of 90° about point E
4) a clockwise rotation of 180° about point E

330 Rectangle $ABCD$ has two vertices at coordinates $A(-1,-3)$ and $B(6,5)$. The slope of $\overline{BC}$ is
1) $-\frac{7}{8}$
2) $\frac{7}{8}$
3) $-\frac{8}{7}$
4) $\frac{8}{7}$

331 Which figure will *not* carry onto itself after a 120-degree rotation about its center?
1) equilateral triangle
2) regular hexagon
3) regular octagon
4) regular nonagon

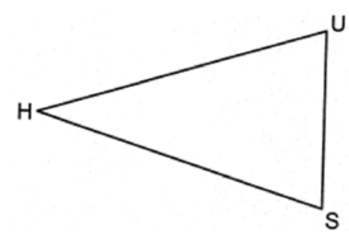
332 A plane intersects a sphere. Which two-dimensional shape is formed by this cross section?
1) rectangle
2) triangle
3) square
4) circle

333 On the set of axes below, congruent triangles ABC and DEF are drawn.



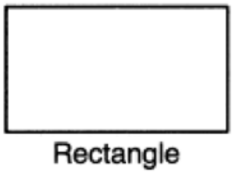
Which sequence of transformations maps $\triangle ABC$ onto $\triangle DEF$?
1) A counterclockwise rotation of 90 degrees about the origin, followed by a translation 8 units to the right.
2) A counterclockwise rotation of 90 degrees about the origin, followed by a reflection over the y-axis.
3) A counterclockwise rotation of 90 degrees about the origin, followed by a translation 4 units down.
4) A clockwise rotation of 90 degrees about the origin, followed by a reflection over the x-axis.

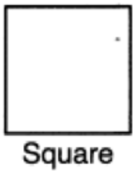
334 Triangle HUS is shown below.

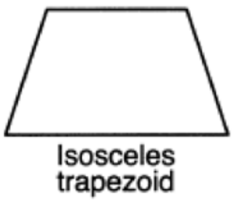


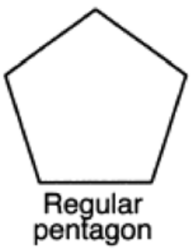
If point G is located on $\overline{US}$ and $\overline{HG}$ is drawn, which additional information is sufficient to prove $\triangle HUG \cong \triangle HSG$ by SAS?
1) $\overline{HG}$ bisects $\overline{US}$
2) $\overline{HG}$ is an altitude
3) $\overline{HG}$ bisects $\angle UHS$
4) $\overline{HG}$ is the perpendicular bisector of $\overline{US}$

335 Which polygon always has a minimum rotation of 180° about its center to carry it onto itself?

1) 

2) 

3) 

4) 

336 Line segment APB has endpoints $A(-5,4)$ and $B(7,-4)$. What are the coordinates of P if $AP:PB$ is in the ratio $1:3$?

1) (-2,2)
2) $(-1,1.3)$
3) $(1,0)$
4) $(4,-2)$

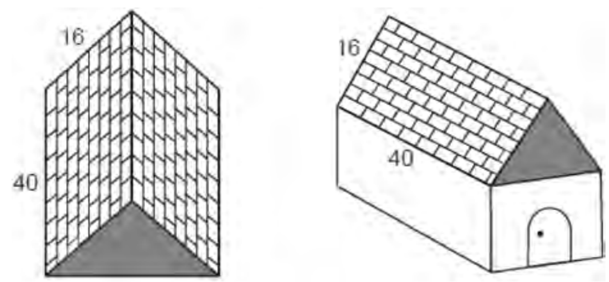
337 Which equation represents a line that is perpendicular to the line whose equation is $y-3x=4$?

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

338 Which set of integers could represent the lengths of the sides of an isosceles triangle?

1) $\{1,1,3\}$
2) $\{2,2,5\}$
3) $\{3,3,6\}$
4) $\{4,4,7\}$

339 The surface of the roof of a house is modeled by two congruent rectangles with dimensions 40 feet by 16 feet, as shown below.



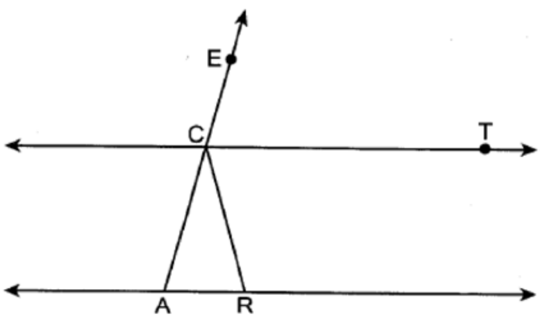
Roofing shingles are sold in bundles. Each bundle covers $33\frac{1}{3}$ square feet. What is the minimum number of bundles that must be purchased to completely cover both rectangular sides of the roof?

1) 20
2) 2
3) 39
4) 4

340 A rectangle with dimensions of 4 feet by 7 feet is continuously rotated about one of its 4-foot sides. The resulting three-dimensional object is a

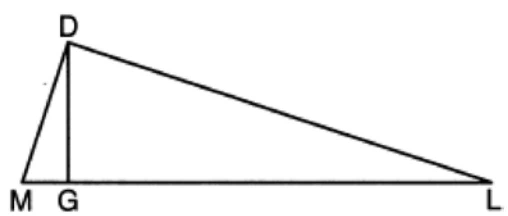
1) cylinder with a height of 7 feet and a base radius of 4 feet.
2) cylinder with a height of 4 feet and a base radius of 7 feet.
3) cone with a height of 7 feet and a base radius of 7 feet.
4) cone with a height of 4 feet and a base radius of 7 feet.

341 In the diagram below, $\overleftrightarrow{CT} \parallel \overleftrightarrow{AR}$, and $\overrightarrow{ACE}$ and $\overline{RC}$ are drawn such that $\overline{AC} \cong \overline{RC}$.



If $m\angle ECT = 75°$, what is $m\angle ACR$?
1) 30º
2) 60º
3) 75º
4) 105º

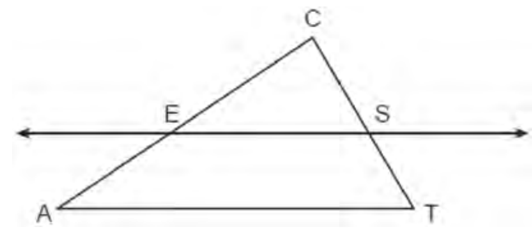
342 In the diagram below of right triangle MDL, altitude $\overline{DG}$ is drawn to hypotenuse $\overline{ML}$.



If $MG = 3$ and $GL = 24$, what is the length of $\overline{DG}$?
1) 8
2) 9
3) $\sqrt{63}$
4) $\sqrt{72}$

343 The line represented by the equation $y = 4x + 15$ is dilated by a scale factor of 2 centered at the origin. Which equation represents its image?
1) $y = 4x + 15$
2) $y = 4x + 30$
3) $y = 8x + 15$
4) $y = 8x + 30$

344 In the diagram below of $\triangle ACT$, $\overleftrightarrow{ES}$ is drawn parallel to $\overline{AT}$ such that E is on $\overline{CA}$ and S is on $\overline{CT}$.



Which statement is always true?
1) $\frac{CE}{CA} = \frac{CS}{ST}$
2) $\frac{CE}{ES} = \frac{EA}{AT}$
3) $\frac{CE}{EA} = \frac{CS}{ST}$
4) $\frac{CE}{ST} = \frac{EA}{CS}$

345 Directed line segment KC has endpoints $K(-4,-2)$ and $C(1,8)$. Point E divides $\overline{KC}$ such that $KE:EC$ is $3:2$. What are the coordinates of point E?
1) $(-1,4)$
2) $(-2,2)$
3) $(-3,0)$
4) $(0,6)$

346 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

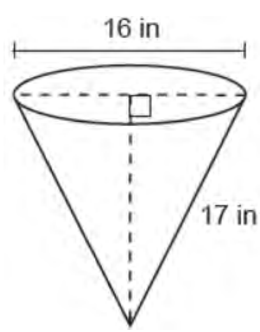
347 What is the volume of a right circular cone that has a height of 7.2 centimeters and a radius of 2.5 centimeters, to the *nearest tenth of a cubic centimeter*?
1) 37.7
2) 47.1
3) 113.1
4) 141.4

348 What is the length of the radius of the circle whose equation is $x^2 + y^2 - 2x + 4y - 5 = 0$?
1) $\sqrt{5}$
2) $\sqrt{10}$
3) 5
4) 10

349 Zach placed the foot of an extension ladder 8 feet from the base of the house and extended the ladder 25 feet to reach the house. To the *nearest degree*, what is the measure of the angle the ladder makes with the ground?
1) 18
2) 19
3) 71
4) 72

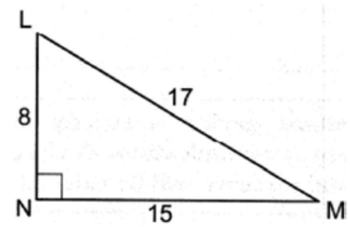
350 A cylindrical pool has a diameter of 16 feet and height of 4 feet. The pool is filled to $\frac{1}{2}$ foot below the top. How much water does the pool contain, to the *nearest gallon*? [1 ft^3 = 7.48 gallons]
1) 704
2) 804
3) 5264
4) 6016

351 In the diagram below, a cone has a diameter of 16 inches and a slant height of 17 inches.



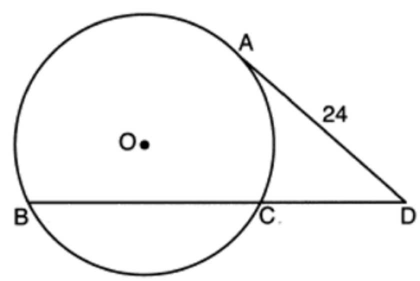
What is the volume of the cone, in cubic inches?
1) 320π
2) 363π
3) 960π
4) 1280π

352 In right triangle LMN below, $LN = 8$, $MN = 15$, and $LM = 17$.



If triangle LMN is translated such that it maps onto triangle XYZ, which statement is always true?
1) $XY = 15$
2) $YZ = 17$
3) $m\angle Z = 90°$
4) $m\angle X = 90°$

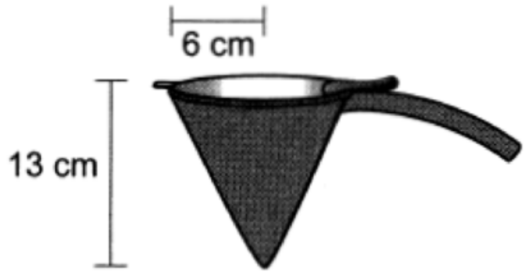
353 Circle O is drawn below with secant $\overline{BCD}$. The length of tangent $\overline{AD}$ is 24.



If the ratio of $DC:CB$ is 4:5, what is the length of $\overline{CB}$?
1) 36
2) 20
3) 16
4) 4

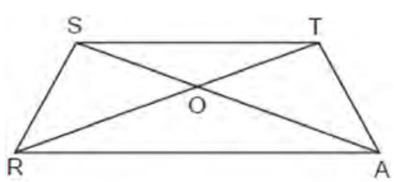
354 A peanut butter manufacturer would like to use a cylindrical jar with a volume of 1180 cm^3. The jar has a height of 10 cm. What is the diameter of the jar, to the *nearest tenth of a centimeter*?
1) 3.8
2) 6.1
3) 10.9
4) 12.3

355 The funnel shown below can be used to decorate cookies with melted chocolate. The funnel can be modeled by a cone whose radius is 6 cm and height is 13 cm.



The baker uses 2 cubic centimeters of chocolate to decorate each cookie. When the funnel is completely filled, what is the maximum number of cookies that can be decorated with the melted chocolate?
1) 78
2) 245
3) 490
4) 735

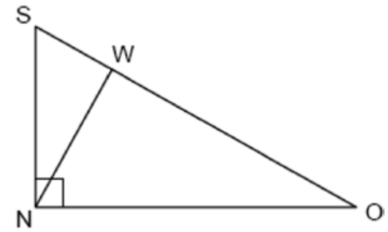
356 In the diagram below of isosceles trapezoid *STAR*, diagonals $\overline{AS}$ and $\overline{RT}$ intersect at *O* and $\overline{ST} \parallel \overline{RA}$, with nonparallel sides $\overline{SR}$ and $\overline{TA}$.



Which pair of triangles are *not* always similar?
1) $\triangle STO$ and $\triangle ARO$
2) $\triangle SOR$ and $\triangle TOA$
3) $\triangle SRA$ and $\triangle ATS$
4) $\triangle SRT$ and $\triangle TAS$

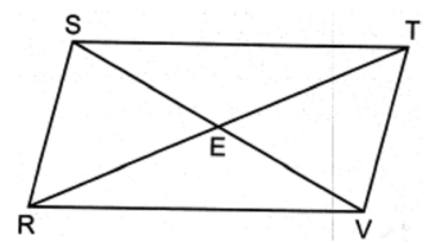
357 If $\sin(3x+9)^\circ = \cos(5x-7)^\circ$, what is the value of x?
1) 8
2) 11
3) 33
4) 42

358 In right triangle *SNO* below, altitude $\overline{NW}$ is drawn to hypotenuse $\overline{SO}$.



Which statement is *not* always true?
1) $\frac{SO}{SN} = \frac{SN}{SW}$
2) $\frac{SW}{NS} = \frac{NS}{OW}$
3) $\frac{SO}{ON} = \frac{ON}{OW}$
4) $\frac{OW}{NW} = \frac{NW}{SW}$

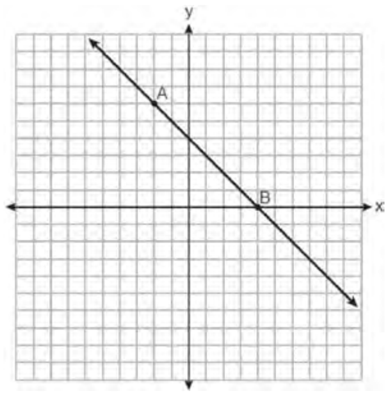
359 In the diagram below of parallelogram *RSTV*, diagonals $\overline{SV}$ and $\overline{RT}$ intersect at *E*.



Which statement is always true?
1) $\overline{SR} \cong \overline{RV}$
2) $\overline{RT} \cong \overline{SV}$
3) $\overline{SE} \cong \overline{RE}$
4) $\overline{RE} \cong \overline{TE}$

360 A circle has a radius of 4.5. What is the measure of the central angle that intercepts an arc whose length is 6.2, to the *nearest degree*?
1) 35º
2) 42º
3) 64º
4) 79º

361 On the set of axes below, $\overleftrightarrow{AB}$ is drawn and passes through $A(-2,6)$ and $B(4,0)$.



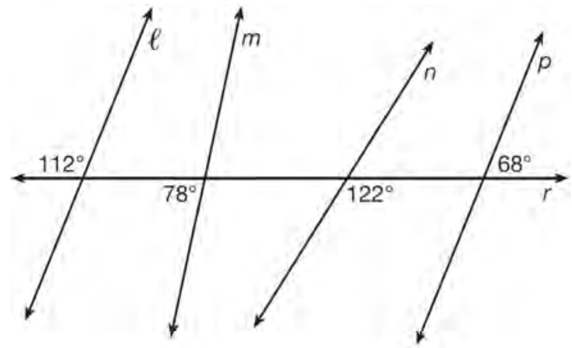
If $\overleftrightarrow{CD}$ is the image of $\overleftrightarrow{AB}$ after a dilation with a scale factor of $\frac{1}{2}$ centered at the origin, which equation represents $\overleftrightarrow{CD}$?

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

362 Triangles YEG and POM are two distinct non-right triangles such that $\angle G \cong \angle M$. Which statement is sufficient to prove $\triangle YEG$ is always congruent to $\triangle POM$?

1) $\angle E \cong \angle O$ and $\angle Y \cong \angle P$
2) $\overline{YG} \cong \overline{PM}$ and $\overline{YE} \cong \overline{PO}$
3) There is a sequence of rigid motions that maps $\angle E$ onto $\angle O$ and $\overline{YE}$ onto $\overline{PO}$.
4) There is a sequence of rigid motions that maps point Y onto point P and $\overline{YG}$ onto $\overline{PM}$.

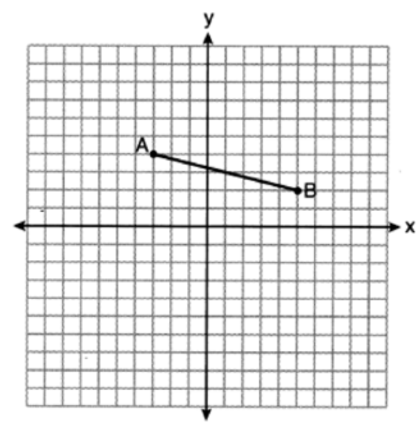
363 In the diagram below, lines ℓ, m, n, and p intersect line r.



Which statement is true?

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

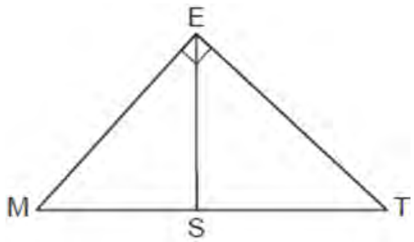
364 On the set of axes below, the endpoints of $\overline{AB}$ have coordinates $A(-3,4)$ and $B(5,2)$.



If $\overline{AB}$ is dilated by a scale factor of 2 centered at $(3,5)$, what are the coordinates of the endpoints of its image, $\overline{A'B'}$?

1) $A'(-7,5)$ and $B'(9,1)$
2) $A'(-1,6)$ and $B'(7,4)$
3) $A'(-6,8)$ and $B'(10,4)$
4) $A'(-9,3)$ and $B'(7,-1)$

365 In the diagram below of right triangle MET, altitude $\overline{ES}$ is drawn to hypotenuse $\overline{MT}$.



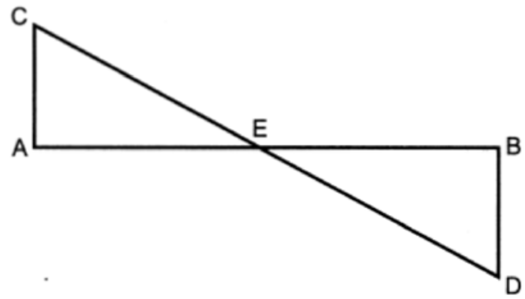
If $ME = 6$ and $SM = 4$, what is MT?
1) 9
2) 8
3) 5
4) 4

366 Triangle KLM is dilated by a scale factor of 3 to map onto triangle DRS. Which statement is *not* always true?
1) $\angle K \cong \angle D$
2) $KM = \frac{1}{3}DS$
3) The area of $\triangle DRS$ is 3 times the area of $\triangle KLM$.
4) The perimeter of $\triangle DRS$ is 3 times the perimeter of $\triangle KLM$.

367 Segment AB is the perpendicular bisector of $\overline{CD}$ at point M. Which statement is always true?
1) $\overline{CB} \cong \overline{DB}$
2) $\overline{CD} \cong \overline{AB}$
3) $\triangle ACD \sim \triangle BCD$
4) $\triangle ACM \sim \triangle BCM$

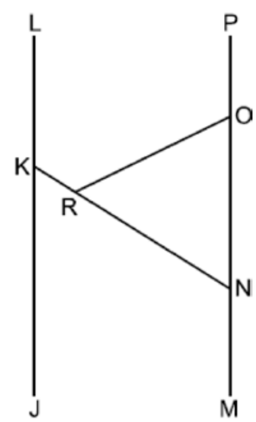
368 An equation of circle M is $x^2 + y^2 + 6x - 2y + 1 = 0$. What are the coordinates of the center and the length of the radius of circle M?
1) center $(3,-1)$ and radius 9
2) center $(3,-1)$ and radius 3
3) center $(-3,1)$ and radius 9
4) center $(-3,1)$ and radius 3

369 In the diagram below, $\overline{AB}$ and $\overline{CD}$ intersect at E, and $\overline{CA}$ and $\overline{DB}$ are drawn.



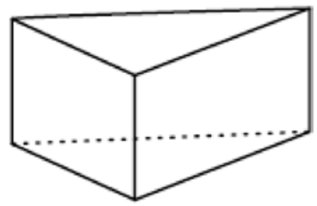
If $\overline{CA} \parallel \overline{BD}$, which statement is always true?
1) $\overline{AE} \cong \overline{BE}$
2) $\overline{CA} \cong \overline{DB}$
3) $\triangle AEC \sim \triangle BED$
4) $\triangle AEC \cong \triangle BED$

370 As shown in the diagram below, $\overline{JKL} \parallel \overline{MNOP}$, $\overline{KRN}$, and $\overline{OR} \cong \overline{ON}$.



If $m\angle POR = 116°$, what is $m\angle LKN$?
1) 58º
2) 116º
3) 122º
4) 128º

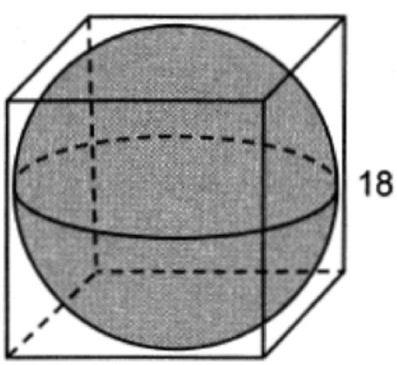
371 The right prism with a triangular base shown below is cut by a plane perpendicular to its bases.



The two-dimensional shape of the cross section is always a
1) triangle
2) rhombus
3) pentagon
4) rectangle

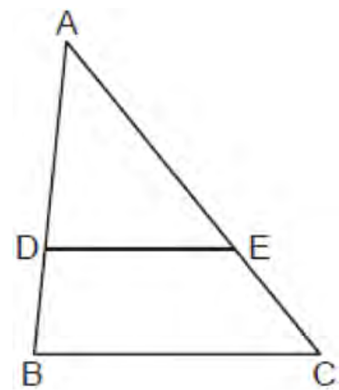
372 What is the image of $(4,3)$ after a reflection over the line $y = 1$?
1) $(-2,3)$
2) $(-4,3)$
3) $(4,-1)$
4) $(4,-3)$

373 In the diagram below, a sphere is inscribed inside a cube. The cube has edge lengths of 18.



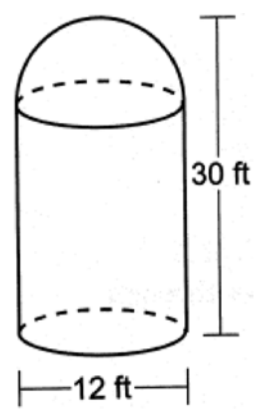
What is the volume of the sphere, in terms of π?
1) 108π
2) 432π
3) 972π
4) 7776π

374 In triangle ABC below, D is a point on $\overline{AB}$ and E is a point on $\overline{AC}$, such that $\overline{DE} \parallel \overline{BC}$.



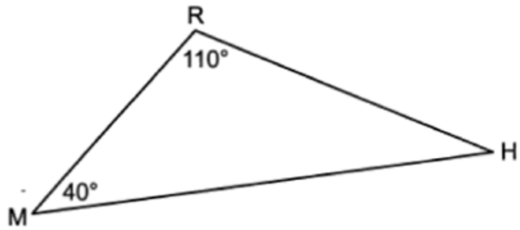
If $AD = 12$, $DB = 8$, and $EC = 10$, what is the length of $\overline{AC}$?
1) 15
2) 22
3) 24
4) 25

375 A storage building is modeled below by a hemisphere on top of a cylinder. The diameter of both the cylinder and hemisphere is 12 feet. The total height of the storage building is 30 feet.



To the *nearest cubic foot*, what is the volume of the storage building?
1) 942
2) 2488
3) 3167
4) 3845

376 In $\triangle RHM$ below, $m\angle R = 110°$ and $m\angle M = 40°$.



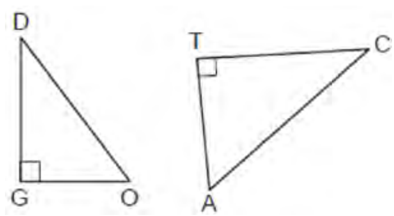
If $\triangle RHM$ is reflected over side $\overline{HM}$ to form quadrilateral *RHR'M*, which statement is always true?

1) Quadrilateral *RHR'M* is a parallelogram.
2) $m\angle MHR' = 40°$
3) $m\angle HMR' = 40°$
4) $\overline{MR} \cong \overline{HR'}$

377 A sandbox in the shape of a rectangular prism has a length of 43 inches and a width of 30 inches. Jack uses bags of sand to fill the sandbox to a depth of 9 inches. Each bag of sand has a volume of 0.5 cubic foot. What is the minimum number of bags of sand that must be purchased to fill the sandbox?

1) 14
2) 13
3) 7
4) 4

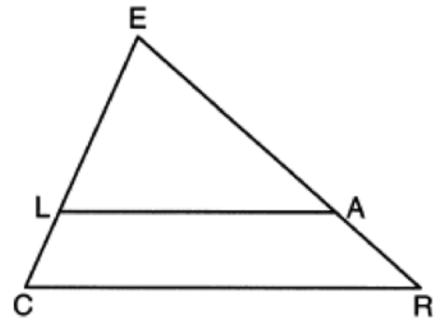
378 In the diagram below, $\triangle DOG \sim \triangle CAT$, where $\angle G$ and $\angle T$ are right angles.



Which expression is always equivalent to $\sin D$?

1) $\cos A$
2) $\sin A$
3) $\tan A$
4) $\cos C$

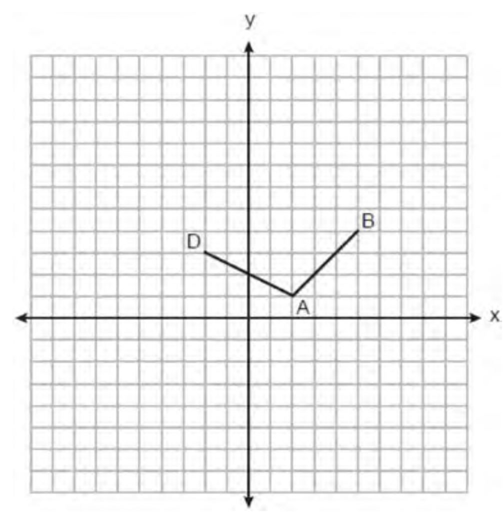
379 In the diagram below of $\triangle CER$, $\overline{LA} \parallel \overline{CR}$.



If $CL = 3.5$, $LE = 7.5$, and $EA = 9.5$, what is the length of $\overline{AR}$, to the *nearest tenth*?

1) 5.5
2) 4.4
3) 3.0
4) 2.8

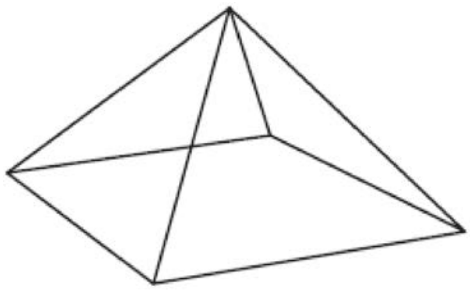
380 On the set of axes below, the coordinates of three vertices of trapezoid *ABCD* are $A(2,1)$, $B(5,4)$, and $D(-2,3)$.



Which point could be vertex C?

1) $(1,5)$
2) $(4,10)$
3) $(-1,6)$
4) $(-3,8)$

381 A square pyramid is intersected by a plane passing through the vertex and perpendicular to the base.



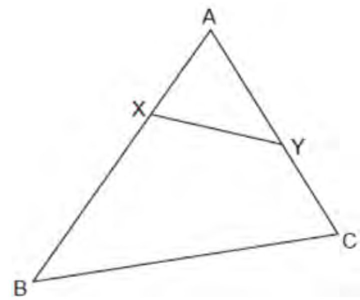
Which two-dimensional shape describes this cross section?
1) square
2) triangle
3) pentagon
4) rectangle

382 Quadrilateral $BEST$ has diagonals that intersect at point D. Which statement would *not* be sufficient to prove quadrilateral $BEST$ is a parallelogram?
1) $\overline{BD} \cong \overline{SD}$ and $\overline{ED} \cong \overline{TD}$
2) $\overline{BE} \cong \overline{ST}$ and $\overline{ES} \cong \overline{TB}$
3) $\overline{ES} \cong \overline{TB}$ and $\overline{BE} \parallel \overline{TS}$
4) $\overline{ES} \parallel \overline{BT}$ and $\overline{BE} \parallel \overline{TS}$

383 If $ABCD$ is a parallelogram, which additional information is sufficient to prove that $ABCD$ is a rectangle?
1) $\overline{AB} \cong \overline{BC}$
2) $\overline{AB} \parallel \overline{CD}$
3) $\overline{AC} \cong \overline{BD}$
4) $\overline{AC} \perp \overline{BD}$

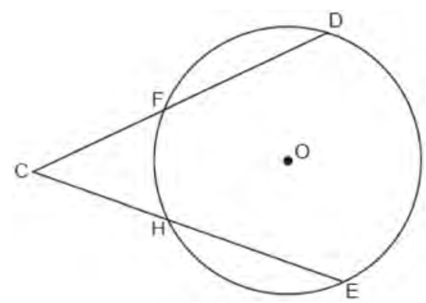
384 If $\triangle TAP$ is dilated by a scale factor of 0.5, which statement about the image, $\triangle T'A'P'$, is true?
1) $m\angle T'A'P' = \frac{1}{2}(m\angle TAP)$
2) $m\angle T'A'P' = 2(m\angle TAP)$
3) $TA = 2(T'A')$
4) $TA = \frac{1}{2}(T'A')$

385 In the diagram below of $\triangle ABC$, X and Y are points on $\overline{AB}$ and $\overline{AC}$, respectively, such that $m\angle AYX = m\angle B$.



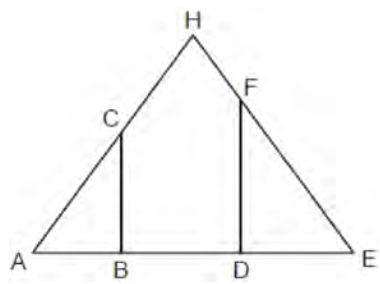
Which statement is *not* always true?
1) $\frac{AX}{AC} = \frac{XY}{CB}$
2) $\frac{AY}{AB} = \frac{AX}{AC}$
3) $(AY)(CB) = (XY)(AB)$
4) $(AY)(AB) = (AC)(AX)$

386 In the diagram below of circle O, secants $\overline{CFD}$ and $\overline{CHE}$ are drawn from external point C.



If $m\overset{\frown}{DE} = 136°$ and $m\angle C = 44°$, then $m\overset{\frown}{FH}$ is
1) 46°
2) 48°
3) 68°
4) 88°

387 In the diagram below of isosceles triangle AHE with the vertex angle at H, $\overline{CB} \perp \overline{AE}$ and $\overline{FD} \perp \overline{AE}$.



Which statement is always true?

1) $\dfrac{AH}{AC} = \dfrac{EH}{EF}$
2) $\dfrac{AC}{EF} = \dfrac{AB}{ED}$
3) $\dfrac{AB}{ED} = \dfrac{CB}{FE}$
4) $\dfrac{AD}{AB} = \dfrac{BE}{DE}$

388 In parallelogram $BFLO$, $OL = 3.8$, $LF = 7.4$, and $m\angle O = 126$. If diagonal $\overline{BL}$ is drawn, what is the area of $\triangle BLF$?

1) 11.4
2) 14.1
3) 22.7
4) 28.1

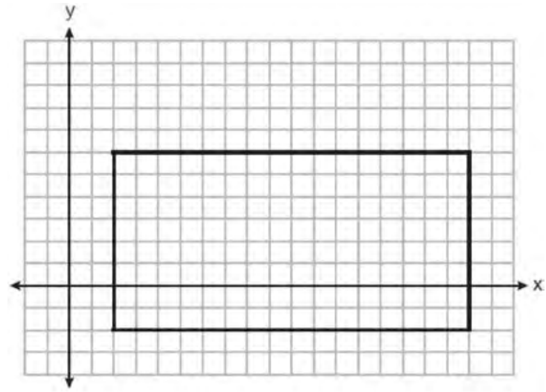
389 What is the minimum number of degrees that a regular hexagon must rotate about its center to carry it onto itself?

1) 45°
2) 72°
3) 60°
4) 120°

390 In rectangle $ABCD$, diagonal $\overline{AC}$ is drawn. The measure of $\angle ACD$ is 37° and the length of $\overline{BC}$ is 7.6 cm. What is the length of $\overline{AC}$, to the *nearest tenth of a centimeter*?

1) 4.6
2) 9.5
3) 10.1
4) 12.6

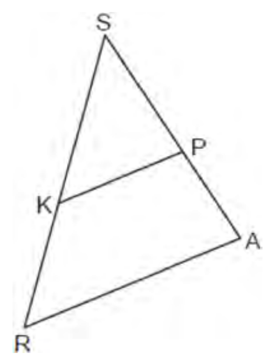
391 A rectangle is graphed on the set of axes below.



A reflection over which line would carry the rectangle onto itself?

1) $y = 2$
2) $y = 10$
3) $y = \dfrac{1}{2}x - 3$
4) $y = -\dfrac{1}{2}x + 7$

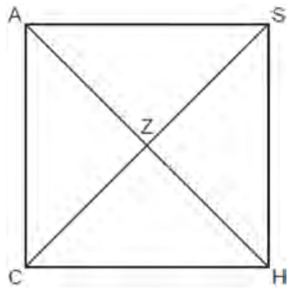
392 In the diagram of $\triangle SRA$ below, $\overline{KP}$ is drawn such that $\angle SKP \cong \angle SRA$.



If $SK = 10$, $SP = 8$, and $PA = 6$, what is the length of $\overline{KR}$, to the *nearest tenth*?

1) 4.8
2) 7.5
3) 8.0
4) 13.3

393 In the diagram below of square $CASH$, diagonals $\overline{AH}$ and $\overline{CS}$ intersect at Z.



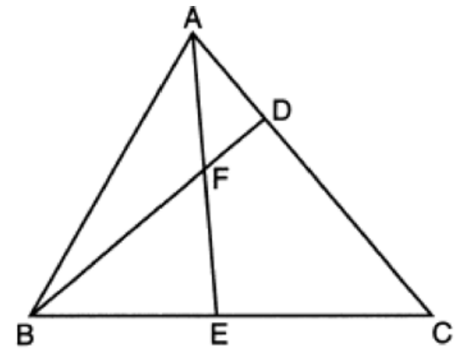
Which statement is true?
1) $m\angle ACZ > m\angle ZCH$
2) $m\angle ACZ < m\angle ASZ$
3) $m\angle AZC = m\angle SHC$
4) $m\angle AZC = m\angle ZCH$

394 The equation of a line is $3x - 5y = 8$. All lines perpendicular to this line must have a slope of
1) $\frac{3}{5}$
2) $\frac{5}{3}$
3) $-\frac{3}{5}$
4) $-\frac{5}{3}$

395 Which congruence statement is sufficient to prove parallelogram $MARK$ is a rhombus?
1) $\overline{MA} \cong \overline{MK}$
2) $\overline{MA} \cong \overline{KR}$
3) $\angle K \cong \angle A$
4) $\angle R \cong \angle A$

396 Which polygon does *not* always have congruent diagonals?
1) square
2) rectangle
3) rhombus
4) isosceles trapezoid

397 In the diagram of $\triangle ABC$ below, $\overline{AE}$ bisects angle BAC, and altitude $\overline{BD}$ is drawn.



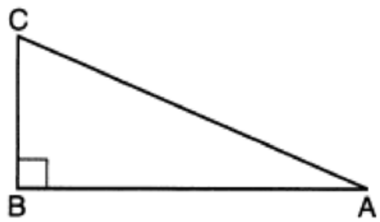
If $m\angle C = 50°$ and $m\angle ABC = 60°$, $m\angle FEB$ is
1) 35º
2) 40º
3) 55º
4) 85º

398 In parallelogram $ABCD$ with $\overline{AC} \perp \overline{BD}$, $AC = 12$ and $BD = 16$. What is the perimeter of $ABCD$?
1) 10
2) 24
3) 40
4) 56

399 If the circumference of a standard lacrosse ball is 19.9 cm, what is the volume of this ball, to the *nearest cubic centimeter*?
1) 42
2) 133
3) 415
4) 1065

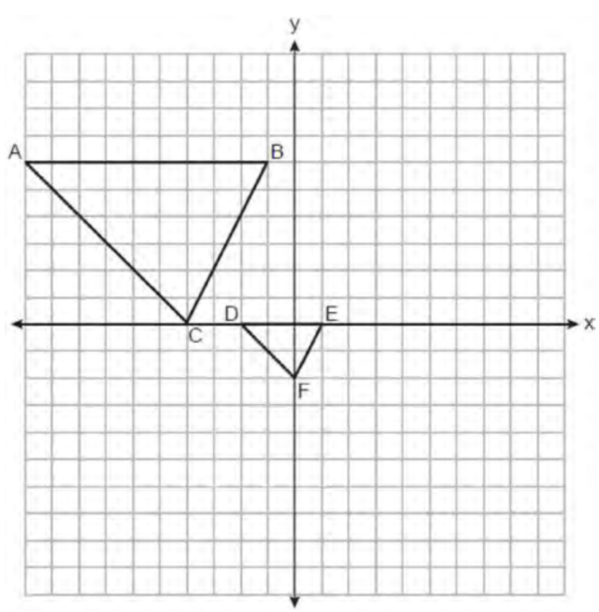
400 The endpoints of $\overline{AB}$ are $A(-5,3)$ and $B(7,-5)$. Point P is on $\overline{AB}$ such that $AP:PB = 3:1$. What are the coordinates of point P?
1) $(-2,-3)$
2) $(1,-1)$
3) $(-2,1)$
4) $(4,-3)$

401 Right triangle *ABC* is shown below.



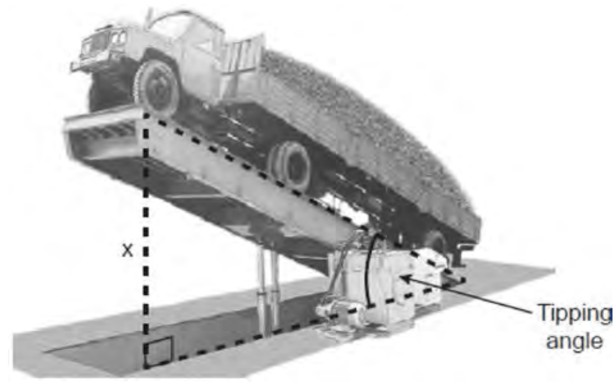
Which trigonometric equation is always true for triangle *ABC*?
1) $\sin A = \cos C$
2) $\cos A = \sin A$
3) $\cos A = \cos C$
4) $\tan A = \tan C$

402 On the set of axes below, $\triangle DEF$ is the image of $\triangle ABC$ after a dilation of scale factor $\frac{1}{3}$.



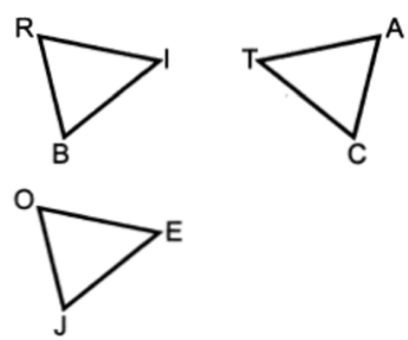
The center of dilation is at
1) $(0,0)$
2) $(2,-3)$
3) $(0,-2)$
4) $(-4,0)$

403 A tipping platform is a ramp used to unload trucks, as shown in the diagram below.



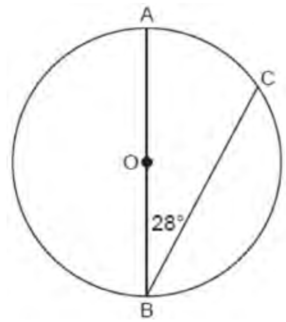
The truck is on a 75-foot-long ramp. The ramp is tipped at an angle of 30°. What is the height of the upper end of the ramp, *x*, to the *nearest tenth of a foot*?
1) 68.7
2) 65.0
3) 43.3
4) 37.5

404 In the diagram below, $\triangle BRI$ is the image of $\triangle JOE$ after a translation. Triangle *CAT* is the image of $\triangle BRI$ after a line reflection.



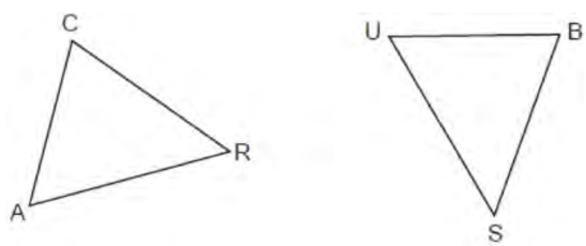
Which statement is always true?
1) $\angle R \cong \angle T$
2) $\angle J \cong \angle A$
3) $\overline{JE} \cong \overline{RI}$
4) $\overline{OE} \cong \overline{AT}$

405 In the diagram below of Circle O, diameter $\overline{AOB}$ and chord $\overline{CB}$ are drawn, and $m\angle B = 28°$.



What is $m\overset{\frown}{BC}$?
1) 56º
2) 124º
3) 152º
4) 166º

406 In the diagram below, $\triangle CAR$ is mapped onto $\triangle BUS$ after a sequence of rigid motions.

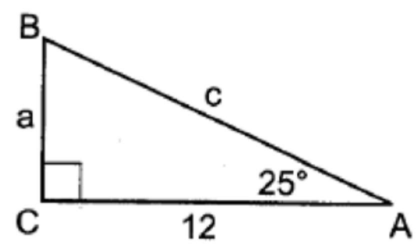


If $AR = 3x + 4$, $RC = 5x - 10$, $CA = 2x + 6$, and $SB = 4x - 4$, what is the length of $\overline{SB}$?
1) 6
2) 16
3) 20
4) 28

407 A line whose equation is $y = -2x + 3$ is dilated by a scale factor of 4 centered at $(0,3)$. Which equation represents the image of the line after the dilation?
1) $y = -2x + 3$
2) $y = -2x + 12$
3) $y = -8x + 3$
4) $y = -8x + 12$

408 A small town is installing a water storage tank in the shape of a cylinder. The tank must be able to hold at least 100,000 gallons of water. The tank must have a height of exactly 30 feet. [1 cubic foot holds 7.48 gallons of water] What should the minimum diameter of the tank be, to the *nearest foot*?
1) 12
2) 24
3) 65
4) 75

409 In right triangle ABC below, $m\angle C = 90°$, $AC = 12$, and $m\angle A = 25°$.

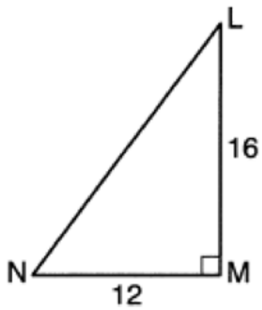


Which equation is correct for $\triangle ABC$?
1) $a = \frac{12}{\tan 25°}$
2) $a = 12\tan 25°$
3) $c = \frac{12}{\tan 25°}$
4) $c = 12\tan 25°$

410 Line m, whose equation is $y = -2x + 8$, is dilated by a scale factor of $\frac{1}{2}$ centered at the origin. Which equation represents the image of line m?
1) $y = -x + 4$
2) $y = -2x + 4$
3) $y = -x + 8$
4) $y = -2x + 8$

411 In right triangle ABC, $m\angle A = 90°$, $m\angle B = 18°$, and $AC = 8$. To the *nearest tenth*, the length of $\overline{BC}$ is
1) 2.5
2) 8.4
3) 24.6
4) 25.9

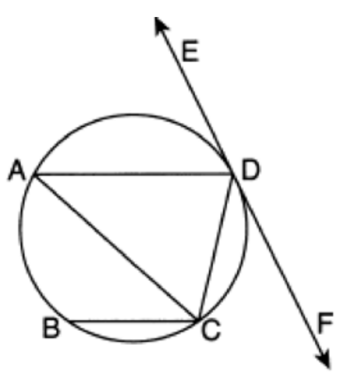
412 In right triangle LMN shown below, $m\angle M = 90°$, $MN = 12$, and $LM = 16$.



The ratio of $\cos N$ is

1) $\frac{12}{20}$
2) $\frac{16}{20}$
3) $\frac{12}{16}$
4) $\frac{16}{12}$

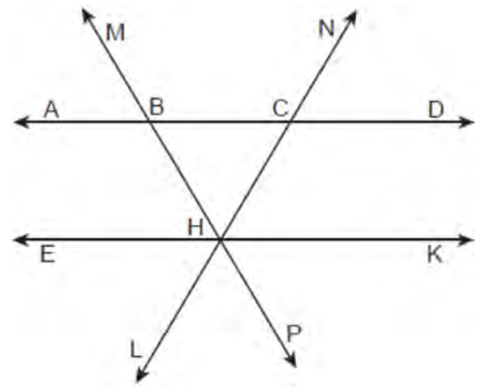
413 In the circle below, $\overline{AD}$, $\overline{AC}$, $\overline{BC}$, and $\overline{DC}$ are chords, $\overleftrightarrow{EDF}$ is tangent at point D, and $\overline{AD} \parallel \overline{BC}$.



Which statement is always true?

1) $\angle ADE \cong \angle CAD$
2) $\angle CDF \cong \angle ACB$
3) $\angle BCA \cong \angle DCA$
4) $\angle ADC \cong \angle ADE$

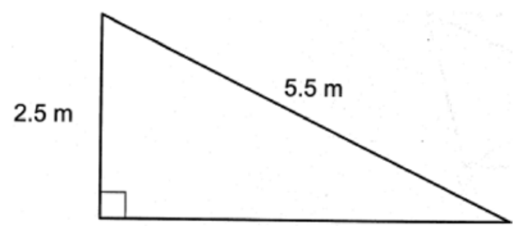
414 In the diagram below, $\overleftrightarrow{ABCD} \parallel \overleftrightarrow{EHK}$, and $\overleftrightarrow{MBHP}$ and $\overleftrightarrow{NCHL}$ are drawn such that $\overline{BC} \cong \overline{BH}$.



If $m\angle NCD = 62°$, what is $m\angle PHK$?

1) 118º
2) 68º
3) 62º
4) 56º

415 Many roofs are slanted to prevent the buildup of snow. As modeled below, the length of a roof is 5.5 meters and it rises to a height of 2.5 meters.



The angle of elevation of the roof, to the *nearest degree*, is

1) 24º
2) 25º
3) 27º
4) 28º

416 A circle is continuously rotated about its diameter. Which three-dimensional object will be formed?

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

417 A gardener wants to buy enough mulch to cover a rectangular garden that is 3 feet by 10 feet. One bag contains 2 cubic feet of mulch and costs \$3.66. How much will the minimum number of bags cost to cover the garden with mulch 3 inches deep?
1) \$3.66
2) \$10.98
3) \$14.64
4) \$29.28

418 The ratio of similarity of square $ABCD$ to square $WXYZ$ is $2:5$. If $AB = x + 3$ and $WX = 3x + 5$, then the perimeter of $ABCD$ is
1) 8
2) 20
3) 32
4) 80

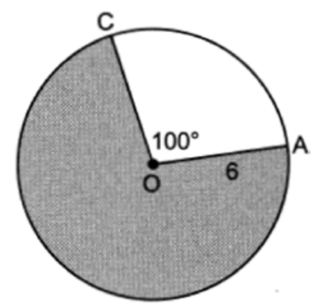
419 In $\triangle ABC$, M is the midpoint of $\overline{AB}$ and N is the midpoint of $\overline{AC}$. If $MN = x + 13$ and $BC = 5x - 1$, what is the length of $\overline{MN}$?
1) 3.5
2) 9
3) 16.5
4) 22

420 The area of the base of a cone is 9π square inches. The volume of the cone is 36π cubic inches. What is the height of the cone in inches?
1) 12
2) 8
3) 3
4) 4

421 The area of $\triangle TAP$ is 36 cm^2. A second triangle, JOE, is formed by connecting the midpoints of each side of $\triangle TAP$. What is the area of JOE, in square centimeters?
1) 9
2) 12
3) 18
4) 27

422 In right triangle ABC, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. If $AD = 4$ and $CD = 8$, the length of $\overline{BD}$ is
1) $\sqrt{48}$
2) $\sqrt{80}$
3) 12
4) 16

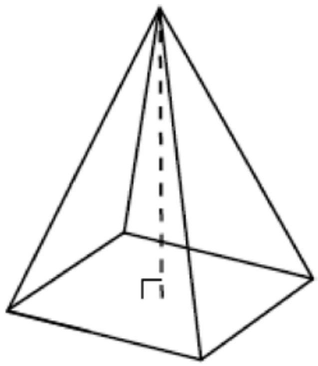
423 In circle O below, $OA = 6$, and $m\angle COA = 100°$.



What is the area of the shaded sector?
1) 10π
2) 26π
3) $\frac{10\pi}{3}$
4) $\frac{26\pi}{3}$

424 Line segment RH has endpoints $R(-4,4)$ and $H(2,-4)$. Which equation represents a line perpendicular to $\overline{RH}$ that passes through the point $(3,-1)$?
1) $y + 1 = \frac{3}{4}(x - 3)$
2) $y + 1 = -\frac{3}{4}(x - 3)$
3) $y + 1 = \frac{4}{3}(x - 3)$
4) $y + 1 = -\frac{4}{3}(x - 3)$

425 The square pyramid drawn below has a volume of 175.



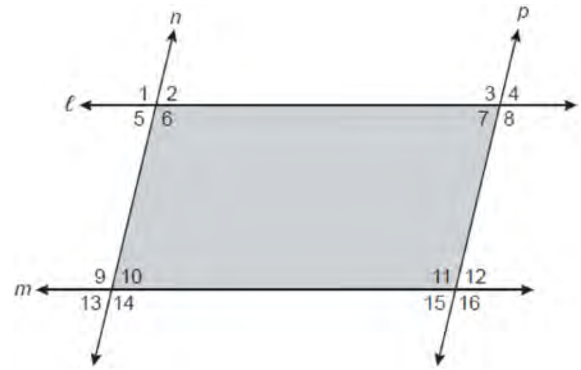
If the height of the pyramid is 21, what is the perimeter of the base?
1) 5
2) 10
3) 20
4) 25

426 The measure of one of the base angles of an isosceles triangle is 42°. The measure of an exterior angle at the vertex of the triangle is
1) 42°
2) 84°
3) 96°
4) 138°

427 Directed line segment AJ has endpoints whose coordinates are $A(5,7)$ and $J(-10,-8)$. Point E is on $\overline{AJ}$ such that $AE:EJ$ is $2:3$. What are the coordinates of point E?
1) $(1,-1)$
2) $(-5,-3)$
3) $(-4,-2)$
4) $(-1,1)$

428 Two sides of a triangular-shaped sandbox measure 22 feet and 13 feet. If the angle between these two sides measures 55°, what is the area of the sandbox, to the *nearest square foot*?
1) 82
2) 117
3) 143
4) 234

429 In the diagram below, lines ℓ and m intersect lines n and p to create the shaded quadrilateral as shown.

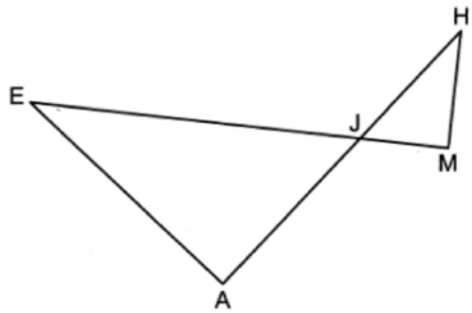


Which congruence statement would be sufficient to prove the quadrilateral is a parallelogram?
1) $\angle 1 \cong \angle 6$ and $\angle 9 \cong \angle 14$
2) $\angle 5 \cong \angle 10$ and $\angle 6 \cong \angle 9$
3) $\angle 5 \cong \angle 7$ and $\angle 10 \cong \angle 15$
4) $\angle 6 \cong \angle 9$ and $\angle 9 \cong \angle 11$

430 The endpoints of $\overline{AB}$ are $A(0,4)$ and $B(-4,6)$. Which equation of a line represents the perpendicular bisector of $\overline{AB}$?
1) $y = -\frac{1}{2}x + 4$
2) $y = -2x + 1$
3) $y = 2x + 8$
4) $y = 2x + 9$

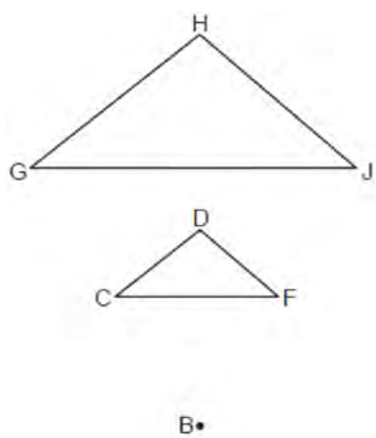
431 An equation of the line perpendicular to the line whose equation is $4x - 5y = 6$ and passes through the point $(-2,3)$ is
1) $y + 3 = -\frac{5}{4}(x - 2)$
2) $y - 3 = -\frac{5}{4}(x + 2)$
3) $y + 3 = \frac{4}{5}(x - 2)$
4) $y - 3 = \frac{4}{5}(x + 2)$

432 In the diagram below, $\overline{EM}$ intersects $\overline{HA}$ at J, $\overline{EA} \perp \overline{HA}$, and $\overline{EM} \perp \overline{HM}$.



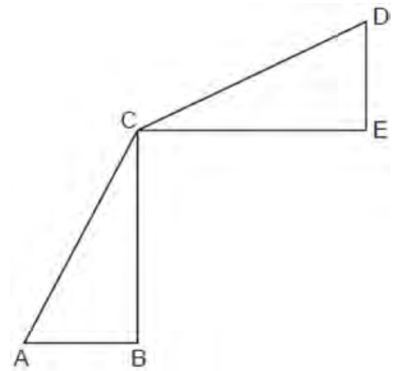
If $EA = 7.2$, $EJ = 9$, $AJ = 5.4$, and $HM = 3.29$, what is the length of $\overline{MJ}$, to the *nearest hundredth*?
1) 2.47
2) 2.63
3) 4.11
4) 4.39

433 In the diagram below, $\triangle GHJ$ is dilated by a scale factor of $\frac{1}{2}$ centered at point B to map onto $\triangle CDF$.



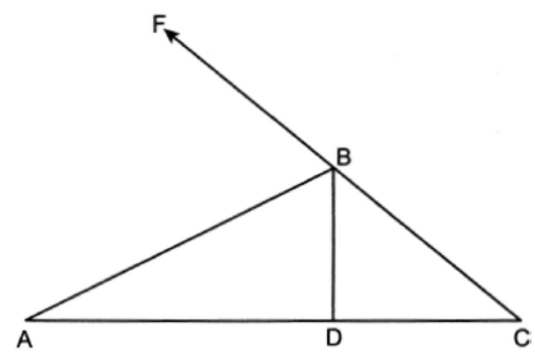
If $m\angle DFC = 40°$, what is $m\angle HJG$?
1) 20º
2) 40º
3) 60º
4) 80º

434 In the diagram below, $\triangle ABC \cong \triangle DEC$.



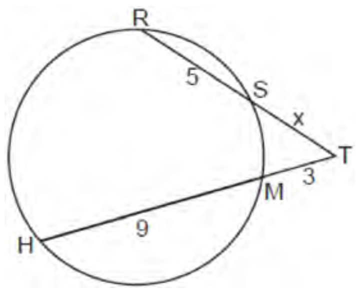
Which transformation will map $\triangle ABC$ onto $\triangle DEC$?
1) a rotation
2) a line reflection
3) a translation followed by a dilation
4) a line reflection followed by a second line reflection

435 In the diagram below of $\triangle ABC$, $\overrightarrow{CBF}$ is drawn, $\overline{AB}$ bisects $\angle FBD$, and $\overline{BD} \perp \overline{AC}$.



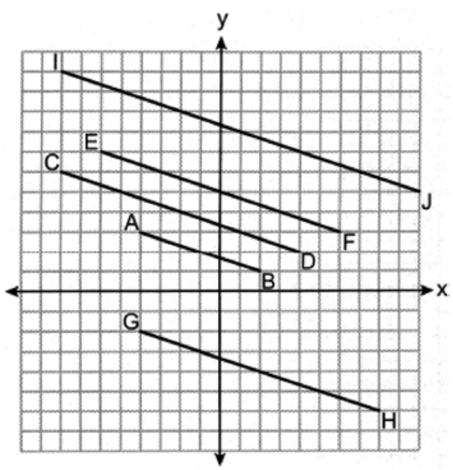
If $m\angle C = 42°$ what is $m\angle A$?
1) 24º
2) 33º
3) 48º
4) 66º

436 In the circle below, secants $\overline{TSR}$ and $\overline{TMH}$ intersect at T, $SR = 5$, $HM = 9$, $TM = 3$, and $TS = x$.



Which equation could be used to find the value of x?
1) $x(x+5)=36$
2) $x(x+5)=27$
3) $3x=45$
4) $5x=27$

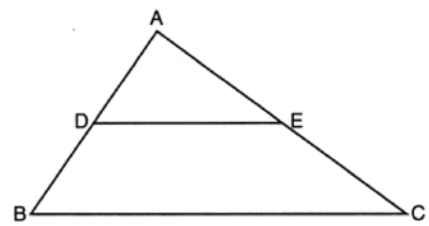
437 On the set of axes below, $\overline{AB}$, $\overline{CD}$, $\overline{EF}$, $\overline{GH}$, and $\overline{IJ}$ are drawn.



Which segment is the image of $\overline{AB}$ after a dilation with a scale factor of 2 centered at $(-2,-1)$?
1) $\overline{CD}$
2) $\overline{EF}$
3) $\overline{GH}$
4) $\overline{IJ}$

438 The equation of line t is $3x - y = 6$. Line m is the image of line t after a dilation with a scale factor of $\frac{1}{2}$ centered at the origin. What is an equation of the line m?
1) $y = \frac{3}{2}x - 3$
2) $y = \frac{3}{2}x - 6$
3) $y = 3x + 3$
4) $y = 3x - 3$

439 In the diagram below of $\triangle ABC$, D and E are the midpoints of $\overline{AB}$ and $\overline{AC}$, respectively, and $\overline{DE}$ is drawn.



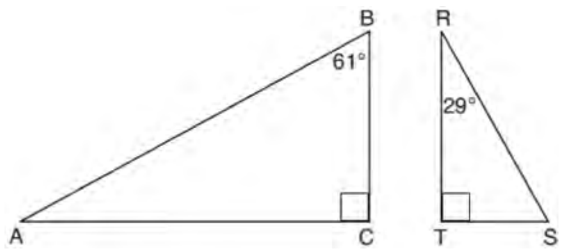
I. AA similarity
II. SSS similarity
III. SAS similarity

Which methods could be used to prove $\triangle ABC \sim \triangle ADE$?
1) I and II, only
2) II and III, only
3) I and III, only
4) I, II, and III

440 Quadrilateral *MATH* is congruent to quadrilateral *WXYZ*. Which statement is always true?
1) $MA = XY$
2) $m\angle H = m\angle W$
3) Quadrilateral *WXYZ* can be mapped onto quadrilateral *MATH* using a sequence of rigid motions.
4) Quadrilateral *MATH* and quadrilateral *WXYZ* are the same shape, but not necessarily the same size.

Geometry Multiple Choice Regents Exam Questions

441 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) $\frac{AB}{AC} = \frac{RS}{RT}$

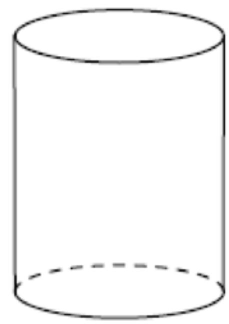
442 Which equation represents a line parallel to the line whose equation is $-2x + 3y = -4$ and passes through the point (1,3)?

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

443 In right triangles ABC and RST, hypotenuse $AB = 4$ and hypotenuse $RS = 16$. If $\triangle ABC \sim \triangle RST$, then 1:16 is the ratio of the corresponding

1) legs
2) areas
3) volumes
4) perimeters

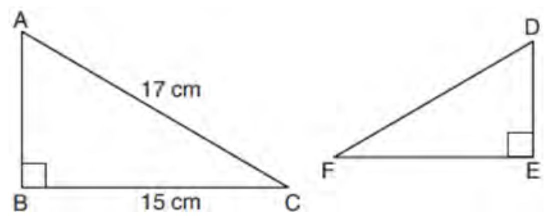
444 A plane intersects a cylinder perpendicular to its bases.



This cross section can be described as a

1) rectangle
2) parabola
3) triangle
4) circle

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



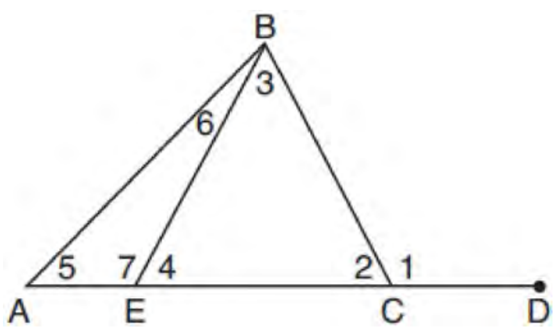
If $\triangle ABC \sim \triangle DEF$, with right angles B and E, $BC = 15$ cm, and $AC = 17$ cm, what is the measure of $\angle F$, to the *nearest degree*?

1) 28°
2) 41°
3) 62°
4) 88°

446 The car tire shown in the photograph below has a diameter of $2\frac{1}{4}$ feet.

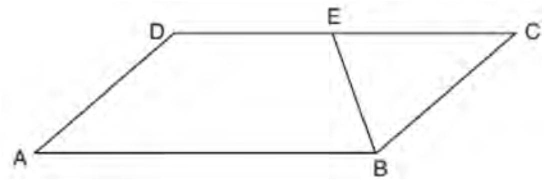
Approximately how many rotations will the tire make in one mile?
1) 373
2) 747
3) 1328
4) 2347

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



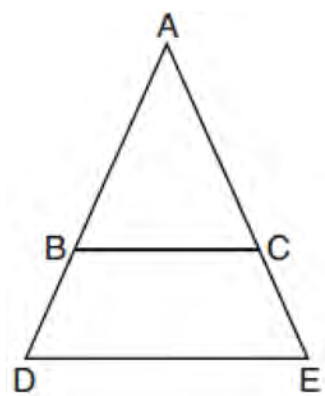
Which equation is always true?
1) $m\angle 1 = m\angle 3 + m\angle 2$
2) $m\angle 5 = m\angle 3 - m\angle 2$
3) $m\angle 6 = m\angle 3 - m\angle 2$
4) $m\angle 7 = m\angle 3 + m\angle 2$

448 In parallelogram $ABCD$ shown below, $\overline{EB}$ bisects $\angle ABC$.



If $m\angle A = 40°$, then $m\angle BED$ is
1) 40°
2) 70°
3) 110°
4) 140°

449 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.



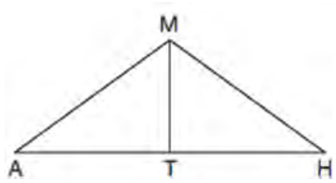
If $AB = 10$, $BD = 5$, and $DE = 12$, what is the length of $\overline{BC}$?
1) 6
2) 7
3) 8
4) 9

450 Right triangle TMR is a scalene triangle with the right angle at M. Which equation is true?
1) $\sin M = \cos T$
2) $\sin R = \cos R$
3) $\sin T = \cos R$
4) $\sin T = \cos M$

451 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) $(-3,-2)$

452 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

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

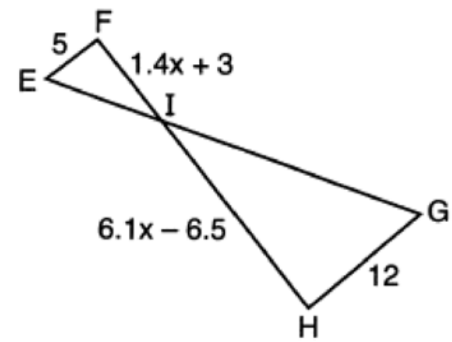


Which statement is *not* always true?
1) $\triangle MAH$ is isosceles.
2) $\triangle MAT$ is isosceles.
3) $\overline{MT}$ bisects $\angle AMH$.
4) $\angle A$ and $\angle TMH$ are complementary.

454 The coordinates of the endpoints of $\overline{SC}$ are $S(-7,3)$ and $C(2,-6)$. If point M is on $\overline{SC}$, what are the coordinates of M such that $SM:MC$ is 1:2?
1) $(-4,0)$
2) $(0,-4)$
3) $(-1,-3)$
4) $\left(-\frac{5}{2},-\frac{3}{2}\right)$

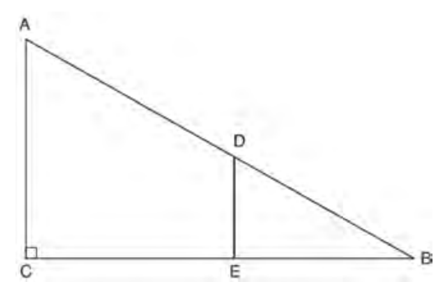
455 For the acute angles in a right triangle, $\sin(4x)° = \cos(3x+13)°$. What is the number of degrees in the measure of the *smaller* angle?
1) 11°
2) 13°
3) 44°
4) 52°

456 In the diagram below, $\overline{EF} \parallel \overline{HG}$, $EF = 5$, $HG = 12$, $FI = 1.4x + 3$, and $HI = 6.1x - 6.5$.



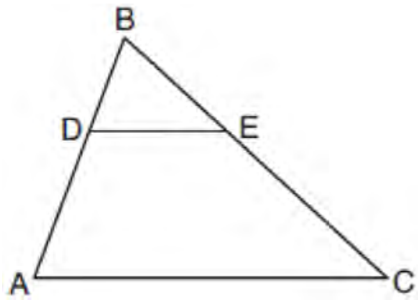
What is the length of $\overline{HI}$?
1) 1
2) 5
3) 10
4) 24

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



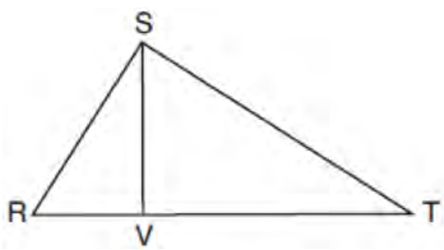
If $AB = 15$, $BC = 12$, and $EC = 7$, what is the length of $\overline{BD}$?
1) 8.75
2) 6.25
3) 5
4) 4

458 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

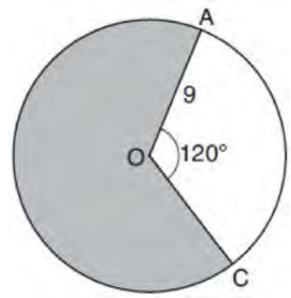
459 In right triangle RST below, altitude $\overline{SV}$ is drawn to hypotenuse $\overline{RT}$.



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

460 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

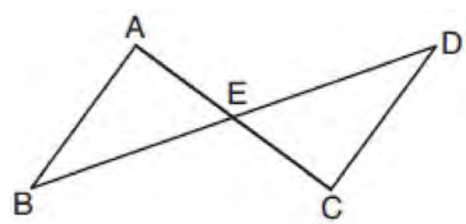
461 Circle O with a radius of 9 is drawn below. The measure of central angle AOC is 120°.



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

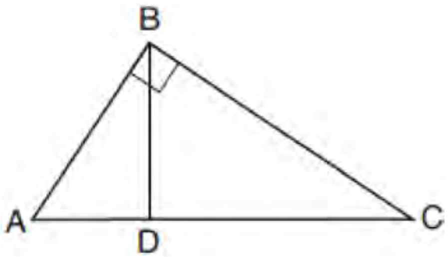
462 Which information is *not* sufficient to prove that a parallelogram is a square?
1) The diagonals are both congruent and perpendicular.
2) The diagonals are congruent and one pair of adjacent sides are congruent.
3) The diagonals are perpendicular and one pair of adjacent sides are congruent.
4) The diagonals are perpendicular and one pair of adjacent sides are perpendicular.

463 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.

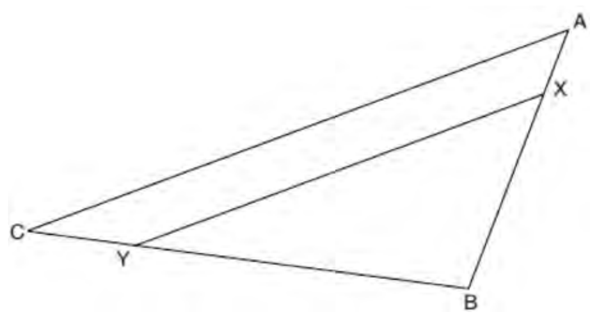
464 In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn.



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

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

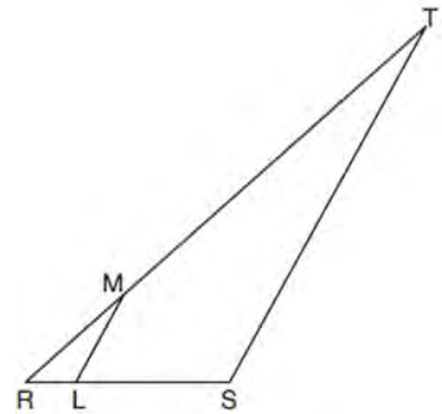
465 The diagram below shows triangle ABC with point X on side $\overline{AB}$ and point Y on side $\overline{CB}$.



Which information is sufficient to prove that $\triangle BXY \sim \triangle BAC$?

1) $\angle B$ is a right angle.
2) $\overline{XY}$ is parallel to $\overline{AC}$.
3) $\triangle ABC$ is isosceles.
4) $\overline{AX} \cong \overline{CY}$

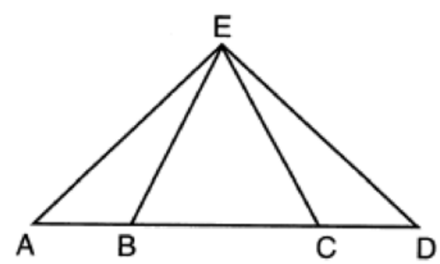
466 In the diagram below of $\triangle RST$, L is a point on $\overline{RS}$, and M is a point on $\overline{RT}$, such that $LM \parallel ST$.



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

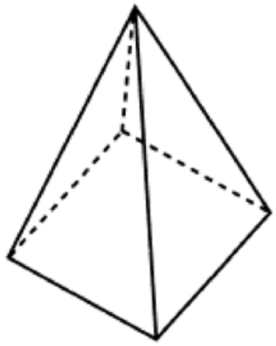
467 In the diagram below of $\triangle AED$ and $\overline{ABCD}$, $\overline{AE} \cong \overline{DE}$.



Which statement is always true?

1) $\overline{EB} \cong \overline{EC}$
2) $\overline{AC} \cong \overline{DB}$
3) $\angle EBA \cong \angle ECD$
4) $\angle EAC \cong \angle EDB$

468 The square pyramid below models a toy block made of maple wood.



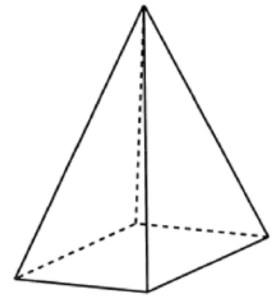
Each side of the base measures 4.5 cm and the height of the pyramid is 10 cm. If the density of maple is 0.676 g/cm^3, what is the mass of the block, to the *nearest tenth of a gram*?
1) 45.6
2) 67.5
3) 136.9
4) 202.5

469 Which regular polygon has a minimum rotation of 36° about its center that carries the polygon onto itself?
1) pentagon
2) octagon
3) nonagon
4) decagon

470 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) $54,613.\overline{3}$

471 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

472 In the diagram below, a plane intersects a square pyramid parallel to its base.



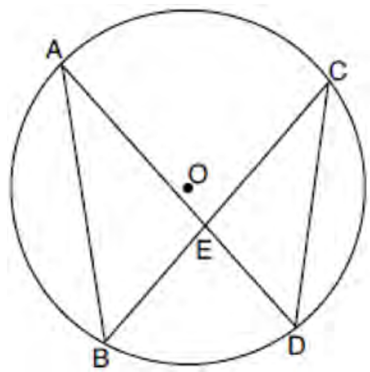
Which two-dimensional shape describes this cross section?
1) circle
2) square
3) triangle
4) pentagon

473 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

474 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

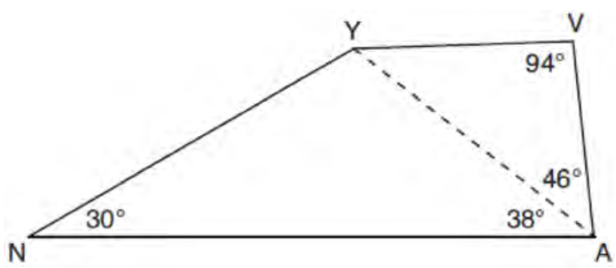
475 Which three-dimensional figure will result when a rectangle 6 inches long and 5 inches wide is continuously rotated about the longer side?
1) a rectangular prism with a length of 6 inches, width of 6 inches, and height of 5 inches
2) a rectangular prism with a length of 6 inches, width of 5 inches, 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

476 In the diagram below of circle O, chords $\overline{AD}$ and $\overline{BC}$ intersect at E, and chords $\overline{AB}$ and $\overline{CD}$ are drawn.



Which statement must always be true?
1) $\overline{AB} \cong \overline{CD}$
2) $\overline{AD} \cong \overline{BC}$
3) $\angle B \cong \angle C$
4) $\angle A \cong \angle C$

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

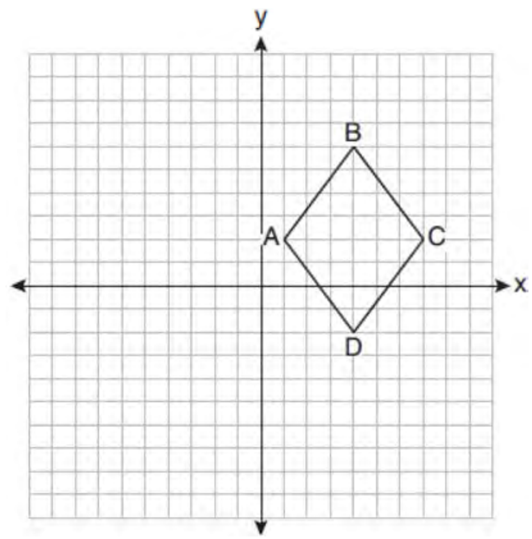


Which segment has the shortest length?
1) $\overline{AY}$
2) $\overline{NY}$
3) $\overline{VA}$
4) $\overline{VY}$

478 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.

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

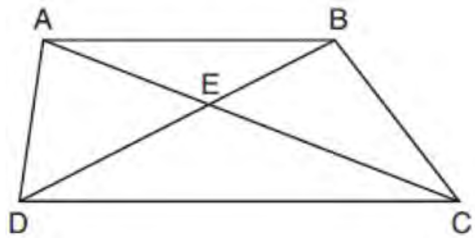
480 On the set of axes below, rhombus $ABCD$ has vertices whose coordinates are $A(1,2)$, $B(4,6)$, $C(7,2)$, and $D(4,-2)$.



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

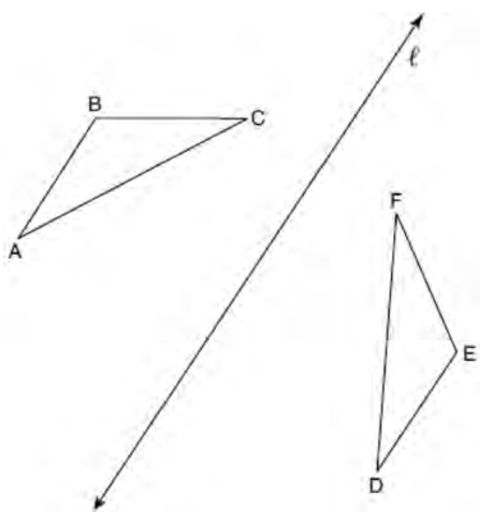
481 Jaden is comparing two cones. The radius of the base of cone A is twice as large as the radius of the base of cone B. The height of cone B is twice the height of cone A. The volume of cone A is
1) twice the volume of cone B
2) four times the volume of cone B
3) equal to the volume of cone B
4) equal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

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



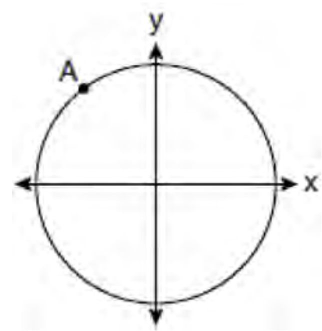
If $AE = 5.2$, $AC = 11.7$, and $CD = 10.5$, what is the length of $\overline{AB}$, to the *nearest tenth*?
1) 4.7
2) 6.5
3) 8.4
4) 13.1

483 In the diagram below, $\triangle ABC$ is reflected over line ℓ to create $\triangle DEF$.



If $m\angle A = 40°$ and $m\angle B = 95°$, what is $m\angle F$?
1) 40°
2) 45°
3) 85°
4) 95°

484 A circle centered at the origin passes through $A(-3,4)$.



What is the equation of the line tangent to the circle at A?
1) $y-4=\frac{4}{3}(x+3)$
2) $y-4=\frac{3}{4}(x+3)$
3) $y+4=\frac{4}{3}(x-3)$
4) $y+4=\frac{3}{4}(x-3)$

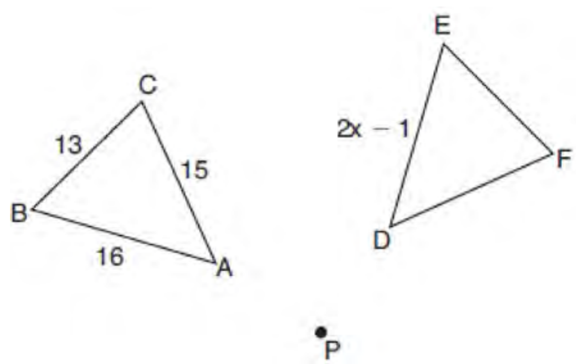
485 What are the coordinates of the center and the length of the radius of the circle whose equation is $x^2+y^2-12y-20.25=0$?
1) center $(0,6)$ and radius 7.5
2) center $(0,-6)$ and radius 7.5
3) center $(0,12)$ and radius 4.5
4) center $(0,-12)$ and radius 4.5

486 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) $(-6,6)$

487 The Pyramid of Memphis, in Tennessee, stands 107 yards tall and has a square base whose side is 197 yards long.

What is the volume of the Pyramid of Memphis, to the *nearest cubic yard*?
1) 751,818
2) 1,384,188
3) 2,076,212
4) 4,152,563

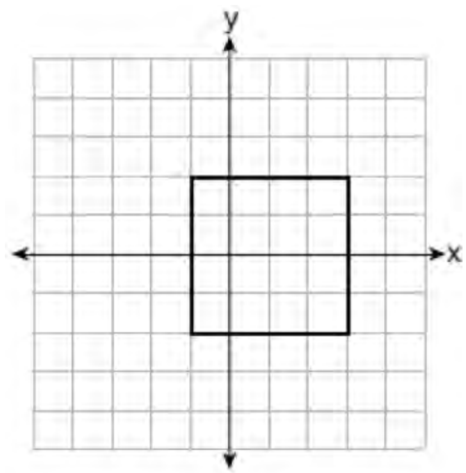
488 In the diagram below, $\triangle ABC$ with sides 13, 15, and 16, is mapped onto $\triangle DEF$ after a clockwise rotation of 90° about point P.



If $DE = 2x - 1$, what is the value of x?
1) 7
2) 7.5
3) 8
4) 8.5

489 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

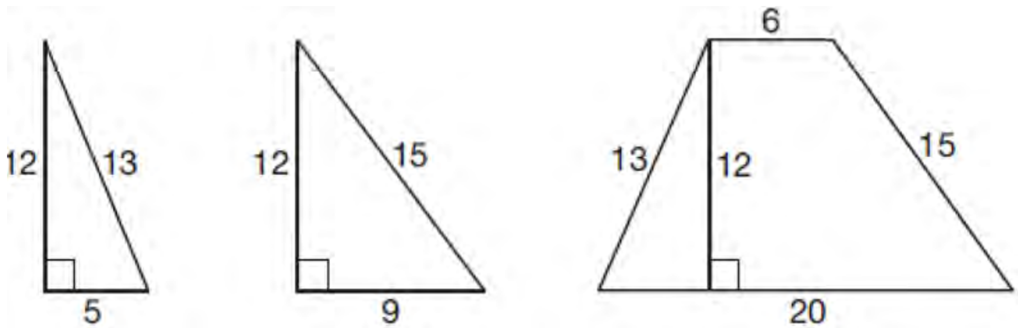
490 A square is graphed on the set of axes below, with vertices at $(-1,2)$, $(-1,-2)$, $(3,-2)$, and $(3,2)$.



Which transformation would *not* carry the square onto itself?
1) reflection over the y-axis
2) reflection over the x-axis
3) rotation of 180 degrees around point $(1,0)$
4) reflection over the line $y = x - 1$

491 A regular pentagon is rotated about its center. What is the minimum number of degrees needed to carry the pentagon onto itself?
1) 72°
2) 108°
3) 144°
4) 360°

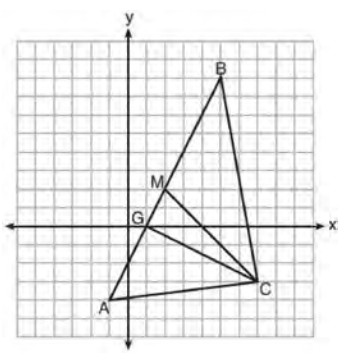
492 Francisco needs the three pieces of glass shown below to complete a stained glass window. The shapes, two triangles and a trapezoid, are measured in inches.



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

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

494 A quadrilateral has diagonals that are perpendicular but *not* congruent. This quadrilateral could be

1) a square
2) a rhombus
3) a rectangle
4) an isosceles trapezoid

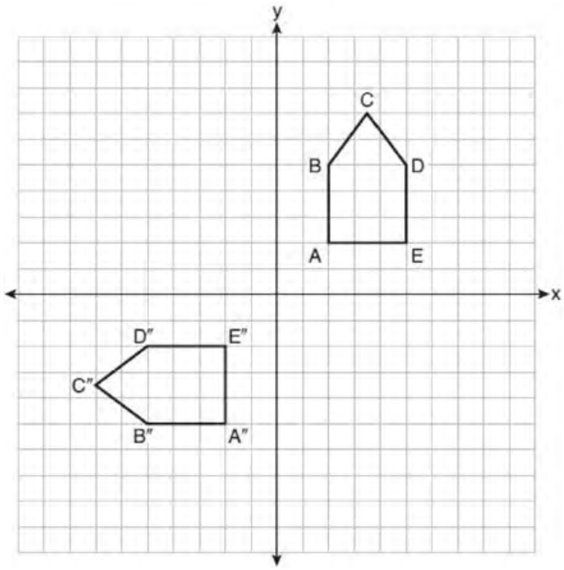
495 If a rectangle is continuously rotated around one of its sides, what is the three-dimensional figure formed?

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

496 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 $\angle BCD$

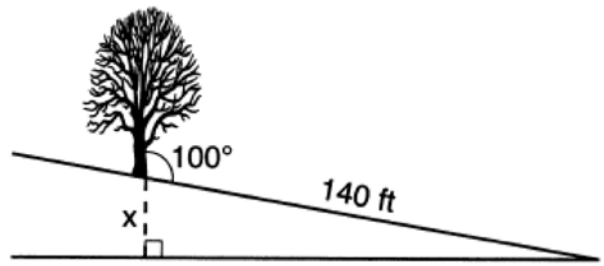
497 On the set of axes below, pentagon *ABCDE* is congruent to *A"B"C"D"E"*.



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

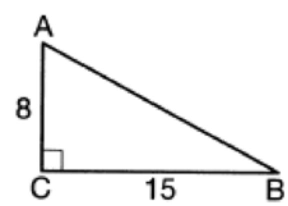
498 A line is dilated by a scale factor of $\frac{1}{3}$ centered at a point on the line. Which statement is correct about the image of the line?
1) Its slope is changed by a scale factor of $\frac{1}{3}$.
2) Its *y*-intercept is changed by a scale factor of $\frac{1}{3}$.
3) Its slope and *y*-intercept are changed by a scale factor of $\frac{1}{3}$.
4) The image of the line and the pre-image are the same line.

499 The diagram below shows a tree growing vertically on a hillside. The angle formed by the tree trunk and the hillside is 100°. The distance from the base of the tree to the bottom of the hill is 140 feet.



What is the vertical drop, *x*, to the base of the hill, to the *nearest foot*?
1) 24
2) 25
3) 70
4) 138

500 As shown in the diagram below, right triangle *ABC* has side lengths of 8 and 15.



If the triangle is continuously rotated about $\overline{AC}$, the resulting figure will be
1) a right cone with a radius of 15 and a height of 8
2) a right cone with a radius of 8 and a height of 15
3) a right cylinder with a radius of 15 and a height of 8
4) a right cylinder with a radius of 8 and a height of 15

501 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) $\angle G \cong \angle S$

502 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

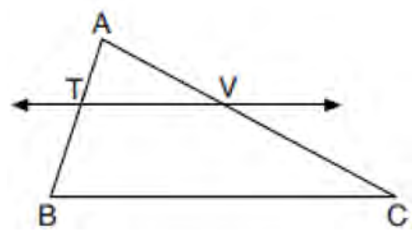
503 Lou has a solid clay brick in the shape of a rectangular prism with a length of 8 inches, a width of 3.5 inches, and a height of 2.25 inches. If the clay weighs 1.055 oz/in^3, how much does Lou's brick weigh, to the *nearest ounce*?
1) 66
2) 64
3) 63
4) 60

504 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

505 Point P divides the directed line segment from point $A(-4,-1)$ to point $B(6,4)$ in the ratio 2:3. The coordinates of point P are
1) $(-1,1)$
2) $(0,1)$
3) $(1,0)$
4) $(2,2)$

506 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) $k = 4$

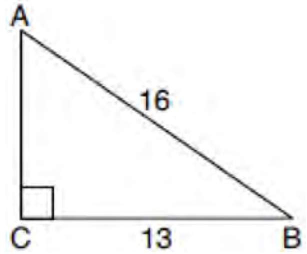
507 In the diagram below of $\triangle ABC$, $\overleftrightarrow{TV}$ intersects $\overline{AB}$ and $\overline{AC}$ at points T and V respectively, and $m\angle ATV = m\angle ABC$.



If $AT = 4$, $BC = 18$, $TB = 5$, and $AV = 6$, what is the perimeter of quadrilateral $TBCV$?
1) 38.5
2) 39.5
3) 40.5
4) 44.9

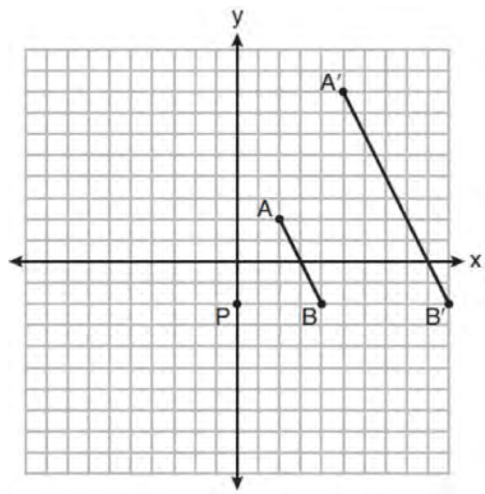
508 What is an equation of the image of the line $y = \frac{3}{2}x - 4$ after a dilation of a scale factor of $\frac{3}{4}$ centered at the origin?
1) $y = \frac{9}{8}x - 4$
2) $y = \frac{9}{8}x - 3$
3) $y = \frac{3}{2}x - 4$
4) $y = \frac{3}{2}x - 3$

509 In the diagram of $\triangle ABC$ below, $m\angle C = 90°$, $CB = 13$, and $AB = 16$.



What is the measure of $\angle A$, to the *nearest degree*?
1) 36°
2) 39°
3) 51°
4) 54°

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

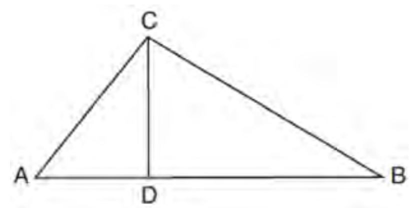


Which statement is always true?
1) $\overline{PA} \cong \overline{AA'}$
2) $\overline{AB} \parallel \overline{A'B'}$
3) $AB = A'B'$
4) $\frac{5}{2}(A'B') = AB$

511 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) $A(-4,-3)$

512 If scalene triangle XYZ is similar to triangle QRS and $m\angle X = 90°$, which equation is always true?
1) $\sin Y = \sin S$
2) $\cos R = \cos Z$
3) $\cos Y = \sin Q$
4) $\sin R = \cos Z$

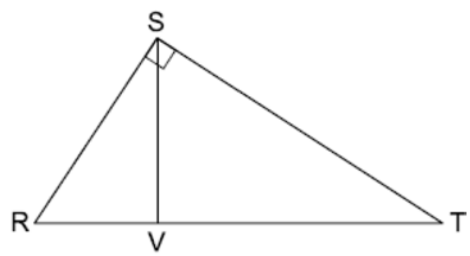
513 In the diagram below of right triangle ABC, altitude $\overline{CD}$ intersects hypotenuse $\overline{AB}$ at D.



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

514 The expression $\sin 57°$ is equal to
1) $\tan 33°$
2) $\cos 33°$
3) $\tan 57°$
4) $\cos 57°$

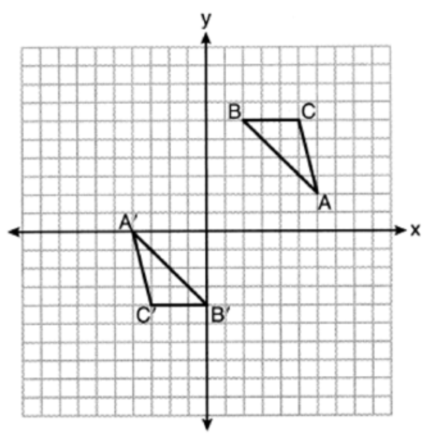
515 In right triangle RST below, altitude $\overline{SV}$ is drawn to hypotenuse $\overline{RT}$.



Which statement is always true?

1) $\frac{RT}{ST}=\frac{ST}{VT}$
2) $\frac{VR}{VT}=\frac{VT}{VS}$
3) $\frac{RV}{SV}=\frac{SV}{RT}$
4) $\frac{TR}{VR}=\frac{VR}{SR}$

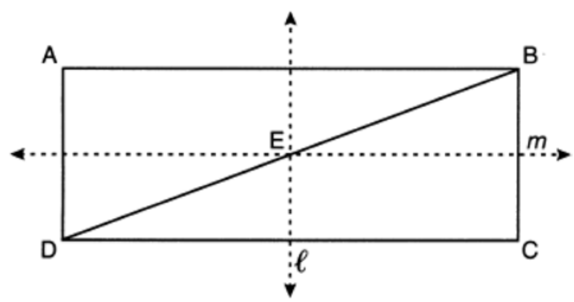
516 On the set of axes below, $\triangle ABC \cong \triangle A'B'C'$.



Triangle ABC maps onto $\triangle A'B'C'$ after a

1) reflection over the line $y=-x$
2) reflection over the line $y=-x+2$
3) rotation of 180° centered at (1,1)
4) rotation of 180° centered at the origin

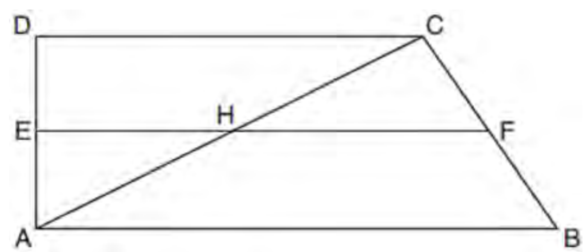
517 In the diagram below, $ABCD$ is a rectangle, and diagonal $\overline{BD}$ is drawn. Line ℓ, a vertical line of symmetry, and line m, a horizontal line of symmetry, intersect at point E.



Which sequence of transformations will map $\triangle ABD$ onto $\triangle CDB$?

1) a reflection over line ℓ followed by a 180° rotation about point E
2) a reflection over line ℓ followed by a reflection over line m
3) a 180° rotation about point B
4) a reflection over $\overline{DB}$

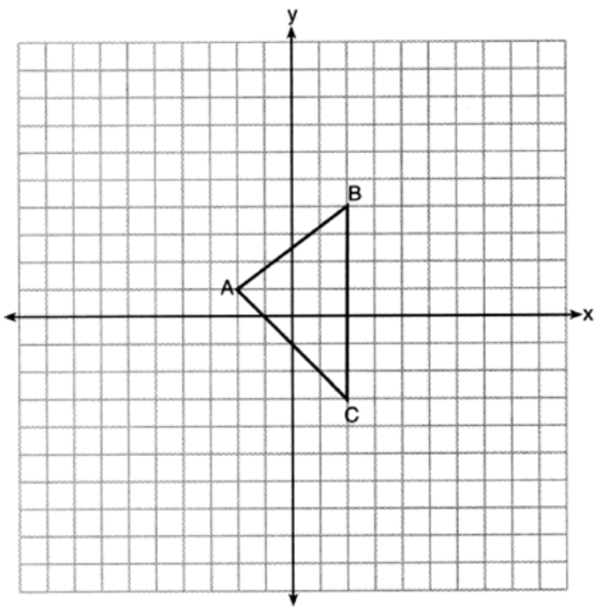
518 In quadrilateral $ABCD$ below, $\overline{AB} \parallel \overline{CD}$, and E, H, and F are the midpoints of $\overline{AD}$, $\overline{AC}$, and $\overline{BC}$, respectively.



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

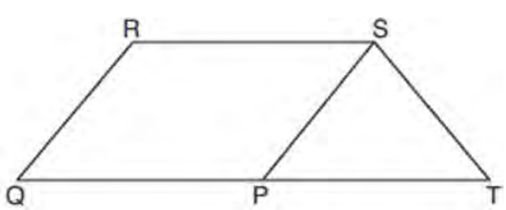
1) 9
2) 10
3) 12
4) 21

519 Triangle $A'B'C'$ is the image of $\triangle ABC$ after a dilation centered at the origin. The coordinates of the vertices of $\triangle ABC$ are $A(-2,1)$, $B(2,4)$, and $C(2,-3)$.



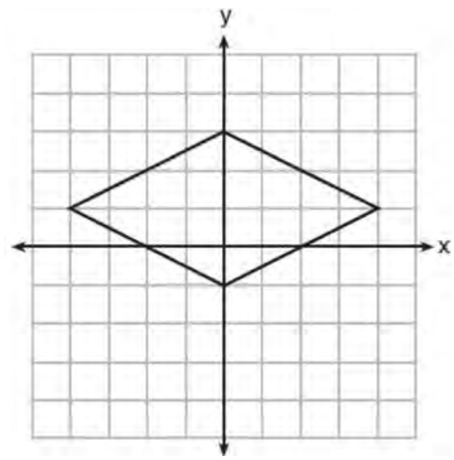
If the coordinates of A' are $(-4,2)$, the coordinates of B' are
1) $(8,4)$
2) $(4,8)$
3) $(4,-6)$
4) $(1,2)$

520 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°

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

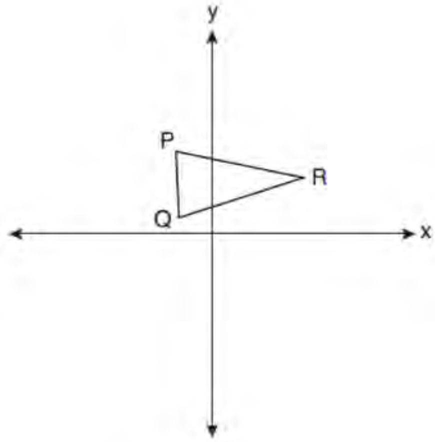


Which transformation would carry the rhombus onto itself?
1) 180° rotation counterclockwise about the origin
2) reflection over the line $y = \frac{1}{2}x + 1$
3) reflection over the line $y = 0$
4) reflection over the line $x = 0$

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

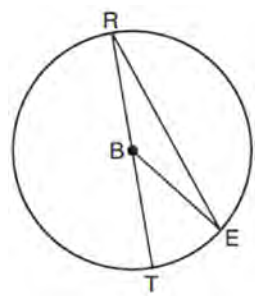
523 The line $-3x + 4y = 8$ is transformed by a dilation centered at the origin. Which linear equation could represent its image?
1) $y = \frac{4}{3}x + 8$
2) $y = \frac{3}{4}x + 8$
3) $y = -\frac{3}{4}x - 8$
4) $y = -\frac{4}{3}x - 8$

524 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

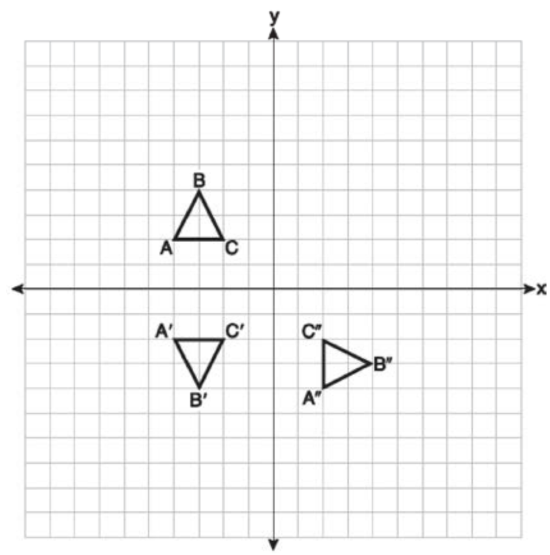
525 In circle B below, diameter $\overline{RT}$, radius $\overline{BE}$, and chord $\overline{RE}$ are drawn.



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

526 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

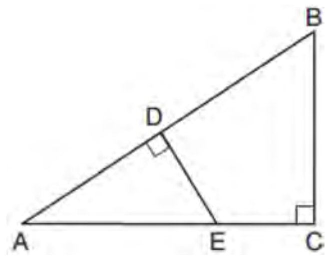
527 On the set of axes below, triangle ABC is graphed. Triangles $A'B'C'$ and $A''B''C''$, the images of triangle ABC, are graphed after a sequence of rigid motions.



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

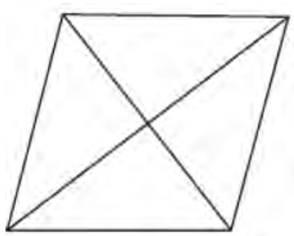
528 In right triangle ABC, $m\angle C = 90°$ and $AC \neq BC$. Which trigonometric ratio is equivalent to $\sin B$?
1) $\cos A$
2) $\cos B$
3) $\tan A$
4) $\tan B$

529 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

530 The figure below shows a rhombus with noncongruent diagonals.



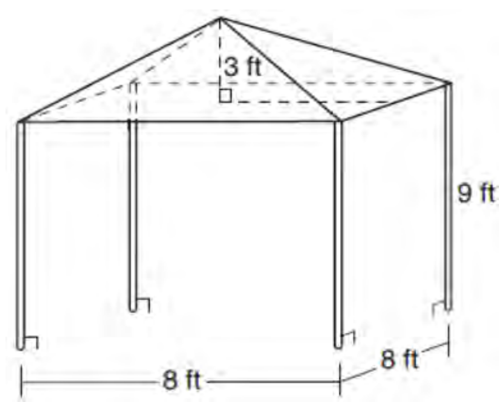
Which transformation would *not* carry this rhombus onto itself?
1) a reflection over the shorter diagonal
2) a reflection over the longer diagonal
3) a clockwise rotation of 90° about the intersection of the diagonals
4) a counterclockwise rotation of 180° about the intersection of the diagonals

531 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 $\overline{SA}$

532 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

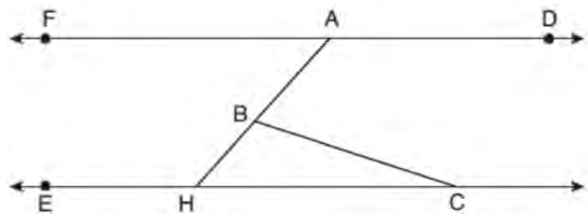
533 A 15-foot ladder leans against a wall and makes an angle of 65° with the ground. What is the horizontal distance from the wall to the base of the ladder, to the *nearest tenth of a foot*?
1) 6.3
2) 7.0
3) 12.9
4) 13.6

534 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.



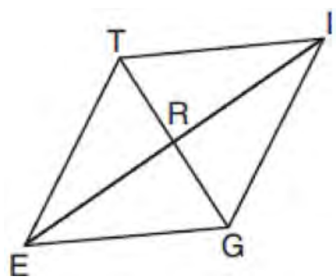
What is the volume, in cubic feet, of space the tent occupies?
1) 256
2) 640
3) 672
4) 768

535 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) 18º
2) 48º
3) 66º
4) 114º

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



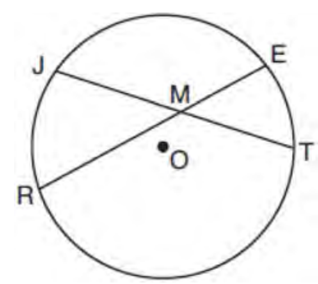
What is the length of diagonal $\overline{IE}$?
1) 15
2) 30
3) 34
4) 52

537 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) $(4,0)$

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

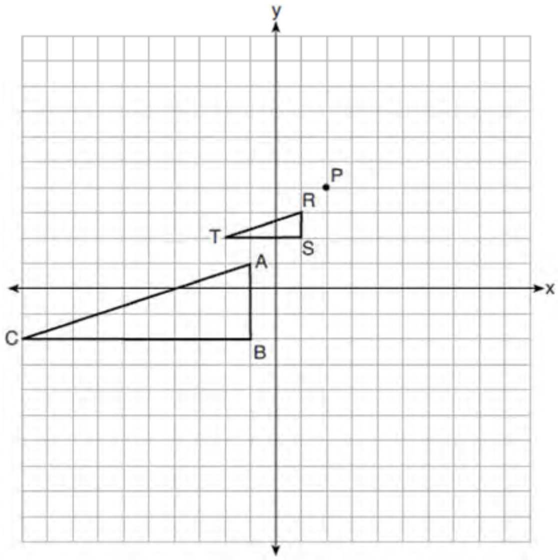
539 An equation of line *p* is $y = \frac{1}{3}x + 4$. An equation of line *q* is $y = \frac{2}{3}x + 8$. Which statement about lines *p* and *q* is true?
1) A dilation of $\frac{1}{2}$ centered at the origin will map line *q* onto line *p*.
2) A dilation of 2 centered at the origin will map line *p* onto line *q*.
3) Line *q* is not the image of line *p* after a dilation because the lines are not parallel.
4) Line *q* is not the image of line *p* after a dilation because the lines do not pass through the origin.

540 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

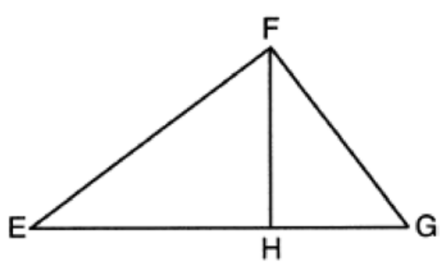
541 On the set of axes below, $\triangle RST$ is the image of $\triangle ABC$ after a dilation centered at point P.



The scale factor of the dilation that maps $\triangle ABC$ onto $\triangle RST$ is

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

542 In the diagram below of right triangle EFG, altitude $\overline{FH}$ intersects hypotenuse $\overline{EG}$ at H.



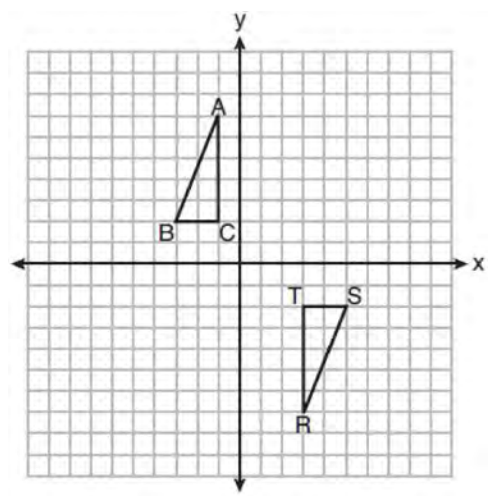
If $FH = 9$ and $EF = 15$, what is EG?

1) 6.75
2) 12
3) 18.75
4) 25

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

544 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 $y = 1$

545 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?

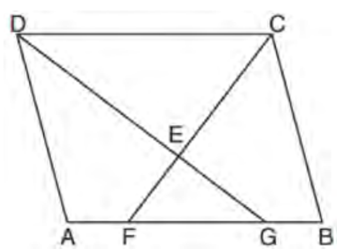
1) 72°
2) 120°
3) 144°
4) 180°

546 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

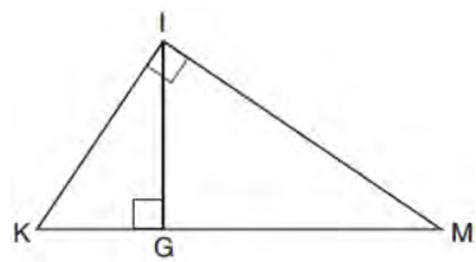
547 In the diagram below of parallelogram $ABCD$, $\overline{AFGB}$, $\overline{CF}$ bisects $\angle DCB$, $\overline{DG}$ bisects $\angle ADC$, and $\overline{CF}$ and $\overline{DG}$ intersect at E.



If $m\angle B = 75°$, then the measure of $\angle EFA$ is
1) 142.5°
2) 127.5°
3) 52.5°
4) 37.5°

548 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

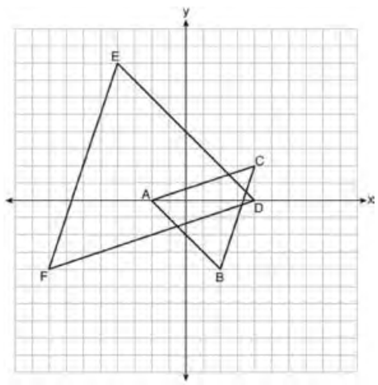
549 In the diagram below of right triangle KMI, altitude $\overline{IG}$ is drawn to hypotenuse $\overline{KM}$.



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

550 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.

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



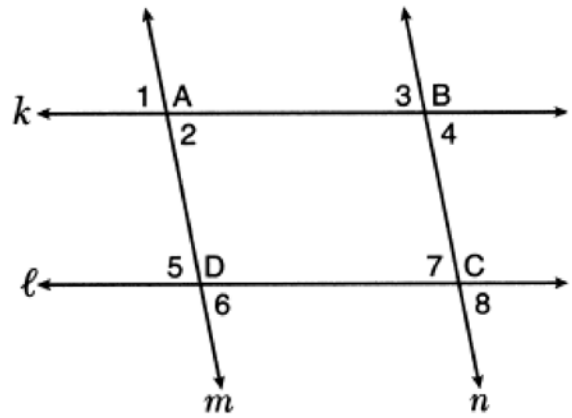
Which sequence of transformations will map $\triangle ABC$ onto $\triangle DEF$?

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

552 Segment JM has endpoints $J(-5,1)$ and $M(7,-9)$. An equation of the perpendicular bisector of $\overline{JM}$ is

1) $y-4=\frac{5}{6}(x+1)$
2) $y+4=\frac{5}{6}(x-1)$
3) $y-4=\frac{6}{5}(x+1)$
4) $y+4=\frac{6}{5}(x-1)$

553 In the diagram below, lines k and ℓ intersect lines m and n at points A, B, C, and D.



Which statement is sufficient to prove $ABCD$ is a parallelogram?

1) $\angle 1 \cong \angle 3$
2) $\angle 4 \cong \angle 7$
3) $\angle 2 \cong \angle 5$ and $\angle 5 \cong \angle 7$
4) $\angle 1 \cong \angle 3$ and $\angle 3 \cong \angle 4$

554 A regular nonagon has a center point, P. What degree of rotation about point P will carry the nonagon onto itself?

1) 60°
2) 90°
3) 180°
4) 200°

555 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 $\angle P$?

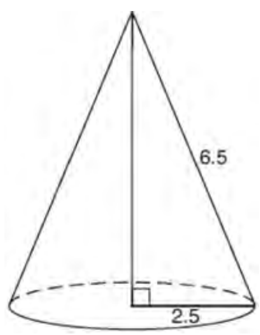
1) 19º
2) 38º
3) 53º
4) 106º

556 Which transformation does *not* always preserve distance?

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

557 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

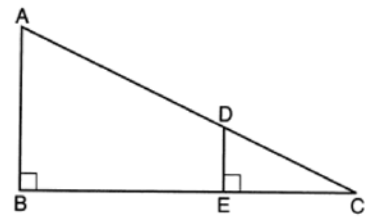
558 As shown in the diagram below, the radius of a cone is 2.5 cm and its slant height is 6.5 cm.



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

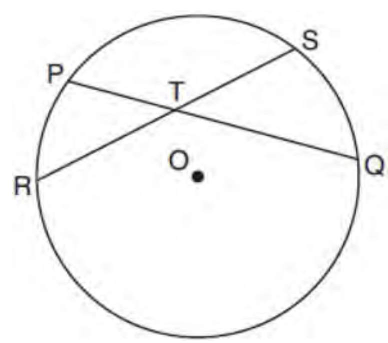
559 Point M divides $\overline{AB}$ so that $AM:MB = 1:2$. If A has coordinates $(-1,-3)$ and B has coordinates $(8,9)$, the coordinates of M are
1) $(2,1)$
2) $\left(\frac{5}{3},0\right)$
3) $(5,5)$
4) $\left(\frac{23}{3},8\right)$

560 In the diagram below, $\triangle CDE$ is the image of $\triangle CAB$ after a dilation of $\frac{DE}{AB}$ centered at C.



Which statement is always true?
1) $\sin A = \frac{CE}{CD}$
2) $\cos A = \frac{CD}{CE}$
3) $\sin A = \frac{DE}{CD}$
4) $\cos A = \frac{DE}{CE}$

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

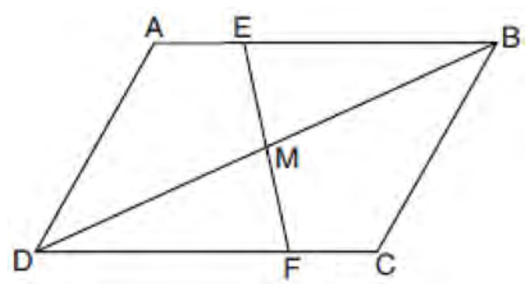


Which relationship must always be true?
1) $RT = TQ$
2) $RT = TS$
3) $RT + TS = PT + TQ$
4) $RT \times TS = PT \times TQ$

562 In quadrilateral $TOWN$, $\overline{OW} \cong \overline{TN}$ and $\overline{OT} \cong \overline{WN}$. Which additional information is sufficient to prove quadrilateral $TOWN$ is a rhombus?
1) $\overline{ON} \perp \overline{TW}$
2) $\overline{TO} \perp \overline{OW}$
3) $\overline{OW} \parallel \overline{TN}$
4) $\overline{ON}$ and $\overline{TW}$ bisect each other.

563 Diameter $\overline{ROQ}$ of circle O is extended through Q to point P, and tangent $\overline{PA}$ is drawn. If $m\overset{\frown}{RA} = 100°$, what is $m\angle P$?
1) 10°
2) 20°
3) 40°
4) 50°

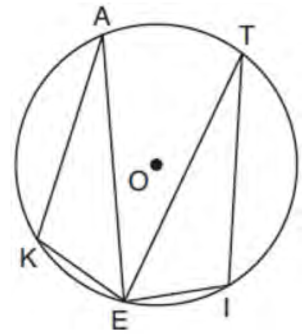
564 Parallelogram $ABCD$ with diagonal $\overline{DB}$ is drawn below. Line segment EF is drawn such that it bisects $\overline{DB}$ at M.



Which triangle congruence method would prove that $\triangle EMB \sim \triangle FMD$?
1) ASA, only
2) AAS, only
3) both ASA and AAS
4) neither ASA nor AAS

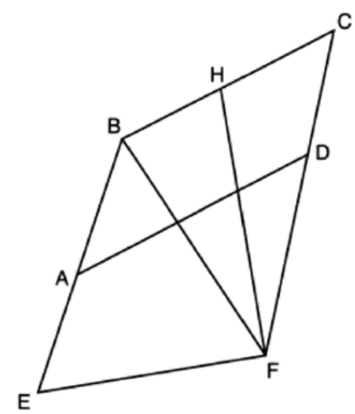
565 The equation of a circle is $x^2 + 8x + y^2 - 12y = 144$. What are the coordinates of the center and the length of the radius of the circle?
1) center $(4,-6)$ and radius 12
2) center $(-4,6)$ and radius 12
3) center $(4,-6)$ and radius 14
4) center $(-4,6)$ and radius 14

566 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 $\angle EKA \cong \angle EIT$.



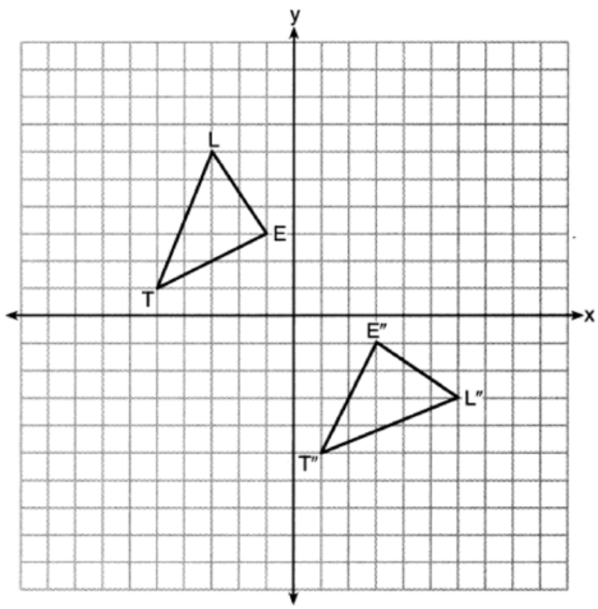
Which statement about $\triangle KAE$ and $\triangle ITE$ is always true?
1) They are neither congruent nor similar.
2) They are similar but not congruent.
3) They are right triangles.
4) They are congruent.

567 Quadrilateral $EBCF$ and $\overline{AD}$ are drawn below, such that $ABCD$ is a parallelogram, $\overline{EB} \cong \overline{FB}$, and $\overline{EF} \perp \overline{FH}$.



If $m\angle E = 62°$ and $m\angle C = 51°$, what is $m\angle FHB$?
1) 79º
2) 76º
3) 73º
4) 62º

568 On the set of axes below, $\triangle LET$ and $\triangle L''E''T''$ are graphed in the coordinate plane where $\triangle LET \cong \triangle L''E''T''$.

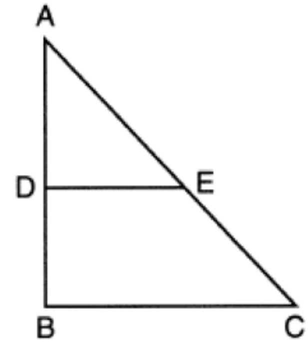


Which sequence of rigid motions maps $\triangle LET$ onto $\triangle L''E''T''$?
1) a reflection over the y-axis followed by a reflection over the x-axis
2) a rotation of 180° about the origin
3) a rotation of 90° counterclockwise about the origin followed by a reflection over the y-axis
4) a reflection over the x-axis followed by a rotation of 90° clockwise about the origin

569 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°

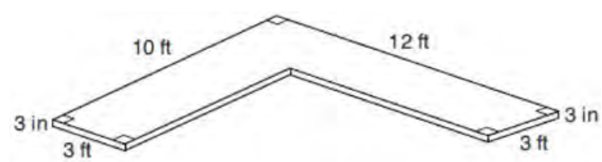
570 What is the volume of a hemisphere that has a diameter of 12.6 cm, to the *nearest tenth of a cubic centimeter*?
1) 523.7
2) 1047.4
3) 4189.6
4) 8379.2

571 In triangle ABC below, D is a point on $\overline{AB}$ and E is a point on $\overline{AC}$, such that $\overline{DE} \parallel \overline{BC}$.



Which statement is always true?
1) $\angle ADE$ and $\angle ABC$ are right angles.
2) $\triangle ADE \sim \triangle ABC$
3) $DE = \frac{1}{2}BC$
4) $\overline{AD} \cong \overline{DB}$

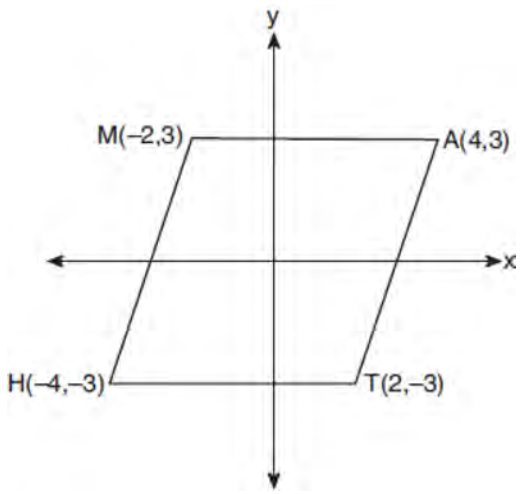
572 The diagram below models a countertop designed for a kitchen. The countertop is made of solid oak and is 3 inches thick.



If oak weighs approximately 44 pounds per cubic foot, the approximate weight, in pounds, of the countertop is
1) 630
2) 730
3) 750
4) 870

573 The area of triangle ABC is 42. If $AB = 8$ and $m\angle B = 61$, the length of $\overline{BC}$ is approximately
1) 5.1
2) 9.2
3) 12.0
4) 21.7

574 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

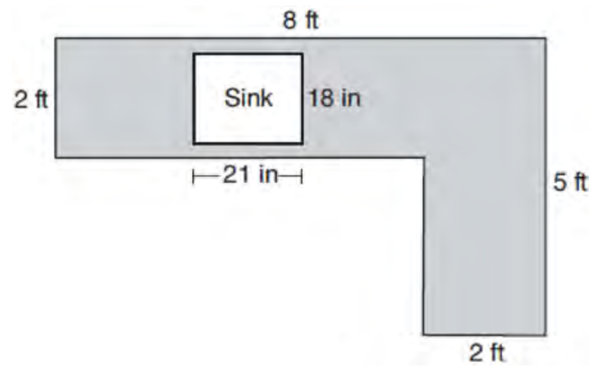
575 What is an equation of a line that is perpendicular to the line whose equation is $2y + 3x = 1$?

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

576 If one exterior angle of a triangle is acute, then the triangle must be
1) right
2) acute
3) obtuse
4) equiangular

577 If two sides of a triangle have lengths of 2 and 7, the length of the third side could be
1) 9
2) 8
3) 5
4) 4

578 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.

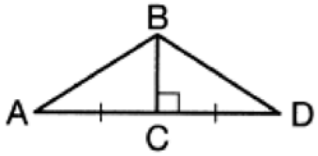


What is the area of the top of the installed countertop, to the *nearest square foot*?
1) 26
2) 23
3) 22
4) 19

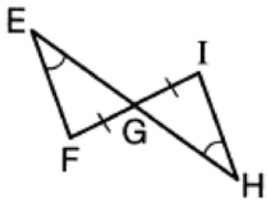
579 In rhombus *VENU*, diagonals $\overline{VN}$ and $\overline{EU}$ intersect at *S*. If $VN = 12$ and $EU = 16$, what is the perimeter of the rhombus?
1) 80
2) 40
3) 20
4) 10

580 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

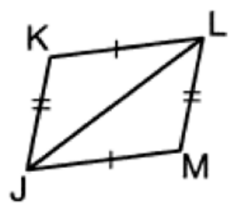
581 Given the information marked on the diagrams below, which pair of triangles can *not* always be proven congruent?



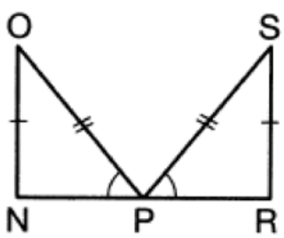
1) $\triangle ABC$ and $\triangle DBC$



2) $\triangle EFG$ and $\triangle HIG$

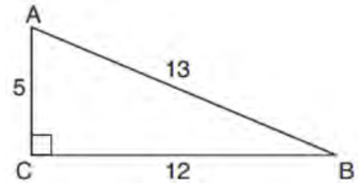


3) $\triangle KLJ$ and $\triangle MJL$



4) $\triangle NOP$ and $\triangle RSP$

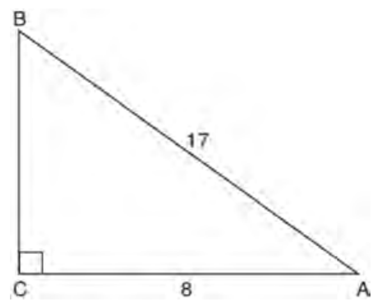
582 In $\triangle ABC$ below, angle C is a right angle.



Which statement must be true?

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

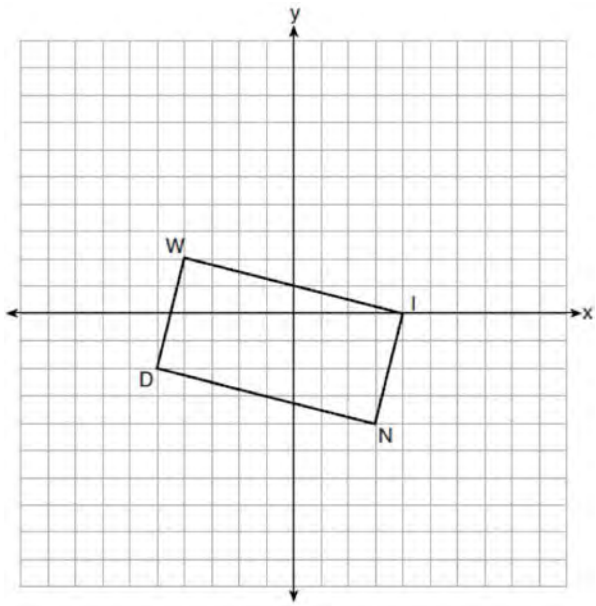
583 In the diagram below of right triangle ABC, $AC = 8$, and $AB = 17$.



Which equation would determine the value of angle A?

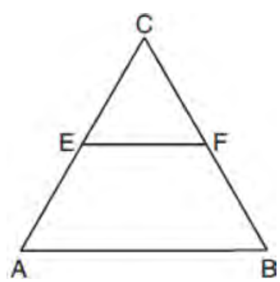
1) $\sin A = \dfrac{8}{17}$
2) $\tan A = \dfrac{8}{15}$
3) $\cos A = \dfrac{15}{17}$
4) $\tan A = \dfrac{15}{8}$

584 On the set of axes below, rectangle $WIND$ has vertices with coordinates $W(-4,2)$, $I(4,0)$, $N(3,-4)$, and $D(-5,-2)$.



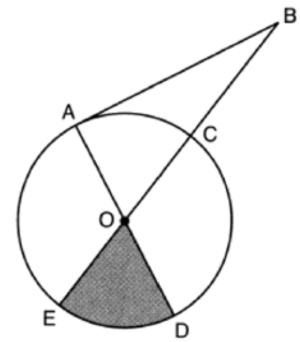
What is the area of rectangle $WIND$?
1) 17
2) 31
3) 32
4) 34

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



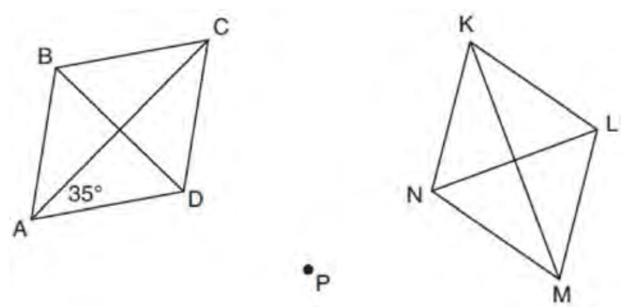
If $EF = 2x + 8$ and $AB = 7x - 2$, what is the perimeter of trapezoid $ABFE$?
1) 36
2) 60
3) 100
4) 120

586 In the diagram below of circle O, tangent $\overline{AB}$ is drawn from external point B, and secant $\overline{BCOE}$ and diameter $\overline{AOD}$ are drawn.



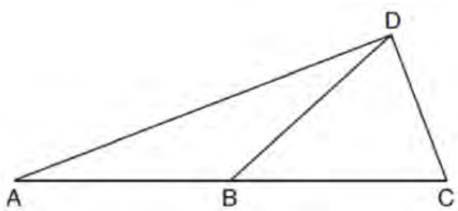
If $m\angle OBA = 36°$ and $OC = 10$, what is the area of shaded sector DOE?
1) $\dfrac{3\pi}{10}$
2) 3π
3) 10π
4) 15π

587 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°

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



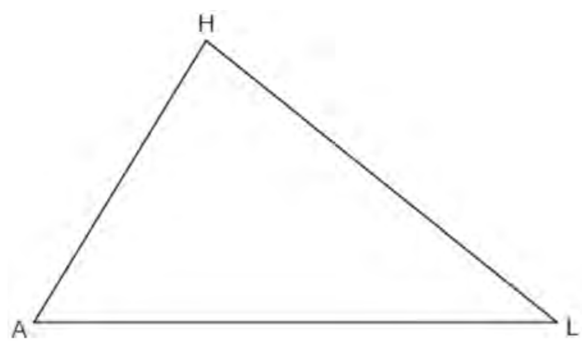
If $m\angle DAB = 32°$, what is $m\angle BDC$?
1) 32º
2) 52º
3) 58º
4) 64º

Geometry 2 Point Regents Exam Questions

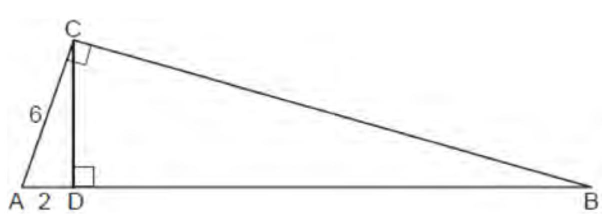
589 A large water basin is in the shape of a right cylinder. The inside of the basin has a diameter of $8\frac{1}{4}$ feet and a height of 3 feet. Determine and state, to the *nearest cubic foot*, the number of cubic feet of water that it will take to fill the basin to a level of $\frac{1}{2}$ foot from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

590 In $\triangle ABC$, $AB = 5$, $AC = 12$, and $m\angle A = 90°$. In $\triangle DEF$, $m\angle D = 90°$, $DF = 12$, and $EF = 13$. Brett claims $\triangle ABC \cong \triangle DEF$ and $\triangle ABC \sim \triangle DEF$. Is Brett correct? Explain why.

591 Using a compass and straightedge, construct a midsegment of $\triangle AHL$ below. [Leave all construction marks.]



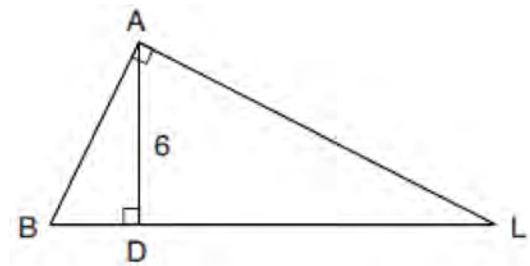
592 In the diagram below of right triangle ACB, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$, $AD = 2$ and $AC = 6$.



Determine and state the length of $\overline{AB}$.

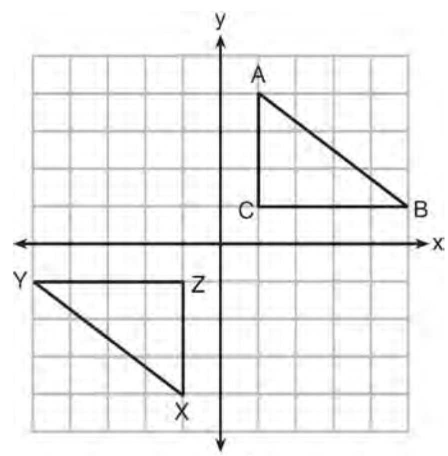
593 After a reflection over a line, $\triangle A'B'C'$ is the image of $\triangle ABC$. Explain why triangle ABC is congruent to triangle $\triangle A'B'C'$.

594 In the diagram below of right triangle BAL, altitude $\overline{AD}$ is drawn to hypotenuse $\overline{BDL}$. The length of $\overline{AD}$ is 6.



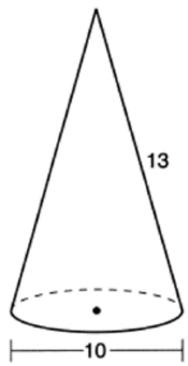
If the length of $\overline{DL}$ is four times the length of $\overline{BD}$, determine and state the length of $\overline{BD}$.

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



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

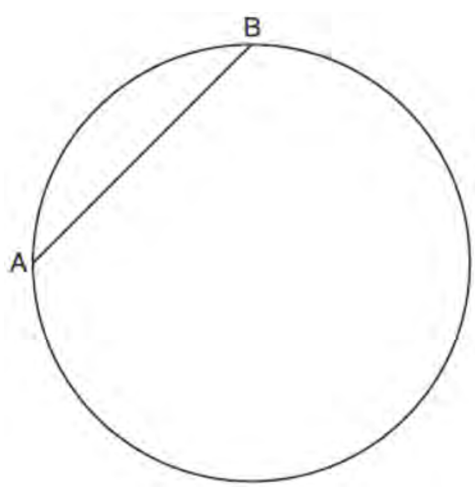
596 In the diagram below, a right circular cone has a diameter of 10 and a slant height of 13.



Determine and state the volume of the cone, in terms of π.

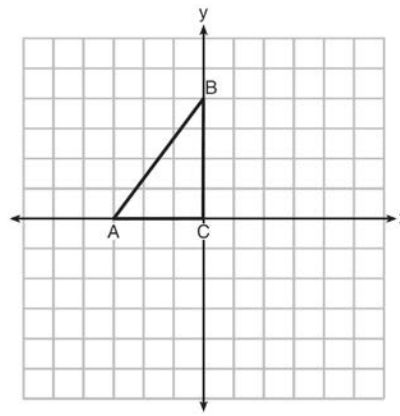
597 Point P is on segment AB such that $AP:PB$ is $4:5$. If A has coordinates $(4,2)$, and B has coordinates $(22,2)$, determine and state the coordinates of P.

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

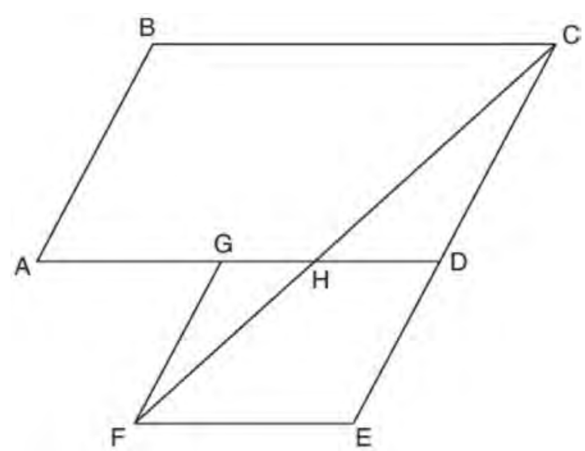


599 A large snowman is made of three spherical snowballs with radii of 1 foot, 2 feet, and 3 feet, respectively. Determine and state the amount of snow, in cubic feet, that is used to make the snowman. [Leave your answer in terms of π.]

600 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 $x = 1$.

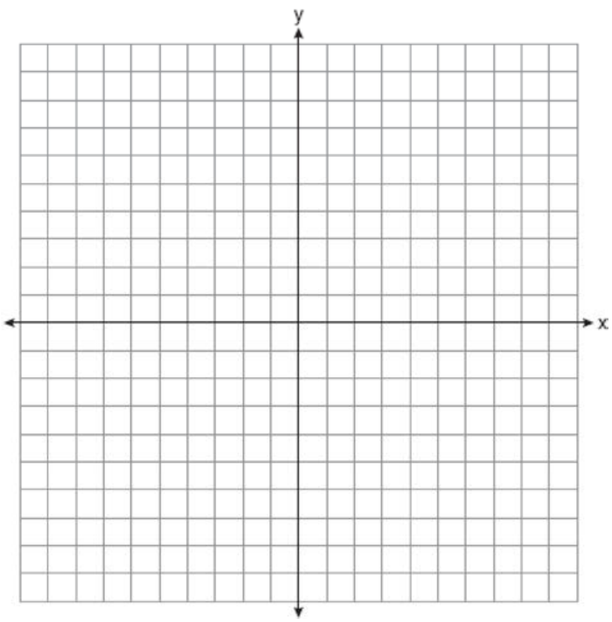


601 Parallelogram $ABCD$ is adjacent to rhombus $DEFG$, as shown below, and $\overline{FC}$ intersects $\overline{AGD}$ at H.

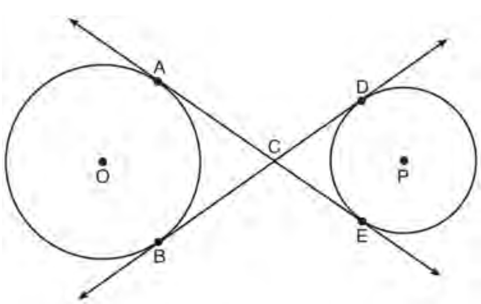


If $m\angle B = 118°$ and $m\angle AHC = 138°$, determine and state $m\angle GFH$.

602 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.



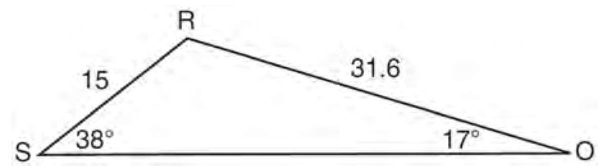
603 Lines AE and BD are tangent to circles O and P at A, E, B, and D, as shown in the diagram below. If $AC:CE = 5:3$, and $BD = 56$, determine and state the length of $\overline{CD}$.



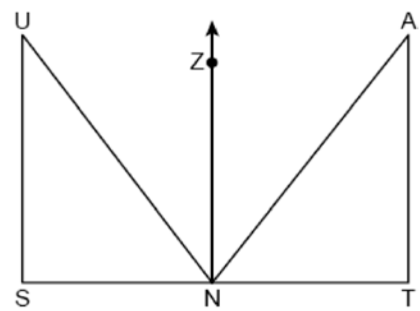
604 Two sides of a triangular-shaped pool measure 16 feet and 21 feet, and the included angle measures 58°. What is the area, to the *nearest tenth of a square foot*, of a nylon cover that would exactly cover the surface of the pool?

605 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*?

606 Determine the area, to the *nearest integer*, of $\triangle SRO$ shown below.

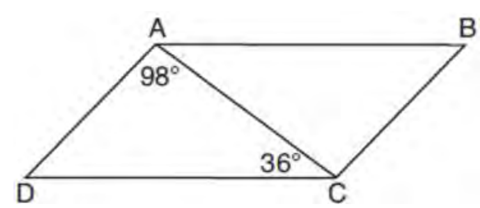


607 In the diagram below, $\triangle TAN$ is the image of $\triangle SUN$ after a reflection over $\overleftrightarrow{NZ}$.



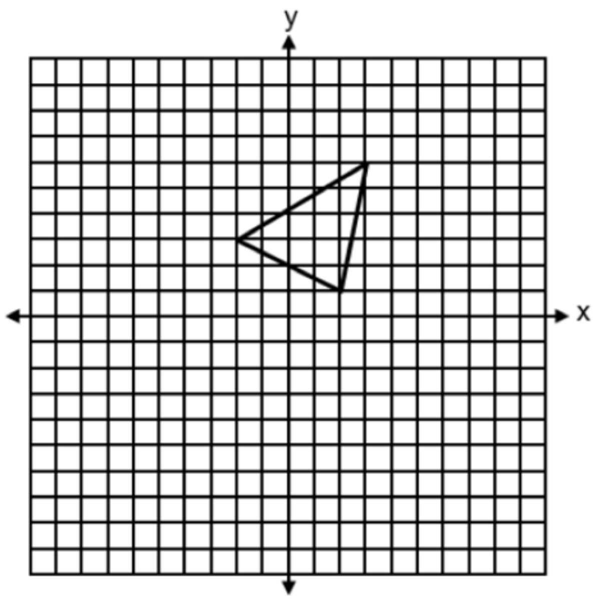
Use the properties of rigid motions to explain why $\triangle TAN \cong \triangle SUN$.

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

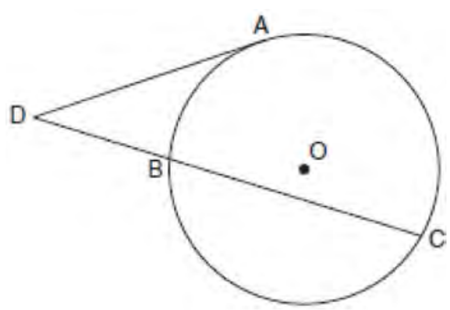


What is the measure of angle B? Explain why.

609 A triangle with vertices at $(-2,3)$, $(3,6)$, and $(2,1)$, is graphed on the set of axes below. A horizontal stretch of scale factor 2 with respect to $x = 0$, is represented by $(x,y) \rightarrow (2x,y)$. Graph the image of this triangle, after the horizontal stretch on the same set of axes.

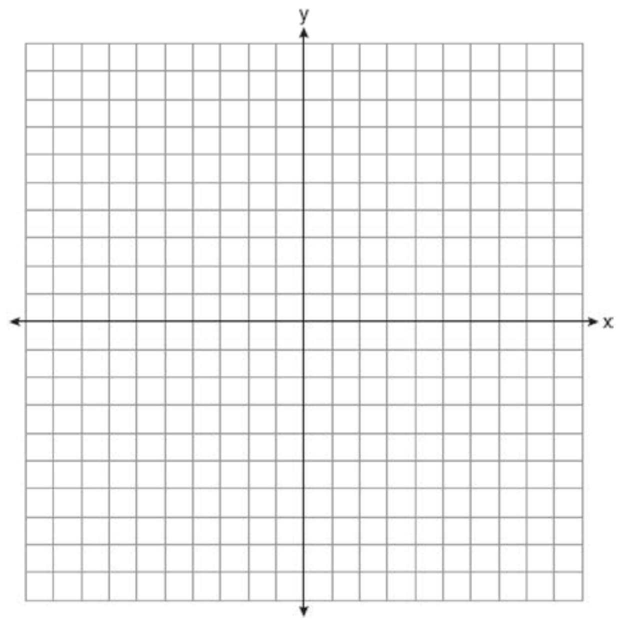


610 In the diagram below, tangent $\overline{DA}$ and secant $\overline{DBC}$ are drawn to circle O from external point D, such that $\overset{\frown}{AC} \cong \overset{\frown}{BC}$.

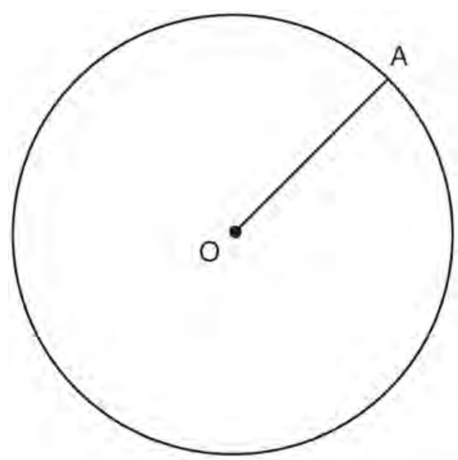


If $m\overset{\frown}{BC} = 152°$, determine and state $m\angle D$.

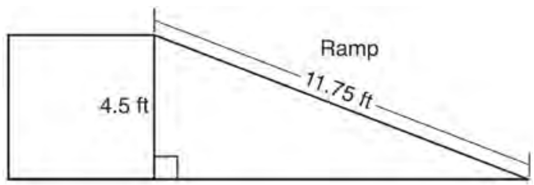
611 In square $GEOM$, the coordinates of G are $(2,-2)$ and the coordinates of O are $(-4,2)$. Determine and state the coordinates of vertices E and M. [The use of the set of axes below is optional.]



612 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.]

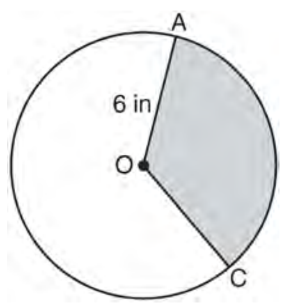


613 The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.

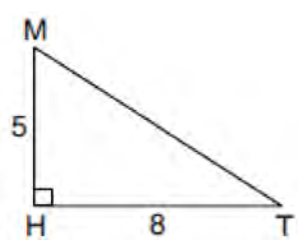


Determine and state, to the *nearest degree*, the angle of elevation formed by the ramp and the ground.

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

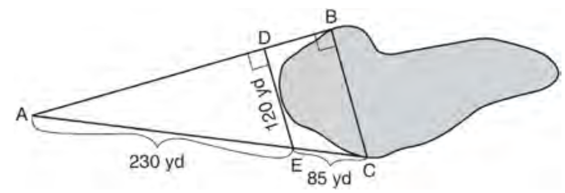


615 In right triangle MTH shown below, $m\angle H = 90°$, $HT = 8$, and $HM = 5$.



Determine and state, to the *nearest tenth*, the volume of the three-dimensional solid formed by rotating $\triangle MTH$ continuously around $\overline{MH}$.

616 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*.

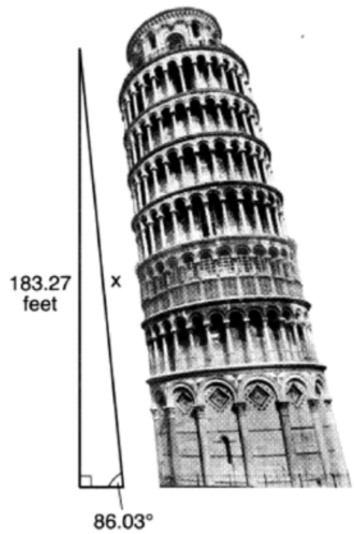
617 A rectangular tabletop will be made of maple wood that weighs 43 pounds per cubic foot. The tabletop will have a length of eight feet, a width of three feet, and a thickness of one inch. Determine and state the weight of the tabletop, in pounds.

618 Izzy is making homemade clay pendants in the shape of a solid hemisphere, as modeled below. Each pendant has a radius of 2.8 cm.

How much clay, to the *nearest cubic centimeter*, does Izzy need to make 100 pendants?

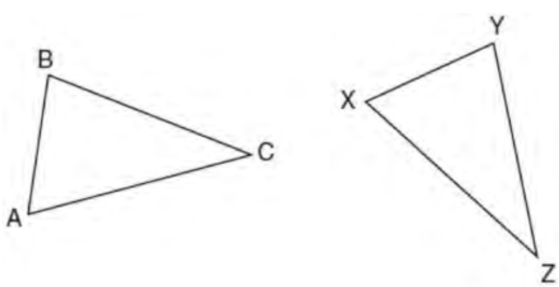
619 A flagpole casts a shadow 16.60 meters long. Tim stands at a distance of 12.45 meters from the base of the flagpole, such that the end of Tim's shadow meets the end of the flagpole's shadow. If Tim is 1.65 meters tall, determine and state the height of the flagpole to the *nearest tenth of a meter*.

620 The Leaning Tower of Pisa in Italy is known for its slant, which occurred after its construction began. The angle of the slant is 86.03° from the ground. The low side of the tower reaches a height of 183.27 feet from the ground.



Determine and state the slant height, x, of the low side of the tower, to the *nearest hundredth of a foot*.

621 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 $\overline{XZ}$.

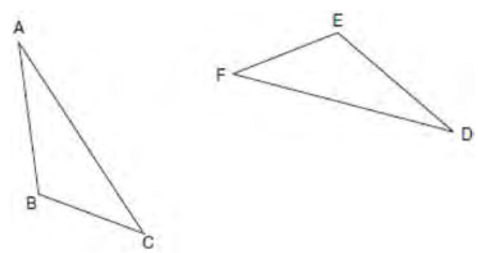


Determine and state whether $\overline{BC} \cong \overline{YZ}$. Explain why.

622 In isosceles triangle ABC shown below, $\overline{AB} \cong \overline{AC}$, and altitude $\overline{AD}$ is drawn.

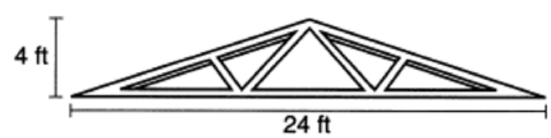
The length of $\overline{AD}$ is 12 cm and the length of $\overline{BC}$ is 10 cm. Determine and state, to the *nearest cubic centimeter*, the volume of the solid formed by continuously rotating $\triangle ABC$ about $\overline{AD}$.

623 Triangle ABC and triangle DEF are drawn below.



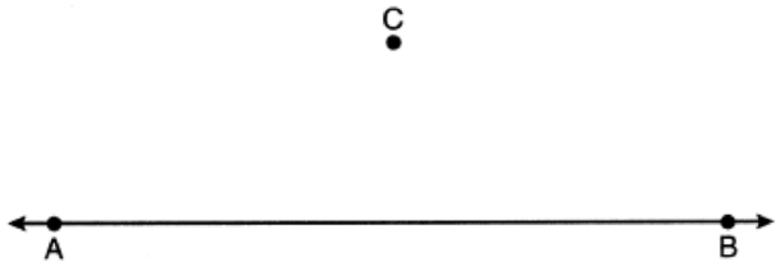
If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle ABC onto triangle DEF.

624 As shown in the diagram below, a symmetrical roof frame rises 4 feet above a house and has a width of 24 feet.

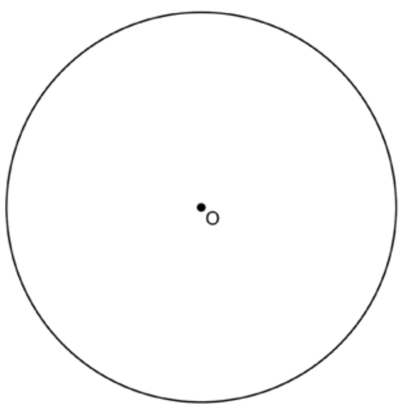


Determine and state, to the *nearest degree*, the angle of elevation of the roof frame.

625 Use a compass and straightedge to construct a line parallel to $\overleftrightarrow{AB}$ through point *C*, shown below. [Leave all construction marks.]



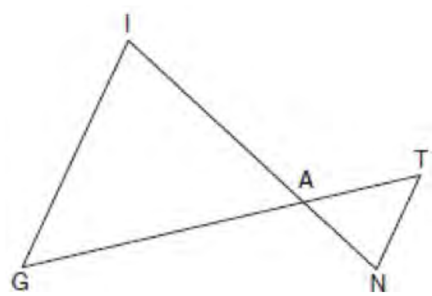
626 Using a compass and straightedge, construct a regular hexagon inscribed in circle *O*. [Leave all construction marks.]



627 Pure silver has a density of 10.5 g/cm^3. Samantha has a pure silver charm on her necklace in the shape of a sphere. The radius of the charm is 0.5 cm. Determine and state the mass of the charm, to the *nearest tenth of a gram*.

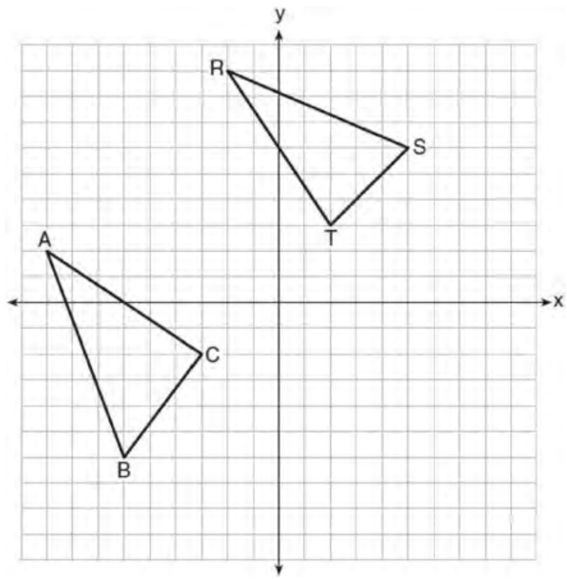
628 Randy's basketball is in the shape of a sphere with a maximum circumference of 29.5 inches. Determine and state the volume of the basketball, to the *nearest cubic inch*.

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



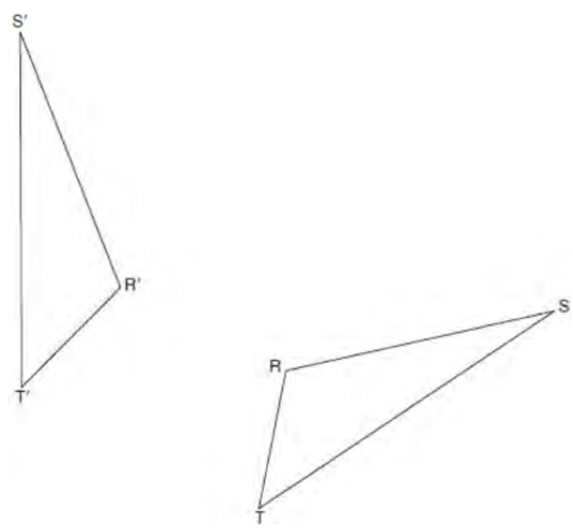
Prove: $\triangle GIA \sim \triangle TNA$

630 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 $T(2,3)$.

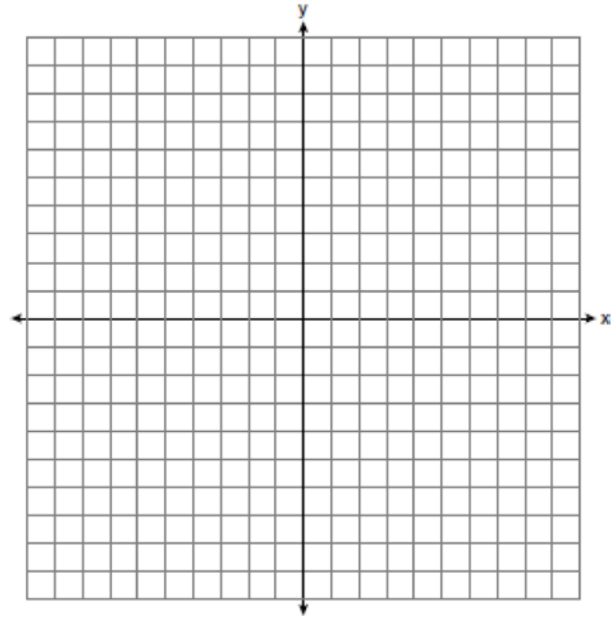


Is $\triangle ABC$ congruent to $\triangle RST$? Use the properties of rigid motions to explain your reasoning.

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

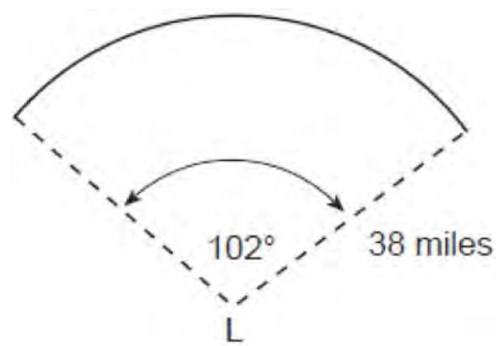


632 The vertices of $\triangle ABC$ have coordinates $A(-2,-1)$, $B(10,-1)$, and $C(4,4)$. Determine and state the area of $\triangle ABC$. [The use of the set of axes below is optional.]



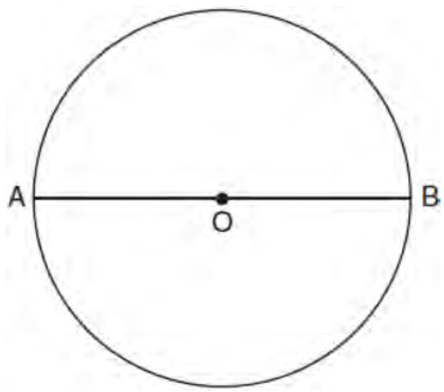
633 Determine and state the coordinates of the center and the length of the radius of the circle whose equation is $x^2 + y^2 + 6x = 6y + 63$.

634 The diagram below models the projection of light from a lighthouse, *L*. The sector has a radius of 38 miles and spans 102°.

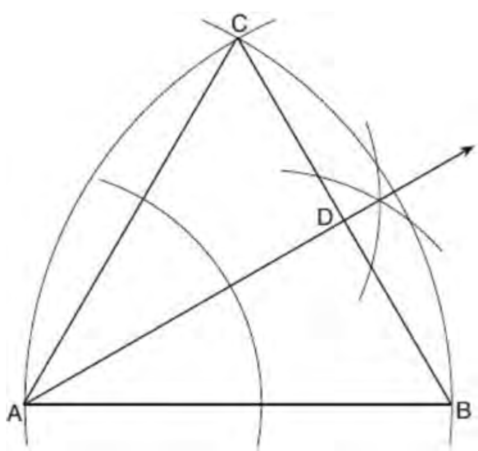


Determine and state the area of the sector, to the *nearest square mile*.

635 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.]



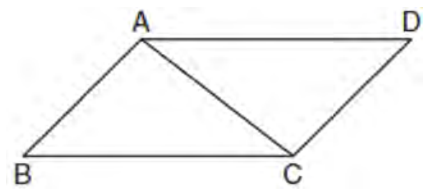
636 Using the construction below, state the degree measure of $\angle CAD$. Explain why.



637 A landscape architect is designing a triangular garden to fit in the corner of a lot. The corner of the lot forms an angle of 70°, and the sides of the garden including this angle are to be 11 feet and 13 feet, respectively. Find, to the *nearest integer*, the number of square feet in the area of the garden.

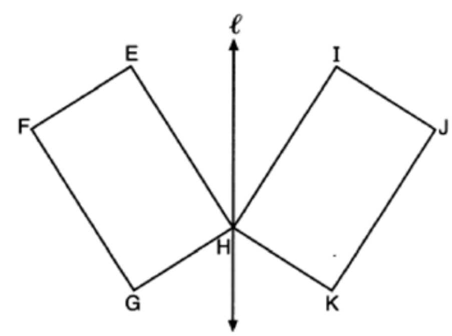
638 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in^3. After being fully inflated, its volume is approximately 294 in^3. To the *nearest tenth of an inch*, how much does the radius increase when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

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



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

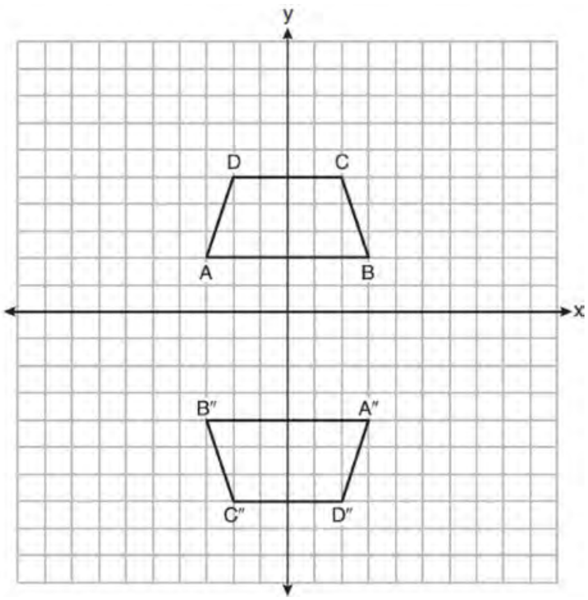
640 In the diagram below, parallelogram $EFGH$ is mapped onto parallelogram $IJKH$ after a reflection over line ℓ.



Use the properties of rigid motions to explain why parallelogram $EFGH$ is congruent to parallelogram $IJKH$.

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

642 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 $A''B''C''D''$.

643 A flagpole casts a shadow on the ground 91 feet long, with a 53° angle of elevation from the end of the shadow to the top of the flagpole. Determine and state, to the *nearest tenth of a foot*, the height of the flagpole.

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

645 Determine and state the coordinates of the center and the length of the radius of the circle represented by the equation $x^2 + 16x + y^2 + 12y - 44 = 0$.

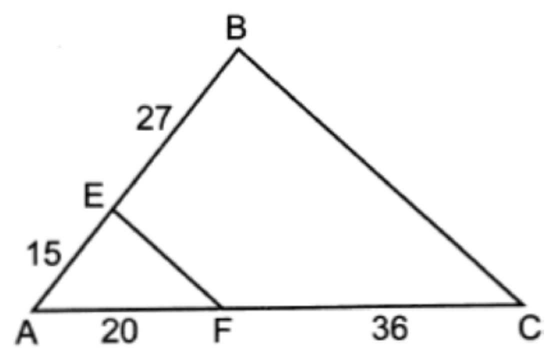
646 The endpoints of $\overline{DEF}$ are $D(1,4)$ and $F(16,14)$. Determine and state the coordinates of point E, if $DE:EF = 2:3$.

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

648 Line AB is dilated by a scale factor of 2 centered at point A.

Evan thinks that the dilation of $\overleftrightarrow{AB}$ will result in a line parallel to $\overleftrightarrow{AB}$, not passing through points A or B. Nathan thinks that the dilation of $\overleftrightarrow{AB}$ will result in the same line, $\overleftrightarrow{AB}$. Who is correct? Explain why.

649 In the diagram below, $AE = 15$, $EB = 27$, $AF = 20$, and $FC = 36$.

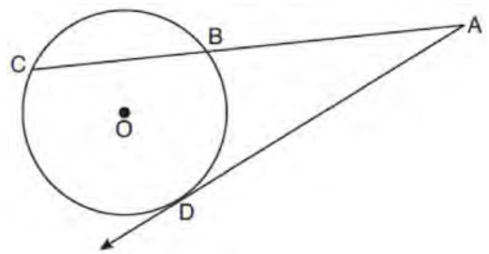


Explain why $\overline{EF} \parallel \overline{BC}$.

650 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*.

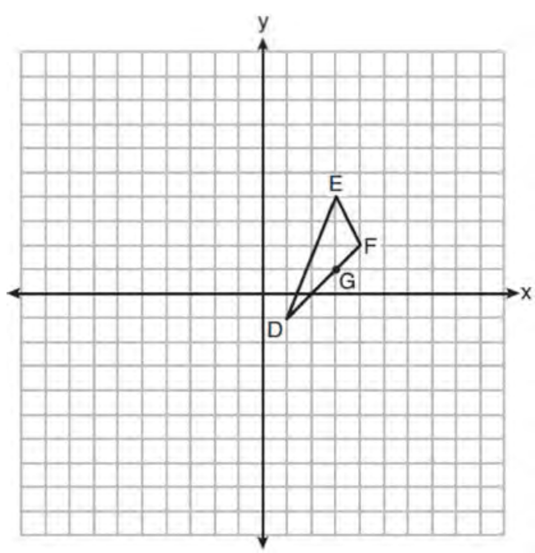
651 In right triangle ABC with the right angle at C, $\sin A = 2x + 0.1$ and $\cos B = 4x - 0.7$. Determine and state the value of x. Explain your answer.

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



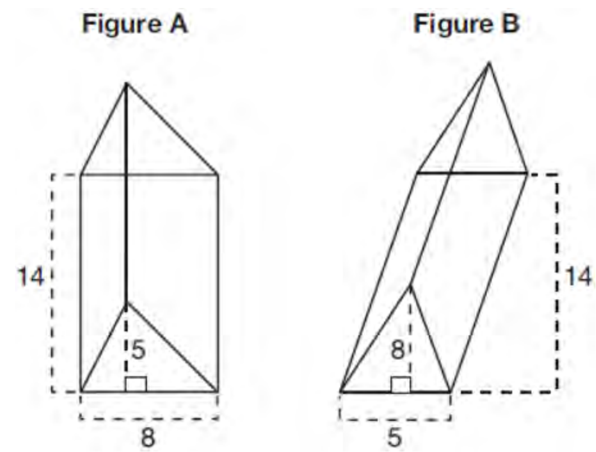
If $CA = 12.5$ and $CB = 4.5$, determine and state the length of $\overline{DA}$.

653 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.



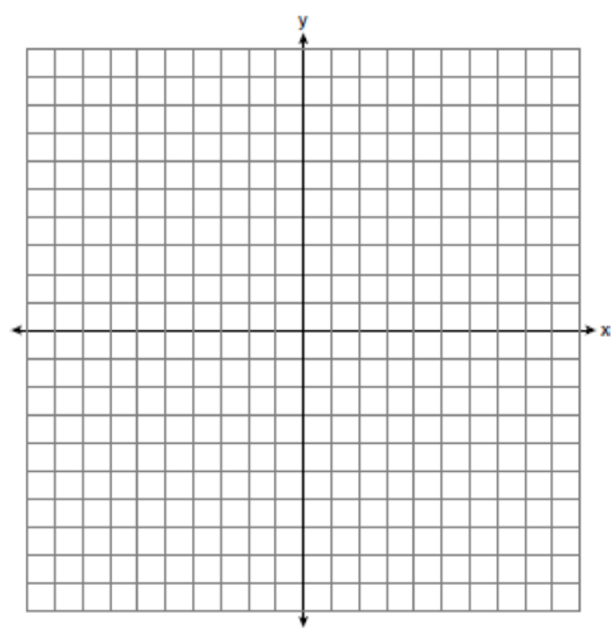
654 Bob places an 18-foot ladder 6 feet from the base of his house and leans it up against the side of his house. Find, to the *nearest degree*, the measure of the angle the bottom of the ladder makes with the ground.

655 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.

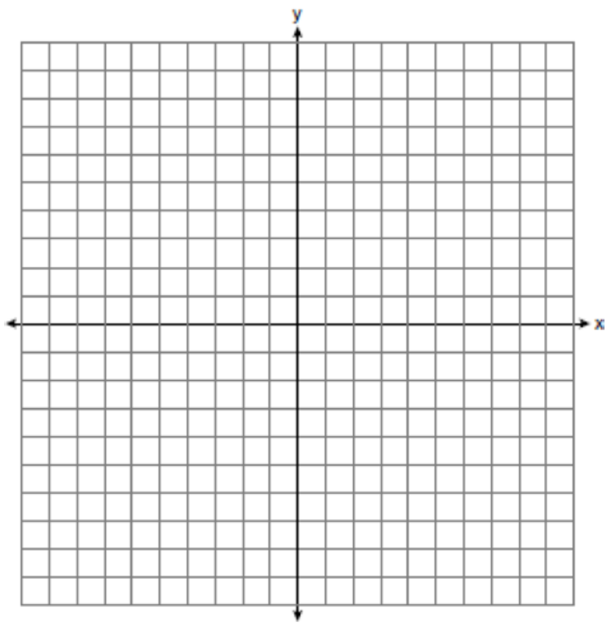


Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

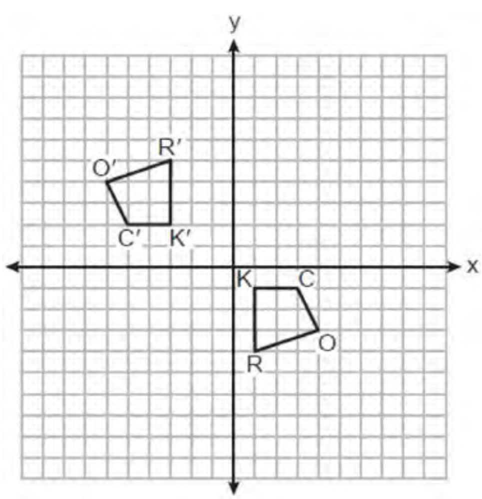
656 Determine and state the area of triangle PQR, whose vertices have coordinates $P(-2,-5)$, $Q(3,5)$, and $R(6,1)$. [The use of the set of axes below is optional.]



657 Triangle RST has vertices with coordinates $R(-3,-2)$, $S(3,2)$ and $T(4,-4)$. Determine and state an equation of the line parallel to $\overline{RT}$ that passes through point S. [The use of the set of axes below is optional.]

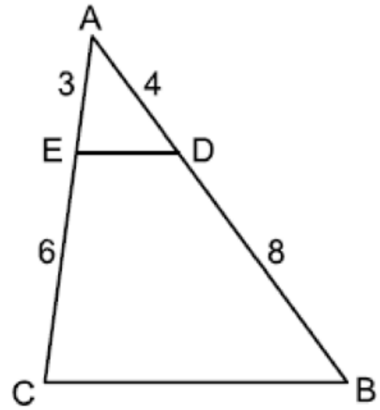


658 On the set of axes below, congruent quadrilaterals $ROCK$ and $R'O'C'K'$ are graphed.



Describe a sequence of transformations that would map quadrilateral $ROCK$ onto quadrilateral $R'O'C'K'$.

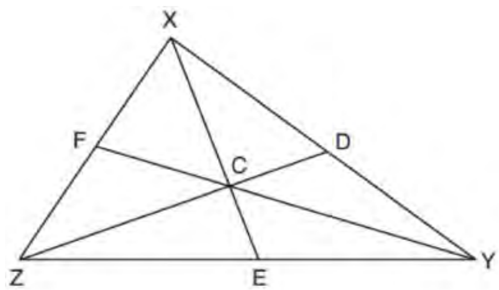
659 In $\triangle ABC$ below, $\overline{DE}$ is drawn such that $AD=4$, $DB=8$, $AE=3$, and $EC=6$.



Explain why $\triangle ADE \sim \triangle ABC$.

660 Segment CA is drawn below. Using a compass and straightedge, construct isosceles right triangle CAT where $\overline{CA} \perp \overline{CT}$ and $\overline{CA} \cong \overline{CT}$. [Leave all construction marks.]

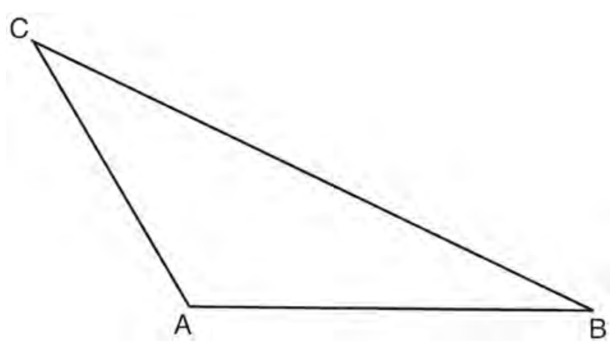
661 In $\triangle XYZ$, shown below, medians $\overline{XE}$, $\overline{YF}$, and $\overline{ZD}$ intersect at C.



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

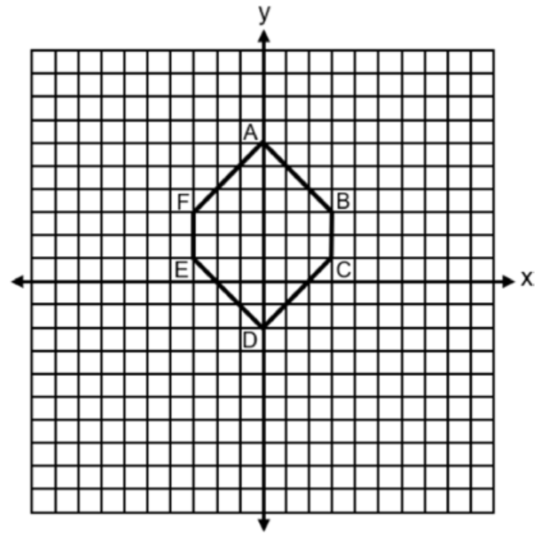
662 Triangle $A'B'C'$ is the image of triangle ABC after a dilation with a scale factor of $\frac{1}{2}$ and centered at point A. Is triangle ABC congruent to triangle $A'B'C'$? Explain your answer.

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



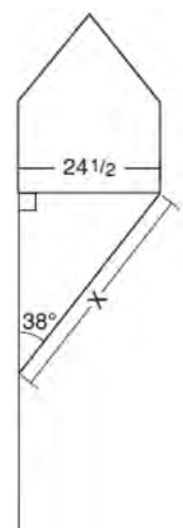
664 A contractor needs to purchase 500 bricks. The dimensions of each brick are 5.1 cm by 10.2 cm by 20.3 cm, and the density of each brick is $1920\ \text{kg}/\text{m}^3$. The maximum capacity of the contractor's trailer is 900 kg. Can the trailer hold the weight of 500 bricks? Justify your answer.

665 Hexagon $ABCDEF$ with coordinates at $A(0,6)$, $B(3,3)$, $C(3,1)$, $D(0,-2)$, $E(-3,1)$, and $F(-3,3)$ is graphed on the set of axes below.

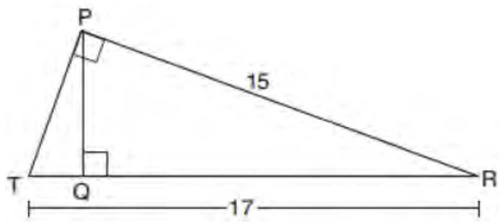


Determine and state the perimeter of $ABCDEF$ in simplest radical form.

666 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*.



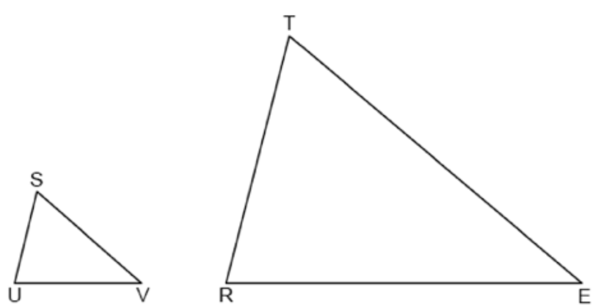
667 In right triangle PRT, $m\angle P = 90°$, altitude $\overline{PQ}$ is drawn to hypotenuse $\overline{RT}$, $RT = 17$, and $PR = 15$.



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

668 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.

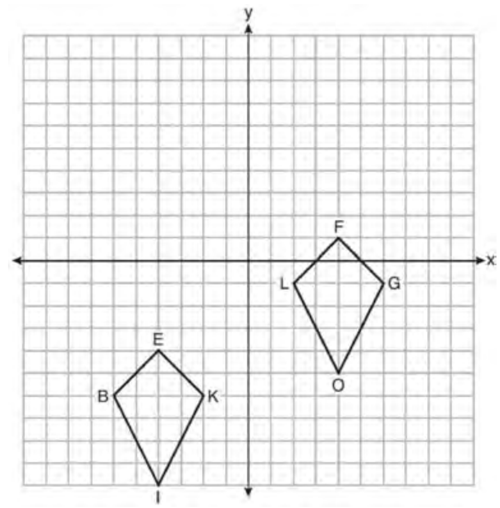
669 In the diagram below, $\triangle SUV \sim \triangle TRE$.



If $SU = 5$, $UV = 7$, $TR = 14$, and $TE = 21$, determine and state the length of $\overline{SV}$.

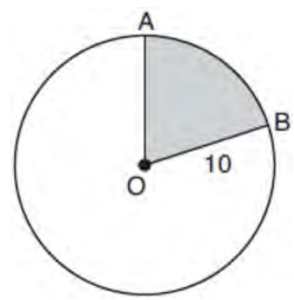
670 Determine and state an equation of the line perpendicular to the line $5x - 4y = 10$ and passing through the point $(5, 12)$.

671 Quadrilaterals $BIKE$ and $GOLF$ are graphed on the set of axes below.



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

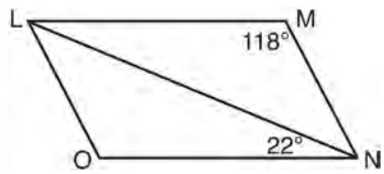
672 In the diagram below, circle O has a radius of 10.



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

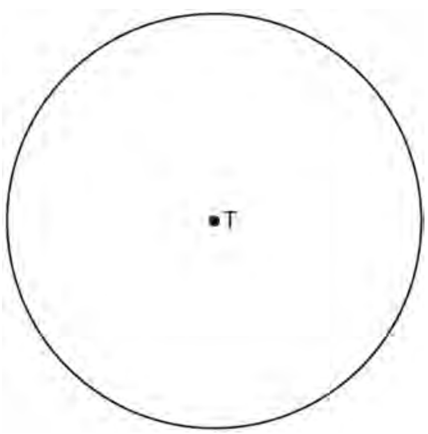
673 A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.

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

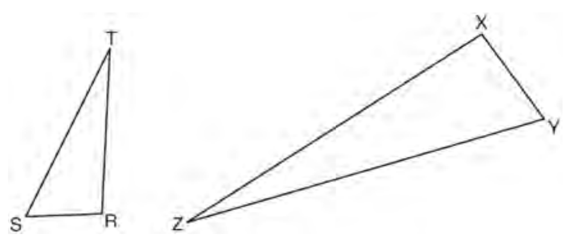


Explain why $m\angle NLO$ is 40 degrees.

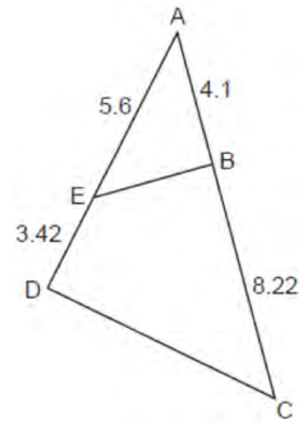
675 Use a compass and straightedge to construct an inscribed square in circle T shown below. [Leave all construction marks.]



676 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.

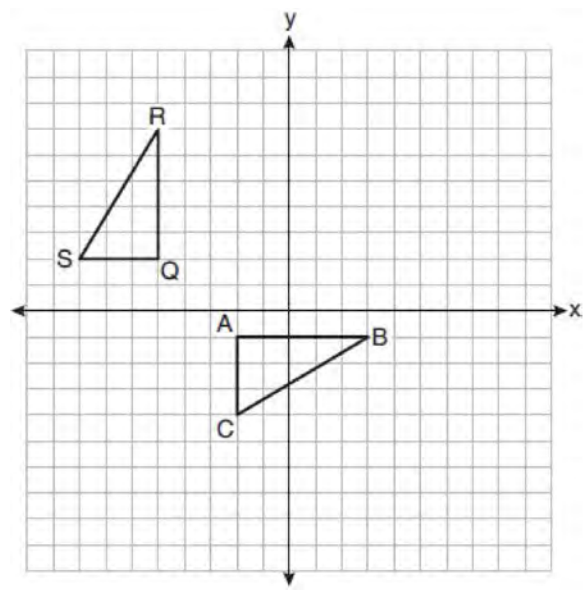


677 In $\triangle ADC$ below, $\overline{EB}$ is drawn such that $AB = 4.1$, $AE = 5.6$, $BC = 8.22$, and $ED = 3.42$.



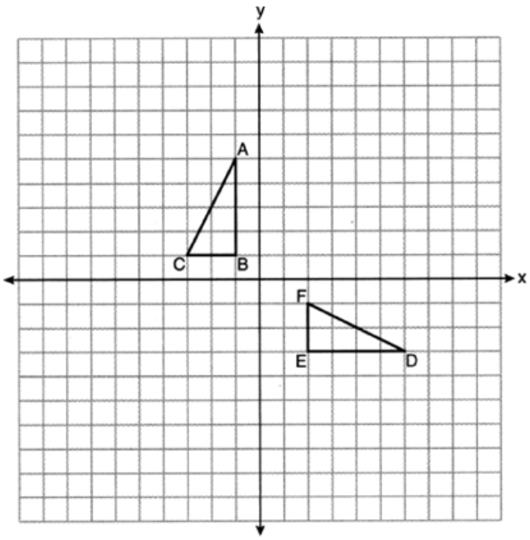
Is $\triangle ABE$ similar to $\triangle ADC$? Explain why.

678 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 $S(-8,2)$.



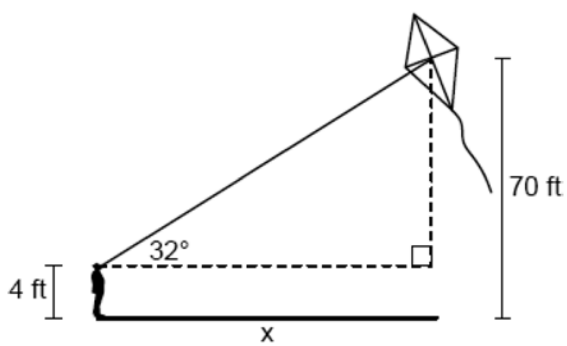
Describe a sequence of transformations that would map $\triangle ABC$ onto $\triangle QRS$.

679 On the set of axes below, $\triangle ABC$ and $\triangle DEF$ are graphed.



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

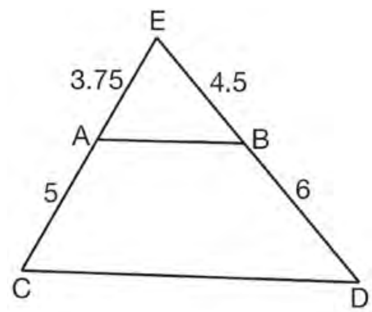
680 A person observes a kite at an angle of elevation of 32° from a line of sight that begins 4 feet above the ground, as modeled in the diagram below. At the moment of observation, the kite is 70 feet above the ground.



Determine and state the horizontal distance, x, between the person and the point on the ground directly below the kite, to the *nearest foot*.

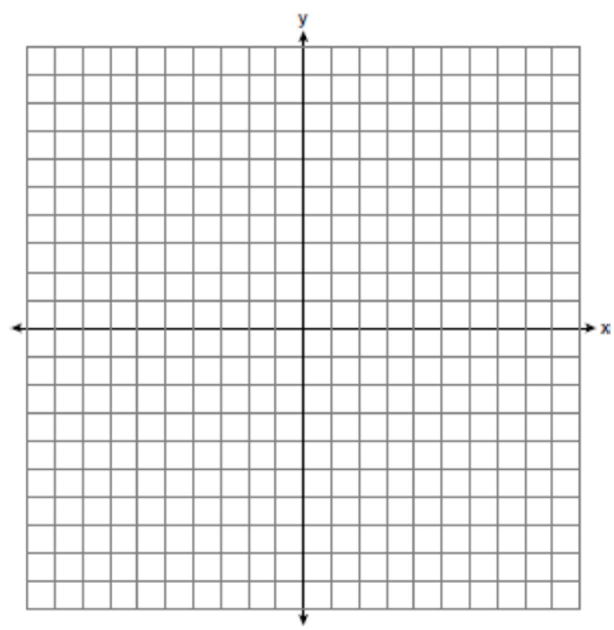
681 In a right triangle, $\sin(4x+3)° = \cos(2x-9)°$. Determine and state the value of x.

682 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 $BD = 6$.



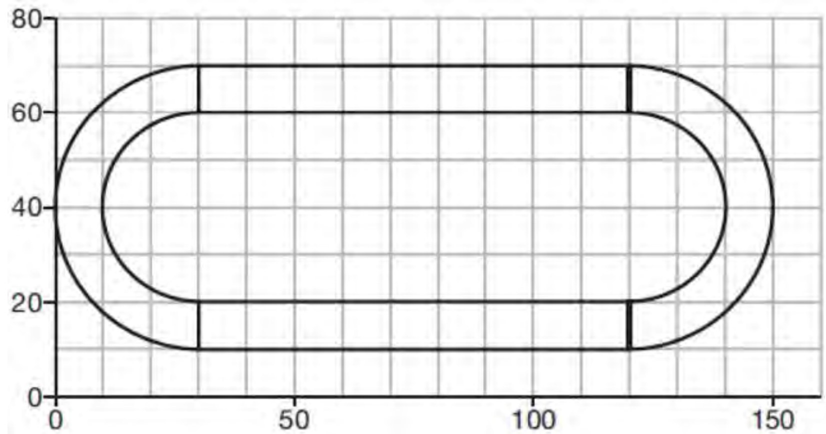
Explain why $\overline{AB}$ is parallel to $\overline{CD}$.

683 Line segment PQ has endpoints $P(-5,1)$ and $Q(5,6)$, and point R is on $\overline{PQ}$. Determine and state the coordinates of R, such that $PR:RQ = 2:3$. [The use of the set of axes below is optional.]

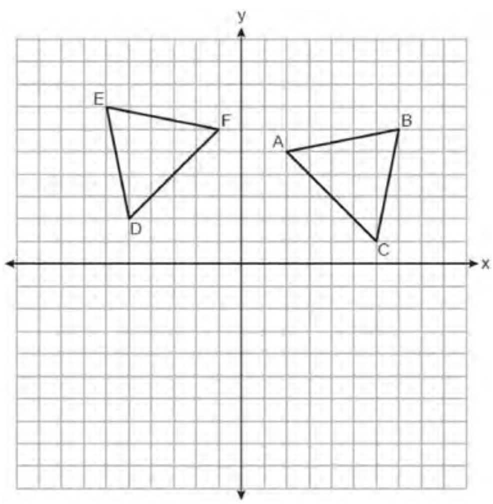


684 A ladder leans against a building. The top of the ladder touches the building 10 feet above the ground. The foot of the ladder is 4 feet from the building. Find, to the *nearest degree*, the angle that the ladder makes with the level ground.

685 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.



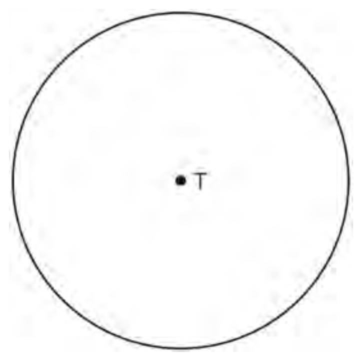
686 On the set of axes below, congruent triangles *ABC* and *DEF* are graphed.



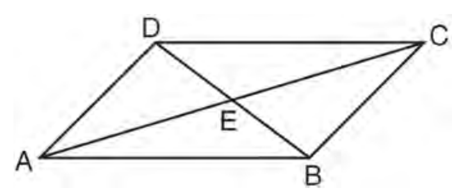
Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle DEF$.

687 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.

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

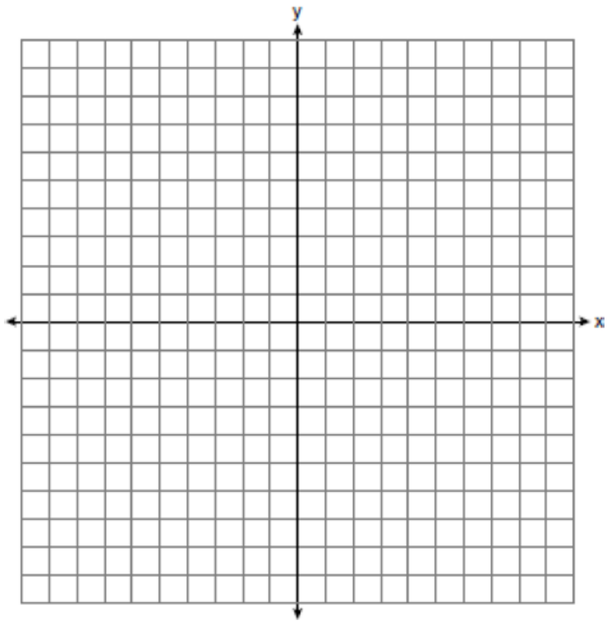


689 In parallelogram *ABCD* shown below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E*.

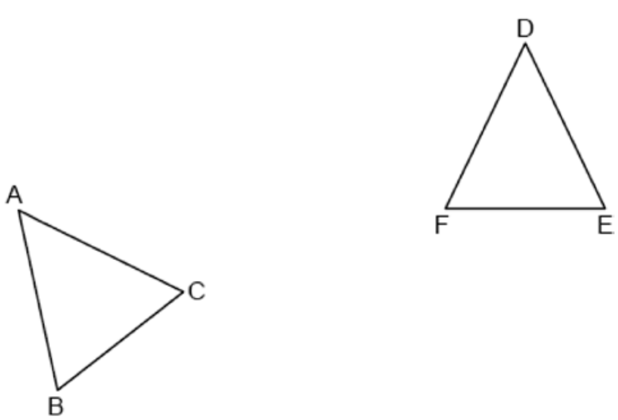


Prove: $\angle ACD \cong \angle CAB$

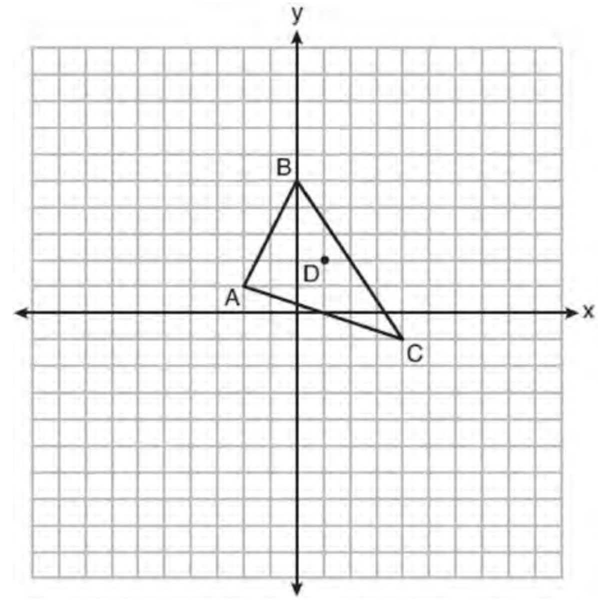
690 Directed line segment AB has endpoints whose coordinates are $A(-2,5)$ and $B(8,-1)$. Determine and state the coordinates of P, the point which divides the segment in the ratio 3:2. [The use of the set of axes below is optional.]



691 Using a compass and straightedge, construct the line of reflection that maps $\triangle ABC$ onto its image, $\triangle DEF$. [Leave all construction marks.]

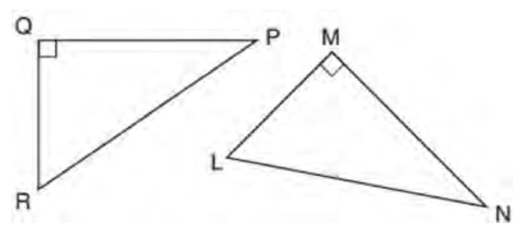


692 Triangle ABC and point $D(1,2)$ are graphed on the set of axes below.



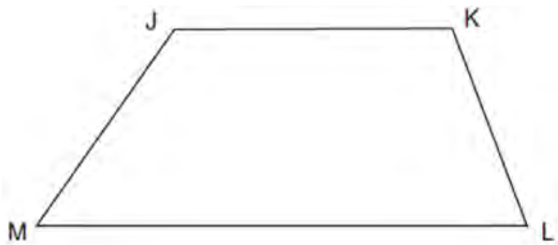
Graph and label $\triangle A'B'C'$, the image of $\triangle ABC$, after a dilation of scale factor 2 centered at point D.

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

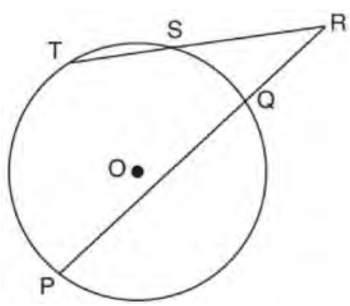


Write a set of three congruency statements that would show ASA congruency for these triangles.

694 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.]

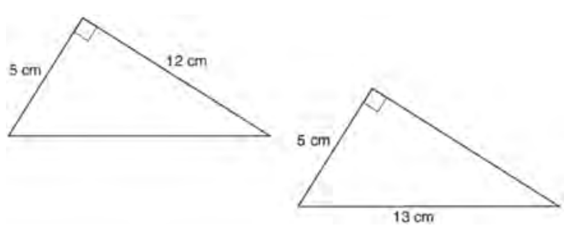


695 In the diagram below, secants $\overline{RST}$ and $\overline{RQP}$, drawn from point R, intersect circle O at S, T, Q, and P.



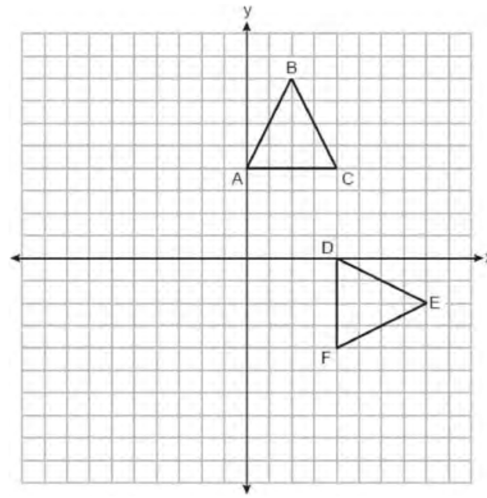
If $RS = 6$, $ST = 4$, and $RP = 15$, what is the length of $\overline{RQ}$?

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



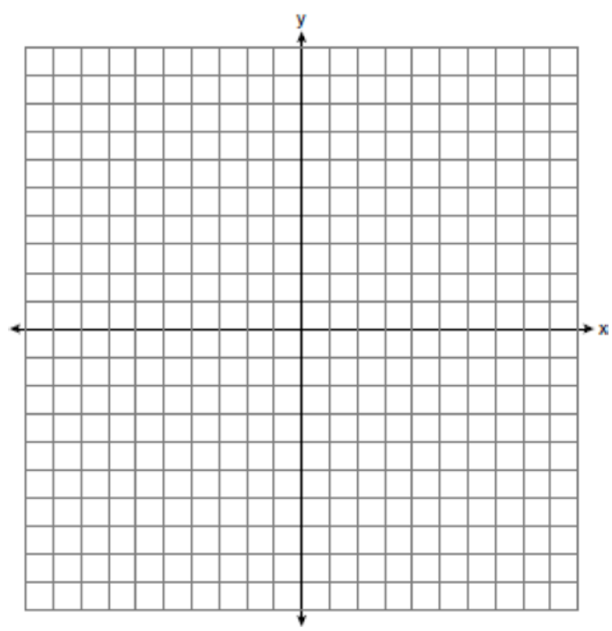
Are Skye and Margaret both correct? Explain why.

697 Triangles ABC and DEF are graphed on the set of axes below.

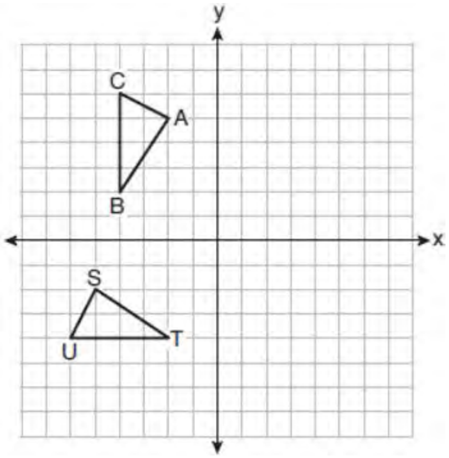


Describe a sequence of transformations that maps $\triangle ABC$ onto $\triangle DEF$.

698 Triangle MAX has vertices with coordinates $M(-5,-2)$, $A(1,4)$, and $X(4,1)$. Determine and state the area of $\triangle MAX$. [The use of the set of axes below is optional.]

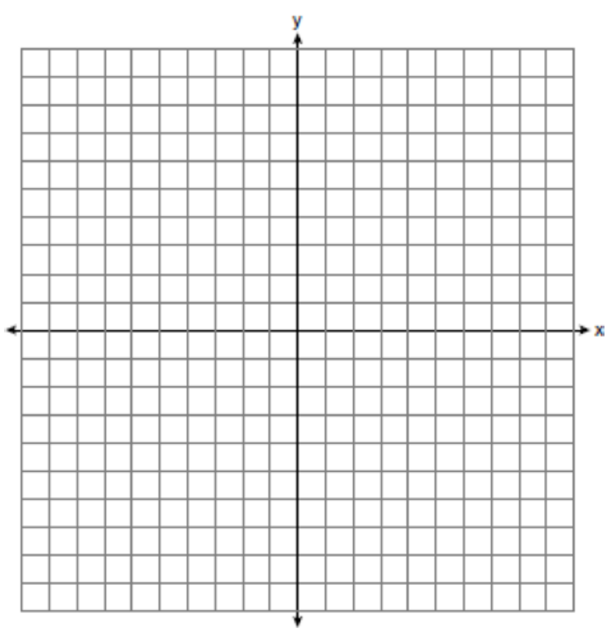


699 On the set of axes below, $\triangle ABC \cong \triangle STU$.



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

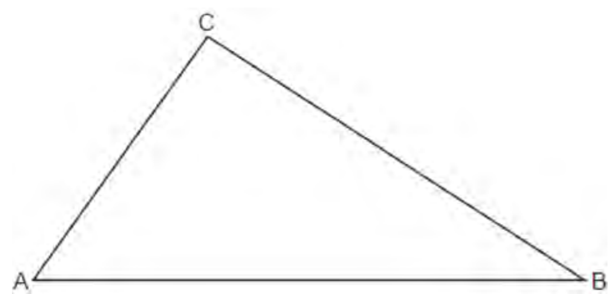
700 The coordinates of the endpoints of $\overline{AB}$ are $A(-6,-5)$ and $B(4,0)$. Point P is on $\overline{AB}$. Determine and state the coordinates of point P, such that $AP:PB$ is $2:3$. [The use of the set of axes below is optional.]



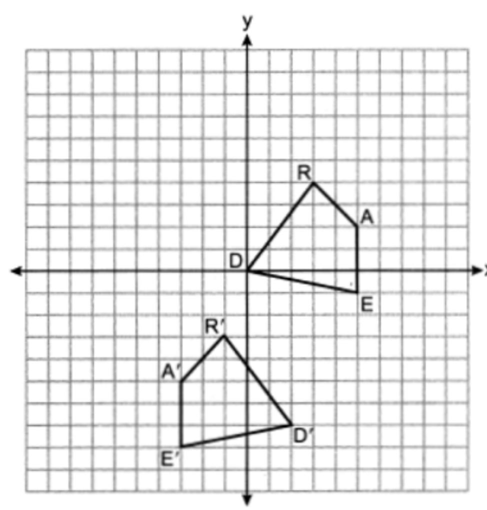
701 Find the value of R that will make the equation $\sin 73° = \cos R$ true when $0° < R < 90°$. Explain your answer.

702 In triangle CEM, $CE = 3x + 10$, $ME = 5x - 14$, and $CM = 2x - 6$. Determine and state the value of x that would make CEM an isosceles triangle with the vertex angle at E.

703 In $\triangle ABC$ below, use a compass and straightedge to construct the altitude from C to $\overline{AB}$. [Leave all construction marks.]

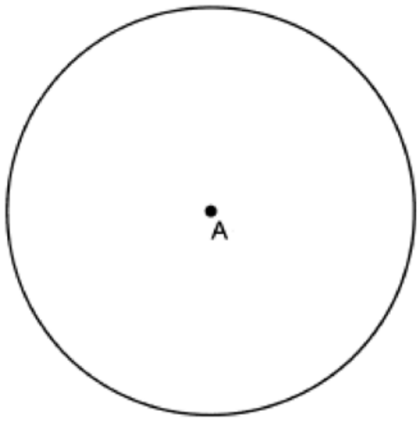


704 Quadrilateral $DEAR$ and its image, quadrilateral $D'E'A'R'$, are graphed on the set of axes below.

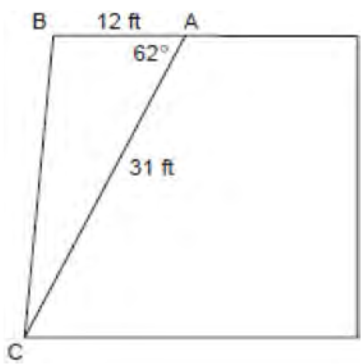


Describe a sequence of transformations that maps quadrilateral $DEAR$ onto quadrilateral $D'E'A'R'$.

705 Use a compass and straightedge to construct an equilateral triangle inscribed in circle A below. [Leave all construction marks.]

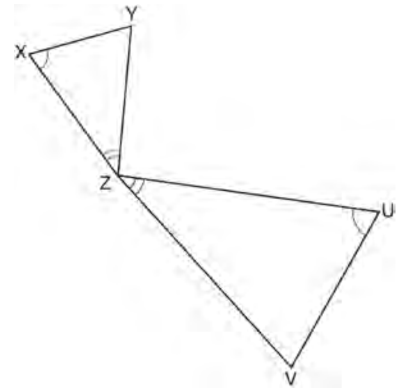


706 The accompanying diagram shows the floor plan for a kitchen. The owners plan to carpet all of the kitchen except the "work space," which is represented by scalene triangle ABC. Find the area of this work space to the *nearest tenth of a square foot.*



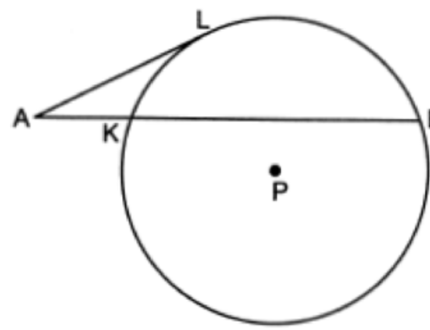
707 The equation of a circle is $x^2 + y^2 + 8x - 6y + 7 = 0$. Determine and state the coordinates of the, center and the length of the radius of the circle.

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



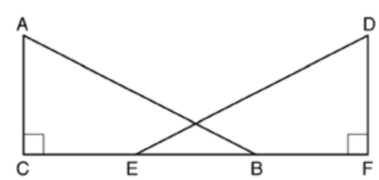
Describe a sequence of similarity transformations that shows $\triangle XYZ$ is similar to $\triangle UVZ$.

709 In circle P below, tangent $\overline{AL}$ and secant $\overline{AKE}$ are drawn.



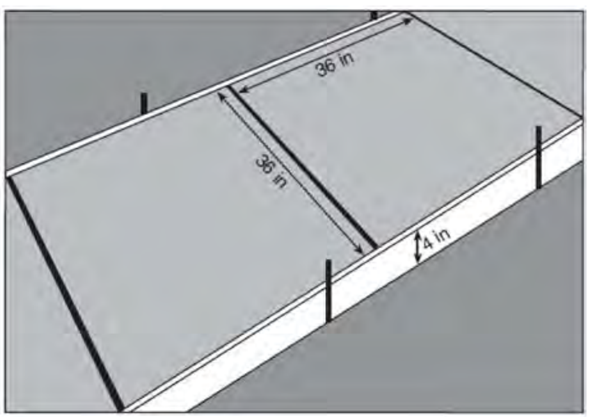
If $AK = 12$ and $KE = 36$, determine and state the length of $\overline{AL}$.

710 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 $\triangle ABC \cong \triangle DEF$.



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

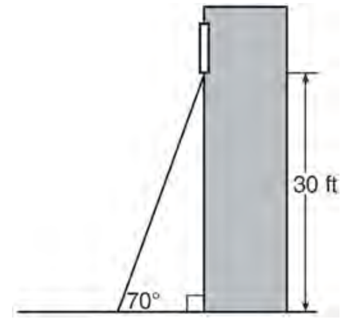
712 Ian needs to replace two concrete sections in his sidewalk, as modeled below. Each section is 36 inches by 36 inches and 4 inches deep. He can mix his own concrete for $3.25 per cubic foot.



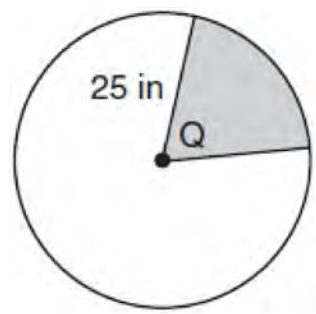
How much money will it cost Ian to replace the two concrete sections?

713 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.

714 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.



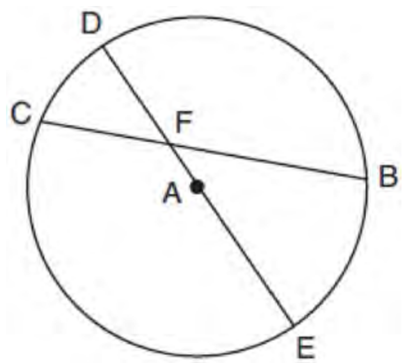
715 In the diagram below, the circle has a radius of 25 inches. The area of the *unshaded* sector is 500π in^2.



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

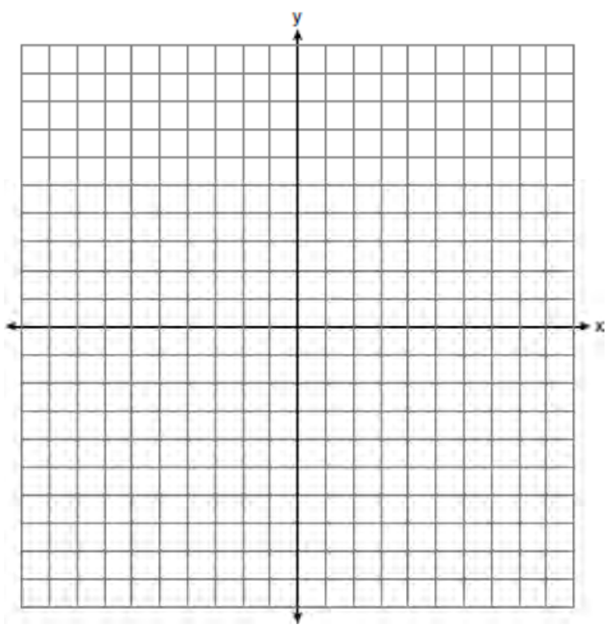
716 A pyramid with a square base is made of solid glass. The pyramid has a base with a side length of 5.7 cm and a height of 7 cm. The density of the glass is 2.4 grams per cubic centimeter. Determine and state, to the *nearest gram*, the mass of the pyramid.

717 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 $m\angle CFE$?

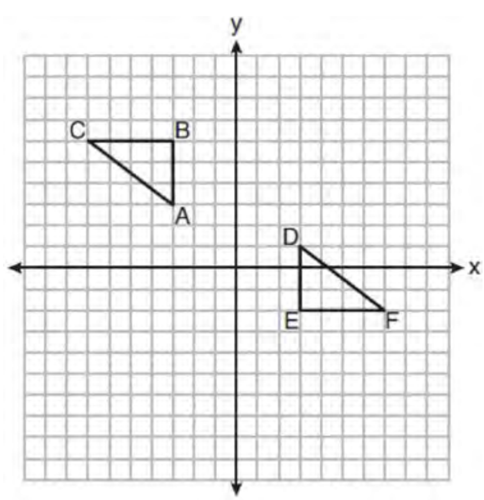
718 Directed line segment PT has endpoints whose coordinates are $P(-2,1)$ and $T(4,7)$. Determine the coordinates of point J that divides the segment in the ratio 2 to 1. [The use of the set of axes below is optional.]



719 Given $\overline{AB}$ below, use a compass and a straightedge to construct a segment that is $\frac{1}{4}AB$. [Leave all construction marks.]

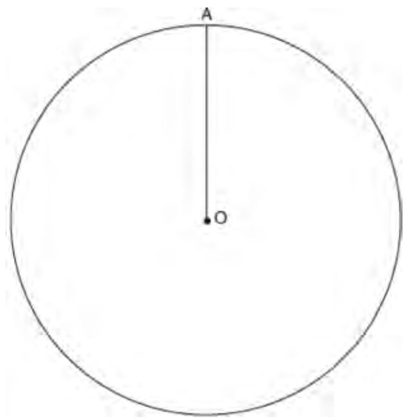
720 Given points A, B, and C, use a compass and straightedge to construct point D so that $ABCD$ is a parallelogram. [Leave all construction marks.]

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

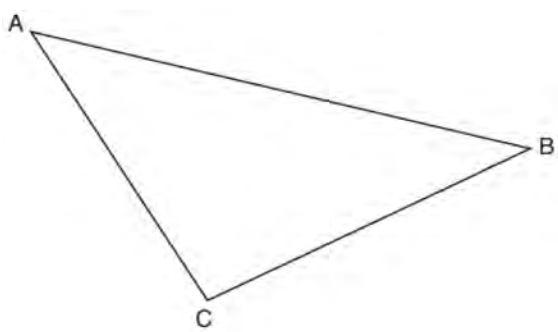


Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle DEF$.

722 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.]

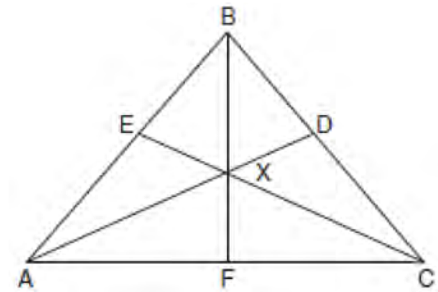


723 Using a compass and straightedge, construct the median to side $\overline{AC}$ in $\triangle ABC$ below. [Leave all construction marks.]



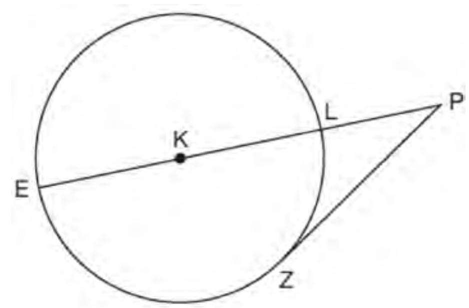
724 The volume of a triangular prism is 70 in^3. The base of the prism is a right triangle with one leg whose measure is 5 inches. If the height of the prism is 4 inches, determine and state the length, in inches, of the other leg of the triangle.

725 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.



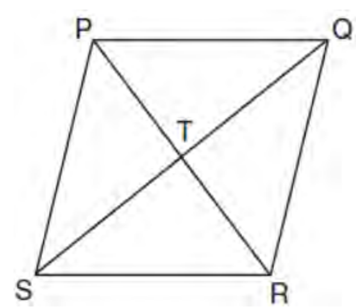
If $m\angle BAC = 50°$, find $m\angle AXC$.

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



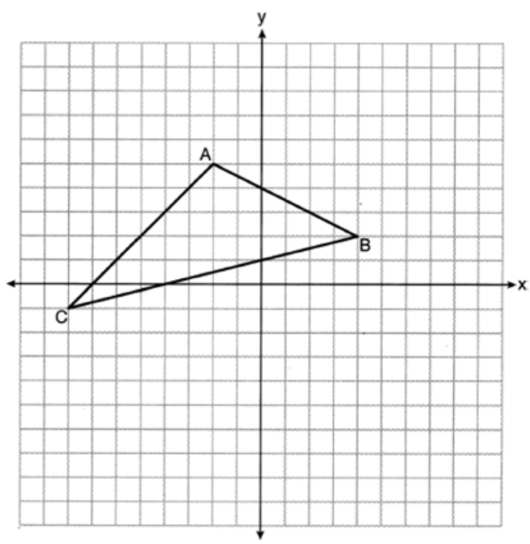
If $m\overset{\frown}{LZ} = 56°$, determine and state the degree measure of angle P.

727 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 $PQRS$.



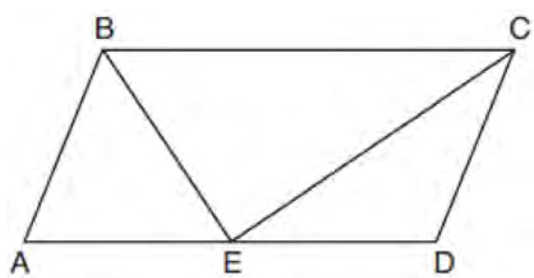
728 Triangle $A'B'C'$ is the image of triangle ABC after a translation of 2 units to the right and 3 units up. Is triangle ABC congruent to triangle $A'B'C'$? Explain why.

729 Triangle ABC with coordinates $A(-2,5)$, $B(4,2)$, and $C(-8,-1)$ is graphed on the set of axes below.



Determine and state the area of $\triangle ABC$.

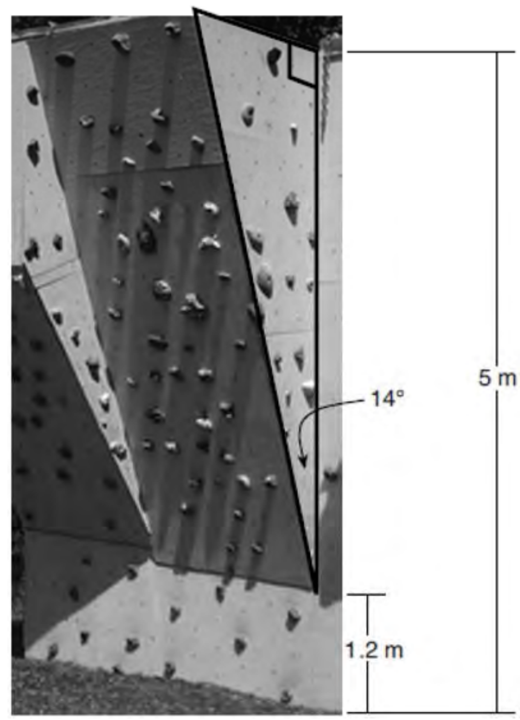
730 In parallelogram $ABCD$ shown below, the bisectors of $\angle ABC$ and $\angle DCB$ meet at E, a point on $\overline{AD}$.



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

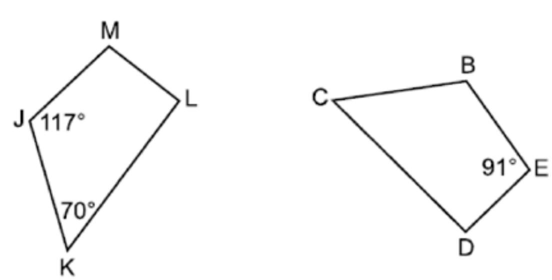
731 A circle has a radius of 6.4 inches. Determine and state, to the *nearest square inch*, the area of a sector whose arc measures 80°.

732 A rock-climbing wall at a local park has a right triangular section that slants toward the climber, as shown in the picture below. The height of the wall is 5 meters and the slanted section begins 1.2 meters up the wall at an angle of 14 degrees.



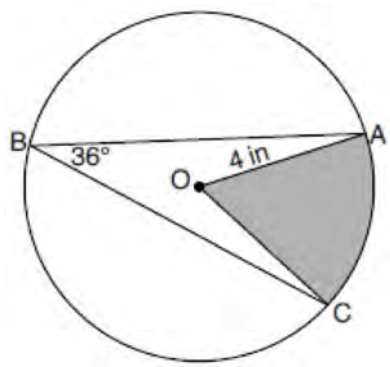
Determine and state, to the *nearest hundredth*, the number of meters in the length of the section of the wall that is slanted (hypotenuse).

733 In the diagram below, quadrilateral $BCDE$ maps onto quadrilateral $JKLM$ using a sequence of rigid motions.



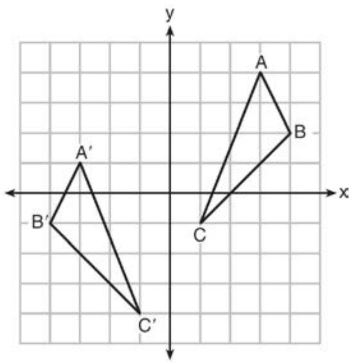
Determine and state the degree measure of angle D.

734 In the diagram below of circle O, the measure of inscribed angle ABC is 36° and the length of $\overline{OA}$ is 4 inches.



Determine and state, to the *nearest tenth of a square inch*, the area of the shaded sector.

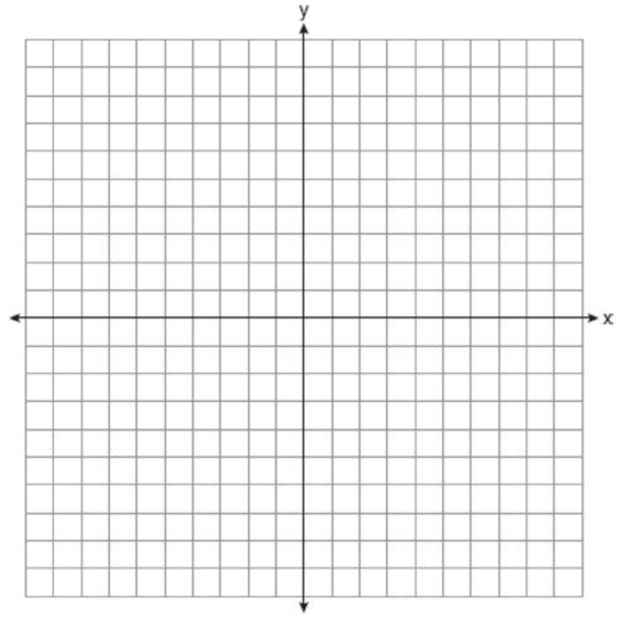
735 As graphed on the set of axes below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a sequence of transformations.



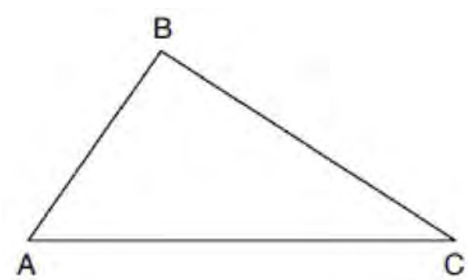
Is $\triangle A'B'C'$ congruent to $\triangle ABC$? Use the properties of rigid motion to explain your answer.

736 A man is spray-painting the tops of 10 patio tables. Five tables have round tops, with diameters of 4 feet, and five tables have rectangular tops, with dimensions of 4 feet by 6 feet. A can of spray paint covers 25 square feet. How many cans of spray paint must be purchased to paint all of the tabletops?

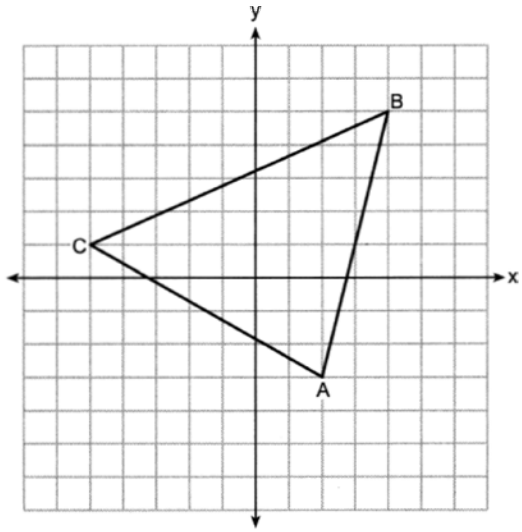
737 The coordinates of the endpoints of $\overline{AB}$ are $A(2,3)$ and $B(5,-1)$. Determine the length of $\overline{A'B'}$, the image of $\overline{AB}$, after a dilation of $\frac{1}{2}$ centered at the origin. [The use of the set of axes below is optional.]



738 Using a compass and straightedge, dilate triangle ABC by a scale factor of 2 centered at C. [Leave all construction marks.]

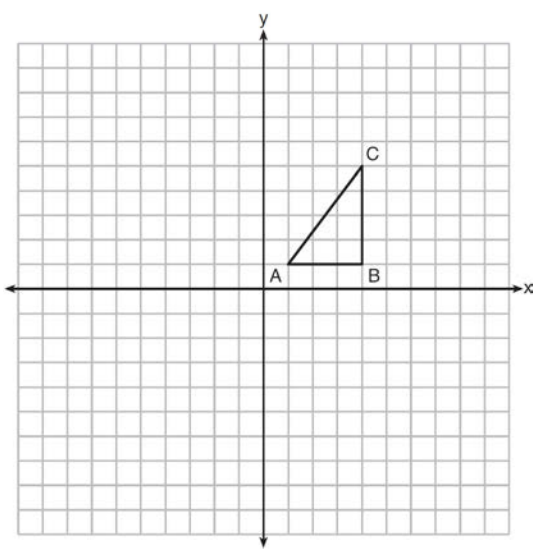


739 On the set of axes below, $\triangle ABC$ is drawn with vertices that have coordinates $A(2,-3)$, $B(4,5)$, and $C(-5,1)$.

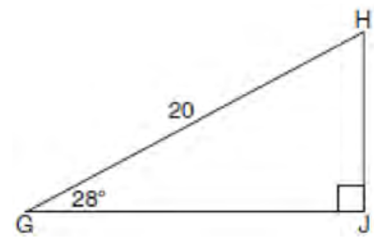


Determine and state the area of $\triangle ABC$.

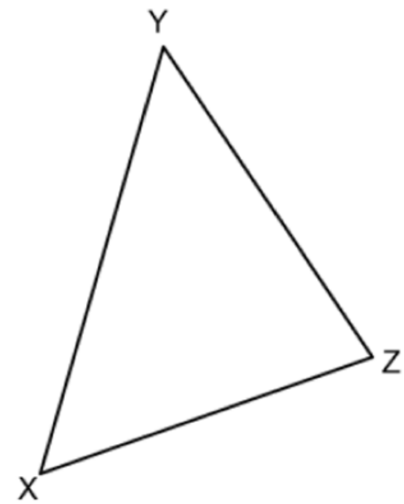
740 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.



741 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.



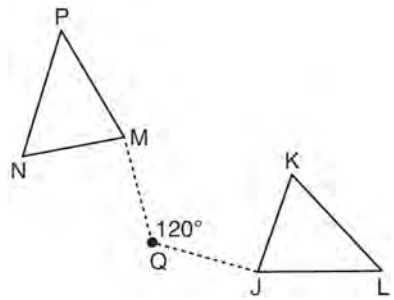
742 Triangle XYZ is shown below. Using a compass and straightedge, construct the circumcenter of $\triangle XYZ$.



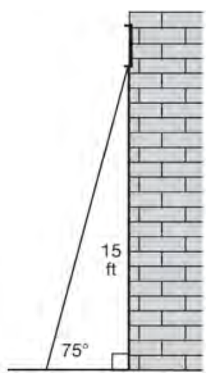
743 Determine and state, in terms of π, the area of a sector that intercepts a 40° arc of a circle with a radius of 4.5.

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

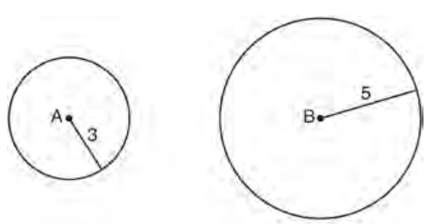
745 Triangle *MNP* is the image of triangle *JKL* after a 120° counterclockwise rotation about point *Q*. If the measure of angle *L* is 47° and the measure of angle *N* is 57°, determine the measure of angle *M*. Explain how you arrived at your answer.



746 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*.

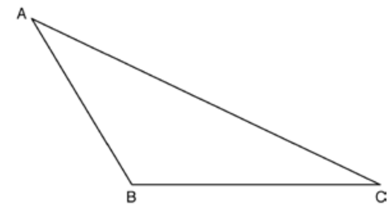


747 As shown in the diagram below, circle *A* has a radius of 3 and circle *B* has a radius of 5.

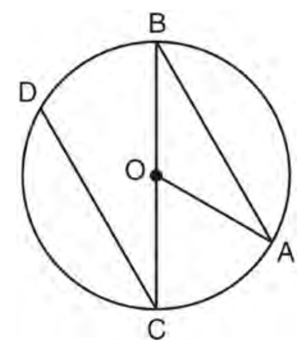


Use transformations to explain why circles *A* and *B* are similar.

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

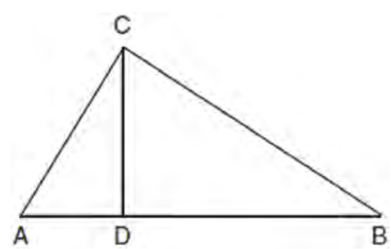


749 In the diagram below of circle *O* with diameter $\overline{BC}$ and radius $\overline{OA}$, chord $\overline{DC}$ is parallel to chord $\overline{BA}$.

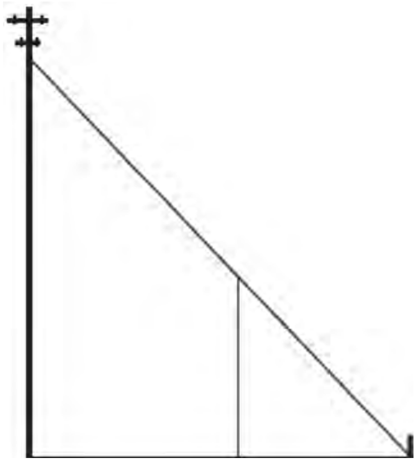


If $m\angle BCD = 30°$, determine and state $m\angle AOB$.

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

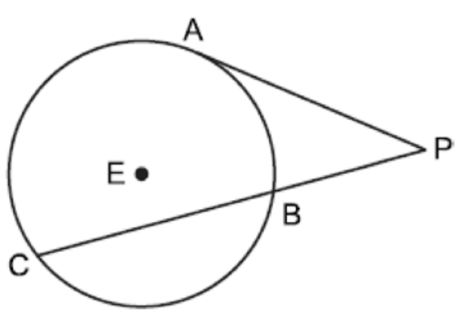


751 In the model below, a support wire for a telephone pole is attached to the pole and anchored to a stake in the ground 15 feet from the base of the telephone pole. Jamal places a 6-foot wooden pole under the support wire parallel to the telephone pole, such that one end of the pole is on the ground 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.



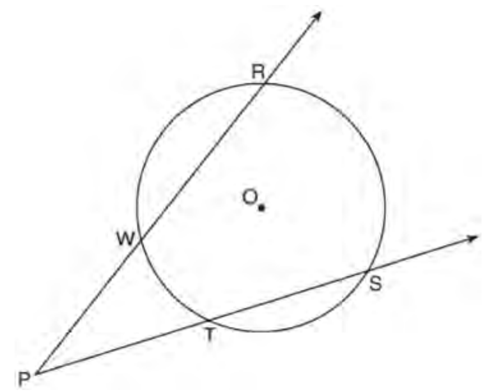
Jamal says he can approximate how high the support wire attaches to the telephone pole by using similar triangles. Explain why the triangles are similar.

752 In circle E below, tangent $\overline{PA}$ and secant $\overline{PBC}$ are drawn.



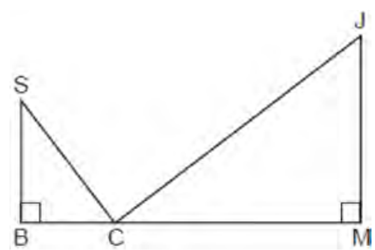
If $PB = 9$ and $BC = 16$, determine and state the length of $\overline{PA}$.

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



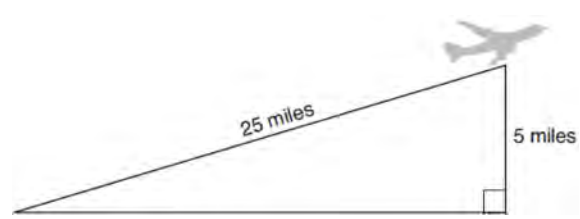
If $m\angle RPS = 35°$ and $m\overset{\frown}{RS} = 121°$, determine and state $m\overset{\frown}{WT}$.

754 In the diagram below, $\triangle SBC \sim \triangle CMJ$ and $\cos J = \frac{3}{5}$.



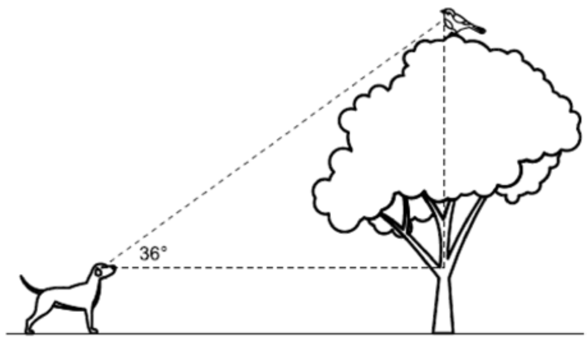
Determine and state $m\angle S$, to the *nearest degree*.

755 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.



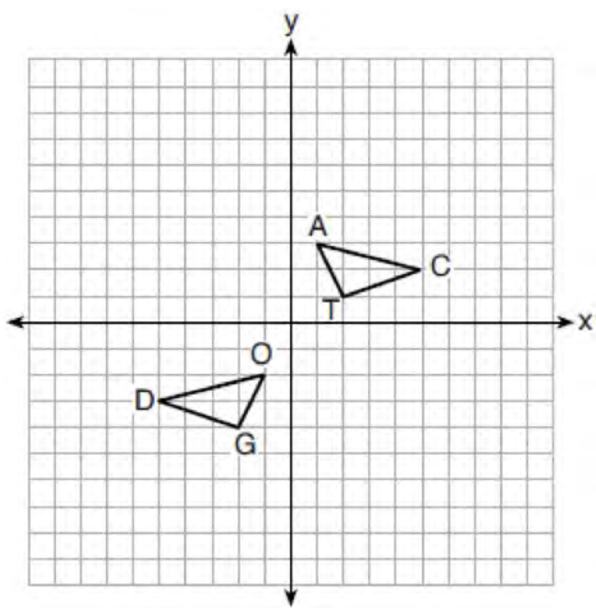
To the *nearest tenth of a degree*, what was the angle of elevation?

756 A dog sees a bird in a tree. The angle of elevation from the dog's eyes to the bird is 36°, as modeled below.



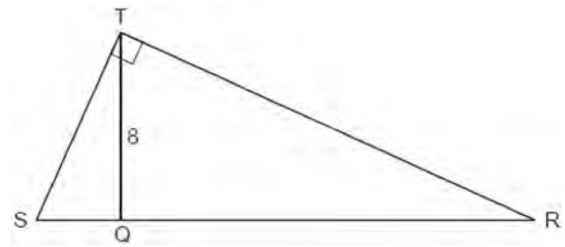
The dog is 18.5 feet away from the base of the tree, and his eyes are 2.5 feet above the ground. Determine and state how high the bird is above the ground, to the *nearest foot*.

757 On the set of axes below, $\triangle DOG \cong \triangle CAT$.



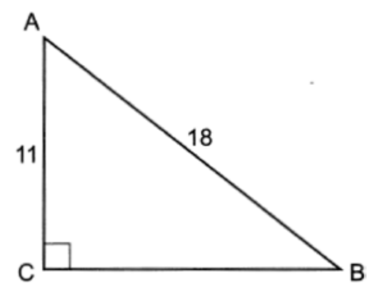
Describe a sequence of transformations that maps $\triangle DOG$ onto $\triangle CAT$.

758 Right triangle STR is shown below, with $m\angle T = 90°$. Altitude $\overline{TQ}$ is drawn to $\overline{SQR}$, and $TQ = 8$.



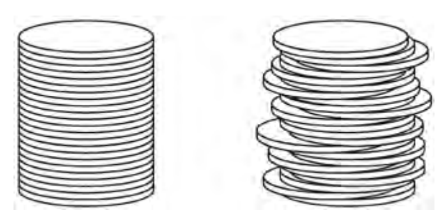
If the ratio $SQ:QR$ is 1:4, determine and state the length of $\overline{SR}$.

759 In $\triangle ABC$ below, $m\angle C = 90°$, $AC = 11$, and $AB = 18$.



Determine and state the measure of angle A, to the *nearest degree*.

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

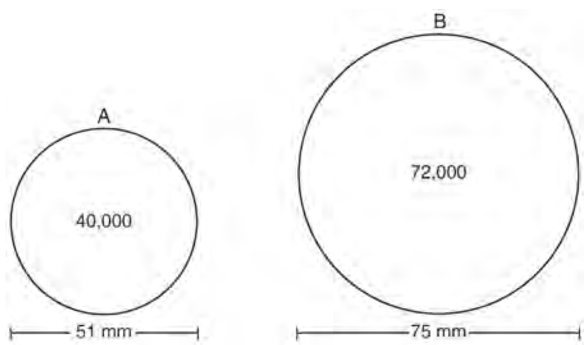


Use Cavelieri's principle to explain why the volumes of these two stacks of quarters are equal.

761 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.

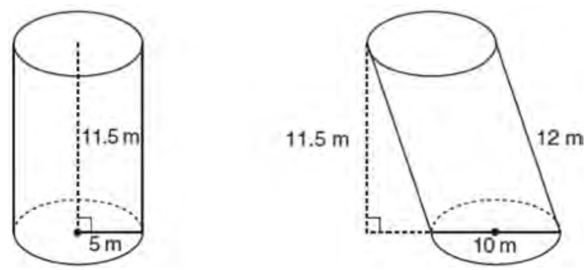
Type of Wood	**Density** (g/cm^3)
Pine	0.373
Hemlock	0.431
Elm	0.554
Birch	0.601
Ash	0.638
Maple	0.676
Oak	0.711

762 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.



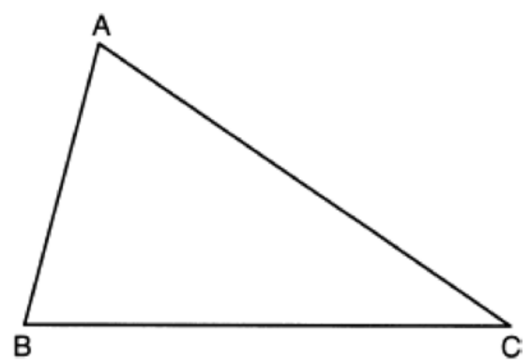
Determine and state which petri dish has the greater population density of bacteria at the end of the first hour.

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

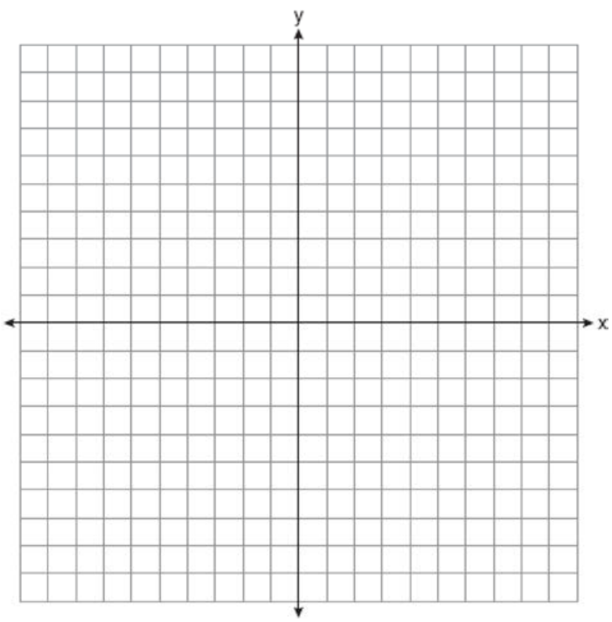


Is Sue correct? Explain why.

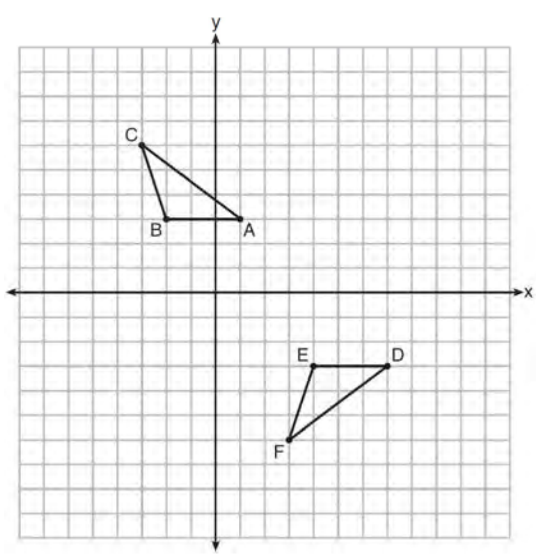
764 Using a compass and straightedge, construct the angle bisector of $\angle ABC$. [Leave all construction marks.]



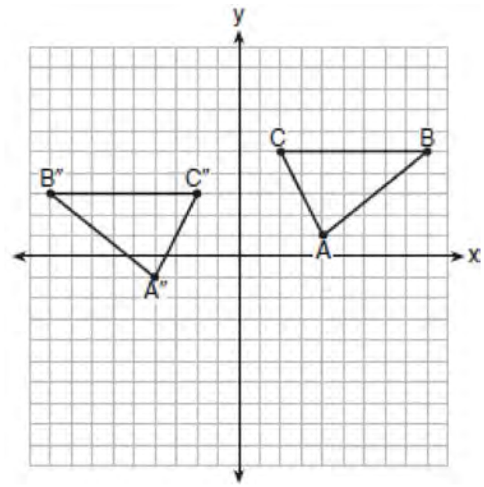
765 Aliyah says that when the line $4x + 3y = 24$ is dilated by a scale factor of 2 centered at the point $(3,4)$, the equation of the dilated line is $y = -\frac{4}{3}x + 16$. Is Aliyah correct? Explain why. [The use of the set of axes below is optional.]



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

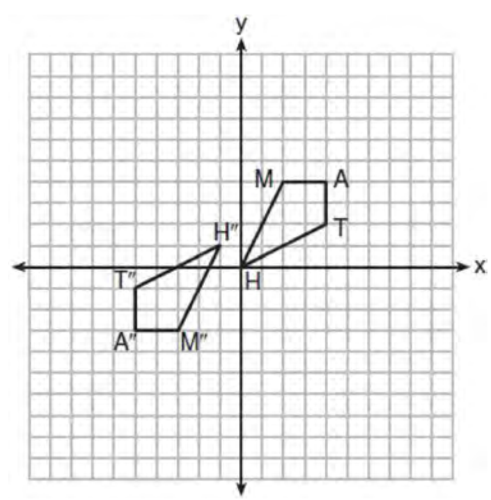


767 The graph below shows $\triangle ABC$ and its image, $\triangle A''B''C''$.



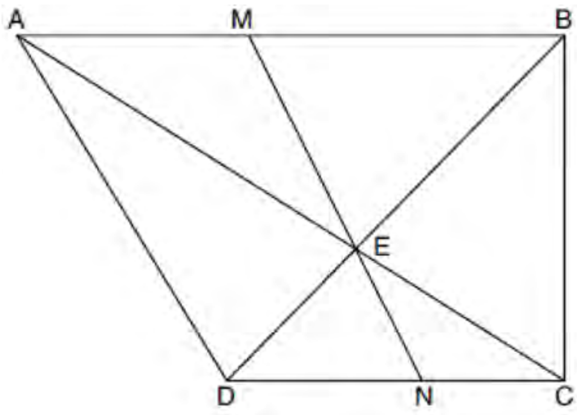
Describe a sequence of rigid motions which would map $\triangle ABC$ onto $\triangle A''B''C''$.

768 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"*.

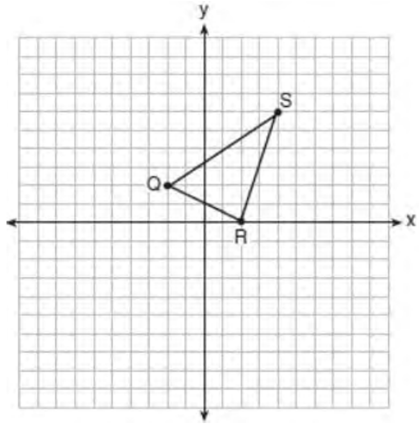
769 Trapezoid $ABCD$, where $\overline{AB} \parallel \overline{CD}$, is shown below. Diagonals $\overline{AC}$ and $\overline{DB}$ intersect $\overline{MN}$ at E, and $\overline{AD} \cong \overline{AE}$.



If $m\angle DAE = 35°$, $m\angle DCE = 25°$, and $m\angle NEC = 30°$, determine and state $m\angle ABD$.

Geometry 4 Point Regents Exam Questions

1 Triangle QRS is graphed on the set of axes below.

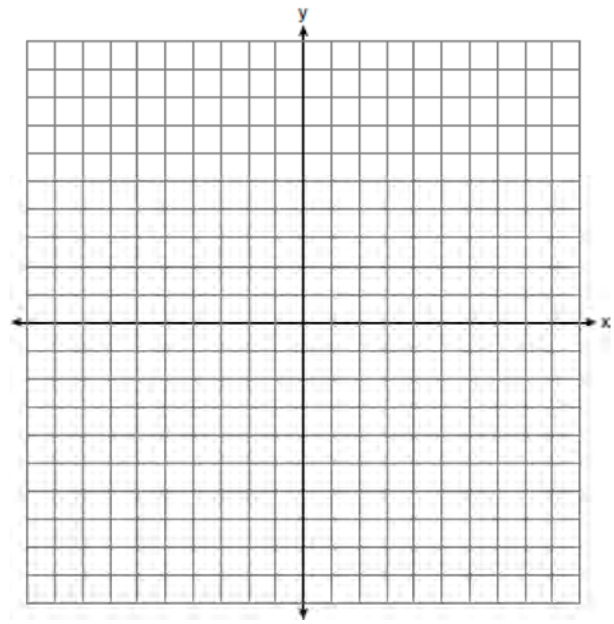


On the same set of axes, graph and label $\triangle Q'R'S'$, the image of $\triangle QRS$ after a dilation with a scale factor of $\frac{3}{2}$ centered at the origin. Use slopes to explain why $Q'R' \parallel QR$.

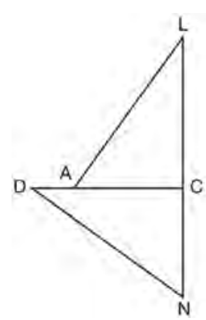
2 A child-sized swimming pool can be modeled by a cylinder. The pool has a diameter of $6\frac{1}{2}$ feet and a height of 12 inches. The pool is filled with water to $\frac{2}{3}$ of its height. Determine and state the volume of the water in the pool, to the *nearest cubic foot*. One cubic foot equals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

3 A small can of soup is a right circular cylinder with a base diameter of 7 cm and a height of 9 cm. A large container is also a right circular cylinder with a base diameter of 9 cm and a height of 13cm. Determine and state the volume of the small can and the volume of the large container to the *nearest cubic centimeter*. What is the minimum number of small cans that must be opened to fill the large container? Justify your answer.

4 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 $\overline{AH}$.

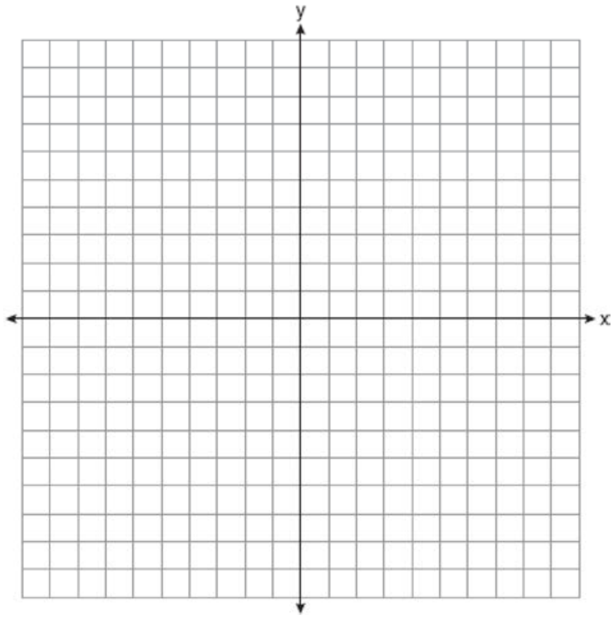


5 In the diagram of $\triangle LAC$ and $\triangle DNC$ below, $\overline{LA} \cong \overline{DN}$, $\overline{CA} \cong \overline{CN}$, and $\overline{DAC} \perp \overline{LCN}$.

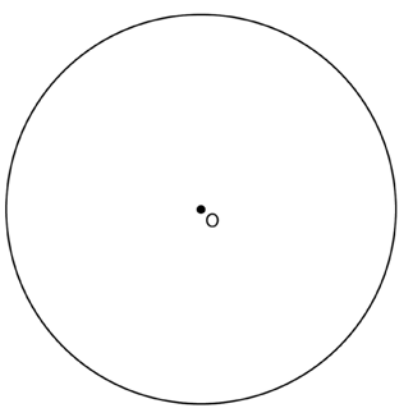


a) Prove that $\triangle LAC \cong \triangle DNC$.
b) Describe a sequence of rigid motions that will map $\triangle LAC$ onto $\triangle DNC$.

6 Parallelogram *MATH* has vertices $M(-7,-2)$, $A(0,4)$, $T(9,2)$, and $H(2,-4)$. Prove that parallelogram *MATH* is a rhombus. [The use of the set of axes below is optional.] Determine and state the area of *MATH*.

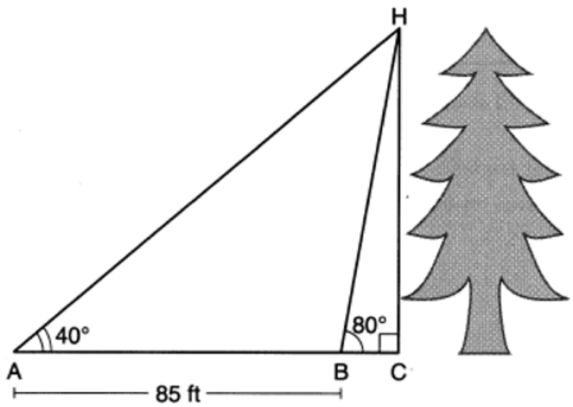


7 Using a compass and straightedge, construct a regular hexagon inscribed in circle *O* below. Label it *ABCDEF*. [Leave all construction marks.]



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

8 Barry wants to find the height of a tree that is modeled in the diagram below, where $\angle C$ is a right angle. The angle of elevation from point *A* on the ground to the top of the tree, *H*, is 40°. The angle of elevation from point *B* on the ground to the top of the tree, *H*, is 80°. The distance between points *A* and *B* is 85 feet.

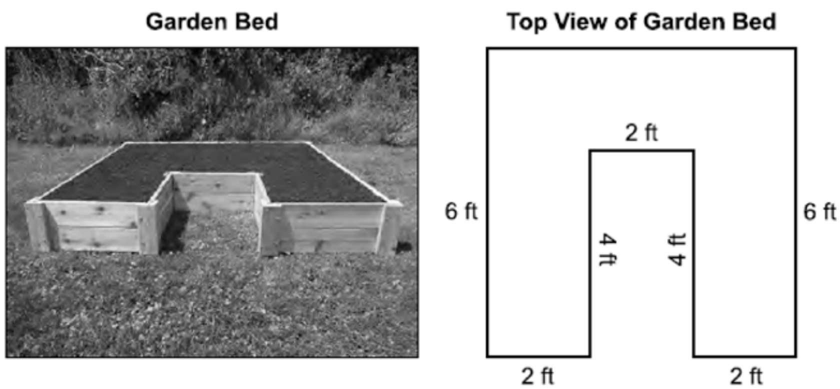


Barry claims that $\triangle ABH$ is isosceles. Explain why Barry is correct. Determine and state, to the *nearest foot*, the height of the tree.

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

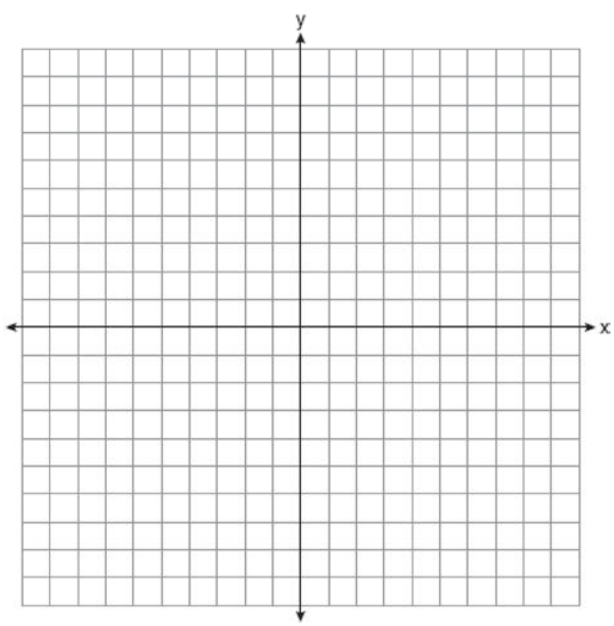
The height of the candle is 13 cm and the circumference of the candle at its widest measure is 31.416 cm. Use modeling to approximate how much wax, to the *nearest cubic centimeter*, is needed to make this candle. Justify your answer.

10 A garden bed, pictured below, is a square prism with a rectangular prism taken out. The inside length of the square prism is 6 feet. The rectangular prism taken out has a width of 2 feet and a length of 4 feet. The diagram below shows the top view of the garden bed with its inside measurements.

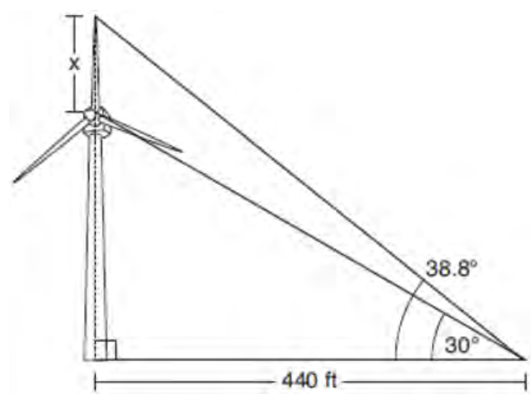


The garden bed is filled with topsoil to a uniform height of 1.25 feet. Determine and state the volume of the topsoil, in cubic feet. Each bag of topsoil sells for \$3.68 and contains 2 cubic feet of topsoil. Determine and state the total cost of the bags of topsoil that must be purchased to fill the garden.

11 Quadrilateral $ABCD$ has vertices with coordinates $A(-3,6)$, $B(6,3)$, $C(6,-2)$, and $D(-6,2)$. Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove $ABCD$ is an isosceles trapezoid. [The use of the set of axes below is optional.]

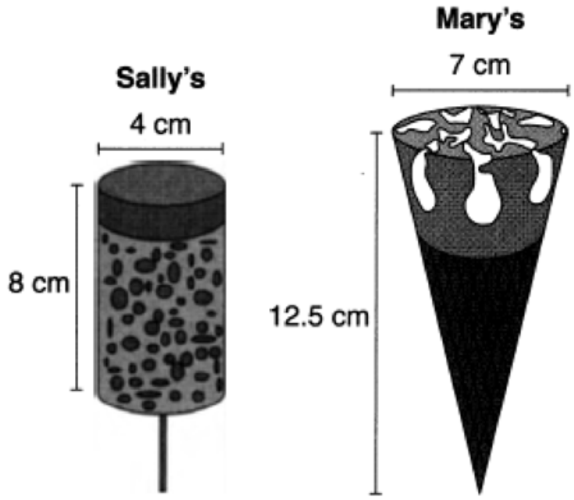


12 Nick wanted to determine the length of one blade of the windmill pictured below. He stood at a point on the ground 440 feet from the windmill's base. Using surveyor's tools, Nick measured the angle between the ground and the highest point reached by the top blade and found it was 38.8°. He also measured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



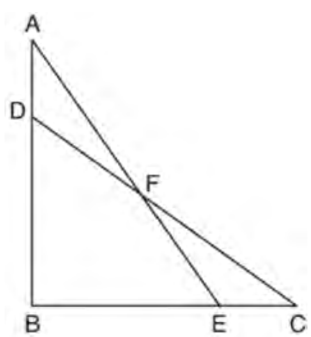
Determine and state a blade's length, x, to the *nearest foot*.

13 Sally and Mary both get ice cream from an ice cream truck. Sally's ice cream is served as a cylinder with a diameter of 4 cm and a total height of 8 cm. Mary's ice cream is served as a cone with a diameter of 7 cm and a total height of 12.5 cm. Assume that ice cream fills Sally's cylinder and Mary's cone.



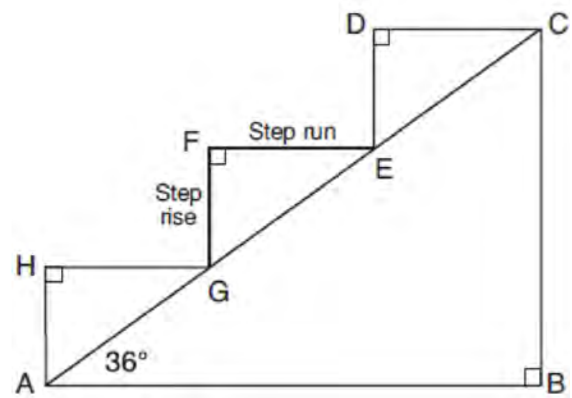
Who was served more ice cream, Sally or Mary? Justify your answer. Determine and state how much more is served in the larger ice cream than the smaller ice cream, to the *nearest cubic centimeter*.

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



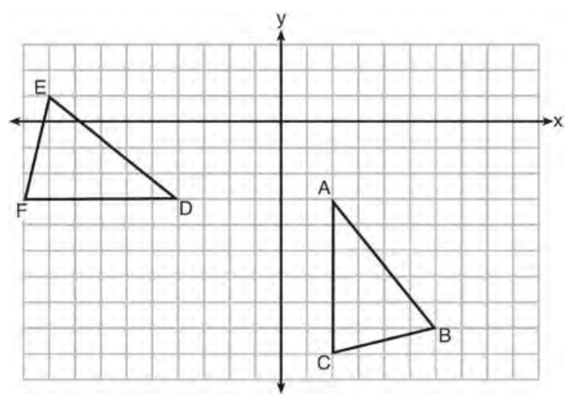
Prove: $\triangle AFD \cong \triangle CFE$

15 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*.

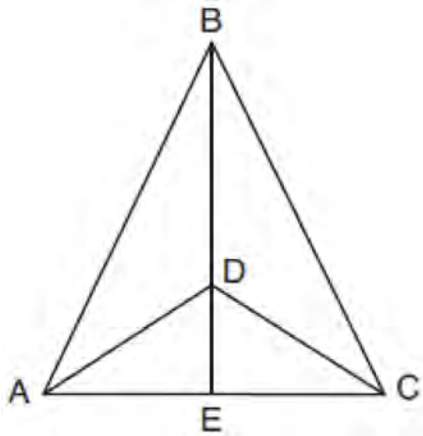
16 The grid below shows $\triangle ABC$ and $\triangle DEF$.



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.

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

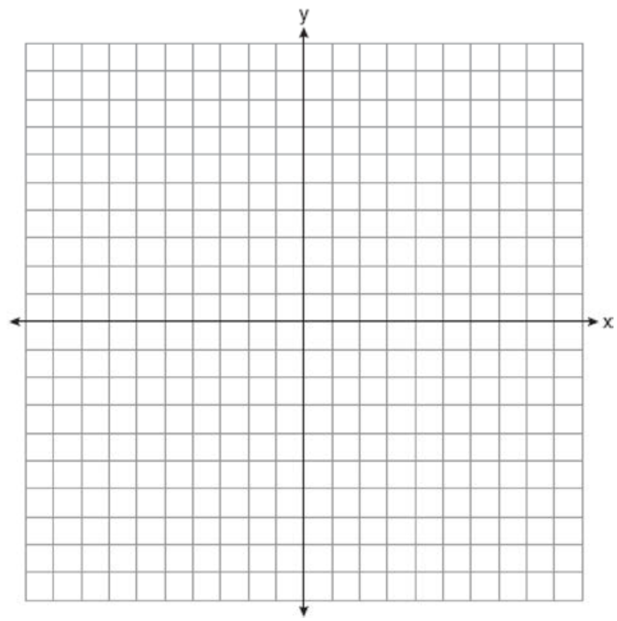
Prove: $\overline{BDE}$ is the perpendicular bisector of $\overline{AC}$



Fill in the missing statement and reasons below.

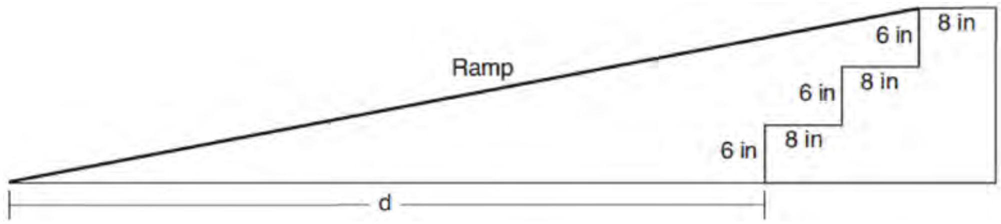
Statements	Reasons
1 $\triangle ABC$, $\overline{AEC}$, $\overline{BDE}$ with $\angle ABE \cong \angle CBE$, and $\angle ADE \cong \angle CDE$	1 Given
2 $\overline{BD} \cong \overline{BD}$	2
3 $\angle BDA$ and $\angle ADE$ are supplementary. $\angle BDC$ and $\angle CDE$ are supplementary.	3 Linear pairs 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

18 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 below 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.



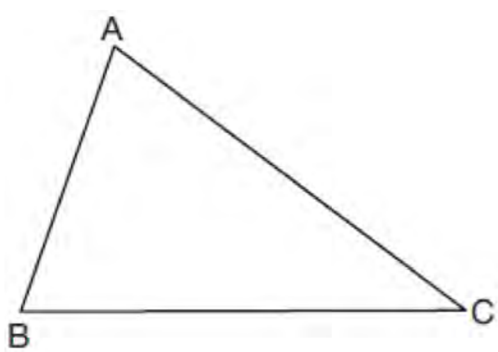
19 Trees that are cut down and stripped of their branches for timber are approximately cylindrical. A timber company specializes in a certain type of tree that has a typical diameter of 50 cm and a typical height of about 10 meters. The density of the wood is 380 kilograms per cubic meter, and the wood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

20 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.



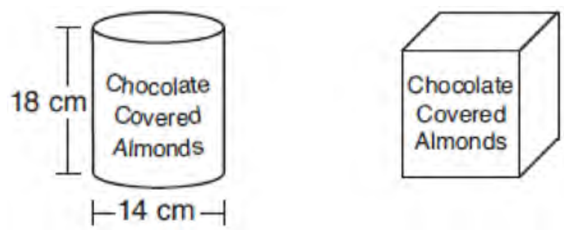
If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the *nearest tenth of a foot*. Determine and state, to the *nearest tenth of a foot*, the horizontal distance, *d*, from the bottom of the stairs to the bottom of the ramp.

21 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.]



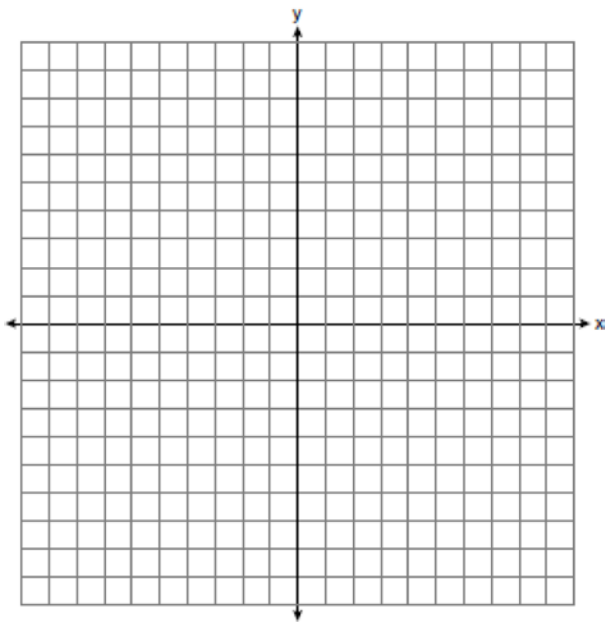
Is the image of $\triangle ABC$ similar to the original triangle? Explain why.

22 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.

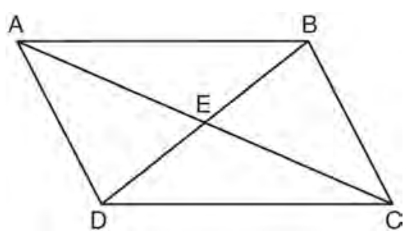


If the new container's height is 16 cm, determine and state, to the *nearest tenth of a centimeter*, the side length of the new container if both containers contain the same amount of almonds. A store owner who sells the chocolate-covered almonds displays them on a shelf whose dimensions are 80 cm long 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.

23 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.]



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

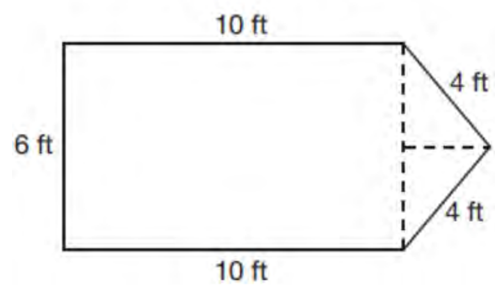


Prove: $\triangle AED \cong \triangle CEB$
Describe a single rigid motion that maps $\triangle AED$ onto $\triangle CEB$.

25 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.

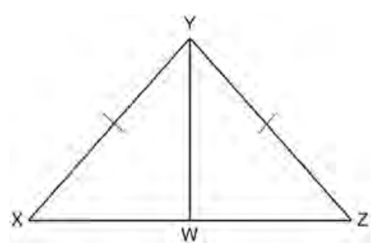
Cargo Trailer

Cargo Trailer Floor

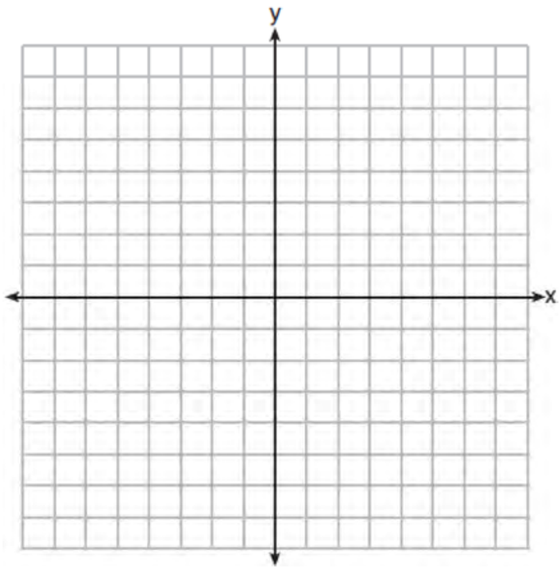


If the inside height of the trailer is 6.5 feet, what is the total volume of the inside of the trailer, to the *nearest cubic foot*?

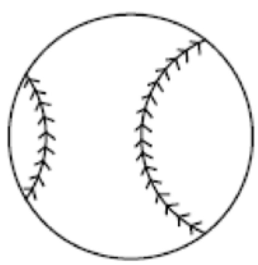
26 Given: $\triangle XYZ$, $\overline{XY} \cong \overline{ZY}$, and $\overline{YW}$ bisects $\angle XYZ$
Prove that $\angle YWZ$ is a right angle.



27 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.]

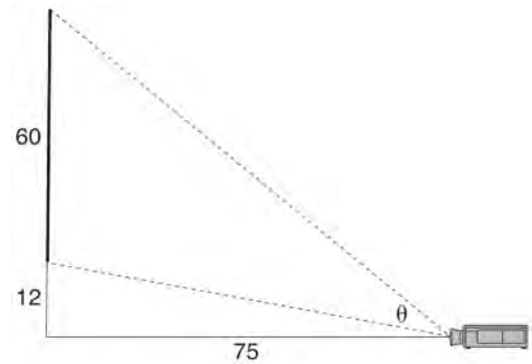


28 A packing box for baseballs is the shape of a rectangular prism with dimensions of $2\text{ ft} \times 1\text{ ft} \times 18\text{ in}$. Each baseball has a diameter of 2.94 inches.



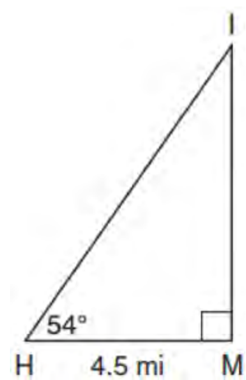
Determine and state the maximum number of baseballs that can be packed in the box if they are stacked in layers and each layer contains an equal number of baseballs. The weight of a baseball is approximately 0.025 pound per cubic inch. Determine and state, to the *nearest pound*, the total weight of all the baseballs in the fully packed box.

29 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.



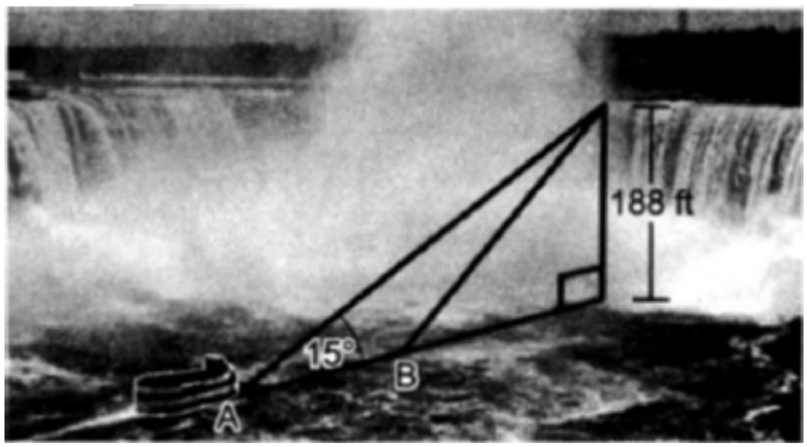
Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

30 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.



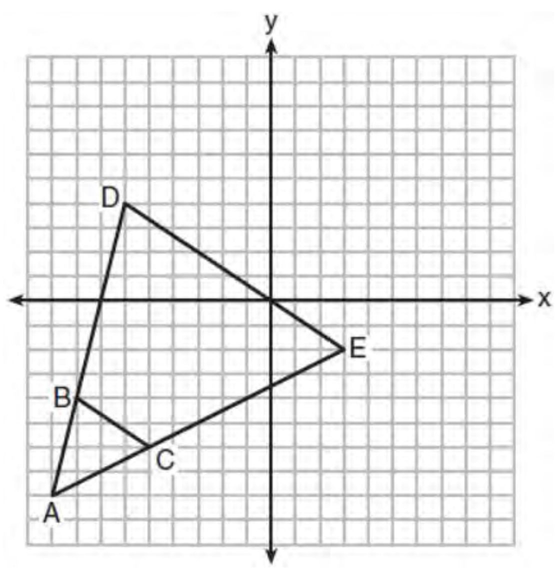
Determine and state, to the *nearest tenth of a mile*, the distance from the boat house (H) to the island (I). Determine and state, to the *nearest tenth of a mile*, the distance from the island (I) to the marina (M).

31 In the diagram below, a boat at point *A* is traveling toward the most powerful waterfall in North America, the Horseshoe Falls. The Horseshoe Falls has a vertical drop of 188 feet. The angle of elevation from point *A* to the top of the waterfall is 15°.



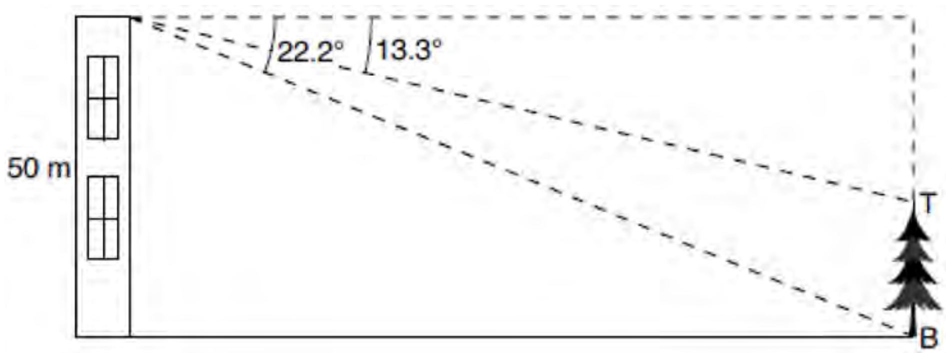
After the boat travels toward the falls, the angle of elevation at point *B* to the top of the waterfall is 23°. Determine and state, to the *nearest foot*, the distance the boat traveled from point *A* to point *B*.

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



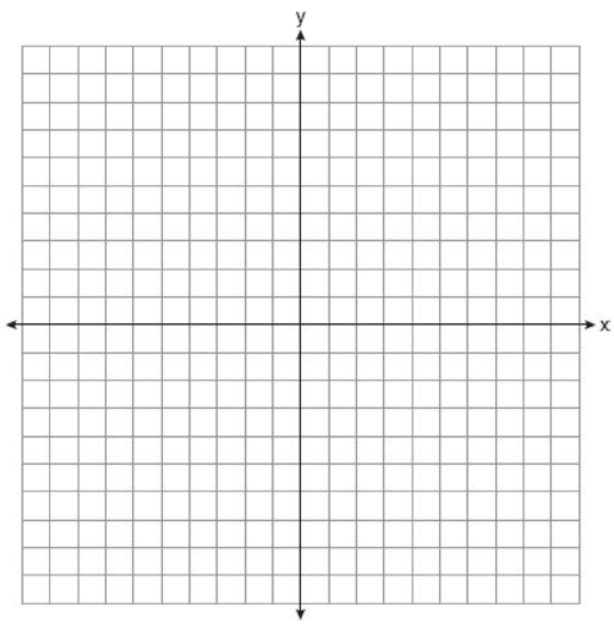
Describe a transformation that maps triangle *ABC* onto triangle *ADE*. Explain why this transformation makes triangle *ADE* similar to triangle *ABC*.

33 As modeled in the diagram below, a building has a height of 50 meters. The angle of depression from the top of the building to the top of the tree, T, is 13.3°. The angle of depression from the top of the building to the bottom of the tree, B, is 22.2°.

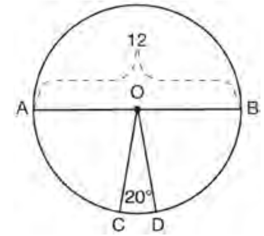


Determine and state, to the *nearest meter*, the height of the tree.

34 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 $\triangle ABC \cong \triangle DEF$.



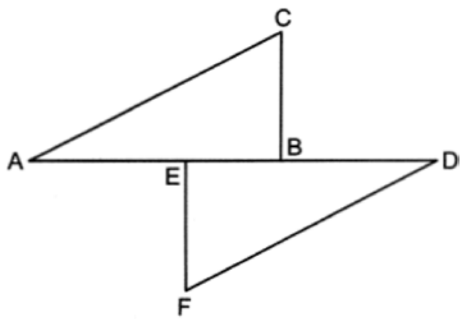
35 In the diagram below of circle O, diameter $\overline{AB}$ and radii $\overline{OC}$ and $\overline{OD}$ are drawn. The length of $\overline{AB}$ is 12 and the measure of $\angle COD$ is 20 degrees.



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

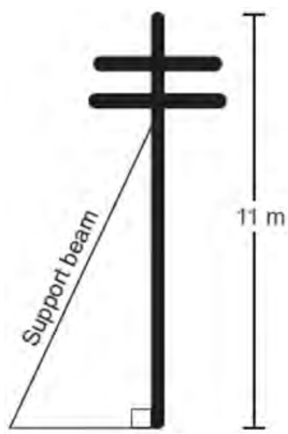
36 The aspect ratio (the ratio of screen width to height) of a rectangular flat-screen television is 16:9. The length of the diagonal of the screen is the television's screen size. Determine and state, to the *nearest inch*, the screen size (diagonal) of this flat-screen television with a screen height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

37 Given: $\triangle ABC$, $\triangle DEF$, $\overline{AB} \perp \overline{BC}$, $\overline{DE} \perp \overline{EF}$, $\overline{AE} \cong \overline{DB}$, and $\overline{AC} \parallel \overline{FD}$



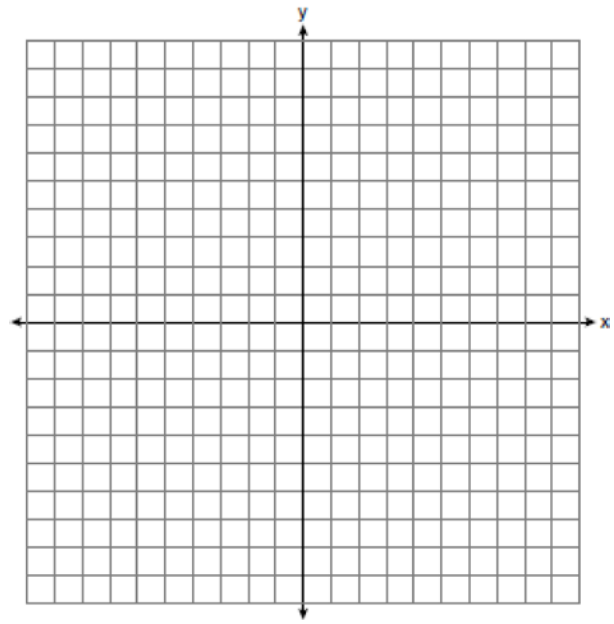
Prove: $\triangle ABC \cong \triangle DEF$

38 A telephone pole 11 meters tall needs to be stabilized with a support beam, as modeled below.

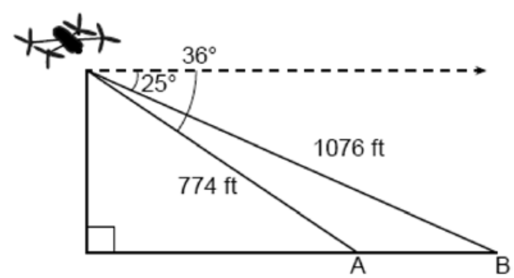


Two conditions for proper support are:
• The beam reaches the telephone pole at 70% of the telephone pole's height above the ground.
• The beam forms a 65° angle with the ground.
Determine and state, to the *nearest tenth of a meter*, the length of the support beam that meets these conditions for this telephone pole. Determine and state, to the *nearest tenth of a meter*, how far the support beam must be placed from the base of the pole to meet the conditions.

39 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.]

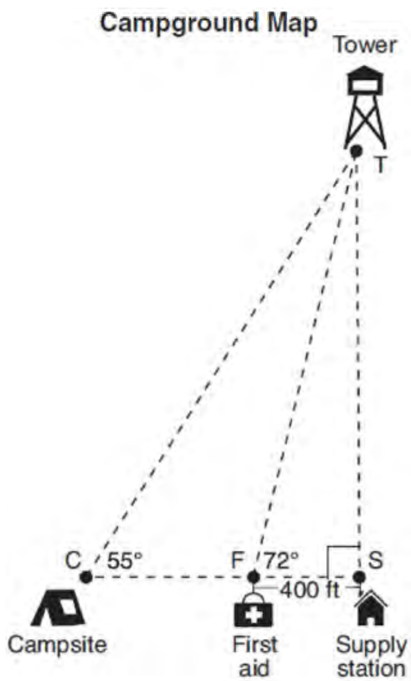


40 A drone is used to measure the size of a brush fire on the ground. Segment AB represents the width of the fire, as shown below. The drone calculates the distance to point B to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point A to be 774 feet at an angle of depression of 36°.



Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

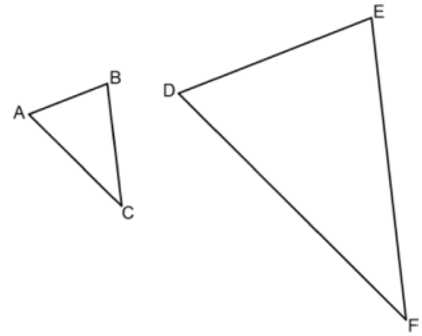
41 The map of a campground is shown below. Campsite C, first aid station F, and supply station S lie along a straight path. The path from the supply station to the tower, T, is perpendicular to the path from the supply station to the campsite. The length of path $\overline{FS}$ is 400 feet. The angle 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.

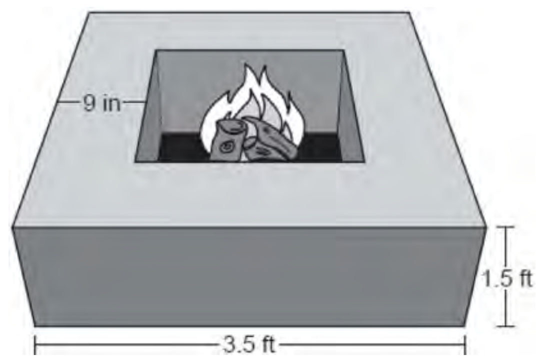
42 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot. Determine and state, to the *nearest pound*, the total weight of the six decorations.

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



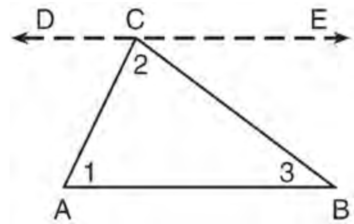
If $AB = 4$, $BC = x - 1$, $DE = x + 3$, and $EF = 15$, determine and state the length of $\overline{DE}$.

44 Josh is making a square-based fire pit out of concrete for his backyard, as modeled by the right prism below. He plans to make the outside walls of the fire pit 3.5 feet on each side with a height of 1.5 feet. The concrete walls of the fire pit are going to be 9 inches thick.



If a bag of concrete mix will fill 0.6 ft^3, determine and state the minimum number of bags needed to build the fire pit.

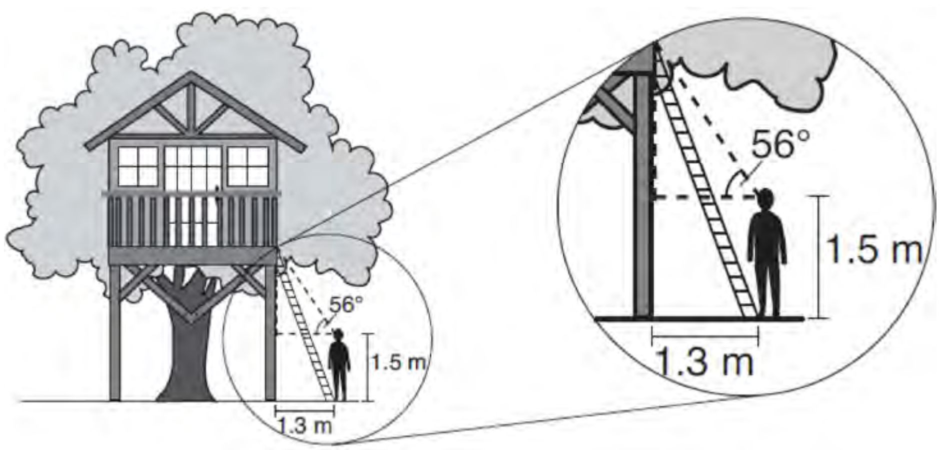
45 Given the theorem, “The sum of the measures of the interior angles of a triangle is 180°,” complete the proof for this theorem.



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

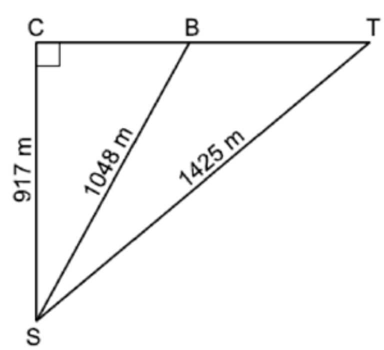
Statements	**Reasons**
(1) $\triangle ABC$	(1) Given
(2) Through point C, draw $\overleftrightarrow{DCE}$ parallel to $\overline{AB}$.	(2) ______
(3) $m\angle 1 = m\angle ACD$, $m\angle 3 = m\angle BCE$	(3) ______
(4) $m\angle ACD + m\angle 2 + m\angle BCE = 180°$	(4) ______
(5) $m\angle 1 + m\angle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

46 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.



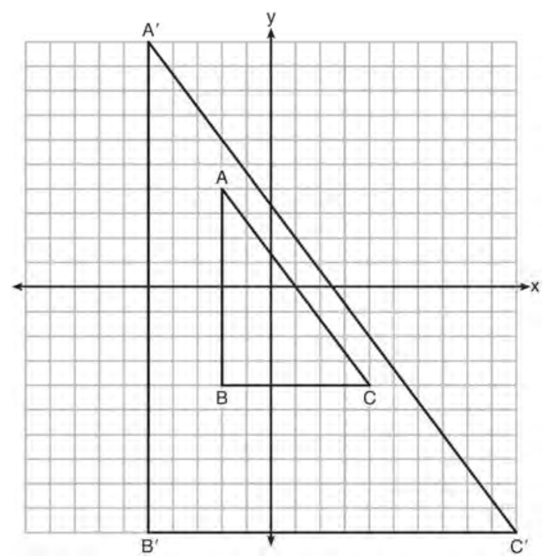
Determine and state the minimum length of a ladder, to the *nearest tenth of a meter*, that David will need to buy for his treehouse.

47 Modeled by right triangles below, a surveyor (S) is taking land measurements using a cabin (C), a boulder (B), and a tree (T) as fixed points of reference. The cabin, boulder, and tree are collinear. The surveyor is 917 meters from the cabin, 1048 meters from the boulder, and 1425 meters from the tree.



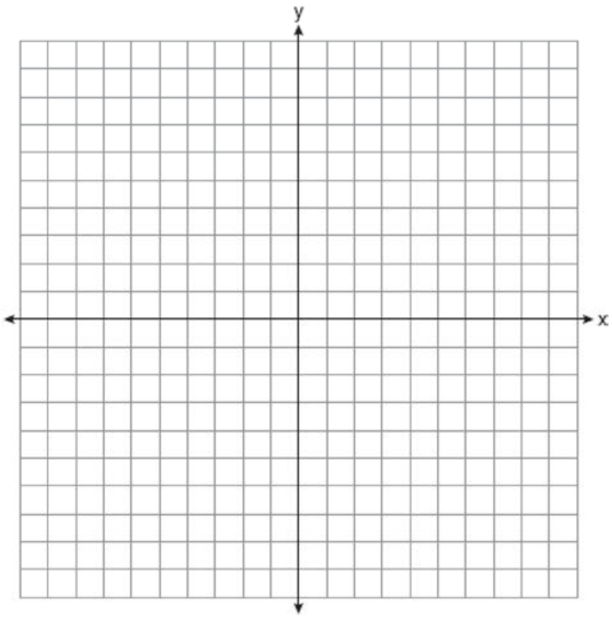
Determine and state, to the *nearest degree*, the measure of $\angle BST$.

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

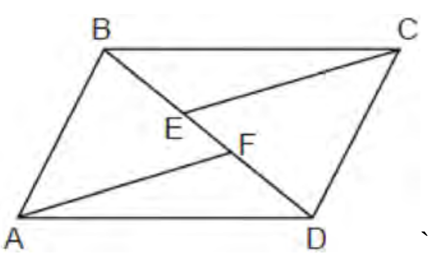


Describe the transformation that was performed. Explain why $\triangle A'B'C' \sim \triangle ABC$.

49 The coordinates of the vertices of quadrilateral $ABCD$ are $A(0,4)$, $B(3,8)$, $C(8,3)$, and $D(5,-1)$. Prove that $ABCD$ is a parallelogram, but not a rectangle. [The use of the set of axes below is optional.]

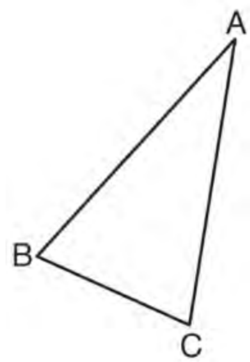


50 In the diagram of quadrilateral $ABCD$ below, $\overline{AB} \cong \overline{CD}$, and $\overline{AB} \parallel \overline{CD}$. Segments CE and AF are drawn to diagonal $\overline{BD}$ such that $\overline{BE} \cong \overline{DF}$.

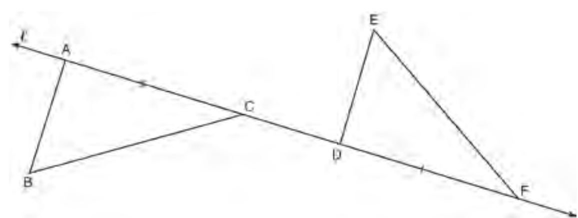


Prove: $\overline{CE} \cong \overline{AF}$

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

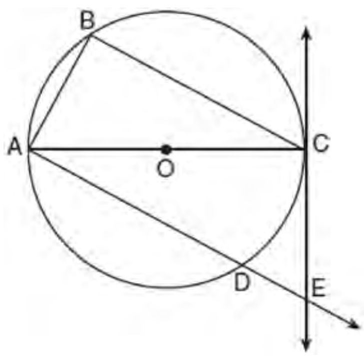


52 In the diagram below, $\overline{AC} \cong \overline{DF}$ and points A, C, D, and F are collinear on line ℓ.



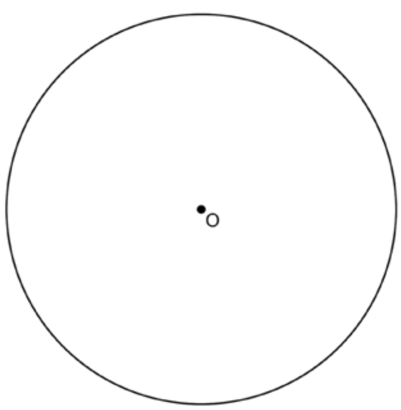
Let $\triangle D'E'F'$ be the image of $\triangle DEF$ after a translation along ℓ, such that point D is mapped onto point A. Determine and state the location of F'. Explain your answer. Let $\triangle D''E''F''$ be the image of $\triangle D'E'F'$ after a reflection across line ℓ. Suppose that E'' is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

53 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.



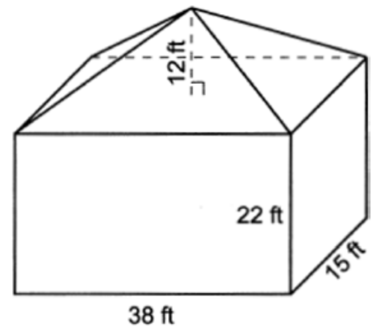
Prove: $\dfrac{BC}{CA} = \dfrac{AB}{EC}$

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



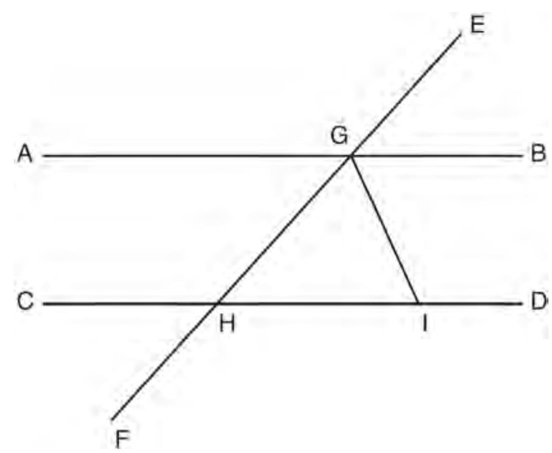
Determine the measure of the arc intercepted by two adjacent sides of the constructed square. Explain your reasoning.

55 A building is composed of a rectangular pyramid on top of a rectangular prism, as shown in the diagram below. The rectangular prism has a length of 38 feet, a width of 15 feet, and a height of 22 feet. The rectangular pyramid sits directly on top of the rectangular prism, and its height is 12 feet.



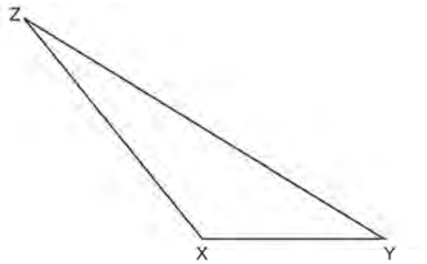
An air purification filter was installed that will clean all the air in the building at a rate of 2400 cubic feet per minute. Determine and state how long it will take, to the *nearest tenth of a minute*, for the filter to clean the air contained in the building.

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

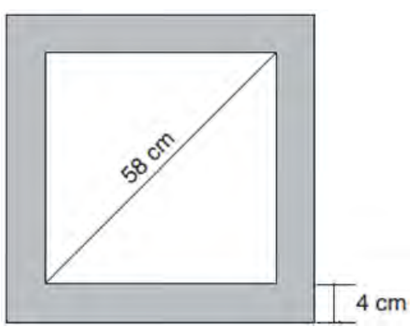


If $m\angle EGB = 50°$ and $m\angle DIG = 115°$, explain why $\overline{AB} \parallel \overline{CD}$.

57 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 $\triangle XYZ$.

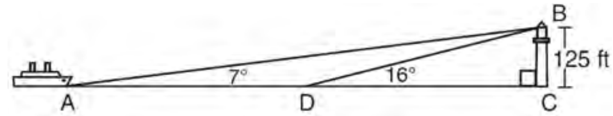


58 Keira has a square poster that she is framing and placing on her wall. The poster has a diagonal 58 cm long and fits exactly inside the frame. The width of the frame around the picture is 4 cm.



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

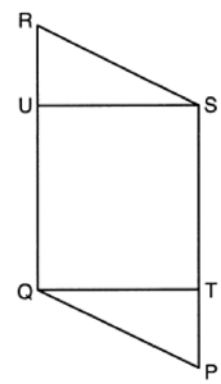
59 As shown in the diagram below, a ship is heading directly toward a lighthouse whose beacon is 125 feet above sea level. At the first sighting, point A, the angle of elevation from the ship to the light was 7°. A short time later, at point D, the angle of elevation was 16°.



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

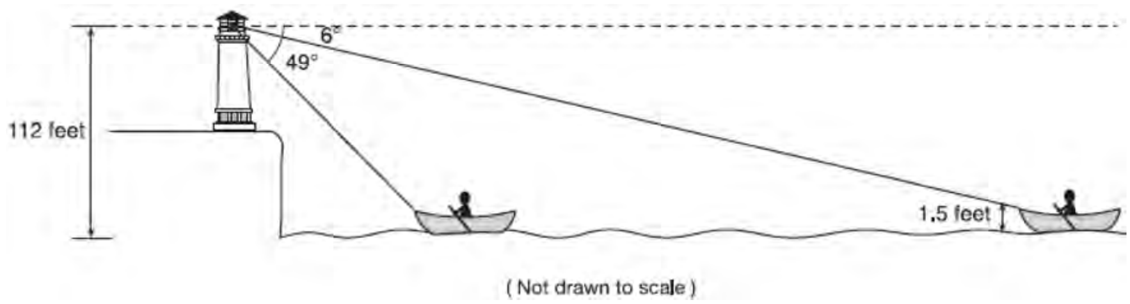
60 A barrel of fuel oil is a right circular cylinder where the inside measurements of the barrel are a diameter of 22.5 inches and a height of 33.5 inches. There are 231 cubic inches in a liquid gallon. Determine and state, to the *nearest tenth*, the gallons of fuel that are in a barrel of fuel oil.

61 Given: Parallelogram $PQRS$, $\overline{QT} \perp \overline{PS}$, $\overline{SU} \perp \overline{QR}$



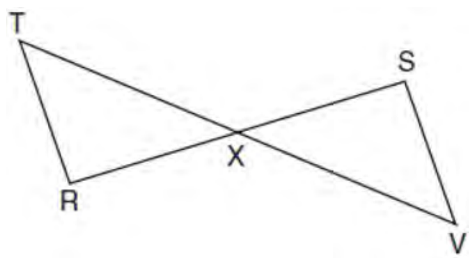
Prove: $\overline{PT} \cong \overline{RU}$

62 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.

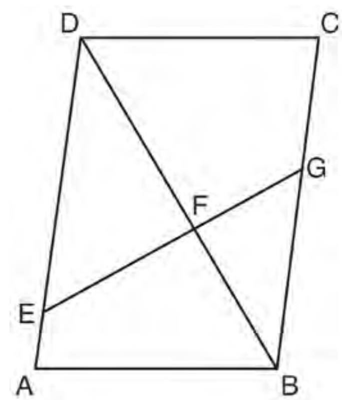
63 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn



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

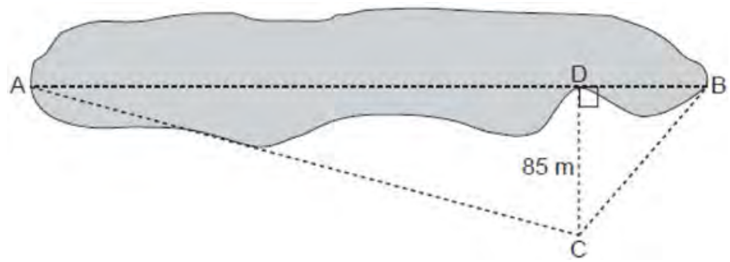
64 Theresa has a rectangular pool 30 ft long, 15 ft wide, and 4 ft deep. Theresa fills her pool using city water at a rate of \$3.95 per 100 gallons of water. Nancy has a circular pool with a diameter of 24 ft and a depth of 4 ft. Nancy fills her pool with a water delivery service at a rate of \$200 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]

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



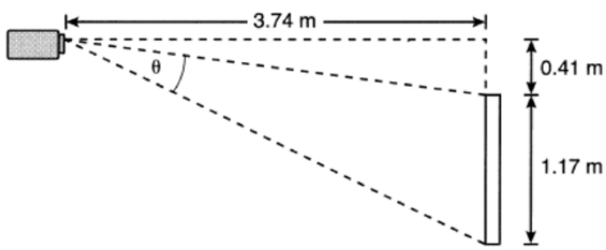
Prove: $\triangle DEF \sim \triangle BGF$

66 Trish is a surveyor who was asked to estimate the distance across a pond. She stands at point C, 85 meters from point D, and locates points A and B on either side of the pond such that A, D, and B are collinear.



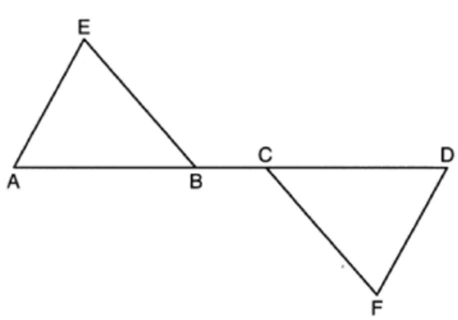
Trish approximates the measure of angle DCB to be 35° and the measure of angle ACD to be 75°. Determine and state the distance across the pond, $\overline{AB}$, to the *nearest meter*.

67 As modeled below, a projector mounted on a ceiling is 3.74 m from a wall, where a whiteboard is displayed. The vertical distance from the ceiling to the top of the whiteboard is 0.41 m, and the height of the whiteboard is 1.17 m.



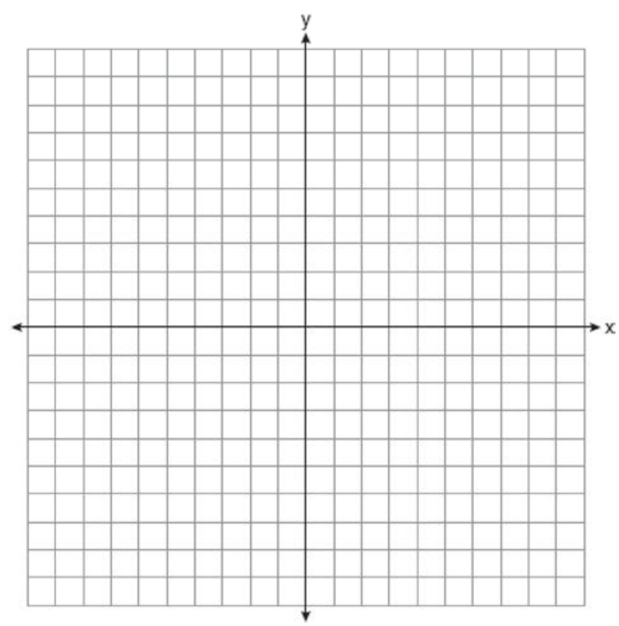
Determine and state the projection angle, θ, to the *nearest tenth of a degree*.

68 Given: $\triangle AEB$ and $\triangle DFC$, $\overline{ABCD}$, $\overline{AE} \parallel \overline{DF}$, $\overline{EB} \parallel \overline{FC}$, $\overline{AC} \cong \overline{DB}$

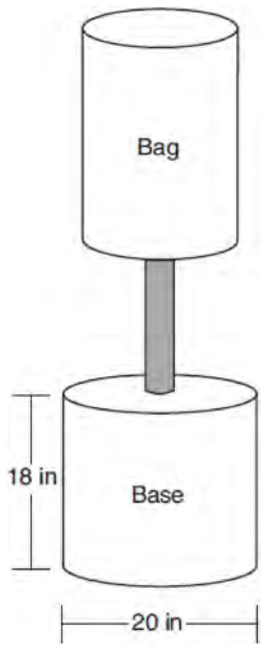


Prove: $\triangle EAB \cong \triangle FDC$

69 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.]



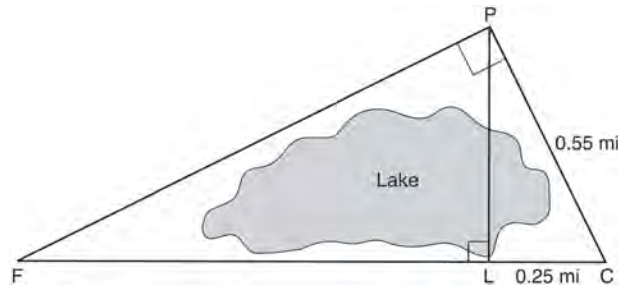
70 Shae has recently begun kickboxing and purchased training equipment as modeled in the diagram below. The total weight of the bag, pole, and unfilled base is 270 pounds. The cylindrical base is 18 inches tall with a diameter of 20 inches. The dry sand used to fill the base weighs 95.46 lbs per cubic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

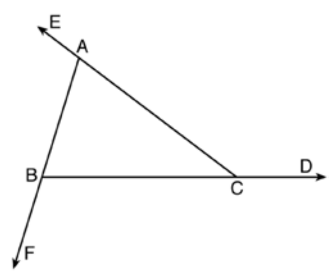
71 A bakery sells hollow chocolate spheres. The larger diameter of each sphere is 4 cm. The thickness of the chocolate of each sphere is 0.5 cm. Determine and state, to the *nearest tenth of a cubic centimeter*, the amount of chocolate in each hollow sphere. The bakery packages 8 of them into a box.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

72 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.

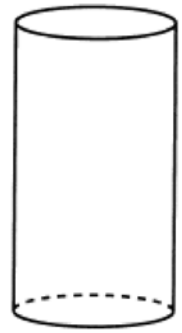


If the path from the park ranger station to the campground is 0.55 mile, determine and state, to the *nearest hundredth of a mile*, the distance between the park ranger station and the lifeguard chair. Gerald believes the distance from the first aid station to the campground is at least 1.5 miles. Is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

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

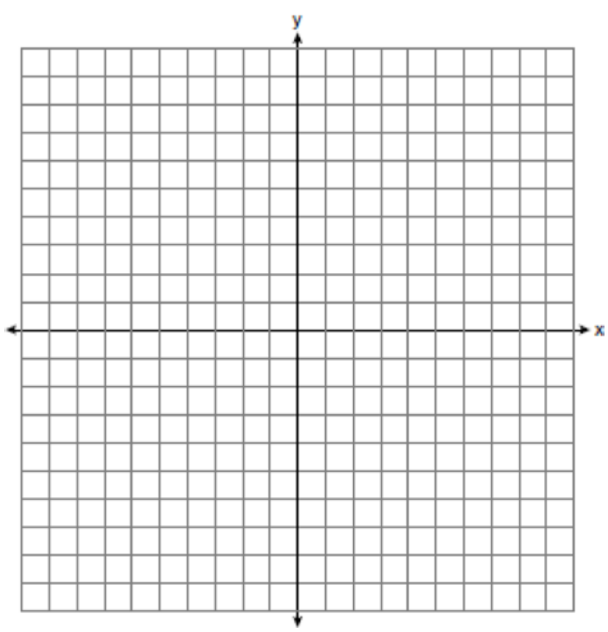


74 A concrete footing is a cylinder that is placed in the ground to support a building structure. The cylinder is 4 feet tall and 12 inches in diameter. A contractor is installing 10 footings.

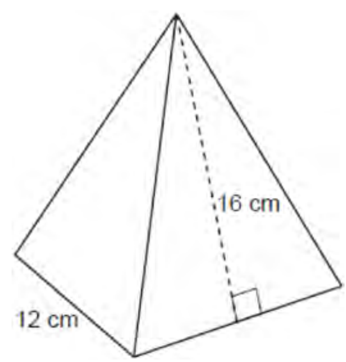


If a bag of concrete mix makes $\frac{2}{3}$ of a cubic foot of concrete, determine and state the minimum number of bags of concrete mix needed to make all 10 footings.

75 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.]

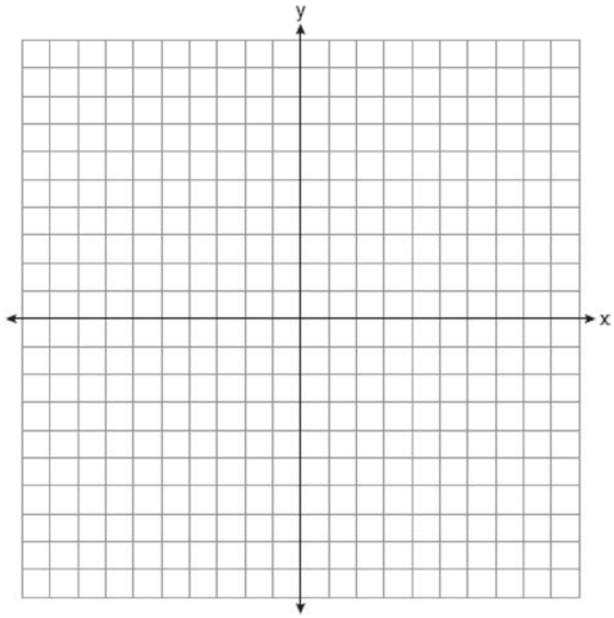


76 A candle in the shape of a right pyramid is modeled below. Each side of the square base measures 12 centimeters. The slant height of the pyramid measures 16 centimeters.

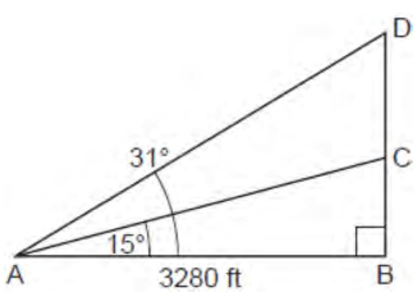


Determine and state the volume of the candle, to the *nearest cubic centimeter*. The wax used to make the candle weighs 0.032 ounce per cubic centimeter. Determine and state the weight of the candle, to the *nearest ounce*.

77 The coordinates of the vertices of quadrilateral $HYPE$ are $H(-3,6)$, $Y(2,9)$, $P(8,-1)$, and $E(3,-4)$. Prove $HYPE$ is a rectangle. [The use of the set of axes below is optional.]

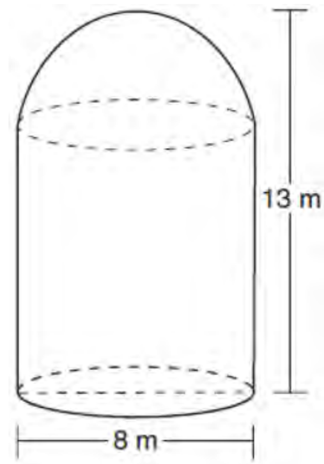


78 Cape Canaveral, Florida is where NASA launches rockets into space. As modeled in the diagram below, a person views the launch of a rocket from observation area A, 3280 feet away from launch pad B. After launch, the rocket was sighted at C with an angle of elevation of 15°. The rocket was later sighted at D with an angle of elevation of 31°.

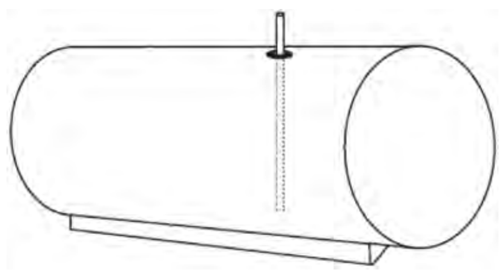


Determine and state, to the *nearest foot*, the distance the rocket traveled between the two sightings, C and D.

79 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.

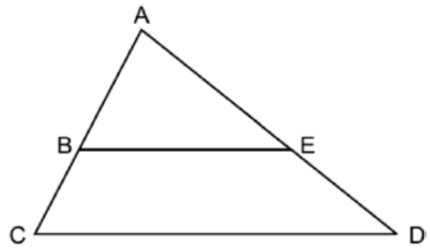


80 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



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]

81 Given: $\triangle ACD$ with $\overline{ABC}$, $\overline{AED}$, and $\overline{BE} \parallel \overline{CD}$



Prove: $AB \bullet AD = AE \bullet AC$

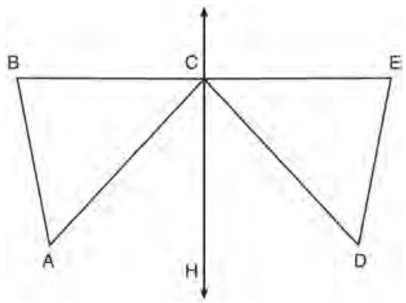
Geometry 6 Point Regents Exam Questions

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

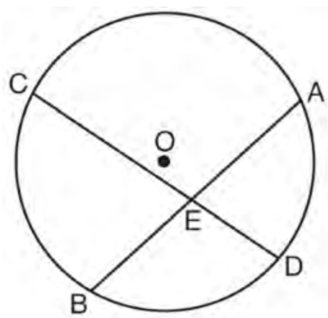
$\overleftrightarrow{CH}$ is the perpendicular bisector of $\overline{BCE}$

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

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

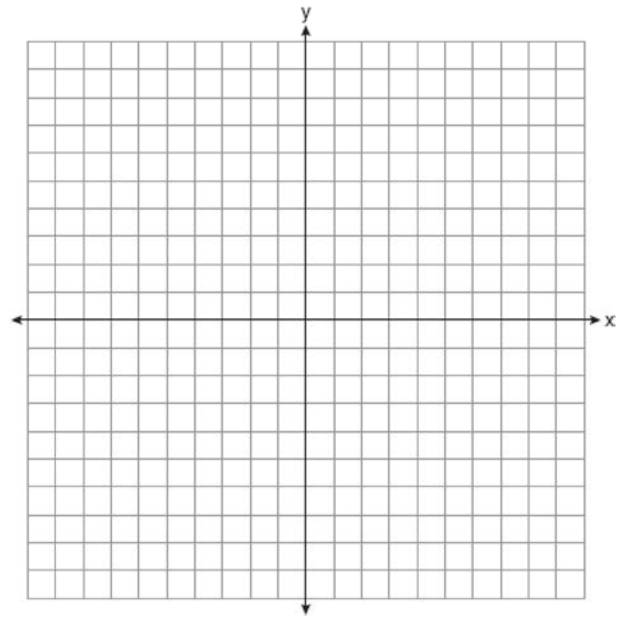


83 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E

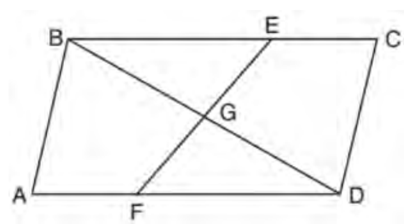


Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord. Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

84 Quadrilateral $MATH$ has vertices with coordinates $M(-1,7)$, $A(3,5)$, $T(2,-7)$, and $H(-6,-3)$. Prove that quadrilateral $MATH$ is a trapezoid. State the coordinates of point Y such that point A is the midpoint of $\overline{MY}$. Prove that quadrilateral $MYTH$ is a rectangle. [The use of the set of axes below is optional.]

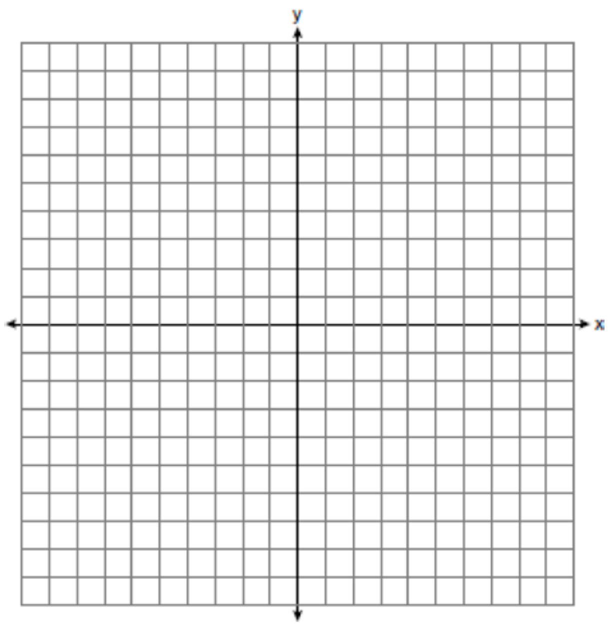


85 In quadrilateral $ABCD$, E and F are points on $\overline{BC}$ and $\overline{AD}$, respectively, and $\overline{BGD}$ and $\overline{EGF}$ are drawn such that $\angle ABG \cong \angle CDG$, $\overline{AB} \cong \overline{CD}$, and $\overline{CE} \cong \overline{AF}$.

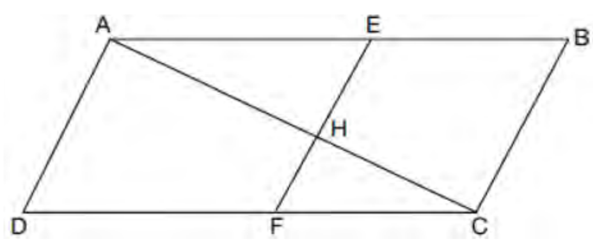


Prove: $\overline{FG} \cong \overline{EG}$

86 Triangle JOE has vertices whose coordinates are $J(4,6)$, $O(-2,4)$, and $E(6,0)$. Prove that $\triangle JOE$ is isosceles. Point $Y(2,2)$ is on $\overline{OE}$. Prove that $\overline{JY}$ is the perpendicular bisector of $\overline{OE}$. [The use of the set of axes below is optional.]

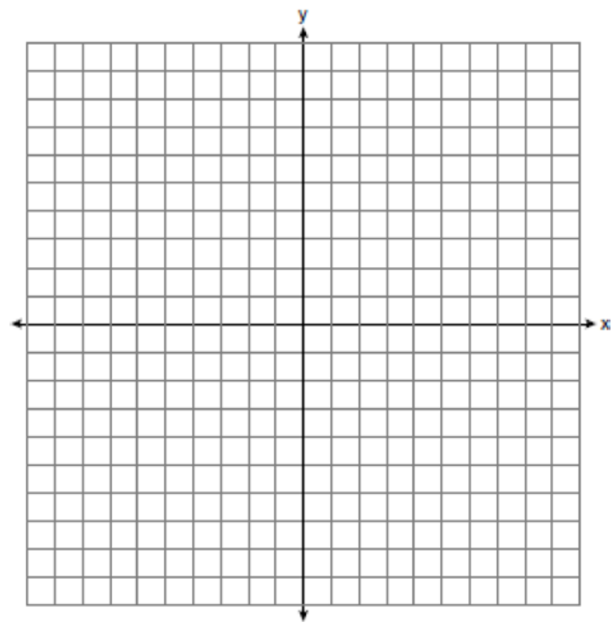


87 Given: Quadrilateral $ABCD$, $\overline{AC}$ and $\overline{EF}$ intersect at H, $\overline{EF} \parallel \overline{AD}$, $\overline{EF} \parallel \overline{BC}$, and $\overline{AD} \cong \overline{BC}$.

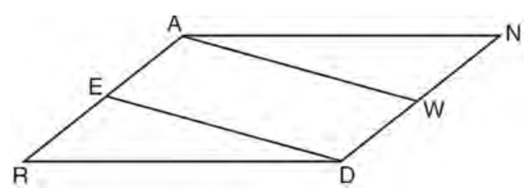


Prove: $(EH)(CH) = (FH)(AH)$

88 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.]

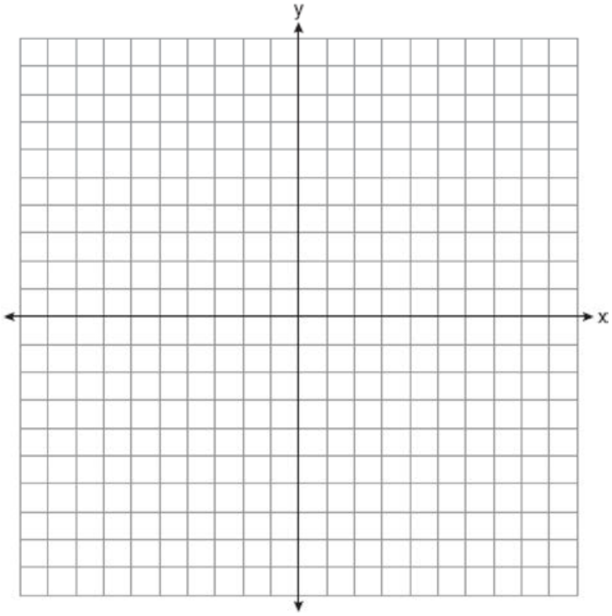


89 Given: Parallelogram $ANDR$ with $\overline{AW}$ and $\overline{DE}$ bisecting $\overline{NWD}$ and $\overline{REA}$ at points W and E, respectively

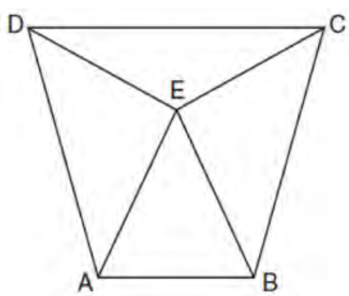


Prove that $\triangle ANW \cong \triangle DRE$. Prove that quadrilateral $AWDE$ is a parallelogram.

90 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.]

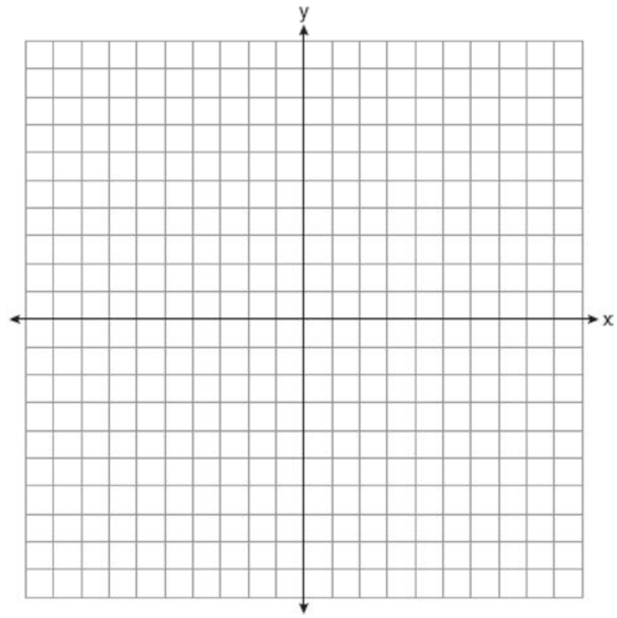


91 Isosceles trapezoid $ABCD$ has bases $\overline{DC}$ and $\overline{AB}$ with nonparallel legs $\overline{AD}$ and $\overline{BC}$. Segments AE, BE, CE, and DE are drawn in trapezoid $ABCD$ such that $\angle CDE \cong \angle DCE$, $\overline{AE} \perp \overline{DE}$, and $\overline{BE} \perp \overline{CE}$.

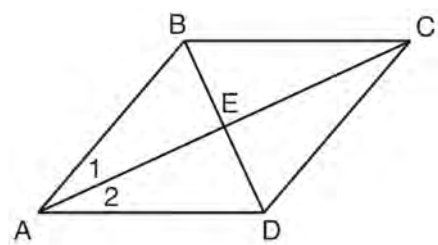


Prove $\triangle ADE \cong \triangle BCE$ and prove $\triangle AEB$ is an isosceles triangle.

92 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.]

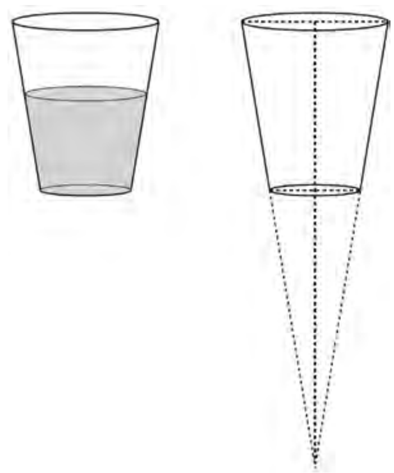


93 Given: Quadrilateral $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$ that bisect each other, and $\angle 1 \cong \angle 2$



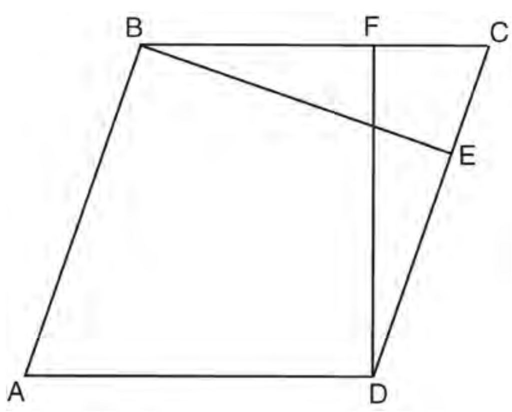
Prove: $\triangle ACD$ is an isosceles triangle and $\triangle AEB$ is a right triangle

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



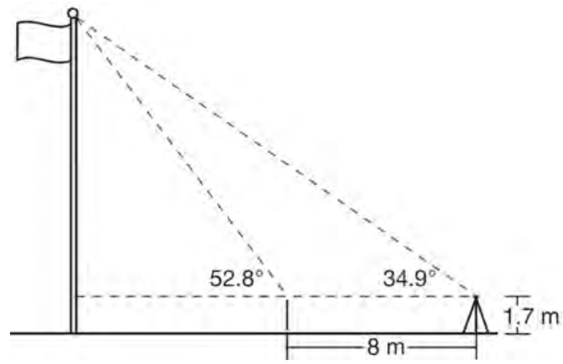
The diameter of the top of the glass is 3 inches, the diameter at the bottom of the glass is 2 inches, and the height of the glass is 5 inches. The base with a diameter of 2 inches must be parallel to the base with a diameter of 3 inches in order to find the height of the cone. Explain why. Determine 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.

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



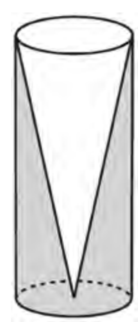
Prove *ABCD* is a rhombus.

96 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.



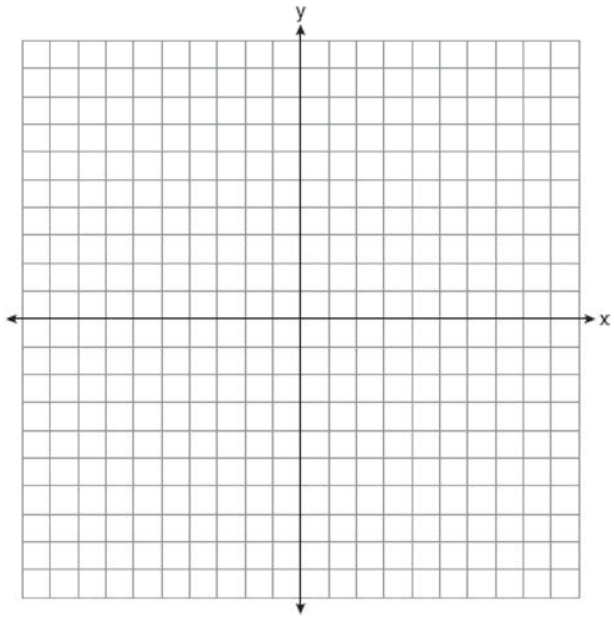
Determine and state, to the *nearest tenth of a meter*, the height of the flagpole.

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

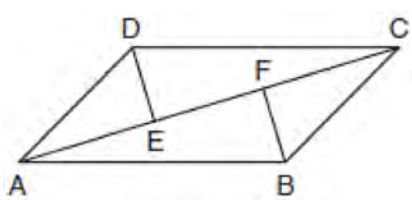


Walter goes to a hobby store to buy the wax for his candles. The wax costs \$0.10 per ounce. If the weight of the wax is 0.52 ounce per cubic inch, how much will it cost Walter to buy the wax for 100 candles? If Walter spent a total of \$37.83 for the molds and charges \$1.95 for each candle, what is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

98 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.]

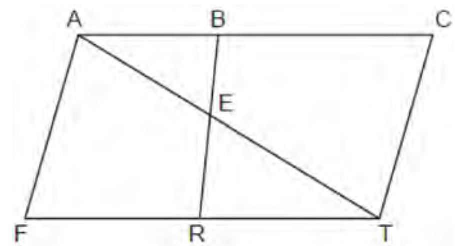


99 In quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$, $\overline{AB} \parallel \overline{CD}$, and $\overline{BF}$ and $\overline{DE}$ are perpendicular to diagonal $\overline{AC}$ at points F and E.



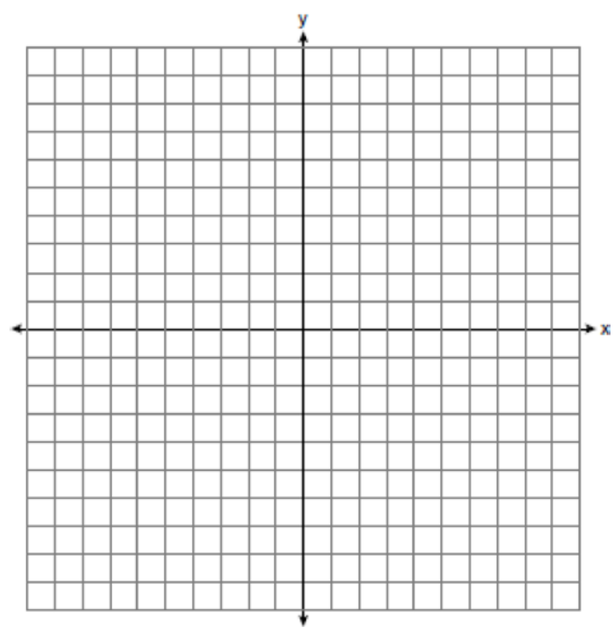
Prove: $\overline{AE} \cong \overline{CF}$

100 In the diagram below of quadrilateral $FACT$, $\overline{BR}$ intersects diagonal $\overline{AT}$ at E, $\overline{AF} \parallel \overline{CT}$, and $\overline{AF} \cong \overline{CT}$.

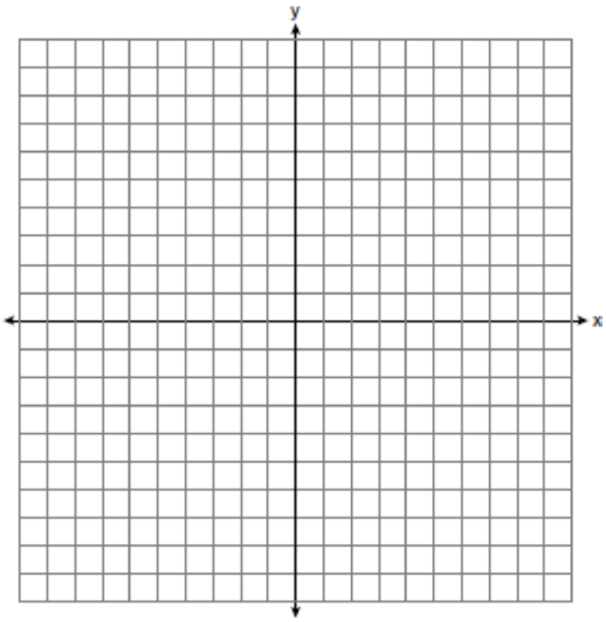


Prove: $(AB)(TE) = (AE)(TR)$

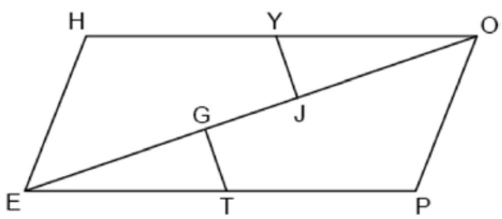
101 Given: Triangle DUC with coordinates $D(-3,-1)$, $U(-1,8)$, and $C(8,6)$
Prove: $\triangle DUC$ is a right triangle
Point U is reflected over $\overline{DC}$ to locate its image point, U', forming quadrilateral $DUCU'$.
Prove quadrilateral $DUCU'$ is a square.
[The use of the set of axes below is optional.]



102 Triangle PET has vertices with coordinates $P(-6,4)$, $E(6,8)$, and $T(-4,-2)$. Prove $\triangle PET$ is a right triangle. State the coordinates of N, the image of P, after a 180° rotation centered at $(1,3)$. Prove $PENT$ is a rectangle. [The use of the set of axes below is optional.]

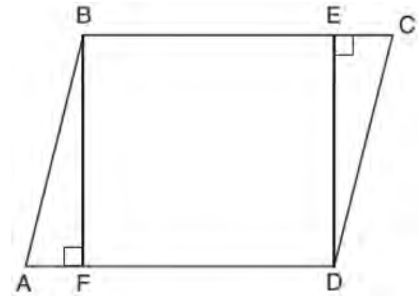


103 In quadrilateral $HOPE$ below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and J, respectively.



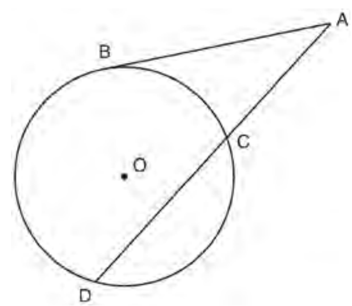
Prove that $\overline{TG} \cong \overline{YJ}$.

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



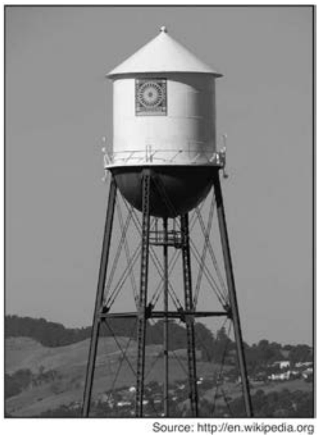
Prove: $BEDF$ is a rectangle

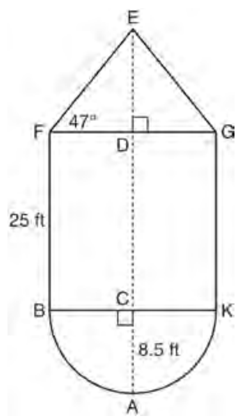
105 In the diagram below, secant $\overline{ACD}$ and tangent $\overline{AB}$ are drawn from external point A to circle O.



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

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

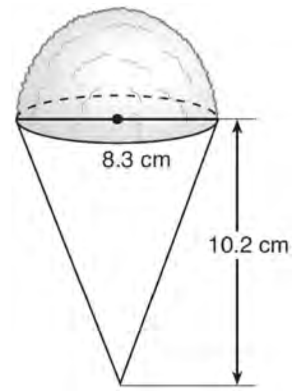




If $AC = 8.5$ feet, $BF = 25$ feet, and $m\angle EFD = 47°$, determine and state, to the *nearest cubic foot*, the volume of the water tower. The water tower was constructed to hold a maximum of 400,000 pounds of water. If water weighs 62.4 pounds per cubic foot, can the water tower be filled to 85%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

107 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?

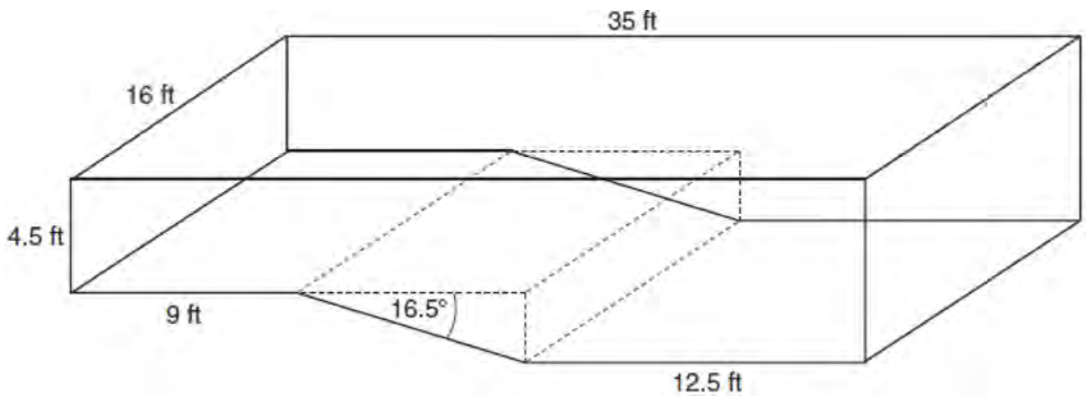
108 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.



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

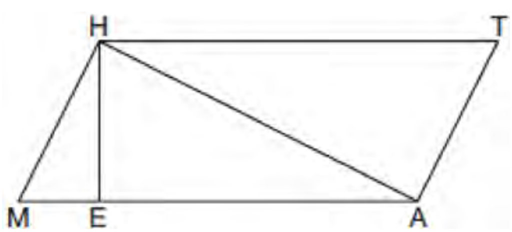
109 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later,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

110 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.



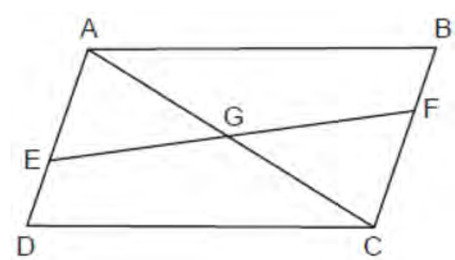
If the sloped floor has an angle of depression of 16.5 degrees, what is the depth of the pool at the deep end, to the *nearest tenth of a foot*? Find the volume of the inside of the pool to the *nearest cubic foot*. A garden hose is used to fill the pool. Water comes out of the hose at a rate of 10 .5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

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



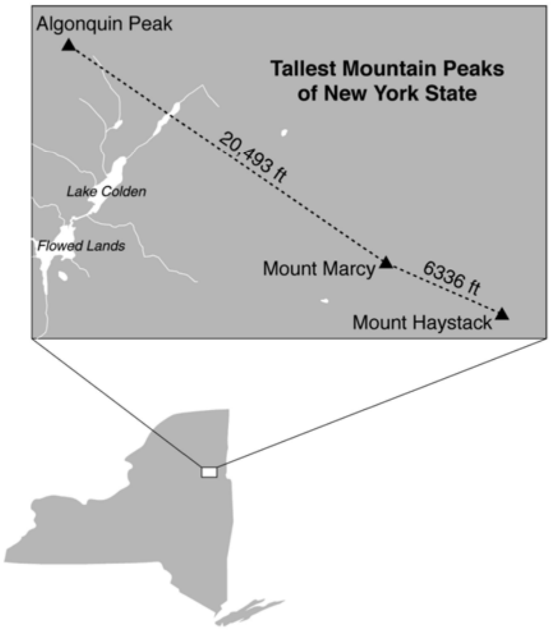
Prove: $TA \bullet HA = HE \bullet TH$

112 Given: Quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$, $\overline{AB} \parallel \overline{CD}$, diagonal $\overline{AC}$ intersects $\overline{EF}$ at G, and $\overline{DE} \cong \overline{BF}$



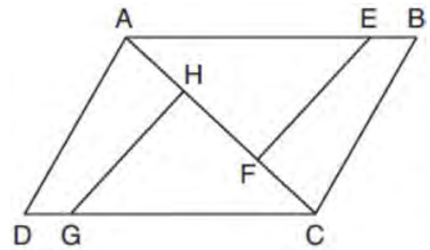
Prove: G is the midpoint of $\overline{EF}$

113 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.



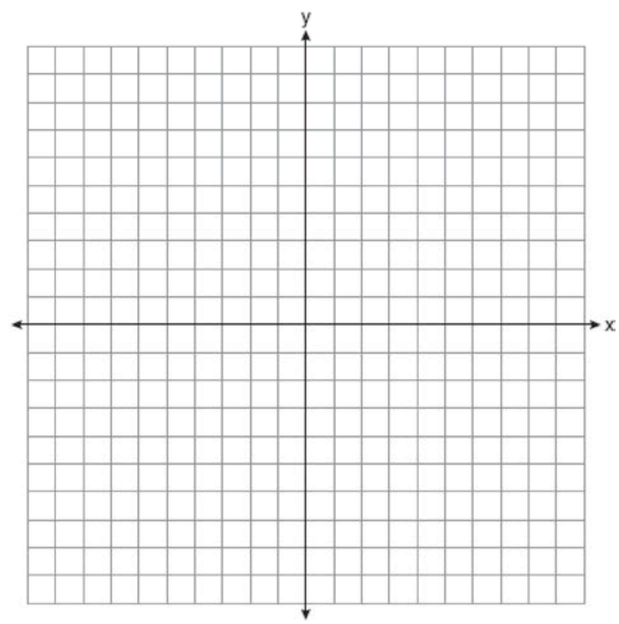
The angle of depression from the peak of Mount Marcy to the peak of Mount Haystack is 3.47 degrees. The angle of elevation from the peak of Algonquin Peak to the peak of Mount Marcy is 0.64 degrees. What are the heights, to the *nearest foot*, of Mount Marcy and Algonquin Peak? Justify your answer.

114 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 $\overline{AD} \cong \overline{CB}$.

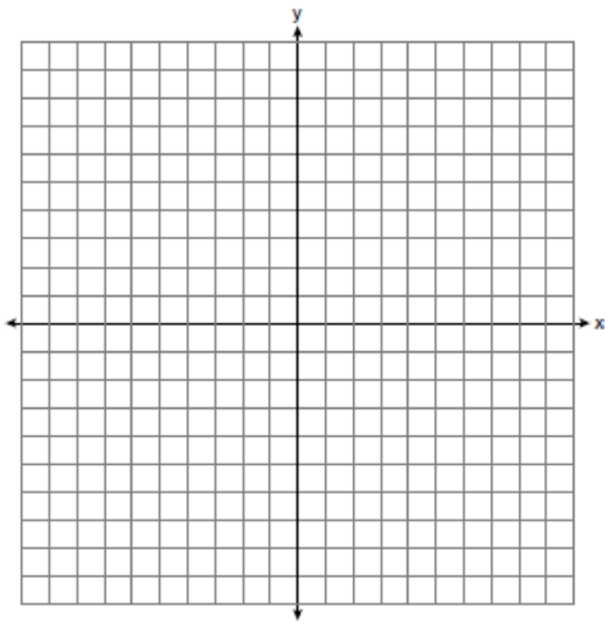


Prove: $\overline{EF} \cong \overline{GH}$

115 The coordinates of the vertices of $\triangle ABC$ are $A(-2,4)$, $B(-7,-1)$, and $C(-3,-3)$. Prove that $\triangle ABC$ is isosceles. State the coordinates of $\triangle A'B'C'$, the image of $\triangle ABC$, after a translation 5 units to the right and 5 units down. Prove that quadrilateral $AA'C'C$ is a rhombus. [The use of the set of axes below is optional.]



116 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.]



Geometry Multiple Choice Regents Exam Questions
Answer Section

1 ANS: 2 PTS: 2 REF: 081701geo
TOP: Cross-Sections of Three-Dimensional Objects

2 ANS: 2

$12^2 = 9 \cdot 16$

$144 = 144$

PTS: 2 REF: 081718geo TOP: Similarity

3 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

4 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

5 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

6 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

7 ANS: 2
SAS

PTS: 2 REF: 012505geo TOP: Triangle Proofs
KEY: statements

8 ANS: 3

$$\frac{6\sqrt{3}}{x} = \frac{\sqrt{3}}{2}$$

$$x = 12$$

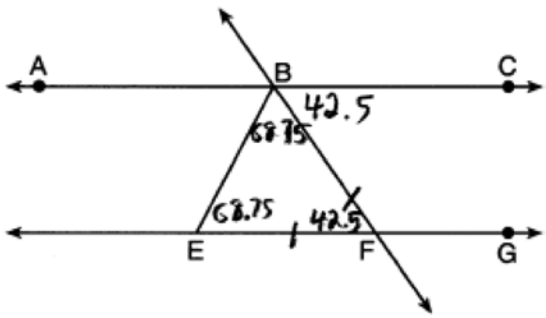
PTS: 2 REF: spr2402geo TOP: 30-60-90 Triangles

9 ANS: 1

$360 - (82 + 104 + 121) = 53$

PTS: 2 REF: 011801geo TOP: Properties of Transformations
KEY: graph

10 ANS: 2



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

11 ANS: 2 PTS: 2 REF: spr2401geo TOP: Identifying Transformations

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

13 ANS: 4

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

$$36 - 4x = 2x$$

$$x = 6$$

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

14 ANS: 1

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

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

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

16 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

17 ANS: 3 PTS: 2 REF: 061706geo TOP: Line Dilations

18 ANS: 1

$84 = \frac{1}{3} \cdot s^2 \cdot 7$

$6 = s$

PTS: 2 REF: 061716geo TOP: Volume KEY: pyramids

19 ANS: 4

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

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

20 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

21 ANS: 1

$24x = 10^2$

$24x = 100$

$x \approx 4.2$

PTS: 2 REF: 061823geo TOP: Similarity

22 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

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

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

25 ANS: 4 PTS: 2 REF: 011810geo TOP: Rotations of Two-Dimensional Objects

26 ANS: 2
$\triangle ACB \sim \triangle AED$

PTS: 2 REF: 061811geo TOP: Side Splitter Theorem
27 ANS: 1
$m = \frac{-4}{-6} = \frac{2}{3}$

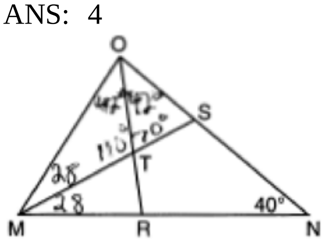
$m_{\perp} = -\frac{3}{2}$

PTS: 2 REF: 011820geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line
28 ANS: 2
$V = \frac{1}{3}\left(\frac{36}{4}\right)^2 \cdot 15 = 405$

PTS: 2 REF: 011822geo TOP: Volume KEY: pyramids
29 ANS: 1
$82.8 = \frac{1}{3}(4.6)(9)h$

$h = 6$

PTS: 2 REF: 061810geo TOP: Volume KEY: pyramids
30 ANS: 2
$\angle B = 180 - (82 + 26) = 72$; $\angle DEC = 180 - 26 = 154$; $\angle EDB = 360 - (154 + 26 + 72) = 108$; $\angle BDF = \frac{108}{2} = 54$;
$\angle DFB = 180 - (54 + 72) = 54$

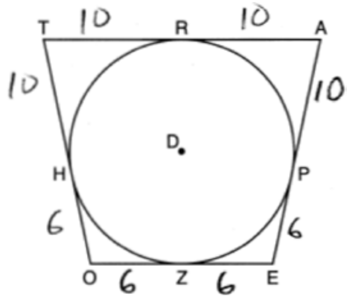
PTS: 2 REF: 061710geo TOP: Interior and Exterior Angles of Triangles
31 ANS: 4


PTS: 2 REF: 061717geo TOP: Interior and Exterior Angles of Triangles
32 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

33 ANS: 2



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

34 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

35 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

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

37 ANS: 1

$\tan x=\frac{1}{12}$

$x\approx 4.76$

PTS: 2 REF: 081715geo TOP: Using Trigonometry to Find an Angle

38 ANS: 2

$6+6\sqrt{3}+6+6\sqrt{3}\approx 32.8$

PTS: 2 REF: 011709geo TOP: 30-60-90 Triangles

39 ANS: 4

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

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

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

41 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

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

43 ANS: 3 PTS: 2 REF: 081817geo TOP: Mapping a Polygon onto Itself

44 ANS: 4 PTS: 2 REF: spr2404geo TOP: Equations of Circles
KEY: write equation, given graph

45 ANS: 1 PTS: 2 REF: 081804geo TOP: Compositions of Transformations
KEY: grids

46 ANS: 4 PTS: 2 REF: 081810geo TOP: Triangle Proofs
KEY: statements

47 ANS: 3

$6 \cdot 3^2 = 54 \quad 12 \cdot 3 = 36$

PTS: 2 REF: 081823geo TOP: Dilations

48 ANS: 1

$-8 + \frac{3}{8}(16 - -8) = -8 + \frac{3}{8}(24) = -8 + 9 = 1 \quad -2 + \frac{3}{8}(6 - -2) = -2 + \frac{3}{8}(8) = -2 + 3 = 1$

PTS: 2 REF: 081717geo TOP: Directed Line Segments

49 ANS: 3

$\frac{x}{6.3} = \frac{3}{5} \quad \frac{y}{9.4} = \frac{6.3}{6.3 + 3.78}$

$x = 3.78 \qquad y \approx 5.9$

PTS: 2 REF: 081816geo TOP: Side Splitter Theorem

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

51 ANS: 1

$V = \frac{1}{3}\pi(4)^2(6) = 32\pi$

PTS: 2 REF: 061718geo TOP: Rotations of Two-Dimensional Objects

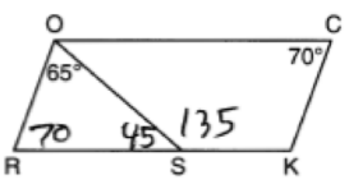
52 ANS: 1

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

$x \approx 23$

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

53 ANS: 4



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

54 ANS: 1

$\frac{64}{4}=16\quad 16^2=256\quad \begin{array}{c}2w+2(w+2)=64\\ w=15\end{array}\quad 15\times 17=255\quad \begin{array}{c}2w+2(w+4)=64\\ w=14\end{array}\quad 14\times 18=252\quad \begin{array}{c}2w+2(w+6)=64\\ w=13\end{array}$

$13\times 19=247$

PTS: 2 REF: 011708geo TOP: Area of Polygons

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

56 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

57 ANS: 2

$\frac{30}{360}(5)^2(\pi)\approx 6.5$

PTS: 2 REF: 081818geo TOP: Sectors

58 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

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

60 ANS: 1 PTS: 2 REF: 061801geo TOP: Properties of Transformations
KEY: graphics

61 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

62 ANS: 4

$40-x+3x=90$

$2x=50$

$x=25$

PTS: 2 REF: 081721geo TOP: Cofunctions

63 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

64 ANS: 2

$$\cos B=\frac{17.6}{26}$$
$$B\approx 47$$

PTS: 2 REF: 061806geo TOP: Using Trigonometry to Find an Angle

65 ANS: 3

$$\cos 40=\frac{14}{x}$$
$$x\approx 18$$

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

66 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

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

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

69 ANS: 4

$$\sin 16.5=\frac{8}{x}$$
$$x\approx 28.2$$

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

70 ANS: 4

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

PTS: 2 REF: 012502geo TOP: Directed Line Segments

71 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

72 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

73 ANS: 3

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

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

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

75 ANS: 3 PTS: 2 REF: 011714geo TOP: Trigonometric Ratios

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

77 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) $3^2 \cdot 10 = 900$

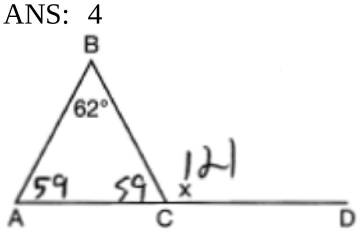
PTS: 2 REF: 081713geo TOP: Rotations of Two-Dimensional Objects

78 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

79 ANS: 4

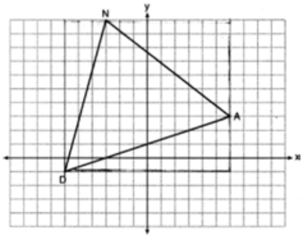


PTS: 2 REF: 081711geo TOP: Exterior Angle Theorem

80 ANS: 3 PTS: 2 REF: 061702geo TOP: Polygons in the Coordinate Plane

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

82 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

83 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

84 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

85 ANS: 3

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

$24x = 600$

$x = 25$

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

86 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

87 ANS: 2

$-4 + \frac{2}{5}(1 - -4) = -4 + \frac{2}{5}(5) = -4 + 2 = -2$ $-2 + \frac{2}{5}(8 - -2) = -2 + \frac{2}{5}(10) = -2 + 4 = 2$

PTS: 2 REF: 061814geo TOP: Directed Line Segments

88 ANS: 4 PTS: 2 REF: 011816geo TOP: Chords, Secants and Tangents
KEY: inscribed

89 ANS: 4

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

PTS: 2 REF: 011721geo TOP: Sectors

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

91 ANS: 3

$$\frac{12\pi\left(\frac{\theta}{180}\right)}{8\pi\left(\frac{\theta}{180}\right)} = 1.5$$

PTS: 2 REF: 011824geo TOP: Arc Length

92 ANS: 3

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

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

93 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

94 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

95 ANS: 2

$$K = \frac{1}{2}(8)(5)\sin 57 \approx 16.8$$

PTS: 2 REF: spr2403geo TOP: Using Trigonometry to Find Area

KEY: basic

96 ANS: 4

AA

PTS: 2 REF: 061809geo TOP: Similarity Proofs

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

98 ANS: 4

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

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

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

$$1 \qquad -1$$

PTS: 2 REF: spr1401geo TOP: Directed Line Segments

99 ANS: 4

$C=12\pi \quad \frac{120}{360}(12\pi)=\frac{1}{3}(12\pi)$

PTS: 2 REF: 061822geo TOP: Arc Length

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

101 ANS: 1

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

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

102 ANS: 4

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

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

103 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

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

105 ANS: 4

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

PTS: 2 REF: 061805geo TOP: Dilations

106 ANS: 3

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

$$10x=200$$

$$x=20$$

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

107 ANS: 2

$$x^2 = 12(12-8)$$
$$x^2 = 48$$
$$x = 4\sqrt{3}$$

PTS: 2 REF: 011823geo TOP: Similarity

108 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

109 ANS: 2

$$\frac{x}{x+3} = \frac{14}{21} \qquad 14-6=8$$
$$21x = 14x + 42$$
$$7x = 42$$
$$x = 6$$

PTS: 2 REF: 081812geo TOP: Side Splitter Theorem

110 ANS: 2

$$K = \frac{1}{2}(8)(5)\sin 57 \approx 16.8$$

PTS: 2 REF: spr2403geo TOP: Using Trigonometry to Find Area
KEY: basic

111 ANS: 4 PTS: 2 REF: 061803geo TOP: Identifying Transformations
KEY: graphics

112 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

113 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

114 ANS: 1

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

$$O \approx 68.6$$

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

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

116 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

117 ANS: 1

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

$$2x = 40$$

$$x = 20$$

PTS: 2 REF: 061808geo TOP: Cofunctions

118 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

119 ANS: 1

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

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

PTS: 2 REF: 012506geo TOP: Equations of Circles
KEY: completing the square

120 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

121 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

122 ANS: 4 PTS: 2 REF: 061711geo TOP: Special Quadrilaterals

123 ANS: 1

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

PTS: 2 REF: 011806geo TOP: Directed Line Segments

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

125 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

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

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

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

128 ANS: 2

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

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

129 ANS: 4 PTS: 2 REF: 011704geo TOP: Midsegments

130 ANS: 2 PTS: 2 REF: 012503geo TOP: Compositions of Transformations

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

132 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

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

134 ANS: 1

$$\sin 32=\frac{x}{6.2}$$
$$x\approx 3.3$$

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

135 ANS: 2

$$2x+7+4x-7=90$$
$$6x=90$$
$$x=15$$

PTS: 2 REF: 081824geo TOP: Cofunctions

136 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

137 ANS: 3 PTS: 2 REF: 011815geo TOP: Mapping a Polygon onto Itself

138 ANS: 4 PTS: 2 REF: 081803geo TOP: Rotations of Two-Dimensional Objects

139 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

140 ANS: 1

$\sin 24 = \frac{7.7}{x}$

$x \approx 18.9$

PTS: 2 REF: 012504geo TOP: Using Trigonometry to Find a Side

141 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

142 ANS: 4

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

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

143 ANS: 2 PTS: 2 REF: 061720geo TOP: Parallelograms

144 ANS: 2

$K = \frac{1}{2}(10)(18)\sin 120 = 45\sqrt{3} \approx 78$

PTS: 2 REF: fall0907a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: basic

145 ANS: 1 PTS: 2 REF: 011814geo TOP: Line Dilations

146 ANS: 3

$\sqrt{(-5)^2 + 12^2} = \sqrt{169}$ $\sqrt{11^2 + (2\sqrt{12})^2} = \sqrt{121 + 48} = \sqrt{169}$

PTS: 2 REF: 011722geo TOP: Circles in the Coordinate Plane

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

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

149 ANS: 3

$\triangle CFB \sim \triangle CAD$ $\frac{CB}{CF} = \frac{CD}{CA}$

$\frac{x}{21.6} = \frac{7.2}{9.6}$

$x = 16.2$

PTS: 2 REF: 061804geo TOP: Similarity KEY: basic

150 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

151 ANS: 4 PTS: 2 REF: 011808geo
TOP: Analytical Representations of Transformations KEY: basic

152 ANS: 1

$$\cos S = \frac{60}{65}$$

$$S \approx 23$$

PTS: 2 REF: 061713geo TOP: Using Trigonometry to Find an Angle

153 ANS: 4 PTS: 2 REF: 012501geo TOP: Dilations

154 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

155 ANS: 1

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

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

Geometry Multiple Choice Regents Exam Questions
Answer Section

156 ANS: 1 PTS: 2 REF: 011601geo
TOP: Cross-Sections of Three-Dimensional Objects

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

PTS: 2 REF: fall1403geo TOP: Line Dilations

158 ANS: 2 PTS: 2 REF: 061610geo TOP: Chords, Secants and Tangents
KEY: inscribed

159 ANS: 1

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

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

$-1 = b$

PTS: 2 REF: 081614geo TOP: Quadrilaterals in the Coordinate Plane
KEY: general

160 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

161 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

162 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

163 ANS: 2

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

PTS: 2 REF: 011604geo TOP: Volume KEY: prisms

164 ANS: 4 PTS: 2 REF: 061504geo TOP: Compositions of Transformations
KEY: identify

165 ANS: 1 PTS: 2 REF: 061520geo TOP: Chords, Secants and Tangents
KEY: mixed

166 ANS: 1 PTS: 2 REF: 061604geo TOP: Identifying Transformations
KEY: graphics

167 ANS: 2 PTS: 2 REF: 081519geo TOP: Similarity
KEY: basic

168 ANS: 4

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

PTS: 2 REF: 081621geo TOP: Line Dilations

169 ANS: 3 PTS: 2 REF: 081622geo TOP: Triangle Proofs
KEY: statements

170 ANS: 2

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

$$4.5 = \pi d$$

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

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

PTS: 2 REF: 081617geo TOP: Density

171 ANS: 2

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

$$x = \sqrt{40}$$

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

PTS: 2 REF: 081610geo TOP: Similarity

172 ANS: 3 PTS: 2 REF: 061616geo TOP: Identifying Transformations
KEY: graphics

173 ANS: 1

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

PTS: 2 REF: 011623geo TOP: Circumference

174 ANS: 2 PTS: 2 REF: 081602geo TOP: Identifying Transformations
KEY: basic

175 ANS: 1 PTS: 2 REF: 011608geo TOP: Compositions of Transformations
KEY: identify

176 ANS: 1
Alternate interior angles

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

177 ANS: 4 PTS: 2 REF: 081514geo TOP: Compositions of Transformations
KEY: grids

178 ANS: 2

$$x^2 + y^2 + 6y + 9 = 7 + 9$$
$$x^2 + (y+3)^2 = 16$$

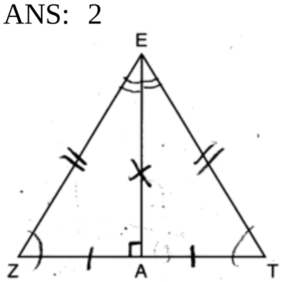
PTS: 2 REF: 061514geo TOP: Equations of Circles
KEY: completing the square

179 ANS: 2

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

PTS: 2 REF: 011622geo TOP: Similarity

180 ANS: 2



PTS: 2 REF: 061619geo TOP: Triangle Proofs

181 ANS: 1 PTS: 2 REF: 061518geo TOP: Line Dilations

182 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

183 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

184 ANS: 3

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

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

185 ANS: 1 PTS: 2 REF: 061508geo TOP: Chords, Secants and Tangents
KEY: inscribed

186 ANS: 3

$$\frac{x}{360} \cdot 3^2 \pi = 2\pi \quad 180 - 80 = 100$$
$$x = 80 \quad \frac{180 - 100}{2} = 40$$

PTS: 2 REF: 011612geo TOP: Sectors

187 ANS: 4

$$4y = 7x - 3 \quad m = \frac{7}{4} \quad .$$
$$y = \frac{7}{4}x - \frac{3}{4} \quad m_{\perp} = -\frac{4}{7}$$

PTS: 2 REF: 012508geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

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

189 ANS: 3

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

PTS: 2 REF: 081608geo TOP: 30-60-90 Triangles

190 ANS: 2

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

PTS: 2 REF: 011619geo TOP: Density

191 ANS: 3

$$\frac{AB}{BC} = \frac{DE}{EF}$$
$$\frac{9}{15} = \frac{6}{10}$$
$$90 = 90$$

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

192 ANS: 3 PTS: 2 REF: 061601geo TOP: Rotations of Two-Dimensional Objects

193 ANS: 4

$$2592276 = \frac{1}{3} \cdot s^2 \cdot 146.5$$
$$230 \approx s$$

PTS: 2 REF: 081521geo TOP: Volume KEY: pyramids

194 ANS: 1

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

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

195 ANS: 3

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

PTS: 2 REF: 081518geo TOP: Sectors

196 ANS: 4

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

PTS: 2 REF: 081522geo TOP: Quadrilaterals in the Coordinate Plane
KEY: general

197 ANS: 4 PTS: 2 REF: 011611geo TOP: Properties of Transformations
KEY: graphics

198 ANS: 1 PTS: 2 REF: 081605geo TOP: Rotations
KEY: grids

199 ANS: 1

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

$$f = 10$$

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

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

201 ANS: 3

$$V = \pi(3)^2(3) = 27\pi$$

PTS: 2 REF: 012507geo TOP: Rotations of Two-Dimensional Objects

202 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

203 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

204 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

205 ANS: 3 PTS: 2 REF: 081613geo
TOP: Cross-Sections of Three-Dimensional Objects

206 ANS: 4 PTS: 2 REF: 061615geo TOP: Trigonometric Ratios

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

208 ANS: 3
$\frac{9}{5} = \frac{9.2}{x}$ $5.1 + 9.2 = 14.3$

$9x = 46$

$x \approx 5.1$

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

209 ANS: 1
$180 - (68 \cdot 2)$

PTS: 2 REF: 081624geo TOP: Interior and Exterior Angles of Polygons

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

211 ANS: 3
$\tan 34 = \frac{T}{20}$

$T \approx 13.5$

PTS: 2 REF: 061505geo TOP: Using Trigonometry to Find a Side
KEY: graphics

212 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

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

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

214 ANS: 2 PTS: 2 REF: 061603geo TOP: Equations of Circles
KEY: find center and radius | completing the square

215 ANS: 3

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

$x=15$

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

216 ANS: 3

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

$W=408\cdot 0.25=102$

PTS: 2 REF: 061507geo TOP: Density

217 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

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

219 ANS: 3

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

PTS: 2 REF: 061503geo TOP: Circles in the Coordinate Plane

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

221 ANS: 2

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

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

PTS: 2 REF: 061519geo TOP: Surface Area

222 ANS: 4

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

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

223 ANS: 3

(3) Could be a trapezoid.

PTS: 2 REF: 081607geo TOP: Parallelograms

224 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

225 ANS: 4

$$m = -\frac{1}{2} \quad -4 = 2(6) + b$$
$$m_{\perp} = 2 \quad -4 = 12 + b$$
$$-16 = b$$

PTS: 2 REF: 011602geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

226 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

227 ANS: 2

$$\frac{12}{4} = \frac{36}{x}$$
$$12x = 144$$
$$x = 12$$

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

228 ANS: 3

$$\frac{120 + (180 - 105)}{2} = \frac{195}{2} = 97.5$$

PTS: 2 REF: 012510geo TOP: Chords, Secants and Tangents
KEY: intersecting chords, angle

229 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

230 ANS: 3 PTS: 2 REF: 011621geo TOP: Chords, Secants and Tangents
KEY: inscribed

231 ANS: 2

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

PTS: 2 REF: 011607geo TOP: Volume KEY: pyramids

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

233 ANS: 1

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

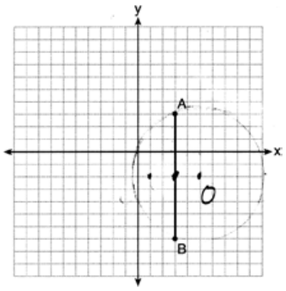
$1 = -4 + b$

$5 = b$

PTS: 2 REF: 081510geo TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

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

235 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

236 ANS: 4 PTS: 2 REF: 061502geo TOP: Identifying Transformations
KEY: basic

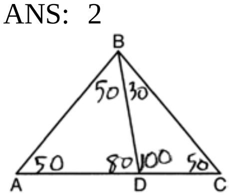
237 ANS: 4 PTS: 2 REF: 081609geo TOP: Compositions of Transformations
KEY: grids

238 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

239 ANS: 2



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

240 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

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: 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

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

244 ANS: 1

$3^2 = 9$

PTS: 2 REF: 081520geo TOP: Dilations

245 ANS: 1

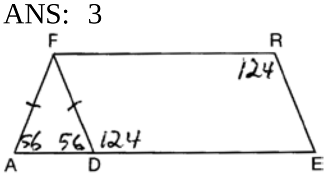
$m = \left(\frac{-11+5}{2}, \frac{5+-7}{2}\right) = (-3,-1)$ $m = \frac{5--7}{-11-5} = \frac{12}{-16} = -\frac{3}{4}$ $m_{\perp} = \frac{4}{3}$

PTS: 2 REF: 061612geo TOP: Parallel and Perpendicular Lines
KEY: perpendicular bisector

246 ANS: 3 PTS: 2 REF: 081502geo TOP: Identifying Transformations
KEY: basic

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

248 ANS: 3



PTS: 2 REF: 081508geo TOP: Interior and Exterior Angles of Polygons

249 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

250 ANS: 4 PTS: 2 REF: 061608geo TOP: Compositions of Transformations
KEY: grids

251 ANS: 2 PTS: 2 REF: 061506geo
TOP: Cross-Sections of Three-Dimensional Objects

252 ANS: 1 PTS: 2 REF: 081507geo TOP: Compositions of Transformations
KEY: identify

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

254 ANS: 4

$3 \times 6 = 18$

PTS: 2 REF: 061602geo TOP: Line Dilations

255 ANS: 2

$\frac{1\,\mathrm{l}}{1.2\text{ oz}}\left(\frac{16\text{ oz}}{1\text{ lb}}\right) = \frac{13.\overline{3}\,\mathrm{l}}{\text{lb}}\quad \frac{13.\overline{3}\,\mathrm{l}}{\text{lb}}\left(\frac{1\text{ g}}{3.785\,\mathrm{l}}\right) \approx \frac{3.5\text{ g}}{1\text{ lb}}$

PTS: 2 REF: 061618geo TOP: Density

256 ANS: 2

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

PTS: 2 REF: 061523geo TOP: Circumference

257 ANS: 2 PTS: 2 REF: 012509geo TOP: Medians, Altitudes and Bisectors

258 ANS: 2 PTS: 2 REF: 081501geo TOP: Special Quadrilaterals

259 ANS: 1

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

PTS: 2 REF: 081523geo TOP: Dilations

260 ANS: 4 PTS: 2 REF: 061606geo TOP: Volume
KEY: compositions

261 ANS: 2

$h^2 = 30 \cdot 12$

$h^2 = 360$

$h = 6\sqrt{10}$

PTS: 2 REF: 061613geo TOP: Similarity

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

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: 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

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

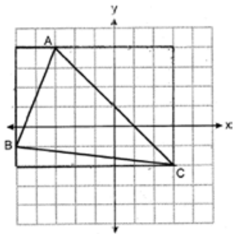
266 ANS: 1

$$\frac{360°}{45°} = 8$$

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

267 ANS: 1 PTS: 2 REF: 012512geo TOP: Midsegments

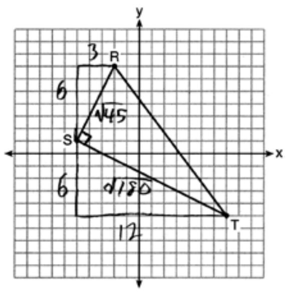
268 ANS: 3



$$8 \times 6 - \frac{1}{2}(8 \times 1 + 5 \times 2 + 6 \times 6) = 48 - \frac{1}{2}(54) = 21$$

PTS: 2 REF: 012511geo TOP: Polygons in the Coordinate Plane

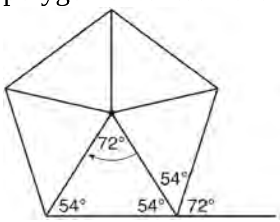
269 ANS: 3



$$\sqrt{45} = 3\sqrt{5} \quad a = \frac{1}{2}\left(3\sqrt{5}\right)\left(6\sqrt{5}\right) = \frac{1}{2}(18)(5) = 45$$
$$\sqrt{180} = 6\sqrt{5}$$

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

270 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

271 ANS: 2

$K = \frac{1}{2}(27)(19)\sin 135 \approx 181.4$

PTS: 2 REF: 061602a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: basic

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

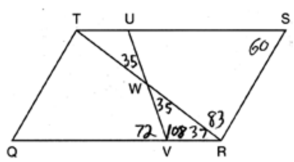
273 ANS: 1 PTS: 2 REF: 081606geo TOP: Cofunctions

274 ANS: 4

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

PTS: 2 REF: 081517geo TOP: Side Splitter Theorem

275 ANS: 3



PTS: 2 REF: 011603geo TOP: Interior and Exterior Angles of Polygons

276 ANS: 3 PTS: 2 REF: 011605geo
TOP: Analytical Representations of Transformations KEY: basic

277 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

278 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

279 ANS: 2 PTS: 2 REF: 010219siii TOP: Using Trigonometry to Find Area
KEY: basic

280 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

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

282 ANS: 3

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

$A \approx 50°$

PTS: 2 REF: 011616geo TOP: Using Trigonometry to Find an Angle

283 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

284 ANS: 3

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

PTS: 2 REF: 081512geo TOP: Chords, Secants and Tangents
KEY: common tangents

285 ANS: 4 PTS: 2 REF: 081506geo TOP: Dilations

Geometry Multiple Choice Regents Exam Questions
Answer Section

286 ANS: 4 PTS: 2 REF: 012415geo
TOP: Cross-Sections of Three-Dimensional Objects

287 ANS: 3

$$x^2+12x+36+y^2=-27+36$$
$$(x+6)^2+y^2=9$$

PTS: 2 REF: 082313geo TOP: Equations of Circles
KEY: completing the square

288 ANS: 1 PTS: 2 REF: 082413geo TOP: Identifying Transformations

289 ANS: 1 PTS: 2 REF: 012418geo TOP: Similarity

290 ANS: 2

$$24\text{ ht}\left(\frac{0.75\text{ in}^3}{\text{ht}}\right)\left(\frac{0.323\text{ lb}}{1\text{ in}^3}\right)\left(\frac{\$3.68}{\text{lb}}\right)\approx \$21.40$$

PTS: 2 REF: 012306geo TOP: Density

291 ANS: 2 PTS: 2 REF: 062402geo
TOP: Cross-Sections of Three-Dimensional Objects

292 ANS: 1

$$\frac{\frac{1}{4}\left(\pi\cdot 22^2\cdot 27\right)}{231}\approx 44$$

PTS: 2 REF: 012517geo TOP: Volume KEY: cylinders

293 ANS: 2 PTS: 2 REF: 012420geo TOP: Special Quadrilaterals

294 ANS: 4

$$\frac{180(8-2)}{8}=135$$

PTS: 2 REF: 082415geo TOP: Mapping a Polygon onto Itself

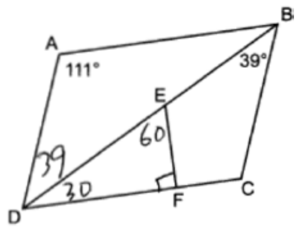
295 ANS: 2 PTS: 2 REF: 082311geo TOP: Cofunctions

296 ANS: 1

$$\frac{56+x}{2}=46$$
$$x+56=92$$
$$x=36$$

PTS: 2 REF: 082421geo TOP: Chords, Secants and Tangents
KEY: intersecting chords, angle

297 ANS: 3



PTS: 2 REF: 062306geo TOP: Interior and Exterior Angles of Polygons

298 ANS: 2

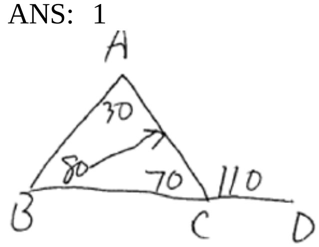
Sine and cosine are cofunctions.

PTS: 2 REF: 082403geo TOP: Cofunctions

299 ANS: 3 PTS: 2 REF: 062302geo TOP: Properties of Transformations

KEY: graphics

300 ANS: 1



PTS: 2 REF: 082310geo TOP: Angle Side Relationship

301 ANS: 4 PTS: 2 REF: 062321geo TOP: Side Splitter Theorem

302 ANS: 1

The lengths of the sides of a triangle remain the same after all rotations and reflections because rotations and reflections are rigid motions which preserve distance.

PTS: 2 REF: 012301geo TOP: Properties of Transformations

KEY: graphics

303 ANS: 2

$\frac{70}{360} \cdot 6^2 \pi = 7\pi$

PTS: 2 REF: 082309geo TOP: Sectors

304 ANS: 1 PTS: 2 REF: 062409geo TOP: Chords, Secants and Tangents

KEY: inscribed

305 ANS: 4

$\frac{360}{6}$ = 60 and 300 is a multiple of 60.

PTS: 2 REF: 082306geo TOP: Mapping a Polygon onto Itself

306 ANS: 4

$\frac{140}{360} \cdot 9^2 \pi = 31.5\pi$

PTS: 2 REF: 012317geo TOP: Sectors

307 ANS: 3 PTS: 2 REF: 082307geo TOP: Rotations of Two-Dimensional Objects

308 ANS: 3

$25 + \frac{12 \times 24 \times 14}{27.7} \approx 171$

PTS: 2 REF: 082423geo TOP: Density

309 ANS: 4

$\cos 47 = \frac{50}{x}$

$x \approx 73$

PTS: 2 REF: 012406geo TOP: Using Trigonometry to Find a Side

310 ANS: 3 PTS: 2 REF: 062310geo TOP: Special Quadrilaterals

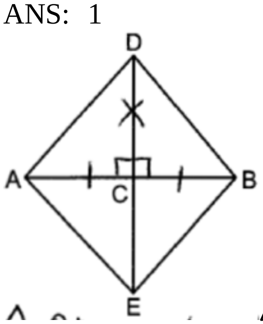
311 ANS: 4 PTS: 2 REF: 062318geo TOP: Lines and Angles

312 ANS: 2

$\triangle ACB \sim \triangle AED$

PTS: 2 REF: 012308geo TOP: Side Splitter Theorem

313 ANS: 1



$\triangle ADC \cong \triangle BDC$ by SAS

PTS: 2 REF: 082316geo TOP: Triangle Congruency

314 ANS: 2

$3y = -6x + 3$

$y = -2x + 1$

PTS: 2 REF: 062319geo TOP: Line Dilations

315 ANS: 2 PTS: 2 REF: 082305geo TOP: Special Quadrilaterals

316 ANS: 4 PTS: 2 REF: 062422geo TOP: Similarity

317 ANS: 2

$$x^2 + 2x + 1 + y^2 - 16y + 64 = -49 + 1 + 64$$

$$(x + 1)^2 + (y - 8)^2 = 16$$

PTS: 2 REF: 012314geo TOP: Equations of Circles
KEY: completing the square

318 ANS: 3

$$\frac{x}{13} = \frac{3}{8}$$

$$8x = 39$$

$$x \approx 4.9$$

PTS: 2 REF: 082405geo TOP: Side Splitter Theorem

319 ANS: 2

$$7 \times 4 - \frac{1}{2}\left((7)(1) + (3)(4) + (4)(3)\right) = 28 - \frac{7}{2} - 6 - 6 = 12.5$$

PTS: 2 REF: 012407geo TOP: Polygons in the Coordinate Plane

320 ANS: 3

$$90 - 30 = 60$$

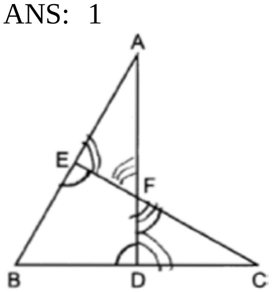
PTS: 2 REF: 012401geo TOP: Cofunctions

321 ANS: 4

$$(3)(4)(1.8)^2 \approx 38.9$$

PTS: 2 REF: 082420geo TOP: Dilations

322 ANS: 1



PTS: 2 REF: 012423geo TOP: Triangle Proofs
KEY: statements

323 ANS: 3

$$m = \frac{3}{4} \quad m_{\perp} = -\frac{4}{3}$$

PTS: 2 REF: 062406geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

324 ANS: 1
$V = \pi r^2 h = \pi \cdot 5^2 \cdot 8 \approx 200\pi$

PTS: 2 REF: 082304geo TOP: Volume KEY: cylinders

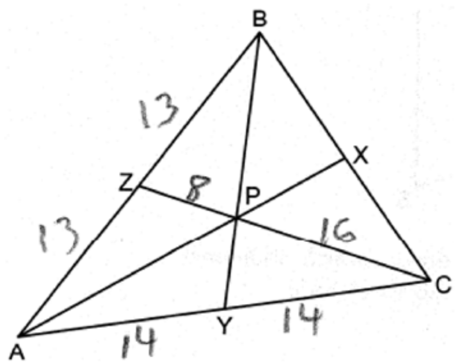
325 ANS: 1
$\cos S = \frac{12.3}{13.6}$

$S \approx 25°$

PTS: 2 REF: 062304geo TOP: Using Trigonometry to Find an Angle

326 ANS: 2
$\frac{1}{3}(36)(10)(2.7) = 324$

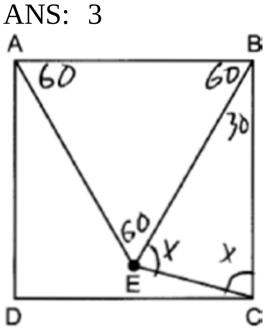
PTS: 2 REF: 082312geo TOP: Density

327 ANS: 2


$\frac{x}{16} = \frac{1}{2}$ $8 + 16 + 13 + 14 + 14 = 65$

$x = 8$

PTS: 2 REF: 082408geo TOP: Centroid, Orthocenter, Incenter and Circumcenter

328 ANS: 3


$30 + 2x = 180$

$2x = 150$

$x = 75$

PTS: 2 REF: 082315geo TOP: Interior and Exterior Angles of Polygons

329 ANS: 4 PTS: 2 REF: 012515geo TOP: Mapping a Polygon onto Itself

330 ANS: 1

$m_{\overline{AB}} = \frac{-3-5}{-1-6} = \frac{-8}{-7} = \frac{8}{7}$

PTS: 2 REF: 062315geo TOP: Quadrilaterals in the Coordinate Plane

331 ANS: 3

1) $\frac{360}{3} = 120$; 2) $\frac{360}{6} = 60$; 3) $\frac{360}{8} = 45$; 4) $\frac{360}{9} = 40$. 120 is not a multiple of 45.

PTS: 2 REF: 062320geo TOP: Mapping a Polygon onto Itself

332 ANS: 4 PTS: 2 REF: 082301geo
TOP: Cross-Sections of Three-Dimensional Objects

333 ANS: 1 PTS: 2 REF: 062308geo TOP: Compositions of Transformations

334 ANS: 4 PTS: 2 REF: 082410geo TOP: Triangle Congruency

335 ANS: 1

2) 90°; 3) 360°; 4) 72°

PTS: 2 REF: 012311geo TOP: Mapping a Polygon onto Itself

336 ANS: 1

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

PTS: 2 REF: 062418geo TOP: Directed Line Segments

337 ANS: 1

$y = 3x + 4,\ m = 3,\ m_{\perp} = -\frac{1}{3}$

PTS: 2 REF: 012405geo TOP: Parallel and Perpendicular Lines
KEY: identify perpendicular lines

338 ANS: 4

$4 + 4 > 7$

PTS: 2 REF: 062421geo TOP: Triangle Inequality Theorem

339 ANS: 3

$2 \times \frac{40 \times 16}{33\frac{1}{3}} = 38.4$

PTS: 2 REF: 012404geo TOP: Area of Polygons

340 ANS: 2 PTS: 2 REF: 062415geo TOP: Rotations of Two-Dimensional Objects

341 ANS: 1

$180 - 2(75) = 30$

PTS: 2 REF: 082407geo TOP: Lines and Angles

342 ANS: 4

$$x^2 = 3 \times 24$$
$$x = \sqrt{72}$$

PTS: 2 REF: 012315geo TOP: Similarity

343 ANS: 2 PTS: 2 REF: 082417geo TOP: Line Dilations

344 ANS: 3 PTS: 2 REF: 062307geo TOP: Side Splitter Theorem

345 ANS: 1

$$-4 + \frac{3}{5}(1 - -4) = -4 + 3 = -1 \quad -2 + \frac{3}{5}(8 - -2) = -2 + 6 = 4$$

PTS: 2 REF: 082402geo TOP: Directed Line Segments

346 ANS: 2

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

PTS: 2 REF: 011907geo TOP: Special Quadrilaterals

347 ANS: 2

$$V = \frac{1}{3}\pi \cdot (2.5)^2 \cdot 7.2 \cong 47.1$$

PTS: 2 REF: 062303geo TOP: Volume KEY: cones

348 ANS: 2

$$x^2 + y^2 - 2x + 4y - 5 = 0$$
$$x^2 - 2x + 1 + y^2 + 4y + 4 = 5 + 1 + 4$$
$$(x - 1)^2 + (y + 2)^2 = 10$$

PTS: 2 REF: 082416geo TOP: Equations of Circles
KEY: completing the square

349 ANS: 3

$$\cos x = \frac{8}{25}$$
$$x \approx 71$$

PTS: 2 REF: 082303geo TOP: Using Trigonometry to Find an Angle

350 ANS: 3

$$V = \pi(8)^2(4 - 0.5)(7.48) \approx 5264$$

PTS: 2 REF: 012320geo TOP: Volume KEY: cylinders

351 ANS: 1

$r = 8$, forming an 8-15-17 triple. $V = \frac{1}{3}\pi(8)^2 15 = 320\pi$

PTS: 2 REF: 082318geo TOP: Volume KEY: cones

352 ANS: 3
The measures of the angles of a triangle remain the same after a translation because translations are rigid motions which preserve angle measure.

PTS: 2 REF: 082401geo TOP: Properties of Transformations
353 ANS: 2

$24^2 = 4x \cdot 9x \quad 5 \cdot 4 = 20$

$576 = 36x^2$

$16 = x^2$

$4 = x$

PTS: 2 REF: 012312geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, length
354 ANS: 4

$V = \pi r^2 h \qquad d \approx 6.129 \times 2 \approx 12.3$

$1180 = \pi r^2 \cdot 10$

$r^2 = \frac{1180}{10\pi}$

$r \approx 6.129$

PTS: 2 REF: 062413geo TOP: Volume KEY: cylinders
355 ANS: 2

$$\frac{\frac{1}{3}\pi(6)^2 13}{2} \approx 245$$

PTS: 2 REF: 062408geo TOP: Volume KEY: cones
356 ANS: 3 PTS: 2 REF: 062323geo TOP: Trapezoids
357 ANS: 2

$3x + 9 + 5x - 7 = 90$

$8x + 2 = 90$

$8x = 88$

$x = 11$

PTS: 2 REF: 062420geo TOP: Cofunctions
358 ANS: 2 PTS: 2 REF: 082419geo TOP: Similarity
359 ANS: 4 PTS: 2 REF: 082404geo TOP: Parallelograms

360 ANS: 4

$$\frac{x}{360} = \frac{6.2}{9\pi}$$

$$x \approx 79$$

PTS: 2 REF: 082424geo TOP: Arc Length

361 ANS: 2 PTS: 2 REF: 012416geo TOP: Line Dilations

362 ANS: 3

(3) is AAS, which proves congruency. (1) is AAA, (2) is SSA and (4) is AS.

PTS: 2 REF: 012422geo TOP: Triangle Congruency

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

364 ANS: 4

A: $(-3-3,4-5) \rightarrow (-6,-1) \rightarrow (-12,-2) \rightarrow (-12+3,-2+5)$

B: $(5-3,2-5) \rightarrow (2,-3) \rightarrow (4,-6) \rightarrow (4+3,-6+5)$

PTS: 2 REF: 012322geo TOP: Line Dilations

365 ANS: 1

$$6^2 = 4x$$

$$x = 9$$

PTS: 2 REF: 012412geo TOP: Similarity

366 ANS: 3 PTS: 2 REF: 062414geo TOP: Dilations

367 ANS: 1 PTS: 2 REF: 012316geo TOP: Medians, Altitudes and Bisectors

368 ANS: 4

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

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

$$(x+3)^2 + (y-1)^2 = 9$$

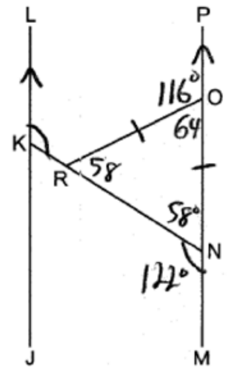
PTS: 2 REF: 062309geo TOP: Equations of Circles

KEY: completing the square

369 ANS: 3 PTS: 2 REF: 062419geo TOP: Similarity

KEY: basic

370 ANS: 3



PTS: 2 REF: 012513geo TOP: Lines and Angles

371 ANS: 4 PTS: 2 REF: 082422geo
TOP: Cross-Sections of Three-Dimensional Objects

372 ANS: 3

$3 - 1 = 2$

$1 - 2 = -1$

PTS: 2 REF: 082317geo TOP: Reflections

373 ANS: 3

$$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot \left(\frac{18}{2}\right)^3 = 972\pi$$

PTS: 2 REF: 062404geo TOP: Volume KEY: spheres

374 ANS: 4

$\frac{x}{10} = \frac{12}{8}$ $15 + 10 = 25$

$x = 15$

PTS: 2 REF: 082314geo TOP: Side Splitter Theorem

375 ANS: 3

$$\pi(6)^2(24) + \frac{4\pi(6)^3}{(3)(2)} = 864\pi + 144\pi = 1008\pi$$

PTS: 2 REF: 082414geo TOP: Volume KEY: compositions

376 ANS: 3 PTS: 2 REF: 062407geo TOP: Properties of Transformations

377 ANS: 1

$$.5\text{ ft}^3 \times \frac{1728\text{ in}^3}{1\text{ ft}^3} = 864\text{ in}^3 \quad \frac{43\text{ in} \times 30\text{ in} \times 9\text{ in}}{864\text{ in}^3} \approx 13.4$$

PTS: 2 REF: 012419geo TOP: Volume KEY: prisms

378 ANS: 1 PTS: 2 REF: 062312geo TOP: Cofunctions

379 ANS: 2

$$\frac{7.5}{3.5} = \frac{9.5}{x}$$

$$x \approx 4.4$$

PTS: 2 REF: 012303geo TOP: Side Splitter Theorem

380 ANS: 4

$$m_{\overline{AD}} = \frac{3-1}{-2-2} = \frac{2}{-4} = -\frac{1}{2}$$ A pair of opposite sides is parallel.

$$m_{\overline{BC}} = \frac{8-4}{-3-5} = \frac{4}{-8} = -\frac{1}{2}$$

PTS: 2 REF: 082321geo TOP: Quadrilaterals in the Coordinate Plane

381 ANS: 2 PTS: 2 REF: 062301geo
TOP: Cross-Sections of Three-Dimensional Objects

382 ANS: 3
3) Could be an isosceles trapezoid.

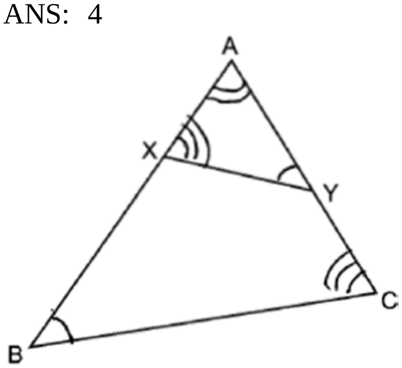
PTS: 2 REF: 012318geo TOP: Parallelograms

383 ANS: 3 PTS: 2 REF: 062417geo TOP: Special Quadrilaterals

384 ANS: 3
(1) and (2) are false as dilations preserve angle measure. (4) would be true if the scale factor was 2.

PTS: 2 REF: 082323geo TOP: Dilations

385 ANS: 4



$\triangle BAC \sim \triangle YAX$

PTS: 2 REF: 082324geo TOP: Similarity KEY: basic

386 ANS: 2

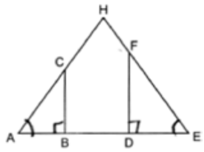
$$\frac{136-x}{2} = 44$$

$$136 - x = 88$$

$$48 = x$$

PTS: 2 REF: 012414geo TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, angle

387 ANS: 2



PTS: 2 REF: 062314geo TOP: Similarity KEY: basic

388 ANS: 1

$\frac{1}{2}(7.4)(3.8)\sin 126 \approx 11.4$

PTS: 2 REF: 011218a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: basic

389 ANS: 3

$\frac{360°}{6} = 60°$

PTS: 2 REF: 062403geo TOP: Mapping a Polygon onto Itself

390 ANS: 4

$\sin 37 = \frac{7.6}{x}$

$x \approx 12.6$

PTS: 2 REF: 062412geo TOP: Using Trigonometry to Find a Side

391 ANS: 1 PTS: 2 REF: 012403geo TOP: Mapping a Polygon onto Itself

392 ANS: 2

$\frac{10}{x} = \frac{8}{6}$

$8x = 60$

$x = 7.5$

PTS: 2 REF: 012402geo TOP: Side Splitter Theorem

393 ANS: 3 PTS: 2 REF: 012413geo TOP: Special Quadrilaterals

394 ANS: 4

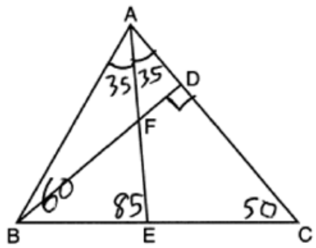
The slope of a line in standard form is $-\frac{A}{B}$ so the slope of this line is $\frac{3}{5}$ Perpendicular lines have slope that are the opposite and reciprocal of each other.

PTS: 2 REF: 012313geo TOP: Parallel and Perpendicular Lines
KEY: find slope of perpendicular line

395 ANS: 1 PTS: 2 REF: 062423geo TOP: Special Quadrilaterals

396 ANS: 3 PTS: 2 REF: 012309geo TOP: Special Quadrilaterals

397 ANS: 4



PTS: 2 REF: 012305geo TOP: Interior and Exterior Angles of Triangles

398 ANS: 3

The half diagonals have lengths of 6 and 8, so each side of *ABCD* is 10.

PTS: 2 REF: 012417geo TOP: Parallelograms

399 ANS: 2

$$19.9 = \pi d \quad \frac{4}{3}\pi\left(\frac{19.9}{2\pi}\right)^3 \approx 133$$

$$\frac{19.9}{\pi} = d$$

PTS: 2 REF: 012310geo TOP: Volume KEY: spheres

400 ANS: 4

$$-5+\frac{3}{4}(7--5) = -5+\frac{3}{4}(12) = -5+9 = 4 \quad 3+\frac{3}{4}(-5-3) = 3+\frac{3}{4}(-8) = 3-6 = -3$$

PTS: 2 REF: 082302geo TOP: Directed Line Segments

401 ANS: 1 PTS: 2 REF: 012304geo TOP: Cofunctions

402 ANS: 2

$$x_0 = \frac{kx_1 - x_2}{k-1} = \frac{\frac{1}{3}(-4)-0}{\frac{1}{3}-1} = \frac{\frac{-4}{3}}{\frac{-2}{3}} = 2 \quad y_0 = \frac{ky_1 - y_2}{k-1} = \frac{\frac{1}{3}(0)--2}{\frac{1}{3}-1} = \frac{2}{\frac{-2}{3}} = -3$$

PTS: 2 REF: 062313geo TOP: Dilations

403 ANS: 4

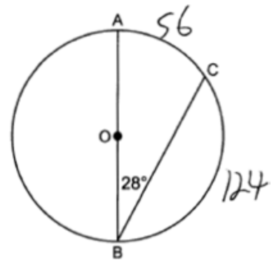
$$\sin 30 = \frac{x}{75}$$

$$x = 37.5$$

PTS: 2 REF: 012411geo TOP: Using Trigonometry to Find a Side

404 ANS: 4 PTS: 2 REF: 062401geo TOP: Properties of Transformations

405 ANS: 2



PTS: 2 REF: 062305geo TOP: Chords, Secants and Tangents
KEY: inscribed

406 ANS: 3

$5x - 10 = 4x - 4$ $4(6) - 4 = 20$

$x = 6$

PTS: 2 REF: 012408geo TOP: Properties of Transformations
KEY: graphics

407 ANS: 1 PTS: 2 REF: 062424geo TOP: Line Dilations

408 ANS: 2

$$\frac{100000\text{ g}}{7.48\text{ g/ft}^3} = \pi(r^2)(30\text{ ft})$$

$11.92\text{ ft} \approx r$

$23.8 \approx d$

PTS: 2 REF: 012424geo TOP: Volume KEY: cylinders

409 ANS: 2

$$\tan 25° = \frac{a}{12}$$

PTS: 2 REF: 082409geo TOP: Using Trigonometry to Find a Side

410 ANS: 2 PTS: 2 REF: 012518geo TOP: Line Dilations

411 ANS: 4

$$\sin 18 = \frac{8}{x}$$

$x \approx 25.9$

PTS: 2 REF: 062316geo TOP: Using Trigonometry to Find a Side

412 ANS: 1

$$\sin N = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{12}{20}$$

PTS: 2 REF: 012307geo TOP: Trigonometric Ratios

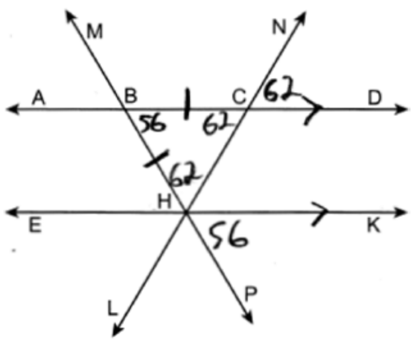
413 ANS: 2

Since $\overline{AD} \parallel \overline{BC}$, $\overset{\frown}{AB} \cong \overset{\frown}{CD}$. $m\angle ACB = \frac{1}{2} m\overset{\frown}{AB}$

$$m\angle CDF = \frac{1}{2} m\overset{\frown}{CD}$$

PTS: 2 REF: 012323geo TOP: Chords, Secants and Tangents
KEY: chords and tangents

414 ANS: 4



PTS: 2 REF: 012421geo TOP: Lines and Angles

415 ANS: 3

$$\sin x = \frac{2.5}{5.5}$$
$$x \approx 27°$$

PTS: 2 REF: 082406geo TOP: Using Trigonometry to Find an Angle

416 ANS: 3 PTS: 2 REF: 012302geo TOP: Rotations of Two-Dimensional Objects

417 ANS: 3

$3 \times 10 \times \frac{3}{12} = 7.5 \text{ ft}^3$ $\frac{7.5}{2} = 3.75$ $4 \times 3.66 = 14.64$

PTS: 2 REF: 062311geo TOP: Volume KEY: prisms

418 ANS: 3

$\frac{5}{2}(x+3) = 3x+5$ $AB = 5+3 = 8$ $8 \times 4 = 32$

$$5x + 15 = 6x + 10$$
$$5 = x$$

PTS: 2 REF: 012514geo TOP: Similarity KEY: perimeter and area

419 ANS: 4

$$2(x+13)=5x-1 \quad MN=9+13=22$$
$$2x+26=5x-1$$
$$27=3x$$
$$x=9$$

PTS: 2 REF: 062322geo TOP: Midsegments

420 ANS: 1

$$36\pi=\frac{9\pi h}{3}$$
$$108=9h$$
$$12=h$$

PTS: 2 REF: 082411geo TOP: Volume KEY: cones

421 ANS: 1

$$\frac{36}{4}=9$$

PTS: 2 REF: 012321geo TOP: Midsegments

422 ANS: 4

$$8^2=4x$$
$$64=4x$$
$$16=x$$

PTS: 2 REF: 062416geo TOP: Similarity

423 ANS: 2

$$\left(\frac{360-100}{360}\right)(\pi)\left(6^2\right)=26\pi$$

PTS: 2 REF: 062411geo TOP: Sectors

424 ANS: 1

$$m=\frac{4--4}{-4-2}=\frac{8}{-6}=-\frac{4}{3}$$
$$m_{\perp}=\frac{3}{4}$$

PTS: 2 REF: 082418geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

425 ANS: 3

$$175 = \frac{1}{3} \cdot s^2 \cdot 21 \quad 5 \times 4 = 20$$
$$25 = s^2$$
$$5 = s$$

PTS: 2 REF: 012516geo TOP: Volume KEY: pyramids

426 ANS: 2

$$180 - (180 - 42 - 42)$$

PTS: 2 REF: 062317geo TOP: Exterior Angle Theorem

427 ANS: 4

$$5 + \frac{2}{5}(-10 - 5) = 5 + \frac{2}{5}(-15) = 5 - 6 = -1 \quad 7 + \frac{2}{5}(-8 - 7) = 7 + \frac{2}{5}(-15) = 7 - 6 = 1$$

PTS: 2 REF: 012410geo TOP: Directed Line Segments

428 ANS: 2

$$\frac{1}{2}(22)(13)\sin 55 \approx 117$$

PTS: 2 REF: 061403a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: basic

429 ANS: 4

$\angle 6$ and $\angle 9$ are alternate interior angles; since congruent, $\ell \parallel m$. $\angle 9$ and $\angle 11$ are corresponding angles; since congruent, $n \parallel p$. Both pairs of opposite sides are parallel.

PTS: 2 REF: 082319geo TOP: Parallelograms

430 ANS: 4

$$\left(\frac{-4+0}{2}, \frac{6+4}{2}\right) \to (-2,5); \quad \frac{6-4}{-4-0} = \frac{2}{-4} = -\frac{1}{2}; \quad m_{\perp} = 2; \quad y - 5 = 2(x+2)$$
$$y = 2x + 4 + 5$$
$$y = 2x + 9$$

PTS: 2 REF: 062324geo TOP: Parallel and Perpendicular Lines
KEY: perpendicular bisector

431 ANS: 2

$$m = \frac{-4}{-5} = \frac{4}{5}$$
$$m_{\perp} = -\frac{5}{4}$$

PTS: 2 REF: 082308geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

432 ANS: 1

$$\frac{7.2}{5.4} = \frac{3.29}{x}$$

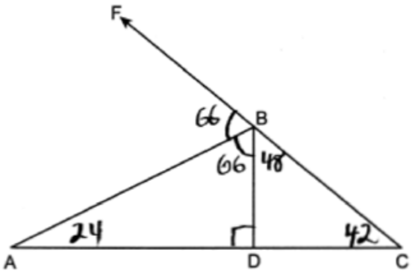
$$x \approx 2.47$$

PTS: 2 REF: 062405geo TOP: Similarity KEY: basic

433 ANS: 2 PTS: 2 REF: 012409geo TOP: Dilations

434 ANS: 2 PTS: 2 REF: 082322geo TOP: Identifying Transformations

435 ANS: 1



PTS: 2 REF: 062410geo TOP: Interior and Exterior Angles of Triangles

436 ANS: 1 PTS: 2 REF: 082320geo TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

437 ANS: 2

$A(-4,3) \to A(-2,4) \to A(-4,8) \to E(-6,7)$ $B(2,1) \to B(4,2) \to B(8,4) \to F(6,3)$

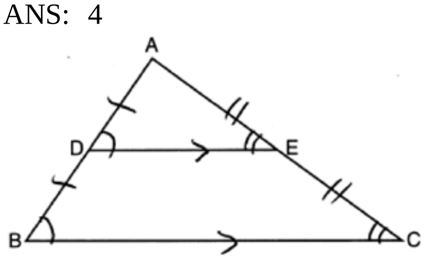
PTS: 2 REF: 082412geo TOP: Line Dilations

438 ANS: 4

Another equation of line t is $y = 3x - 6$. $-6 \bullet \frac{1}{2} = -3$

PTS: 2 REF: 012319geo TOP: Line Dilations

439 ANS: 4



AA from diagram; SSS as the three corresponding sides are proportional; SAS as two corresponding sides are proportional and an angle is equal.

PTS: 2 REF: 012324geo TOP: Similarity Proofs

440 ANS: 3 PTS: 2 REF: 082203geo TOP: Properties of Transformations
KEY: basic

Geometry Multiple Choice Regents Exam Questions
Answer Section

441 ANS: 1
$\triangle ABC \sim \triangle RST$

PTS: 2 REF: 011908geo TOP: Similarity KEY: basic

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

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

443 ANS: 2
$\left(\frac{1}{4}\right)^2 = \frac{1}{16}$

PTS: 2 REF: 082216geo TOP: Similarity KEY: perimeter and area

444 ANS: 1 PTS: 2 REF: 082211geo
TOP: Cross-Sections of Three-Dimensional Objects

445 ANS: 1
$\cos C = \frac{15}{17}$

$C \approx 28$

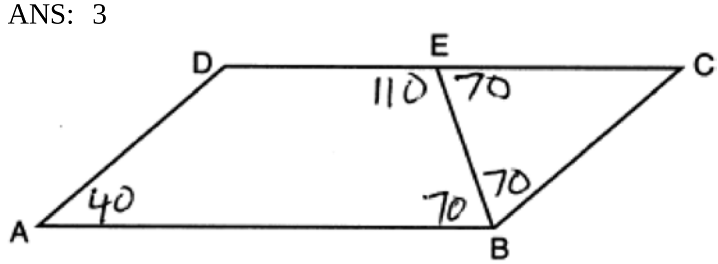
PTS: 2 REF: 012007geo TOP: Using Trigonometry to Find an Angle

446 ANS: 2
$\frac{5280}{2.25\pi} \approx 747$

PTS: 2 REF: 012523geo TOP: Circumference

447 ANS: 4 PTS: 2 REF: 011916geo TOP: Exterior Angle Theorem

448 ANS: 3



PTS: 2 REF: 082215geo TOP: Interior and Exterior Angles of Polygons

449 ANS: 3

$$\frac{10}{x} = \frac{15}{12}$$
$$x = 8$$

PTS: 2 REF: 081918geo TOP: Side Splitter Theorem

450 ANS: 3

Sine and cosine are cofunctions.

PTS: 2 REF: 062206geo TOP: Cofunctions

451 ANS: 3

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

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

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

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

454 ANS: 1

$$-7+\frac{1}{3}(2--7) = -7+\frac{1}{3}(9) = -7+3 = -4 \quad 3+\frac{1}{3}(-6-3) = 3+\frac{1}{3}(-9) = 3-3 = 0$$

PTS: 2 REF: 082213geo TOP: Directed Line Segments

455 ANS: 3

$$4x+3x+13 = 90 \quad 4(11) < 3(11)+13$$
$$7x = 77 \quad 44 < 46$$
$$x = 11$$

PTS: 2 REF: 012021geo TOP: Cofunctions

456 ANS: 4

$$\frac{12}{6.1x-6.5} = \frac{5}{1.4x+3} \quad 6.1(5)-6.5 = 24$$
$$16.8x+36 = 30.5x-32.5$$
$$68.5 = 13.7x$$
$$5 = x$$

PTS: 2 REF: 062211geo TOP: Similarity KEY: basic

457 ANS: 2

$$\frac{x}{15} = \frac{5}{12}$$
$$x = 6.25$$

PTS: 2 REF: 011906geo TOP: Side Splitter Theorem

458 ANS: 1

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

$5x = 84$

$x = 16.8$

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

459 ANS: 4

$x^2 = 10.2 \times 14.3$

$x \approx 12.1$

PTS: 2 REF: 012016geo TOP: Similarity

460 ANS: 2

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

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

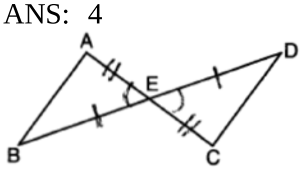
461 ANS: 4

$\left(\frac{360-120}{360}\right)(\pi)\left(9^2\right) = 54\pi$

PTS: 2 REF: 081912geo TOP: Sectors

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

463 ANS: 4



PTS: 2 REF: 061908geo TOP: Triangle Proofs
KEY: statements

464 ANS: 2

$\triangle ABC \sim \triangle BDC$

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

PTS: 2 REF: 012023geo TOP: Trigonometric Ratios

465 ANS: 2

If (2) is true, $\angle ACB \cong \angle XYB$ and $\angle CAB \cong \angle YXB$.

PTS: 2 REF: 082202geo TOP: Side Splitter Theorem

466 ANS: 4

$$\frac{2}{4}=\frac{8}{x+2} \quad 14+2=16$$

$$2x+4=32$$

$$x=14$$

PTS: 2 REF: 012024geo TOP: Side Splitter Theorem

467 ANS: 4

Isosceles triangle theorem.

PTS: 2 REF: 062207geo TOP: Isosceles Triangle Theorem

468 ANS: 1

$$\frac{1}{3}(4.5)^2(10)(0.676)\approx 45.6$$

PTS: 2 REF: 062212geo TOP: Density

469 ANS: 4

$$\frac{360^\circ}{n}=36$$

$$n=10$$

PTS: 2 REF: 082205geo TOP: Mapping a Polygon onto Itself

470 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

471 ANS: 1 PTS: 2 REF: 081904geo

TOP: Centroid, Orthocenter, Incenter and Circumcenter

472 ANS: 2 PTS: 2 REF: 062202geo

TOP: Cross-Sections of Three-Dimensional Objects

473 ANS: 4

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

$$x\approx 56$$

PTS: 2 REF: 061922geo TOP: Using Trigonometry to Find an Angle

474 ANS: 2

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

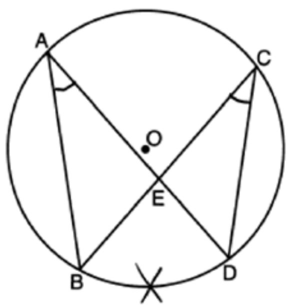
$$\frac{324\pi}{36\pi} = h$$

$$9 = h$$

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

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

476 ANS: 4



PTS: 2 REF: 082218geo TOP: Chords, Secants and Tangents
KEY: inscribed

477 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

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

479 ANS: 3 PTS: 2 REF: 081913geo TOP: Parallelograms

480 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

481 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

482 ANS: 1

$$\frac{6.5}{10.5}=\frac{5.2}{x}$$
$$x=8.4$$

PTS: 2 REF: 012006geo TOP: Trapezoids

483 ANS: 2

$180-40-95=45$

PTS: 2 REF: 082201geo TOP: Properties of Transformations
KEY: graphics

484 ANS: 2

slope of $\overline{OA}=\frac{4-0}{-3-0}=-\frac{4}{3}$ $m_{\perp}=\frac{3}{4}$

PTS: 2 REF: 082223geo TOP: Chords, Secants and Tangents
KEY: radius drawn to tangent

485 ANS: 1

$$x^2+y^2-12y+36=20.25+36 \quad \sqrt{56.25}=7.5$$
$$x^2+(y-6)^2=56.25$$

PTS: 2 REF: 082219geo TOP: Equations of Circles
KEY: completing the square

486 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

487 ANS: 2

$V=\frac{1}{3}\cdot 197^2\cdot 107=1{,}384{,}188$

PTS: 2 REF: 082208geo TOP: Volume KEY: pyramids

488 ANS: 4

$$2x-1=16$$
$$x=8.5$$

PTS: 2 REF: 011902geo TOP: Properties of Transformations
KEY: graphics

489 ANS: 4

$\frac{18}{4.5}=4$

PTS: 2 REF: 011901geo TOP: Line Dilations

490 ANS: 1 PTS: 2 REF: 082209geo TOP: Mapping a Polygon onto Itself

491 ANS: 1

$\frac{360°}{5} = 72°$

PTS: 2 REF: 062204geo TOP: Mapping a Polygon onto Itself

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

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

494 ANS: 2 PTS: 2 REF: 082204geo TOP: Special Quadrilaterals

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

496 ANS: 1 PTS: 2 REF: 012004geo TOP: Special Quadrilaterals

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

498 ANS: 4 PTS: 2 REF: 062223geo TOP: Line Dilations

499 ANS: 1

$\sin 10 = \frac{x}{140}$

$x \approx 24$

PTS: 2 REF: 062217geo TOP: Using Trigonometry to Find a Side

500 ANS: 1 PTS: 2 REF: 062208geo TOP: Rotations of Two-Dimensional Objects

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

502 ANS: 2

$\tan 36 = \frac{x}{8}$ $5.8 + 1.5 \approx 7$

$x \approx 5.8$

PTS: 2 REF: 081915geo TOP: Using Trigonometry to Find a Side

503 ANS: 1

$8 \times 3.5 \times 2.25 \times 1.055 = 66.465$

PTS: 2 REF: 012014geo TOP: Density

504 ANS: 2

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

$324 = 12(x+12)$

$27 = x + 12$

$x = 15$

PTS: 2 REF: 081920geo TOP: Similarity

505 ANS: 2

$-4 + \frac{2}{5}(6 - -4) = -4 + \frac{2}{5}(10) = -4 + 4 = 0$ $-1 + \frac{2}{5}(4 - -1) = -1 + \frac{2}{5}(5) = -1 + 2 = 1$

PTS: 2 REF: 062222geo TOP: Directed Line Segments

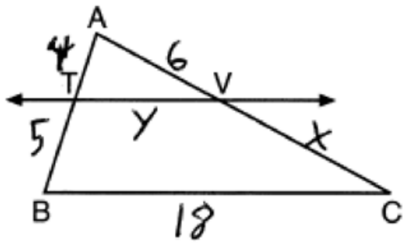
506 ANS: 1

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

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

PTS: 2 REF: 012008geo TOP: Line Dilations

507 ANS: 4



$\frac{4}{5}=\frac{6}{x}$ $\frac{4}{9}=\frac{y}{18}$ $5+18+7.5+8=38.5$

$x=7.5$ $y=8$

PTS: 2 REF: 082222geo TOP: Side Splitter Theorem

508 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

509 ANS: 4

$\sin A=\frac{13}{16}$

$A\approx 54°$

PTS: 2 REF: 082207geo TOP: Using Trigonometry to Find an Angle

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

511 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

512 ANS: 4 PTS: 2 REF: 082210geo TOP: Cofunctions

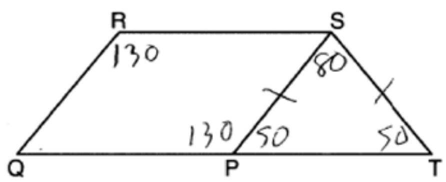
513 ANS: 1 PTS: 2 REF: 081916geo TOP: Similarity

514 ANS: 2
$90 - 57 = 33$

PTS: 2 REF: 061909geo TOP: Cofunctions
515 ANS: 1 PTS: 2 REF: 012519geo TOP: Similarity
516 ANS: 3
Since orientation is preserved, a reflection has not occurred.

PTS: 2 REF: 062205geo TOP: Identifying Transformations
KEY: graphics
517 ANS: 2 PTS: 2 REF: 082220geo TOP: Compositions of Transformations
KEY: identify
518 ANS: 3
$\frac{1}{2} \times 24 = 12$

PTS: 2 REF: 012009geo TOP: Midsegments
519 ANS: 2
$\frac{(-4,2)}{(-2,1)} = 2$

PTS: 2 REF: 062201geo TOP: Dilations
520 ANS: 2


PTS: 2 REF: 061921geo TOP: Interior and Exterior Angles of Polygons
521 ANS: 4 PTS: 2 REF: 081923geo TOP: Mapping a Polygon onto Itself
522 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
523 ANS: 2
The slope of $-3x + 4y = 8$ is $\frac{3}{4}$.

PTS: 2 REF: 061907geo TOP: Line Dilations
524 ANS: 1 PTS: 2 REF: 012022geo TOP: Compositions of Transformations
KEY: grids

525 ANS: 3

$$\frac{150}{360} \cdot 9^2 \pi = 33.75\pi$$

PTS: 2 REF: 012013geo TOP: Sectors

526 ANS: 2

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

$$x \approx 555$$

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

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

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

529 ANS: 2

$$\frac{4}{x} = \frac{6}{9}$$

$$x = 6$$

PTS: 2 REF: 061915geo TOP: Similarity KEY: basic

530 ANS: 3 PTS: 2 REF: 011904geo TOP: Mapping a Polygon onto Itself

531 ANS: 4
d) is SSA

PTS: 2 REF: 061914geo TOP: Triangle Congruency

532 ANS: 4 PTS: 2 REF: 012019geo
TOP: Cross-Sections of Three-Dimensional Objects

533 ANS: 1

$$\cos 65 = \frac{x}{15}$$

$$x \approx 6.3$$

PTS: 2 REF: 081924geo TOP: Using Trigonometry to Find a Side

534 ANS: 2

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

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

535 ANS: 3

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

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

536 ANS: 2

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

PTS: 2 REF: 061917geo TOP: Special Quadrilaterals

537 ANS: 4

$-8 + \frac{2}{3}(10 - -8) = -8 + \frac{2}{3}(18) = -8 + 12 = 4 \quad 4 + \frac{2}{3}(-2 - 4) = 4 + \frac{2}{3}(-6) = 4 - 4 = 0$

PTS: 2 REF: 061919geo TOP: Directed Line Segments

538 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

539 ANS: 3 PTS: 2 REF: 082212geo TOP: Line Dilations

540 ANS: 3

$8 \cdot 15 = 16 \cdot 7.5$

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

541 ANS: 1

$\frac{1}{3}, \frac{3}{9}, \frac{\sqrt{10}}{\sqrt{90}}$

PTS: 2 REF: 082206geo TOP: Dilations

542 ANS: 3

$12x = 9^2 \qquad 6.75 + 12 = 18.75$

$12x = 81$

$x = \frac{82}{12} = \frac{27}{4}$

PTS: 2 REF: 062213geo TOP: Similarity

543 ANS: 1

$\frac{9}{6} = \frac{3}{2}$

PTS: 2 REF: 061905geo TOP: Line Dilations

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

545 ANS: 2

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

$$x = 120$$

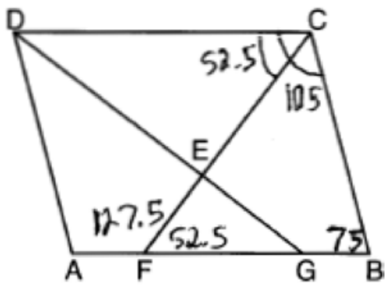
PTS: 2 REF: 011914geo TOP: Sectors

546 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

547 ANS: 2



PTS: 2 REF: 081907geo TOP: Interior and Exterior Angles of Polygons

548 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

549 ANS: 3

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

$GM = 16$ $IM = 20$

PTS: 2 REF: 011910geo TOP: Similarity

550 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

551 ANS: 3 PTS: 2 REF: 011903geo TOP: Compositions of Transformations

KEY: identify

552 ANS: 4

$\left(\frac{-5+7}{2},\frac{1-9}{2}\right)=(1,-4)$ $m=\frac{1--9}{-5-7}=\frac{10}{-12}=-\frac{5}{6}$ $m_{\perp}=\frac{6}{5}$

PTS: 2 REF: 062220geo TOP: Parallel and Perpendicular Lines
KEY: perpendicular bisector

553 ANS: 3

Therefore $\angle 2\cong\angle 7$. Since opposite angles are congruent, *ABCD* is a parallelogram.

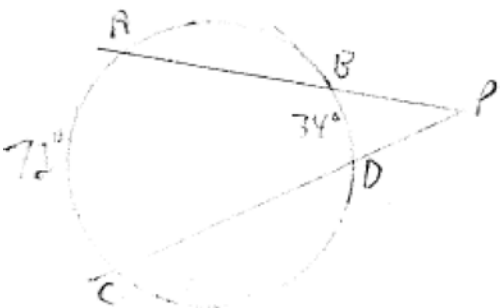
PTS: 2 REF: 062209geo TOP: Parallelograms

554 ANS: 4

$\frac{360^\circ}{9}=40^\circ$ 200º is a multiple of 40º

PTS: 2 REF: 012521geo TOP: Mapping a Polygon onto Itself

555 ANS: 1



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

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

556 ANS: 3

A dilation does not preserve distance.

PTS: 2 REF: 062210geo TOP: Analytical Representations of Transformations
KEY: basic

557 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

558 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

559 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

560 ANS: 1

A dilation preserves angle measure, so $\angle A \cong \angle CDE$.

PTS: 2 REF: 062203geo TOP: Trigonometric Ratios

561 ANS: 4 PTS: 2 REF: 081922geo TOP: Chords, Secants and Tangents

KEY: intersecting chords, length

562 ANS: 1 PTS: 2 REF: 012524geo TOP: Special Quadrilaterals

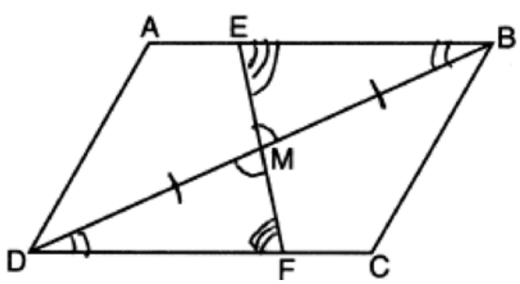
563 ANS: 1

$$\frac{100-80}{2}=10$$

PTS: 2 REF: 062219geo TOP: Chords, Secants and Tangents

KEY: secant and tangent drawn from common point, angle

564 ANS: 3



PTS: 2 REF: 082217geo TOP: Triangle Proofs

KEY: statements

565 ANS: 4

$$x^2+8x+16+y^2-12y+36=144+16+36$$

$$(x+4)^2+(y-6)^2=196$$

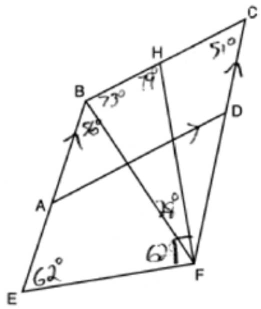
PTS: 2 REF: 061920geo TOP: Equations of Circles

KEY: completing the square

566 ANS: 4 PTS: 2 REF: 011905geo TOP: Chords, Secants and Tangents

KEY: inscribed

567 ANS: 1



$m\angle CBE = 180 - 51 = 129$

PTS: 2 REF: 062221geo TOP: Interior and Exterior Angles of Polygons

568 ANS: 3

1) and 2) are wrong because the orientation of $\triangle LET$ has changed, implying one reflection has occurred. The sequence in 4) moves $\triangle LET$ back to Quadrant II.

PTS: 2 REF: 062218geo TOP: Compositions of Transformations
KEY: identify

569 ANS: 3

$\frac{360°}{6} = 60°$ 120º is a multiple of 60º

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

570 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

571 ANS: 2

$\angle ADE \cong \angle ABC$ and $\angle AED \cong \angle ACB$

PTS: 2 REF: 062214geo TOP: Side Splitter Theorem

572 ANS: 1

$$44\left(\left(10 \times 3 \times \frac{1}{4}\right) + \left(9 \times 3 \times \frac{1}{4}\right)\right) = 627$$

PTS: 2 REF: 082221geo TOP: Volume KEY: compositions

573 ANS: 3

$$42 = \frac{1}{2}(a)(8)\sin 61$$

$$42 \approx 3.5a$$

$$12 \approx a$$

PTS: 2 REF: 011316a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: basic

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

575 ANS: 1

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

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

576 ANS: 3 PTS: 2 REF: 062215geo TOP: Exterior Angle Theorem

577 ANS: 2

$$7-2 < T < 7+2$$
$$5 < T < 9$$

PTS: 2 REF: 012522geo TOP: Triangle Inequality Theorem

578 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

579 ANS: 2

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

PTS: 2 REF: 011907geo TOP: Special Quadrilaterals

580 ANS: 4 PTS: 2 REF: 081911geo TOP: Rotations of Two-Dimensional Objects

581 ANS: 4

1) SAS; 2) AAS; 3) SSS

PTS: 2 REF: 062216geo TOP: Triangle Congruency

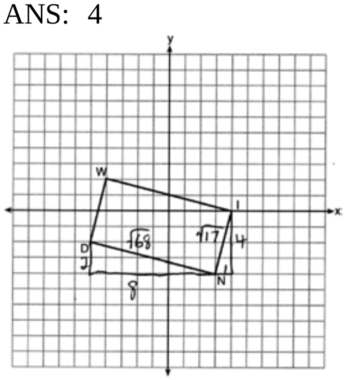
582 ANS: 1 PTS: 2 REF: 081919geo TOP: Cofunctions

583 ANS: 4

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

PTS: 2 REF: 011917geo TOP: Trigonometric Ratios

584 ANS: 4



$$\sqrt{8^2+2^2}\times\sqrt{4^2+1^2} = \sqrt{68}\times\sqrt{17} = \sqrt{4}\sqrt{17}\times\sqrt{17} = 2\cdot 17 = 34$$

PTS: 2 REF: 082214geo TOP: Polygons in the Coordinate Plane

585 ANS: 3

$2(2x+8)=7x-2 \quad AB=7(6)-2=40$. 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

586 ANS: 4

$\frac{54}{360}\cdot 10^2\pi=15\pi$

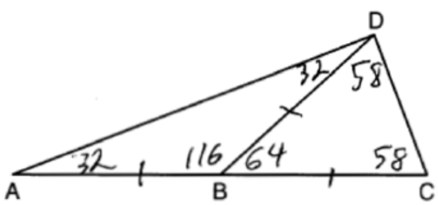
PTS: 2 REF: 062224geo TOP: Sectors

587 ANS: 4

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

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

588 ANS: 3



PTS: 2 REF: 081905geo TOP: Interior and Exterior Angles of Triangles

Geometry 2 Point Regents Exam Questions
Answer Section

589 ANS:

$$\left(\frac{2.5}{3}\right)(\pi)\left(\frac{8.25}{2}\right)^2(3) \approx 134$$

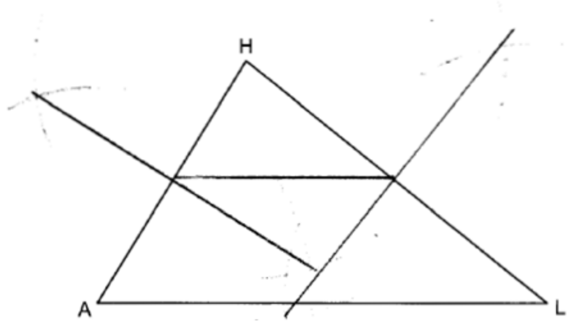
PTS: 2 REF: 081931geo TOP: Volume KEY: cylinders

590 ANS:

Yes. $\triangle ABC$ and $\triangle DEF$ are both 5-12-13 triangles and therefore congruent by SSS. All congruent triangles are similar.

PTS: 2 REF: 012329geo TOP: Triangle Proofs
KEY: statements

591 ANS:



PTS: 2 REF: 082329geo TOP: Constructions
KEY: line bisector

592 ANS:

$6^2 = 2(x+2)$; $16+2=18$

$36 = 2x+4$

$32 = 2x$

$16 = x$

PTS: 2 REF: 062330geo TOP: Similarity

593 ANS:

Reflections are rigid motions that preserve distance.

PTS: 2 REF: 061530geo TOP: Triangle Congruency

594 ANS:

$$4x \cdot x = 6^2$$
$$4x^2 = 36$$
$$x^2 = 9$$
$$x = 3$$

PTS: 2 REF: 082229geo TOP: Similarity

595 ANS:

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

PTS: 2 REF: 081530geo TOP: Triangle Congruency

596 ANS:

If $d = 10$, $r = 5$ and $h = 12$ $V = \frac{1}{3}\pi(5^2)(12) = 100\pi$

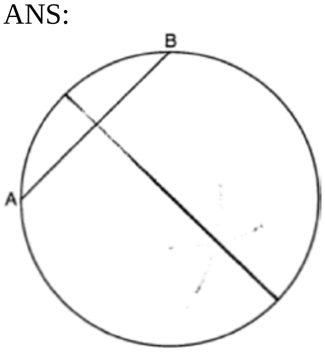
PTS: 2 REF: 062227geo TOP: Volume KEY: cones

597 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

598 ANS:



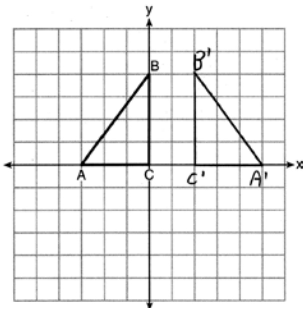
PTS: 2 REF: 081825geo TOP: Constructions
KEY: parallel and perpendicular lines

599 ANS:

$$\frac{4}{3}\pi \cdot (1)^3 + \frac{4}{3}\pi \cdot (2)^3 \frac{4}{3}\pi \cdot (3)^3 = \frac{4}{3}\pi + \frac{32}{3}\pi + \frac{108}{3}\pi = 48\pi$$

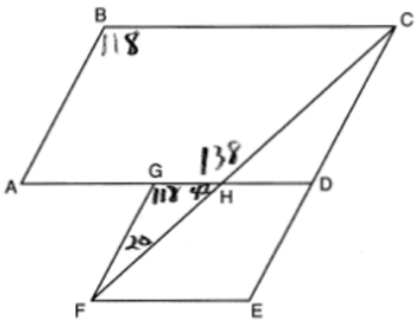
PTS: 2 REF: 062329geo TOP: Volume KEY: spheres

600 ANS:



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

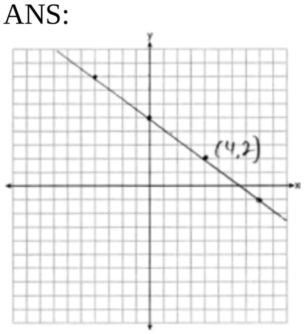
601 ANS:



20º

PTS: 2 REF: 011926geo TOP: Interior and Exterior Angles of Polygons

602 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

603 ANS:

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

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

604 ANS:

142.5. $K = \frac{1}{2}(16)(21)\sin 58° \approx 142.5$

PTS: 2 REF: 080226b TOP: Using Trigonometry to Find Area
KEY: basic

605 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

606 ANS:

$$\frac{1}{2} \cdot 15 \cdot 31.6 \sin 125 \approx 194$$

PTS: 2 REF: 011633a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: basic

607 ANS:

Reflections preserve distance, so the corresponding sides are congruent.

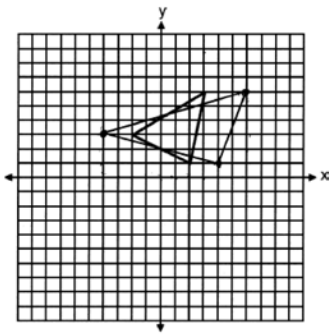
PTS: 2 REF: 082430geo TOP: Properties of Transformations

608 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

609 ANS:



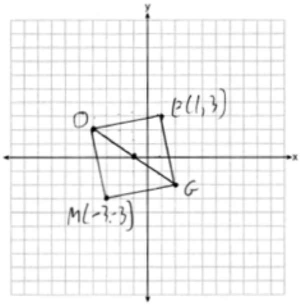
PTS: 2 REF: spr2405geo TOP: Analytical Representations of Transformations
KEY: graphics

610 ANS:

$$\frac{152 - 56}{2} = 48$$

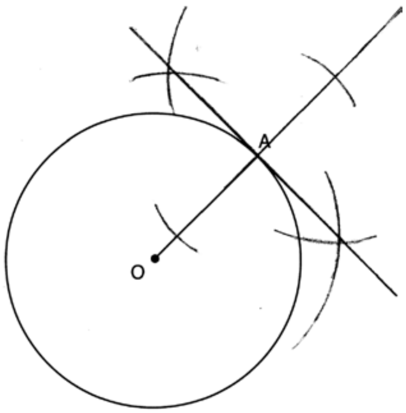
PTS: 2 REF: 011728geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

611 ANS:



PTS: 2 REF: 011731geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

612 ANS:



PTS: 2 REF: 061631geo TOP: Constructions
KEY: parallel and perpendicular lines

613 ANS:

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

$$x \approx 23$$

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

614 ANS:

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

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

$$x = 120$$

PTS: 2 REF: 061529geo TOP: Sectors

615 ANS:

$$\frac{1}{3}\pi \times 8^2 \times 5 \approx 335.1$$

PTS: 2 REF: 082226geo TOP: Rotations of Two-Dimensional Objects

616 ANS:

$$\frac{120}{230} = \frac{x}{315}$$
$$x = 164$$

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

617 ANS:

$$8 \times 3 \times \frac{1}{12} \times 43 = 86$$

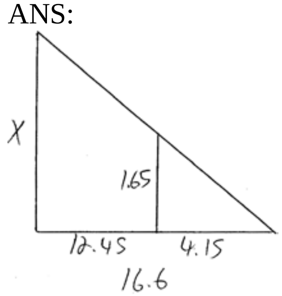
PTS: 2 REF: 012027geo TOP: Density

618 ANS:

$$100 \times \frac{1}{2} \times \frac{4}{3} \times \pi \times 2.8^3 \approx 4598$$

PTS: 2 REF: 062229geo TOP: Volume KEY: spheres

619 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

620 ANS:

$$\sin 86.03 = \frac{183.27}{x}$$
$$x \approx 183.71$$

PTS: 2 REF: 062225geo TOP: Using Trigonometry to Find a Side

621 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

622 ANS:
$\frac{1}{3}\pi \times 5^2 \times 12 = 100\pi \approx 314$

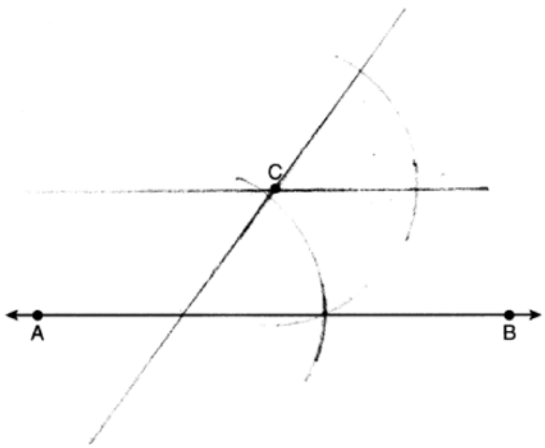
PTS: 2 REF: 012425geo TOP: Rotations of Two-Dimensional Objects

623 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.

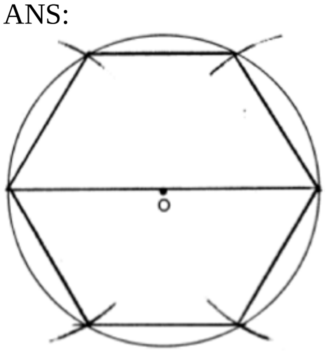
PTS: 2 REF: 061730geo TOP: Compositions of Transformations
KEY: identify

624 ANS:
$\tan^{-1}\left(\frac{4}{12}\right) \approx 18$

PTS: 2 REF: 012327geo TOP: Using Trigonometry to Find an Angle

625 ANS:


PTS: 2 REF: 062231geo TOP: Constructions
KEY: parallel and perpendicular lines

626 ANS:


PTS: 2 REF: 081728geo TOP: Constructions

627 ANS:

$\frac{4}{3}\pi \times .5^3 \times 10.5 \approx 5.5$

PTS: 2 REF: 012528geo TOP: Density

628 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

629 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).

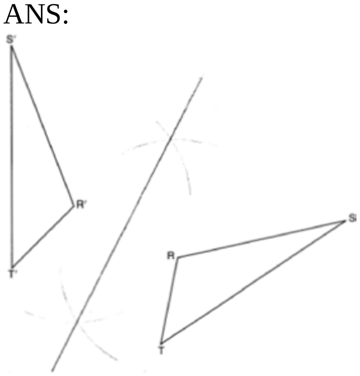
PTS: 2 REF: 011729geo TOP: Similarity Proofs

630 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 $\triangle RST$.

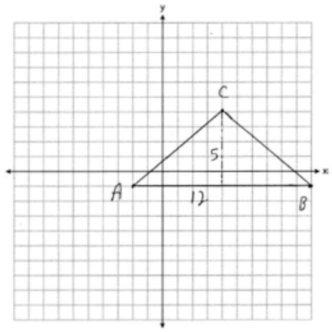
PTS: 2 REF: 011830geo TOP: Triangle Congruency

631 ANS:



PTS: 2 REF: 011725geo TOP: Constructions
KEY: line bisector

632 ANS:



$\frac{1}{2}(5)(12) = 30$

PTS: 2 REF: 081928geo TOP: Polygons in the Coordinate Plane

633 ANS:

$x^2 + 6x + 9 + y^2 - 6y + 9 = 63 + 9 + 9$ $(-3,3)$; $r = 9$

$(x+3)^2 + (y-3)^2 = 81$

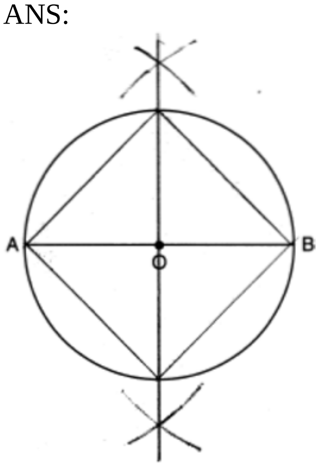
PTS: 2 REF: 062230geo TOP: Equations of Circles
KEY: completing the square

634 ANS:

$\frac{102}{360}(\pi)\left(38^2\right) \approx 1285$

PTS: 2 REF: 012426geo TOP: Sectors

635 ANS:



PTS: 2 REF: 011826geo TOP: Constructions

636 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: polygons

637 ANS:

67. $K=\frac{1}{2}(11)(13)\sin 70°\approx 67$

PTS: 2 REF: 060525b TOP: Using Trigonometry to Find Area
KEY: basic

638 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

639 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

640 ANS:

Reflections preserve distance and angle measure.

PTS: 2 REF: 062228geo TOP: Properties of Transformations
KEY: graphics

641 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

642 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

643 ANS:

$\tan 53=\frac{f}{91}$

$f\approx 120.8$

PTS: 2 REF: 082327geo TOP: Using Trigonometry to Find a Side

644 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

645 ANS:
$x^2+16x++64+y^2+12y+36=44+64+36$ $(-8,-6)$; $r=12$

$$(x+8)^2+(y+6)^2=144$$

PTS: 2 REF: 012430geo TOP: Equations of Circles
KEY: completing the square

646 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

647 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

648 ANS:
Nathan, because a line dilated through a point on the line results in the same line.

PTS: 2 REF: 082331geo TOP: Line Dilations

649 ANS:
$\frac{15}{27}=\frac{20}{36}$ $\overline{EF}$ is parallel to $\overline{BC}$ because $\overline{EF}$ divides the sides proportionately.

$540=540$

PTS: 2 REF: 062431geo TOP: Side Splitter Theorem

650 ANS:
$\cos 68=\frac{10}{x}$

$x\approx 27$

PTS: 2 REF: 061927geo TOP: Using Trigonometry to Find a Side

651 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

652 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

653 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

654 ANS:

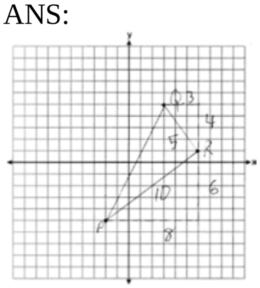
$$\cos W = \frac{6}{18}$$
$$W \approx 71$$

PTS: 2 REF: 011831geo TOP: Using Trigonometry to Find an Angle

655 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

656 ANS:

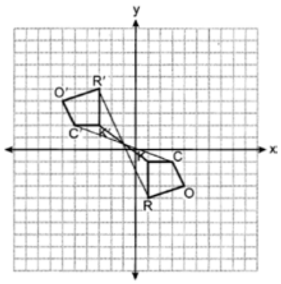


$\frac{1}{2}(5)(10) = 25$

PTS: 2 REF: 061926geo TOP: Polygons in the Coordinate Plane

657 ANS:
$\frac{-2--4}{-3-4}=\frac{2}{-7};\ y-2=-\frac{2}{7}(x-3)$

PTS: 2 REF: 062331geo TOP: Triangles in the Coordinate Plane

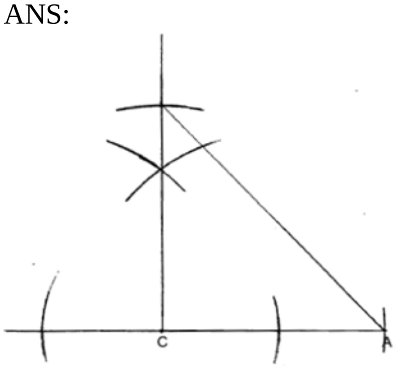
658 ANS:


Rotate 180º about $\left(-1,\frac{1}{2}\right)$.

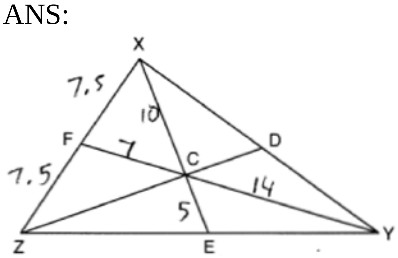
PTS: 2 REF: 082325geo TOP: Compositions of Transformations

659 ANS:
Because $\overline{DE}$ divides $\overline{AC}$ and $\overline{AB}$ proportionally $\left(\frac{3}{6}=\frac{4}{8}\right)$, $\overline{DE}$ is a side splitter and $\overline{ED}\parallel\overline{CB}$. Therefore $\angle AED\cong\angle ACB$ and $\angle ADE\cong\angle ABC$ as corresponding angles. $\triangle ADE\sim\triangle ABC$ by AA.

PTS: 2 REF: 012529geo TOP: Side Splitter Theorem

660 ANS:


PTS: 2 REF: 012427geo TOP: Constructions
KEY: polygons

661 ANS:


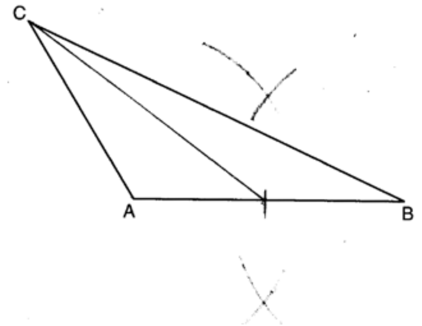
$7.5+7+10=24.5$

PTS: 2 REF: 012030geo STA: G.G.43
TOP: Centroid, Orthocenter, Incenter and Circumcenter

662 ANS:
No, because dilations do not preserve distance.

PTS: 2 REF: 061925geo TOP: Dilations

663 ANS:



PTS: 2 REF: 081628geo TOP: Constructions
KEY: line bisector

664 ANS:
No, the weight of the bricks is greater than 900 kg. $500 \times (5.1 \text{ cm} \times 10.2 \text{ cm} \times 20.3 \text{ cm}) = 528,003 \text{ cm}^3$.
$528,003 \text{ cm}^3 \times \dfrac{1 \text{ m}^3}{1000000 \text{ cm}^3} = 0.528003 \text{ m}^3$. $\dfrac{1920 \text{ kg}}{\text{m}^3} \times 0.528003 \text{ m}^3 \approx 1013 \text{ kg}$.

PTS: 2 REF: fall1406geo TOP: Density

665 ANS:
$4\sqrt{3^2 + 3^2} + 2(2) = 4\sqrt{18} + 4 = 12\sqrt{2} + 4$

PTS: 2 REF: spr2408geo TOP: Polygons in the Coordinate Plane

666 ANS:
$\sin 38 = \dfrac{24.5}{x}$

$x \approx 40$

PTS: 2 REF: 012026geo TOP: Using Trigonometry to Find a Side
KEY: graphics

667 ANS:
$17x = 15^2$

$17x = 225$

$x \approx 13.2$

PTS: 2 REF: 061930geo TOP: Similarity

668 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

669 ANS:

$$\frac{5}{x}=\frac{14}{21}$$

$$14x=105$$

$$x=7.5$$

PTS: 2 REF: 082425geo TOP: Similarity KEY: basic

670 ANS:

$m=\frac{5}{4};\ m_{\perp}=-\frac{4}{5}\ \ y-12=-\frac{4}{5}(x-5)$

PTS: 2 REF: 012031geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

671 ANS:

Reflection across the *y*-axis, then translation up 5.

PTS: 2 REF: 061827geo TOP: Compositions of Transformations
KEY: identify

672 ANS:

$\frac{72}{360}(\pi)\left(10^2\right)=20\pi$

PTS: 2 REF: 061928geo TOP: Sectors

673 ANS:

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

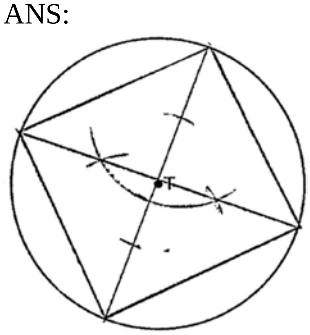
PTS: 2 REF: 081627geo TOP: Mapping a Polygon onto Itself

674 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

675 ANS:



PTS: 2 REF: 061525geo TOP: Constructions

676 ANS:

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

$$126 = 126$$

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

677 ANS:

Yes, because of SAS.

$$\frac{AB}{AD} = \frac{AE}{AC}$$

$$\frac{4.1}{3.42+5.6} = \frac{5.6}{4.1+8.22}$$

$$50.512 = 50.512$$

PTS: 2 REF: 012429geo TOP: Similarity KEY: basic

678 ANS:

$r_{x\text{-axis}} \circ T_{-3,1} \circ R_{(-5,2),90^\circ}$

PTS: 2 REF: 011928geo TOP: Compositions of Transformations
KEY: identify

679 ANS:

Rotate 90° clockwise about *B* and translate down 4 and right 3.

PTS: 2 REF: 012326geo TOP: Compositions of Transformations
KEY: identify

680 ANS:

$$\tan 32 = \frac{66}{x}$$

$$x \approx 106$$

PTS: 2 REF: 082428geo TOP: Using Trigonometry to Find a Side

681 ANS:

$$4x+3+2x-9=90$$

$$6x-6=90$$

$$6x=96$$

$$x=16$$

PTS: 2 REF: 012531geo TOP: Cofunctions

682 ANS:

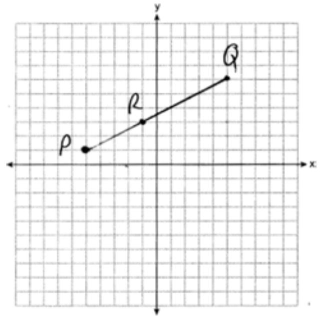
$$\frac{3.75}{5} = \frac{4.5}{6}$$

$\overline{AB}$ is parallel to $\overline{CD}$ because $\overline{AB}$ divides the sides proportionately.

$$39.375 = 39.375$$

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

683 ANS:



$-5+\frac{2}{5}(5--5)$ $1+\frac{2}{5}(6-1)$ $(-1,3)$

$-5+\frac{2}{5}(10)$ $1+\frac{2}{5}(5)$

$-5+4$ $1+2$

-1 3

PTS: 2 REF: 062327geo TOP: Directed Line Segments

684 ANS:

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

$x\approx 68$

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

685 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

686 ANS:

Rotation of 90º counterclockwise about the origin.

PTS: 2 REF: 012428geo TOP: Identifying Transformations

687 ANS:

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

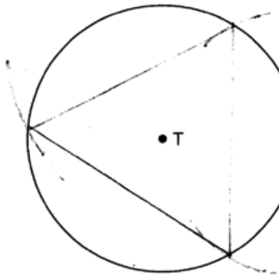
$(3.4-1)^2+(1.2+2)^2=16$

$5.76+10.24=16$

$16=16$

PTS: 2 REF: 081630geo TOP: Circles in the Coordinate Plane

688 ANS:



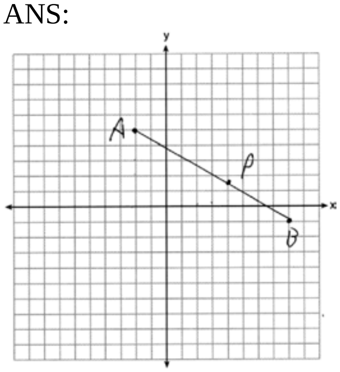
PTS: 2 REF: 081526geo TOP: Constructions

689 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

690 ANS:

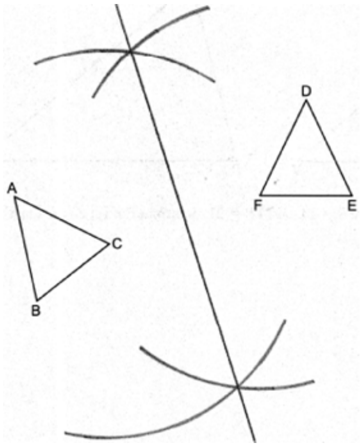


$$x = -2 + \frac{3}{5}(8+2) = -2+6 = 4$$

$$y = 5 + \frac{3}{5}(-1-5) = \frac{25}{5} - \frac{18}{5} = \frac{7}{5}$$

PTS: 2 REF: 012328geo TOP: Directed Line Segments

691 ANS:



PTS: 2 REF: 082426geo TOP: Constructions
KEY: line bisector

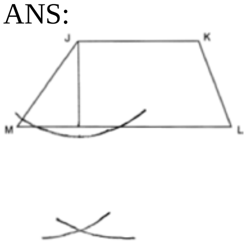
692 ANS:
$A(-2,1) \rightarrow (-3,-1) \rightarrow (-6,-2) \rightarrow (-5,0)$, $B(0,5) \rightarrow (-1,3) \rightarrow (-2,6) \rightarrow (-1,8)$,
$C(4,-1) \rightarrow (3,-3) \rightarrow (6,-6) \rightarrow (7,-4)$

PTS: 2 REF: 061826geo TOP: Dilations

693 ANS:
$\angle Q \cong \angle M \quad \angle P \cong \angle N \quad \overline{QP} \cong \overline{MN}$

PTS: 2 REF: 012025geo TOP: Triangle Congruency

694 ANS:



PTS: 2 REF: 061725geo TOP: Constructions
KEY: parallel and perpendicular lines

695 ANS:
$10 \cdot 6 = 15x$

$x = 4$

PTS: 2 REF: 061828geo TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

696 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

697 ANS:
$T_{4,-4}$, followed by a 90º clockwise rotation about point *D*.

PTS: 2 REF: 062326geo TOP: Compositions of Transformations

698 ANS:
$m_{\overline{AX}} = \frac{4-1}{1-4} = -1$ $\overline{AM}$ is an altitude. $A = \frac{1}{2}\sqrt{18}\sqrt{72} = \frac{1}{2}\sqrt{9}\sqrt{2}\sqrt{9}\sqrt{8} = 18$

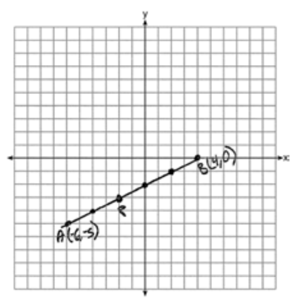
$m_{\overline{AM}} = \frac{4--2}{1--5} = 1$

PTS: 2 REF: 082427geo TOP: Polygons in the Coordinate Plane

699 ANS:
R_{90° or $T_{2,-6} \circ R_{(-4,2),90^\circ}$ or $R_{270^\circ} \circ r_{\text{x-axis}} \circ r_{y\text{-axis}}$

PTS: 2 REF: 061929geo TOP: Compositions of Transformations
KEY: identify

700 ANS:



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

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

$-6+4$ $-5+2$

-2 -3

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

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

$R = 17$

PTS: 2 REF: 061628geo TOP: Cofunctions

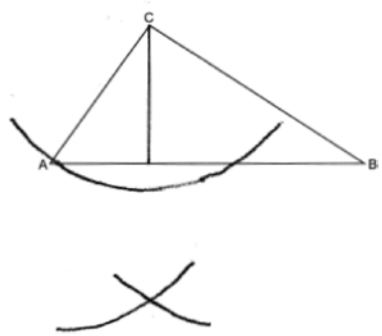
702 ANS:
$5x - 14 = 3x + 10$

$2x = 24$

$x = 12$

PTS: 2 REF: 082326geo TOP: Isosceles Triangle Theorem

703 ANS:



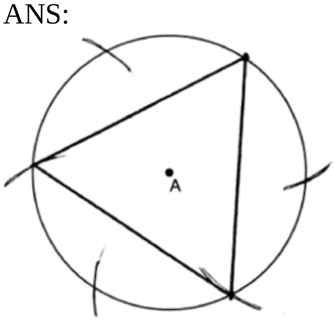
PTS: 2 REF: 062325geo TOP: Constructions
KEY: parallel and perpendicular lines

704 ANS:

$T_{2,-7} \circ r_{y-\text{axis}}$

PTS: 2 REF: 062427geo TOP: Compositions of Transformations

705 ANS:



PTS: 2 REF: 062426geo TOP: Constructions

706 ANS:

164.2. $K = \frac{1}{2}(12)(31)\sin 62° \approx 164.2$

PTS: 2 REF: 010225b TOP: Using Trigonometry to Find Area
KEY: basic

707 ANS:

$x^2 + 8x + 16 + y^2 - 6y + 9 = -7 + 16 + 9$ $(-4,3)$ $\sqrt{18}$

$(x+4)^2 + (y-3)^2 = 18$

PTS: 2 REF: 062429geo TOP: Equations of Circles
KEY: completing the square

708 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

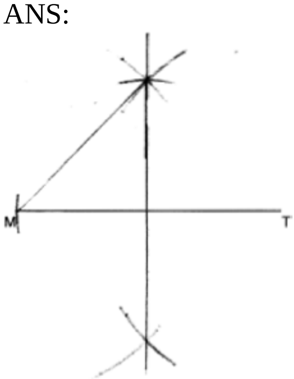
709 ANS:
$x^2 = 12 \cdot 48$

$x = 24$

PTS: 2 REF: 062428geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, length

710 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

711 ANS:


PTS: 2 REF: 012029geo TOP: Constructions
KEY: parallel and perpendicular lines

712 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

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

$m: y = 3x - 8$

PTS: 2 REF: 011631geo TOP: Line Dilations

714 ANS:
$\sin 70 = \frac{30}{L}$

$L \approx 32$

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

715 ANS:
$\frac{Q}{360}(\pi)\left(25^2\right) = (\pi)\left(25^2\right) - 500\pi$

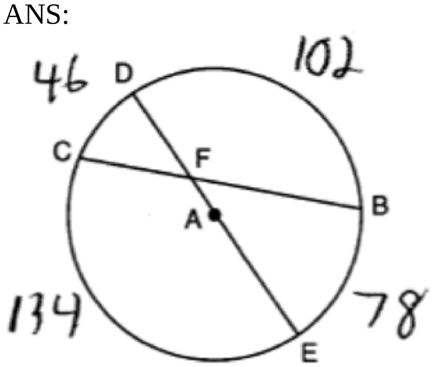
$Q = \frac{125\pi(360)}{625\pi}$

$Q = 72$

PTS: 2 REF: 011828geo TOP: Sectors

716 ANS:
$\frac{1}{3}(5.7)^2(7) \cdot 2.4 \approx 182$

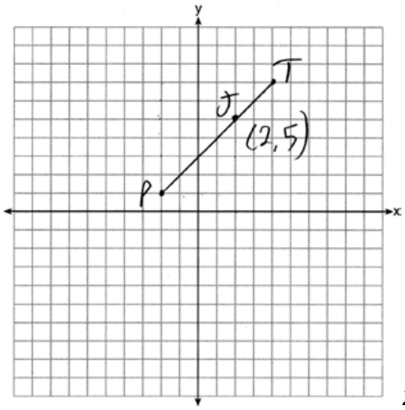
PTS: 2 REF: 082431geo TOP: Density

717 ANS:


$\frac{134 + 102}{2} = 118$

PTS: 2 REF: 081827geo TOP: Chords, Secants and Tangents
KEY: intersecting chords, angle

718 ANS:

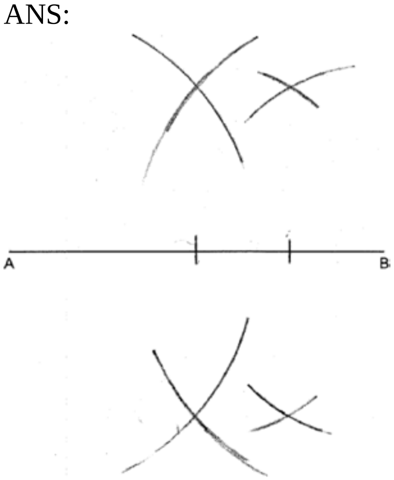


$$x = \frac{2}{3}(4 - -2) = 4 \quad -2 + 4 = 2 \quad J(2,5)$$

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

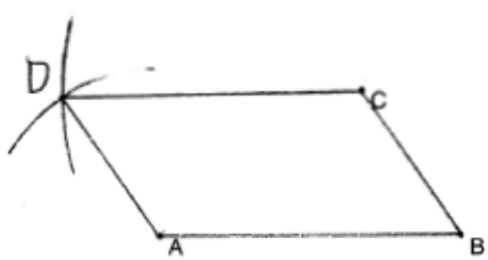
PTS: 2 REF: 011627geo TOP: Directed Line Segments

719 ANS:



PTS: 2 REF: 012526geo TOP: Constructions
KEY: line bisector

720 ANS:

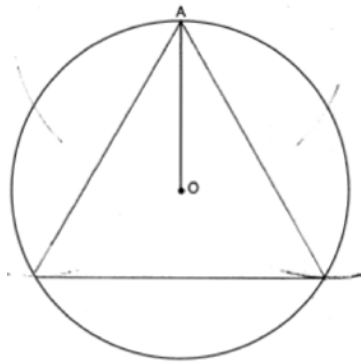


PTS: 2 REF: 011929geo TOP: Constructions
KEY: polygons

721 ANS:
$r_{y=2} \circ r_{y\text{-axis}}$

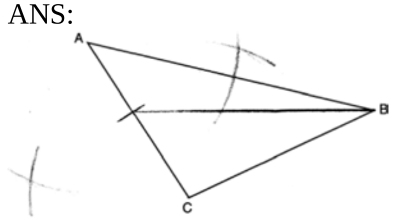
PTS: 2 REF: 081927geo TOP: Compositions of Transformations
KEY: identify

722 ANS:



PTS: 2 REF: 061931geo TOP: Constructions

723 ANS:



PTS: 2 REF: 061829geo TOP: Constructions
KEY: line bisector

724 ANS:

$$\frac{1}{2}(5)(L)(4) = 70$$
$$10L = 70$$
$$L = 7$$

PTS: 2 REF: 012330geo TOP: Volume KEY: prisms

725 ANS:
$180 - 2(25) = 130$

PTS: 2 REF: 011730geo TOP: Centroid, Orthocenter, Incenter and Circumcenter

726 ANS:

$$\frac{124 - 56}{2} = 34$$

PTS: 2 REF: 081930geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

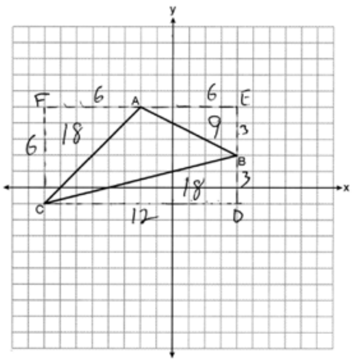
727 ANS:
The four small triangles are 8-15-17 triangles. $4 \times 17 = 68$

PTS: 2 REF: 081726geo TOP: Special Quadrilaterals

728 ANS:
Yes, as translations do not change angle measurements.

PTS: 2 REF: 061825geo TOP: Properties of Transformations
KEY: basic

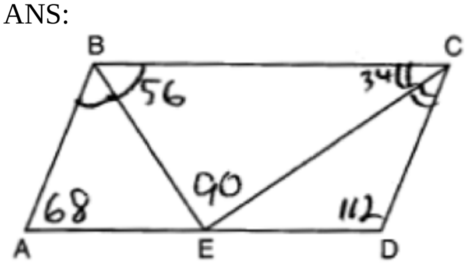
729 ANS:



$$6 \times 12 - \frac{1}{2}(12 \times 3) - \frac{1}{2}(6 \times 6) - \frac{1}{2}(6 \times 3) = 27$$

PTS: 2 REF: 012331geo TOP: Polygons in the Coordinate Plane

730 ANS:



PTS: 2 REF: 081826geo TOP: Interior and Exterior Angles of Polygons

731 ANS:
$$\frac{80}{360} \cdot \pi(6.4)^2 \approx 29$$

PTS: 2 REF: 062328geo TOP: Sectors

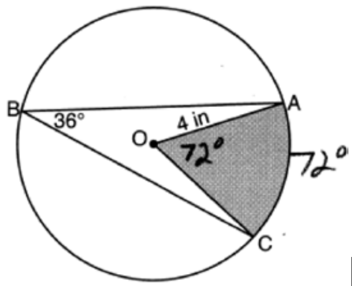
732 ANS:
$$\cos 14 = \frac{5 - 1.2}{x}$$
$$x \approx 3.92$$

PTS: 2 REF: 082228geo TOP: Using Trigonometry to Find a Side

733 ANS:
$D = 360 - (117 + 70 + 91) = 82$

PTS: 2 REF: 012525geo TOP: Properties of Transformations

734 ANS:



$$\left(\frac{72}{360}\right)\pi(4)^2 \approx 10.1$$

PTS: 2 REF: 082231geo TOP: Sectors

735 ANS:

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

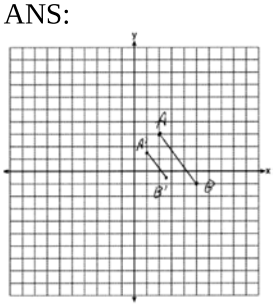
PTS: 2 REF: 011628geo TOP: Triangle Congruency

736 ANS:

$$\frac{5\pi(2)^2+5(6)(4)}{25} \approx 7.3 \text{ 8 cans}$$

PTS: 2 REF: 082328geo TOP: Compositions of Polygons and Circles
KEY: area

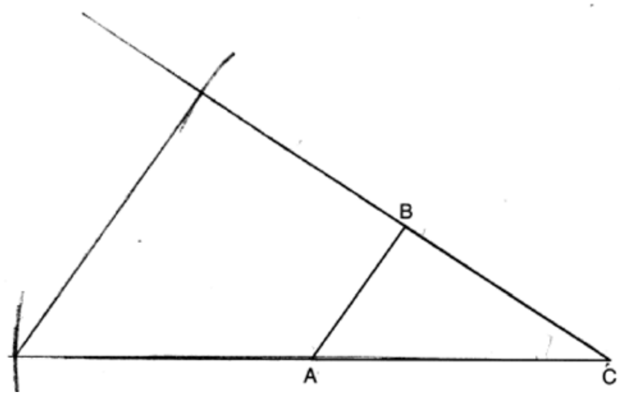
737 ANS:



$$\sqrt{(2.5-1)^2+(-.5-1.5)^2}=\sqrt{2.25+4}=2.5$$

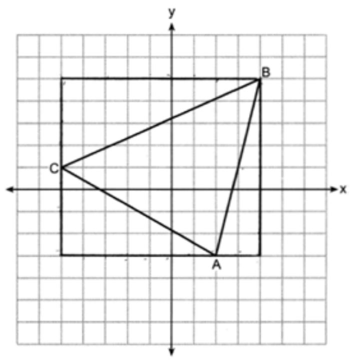
PTS: 2 REF: 081729geo TOP: Line Dilations

738 ANS:



PTS: 2 REF: 082227geo TOP: Constructions
KEY: congruent and similar figures

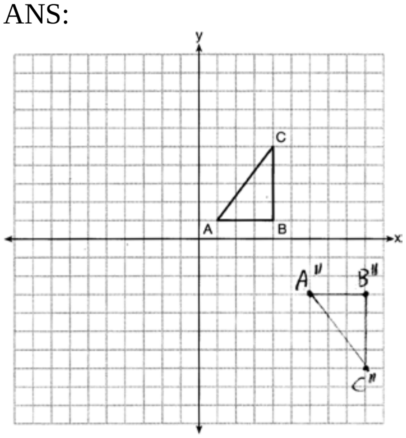
739 ANS:



$$9 \times 8 - \frac{1}{2}(4 \times 7) - \frac{1}{2}(4 \times 9) - \frac{1}{2}(8 \times 2) = 32$$

PTS: 2 REF: 062430geo TOP: Polygons in the Coordinate Plane

740 ANS:



PTS: 2 REF: 081626geo TOP: Compositions of Transformations
KEY: grids

741 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

742 ANS:

PTS: 2 REF: spr2406geo TOP: Constructions
KEY: line bisector

743 ANS:

$\frac{40}{360} \cdot \pi(4.5)^2 = 2.25\pi$

PTS: 2 REF: 061726geo TOP: Sectors

744 ANS:

$\cos B$ increases because $\angle A$ and $\angle B$ are complementary and $\sin A = \cos B$.

PTS: 2 REF: 011827geo TOP: Cofunctions

745 ANS:

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

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

746 ANS:

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

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

$x \approx 15.5$

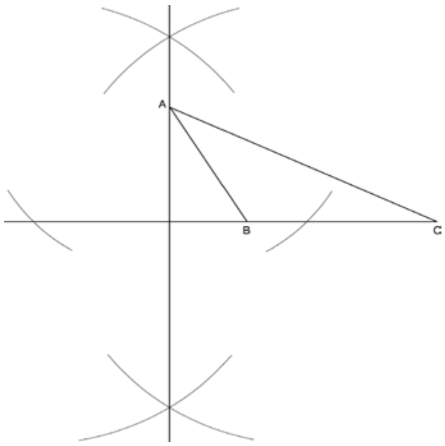
PTS: 2 REF: 081631geo TOP: Using Trigonometry to Find a Side
KEY: graphics

747 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.

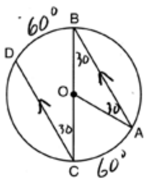
PTS: 2 REF: spr1404geo TOP: Similarity Proofs

748 ANS:



PTS: 2 REF: fall1409geo TOP: Constructions
KEY: parallel and perpendicular lines

749 ANS:



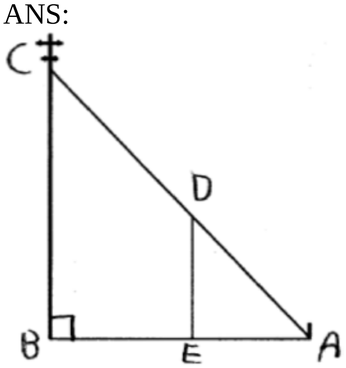
$180 - 2(30) = 120$

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

750 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

751 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

752 ANS:
$$x^2 = 9 \times 25$$
$$x = 15$$

PTS: 2 REF: 012530geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, length

753 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

754 ANS:
$$\cos J = \frac{3}{5} \quad S \approx 90 - 53 = 37$$
$$J \approx 53$$

PTS: 2 REF: 012431geo TOP: Using Trigonometry to Find an Angle

755 ANS:
$$\sin^{-1}\left(\frac{5}{25}\right) \approx 11.5$$

PTS: 2 REF: 081926geo TOP: Using Trigonometry to Find an Angle

756 ANS:
$$\tan 36 = \frac{x}{18.5} \quad 13.44 + 2.5 \approx 16$$
$$x \approx 13.44$$

PTS: 2 REF: 012527geo TOP: Using Trigonometry to Find a Side

757 ANS:
$$T_{0,5} \circ r_{\text{y-axis}}$$

PTS: 2 REF: 082225geo TOP: Compositions of Transformations
KEY: identify

758 ANS:
$$4x \cdot x = 8^2 \quad 4 + 4(4) = 20$$
$$4x^2 = 64$$
$$x^2 = 16$$
$$x = 4$$

PTS: 2 REF: 082330geo TOP: Similarity

759 ANS:

$$\cos A = \frac{11}{18}$$
$$A \approx 52$$

PTS: 2 REF: 062425geo TOP: Using Trigonometry to Find an Angle

760 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

761 ANS:

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

PTS: 2 REF: 081525geo TOP: Density

762 ANS:

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

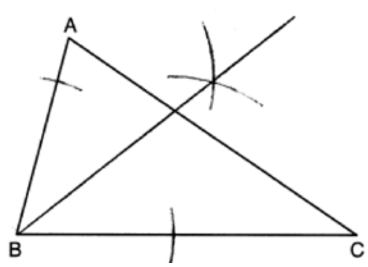
PTS: 2 REF: 011630geo TOP: Density

763 ANS:

Yes. The bases of the cylinders have the same area and the cylinders have the same height.

PTS: 2 REF: 081725geo TOP: Volume

764 ANS:



PTS: 2 REF: 012325geo TOP: Constructions

KEY: angle bisector

765 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

766 ANS:
$T_{6,0}\circ r_{x\text{-axis}}$

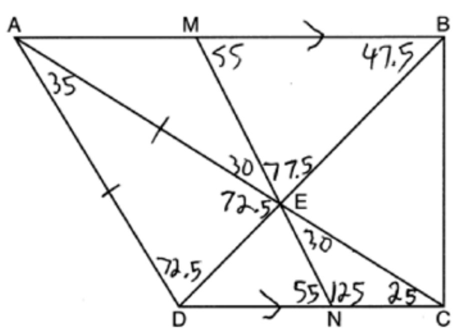
PTS: 2 REF: 061625geo TOP: Compositions of Transformations
KEY: identify

767 ANS:
$T_{0,-2}\circ r_{y\text{-axis}}$

PTS: 2 REF: 011726geo TOP: Compositions of Transformations
KEY: identify

768 ANS:
R_{180° about $\left(-\frac{1}{2},\frac{1}{2}\right)$

PTS: 2 REF: 081727geo TOP: Compositions of Transformations
KEY: identify

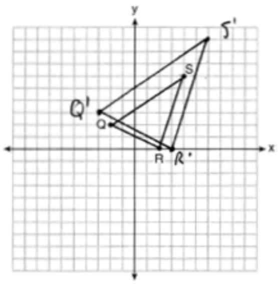
769 ANS:


47.5°

PTS: 2 REF: 082230geo TOP: Interior and Exterior Angles of Polygons

Geometry 4 Point Regents Exam Questions
Answer Section

1 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

2 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

3 ANS:

$\pi(3.5)^2(9) \approx 346; \quad \pi(4.5)^2(13) \approx 827; \quad \frac{827}{346} \approx 2.4;$ 3 cans

PTS: 4 REF: 062333geo TOP: Volume KEY: cylinders

4 ANS:

$M\left(\frac{4+0}{2}, \frac{6-1}{2}\right) = M\left(2, \frac{5}{2}\right) \quad m = \frac{6--1}{4-0} = \frac{7}{4} \quad m_{\perp} = -\frac{4}{7} \quad y - 2.5 = -\frac{4}{7}(x-2)$ 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

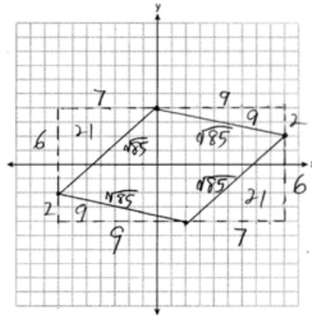
5 ANS:

$\overline{LA} \cong \overline{DN}$, $\overline{CA} \cong \overline{CN}$, 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

6 ANS:

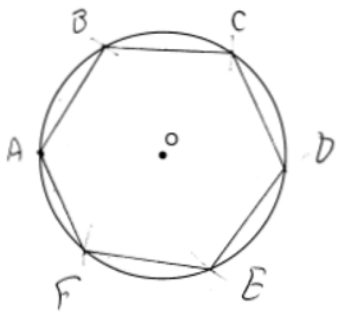
A rhombus has four congruent sides. Since each side measures $\sqrt{85}$, all four sides of *MATH* are congruent, and



MATH is a rhombus. $16 \times 8 - (21 + 9 + 21 + 9) = 68$

PTS: 4 REF: 062334geo TOP: Quadrilaterals in the Coordinate Plane

7 ANS:



Right triangle because $\angle CBF$ is inscribed in a semi-circle.

PTS: 4 REF: 011733geo TOP: Constructions

8 ANS:

Since $\angle ABH$ is 100°, $\angle AHB$ is 40°. An isosceles triangle has two congruent angles. $\cos 80 = \dfrac{x}{85}$

$x \approx 14.8$

$\tan 40 = \dfrac{y}{85 + 14.8}$

$y \approx 84$

PTS: 4 REF: 012334geo TOP: Using Trigonometry to Find a Side

9 ANS:

$C = 2\pi r$ $V = \dfrac{1}{3}\pi \cdot 5^2 \cdot 13 \approx 340$

$31.416 = 2\pi r$

$5 \approx r$

PTS: 4 REF: 011734geo TOP: Volume KEY: cones

10 ANS:

$((6 \times 6) - (4 \times 2)) \times 1.25 = 35$ $18 \times \$3.68 = \$66.24$

PTS: 4 REF: 012533geo TOP: Volume KEY: compositions

11 ANS:

$m_{\overline{AB}} = \frac{6-3}{-3-6} = \frac{3}{-9} = -\frac{1}{3}$ $m_{\overline{BC}} = \frac{3--2}{6-6} = \frac{5}{0} \rightarrow$ undefined *ABCD* is a trapezoid because it has only one pair of

$m_{\overline{CD}} = \frac{2--2}{-6-6} = \frac{4}{-12} = -\frac{1}{3}$ $m_{\overline{AD}} = \frac{6-2}{-3--6} = \frac{4}{3}$

parallel sides. $BD = \sqrt{(6--6)^2 + (3-2)^2} = \sqrt{145}$ *ABCD* is isosceles because *ABCD*'s diagonals are

$AC = \sqrt{(6--3)^2 + (-2-6)^2} = \sqrt{145}$

congruent.

PTS: 4 REF: 082433geo TOP: Quadrilaterals in the Coordinate Plane

12 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

13 ANS:

Mary. Sally: $V = \pi \cdot 2^2 \cdot 8 \approx 100.5$ Mary: $V = \frac{1}{3}\pi \cdot 3.5^2 \cdot 12.5 \approx 160.4$ $160.4 - 100.5 \approx 60$

PTS: 4 REF: 012332geo TOP: Volume KEY: cones

14 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

15 ANS:

$\tan 36 = \frac{x}{10}$ $\cos 36 = \frac{10}{y}$ $12.3607 \times 3 \approx 37$

$x \approx 7.3$ $y \approx 12.3607$

PTS: 4 REF: 081833geo TOP: Using Trigonometry to Find a Side

16 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

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

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

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

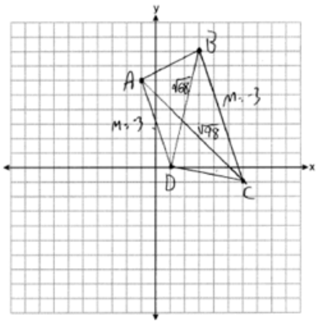
$\triangle A'B'C'$ and reflections preserve distance.

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

17 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

18 ANS:



$m_{\overline{AD}} = \dfrac{0-6}{1--1} = -3$ $\overline{AD} \parallel \overline{BC}$ because their slopes are equal. $ABCD$ is a trapezoid

$m_{\overline{BC}} = \dfrac{-1-8}{6-3} = -3$

because it has a pair of parallel sides. $AC = \sqrt{(-1-6)^2 + (6--1)^2} = \sqrt{98}$ $ABCD$ is not an isosceles trapezoid

$BD = \sqrt{(8-0)^2 + (3-1)^2} = \sqrt{68}$

because its diagonals are not congruent.

PTS: 4 REF: 061932geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

19 ANS:

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

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

PTS: 4 REF: spr1412geo TOP: Density

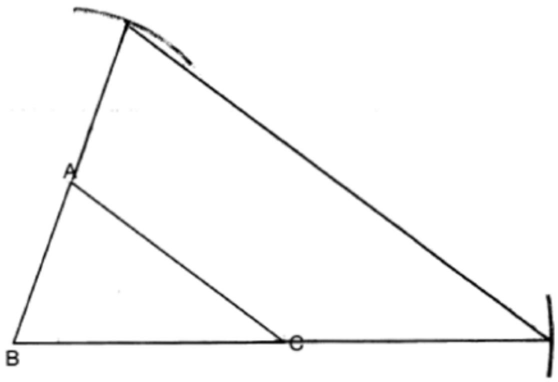
20 ANS:

$\sin 4.76 = \dfrac{1.5}{x}$ $\tan 4.76 = \dfrac{1.5}{x}$ $18 - \dfrac{16}{12} \approx 16.7$

$x \approx 18.1$ $x \approx 18$

PTS: 4 REF: 011934geo TOP: Using Trigonometry to Find a Side

21 ANS:



Yes, because a dilation preserves angle measure.

PTS: 4 REF: 081932geo TOP: Constructions
KEY: congruent and similar figures

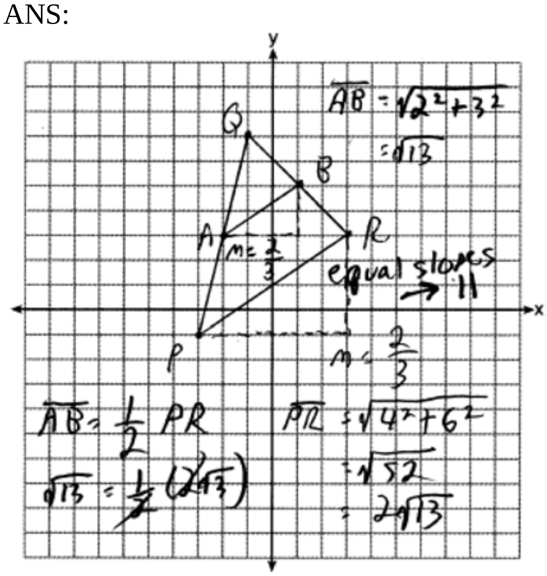
22 ANS:

$(7^2)18\pi = 16x^2$ $\frac{80}{13.2} \approx 6.1$ $\frac{60}{13.2} \approx 4.5$ $6 \times 4 = 24$

$13.2 \approx x$

PTS: 4 REF: 012034geo TOP: Volume KEY: cylinders

23 ANS:



PTS: 4 REF: 081732geo TOP: Triangles in the Coordinate Plane

24 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.

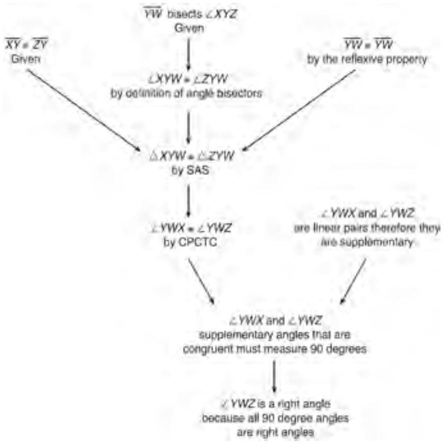
PTS: 4 REF: 061533geo TOP: Quadrilateral Proofs

25 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

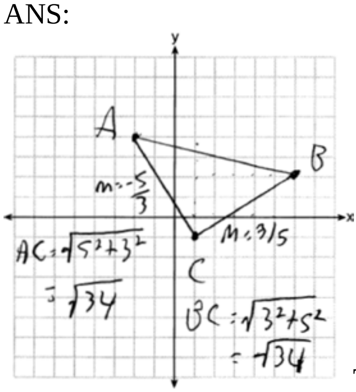
26 ANS:



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

27 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

28 ANS:

$$24\text{ in}\times 12\text{ in}\times 18\text{ in}\quad 2.94\approx 3\quad \frac{24}{3}\times\frac{12}{3}\times\frac{18}{3}=192\quad 192\left(\frac{4}{3}\pi\right)\left(\frac{2.94}{2}\right)^3(0.025)\approx 64$$

PTS: 4 REF: 082234geo TOP: Density

29 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

30 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

31 ANS:

$\tan 15 = \frac{188}{x}$ $\tan 23 = \frac{188}{y}$ $701.63 - 442.9 \approx 259$

$x \approx 701.63$ $y \approx 442.9$

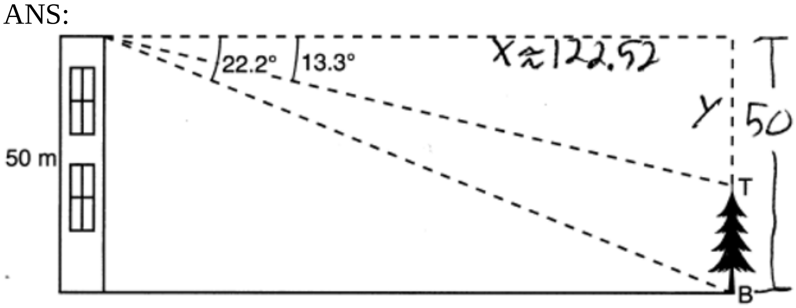
PTS: 4 REF: 062434geo TOP: Using Trigonometry to Find a Side

32 ANS:

A dilation of 3 centered at *A*. A dilation preserves angle measure, so the triangles are similar.

PTS: 4 REF: 011832geo TOP: Dilations

33 ANS:



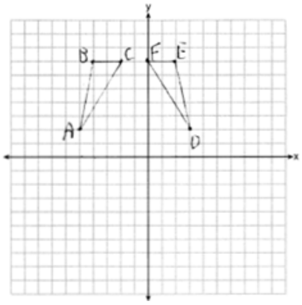
$\tan 22.2 = \frac{50}{x}$ $\tan 13.3 = \frac{y}{122.52}$

$x \approx 122.52$ $y \approx 29$

$50 - 29 = 21$

PTS: 4 REF: 082232geo TOP: Using Trigonometry to Find a Side
KEY: advanced

34 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

35 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

36 ANS:

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

$$x \approx 36.6$$

PTS: 4 REF: 011632geo TOP: Similarity KEY: basic

37 ANS:

$\triangle ABC$, $\triangle DEF$, $\overline{AB} \perp \overline{BC}$, $\overline{DE} \perp \overline{EF}$, $\overline{AE} \cong \overline{DB}$, and $\overline{AC} \parallel \overline{FD}$ (Given); $\angle DEF \cong \angle CBA$ (Perpendicular lines form congruent angles); $\angle CAB \cong \angle DEF$ (Parallel lines cut by a transversal form congruent alternate interior angles); $\overline{EB} \cong \overline{BE}$ (Symmetric Property); $\overline{AE} + \overline{EB} \cong \overline{DB} + \overline{BE}$ (Segment Addition); $\triangle ABC \cong \triangle DEF$ (ASA)

$$\overline{AB} \cong \overline{ED}$$

PTS: 4 REF: 062433geo TOP: Triangle Proofs
KEY: proof

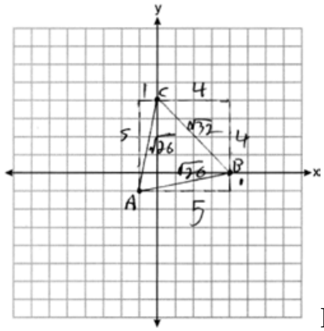
38 ANS:

$$\sin 65 = \frac{7.7}{x}. \quad \tan 65 = \frac{7.7}{y}$$

$$x \approx 8.5 \qquad y \approx 3.6$$

PTS: 4 REF: 082333geo TOP: Using Trigonometry to Find a Side

39 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

40 ANS:

$\sin 65 = \frac{RB}{1076}$ $\sin 54 = \frac{RA}{774}$ $975.2 - 626.2 = 349$

$RB \approx 975.2$ $RA \approx 626.2$

PTS: 4 REF: 082432geo TOP: Using Trigonometry to Find a Side

41 ANS:

$\tan 72 = \frac{x}{400}$ $\sin 55 = \frac{400 \tan 72}{y}$

$x = 400 \tan 72$ $y = \frac{400 \tan 72}{\sin 55} \approx 1503$

PTS: 4 REF: 061833geo TOP: Using Trigonometry to Find a Side
KEY: advanced

42 ANS:

$6\left(\frac{4}{3}\pi\right)\left(\frac{2.5}{12}\right)^3(68) \approx 15$

PTS: 4 REF: 082434geo TOP: Density

43 ANS:

$\frac{4}{x+3} = \frac{x-1}{15}$ $7 + 3 = 10$

$x^2 - x + 3x - 3 = 60$

$x^2 + 2x - 63 = 0$

$(x+9)(x-7) = 0$

$x = 7$

PTS: 4 REF: spr2407geo TOP: Similarity KEY: basic

44 ANS:

$$\frac{(3.5)^2(1.5)-(2)^2(1.5)}{.6}\approx 20.6.\ \ 21\text{ bags}$$

PTS: 4 REF: 082332geo TOP: Volume KEY: compositions

45 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

46 ANS:

$$\tan 56=\frac{x}{1.3} \qquad \sqrt{(1.3\tan 56)^2+1.5^2}\approx 3.7$$

$$x=1.3\tan 56$$

PTS: 4 REF: 012033geo TOP: Using Trigonometry to Find a Side

KEY: advanced

47 ANS:

$$\sin x=\frac{917}{1048} \quad \sin T=\frac{917}{1425} \quad 180-((180-61)+40)=21$$

$$x\approx 61 \qquad T\approx 40$$

$$\angle SBC$$

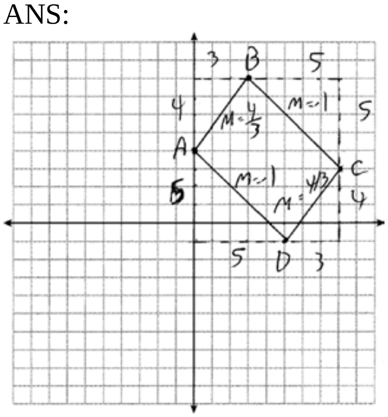
PTS: 4 REF: 012532geo TOP: Using Trigonometry to Find an Angle

48 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

49 ANS:



$\overline{AD}$ and $\overline{BC}$ have equal slope, so are parallel. $\overline{AB}$ and $\overline{CD}$ have equal slope, so are parallel. Since both pairs of opposite sides are parallel, *ABCD* is a parallelogram. The slope of $\overline{AB}$ and $\overline{BC}$ are not opposite reciprocals, so they are not perpendicular, and so $\angle B$ is not a right angle. *ABCD* is not a rectangle since all four angles are not right angles.

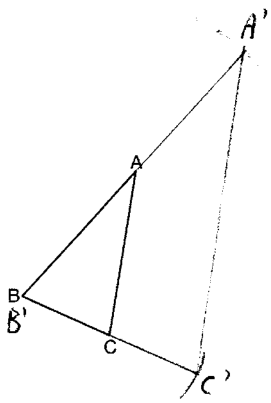
PTS: 4 REF: 082334geo TOP: Quadrilaterals in the Coordinate Plane

50 ANS:
In quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{CD}$, segments CE and AF are drawn to diagonal $\overline{BD}$ such that $\overline{BE} \cong \overline{DF}$ (Given); $\angle ABF \cong \angle CDE$ (Parallel lines cut by a transversal form congruent interior angles); $\overline{EF} \cong \overline{FE}$ (Reflexive); $\overline{BE} + \overline{EF} \cong \overline{DF} + \overline{FE}$ (Addition); $\triangle AFB \cong \triangle CED$ (SAS); $\overline{CE} \cong \overline{AF}$ *(CPCTC).*

$\overline{BF} \cong \overline{DE}$

PTS: 4 REF: 012434geo TOP: Quadrilateral Proofs

51 ANS:



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

PTS: 4 REF: 081632geo TOP: Constructions
KEY: congruent and similar figures

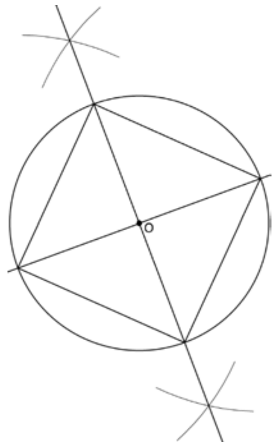
52 ANS:
Translations preserve distance. If point D is mapped onto point A, point F would map onto point C. $\triangle DEF \cong \triangle ABC$ as $\overline{AC} \cong \overline{DF}$ and points are collinear on line ℓ and a reflection preserves distance.

PTS: 4 REF: 081534geo TOP: Triangle Congruency

53 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); $\dfrac{BC}{CA} = \dfrac{AB}{EC}$ (Corresponding sides of similar triangles are in proportion).

PTS: 4 REF: 081733geo TOP: Circle Proofs

54 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

55 ANS:

$$\frac{22 \times 38 \times 15 + \frac{1}{3}(38 \times 15 \times 12)}{2400} \approx 6.2$$

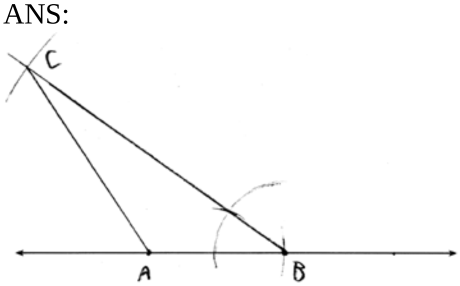
PTS: 4 REF: 062432geo TOP: Volume KEY: compositions

56 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

57 ANS:



SAS ≅ SAS

PTS: 4 REF: 011634geo TOP: Constructions
KEY: congruent and similar figures

58 ANS:

$$x^2+x^2=58^2 \qquad A=(\sqrt{1682}+8)^2\approx 2402.2$$
$$2x^2=3364$$
$$x=\sqrt{1682}$$

PTS: 4 REF: 081734geo TOP: Area of Polygons

59 ANS:

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

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

60 ANS:

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

PTS: 4 REF: 061632geo TOP: Volume KEY: cylinders

61 ANS:

Parallelogram $PQRS$, $\overline{QT}\perp\overline{PS}$, $\overline{SU}\perp\overline{QR}$ (given); $\overline{QUR}\cong\overline{PTS}$ (opposite sides of a parallelogram are parallel; Quadrilateral $QUST$ is a rectangle (quadrilateral with parallel opposite sides and opposite right angles is a rectangle); $\overline{SU}\cong\overline{QT}$ (opposite sides of a rectangle are congruent); $\overline{RS}\cong\overline{PQ}$ (opposite sides of a parallelogram are congruent); $\angle RUS$ and $\angle PTQ$ are right angles (the supplement of a right angle is a right angle), $\triangle RSU\cong\triangle PQT$ (HL); $\overline{PT}\cong\overline{RU}$ (CPCTC)

PTS: 4 REF: 062233geo TOP: Quadrilateral Proofs

62 ANS:

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

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

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

63 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

64 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

65 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

66 ANS:

$\tan 75 = \frac{y}{85}$ $\tan 35 = \frac{x}{85}$ $317.2 + 59.5 \approx 377$

$y \approx 317.2$ $h \approx 59.5$

PTS: 4 REF: 012432geo TOP: Using Trigonometry to Find a Side

67 ANS:

$\tan y = \frac{1.58}{3.74}$ $\tan x = \frac{.41}{3.74}$ $22.90 - 6.26 = 16.6$

$y \approx 22.90$ $x \approx 6.26$

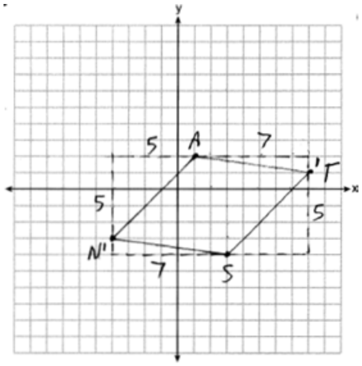
PTS: 4 REF: 062232geo TOP: Using Trigonometry to Find an Angle

68 ANS:

$\triangle AEB$ and $\triangle DFC$, $\overline{ABCD}$, $\overline{AE} \parallel \overline{DF}$, $\overline{EB} \parallel \overline{FC}$, $\overline{AC} \cong \overline{DB}$ (given); $\angle A \cong \angle D$ (Alternate interior angles formed by parallel lines and a transversal are congruent); $\angle EBA \cong \angle FCD$ (Alternate exterior angles formed by parallel lines and a transversal are congruent); $\overline{BC} \cong \overline{BC}$ (reflexive); $\overline{AB} \cong \overline{CD}$ (segment subtraction); $\triangle EAB \cong \triangle FDC$ (ASA)

PTS: 4 REF: 012333geo TOP: Triangle Proofs
KEY: proof

69 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

70 ANS:

$V = \pi(10)^2(18) = 1800\pi \text{ in}^3$ $1800\pi \text{ in}^3\left(\frac{1 \text{ ft}^3}{12^3 \text{ in}^3}\right) = \frac{25}{24}\pi \text{ ft}^3$ $\frac{25}{24}\pi(95.46)(0.85) \approx 266$ $266 + 270 = 536$

PTS: 4 REF: 061834geo TOP: Density

71 ANS:

$\frac{4\pi}{3}(2^3 - 1.5^3) \approx 19.4$ $19.4 \cdot 1.308 \cdot 8 \approx 203$

PTS: 4 REF: 081834geo TOP: Density

72 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

73 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

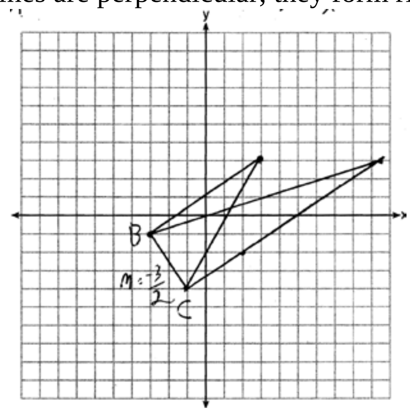
74 ANS:

$$\frac{10\pi(.5)^2 4}{\frac{2}{3}} \approx 47.1 \quad 48 \text{ bags}$$

PTS: 4 REF: 062234geo TOP: Volume KEY: cylinders

75 ANS:

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



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

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

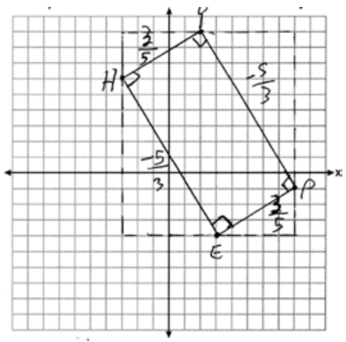
PTS: 4 REF: 081533geo TOP: Triangles in the Coordinate Plane

76 ANS:

$$h = \sqrt{16^2 - \left(\frac{12}{2}\right)^2} = \sqrt{220} \quad V = \frac{1}{3}(12)^2\sqrt{220} \approx 712 \quad 712 \times 0.32 \approx 23$$

PTS: 4 REF: 012433geo TOP: Density

77 ANS:



1) Quadrilateral $HYPE$ with $H(-3,6)$, $Y(2,9)$, $P(8,-1)$, and $E(3,-4)$ (Given); 2) Slope of $\overline{HY}$ and $\overline{PE}$ is $\frac{3}{5}$, slope of $\overline{YP}$ and $\overline{EH}$ is $-\frac{5}{3}$ (Slope determined graphically); 3) $\overline{HY}\perp\overline{YP}$, $\overline{PE}\perp\overline{EH}$, $\overline{YP}\perp\overline{PE}$, $\overline{EY}\perp\overline{HY}$ (The slopes of perpendicular lines are opposite reciprocals); 4) $\angle H$, $\angle Y$, $\angle P$, $\angle E$ are right angles (Perpendicular lines form right angles); 5) $HYPE$ is a rectangle (A rectangle has four right angles).

PTS: 4 REF: 082233geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

78 ANS:

$\tan 15 = \frac{x}{3280}$; $\tan 31 = \frac{y}{3280}$; $1970.8 - 878.9 \approx 1092$

$x \approx 878.9$ $\quad$ $x \approx 1970.8$

PTS: 4 REF: 062332geo TOP: Using Trigonometry to Find a Side

79 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

80 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

81 ANS:

1) $\triangle ACD$ with $\overline{ABC}$, $\overline{AED}$, and $\overline{BE} \parallel \overline{CD}$ (Given); 2) $\angle ABE \cong \angle ACD$ and $\angle AEB \cong \angle ADC$ (A transversal crossing parallel lines creates congruent corresponding angles; 3) $\triangle ABE \cong \triangle ACD$ (AA); 4) $\frac{AB}{AC} = \frac{AE}{AD}$ (Corresponding sides of similar triangles are proportional); 5) $AB \bullet AD = AE \bullet AC$ (Product of the means equals the product of the extremes)

PTS: 4 REF: 012534geo TOP: Similarity Proofs

Geometry 6 Point Regents Exam Questions
Answer Section

82 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.

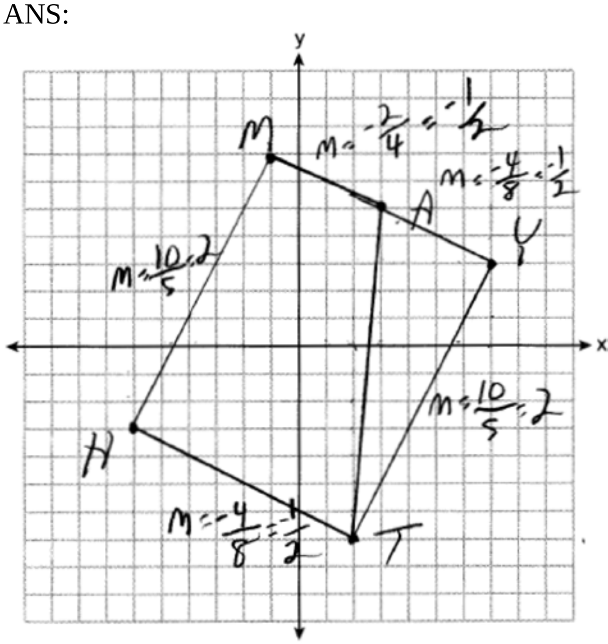
PTS: 6 REF: spr1414geo TOP: Triangle Congruency

83 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

84 ANS:



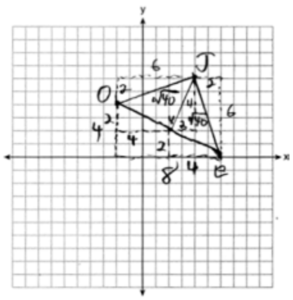
The slope of $\overline{MA}$ and $\overline{TH}$ equals $-\frac{1}{2}$. Distinct lines with equal slope are parallel. $MATH$ is a trapezoid because it has a pair of parallel lines. (7,3). The slope of $\overline{MY}$ and $\overline{TH}$ equals $-\frac{1}{2}$. The slope of $\overline{YT}$ and $\overline{HM}$ equals 2. The slopes of each side are opposite reciprocals and therefore perpendicular. Perpendicular sides form right angles, so $MYTH$ has four right angles and is a rectangle.

PTS: 6 REF: 012435geo TOP: Quadrilaterals in the Coordinate Plane

85 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

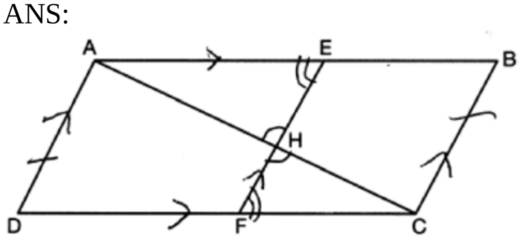
86 ANS:



$JE = JO = \sqrt{6^2 + 2^2} = \sqrt{40}$ Since $\triangle JOE$ has two congruent sides, it is isosceles. $OY = YE = \sqrt{4^2 + 2^2} = \sqrt{20}$ Since $\overline{OY} \cong \overline{YE}$, $\overline{JY}$ is a bisector of $\overline{OE}$. $m_{\overline{OE}} = \frac{4}{-8} = -\frac{1}{2}$ $m_{\overline{JY}} = \frac{4}{2} = 2$ Since the slopes are opposite reciprocals, $\overline{OE} \perp \overline{JY}$.

PTS: 6 REF: 062435geo TOP: Triangles in the Coordinate Plane

87 ANS:

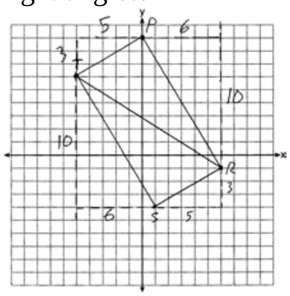


1) Quadrilateral $ABCD$, $\overline{AC}$ and $\overline{EF}$ intersect at H, $\overline{EF} \parallel \overline{AD}$, $\overline{EF} \parallel \overline{BC}$, and $\overline{AD} \cong \overline{BC}$ (Given); 2) $\angle EHA \cong \angle FHC$ (Vertical angles are congruent); 3) $\overline{AD} \parallel \overline{BC}$ (Transitive property of parallel lines); 4) $ABCD$ is a parallelogram (Quadrilateral with a pair of sides both parallel and congruent); 5) $\overline{AB} \parallel \overline{CD}$ (Opposite sides of a parallelogram); 6) $\angle AEH \cong \angle CFH$ (Alternate interior angles formed by parallel lines and a transversal); 7) $\triangle AEH \sim \triangle CFH$ (AA); 8) $\frac{EH}{FH} = \frac{AH}{CH}$ (Corresponding sides of similar triangles are proportional); 8) $(EH)(CH) = (FH)(AH)$ (Product of means equals product of extremes).

PTS: 6 REF: 082235geo TOP: Quadrilateral Proofs

88 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

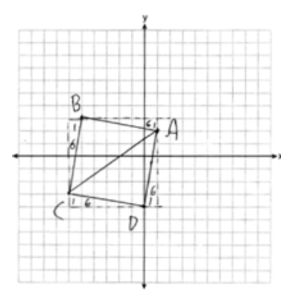
89 ANS:

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

90 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

91 ANS:

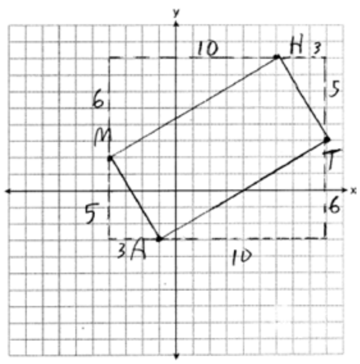
Isosceles trapezoid $ABCD$, $\angle CDE \cong \angle DCE$, $\overline{AE} \perp \overline{DE}$, and $\overline{BE} \perp \overline{CE}$ (given); $\overline{AD} \cong \overline{BC}$ (congruent legs of isosceles trapezoid); $\angle DEA$ and $\angle CEB$ are right angles (perpendicular lines form right 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

92 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

93 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

94 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

95 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

96 ANS:

$\tan 52.8=\frac{h}{x}$

$h=x\tan 52.8$

$\tan 34.9=\frac{h}{x+8}$

$h=(x+8)\tan 34.9$

$x\tan 52.8=x\tan 34.9+8\tan 34.9$

$x\tan 52.8-x\tan 34.9=8\tan 34.9$

$x(\tan 52.8-\tan 34.9)=8\tan 34.9$

$x=\frac{8\tan 34.9}{\tan 52.8-\tan 34.9}$

$x\approx 9$

$\tan 52.8\approx\frac{h}{9}$

$x\approx 11.86$

$11.86+1.7\approx 13.6$

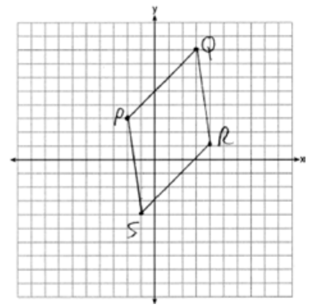
PTS: 6 REF: 011636geo TOP: Using Trigonometry to Find a Side
KEY: advanced

97 ANS:

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

PTS: 6 REF: 081536geo TOP: Density

98 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. $m_{\overline{PQ}}=\dfrac{8-3}{3--2}=\dfrac{5}{5}=1$
$m_{\overline{QR}}=\dfrac{1-8}{4-3}=-7$ 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.

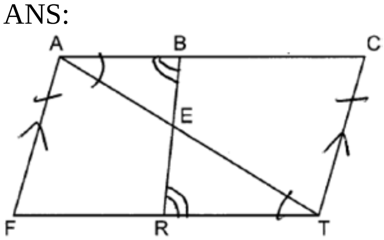


PTS: 6 REF: 061735geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

99 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

100 ANS:

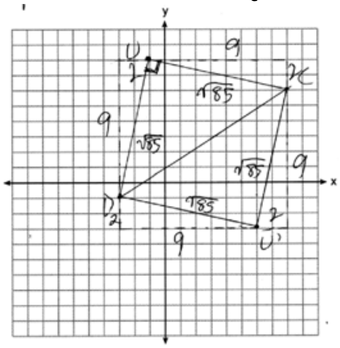


Quadrilateral *FACT*, $\overline{BR}$ intersects diagonal $\overline{AT}$ at *E*, $\overline{AF}\parallel\overline{CT}$, and $\overline{AF}\cong\overline{CT}$ (Given); *FACT* is a parallelogram (A quadrilateral with one pair of opposite sides parallel and congruent is a parallelogram); $\overline{AC}\cong\overline{FT}$ (Opposite sides of a parallelogram are parallel); $\angle BAE\cong\angle RTE$, $\angle ABE\cong\angle TRE$ (Parallel lines cut by a transversal form alternate interior angles that are congruent); $\triangle ABE\sim\triangle TRE$ (AA); $\dfrac{AB}{AE}=\dfrac{TR}{TE}$ (Corresponding sides of similar triangles are proportional); $(AB)(TE)=(AE)(TR)$ (Product of the means equals the product of the extremes).

PTS: 6 REF: 082335geo TOP: Similarity Proofs

101 ANS:

$m_{\overline{DU}} = \frac{9}{2}$ $m_{\overline{UC}} = -\frac{2}{9}$ Since the slopes of $\overline{DU}$ and $\overline{UC}$ are opposite reciprocals, they are perpendicular and form a right angle. $\triangle DUC$ is a right triangle because $\angle DUC$ is a right angle. Each side of quadrilateral $DUCU'$ is $\sqrt{9^2 + 2^2} = \sqrt{85}$. Quadrilateral $DUCU'$ is a square because all four side are congruent and it has a right angle.



PTS: 6 REF: 012335geo TOP: Quadrilaterals in the Coordinate Plane

102 ANS:

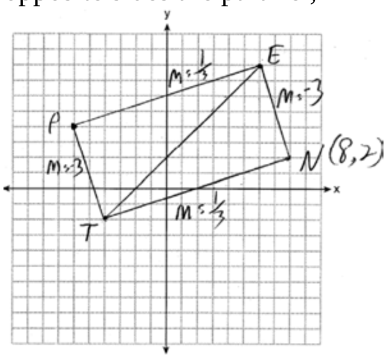
$m_{\overline{PE}} = \frac{8-4}{6--6} = \frac{4}{12} = \frac{1}{3}$ Since the slopes of $\overline{PE}$ and $\overline{PT}$ are opposite reciprocals, they are perpendicular and

$m_{\overline{PT}} = \frac{4--2}{-6--4} = \frac{6}{-2} = -3$

form a right angle. $\triangle PET$ is a right triangle because it has a right angle. $(8,2)$ $m_{\overline{TN}} = \frac{2--2}{8--4} = \frac{4}{12} = \frac{1}{3}$ Because

$m_{\overline{EN}} = \frac{8-2}{6-8} = \frac{6}{-2} = -3$

the slopes of $\overline{PE}$ and $\overline{TN}$ are equal, $\overline{PE} \parallel \overline{TN}$. Because the slopes of $\overline{PT}$ and $\overline{EN}$ are equal, $\overline{PT} \parallel \overline{EN}$. Because opposite sides are parallel, $PENT$ is a parallelogram. Because $\angle P$ is a right angle, $PENT$ is a rectangle.



PTS: 6 REF: 012535geo TOP: Quadrilaterals in the Coordinate Plane

103 ANS:
Quad *HOPE*, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, $\overline{TG} \perp \overline{EO}$ and $\overline{YJ} \perp \overline{EO}$ (Given); *HOPE* is a parallelogram (Both pairs of opposite sides are parallel); $\overline{HO} \parallel \overline{PE}$ (Opposite sides of a parallelogram are parallel); $\angle YOJ \cong \angle GET$ (Parallel lines cut by a transversal form congruent alternate interior angles); $\overline{GJ} \cong \overline{GJ}$ (Reflexive); $\overline{EG} \cong \overline{OJ}$ (Subtraction); $\angle EGT$ and $\angle OJY$ are right angles (Perpendicular lines form right angles); $\angle EGT \cong \angle OJY$ (All right angles are congruent); $\triangle EGT \cong \triangle OJY$ (ASA); $\overline{TG} \cong \overline{YJ}$ (CPCTC).

PTS: 6 REF: 082435geo TOP: Quadrilateral Proofs

104 ANS:
Parallelogram *ABCD*, $\overline{BF} \perp \overline{AFD}$, and $\overline{DE} \perp \overline{BEC}$ (given); $\overline{BC} \parallel \overline{AD}$ (opposite sides of a ▱ 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 ▱ (a quadrilateral with both pairs of opposite sides $\parallel$ is a ▱); $\angle DEB$ is a right $\angle$ ($\perp$ lines form right $\angle$s); *BEDF* is a rectangle (a ▱ with one right $\angle$ is a rectangle).

PTS: 6 REF: 061835geo TOP: Quadrilateral Proofs

105 ANS:
Circle *O*, secant $\overline{ACD}$, tangent $\overline{AB}$ (Given). Chords $\overline{BC}$ and $\overline{BD}$ are drawn (Auxiliary lines). $\angle A \cong \angle A$, $\overparen{BC} \cong \overparen{BC}$ (Reflexive property). $m\angle BDC = \frac{1}{2}m\overparen{BC}$ (The measure of an inscribed angle is half the measure of the intercepted arc). $m\angle CBA = \frac{1}{2}m\overparen{BC}$ (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

106 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

107 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: $V=40^2(750)-35^2(750)=281,250$ $\qquad$ $\$307.62-288.56=\$19.06$

$$281,250\ \text{cm}^3\left(\frac{2.7\ \text{g}}{\text{cm}^3}\right)\left(\frac{1\ \text{kg}}{1000\ \text{g}}\right)\left(\frac{\$0.38}{\text{kg}}\right)=\$288.56$$

PTS: 6 REF: 011736geo TOP: Density

108 ANS:
$$V=\frac{1}{3}\pi\left(\frac{8.3}{2}\right)^2(10.2)+\frac{1}{2}\cdot\frac{4}{3}\pi\left(\frac{8.3}{2}\right)^3\approx183.961+149.693\approx333.65\ \text{cm}^3\quad 333.65\times50=16682.7\ \text{cm}^3$$

$16682.7\times0.697=11627.8\ \text{g}\quad 11.6278\times3.83=\$44.53$

PTS: 6 REF: 081636geo TOP: Density

109 ANS:
$\tan15=\frac{6250}{x}$ $\quad$ $\tan52=\frac{6250}{y}$ $\quad$ $23325.3-4883=18442$ $\quad$ $\frac{18442\ \text{ft}}{1\ \text{min}}\left(\frac{1\ \text{mi}}{5280\ \text{ft}}\right)\left(\frac{60\ \text{min}}{1\ \text{h}}\right)\approx210$

$x\approx23325.3$ $\quad$ $y\approx4883$

PTS: 6 REF: 061736geo TOP: Using Trigonometry to Find a Side
KEY: advanced

110 ANS:
$\tan16.5=\frac{x}{13.5}$ $\quad$ $9\times16\times4.5=648$ $\quad$ $3752-(35\times16\times.5)=3472$

$x\approx4$ $\quad$ $13.5\times16\times4.5=972$ $\quad$ $3472\times7.48\approx25971$

$4+4.5=8.5$ $\quad$ $\frac{1}{2}\times13.5\times16\times4=432$ $\quad$ $\frac{25971}{10.5}\approx2473.4$

$12.5\times16\times8.5=\underline{1700}$ $\quad$ $\frac{2473.4}{60}\approx41$

3752

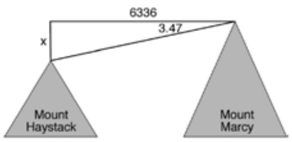
PTS: 6 REF: 081736geo TOP: Volume KEY: compositions

111 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).

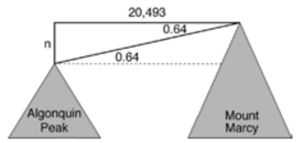
PTS: 6 REF: 061935geo TOP: Quadrilateral Proofs

112 ANS:
Quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$, $\overline{AB} \parallel \overline{CD}$, diagonal $\overline{AC}$ intersects $\overline{EF}$ at G, and $\overline{DE} \cong \overline{BF}$ (given); $ABCD$ is a parallelogram (a quadrilateral with a pair of opposite sides $\parallel$ is a parallelogram); $\overline{AD} \cong \overline{CB}$ (opposite side of a parallelogram are congruent); $\overline{AE} \cong \overline{CF}$ (subtraction postulate); $\overline{AD} \parallel \overline{CB}$ (opposite side of a parallelogram are parallel); $\angle EAG \cong \angle FCG$ (if parallel sides are cut by a transversal, the alternate interior angles are congruent); $\angle AGE \cong \angle CGF$ (vertical angles); $\triangle AEG \cong \triangle CFG$ (AAS); $\overline{EG} \cong \overline{FG}$ (CPCTC): G is the midpoint of $\overline{EF}$ (since G divides $\overline{EF}$ into two equal parts, G is the midpoint of $\overline{EF}$).

PTS: 6 REF: 062335geo TOP: Quadrilateral Proofs

113 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

114 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); $\underbrace{\overline{AH} + \overline{HF} \cong \overline{CF} + \overline{HF}}_{\overline{AF} \cong \overline{CH}}$, $\underbrace{\overline{AE} + \overline{BE} \cong \overline{CG} + \overline{DG}}_{\overline{AB} \cong \overline{CD}}$ (segment addition); $\triangle ABC \cong \triangle CDA$ (SSS); $\angle EAF \cong \angle GCH$ (CPCTC); $\triangle AEF \cong \triangle CGH$ (SAS); $\overline{EF} \cong \overline{GH}$ (CPCTC).

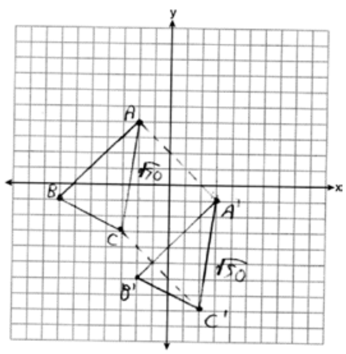
PTS: 6 REF: 011935geo TOP: Quadrilateral Proofs

115 ANS:

$\sqrt{(-2--7)^2+(4--1)^2} = \sqrt{(-2--3)^2+(4--3)^2}$ Since $\overline{AB}$ and $\overline{AC}$ are congruent, $\triangle ABC$ is isosceles.

$\sqrt{50} = \sqrt{50}$

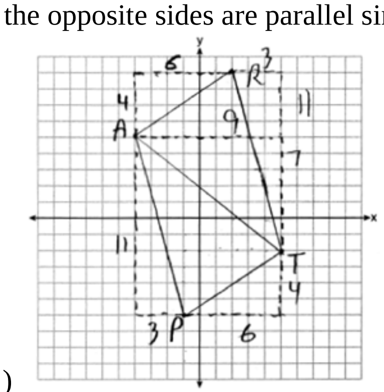
$A'(3,-1)$, $B'(-2,-6)$, $C'(2,-8)$. $AC = \sqrt{50}$ $AA' = \sqrt{(-2-3)^2+(4--1)^2} = \sqrt{50}$, $A'C' = \sqrt{50}$ (translation preserves distance), $CC' = \sqrt{(-3-2)^2+(-3--8)^2} = \sqrt{50}$ Since all four sides are congruent, $AA'C'C$ is a rhombus.



PTS: 6 REF: 062235geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

116 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