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REGENTS BY TYPE

The NY Geometry Regents Exam Questions
from Spring 2014 to January 2024 Sorted by Type

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Geometry Multiple Choice Regents Exam Questions

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

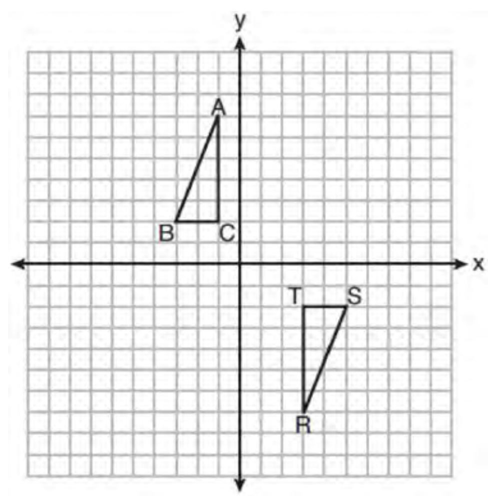
2 A quadrilateral must be a parallelogram if
1) one pair of sides is parallel and one pair of angles is congruent
2) one pair of sides is congruent and one pair of angles is congruent
3) one pair of sides is both parallel and congruent
4) the diagonals are congruent

3 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

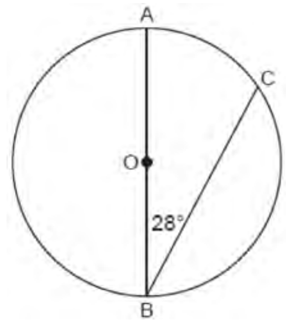
4 Which three-dimensional figure will result when a rectangle 6 inches long and 5 inches wide is continuously rotated about the longer side?
1) a rectangular prism with a length of 6 inches, width of 6 inches, and height of 5 inches
2) a rectangular prism with a length of 6 inches, width of 5 inches,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

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



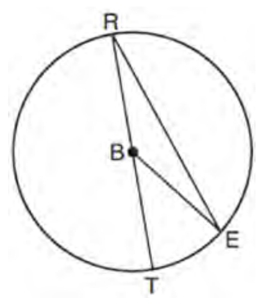
Which sequence of rigid motions will prove $\triangle ABC \cong \triangle RST$?
1) a line reflection over $y = x$
2) a rotation of 180° centered at $(1,0)$
3) a line reflection over the *x*-axis followed by a translation of 6 units right
4) a line reflection over the *x*-axis followed by a line reflection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

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



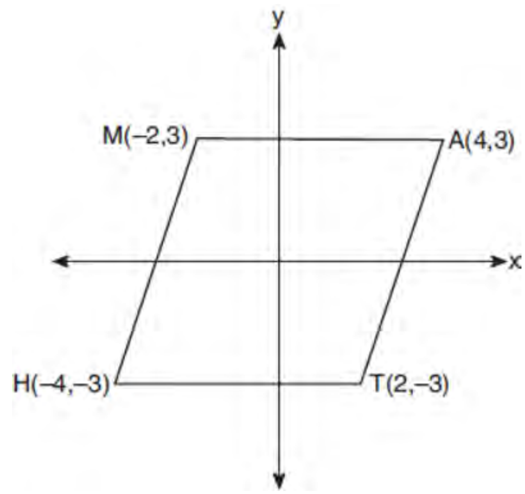
What is $m\overset{\frown}{BC}$?
1) 56º
2) 124º
3) 152º
4) 166º

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



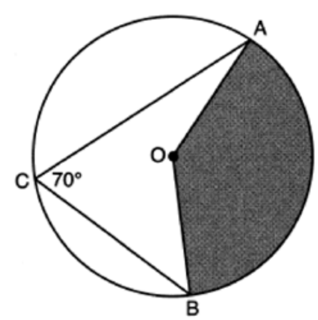
If $m\angle TRE = 15°$ and $BE = 9$, then the area of sector EBR is
1) 3.375π
2) 6.75π
3) 33.75π
4) 37.125π

8 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

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



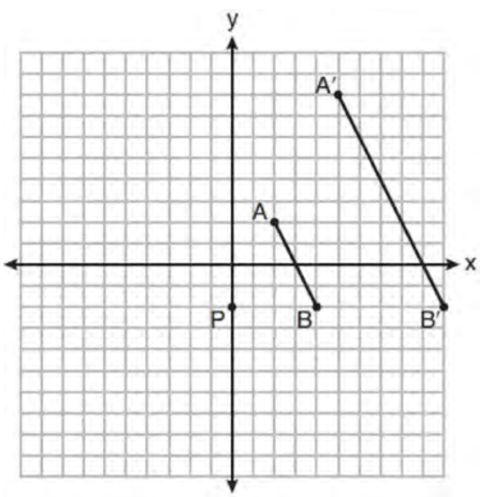
If $OA = 9$, the area of the shaded sector AOB is
1) 3.5π
2) 7π
3) 15.75π
4) 31.5π

10 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 (mi^2)
Broome	200,536	706.82
Dutchess	280,150	801.59
Niagara	219,846	522.95
Saratoga	200,635	811.84

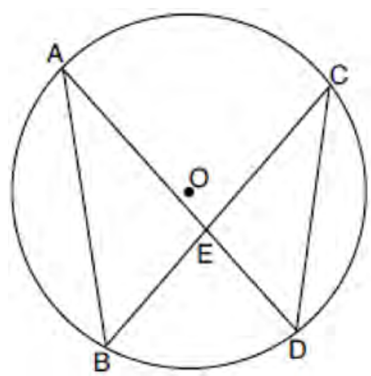
Which county had the greatest population density?
1) Broome
2) Dutchess
3) Niagara
4) Saratoga

11 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) $\frac{5}{2}(A'B') = AB$

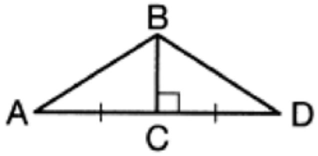
12 In the diagram below of circle O, chords $\overline{AD}$ and $\overline{BC}$ intersect at E, and chords $\overline{AB}$ and $\overline{CD}$ are drawn.



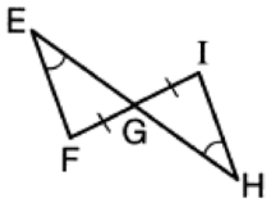
Which statement must always be true?
1) $\overline{AB} \cong \overline{CD}$
2) $\overline{AD} \cong \overline{BC}$
3) $\angle B \cong \angle C$
4) $\angle A \cong \angle C$

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

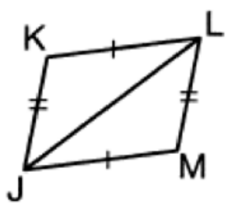
14 Given the information marked on the diagrams below, which pair of triangles can *not* always be proven congruent?



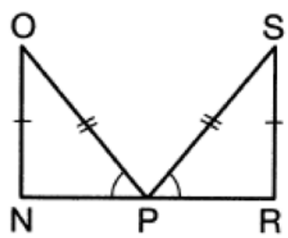
1) $\triangle ABC$ and $\triangle DBC$



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



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

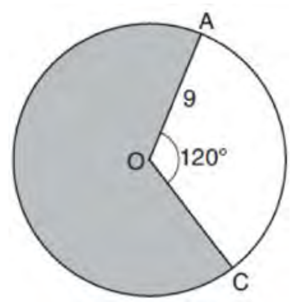


4) $\triangle NOP$ and $\triangle RSP$

15 In circle O two secants, $\overline{ABP}$ and $\overline{CDP}$, are drawn to external point P. If $m\overparen{AC} = 72°$, and $m\overparen{BD} = 34°$, what is the measure of $\angle P$?
1) 19º
2) 38º
3) 53º
4) 106º

16 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

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

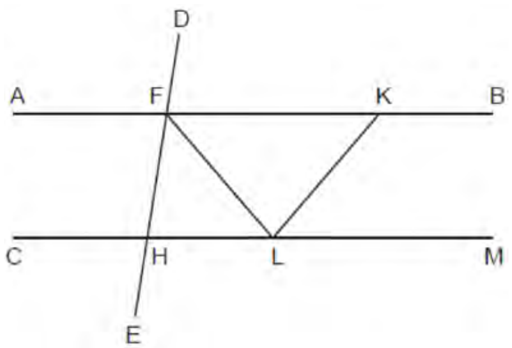


What is the area of the shaded sector of circle O?
1) 6π
2) 12π
3) 27π
4) 54π

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

19 Which transformation does *not* always preserve distance?
1) $(x,y) \rightarrow (x+2,y)$
2) $(x,y) \rightarrow (-y,-x)$
3) $(x,y) \rightarrow (2x,y-1)$
4) $(x,y) \rightarrow (3-x,2-y)$

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

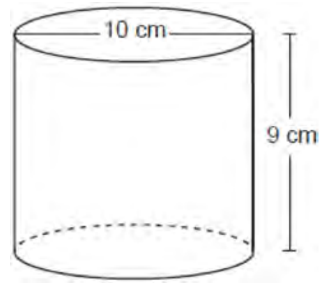


Which statement is always true?
1) $2(m\angle HLF) = m\angle CHE$
2) $2(m\angle FLK) = m\angle LKB$
3) $m\angle AFD = m\angle BKL$
4) $m\angle DFK = m\angle KLF$

21 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) $\angle G \cong \angle S$

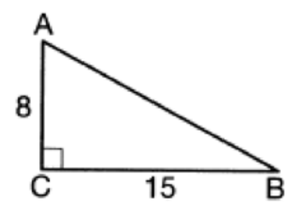
22 What are the coordinates of the center and length of the radius of the circle whose equation is $x^2 + y^2 + 2x - 16y + 49 = 0$?
1) center $(1,-8)$ and radius 4
2) center $(-1,8)$ and radius 4
3) center $(1,-8)$ and radius 16
4) center $(-1,8)$ and radius 16

23 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

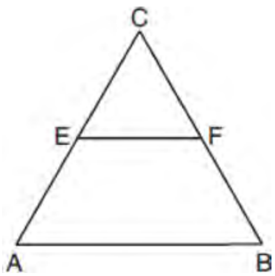
24 As shown in the diagram below, right triangle ABC has side lengths of 8 and 15.



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

25 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

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

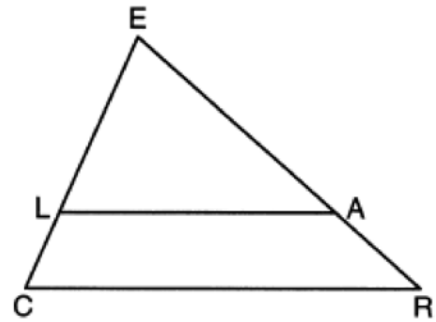


If $EF = 2x + 8$ and $AB = 7x - 2$, what is the perimeter of trapezoid $ABFE$?
1) 36
2) 60
3) 100
4) 120

27 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

28 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) $\tan B$

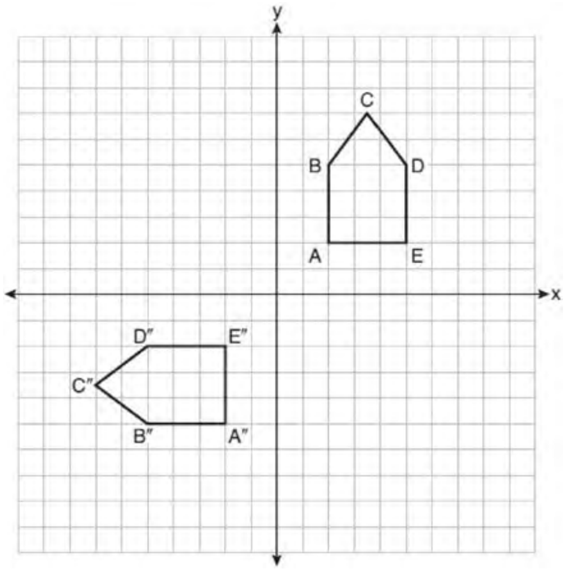
29 In the diagram below of $\triangle CER$, $\overline{LA} \parallel \overline{CR}$.



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

30 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

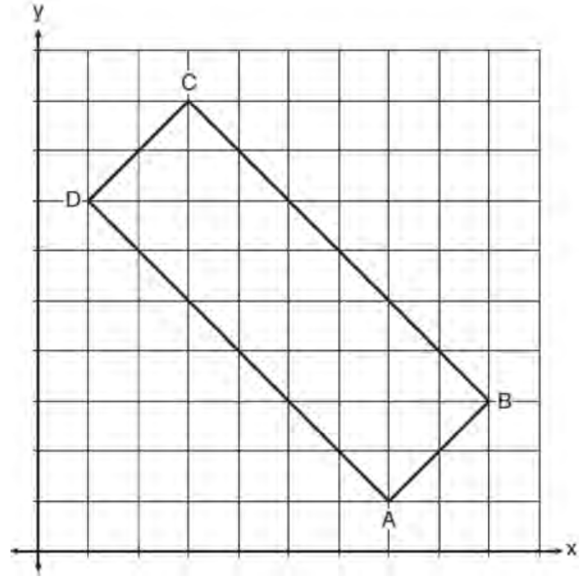
31 On the set of axes below, pentagon $ABCDE$ is congruent to $A''B''C''D''E''$.



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

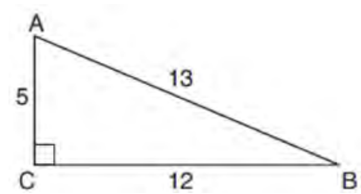
32 Point P divides the directed line segment from point $A(-4,-1)$ to point $B(6,4)$ in the ratio 2:3. The coordinates of point P are
1) $(-1,1)$
2) $(0,1)$
3) $(1,0)$
4) $(2,2)$

33 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 $(5,5)$

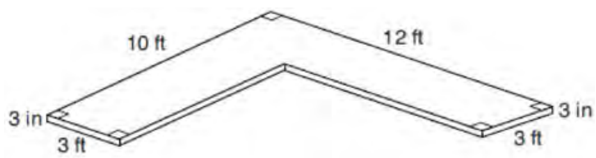
34 In $\triangle ABC$ below, angle C is a right angle.



Which statement must be true?
1) $\sin A = \cos B$
2) $\sin A = \tan B$
3) $\sin B = \tan A$
4) $\sin B = \cos B$

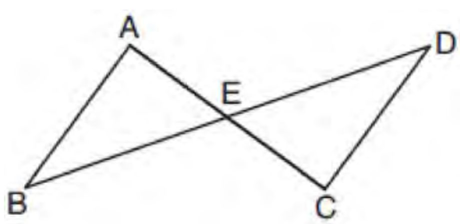
35 If the altitudes of a triangle meet at one of the triangle's vertices, then the triangle is
1) a right triangle
2) an acute triangle
3) an obtuse triangle
4) an equilateral triangle

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



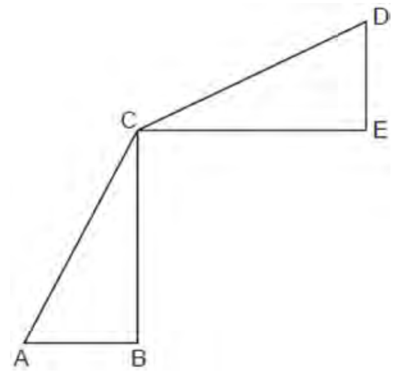
If oak weighs approximately 44 pounds per cubic foot, the approximate weight, in pounds, of the countertop is
1) 630
2) 730
3) 750
4) 870

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



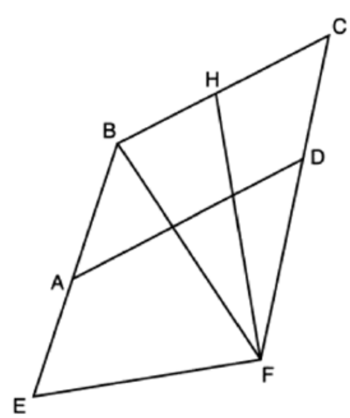
Which information is always sufficient to prove $\triangle ABE \cong \triangle CDE$?
1) $\overline{AB} \parallel \overline{CD}$
2) $\overline{AB} \cong \overline{CD}$ and $\overline{BE} \cong \overline{DE}$
3) E is the midpoint of $\overline{AC}$.
4) $\overline{BD}$ and $\overline{AC}$ bisect each other.

38 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

39 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

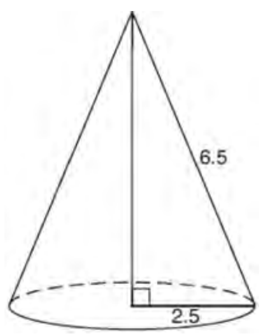
40 If the line represented by $y = -\frac{1}{4}x - 2$ is dilated by a scale factor of 4 centered at the origin, which statement about the image is true?

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.

41 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) $y = -\frac{4}{3}x - 8$

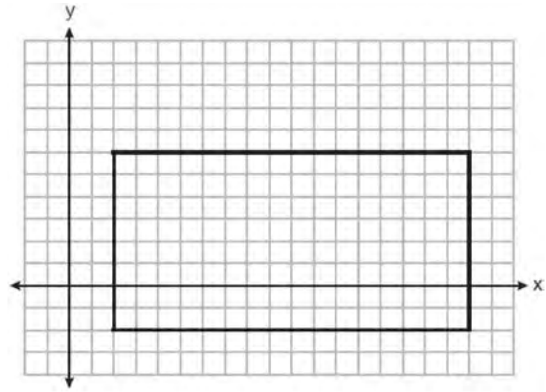
42 As shown in the diagram below, the radius of a cone is 2.5 cm and its slant height is 6.5 cm.



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

1) 12.5π
2) 13.5π
3) 30.0π
4) 37.5π

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

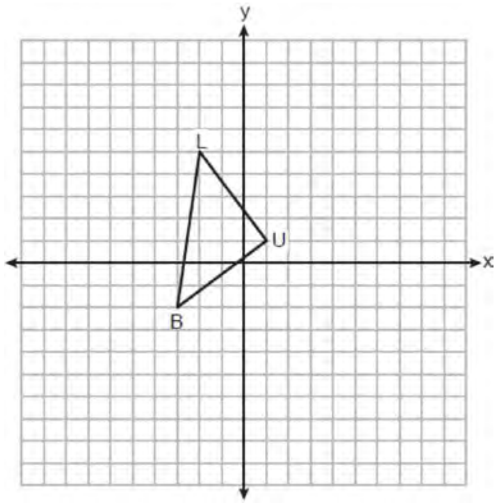
44 The line whose equation is $6x + 3y = 3$ is dilated by a scale factor of 2 centered at the point $(0,0)$. An equation of its image is

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

45 Right triangle ACT has $m\angle A = 90°$. Which expression is always equivalent to $\cos T$?

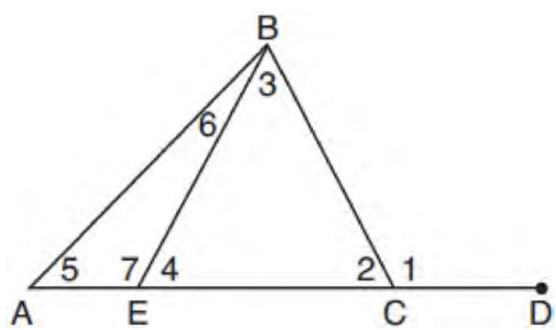
1) $\cos C$
2) $\sin C$
3) $\tan T$
4) $\sin T$

46 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

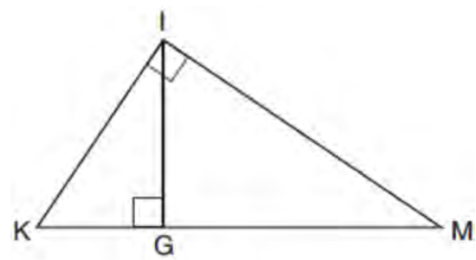
47 In the diagram below of triangle ABC, $\overline{AC}$ is extended through point C to point D, and $\overline{BE}$ is drawn to $\overline{AC}$.



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

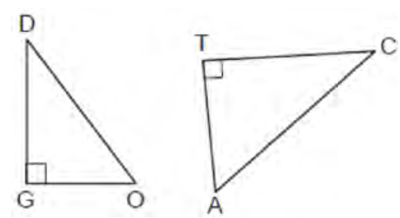
48 In quadrilateral $QRST$, diagonals $\overline{QS}$ and $\overline{RT}$ intersect at M. Which statement would always prove quadrilateral $QRST$ is a parallelogram?
1) $\angle TQR$ and $\angle QRS$ are supplementary.
2) $\overline{QM} \cong \overline{SM}$ and $\overline{QT} \cong \overline{RS}$
3) $\overline{QR} \cong \overline{TS}$ and $\overline{QT} \cong \overline{RS}$
4) $\overline{QR} \cong \overline{TS}$ and $\overline{QT} \parallel \overline{RS}$

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



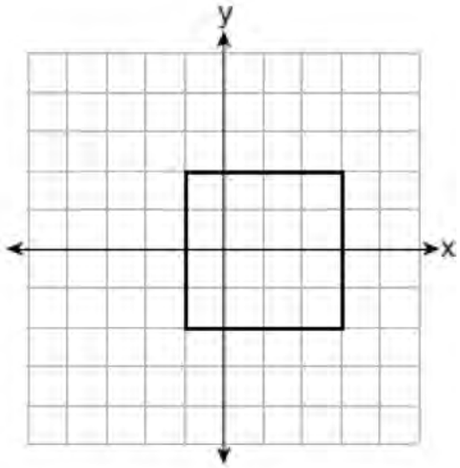
If $KG = 9$ and $IG = 12$, the length of $\overline{IM}$ is
1) 15
2) 16
3) 20
4) 25

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



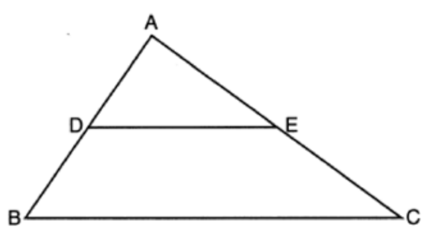
Which expression is always equivalent to $\sin D$?
1) $\cos A$
2) $\sin A$
3) $\tan A$
4) $\cos C$

51 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 $y = x - 1$

52 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.

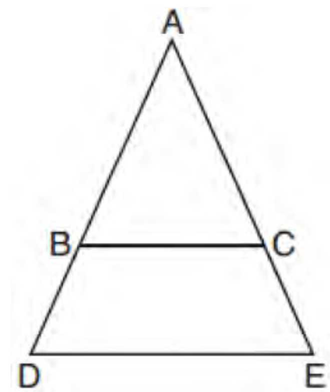


I. AA similarity
II. SSS similarity
III. SAS similarity

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

53 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°

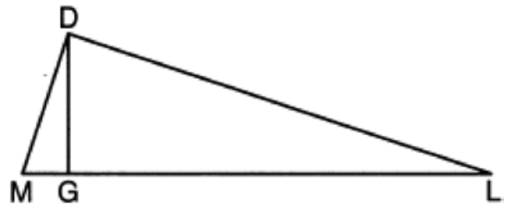
54 In the diagram below, $\overline{BC}$ connects points B and C on the congruent sides of isosceles triangle ADE, such that $\triangle ABC$ is isosceles with vertex angle A.



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

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

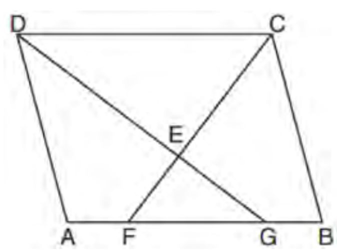
56 In the diagram below of right triangle MDL, altitude $\overline{DG}$ is drawn to hypotenuse $\overline{ML}$.



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

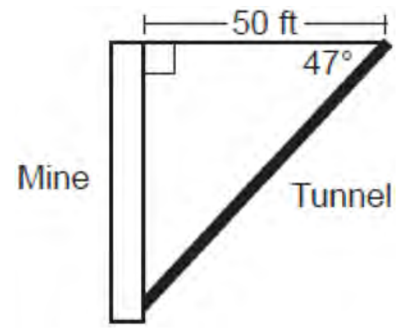
57 Segment AB is the perpendicular bisector of $\overline{CD}$ at point M. Which statement is always true?
1) $\overline{CB} \cong \overline{DB}$
2) $\overline{CD} \cong \overline{AB}$
3) $\triangle ACD \sim \triangle BCD$
4) $\triangle ACM \sim \triangle BCM$

58 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.



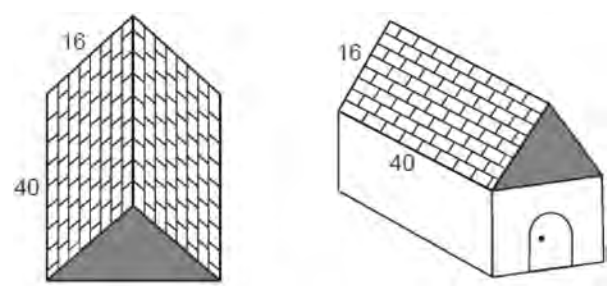
If $m\angle B = 75°$, then the measure of $\angle EFA$ is
1) 142.5°
2) 127.5°
3) 52.5°
4) 37.5°

59 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°.



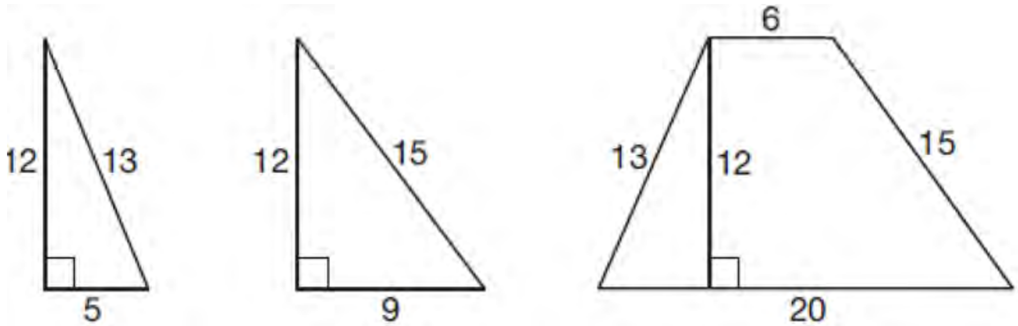
What is the length of the tunnel, to the *nearest foot*?
1) 47
2) 54
3) 68
4) 73

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



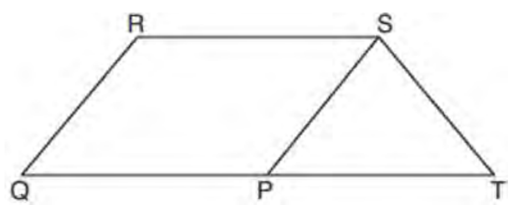
Roofing shingles are sold in bundles. Each bundle covers $33\frac{1}{3}$ square feet. What is the minimum number of bundles that must be purchased to completely cover both rectangular sides of the roof?
1) 20
2) 2
3) 39
4) 4

61 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

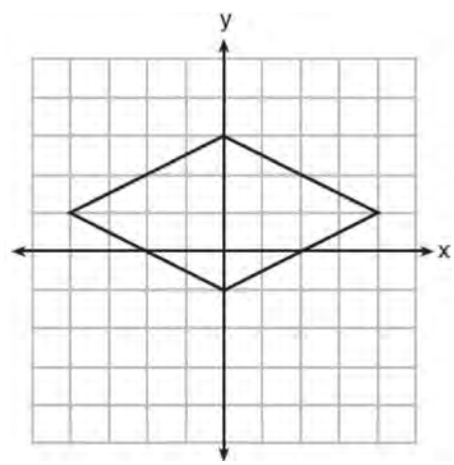
62 In parallelogram $PQRS$, $\overline{QP}$ is extended to point T and $\overline{ST}$ is drawn.



If $\overline{ST} \cong \overline{SP}$ and $m\angle R = 130°$, what is $m\angle PST$?
1) 130°
2) 80°
3) 65°
4) 50°

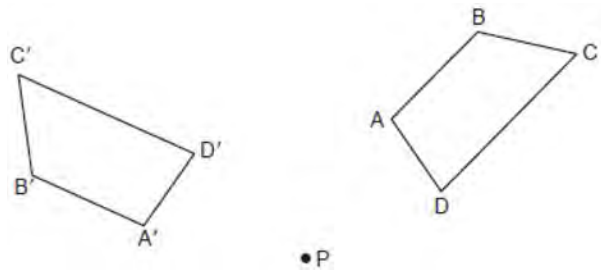
63 Which polygon does *not* always have congruent diagonals?
1) square
2) rectangle
3) rhombus
4) isosceles trapezoid

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



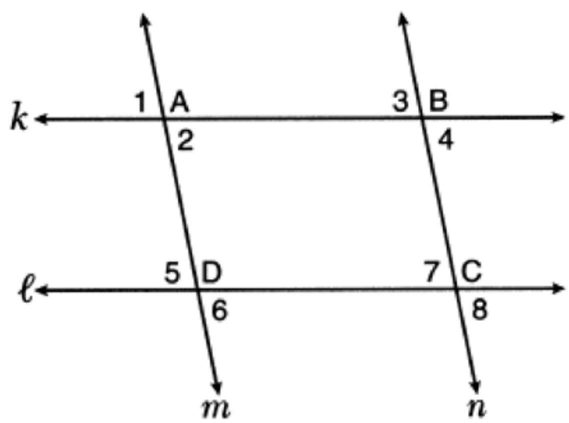
Which transformation would carry the rhombus onto itself?
1) 180° rotation counterclockwise about the origin
2) reflection over the line $y = \frac{1}{2}x + 1$
3) reflection over the line $y = 0$
4) reflection over the line $x = 0$

65 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*.



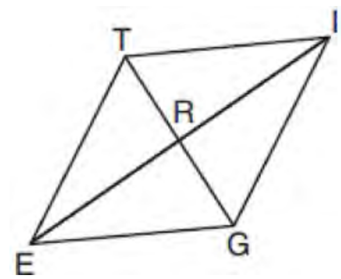
Which statement is always true?
1) $\angle A \cong \angle D'$
2) $\overline{AC} \cong \overline{B'D'}$
3) $\overline{A'B'} \parallel \overline{D'C'}$
4) $\overline{B'A'} \cong \overline{C'D'}$

66 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 $\angle 3 \cong \angle 4$

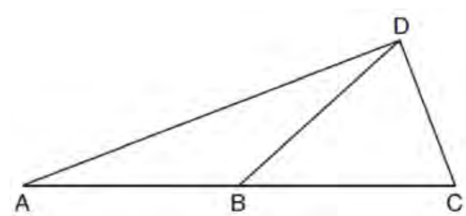
67 In rhombus *TIGE*, diagonals $\overline{TG}$ and $\overline{IE}$ intersect at *R*. The perimeter of *TIGE* is 68, and $TG = 16$.



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

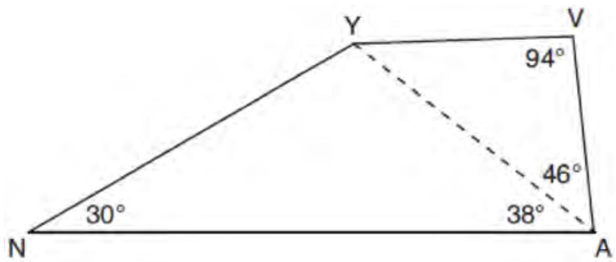
68 Lou has a solid clay brick in the shape of a rectangular prism with a length of 8 inches, a width of 3.5 inches, and a height of 2.25 inches. If the clay weighs 1.055 oz/in^3, how much does Lou's brick weigh, to the *nearest ounce*?
1) 66
2) 64
3) 63
4) 60

69 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

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

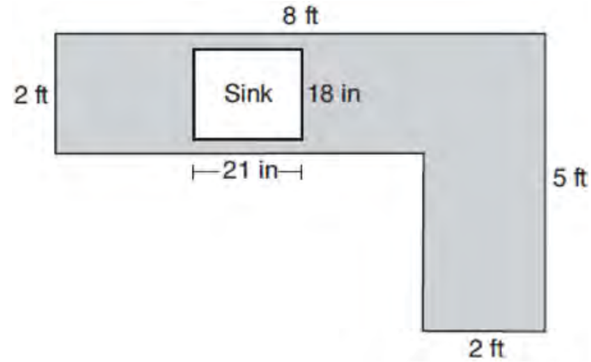


Which segment has the shortest length?
1) $\overline{AY}$
2) $\overline{NY}$
3) $\overline{VA}$
4) $\overline{VY}$

71 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) $y = 3x - 3$

72 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

73 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.

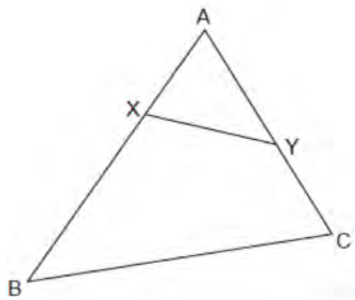


What is the area of the top of the installed countertop, to the *nearest square foot*?
1) 26
2) 23
3) 22
4) 19

74 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

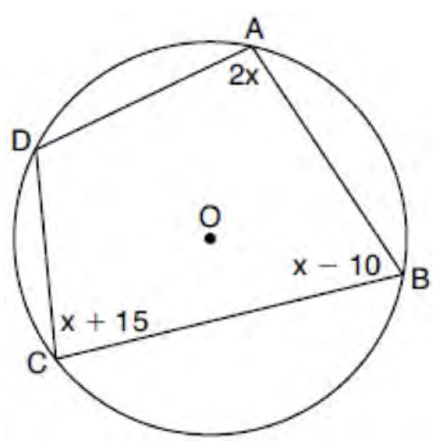
75 Square *MATH* has a side length of 7 inches. Which three-dimensional object will be formed by continuously rotating square *MATH* around side $\overline{AT}$?
1) a right cone with a base diameter of 7 inches
2) a right cylinder with a diameter of 7 inches
3) a right cone with a base radius of 7 inches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

76 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) $(AY)(AB) = (AC)(AX)$

77 In the diagram below, quadrilateral $ABCD$ is inscribed in circle O, $m\angle A = (2x)°$, $m\angle B = (x-10)°$, and $m\angle C = (x+15)°$.



What is $m\angle D$?
1) 55°
2) 70°
3) 110°
4) 135°

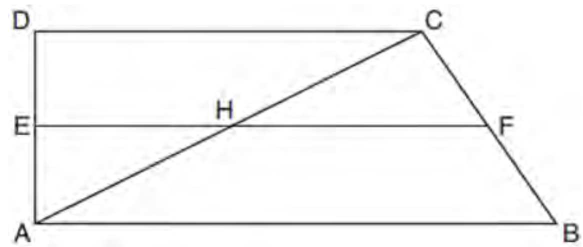
78 The area of a sector of a circle with a radius measuring 15 cm is 75π cm^2. What is the measure of the central angle that forms the sector?
1) 72°
2) 120°
3) 144°
4) 180°

79 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

80 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

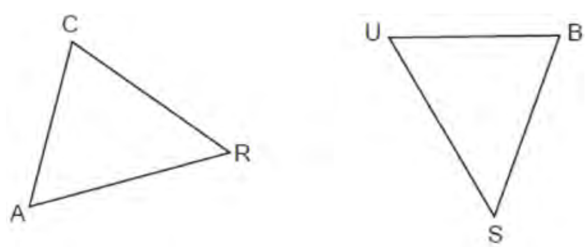
81 The equation of a circle is $x^2 + 8x + y^2 - 12y = 144$. What are the coordinates of the center and the length of the radius of the circle?
1) center $(4,-6)$ and radius 12
2) center $(-4,6)$ and radius 12
3) center $(4,-6)$ and radius 14
4) center $(-4,6)$ and radius 14

82 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

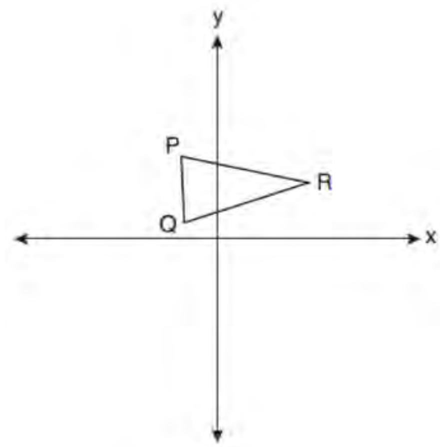
83 In the diagram below, $\triangle CAR$ is mapped onto $\triangle BUS$ after a sequence of rigid motions.



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

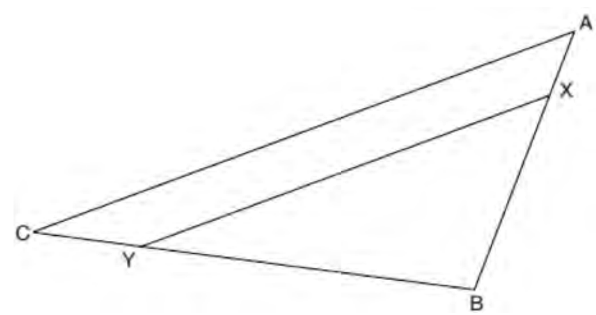
84 In parallelogram $ABCD$, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E. Which statement proves $ABCD$ is a rectangle?
1) $\overline{AC} \cong \overline{BD}$
2) $\overline{AB} \perp \overline{BD}$
3) $\overline{AC} \perp \overline{BD}$
4) $\overline{AC}$ bisects $\angle BCD$

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



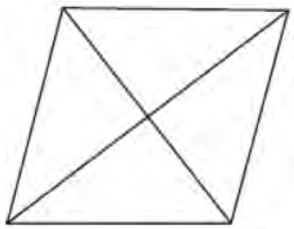
Which quadrant will contain point R'', the image of point R, after a 90° clockwise rotation centered at $(0,0)$ followed by a reflection over the x-axis?
1) I
2) II
3) III
4) IV

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



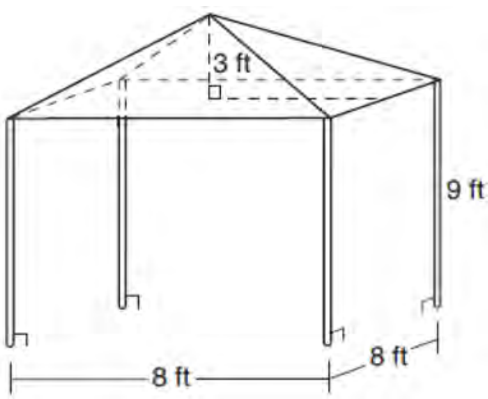
Which information is sufficient to prove that $\triangle BXY \sim \triangle BAC$?
1) $\angle B$ is a right angle.
2) $\overline{XY}$ is parallel to $\overline{AC}$.
3) $\triangle ABC$ is isosceles.
4) $\overline{AX} \cong \overline{CY}$

87 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

88 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

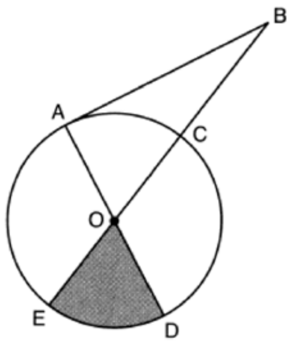
89 An equation of the line perpendicular to the line whose equation is $4x-5y=6$ and passes through the point $(-2,3)$ is
1) $y+3=-\frac{5}{4}(x-2)$
2) $y-3=-\frac{5}{4}(x+2)$
3) $y+3=\frac{4}{5}(x-2)$
4) $y-3=\frac{4}{5}(x+2)$

90 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°

91 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

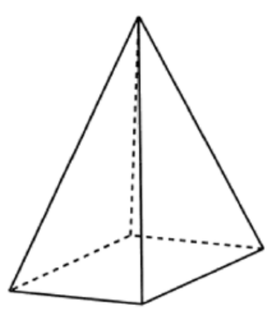
92 If $\triangle TAP$ is dilated by a scale factor of 0.5, which statement about the image, $\triangle T'A'P'$, is true?
1) $m\angle T'A'P' = \frac{1}{2}(m\angle TAP)$
2) $m\angle T'A'P' = 2(m\angle TAP)$
3) $TA = 2(T'A')$
4) $TA = \frac{1}{2}(T'A')$

93 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.



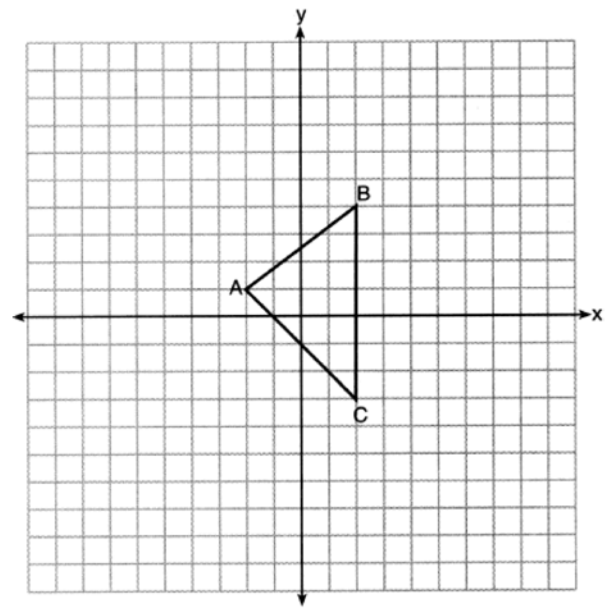
If $m\angle OBA = 36°$ and $OC = 10$, what is the area of shaded sector DOE?
1) $\frac{3\pi}{10}$
2) 3π
3) 10π
4) 15π

94 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

95 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) $(1,2)$

96 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

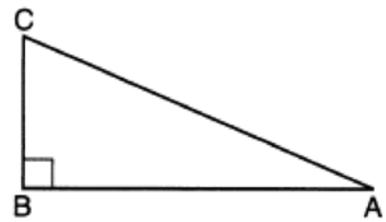
97 Point M divides $\overline{AB}$ so that $AM:MB = 1:2$. If A has coordinates $(-1,-3)$ and B has coordinates $(8,9)$, the coordinates of M are
1) $(2,1)$
2) $\left(\frac{5}{3},0\right)$
3) $(5,5)$
4) $\left(\frac{23}{3},8\right)$

98 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°

99 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°

100 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) $k = 4$

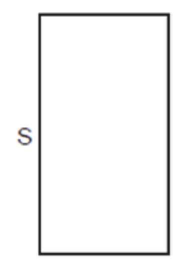
101 Right triangle ABC is shown below.



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) $\tan A = \tan C$

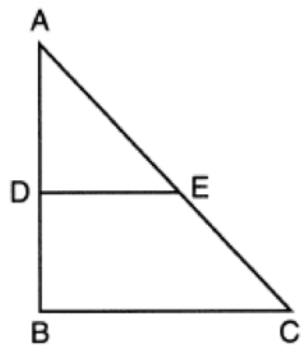
102 An equation of circle M is $x^2 + y^2 + 6x - 2y + 1 = 0$. What are the coordinates of the center and the length of the radius of circle M?
1) center $(3,-1)$ and radius 9
2) center $(3,-1)$ and radius 3
3) center $(-3,1)$ and radius 9
4) center $(-3,1)$ and radius 3

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



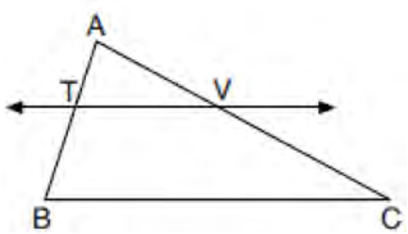
Which three-dimensional figure is formed by this rotation?
1) rectangular prism
2) square pyramid
3) cylinder
4) cone

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



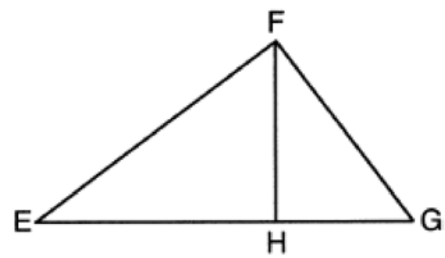
Which statement is always true?
1) $\angle ADE$ and $\angle ABC$ are right angles.
2) $\triangle ADE \sim \triangle ABC$
3) $DE = \frac{1}{2}BC$
4) $\overline{AD} \cong \overline{DB}$

105 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

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



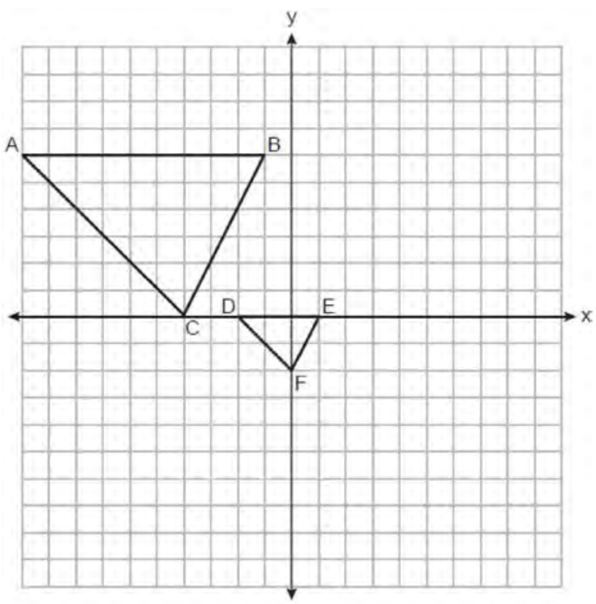
If $FH = 9$ and $EF = 15$, what is EG?
1) 6.75
2) 12
3) 18.75
4) 25

107 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

108 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 $\overline{BE} \parallel \overline{TS}$

109 A circle is continuously rotated about its diameter. Which three-dimensional object will be formed?
1) cone
2) prism
3) sphere
4) cylinder

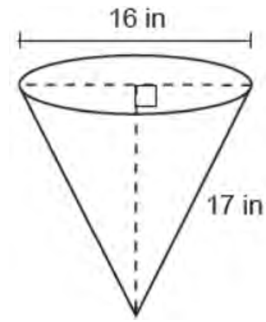
110 On the set of axes below, $\triangle DEF$ is the image of $\triangle ABC$ after a dilation of scale factor $\frac{1}{3}$.



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

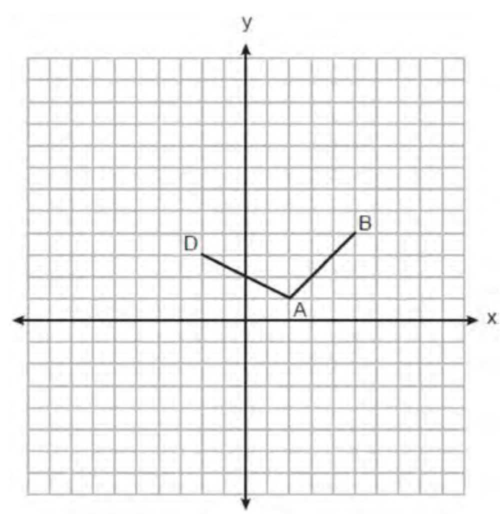
111 What is an equation of the image of the line $y = \frac{3}{2}x - 4$ after a dilation of a scale factor of $\frac{3}{4}$ centered at the origin?
1) $y = \frac{9}{8}x - 4$
2) $y = \frac{9}{8}x - 3$
3) $y = \frac{3}{2}x - 4$
4) $y = \frac{3}{2}x - 3$

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



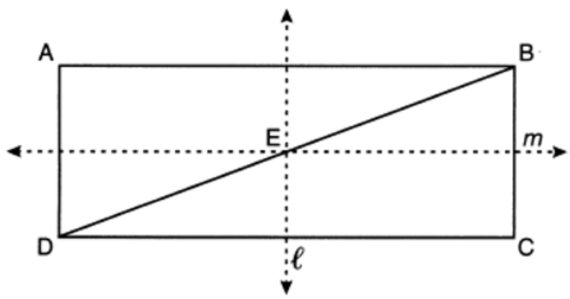
What is the volume of the cone, in cubic inches?
1) 320π
2) 363π
3) 960π
4) 1280π

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



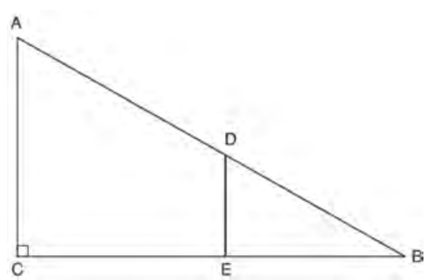
Which point could be vertex C?
1) $(1,5)$
2) $(4,10)$
3) $(-1,6)$
4) $(-3,8)$

114 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.



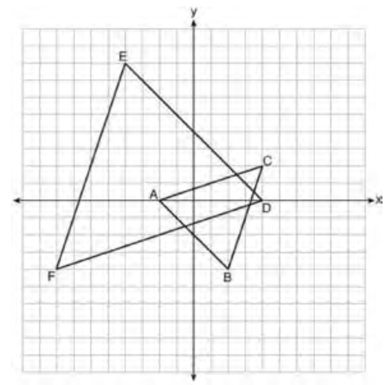
Which sequence of transformations will map $\triangle ABD$ onto $\triangle CDB$?
1) a reflection over line ℓ followed by a 180° rotation about point E
2) a reflection over line ℓ followed by a reflection over line m
3) a 180° rotation about point B
4) a reflection over $\overline{DB}$

115 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

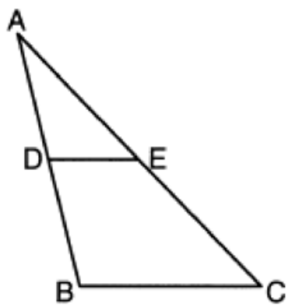
116 On the set of axes below, $\triangle ABC$ has vertices at $A(-2,0)$, $B(2,-4)$, $C(4,2)$, and $\triangle DEF$ has vertices at $D(4,0)$, $E(-4,8)$, $F(-8,-4)$.



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

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

118 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) $\frac{AD}{BC} = \frac{DE}{AB}$

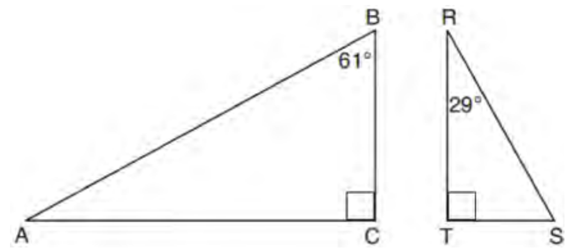
119 The coordinates of the endpoints of $\overline{SC}$ are $S(-7,3)$ and $C(2,-6)$. If point M is on $\overline{SC}$, what are the coordinates of M such that $SM:MC$ is 1:2?

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

120 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) $(-3,-2)$

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

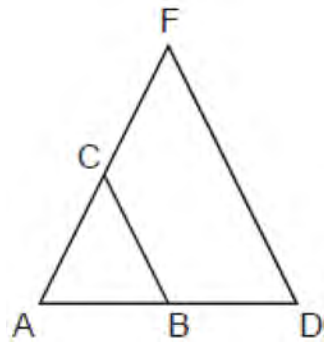
122 In right triangles ABC and RST, hypotenuse $AB = 4$ and hypotenuse $RS = 16$. If $\triangle ABC \sim \triangle RST$, then 1:16 is the ratio of the corresponding

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

123 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

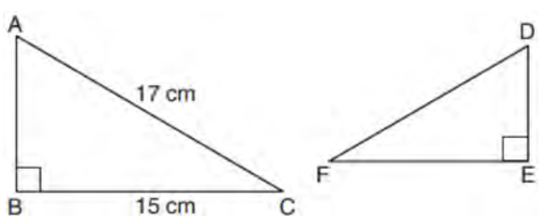
124 Triangle ADF is drawn and $\overline{BC} \parallel \overline{DF}$.



Which statement must be true?

1) $\frac{AB}{BC} = \frac{BD}{DF}$
2) $BC = \frac{1}{2}DF$
3) $AB:AD = AC:CF$
4) $\angle ACB \cong \angle AFD$

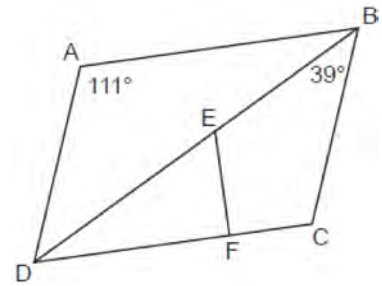
125 Kayla was cutting right triangles from wood to use for an art project. Two of the right triangles she cut are shown below.



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°

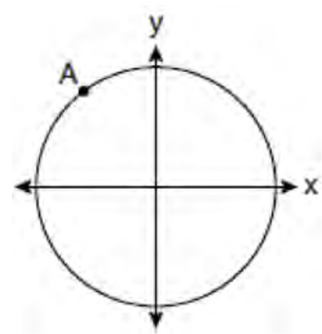
126 In the diagram below of parallelogram $ABCD$, diagonal $\overline{BED}$ and $\overline{EF}$ are drawn, $\overline{EF} \perp \overline{DFC}$, $m\angle DAB = 111°$, and $m\angle DBC = 39°$.



What is $m\angle DEF$?

1) 30°
2) 51°
3) 60°
4) 120°

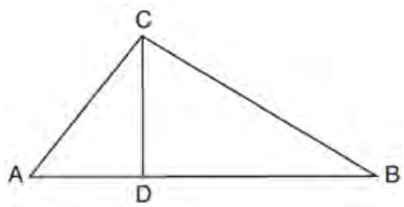
127 A circle centered at the origin passes through $A(-3,4)$.



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

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

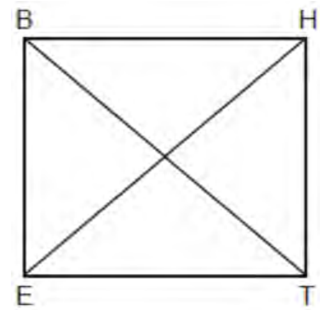
129 If one exterior angle of a triangle is acute, then the triangle must be

1) right
2) acute
3) obtuse
4) equiangular

130 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

131 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) $\overline{BE} \cong \overline{ET}$

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

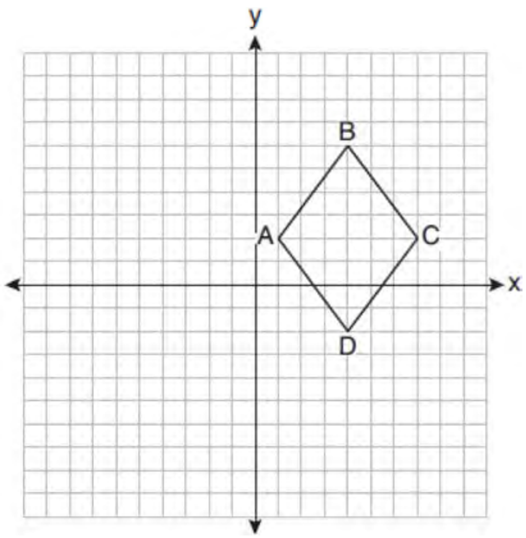
1) a square
2) a rhombus
3) a rectangle
4) an isosceles trapezoid

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

134 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

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

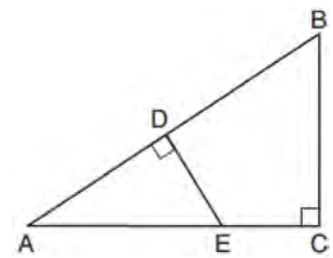


What is the area of rhombus $ABCD$?
1) 20
2) 24
3) 25
4) 48

136 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) $(4,-3)$

137 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.

138 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 $\overline{AB}$.

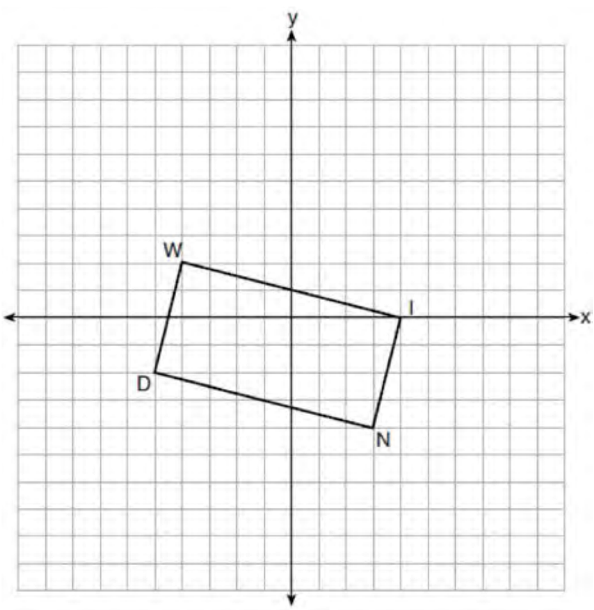


If $AB = 9$, $BC = 6$, and $DE = 4$, what is the length of $\overline{AE}$?
1) 5
2) 6
3) 7
4) 8

139 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

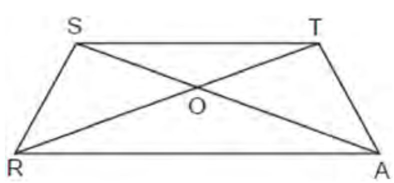
140 What is the volume, in cubic centimeters, of a right square pyramid with base edges that are 64 cm long and a slant height of 40 cm?
1) 8192.0
2) $13,653.\overline{3}$
3) 32,768.0
4) $54,613.\overline{3}$

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



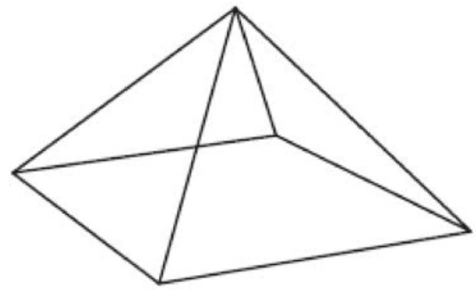
What is the area of rectangle $WIND$?
1) 17
2) 31
3) 32
4) 34

142 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 $\overline{TA}$.



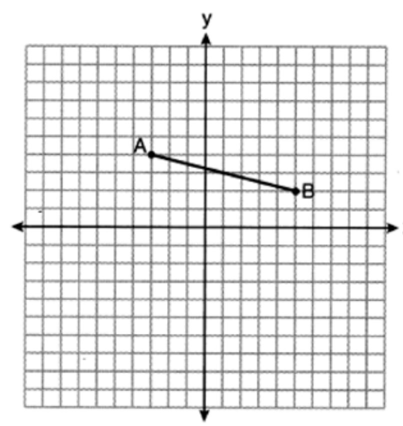
Which pair of triangles are *not* always similar?
1) $\triangle STO$ and $\triangle ARO$
2) $\triangle SOR$ and $\triangle TOA$
3) $\triangle SRA$ and $\triangle ATS$
4) $\triangle SRT$ and $\triangle TAS$

143 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

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

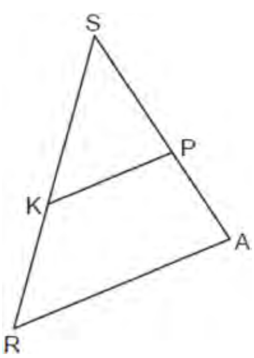


If $\overline{AB}$ is dilated by a scale factor of 2 centered at $(3,5)$, what are the coordinates of the endpoints of its image, $\overline{A'B'}$?
1) $A'(-7,5)$ and $B'(9,1)$
2) $A'(-1,6)$ and $B'(7,4)$
3) $A'(-6,8)$ and $B'(10,4)$
4) $A'(-9,3)$ and $B'(7,-1)$

145 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) $\sin T = \cos M$

146 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

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

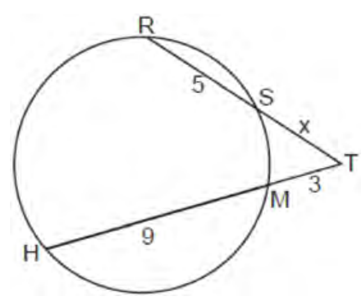


If $SK = 10$, $SP = 8$, and $PA = 6$, what is the length of $\overline{KR}$, to the *nearest tenth*?
1) 4.8
2) 7.5
3) 8.0
4) 13.3

148 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

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

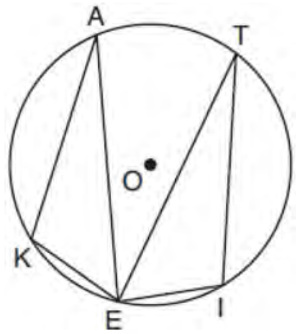
150 In the circle below, secants $\overline{TSR}$ and $\overline{TMH}$ intersect at T, $SR = 5$, $HM = 9$, $TM = 3$, and $TS = x$.



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) $5x = 27$

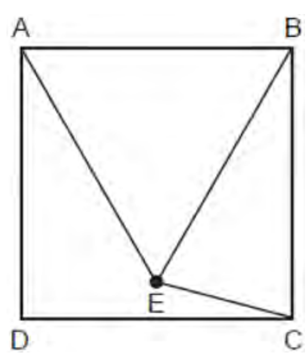
151 If scalene triangle XYZ is similar to triangle QRS and $m\angle X = 90°$, which equation is always true?
1) $\sin Y = \sin S$
2) $\cos R = \cos Z$
3) $\cos Y = \sin Q$
4) $\sin R = \cos Z$

152 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 $\angle EKA \cong \angle EIT$.



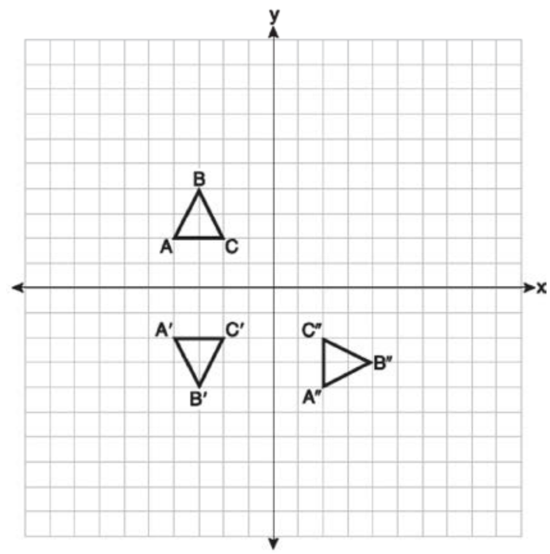
Which statement about $\triangle KAE$ and $\triangle ITE$ is always true?
1) They are neither congruent nor similar.
2) They are similar but not congruent.
3) They are right triangles.
4) They are congruent.

153 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) 60º
3) 75º
4) 90º

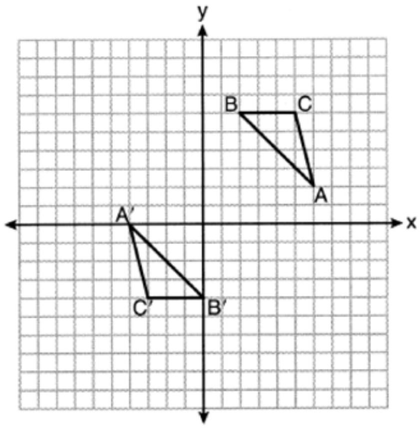
154 On the set of axes below, triangle ABC is graphed. Triangles $A'B'C'$ and $A''B''C''$, the images of triangle ABC, are graphed after a sequence of rigid motions.



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

155 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

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

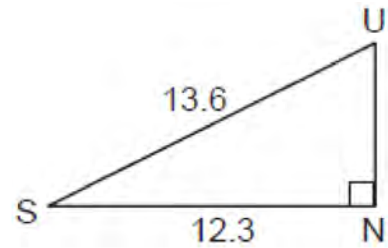


Triangle ABC maps onto $\triangle A'B'C'$ after a
1) reflection over the line $y = -x$
2) reflection over the line $y = -x + 2$
3) rotation of 180° centered at (1,1)
4) rotation of 180° centered at the origin

157 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) $(4,0)$

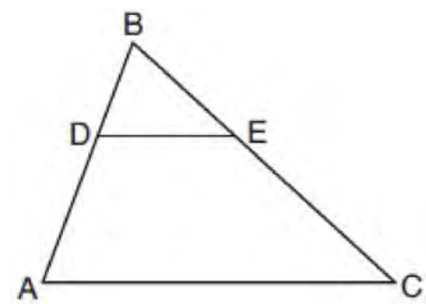
158 Which equation represents a line that is perpendicular to the line represented by $y = \frac{2}{3}x + 1$?
1) $3x + 2y = 12$
2) $3x - 2y = 12$
3) $y = \frac{3}{2}x + 2$
4) $y = -\frac{2}{3}x + 4$

159 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°

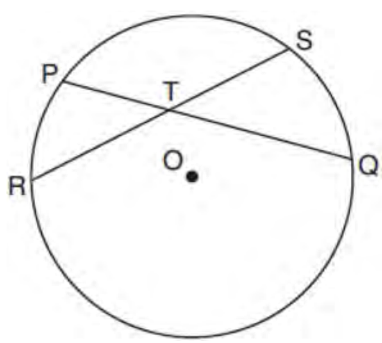
160 In the diagram below of $\triangle ABC$, D is a point on $\overline{BA}$, E is a point on $\overline{BC}$, and $\overline{DE}$ is drawn.



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

161 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

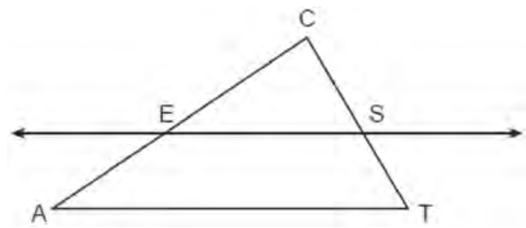
162 In the diagram below, chords $\overline{PQ}$ and $\overline{RS}$ of circle O intersect at T.



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

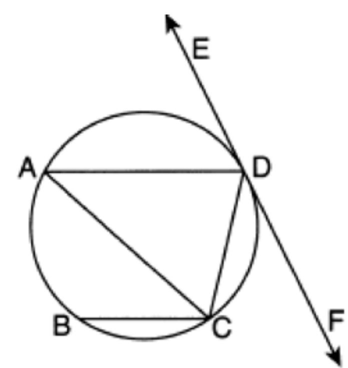
163 Quadrilateral *MATH* is congruent to quadrilateral *WXYZ*. Which statement is always true?
1) $MA = XY$
2) $m\angle H = m\angle W$
3) Quadrilateral *WXYZ* can be mapped onto quadrilateral *MATH* using a sequence of rigid motions.
4) Quadrilateral *MATH* and quadrilateral *WXYZ* are the same shape,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

164 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 $\overline{CT}$.



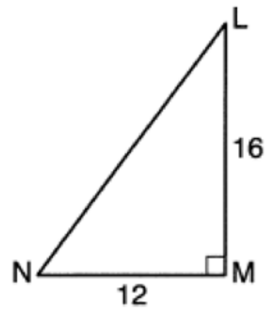
Which statement is always true?
1) $\frac{CE}{CA} = \frac{CS}{ST}$
2) $\frac{CE}{ES} = \frac{EA}{AT}$
3) $\frac{CE}{EA} = \frac{CS}{ST}$
4) $\frac{CE}{ST} = \frac{EA}{CS}$

165 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) $\angle ADC \cong \angle ADE$

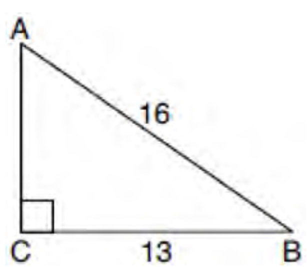
166 In right triangle LMN shown below, $m\angle M = 90°$, $MN = 12$, and $LM = 16$.



The ratio of $\cos N$ is

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

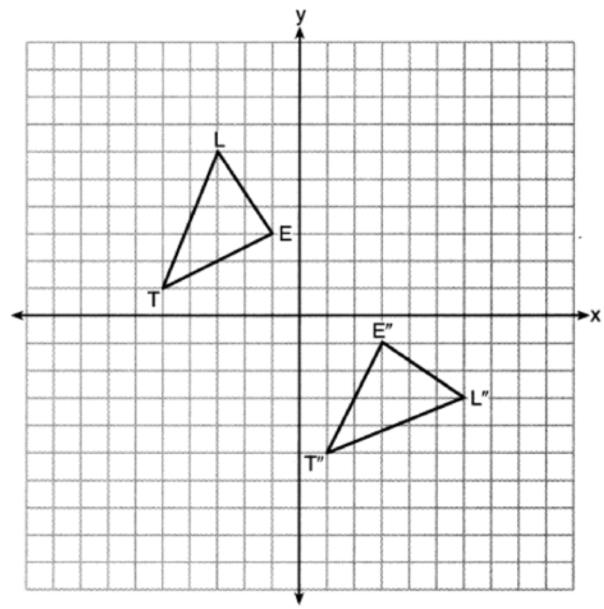
167 In the diagram of $\triangle ABC$ below, $m\angle C = 90°$, $CB = 13$, and $AB = 16$.



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

1) 36°
2) 39°
3) 51°
4) 54°

168 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

169 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) $\overline{CD}$

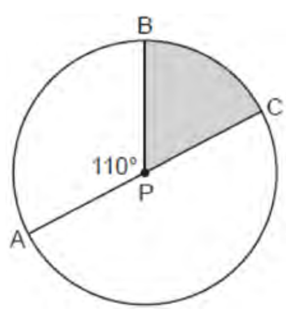
170 The equation of a line is $3x - 5y = 8$. All lines perpendicular to this line must have a slope of

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

171 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.

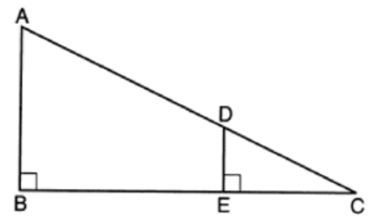
172 In circle P below, diameter $\overline{AC}$ and radius $\overline{BP}$ are drawn such that $m\angle APB = 110°$.



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

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

173 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) $\cos A = \frac{DE}{CE}$

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

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

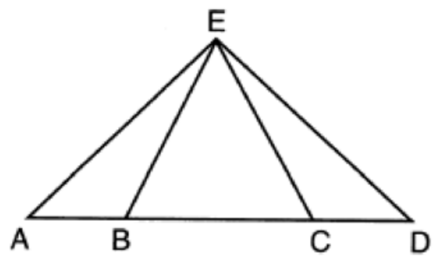
175 In rhombus $VENU$, diagonals $\overline{VN}$ and $\overline{EU}$ intersect at S. If $VN = 12$ and $EU = 16$, what is the perimeter of the rhombus?

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

176 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

177 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) $\angle EAC \cong \angle EDB$

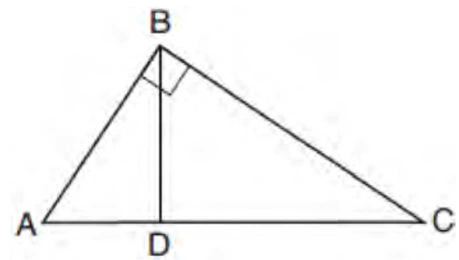
178 What is an equation of a circle whose center is at $(2,-4)$ and is tangent to the line $x = -2$?

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

179 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.

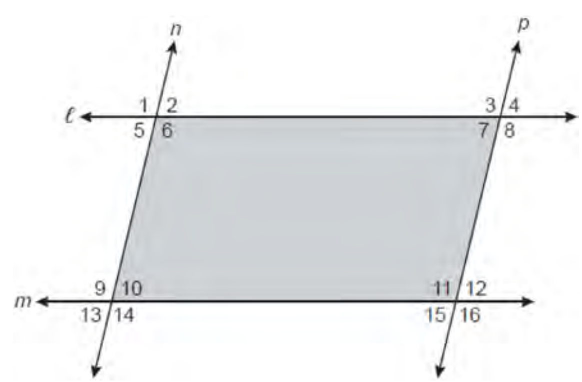
180 In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn.



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

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

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



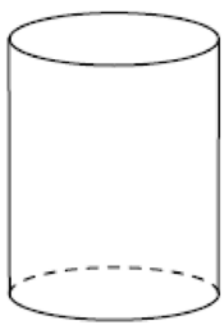
Which congruence statement would be sufficient to prove the quadrilateral is a parallelogram?

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 $\angle 9 \cong \angle 11$

182 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) $\frac{8}{7}$

183 A plane intersects a cylinder perpendicular to its bases.



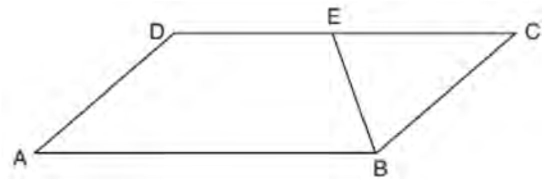
This cross section can be described as a

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

184 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) $y = 2x + 9$

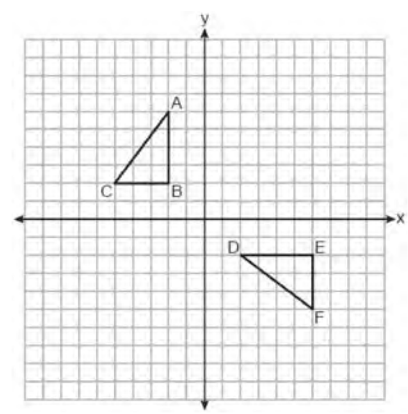
185 In parallelogram $ABCD$ shown below, $\overline{EB}$ bisects $\angle ABC$.



If $m\angle A = 40°$, then $m\angle BED$ is

1) 40°
2) 70°
3) 110°
4) 140°

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



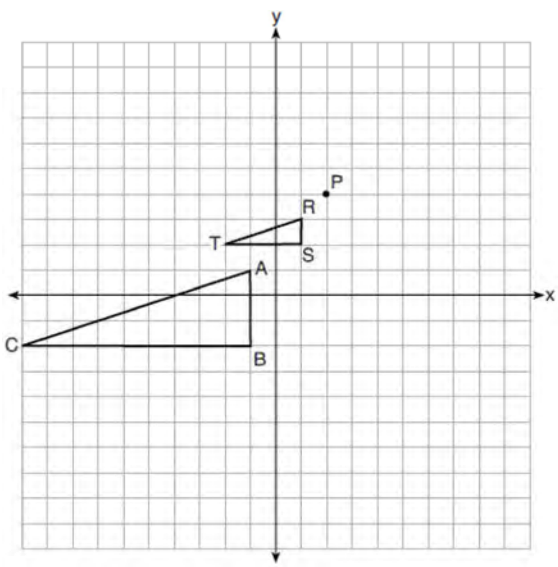
Which sequence of transformations maps $\triangle ABC$ onto $\triangle DEF$?

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.

187 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

188 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°

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

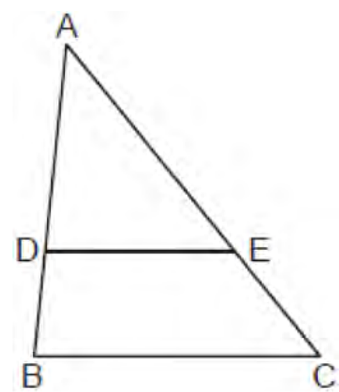


The scale factor of the dilation that maps $\triangle ABC$ onto $\triangle RST$ is
1) $\frac{1}{3}$
2) 2
3) 3
4) $\frac{2}{3}$

190 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

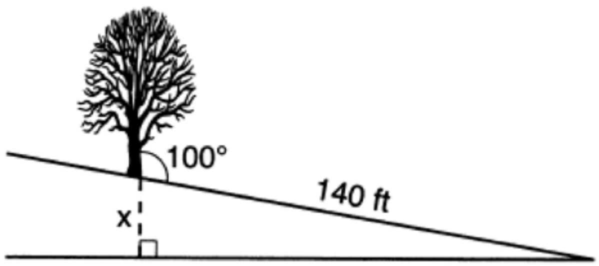
191 A plane intersects a sphere. Which two-dimensional shape is formed by this cross section?
1) rectangle
2) triangle
3) square
4) circle

192 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

193 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.

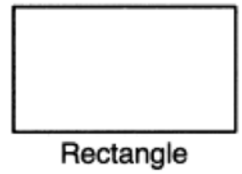


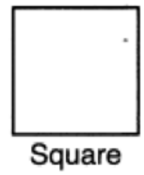
What is the vertical drop, x, to the base of the hill, to the *nearest foot*?
1) 24
2) 25
3) 70
4) 138

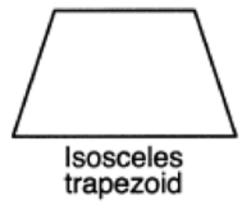
194 Triangles JOE and SAM are drawn such that $\angle E \cong \angle M$ and $\overline{EJ} \cong \overline{MS}$. Which mapping would *not* always lead to $\triangle JOE \cong \triangle SAM$?
1) $\angle J$ maps onto $\angle S$
2) $\angle O$ maps onto $\angle A$
3) $\overline{EO}$ maps onto $\overline{MA}$
4) $\overline{JO}$ maps onto $\overline{SA}$

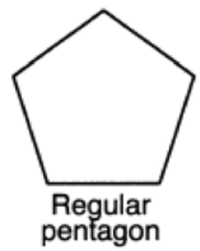
195 After a dilation with center $(0,0)$, the image of $\overline{DB}$ is $\overline{D'B'}$. If $DB = 4.5$ and $D'B' = 18$, the scale factor of this dilation is
1) $\frac{1}{5}$
2) 5
3) $\frac{1}{4}$
4) 4

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

1) 

2) 

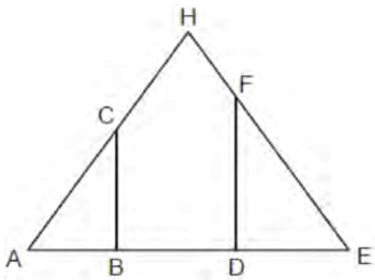
3) 

4) 

197 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

198 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

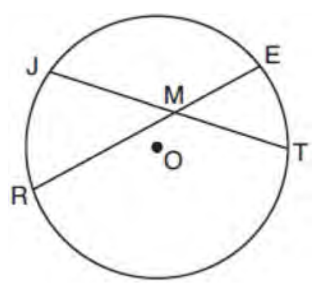
199 In the diagram below of isosceles triangle AHE with the vertex angle at H, $\overline{CB} \perp \overline{AE}$ and $\overline{FD} \perp \overline{AE}$.



Which statement is always true?

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

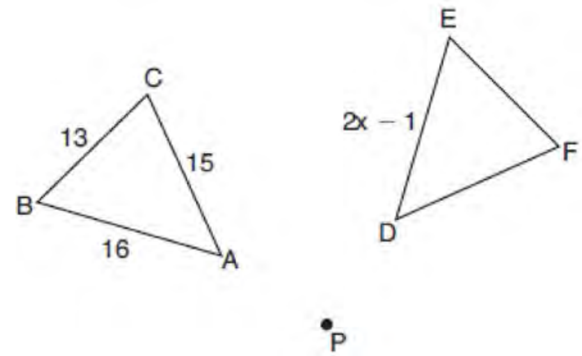
200 In the diagram below of circle O, chords $\overline{JT}$ and $\overline{ER}$ intersect at M.



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

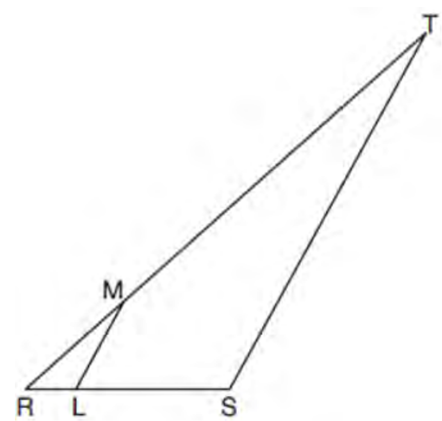
201 In the diagram below, $\triangle ABC$ with sides 13, 15, and 16, is mapped onto $\triangle DEF$ after a clockwise rotation of 90° about point P.



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

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

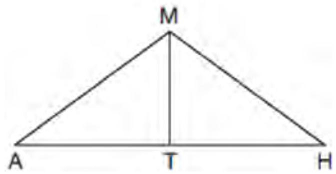
202 In the diagram below of $\triangle RST$, L is a point on $\overline{RS}$, and M is a point on $\overline{RT}$, such that $\overline{LM} \parallel \overline{ST}$.



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

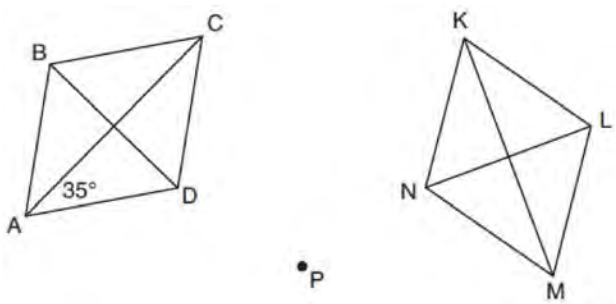
203 In triangle MAH below, $\overline{MT}$ is the perpendicular bisector of $\overline{AH}$.



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.

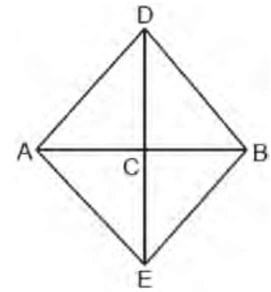
204 A tent is in the shape of a right pyramid with a square floor. The square floor has side lengths of 8 feet. If the height of the tent at its center is 6 feet, what is the volume of the tent, in cubic feet?
1) 48
2) 128
3) 192
4) 384

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



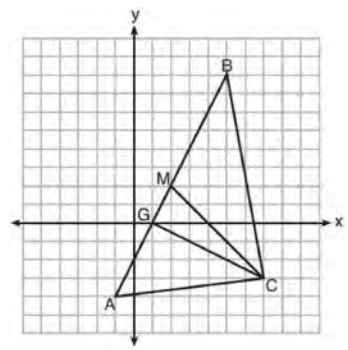
What is the measure of $\angle KNM$ if the measure of $\angle CAD = 35$?
1) 35°
2) 55°
3) 70°
4) 110°

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



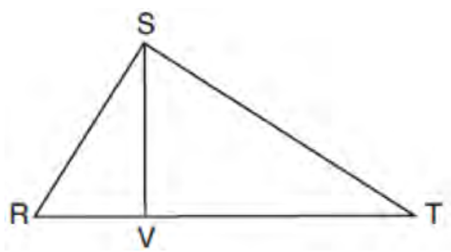
Which statement is always true?
1) $\angle ADC \cong \angle BDC$
2) $\angle EAC \cong \angle DAC$
3) $\overline{AD} \cong \overline{BE}$
4) $\overline{AE} \cong \overline{AD}$

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



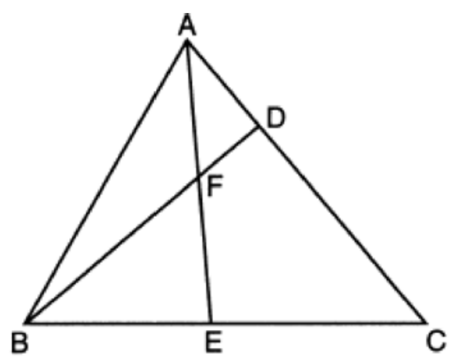
Which expression represents the area of $\triangle ABC$?
1) $\dfrac{(BC)(AC)}{2}$
2) $\dfrac{(GC)(BC)}{2}$
3) $\dfrac{(CM)(AB)}{2}$
4) $\dfrac{(GC)(AB)}{2}$

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



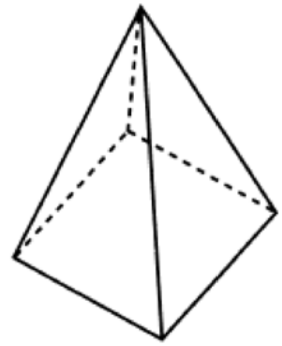
If $RV = 4.1$ and $TV = 10.2$, what is the length of $\overline{ST}$, to the *nearest tenth*?
1) 6.5
2) 7.7
3) 11.0
4) 12.1

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



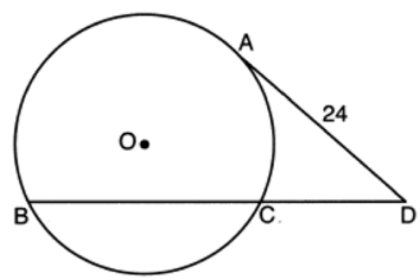
If $m\angle C = 50°$ and $m\angle ABC = 60°$, $m\angle FEB$ is
1) 35º
2) 40º
3) 55º
4) 85º

210 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

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

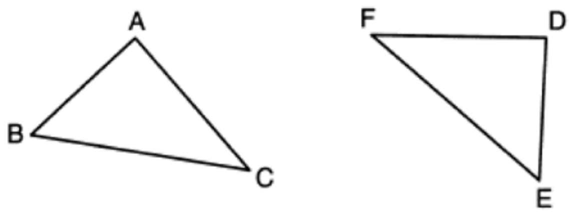


If the ratio of $DC:CB$ is 4:5, what is the length of $\overline{CB}$?
1) 36
2) 20
3) 16
4) 4

212 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) $y=3x-4$

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



Which statement is always true?

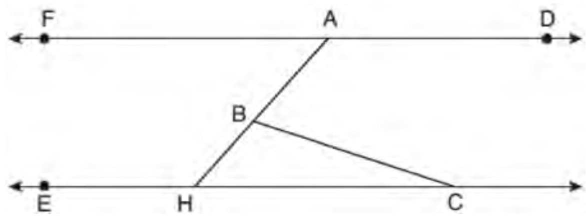
1) $\overline{BC} \cong \overline{EF}$
2) $\overline{AC} \cong \overline{DE}$
3) $\angle A \cong \angle F$
4) $\angle B \cong \angle D$

214 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

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



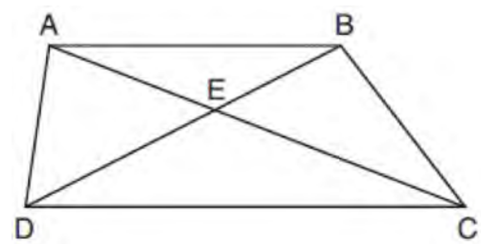
If $m\angle FAB=48°$ and $m\angle ECB=18°$, what is $m\angle ABC$?

1) 18º
2) 48º
3) 66º
4) 114º

216 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

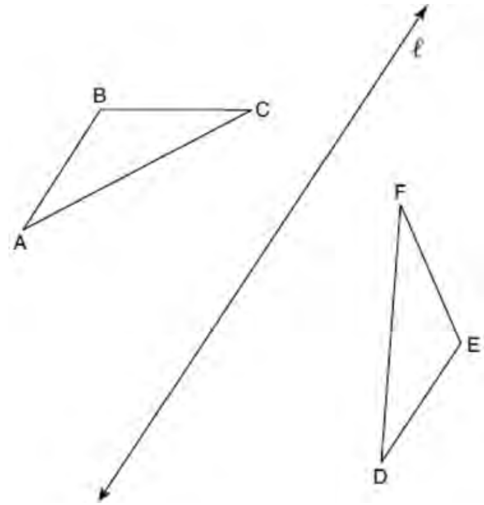
217 In trapezoid $ABCD$ below, $\overline{AB} \parallel \overline{CD}$.



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

218 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°

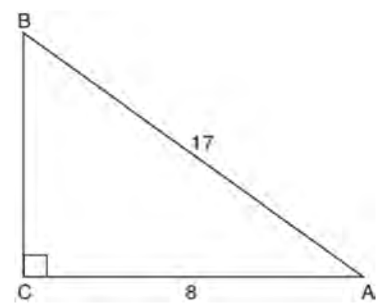
219 The coordinates of the endpoints of $\overline{QS}$ are $Q(-9,8)$ and $S(9,-4)$. Point R is on $\overline{QS}$ such that $QR:RS$ is in the ratio of 1:2. What are the coordinates of point R?
1) $(0,2)$
2) $(3,0)$
3) $(-3,4)$
4) $(-6,6)$

220 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.

221 Which regular polygon would carry onto itself after a rotation of 300° about its center?
1) decagon
2) nonagon
3) octagon
4) hexagon

222 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) $(4,-3)$

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



Which equation would determine the value of angle A?
1) $\sin A = \frac{8}{17}$
2) $\tan A = \frac{8}{15}$
3) $\cos A = \frac{15}{17}$
4) $\tan A = \frac{15}{8}$

Geometry Multiple Choice Regents Exam Questions

224 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

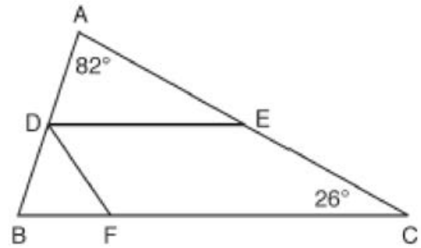
225 A parallelogram is always a rectangle if
1) the diagonals are congruent
2) the diagonals bisect each other
3) the diagonals intersect at right angles
4) the opposite angles are congruent

226 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

227 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

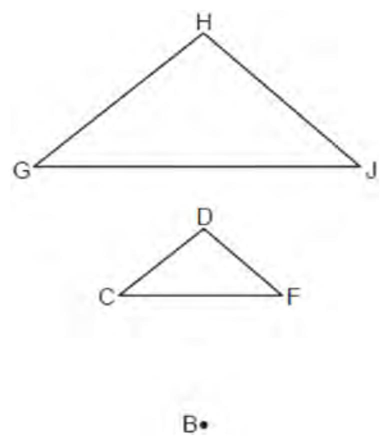
228 Which rotation about its center will carry a regular decagon onto itself?
1) 54°
2) 162°
3) 198°
4) 252°

229 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 $\angle BDE$.



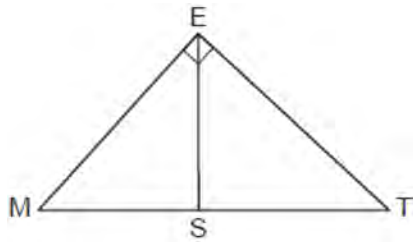
The measure of angle DFB is
1) 36°
2) 54°
3) 72°
4) 82°

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



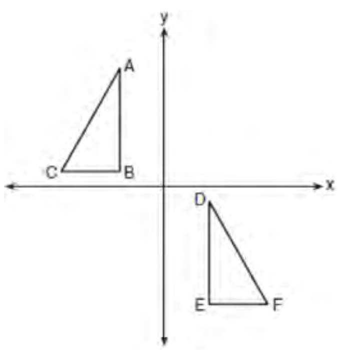
If $m\angle DFC = 40°$, what is $m\angle HJG$?
1) 20º
2) 40º
3) 60º
4) 80º

231 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

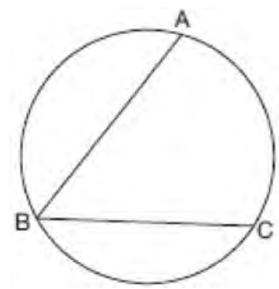
232 In the diagram below, $\triangle ABC \cong \triangle DEF$.



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

233 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) $4\sqrt{10}$

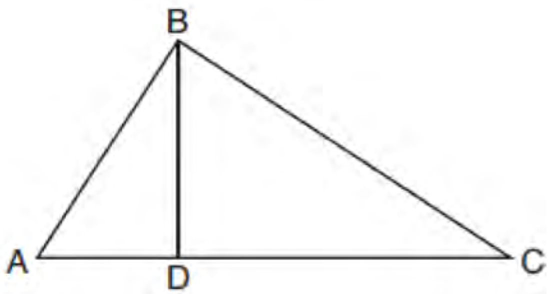
234 In the diagram below, $m\overset{\frown}{ABC} = 268°$.



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

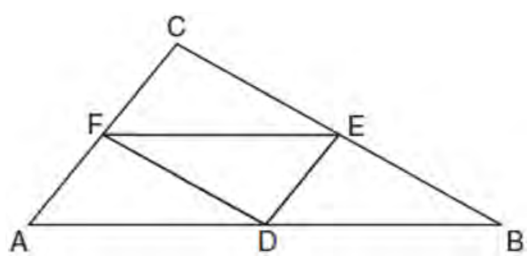
235 A line segment is dilated by a scale factor of 2 centered at a point not on the line segment. Which statement regarding the relationship between the given line segment and its image is true?
1) The line segments are perpendicular, and the image is one-half of the length of the given line segment.
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.

236 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

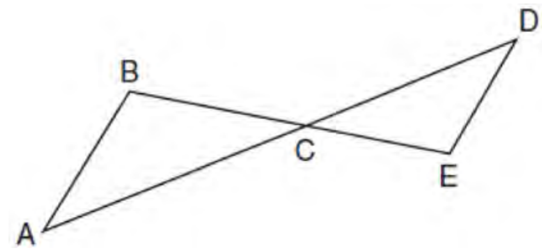
237 In the diagram below of $\triangle ABC$, D, E, and F are the midpoints of $\overline{AB}$, $\overline{BC}$, and $\overline{CA}$, respectively.



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

238 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

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

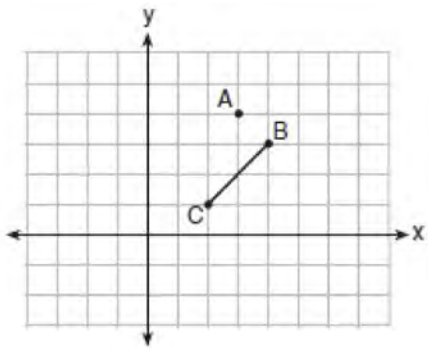


If $CD = 6.6$ cm, $DE = 3.4$ cm, $CE = 4.2$ cm, and $BC = 5.25$ cm, what is the length of $\overline{AC}$, to the *nearest hundredth of a centimeter*?
1) 2.70
2) 3.34
3) 5.28
4) 8.25

240 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 $ABCD$.

241 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 $\triangle DEF$

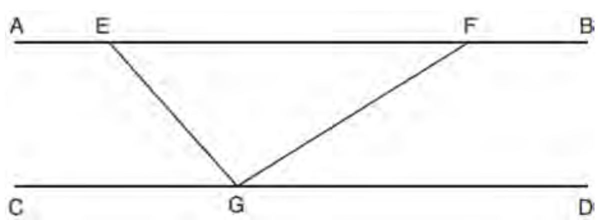
242 On the graph below, point $A(3,4)$ and $\overline{BC}$ with coordinates $B(4,3)$ and $C(2,1)$ are graphed.



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 $C'(3,0)$

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



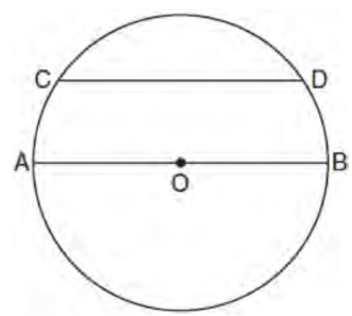
If $m\angle EFG = 32°$ and $m\angle AEG = 137°$, what is $m\angle EGF$?

1) 11º
2) 43º
3) 75º
4) 105º

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

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



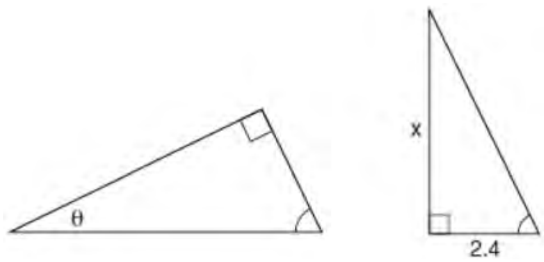
What is $m\overset{\frown}{AC}$?

1) 25
2) 50
3) 65
4) 115

246 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

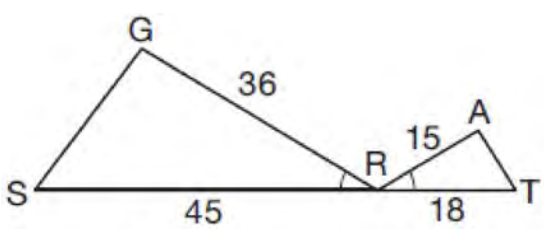
247 The diagram below shows two similar triangles.



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

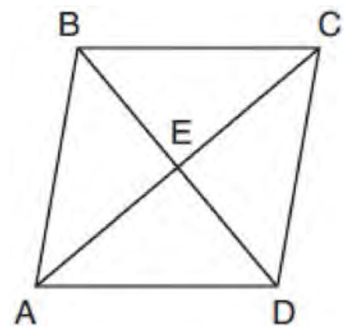
248 A circle whose center is the origin passes through the point $(-5,12)$. Which point also lies on this circle?
1) $(10,3)$
2) $(-12,13)$
3) $(11,2\sqrt{12})$
4) $(-8,5\sqrt{21})$

249 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 $\triangle ART$.

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



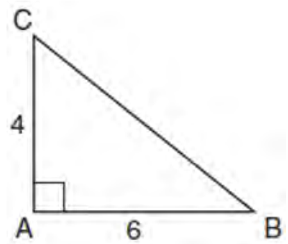
What additional information is sufficient to prove that parallelogram *ABCD* is also a rhombus?
1) $\overline{BD}$ bisects $\overline{AC}$.
2) $\overline{AB}$ is parallel to $\overline{CD}$.
3) $\overline{AC}$ is congruent to $\overline{BD}$.
4) $\overline{AC}$ is perpendicular to $\overline{BD}$.

251 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) $y = -2x + 3$

252 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) $(6.4,2.8)$

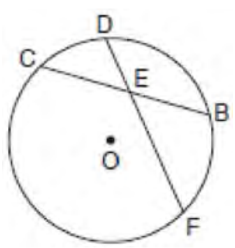
253 The vertices of $\triangle PQR$ have coordinates $P(2,3)$, $Q(3,8)$, and $R(7,3)$. Under which transformation of $\triangle PQR$ are distance and angle measure preserved?
1) $(x,y) \rightarrow (2x,3y)$
2) $(x,y) \rightarrow (x+2,3y)$
3) $(x,y) \rightarrow (2x,y+3)$
4) $(x,y) \rightarrow (x+2,y+3)$

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



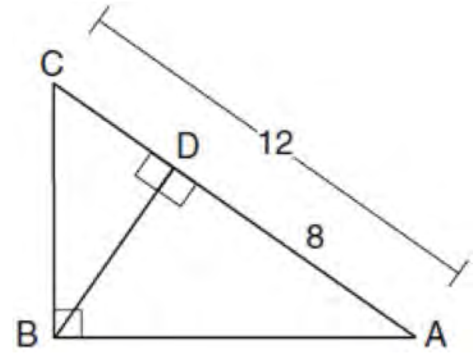
What is the volume of the three-dimensional object formed by continuously rotating the right triangle around $\overline{AB}$?
1) 32π
2) 48π
3) 96π
4) 144π

255 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

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

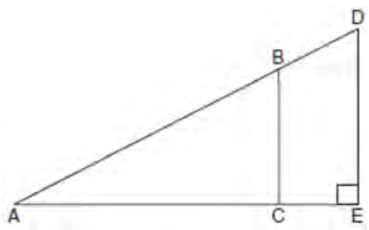


What is the length of $\overline{BC}$?
1) $4\sqrt{2}$
2) $4\sqrt{3}$
3) $4\sqrt{5}$
4) $4\sqrt{6}$

257 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

258 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

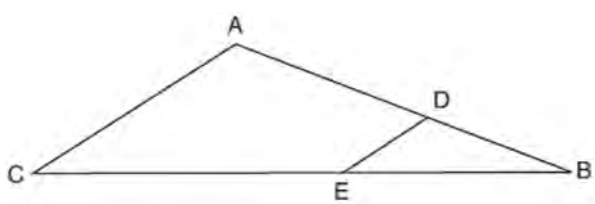
259 In the diagram of right triangle ADE below, $\overline{BC} \parallel \overline{DE}$.



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

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

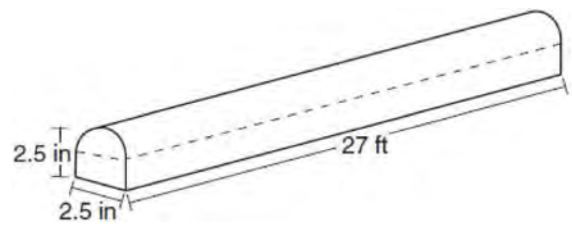
260 In the diagram of $\triangle ABC$ below, points D and E are on sides $\overline{AB}$ and $\overline{CB}$ respectively, such that $\overline{DE} \parallel \overline{AC}$.



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

261 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

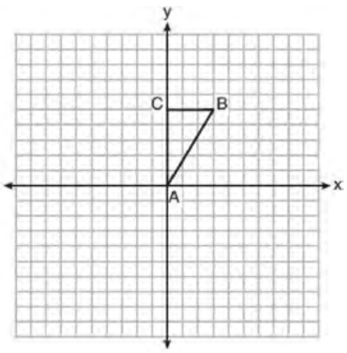
262 What is an equation of the line that passes through the point $(6,8)$ and is perpendicular to a line with equation $y = \frac{3}{2}x + 5$?

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

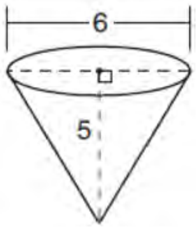
263 The equation of a circle is $x^2 + y^2 - 12y + 20 = 0$. What are the coordinates of the center and the length of the radius of the circle?

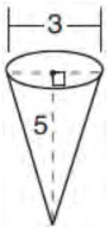
1) center $(0,6)$ and radius 4
2) center $(0,-6)$ and radius 4
3) center $(0,6)$ and radius 16
4) center $(0,-6)$ and radius 16

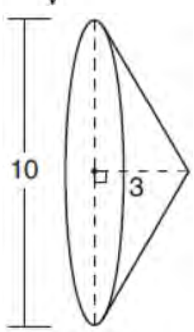
264 Triangle ABC, with vertices at $A(0,0)$, $B(3,5)$, and $C(0,5)$, is graphed on the set of axes shown below.

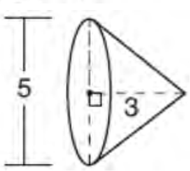


Which figure is formed when $\triangle ABC$ is rotated continuously about $\overline{BC}$?

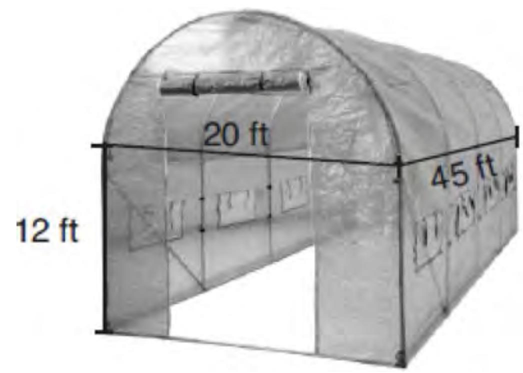
1) 

2) 

3) 

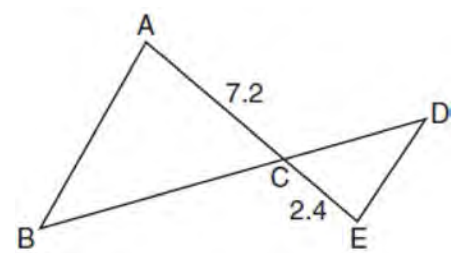
4) 

265 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.



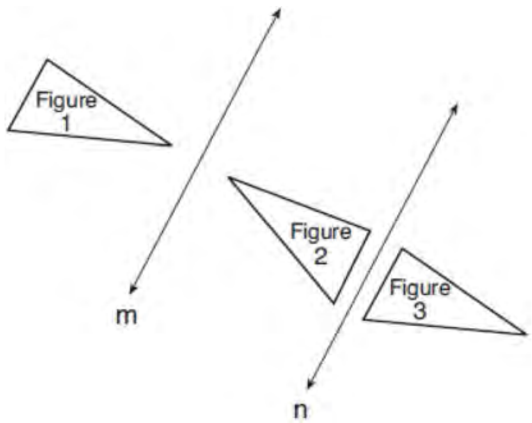
To the *nearest cubic foot*, what is the volume of the greenhouse?
1) 17,869
2) 24,937
3) 39,074
4) 67,349

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



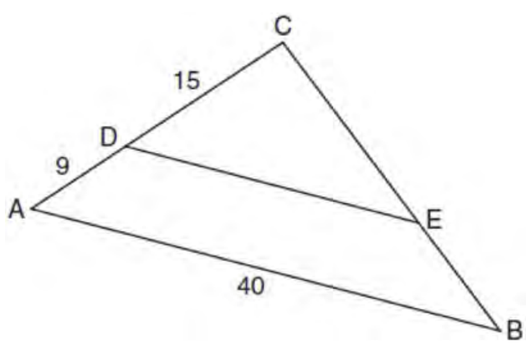
Which statement is *not* sufficient to prove $\triangle ABC \sim \triangle EDC$?
1) $\overline{AB} \parallel \overline{ED}$
2) $DE = 2.7$ and $AB = 8.1$
3) $CD = 3.6$ and $BC = 10.8$
4) $DE = 3.0$, $AB = 9.0$, $CD = 2.9$, and $BC = 8.7$

267 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

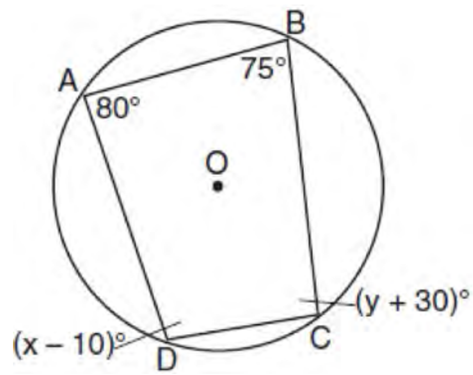
268 In the diagram of $\triangle ABC$ below, $\overline{DE}$ is parallel to $\overline{AB}$, $CD = 15$, $AD = 9$, and $AB = 40$.



The length of $\overline{DE}$ is
1) 15
2) 24
3) 25
4) 30

269 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

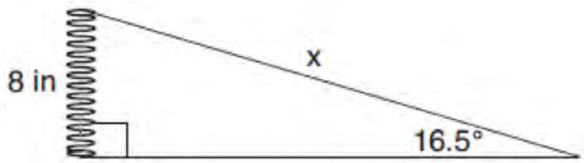
270 Quadrilateral *ABCD* is inscribed in circle *O*, as shown below.



If $m\angle A = 80°$, $m\angle B = 75°$, $m\angle C = (y + 30)°$, and $m\angle D = (x - 10)°$, which statement is true?
1) $x = 85$ and $y = 50$
2) $x = 90$ and $y = 45$
3) $x = 110$ and $y = 75$
4) $x = 115$ and $y = 70$

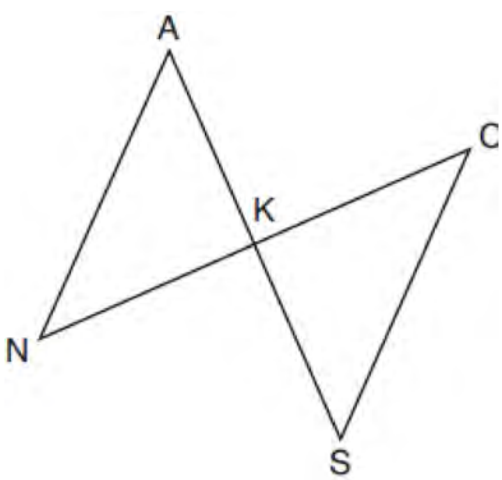
271 The equation of a circle is $x^2 + y^2 - 6y + 1 = 0$. What are the coordinates of the center and the length of the radius of this circle?
1) center $(0,3)$ and radius = $2\sqrt{2}$
2) center $(0,-3)$ and radius = $2\sqrt{2}$
3) center $(0,6)$ and radius = $\sqrt{35}$
4) center $(0,-6)$ and radius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

272 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.



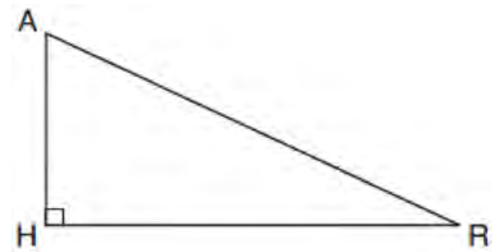
To the *nearest tenth of an inch*, what will be the length of the springboard, x?
1) 2.3
2) 8.3
3) 27.0
4) 28.2

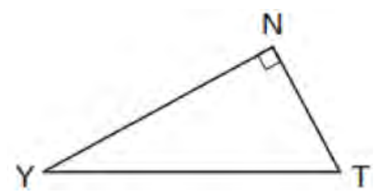
273 In the diagram below, $\overline{AKS}$, $\overline{NKC}$, $\overline{AN}$, and $\overline{SC}$ are drawn such that $\overline{AN} \cong \overline{SC}$.



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

274 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°

275 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°

276 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

277 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

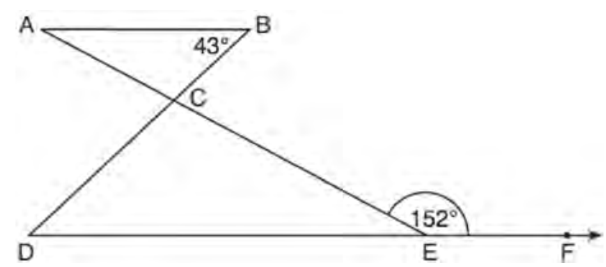
278 Parallelogram $ABCD$ has coordinates $A(0,7)$ and $C(2,1)$. Which statement would prove that $ABCD$ is a rhombus?
1) The midpoint of $\overline{AC}$ is $(1,4)$.
2) The length of $\overline{BD}$ is $\sqrt{40}$.
3) The slope of $\overline{BD}$ is $\frac{1}{3}$.
4) The slope of $\overline{AB}$ is $\frac{1}{3}$.

279 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) $4\sqrt{40}$

280 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.

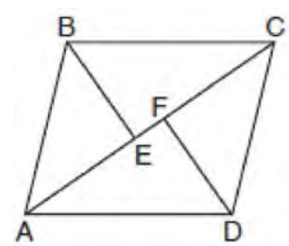
281 The equation of a circle is $x^2 + y^2 - 6x + 2y = 6$. What are the coordinates of the center and the length of the radius of the circle?
1) center $(-3,1)$ and radius 4
2) center $(3,-1)$ and radius 4
3) center $(-3,1)$ and radius 16
4) center $(3,-1)$ and radius 16

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



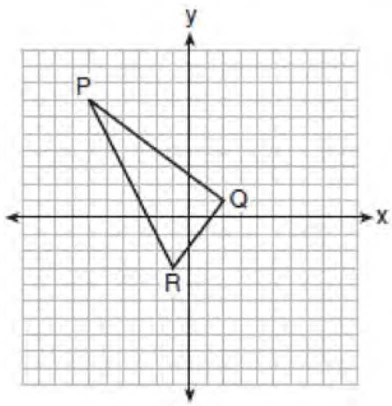
Which statement is true?
1) $m\angle D = 28°$
2) $m\angle A = 43°$
3) $m\angle ACD = 71°$
4) $m\angle BCE = 109°$

283 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



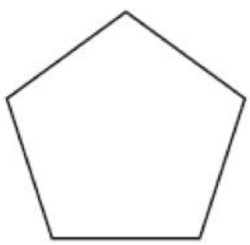
1) square
2) rhombus
3) rectangle
4) parallelogram

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



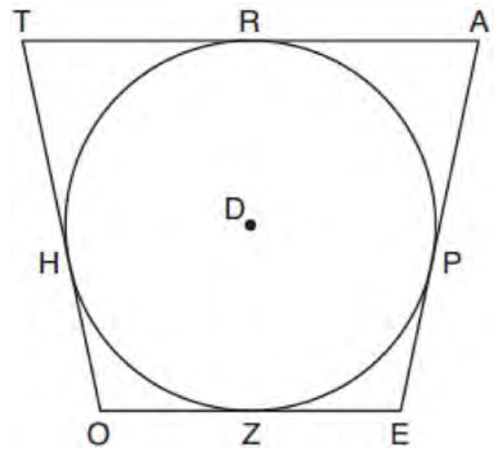
What is the area of $\triangle PQR$?
1) 10
2) 20
3) 25
4) 50

285 The regular polygon below is rotated about its center.



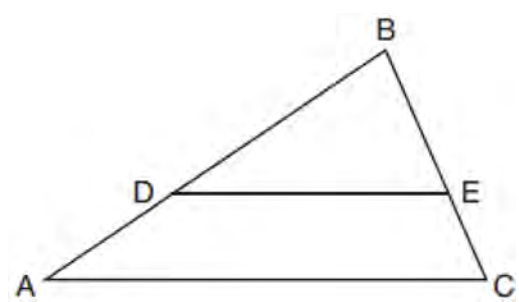
Which angle of rotation will carry the figure onto itself?
1) 60°
2) 108°
3) 216°
4) 540°

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



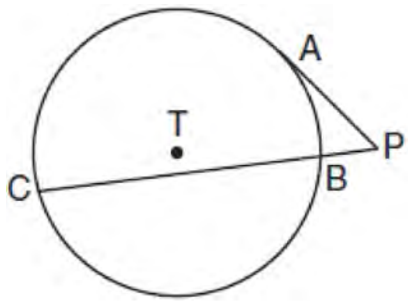
If $AP = 10$ and $EO = 12$, what is the perimeter of quadrilateral $TAEO$?
1) 56
2) 64
3) 72
4) 76

287 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

288 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.



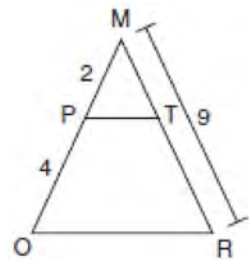
If $PB = 3$ and $BC = 15$, what is the length of $\overline{PA}$?
1) $3\sqrt{5}$
2) $3\sqrt{6}$
3) 3
4) 9

289 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

290 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) $(-1,1)$

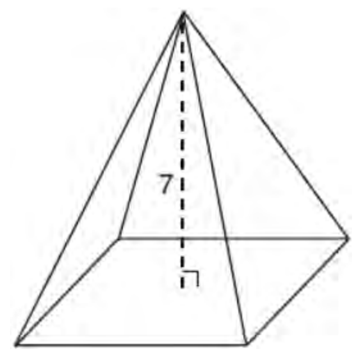
291 A regular decagon is rotated n degrees about its center, carrying the decagon onto itself. The value of n could be
1) 10°
2) 150°
3) 225°
4) 252°

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



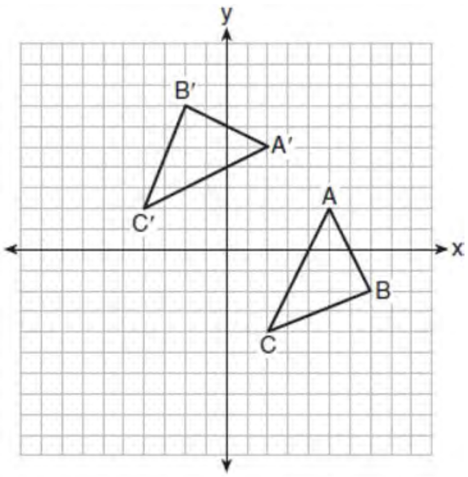
What is the length of $\overline{TR}$?
1) 4.5
2) 5
3) 3
4) 6

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



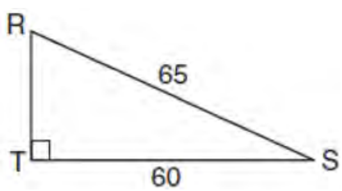
What is the length of the side of the base?
1) 6
2) 12
3) 18
4) 36

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



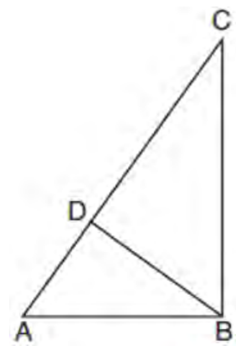
Which rigid motion would map $\triangle ABC$ onto $\triangle A'B'C'$?
1) a rotation of 90 degrees counterclockwise about the origin
2) a translation of three units to the left and three units up
3) a rotation of 180 degrees about the origin
4) a reflection over the line $y = x$

295 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

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

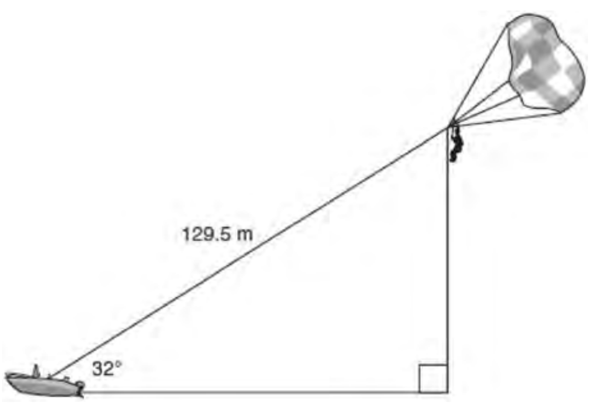
297 A ladder 20 feet long leans against a building, forming an angle of 71° with the level ground. To the *nearest foot*, how high up the wall of the building does the ladder touch the building?
1) 15
2) 16
3) 18
4) 19

298 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) $\angle MAT \cong \angle MHT$

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

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



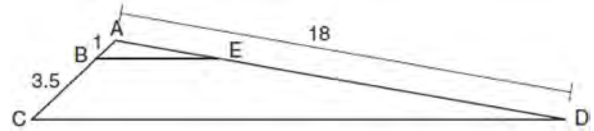
If 129.5 meters of cable connected the boat to the parasail, approximately how many meters above the lake was the man?

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

301 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) $(3,-6)$

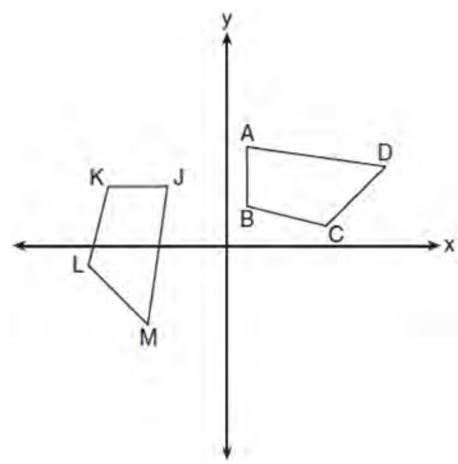
302 In the diagram below, triangle ACD has points B and E on sides $\overline{AC}$ and $\overline{AD}$, respectively, such that $\overline{BE} \parallel \overline{CD}$, $AB = 1$, $BC = 3.5$, and $AD = 18$.



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

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

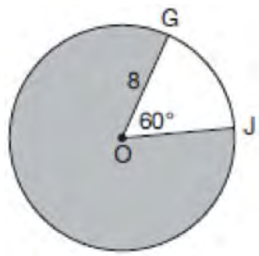
303 In the diagram below, a sequence of rigid motions maps $ABCD$ onto $JKLM$.



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°

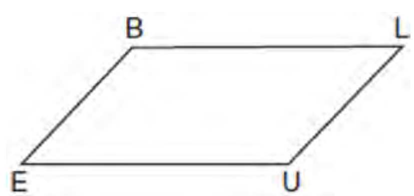
304 In the diagram below of circle O, $GO = 8$ and $m\angle GOJ = 60°$.



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

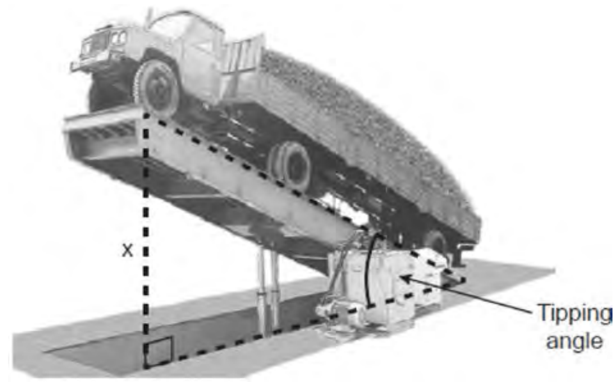
305 In quadrilateral $BLUE$ shown below, $\overline{BE} \cong \overline{UL}$.



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

306 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

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

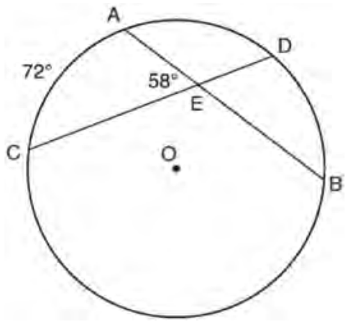
I. $\overline{BD}$ is a median.
II. $\overline{BD}$ bisects $\angle ABC$.
III. $\triangle ABC$ is isosceles.

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

308 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?

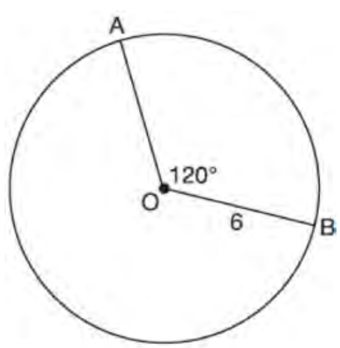
1) $(2,9)$
2) $(0,11)$
3) $(2,14)$
4) $(10,2)$

309 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

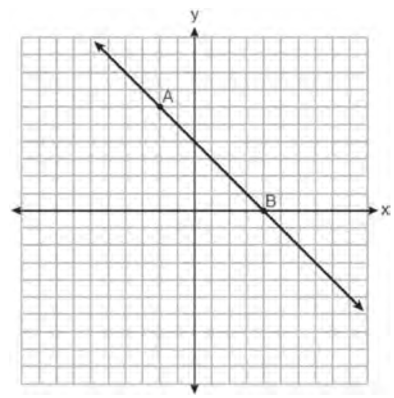
310 The diagram below shows circle O with radii $\overline{OA}$ and $\overline{OB}$. The measure of angle AOB is 120°, and the length of a radius is 6 inches.



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

311 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) $(6,0)$

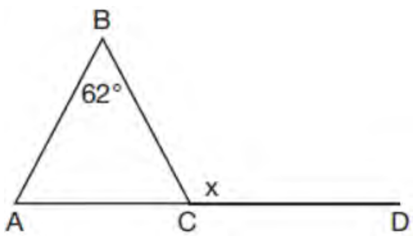
312 On the set of axes below, $\overleftrightarrow{AB}$ is drawn and passes through $A(-2,6)$ and $B(4,0)$.



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

313 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

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

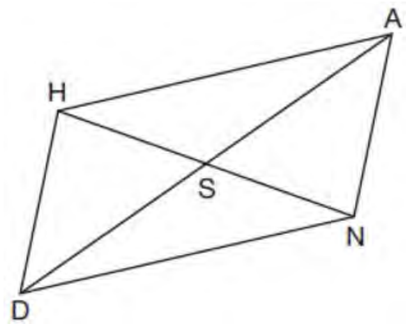


Which value of x makes $\overline{AB} \cong \overline{CB}$?
1) 59º
2) 62º
3) 118º
4) 121º

315 In a circle with a diameter of 32, the area of a sector is $\frac{512\pi}{3}$. The measure of the angle of the sector, in radians, is
1) $\frac{\pi}{3}$
2) $\frac{4\pi}{3}$
3) $\frac{16\pi}{3}$
4) $\frac{64\pi}{3}$

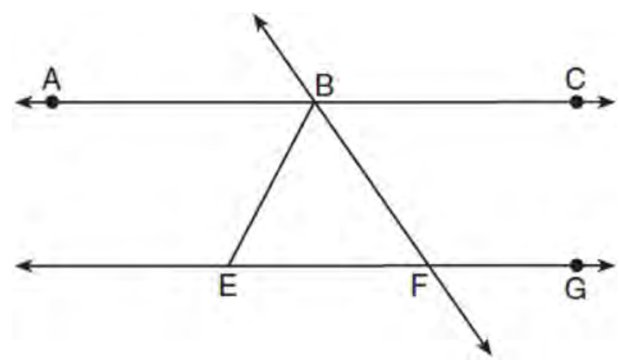
316 The line represented by the equation $4y = 3x + 7$ is transformed by a dilation centered at the origin. Which linear equation could represent its image?
1) $3x - 4y = 9$
2) $3x + 4y = 9$
3) $4x - 3y = 9$
4) $4x + 3y = 9$

317 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) $\angle HDS \cong \angle NDS$

318 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°

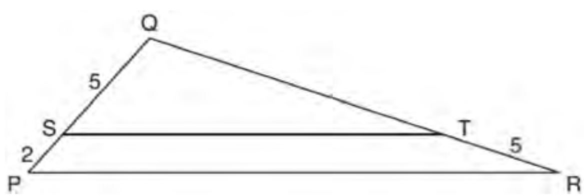
319 The 2010 U.S. Census populations and population densities are shown in the table below.

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

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



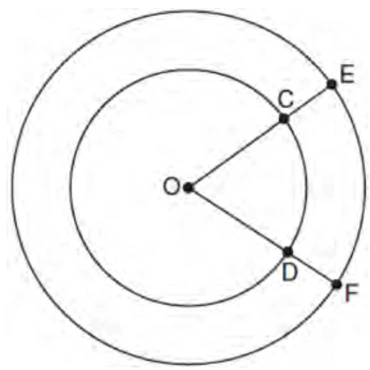
What is the length of $\overline{QR}$?

1) 7
2) 2
3) $12\frac{1}{2}$
4) $17\frac{1}{2}$

321 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

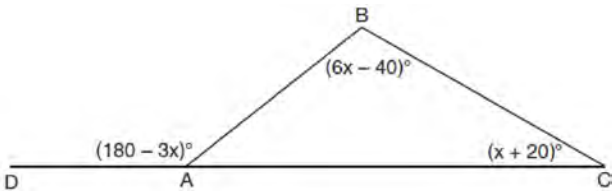
322 In the diagram below, two concentric circles with center O, and radii $\overline{OC}$, $\overline{OD}$, $\overline{OGE}$, and $\overline{ODF}$ are drawn.



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.

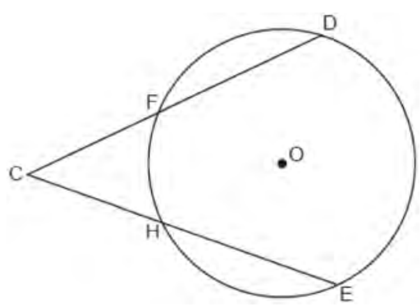
323 In $\triangle ABC$ shown below, side $\overline{AC}$ is extended to point D with $m\angle DAB = (180 - 3x)°$, $m\angle B = (6x - 40)°$, and $m\angle C = (x + 20)°$.



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

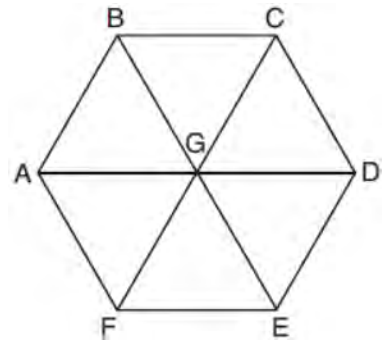
324 Given square *RSTV*, where $RS = 9$ cm. If square *RSTV* is dilated by a scale factor of 3 about a given center, what is the perimeter, in centimeters, of the image of *RSTV* after the dilation?
1) 12
2) 27
3) 36
4) 108

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



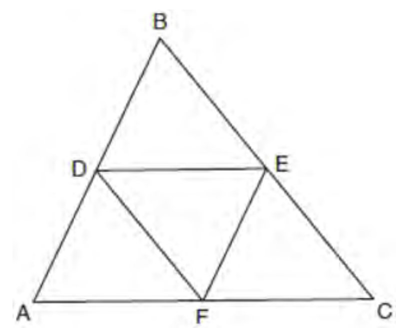
If $m\overset{\frown}{DE} = 136°$ and $m\angle C = 44°$, then $m\overset{\frown}{FH}$ is
1) 46°
2) 48°
3) 68°
4) 88°

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



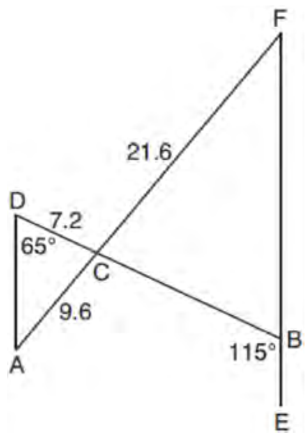
When $\triangle ABG$ is reflected over $\overline{BG}$ and then rotated 180° about point *G*, $\triangle ABG$ is mapped onto
1) $\triangle FEG$
2) $\triangle AFG$
3) $\triangle CBG$
4) $\triangle DEG$

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



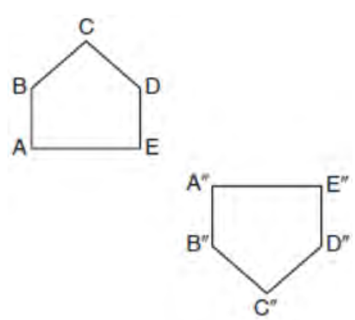
The perimeter of quadrilateral *ADEF* is equivalent to
1) $AB + BC + AC$
2) $\frac{1}{2}AB + \frac{1}{2}AC$
3) $2AB + 2AC$
4) $AB + AC$

328 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 $FC = 21.6$.



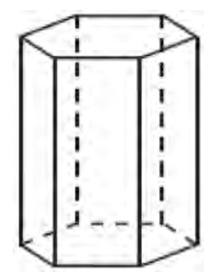
What is the length of $\overline{CB}$?
1) 3.2
2) 4.8
3) 16.2
4) 19.2

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



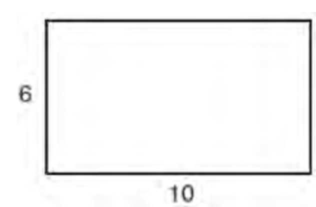
1) dilation followed by a rotation
2) translation followed by a rotation
3) line reflection followed by a translation
4) line reflection followed by a line reflection

330 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

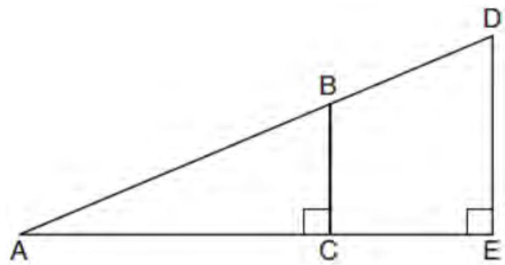
331 A rectangle whose length and width are 10 and 6, respectively, is shown below. The rectangle is continuously rotated around a straight line to form an object whose volume is 150π.



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

332 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) $24\frac{3}{4}$

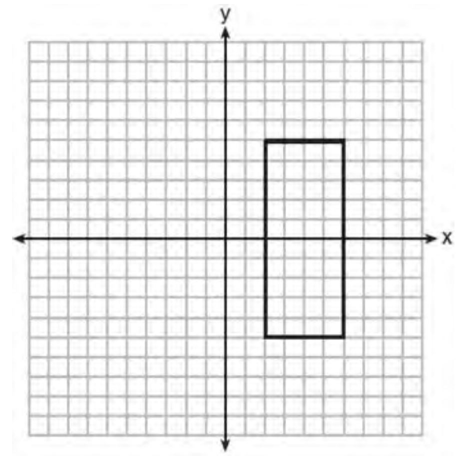
333 In the diagram below of right triangle *AED*, $\overline{BC} \parallel \overline{DE}$.



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

334 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

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

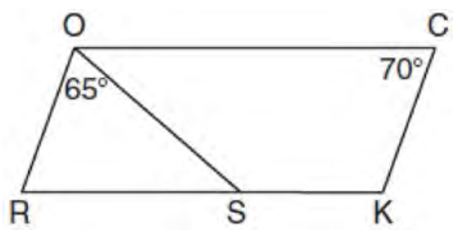


Which transformation would *not* map the rectangle onto itself?
1) a reflection over the *x*-axis
2) a reflection over the line $x = 4$
3) a rotation of 180° about the origin
4) a rotation of 180° about the point $(4,0)$

336 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

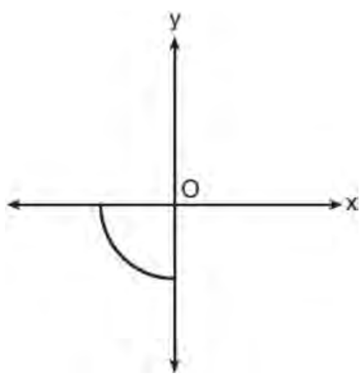
337 Line *MN* is dilated by a scale factor of 2 centered at the point $(0,6)$. If $\overleftrightarrow{MN}$ is represented by $y = -3x + 6$, which equation can represent $\overleftrightarrow{M'N'}$, the image of $\overleftrightarrow{MN}$?
1) $y = -3x + 12$
2) $y = -3x + 6$
3) $y = -6x + 12$
4) $y = -6x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

338 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

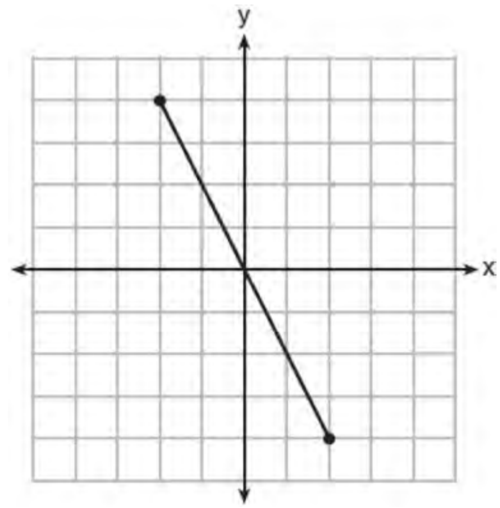
339 Circle *O* is centered at the origin. In the diagram below, a quarter of circle *O* is graphed.



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

340 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) $(2,4)$

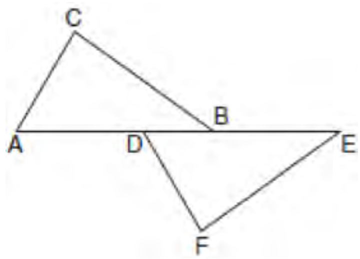
341 What is an equation of the perpendicular bisector of the line segment shown in the diagram below?



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

342 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

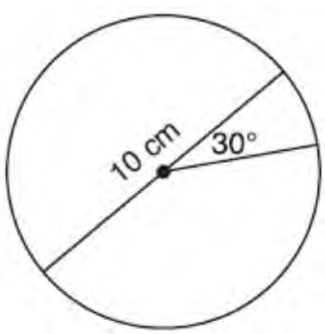
343 Kelly is completing a proof based on the figure below.



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

344 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

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

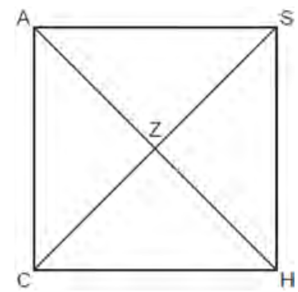
1) center is $(2,-4)$ and is tangent to the x-axis
2) center is $(2,-4)$ and is tangent to the y-axis
3) center is $(-2,4)$ and is tangent to the x-axis
4) center is $(-2,4)$ and is tangent to the y-axis

346 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

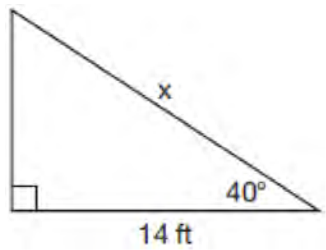
347 In the diagram below of square $CASH$, diagonals $\overline{AH}$ and $\overline{CS}$ intersect at Z.



Which statement is true?

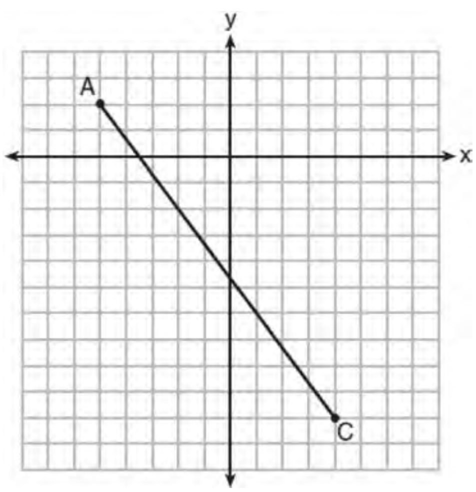
1) $m\angle ACZ > m\angle ZCH$
2) $m\angle ACZ < m\angle ASZ$
3) $m\angle AZC = m\angle SHC$
4) $m\angle AZC = m\angle ZCH$

348 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

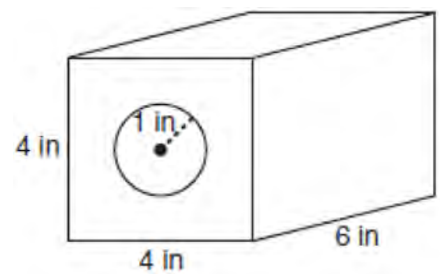
349 In the diagram below, $\overline{AC}$ has endpoints with coordinates $A(-5,2)$ and $C(4,-10)$.



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) $(1,-6)$

350 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

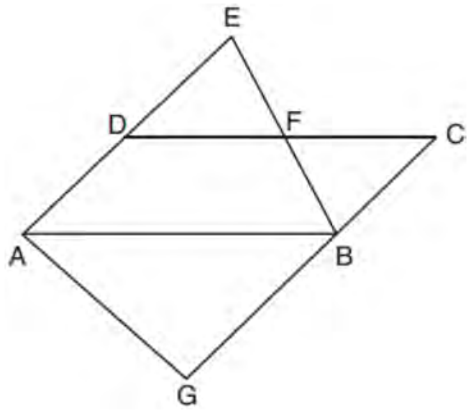
351 In the two distinct acute triangles ABC and DEF, $\angle B \cong \angle E$. Triangles ABC and DEF are congruent when there is a sequence of rigid motions that maps

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 $\overline{DE}$

352 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?

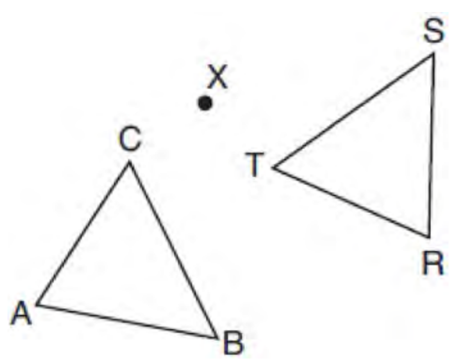
1) cone
2) cylinder
3) pyramid
4) rectangular prism

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



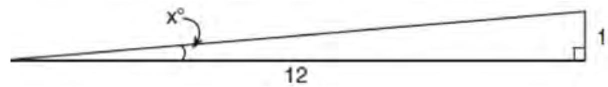
Which statement is always true?
1) $\triangle DEF \cong \triangle CBF$
2) $\triangle BAG \cong \triangle BAE$
3) $\triangle BAG \sim \triangle AEB$
4) $\triangle DEF \sim \triangle AEB$

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



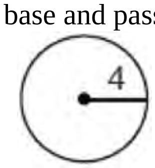
Which statement must be true?
1) $\angle A \cong \angle R$
2) $\angle A \cong \angle S$
3) $\overline{CB} \cong \overline{TR}$
4) $\overline{CA} \cong \overline{TS}$

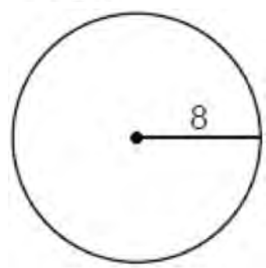
355 To build a handicapped-access ramp, the building code states that for every 1 inch of vertical rise in height, the ramp must extend out 12 inches horizontally, as shown in the diagram below.

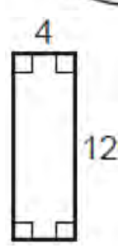


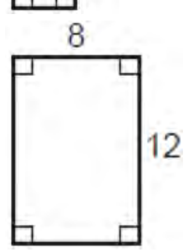
What is the angle of inclination, x, of this ramp, to the *nearest hundredth of a degree*?
1) 4.76
2) 4.78
3) 85.22
4) 85.24

356 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?

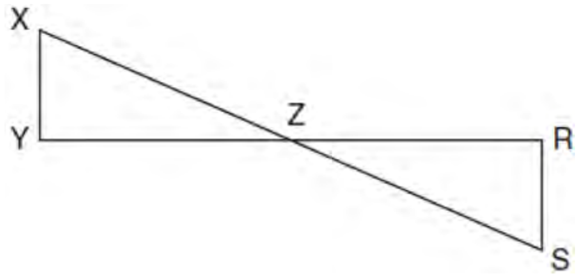
1) 

2) 

3) 

4) 

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

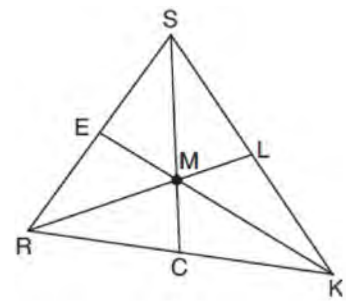


Which statement is always true?
1) $(XY)(SR) = (XZ)(RZ)$
2) $\triangle XYZ \cong \triangle SRZ$
3) $\overline{XS} \cong \overline{YR}$
4) $\frac{XY}{SR} = \frac{YZ}{RZ}$

358 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

359 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

360 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) $SM = KM$

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

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

I. Diagonals are perpendicular bisectors of each other.

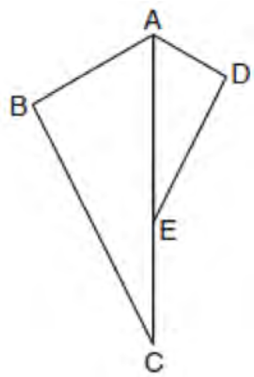
II. Diagonals bisect the angles from which they are drawn.

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

363 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) $\sin B$

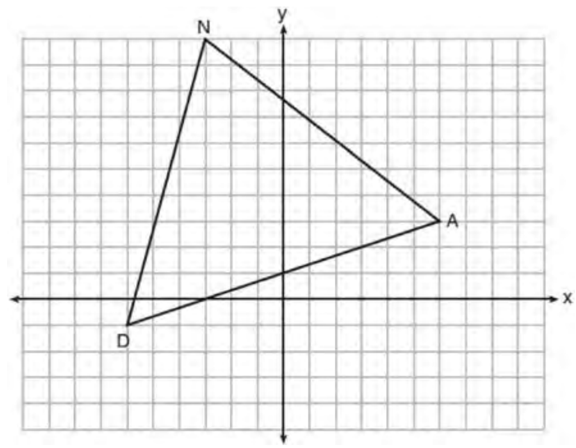
364 In the diagram below, $\triangle ADE$ is the image of $\triangle ABC$ after a reflection over the line AC followed by a dilation of scale factor $\frac{AE}{AC}$ centered at point A.



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

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

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

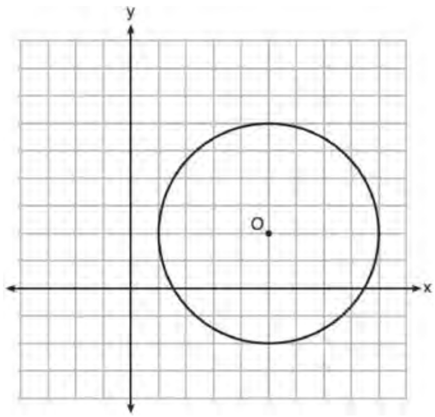


What is the area of $\triangle DAN$?
1) 60
2) 120
3) $20\sqrt{13}$
4) $40\sqrt{13}$

367 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

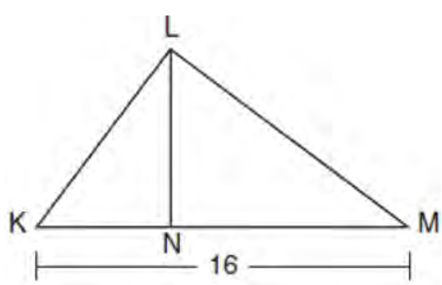
368 In a right triangle, $\sin(40-x)° = \cos(3x)°$. What is the value of x?
1) 10
2) 15
3) 20
4) 25

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



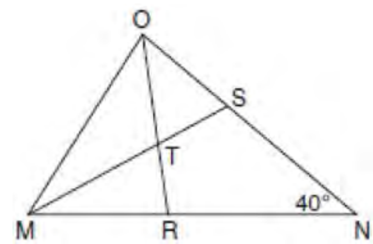
1) $x^2 + 10x + y^2 + 4y = -13$
2) $x^2 - 10x + y^2 - 4y = -13$
3) $x^2 + 10x + y^2 + 4y = -25$
4) $x^2 - 10x + y^2 - 4y = -25$

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



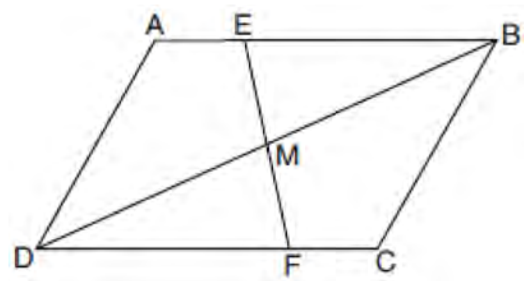
Which lengths would make triangle KLM a right triangle?
1) $LM = 13$ and $KN = 6$
2) $LM = 12$ and $NM = 9$
3) $KL = 11$ and $KN = 7$
4) $LN = 8$ and $NM = 10$

371 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

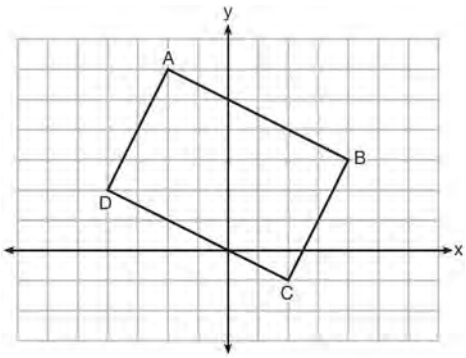
372 Parallelogram $ABCD$ with diagonal $\overline{DB}$ is drawn below. Line segment EF is drawn such that it bisects $\overline{DB}$ at M.



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

Geometry Multiple Choice Regents Exam Questions

373 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 $B'(-3,4)$

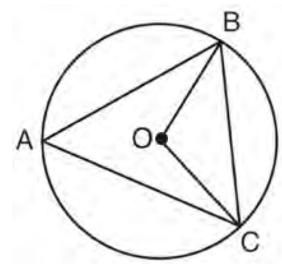
374 Two right triangles must be congruent if

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

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

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

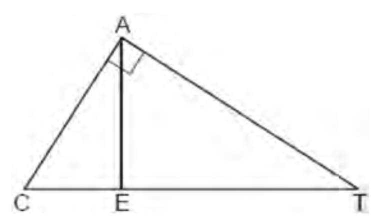
376 In the diagram below of circle O, $\overline{OB}$ and $\overline{OC}$ are radii, and chords $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$ are drawn.



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 $\triangle BOC$.

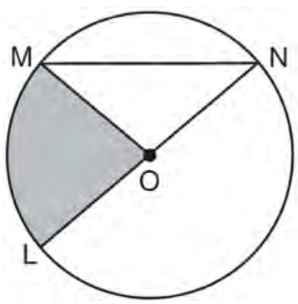
377 In the diagram of $\triangle CAT$ below, $m\angle A = 90°$ and altitude $\overline{AE}$ is drawn from vertex A.



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) $\frac{CE}{AC} = \frac{AC}{ET}$

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



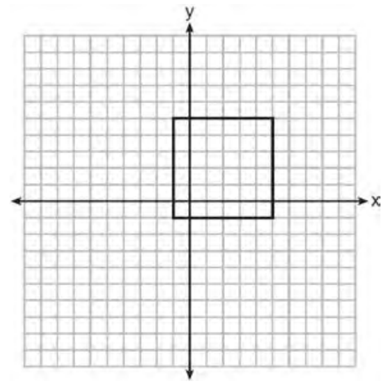
If the length of $\overline{NL}$ is 6 cm, what is $m\angle N$?
1) 10º
2) 20º
3) 40º
4) 80º

379 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

380 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

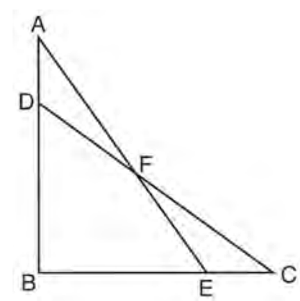
381 Segment CD is the perpendicular bisector of $\overline{AB}$ at E. Which pair of segments does *not* have to be congruent?
1) $\overline{AD}, \overline{BD}$
2) $\overline{AC}, \overline{BC}$
3) $\overline{AE}, \overline{BE}$
4) $\overline{DE}, \overline{CE}$

382 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) $x + y = 4$

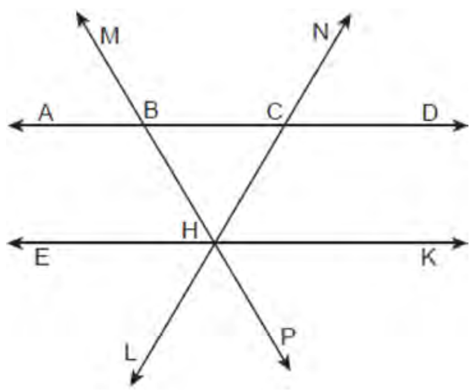
383 Given: $\triangle ABE$ and $\triangle CBD$ shown in the diagram below with $\overline{DB} \cong \overline{BE}$



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

384 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

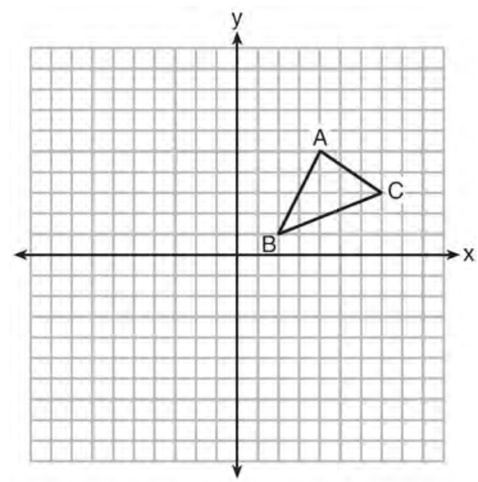
385 In the diagram below, $\overleftrightarrow{ABCD} \parallel \overleftrightarrow{EHK}$, and $\overleftrightarrow{MBHP}$ and $\overleftrightarrow{NCHL}$ are drawn such that $\overline{BC} \cong \overline{BH}$.



If m$\angle NCD = 62°$, what is m$\angle PHK$?
1) 118º
2) 68º
3) 62º
4) 56º

386 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

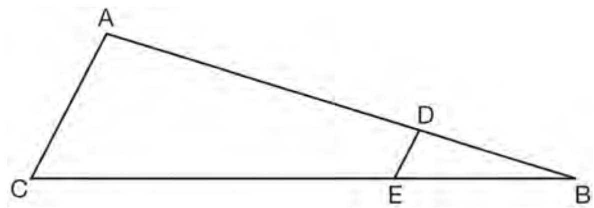
387 In the diagram below, $\triangle ABC$ has vertices $A(4,5)$, $B(2,1)$, and $C(7,3)$.



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

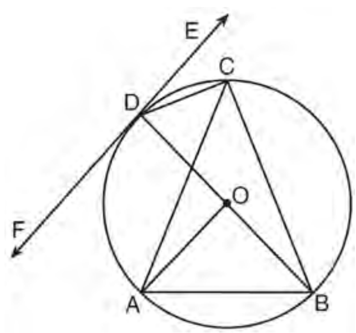
388 A company is creating an object from a wooden cube with an edge length of 8.5 cm. A right circular cone with a diameter of 8 cm and an altitude of 8 cm will be cut out of the cube. Which expression represents the volume of the remaining wood?
1) $(8.5)^3 - \pi(8)^2(8)$
2) $(8.5)^3 - \pi(4)^2(8)$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

389 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

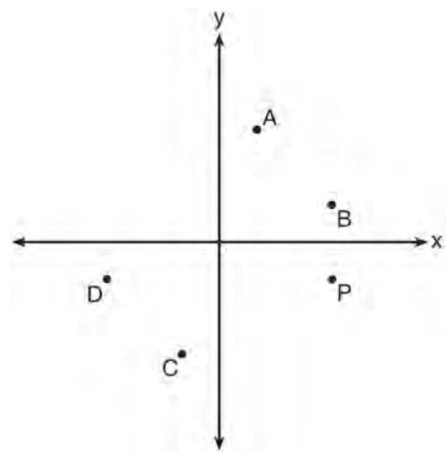
390 In the diagram below, $\overline{DC}$, $\overline{AC}$, $\overline{DOB}$, $\overline{CB}$, and $\overline{AB}$ are chords of circle O, $\overleftrightarrow{FDE}$ is tangent at point D, and radius $\overline{AO}$ is drawn. Sam decides to apply this theorem to the diagram: "An angle inscribed in a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



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

391 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

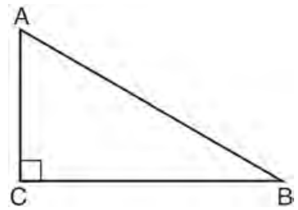
392 Which point shown in the graph below is the image of point P after a counterclockwise rotation of 90° about the origin?



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

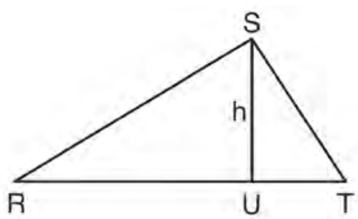
393 Parallelogram $EATK$ has diagonals $\overline{ET}$ and $\overline{AK}$. Which information is always sufficient to prove $EATK$ is a rhombus?
1) $\overline{EA} \perp \overline{AT}$
2) $\overline{EA} \cong \overline{AT}$
3) $\overline{ET} \cong \overline{AK}$
4) $\overline{ET} \cong \overline{AT}$

394 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) $\sin A = \cos B$

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

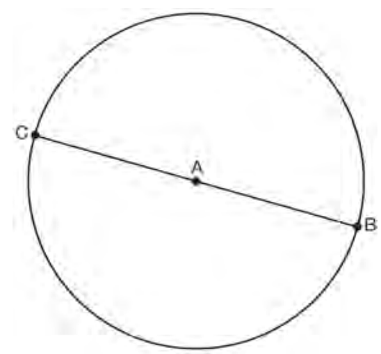


If $SU = h$, $UT = 12$, and $RT = 42$, which value of h will make $\triangle RST$ a right triangle with $\angle RST$ as a right angle?
1) $6\sqrt{3}$
2) $6\sqrt{10}$
3) $6\sqrt{14}$
4) $6\sqrt{35}$

396 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

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

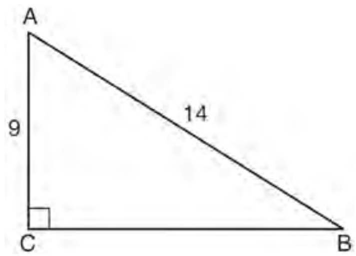
398 In the diagram below, $\overline{BC}$ is the diameter of circle A.



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.

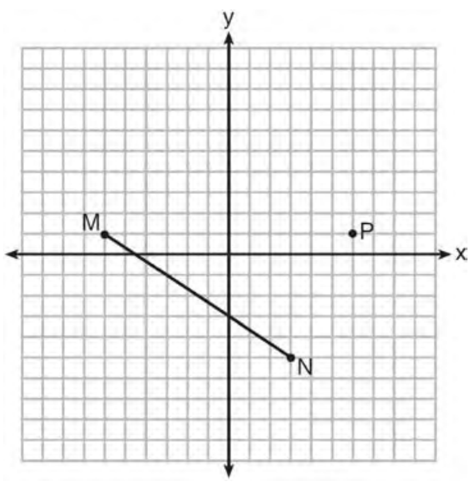
399 In $\triangle ABC$, where $\angle C$ is a right angle, $\cos A = \frac{\sqrt{21}}{5}$. What is $\sin B$?
1) $\frac{\sqrt{21}}{5}$
2) $\frac{\sqrt{21}}{2}$
3) $\frac{2}{5}$
4) $\frac{5}{\sqrt{21}}$

400 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

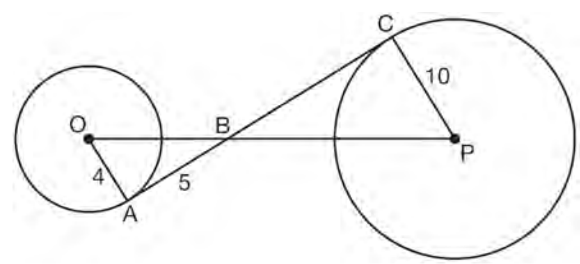
401 Given $\overline{MN}$ shown below, with $M(-6,1)$ and $N(3,-5)$, what is an equation of the line that passes through point $P(6,1)$ and is parallel to $\overline{MN}$?



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

402 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 $\overline{PM}$.

403 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 $PC = 10$.



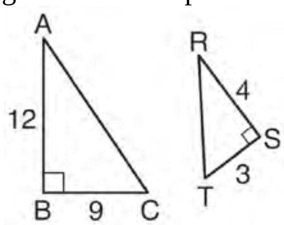
What is the length of $\overline{BC}$?
1) 6.4
2) 8
3) 12.5
4) 16

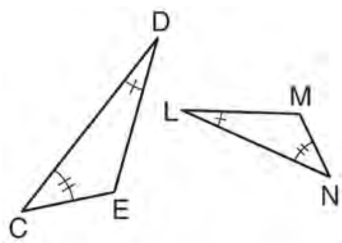
404 A hemispherical tank is filled with water and has a diameter of 10 feet. If water weighs 62.4 pounds per cubic foot, what is the total weight of the water in a full tank, to the *nearest pound*?
1) 16,336
2) 32,673
3) 130,690
4) 261,381

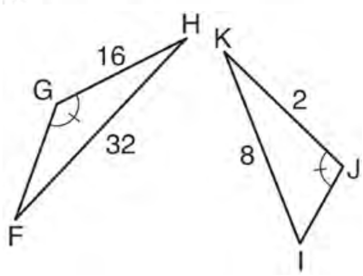
405 What is the area of a sector of a circle with a radius of 8 inches and formed by a central angle that measures 60°?

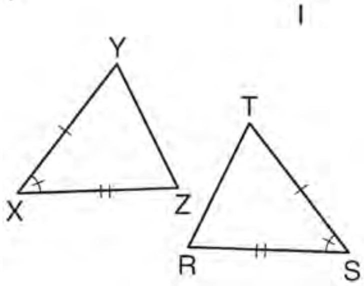
1) $\frac{8\pi}{3}$
2) $\frac{16\pi}{3}$
3) $\frac{32\pi}{3}$
4) $\frac{64\pi}{3}$

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

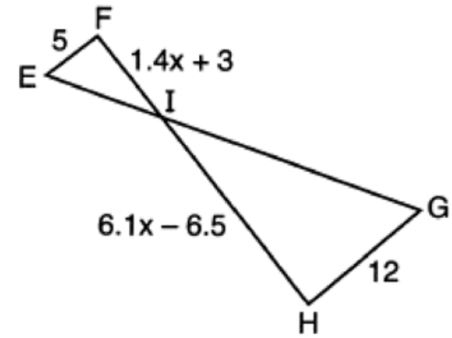
1) 

2) 

3) 

4) 

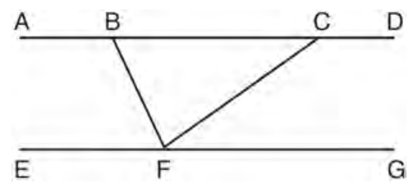
407 In the diagram below, $\overline{EF} \parallel \overline{HG}$, $EF = 5$, $HG = 12$, $FI = 1.4x + 3$, and $HI = 6.1x - 6.5$.



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

1) 1
2) 5
3) 10
4) 24

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



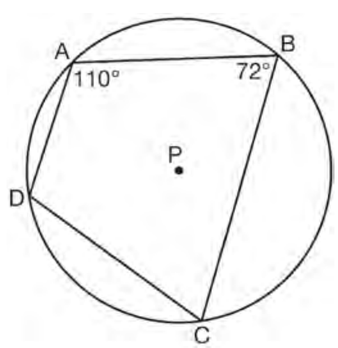
Which statement will allow Steve to prove $\overline{ABCD} \parallel \overline{EFG}$?

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

409 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

410 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

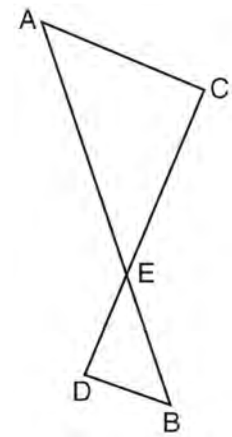
411 In the diagram below, quadrilateral *ABCD* is inscribed in circle *P*.



What is $m\angle ADC$?
1) 70°
2) 72°
3) 108°
4) 110°

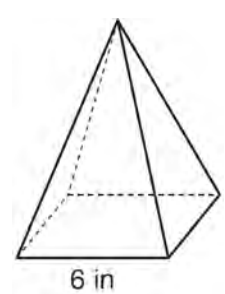
412 Molly wishes to make a lawn ornament in the form of a solid sphere. The clay being used to make the sphere weighs .075 pound per cubic inch. If the sphere's radius is 4 inches, what is the weight of the sphere, to the *nearest pound*?
1) 34
2) 20
3) 15
4) 4

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



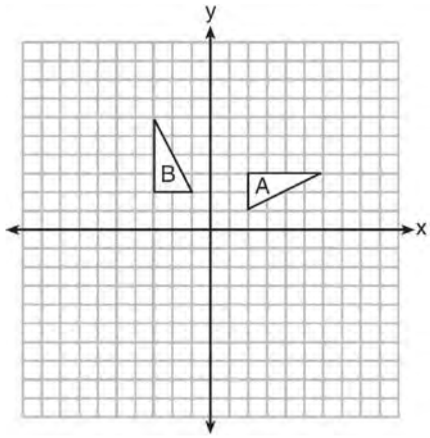
Given $\triangle AEC \sim \triangle BED$, which equation is true?
1) $\frac{CE}{DE} = \frac{EB}{EA}$
2) $\frac{AE}{BE} = \frac{AC}{BD}$
3) $\frac{EC}{AE} = \frac{BE}{ED}$
4) $\frac{ED}{EC} = \frac{AC}{BD}$

414 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

415 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

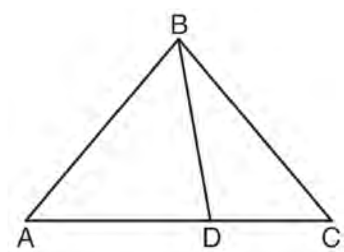
416 Which transformation would result in the perimeter of a triangle being different from the perimeter of its image?
1) $(x,y) \rightarrow (y,x)$
2) $(x,y) \rightarrow (x,-y)$
3) $(x,y) \rightarrow (4x,4y)$
4) $(x,y) \rightarrow (x+2,y-5)$

417 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) $3(m\angle C') = m\angle C$

418 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

419 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

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

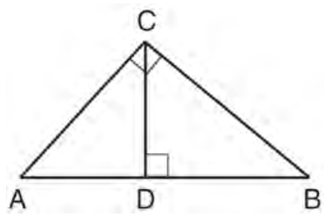


Which statement is true?
1) $\triangle ABD$ is obtuse.
2) $\triangle ABC$ is isosceles.
3) $m\angle ABD = 80°$
4) $\triangle ABD$ is scalene.

421 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

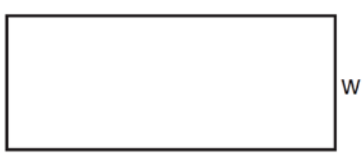
422 In the diagram below, $\overline{CD}$ is the altitude drawn to the hypotenuse $\overline{AB}$ of right triangle ABC.



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

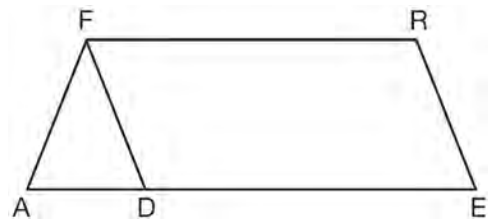
1) $AD = 2$ and $DB = 36$
2) $AD = 3$ and $AB = 24$
3) $AD = 6$ and $DB = 12$
4) $AD = 8$ and $AB = 17$

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



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

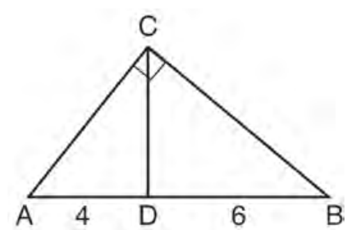
424 In the diagram of parallelogram $FRED$ shown below, $\overline{ED}$ is extended to A, and $\overline{AF}$ is drawn such that $\overline{AF} \cong \overline{DF}$.



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

1) 124°
2) 112°
3) 68°
4) 56°

425 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 $\overline{CD} \perp \overline{AB}$?

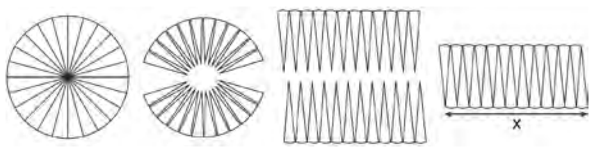
1) $2\sqrt{6}$
2) $2\sqrt{10}$
3) $2\sqrt{15}$
4) $4\sqrt{2}$

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

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

427 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

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

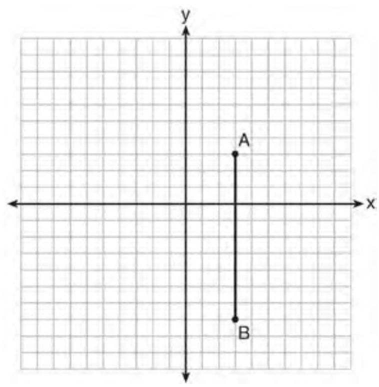


To the *nearest integer*, the value of x is
1) 31
2) 16
3) 12
4) 10

429 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

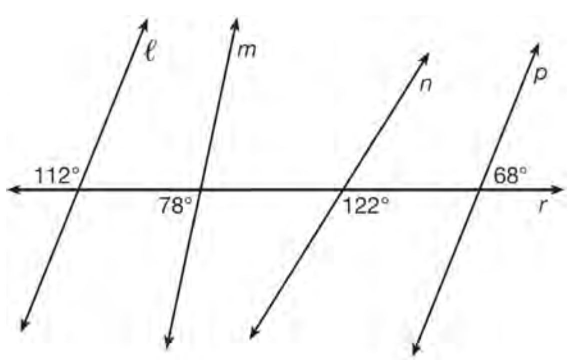
430 A designer needs to create perfectly circular necklaces. The necklaces each need to have a radius of 10 cm. What is the largest number of necklaces that can be made from 1000 cm of wire?
1) 15
2) 16
3) 31
4) 32

431 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.



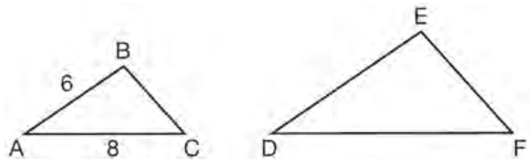
What could be a correct equation for circle O?
1) $(x-1)^2+(y+2)^2=29$
2) $(x+5)^2+(y-2)^2=29$
3) $(x-1)^2+(y-2)^2=25$
4) $(x-5)^2+(y+2)^2=25$

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



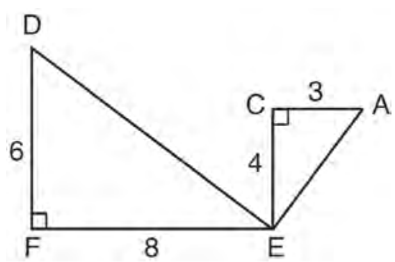
Which statement is true?
1) $\ell \parallel n$
2) $\ell \parallel p$
3) $m \parallel p$
4) $m \parallel n$

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



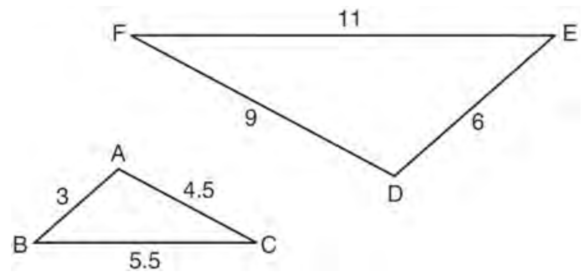
If $AB = 6$ and $AC = 8$, which statement will justify similarity by SAS?
1) $DE = 9$, $DF = 12$, and $\angle A \cong \angle D$
2) $DE = 8$, $DF = 10$, and $\angle A \cong \angle D$
3) $DE = 36$, $DF = 64$, and $\angle C \cong \angle F$
4) $DE = 15$, $DF = 20$, and $\angle C \cong \angle F$

434 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

435 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) $\dfrac{m\angle B}{m\angle E} = \dfrac{m\angle C}{m\angle F}$

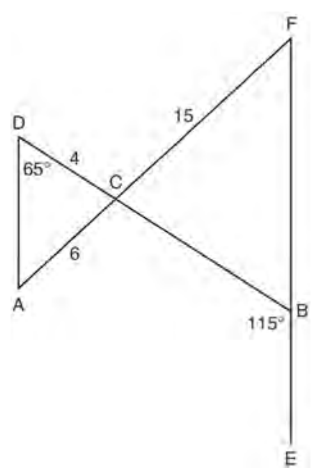
436 An equation of a line perpendicular to the line represented by the equation $y = -\frac{1}{2}x - 5$ and passing through $(6,-4)$ is
1) $y = -\frac{1}{2}x + 4$
2) $y = -\frac{1}{2}x - 1$
3) $y = 2x + 14$
4) $y = 2x - 16$

437 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

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

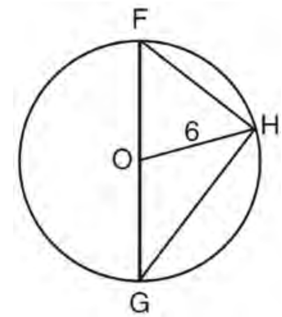
439 A sandbox in the shape of a rectangular prism has a length of 43 inches and a width of 30 inches. Jack uses bags of sand to fill the sandbox to a depth of 9 inches. Each bag of sand has a volume of 0.5 cubic foot. What is the minimum number of bags of sand that must be purchased to fill the sandbox?
1) 14
2) 13
3) 7
4) 4

440 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

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

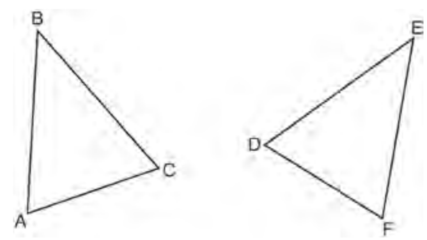


What is the area of the sector formed by angle FOH?
1) 2π
2) $\frac{3}{2}\pi$
3) 6π
4) 24π

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

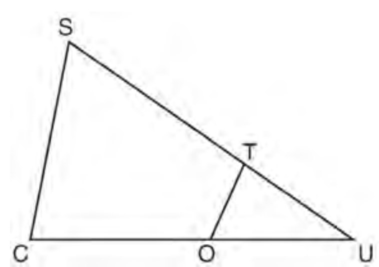
443 The diameter of a basketball is approximately 9.5 inches and the diameter of a tennis ball is approximately 2.5 inches. The volume of the basketball is about how many times greater than the volume of the tennis ball?
1) 3591
2) 65
3) 55
4) 4

444 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 $\angle E$.

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



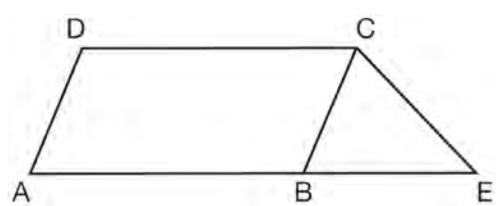
If $TU = 4$, $OU = 5$, and $OC = 7$, what is the length of $\overline{ST}$?
1) 5.6
2) 8.75
3) 11
4) 15

446 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

447 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

448 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) $(1,-1)$

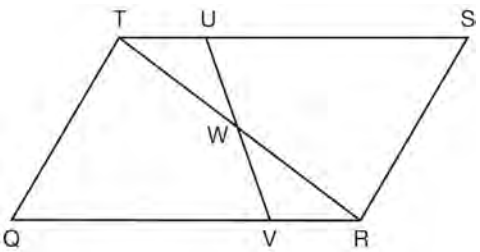
449 In the diagram below, $ABCD$ is a parallelogram, $\overline{AB}$ is extended through B to E, and $\overline{CE}$ is drawn.



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

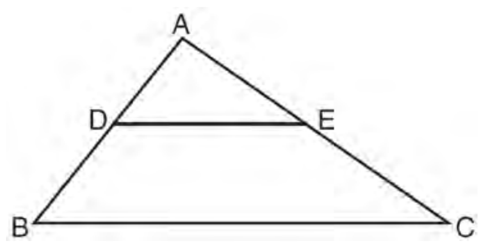
450 What are the coordinates of the center and the length of the radius of the circle represented by the equation $x^2 + y^2 - 4x + 8y + 11 = 0$?
1) center $(2,-4)$ and radius 3
2) center $(-2,4)$ and radius 3
3) center $(2,-4)$ and radius 9
4) center $(-2,4)$ and radius 9

451 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*.



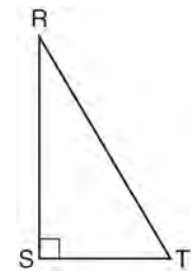
If $m\angle S = 60°$, $m\angle SRT = 83°$, and $m\angle TWU = 35°$, what is $m\angle WVQ$?
1) 37º
2) 60º
3) 72º
4) 83º

452 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 $AC = 15$

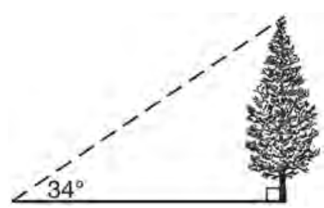
453 Which object is formed when right triangle *RST* shown below is rotated around leg $\overline{RS}$?



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

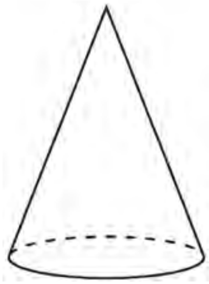
454 Quadrilateral *ABCD* has diagonals $\overline{AC}$ and $\overline{BD}$. Which information is *not* sufficient to prove *ABCD* is a parallelogram?
1) $\overline{AC}$ and $\overline{BD}$ bisect each other.
2) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{AD}$
3) $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{CD}$
4) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$

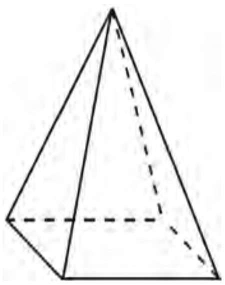
455 As shown in the diagram below, the angle of elevation from a point on the ground to the top of the tree is 34°.

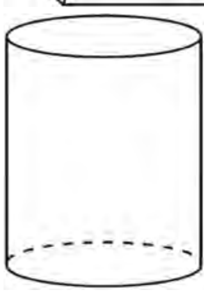


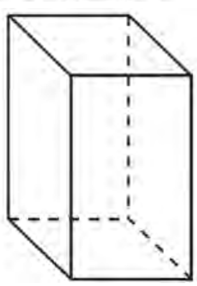
If the point is 20 feet from the base of the tree, what is the height of the tree, to the *nearest tenth of a foot*?
1) 29.7
2) 16.6
3) 13.5
4) 11.2

456 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) 

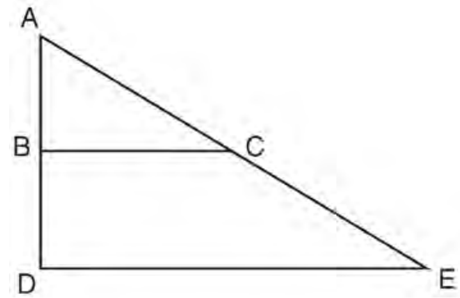
3) 

4) 

457 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) $3x - 2y = 5$

458 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) $\overline{BC} \parallel \overline{DE}$

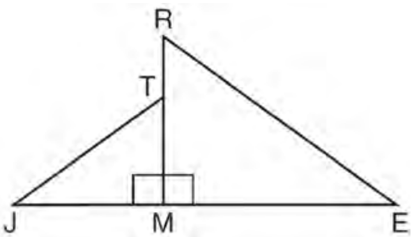
459 Point P is on the directed line segment from point $X(-6,-2)$ to point $Y(6,7)$ and divides the segment in the ratio $1:5$. What are the coordinates of point P?

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

460 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) $(6,3)$

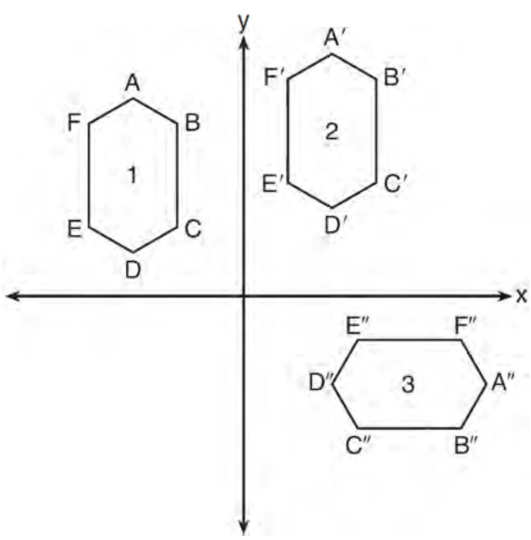
461 In the diagram below, $\triangle ERM \sim \triangle JTM$.



Which statement is always true?

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

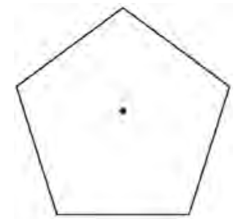
462 In the diagram below, congruent figures 1, 2, and 3 are drawn.



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

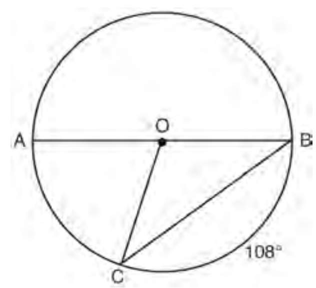
463 A regular pentagon is shown in the diagram below.



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

464 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 $\dfrac{3}{10} \cdot \pi \cdot (BC)^2$

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

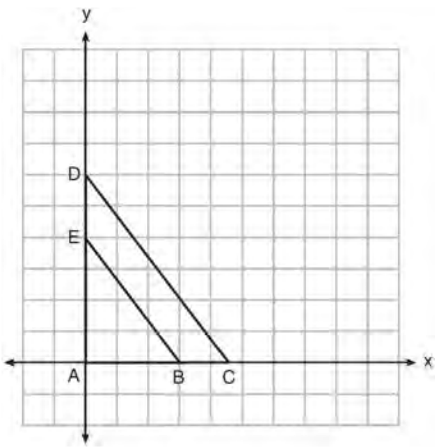
Carl $\dfrac{3}{10} \cdot \pi \cdot (\dfrac{1}{2} AB)^2$

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

Which students wrote correct formulas?

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

465 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 $E(0,4)$.



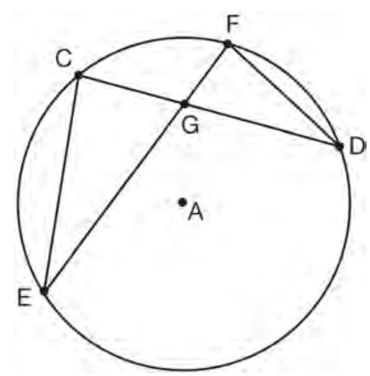
The ratio of the lengths of $\overline{BE}$ to $\overline{CD}$ is
1) $\frac{2}{3}$
2) $\frac{3}{2}$
3) $\frac{3}{4}$
4) $\frac{4}{3}$

466 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

467 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 $\angle DCB$

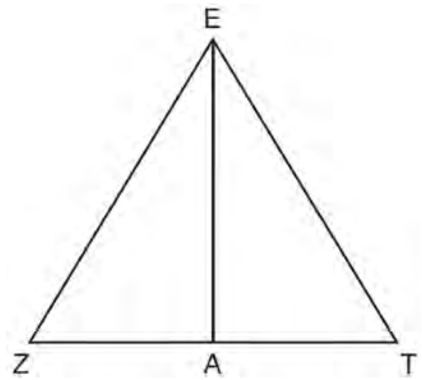
468 Line $y = 3x - 1$ is transformed by a dilation with a scale factor of 2 and centered at $(3,8)$. The line's image is
1) $y = 3x - 8$
2) $y = 3x - 4$
3) $y = 3x - 2$
4) $y = 3x - 1$

469 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.



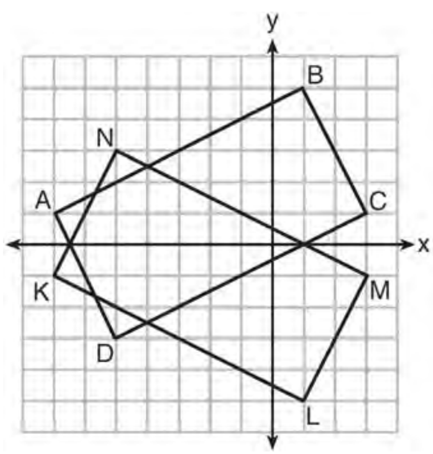
Which statement is *not* always true?
1) $\overline{CG} \cong \overline{FG}$
2) $\angle CEG \cong \angle FDG$
3) $\frac{CE}{EG} = \frac{FD}{DG}$
4) $\triangle CEG \sim \triangle FDG$

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



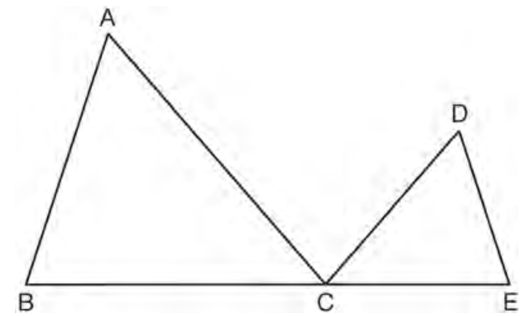
Which conclusion can *not* be proven?
1) $\overline{EA}$ bisects angle ZET.
2) Triangle EZT is equilateral.
3) $\overline{EA}$ is a median of triangle EZT.
4) Angle Z is congruent to angle T.

471 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

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



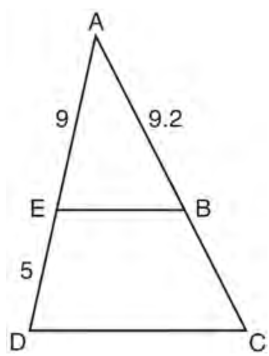
If $AC = 12$, $DC = 7$, $DE = 5$, and the perimeter of $\triangle ABC$ is 30, what is the perimeter of $\triangle DEC$?
1) 12.5
2) 14.0
3) 14.8
4) 17.5

473 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

474 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) $y = 3x - 6$

475 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

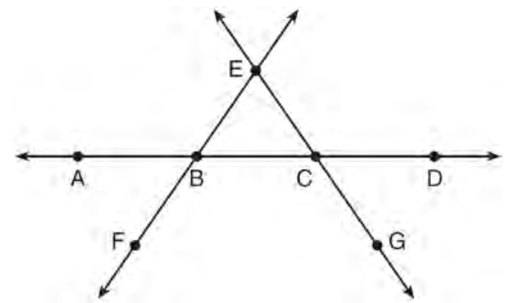
476 In the diagram of $\triangle ADC$ below, $\overline{EB} \parallel \overline{DC}$, $AE = 9$, $ED = 5$, and $AB = 9.2$.



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

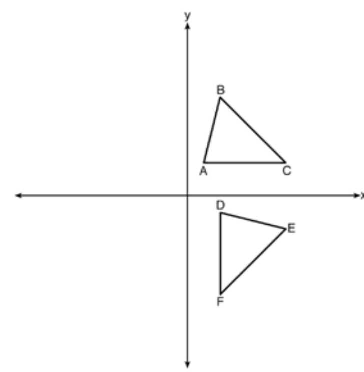
477 The vertices of $\triangle JKL$ have coordinates $J(5,1)$, $K(-2,-3)$, and $L(-4,1)$. Under which transformation is the image $\triangle J'K'L'$ *not* congruent to $\triangle JKL$?
1) a translation of two units to the right and two units down
2) a counterclockwise rotation of 180 degrees around the origin
3) a reflection over the x-axis
4) a dilation with a scale factor of 2 and centered at the origin

478 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.

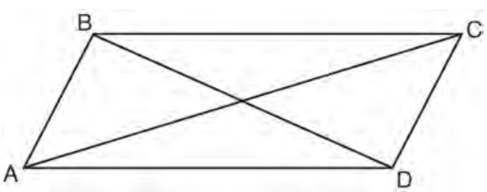
479 The image of $\triangle ABC$ after a rotation of 90º clockwise about the origin is $\triangle DEF$, as shown below.



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

480 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

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

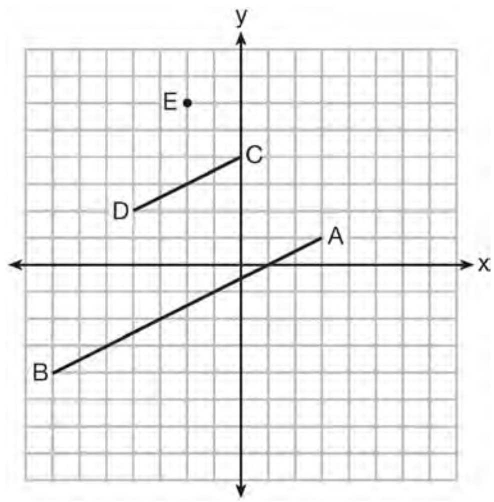


Which information is *not* enough to prove $ABCD$ is a parallelogram?
1) $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{DC}$
2) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$
3) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$
4) $\overline{AB} \parallel \overline{DC}$ and $\overline{BC} \parallel \overline{AD}$

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

483 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

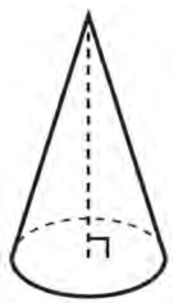
484 In the diagram below, $\overline{CD}$ is the image of $\overline{AB}$ after a dilation of scale factor k with center E.



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) $\frac{EA}{EC}$

485 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

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



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

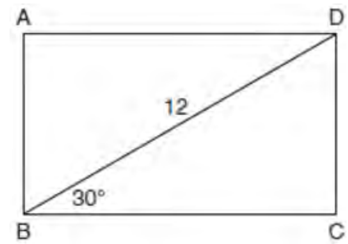
1) 

2) 

3) 

4) 

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

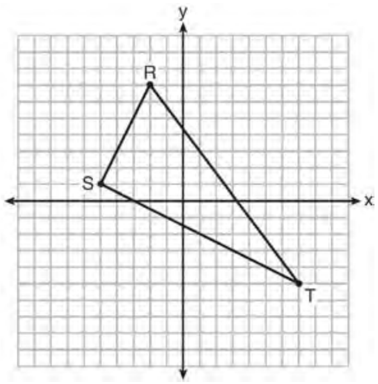


What is the perimeter of rectangle $ABCD$, to the *nearest tenth*?
1) 28.4
2) 32.8
3) 48.0
4) 62.4

488 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

489 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) $y = 2x + 6$

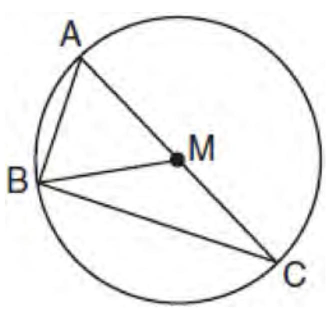
490 Triangle RST is graphed on the set of axes below.



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

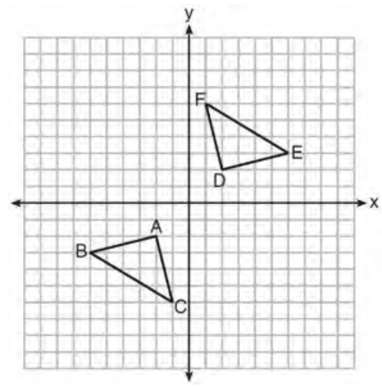
491 In circle M below, diameter $\overline{AC}$, chords $\overline{AB}$ and $\overline{BC}$, and radius $\overline{MB}$ are drawn.



Which statement is *not* true?

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

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



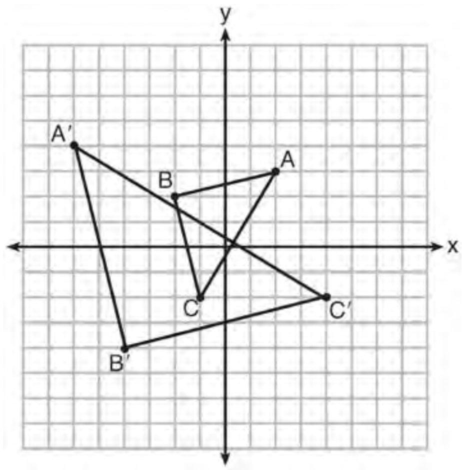
Which sequence of transformations maps triangle ABC onto triangle DEF?

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

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

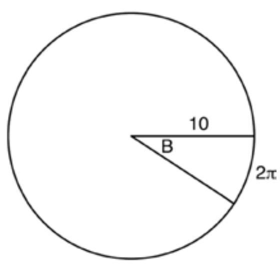
1) $y-3=-\frac{3}{2}(x-1)$
2) $y-3=\frac{2}{3}(x-1)$
3) $y+3=-\frac{3}{2}(x+1)$
4) $y+3=\frac{2}{3}(x+1)$

494 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

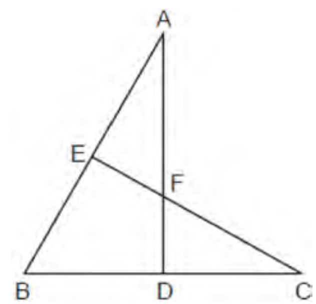
495 In the diagram below, the circle shown has radius 10. Angle B intercepts an arc with a length of 2π.



What is the measure of angle B, in radians?
1) $10 + 2\pi$
2) 20π
3) $\frac{\pi}{5}$
4) $\frac{5}{\pi}$

496 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) $y = 2x + 1$

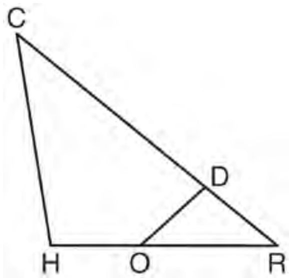
497 In the diagram of triangles ABD and CBE below, sides $\overline{AD}$ and $\overline{CE}$ intersect at F, and $\angle ADB \cong \angle CEB$.



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) $\triangle EAF \sim \triangle DCF$

498 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

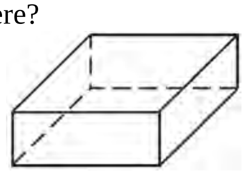
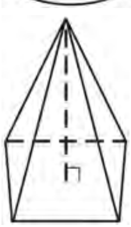
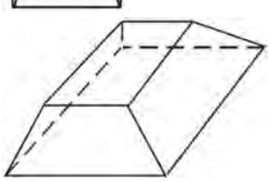
499 In triangle CHR, O is on $\overline{HR}$, and D is on $\overline{CR}$ so that $\angle H \cong \angle RDO$.



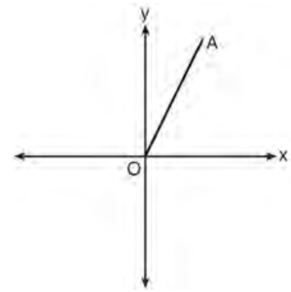
If $RD = 4$, $RO = 6$, and $OH = 4$, what is the length of $\overline{CD}$?

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

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

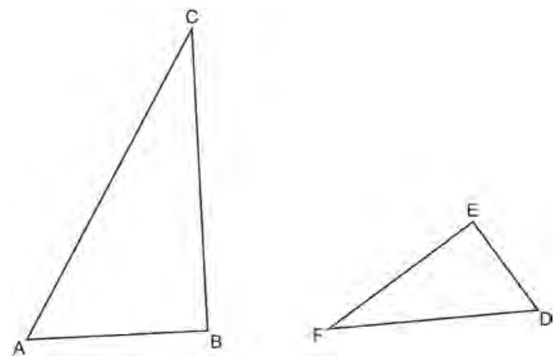
1) 
2) 
3) 
4) 

501 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

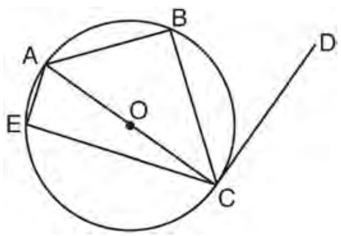
502 Triangles ABC and DEF are drawn below.



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

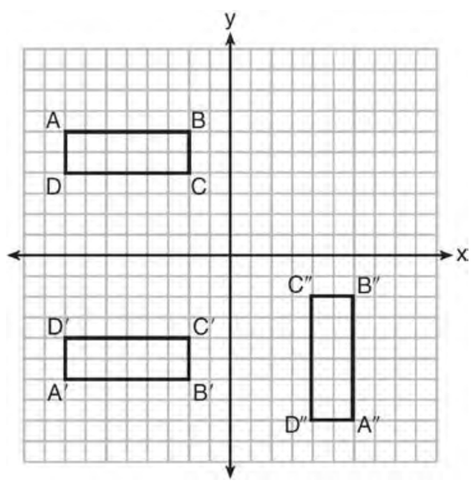
1) $\angle CAB \cong \angle DEF$
2) $\frac{AB}{CB} = \frac{FE}{DE}$
3) $\triangle ABC \sim \triangle DEF$
4) $\frac{AB}{DE} = \frac{FE}{CB}$

503 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) $\angle CBA \cong \angle AEC$

504 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

505 Linda is designing a circular piece of stained glass with a diameter of 7 inches. She is going to sketch a square inside the circular region. To the *nearest tenth of an inch*, the largest possible length of a side of the square is
1) 3.5
2) 4.9
3) 5.0
4) 6.9

506 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

507 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

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

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

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

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

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

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

In which step did he make an error in his work?
1) Step 1
2) Step 2
3) Step 3
4) Step 4

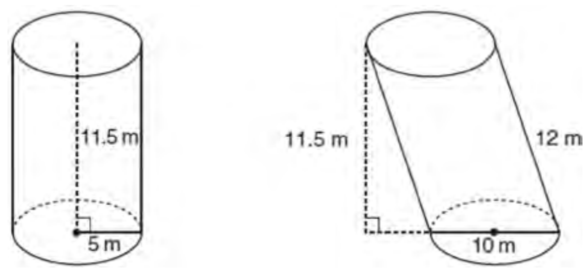
509 The diagonals of rhombus *TEAM* intersect at $P(2,1)$. If the equation of the line that contains diagonal $\overline{TA}$ is $y=-x+3$, what is the equation of a line that contains diagonal *EM*?
1) $y=x-1$
2) $y=x-3$
3) $y=-x-1$
4) $y=-x-3$

510 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) $25\sqrt{2}$

511 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.

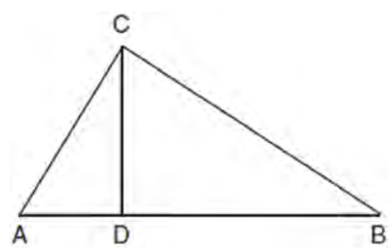
Geometry 2 Point Regents Exam Questions

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

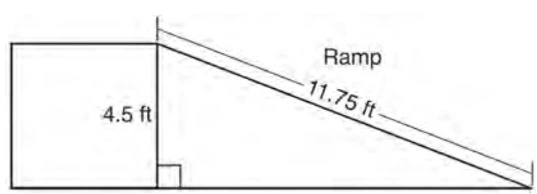


Is Sue correct? Explain why.

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

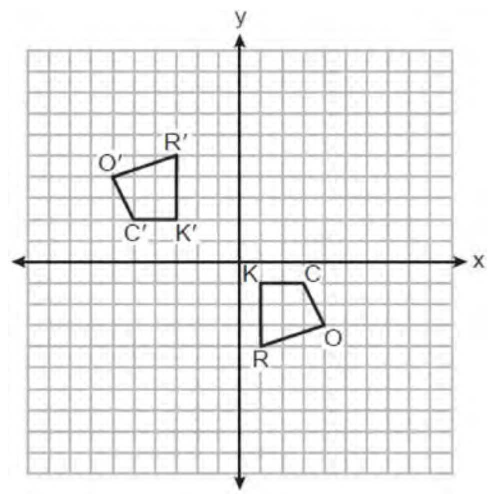


514 The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.



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

515 On the set of axes below, congruent quadrilaterals *ROCK* and *R'O'C'K'* are graphed.



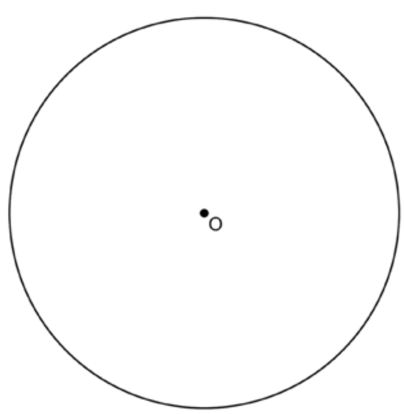
Describe a sequence of transformations that would map quadrilateral *ROCK* onto quadrilateral *R'O'C'K'*.

516 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.]

517 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.

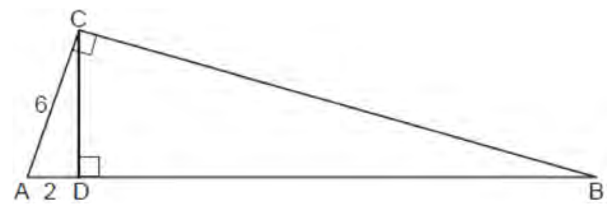
518 Given $\overline{MT}$ below, use a compass and straightedge to construct a 45° angle whose vertex is at point M. [Leave all construction marks.]

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



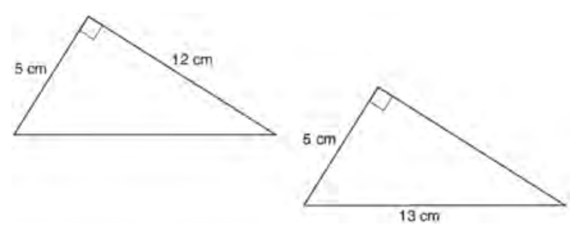
520 Triangle $A'B'C'$ is the image of triangle ABC after a translation of 2 units to the right and 3 units up. Is triangle ABC congruent to triangle $A'B'C'$? Explain why.

521 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 $\overline{AB}$.

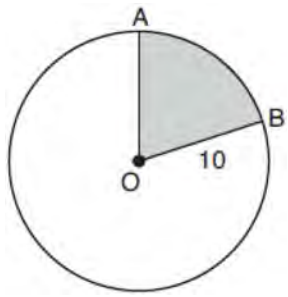
522 Skye says that the two triangles below are congruent. Margaret says that the two triangles are similar.



Are Skye and Margaret both correct? Explain why.

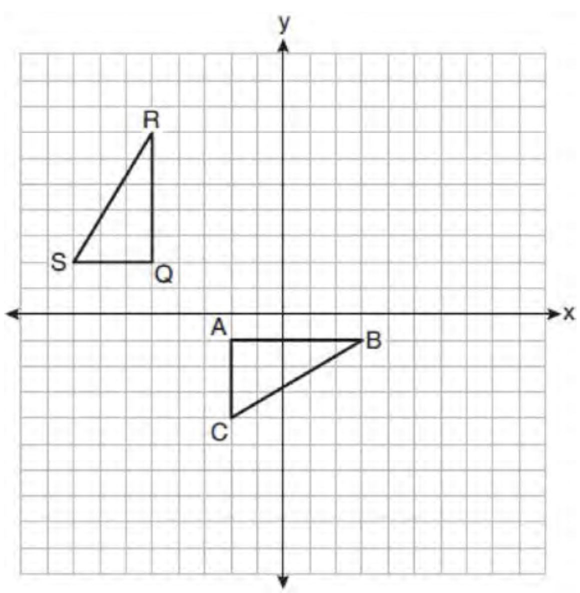
523 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in^3. After being fully inflated, its volume is approximately 294 in^3. To the *nearest tenth of an inch*, how much does the radius increase when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

524 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.

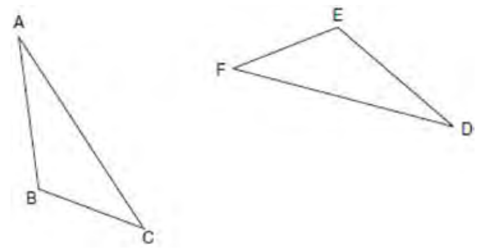
525 On the set of axes below, $\triangle ABC$ is graphed with coordinates $A(-2,-1)$, $B(3,-1)$, and $C(-2,-4)$. Triangle QRS, the image of $\triangle ABC$, is graphed with coordinates $Q(-5,2)$, $R(-5,7)$, and $S(-8,2)$.



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

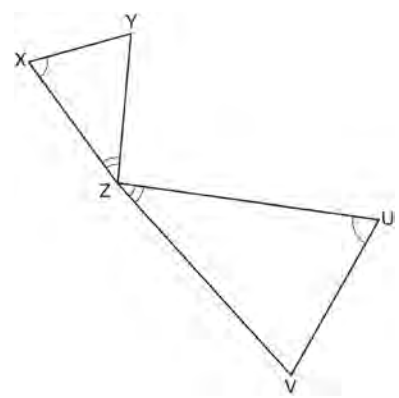
526 After a reflection over a line, $\triangle A'B'C'$ is the image of $\triangle ABC$. Explain why triangle ABC is congruent to triangle $\triangle A'B'C'$.

527 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.

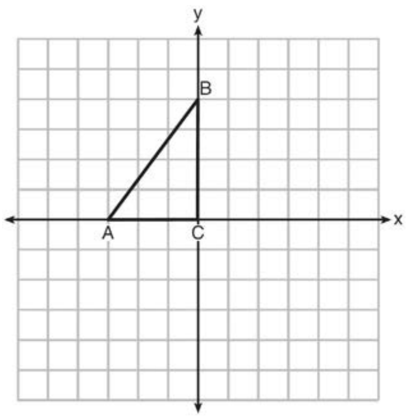
528 In the diagram below, triangles XYZ and UVZ are drawn such that $\angle X \cong \angle U$ and $\angle XZY \cong \angle UZV$.



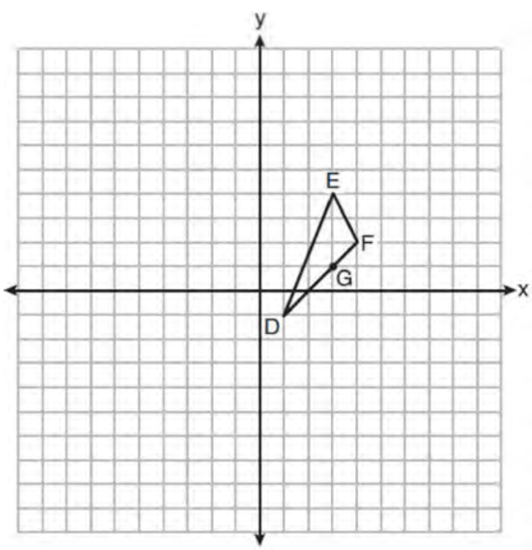
Describe a sequence of similarity transformations that shows $\triangle XYZ$ is similar to $\triangle UVZ$.

529 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.

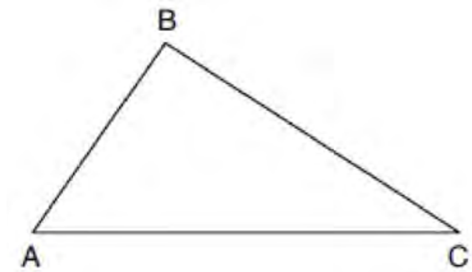
530 Triangle ABC is graphed on the set of axes below. Graph and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a reflection over the line $x = 1$.



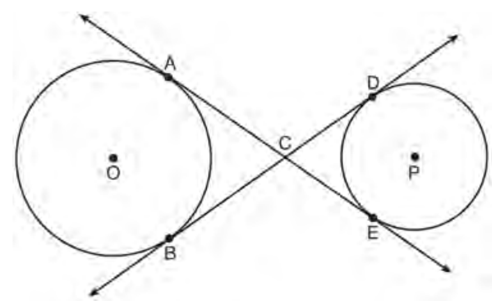
531 On the set of axes below, $\triangle DEF$ has vertices at the coordinates $D(1,-1)$, $E(3,4)$, and $F(4,2)$, and point G has coordinates $(3,1)$. Owen claims the median from point E must pass through point G. Is Owen correct? Explain why.



532 Using a compass and straightedge, dilate triangle ABC by a scale factor of 2 centered at C. [Leave all construction marks.]

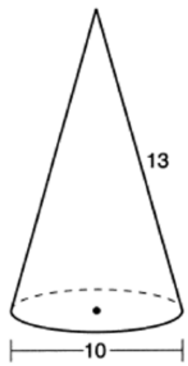


533 Lines AE and BD are tangent to circles O and P at A, E, B, and D, as shown in the diagram below. If $AC:CE = 5:3$, and $BD = 56$, determine and state the length of $\overline{CD}$.



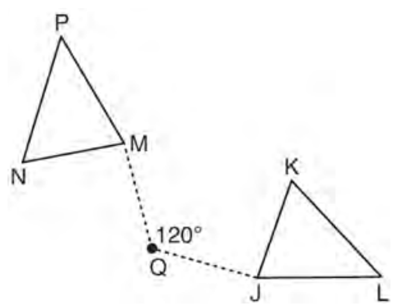
534 A man is spray-painting the tops of 10 patio tables. Five tables have round tops, with diameters of 4 feet, and five tables have rectangular tops, with dimensions of 4 feet by 6 feet. A can of spray paint covers 25 square feet. How many cans of spray paint must be purchased to paint all of the tabletops?

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



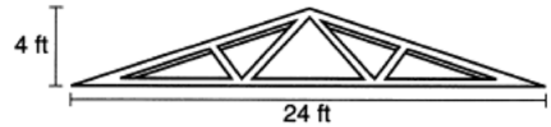
Determine and state the volume of the cone, in terms of π.

536 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.



537 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.

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

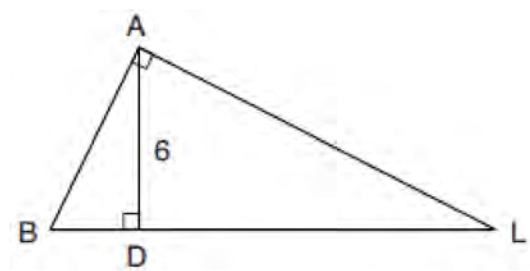


Determine and state, to the *nearest degree*, the angle of elevation of the roof frame.

539 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*.

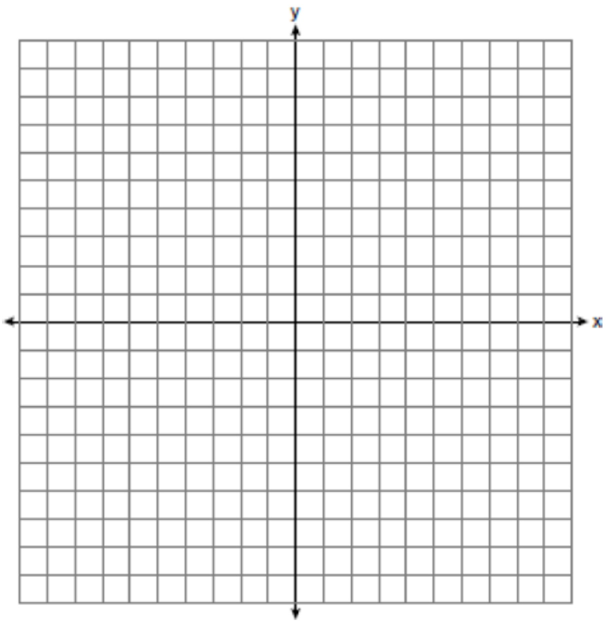
540 The volume of a triangular prism is 70 in^3. The base of the prism is a right triangle with one leg whose measure is 5 inches. If the height of the prism is 4 inches, determine and state the length, in inches, of the other leg of the triangle.

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

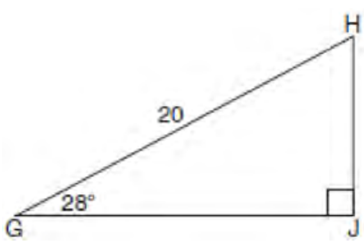


If the length of $\overline{DL}$ is four times the length of $\overline{BD}$, determine and state the length of $\overline{BD}$.

542 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.]

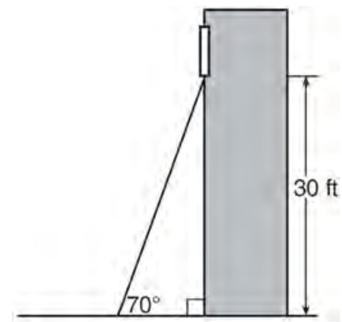


543 When instructed to find the length of $\overline{HJ}$ in right triangle HJG, Alex wrote the equation $\sin 28° = \frac{HJ}{20}$ while Marlene wrote $\cos 62° = \frac{HJ}{20}$. Are both students' equations correct? Explain why.

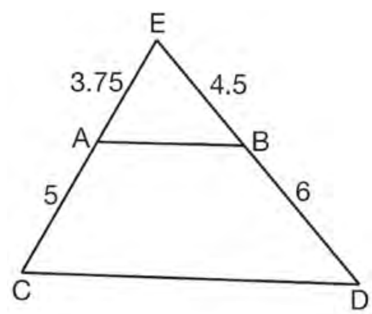


544 The endpoints of $\overline{DEF}$ are $D(1,4)$ and $F(16,14)$. Determine and state the coordinates of point E, if $DE:EF = 2:3$.

545 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.



546 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 $BD = 6$.



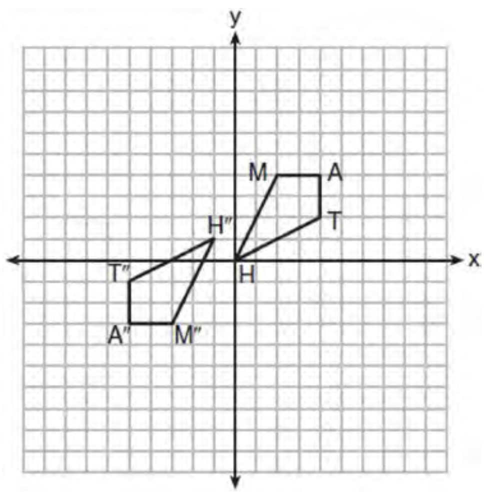
Explain why $\overline{AB}$ is parallel to $\overline{CD}$.

547 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.

548 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

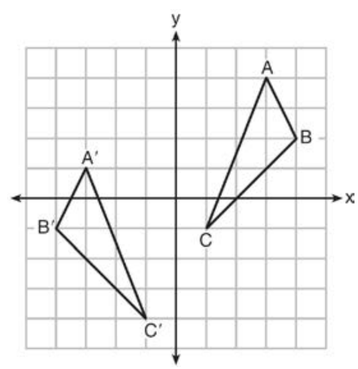
549 Quadrilateral *MATH* and its image $M''A''T''H''$ are graphed on the set of axes below.



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

550 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*.

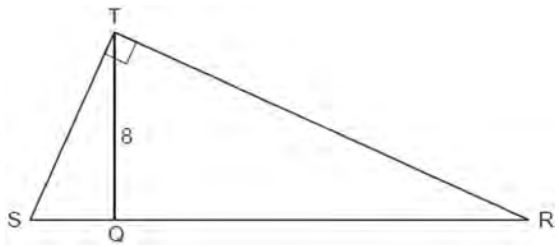
551 As graphed on the set of axes below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a sequence of transformations.



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

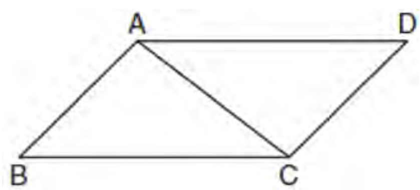
552 A flagpole casts a shadow 16.60 meters long. Tim stands at a distance of 12.45 meters from the base of the flagpole, such that the end of Tim's shadow meets the end of the flagpole's shadow. If Tim is 1.65 meters tall, determine and state the height of the flagpole to the *nearest tenth of a meter*.

553 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 $\overline{SR}$.

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

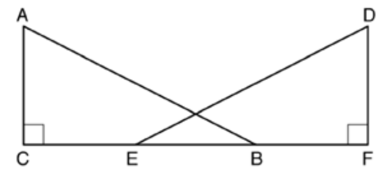


Prove: $\triangle ABC \cong \triangle CDA$

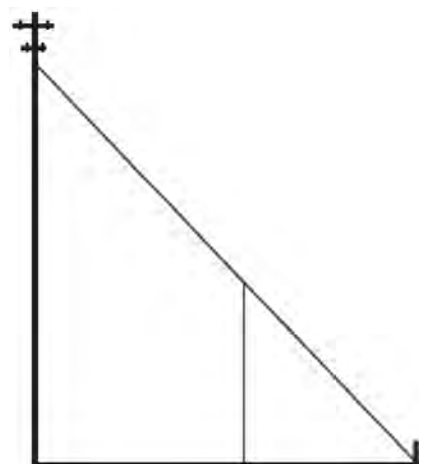
555 A support wire reaches from the top of a pole to a clamp on the ground. The pole is perpendicular to the level ground and the clamp is 10 feet from the base of the pole. The support wire makes a 68° angle with the ground. Find the length of the support wire to the *nearest foot*.

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

557 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 $\triangle ABC \cong \triangle DEF$.

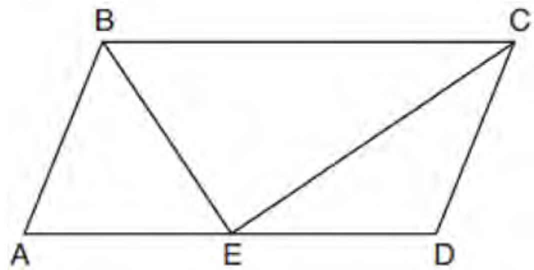


558 In the model below, a support wire for a telephone pole is attached to the pole and anchored to a stake in the ground 15 feet from the base of the telephone pole. Jamal places a 6-foot wooden pole under the support wire parallel to the telephone pole, such that one end of the pole is on the ground 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.



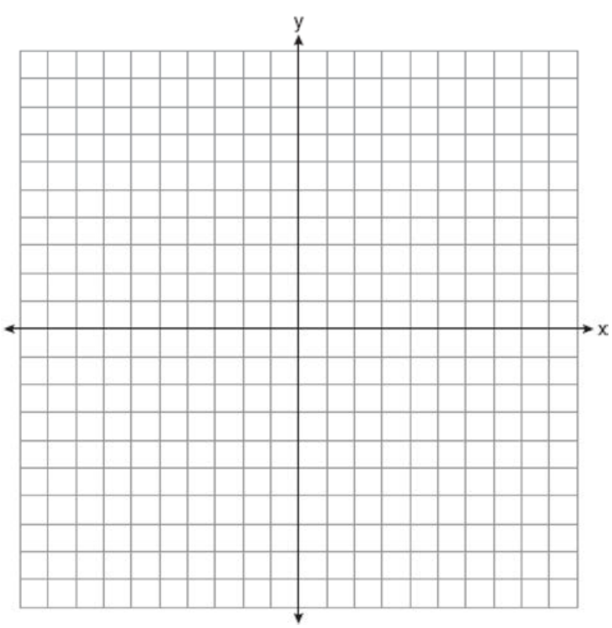
Jamal says he can approximate how high the support wire attaches to the telephone pole by using similar triangles. Explain why the triangles are similar.

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

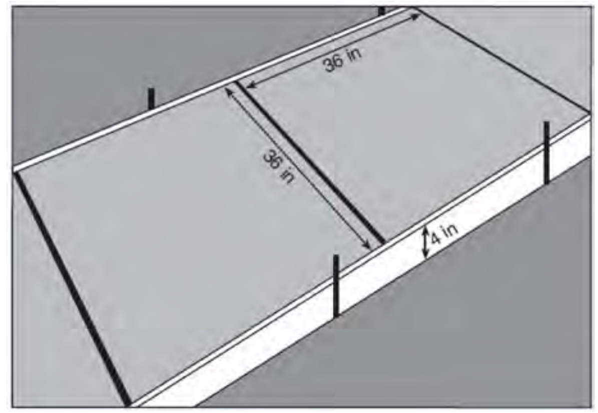


If $m\angle A = 68°$, determine and state $m\angle BEC$.

560 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.

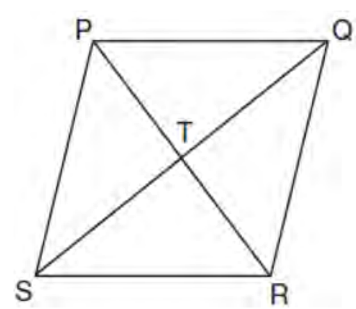


561 Ian needs to replace two concrete sections in his sidewalk, as modeled below. Each section is 36 inches by 36 inches and 4 inches deep. He can mix his own concrete for $3.25 per cubic foot.



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

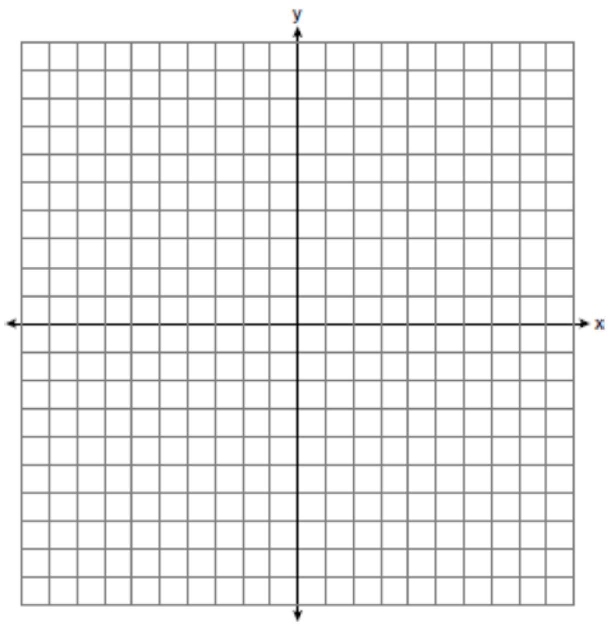
562 In the diagram of rhombus $PQRS$ below, the diagonals $\overline{PR}$ and $\overline{QS}$ intersect at point T, $PR = 16$, and $QS = 30$. Determine and state the perimeter of $PQRS$.



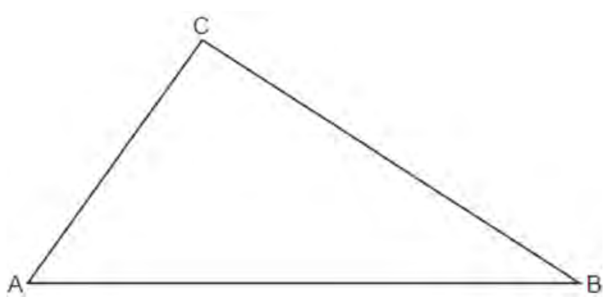
563 A machinist creates a solid steel part for a wind turbine engine. The part has a volume of 1015 cubic centimeters. Steel can be purchased for $0.29 per kilogram, and has a density of 7.95 g/cm^3. If the machinist makes 500 of these parts, what is the cost of the steel, to the *nearest dollar*?

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

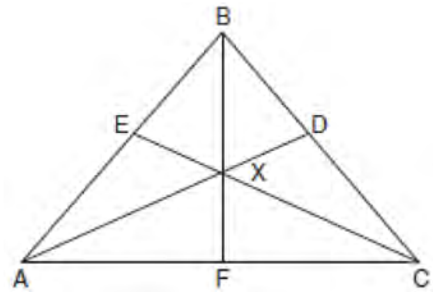
565 Directed line segment PT has endpoints whose coordinates are $P(-2,1)$ and $T(4,7)$. Determine the coordinates of point J that divides the segment in the ratio 2 to 1. [The use of the set of axes below is optional.]



566 In $\triangle ABC$ below, use a compass and straightedge to construct the altitude from C to $\overline{AB}$. [Leave all construction marks.]

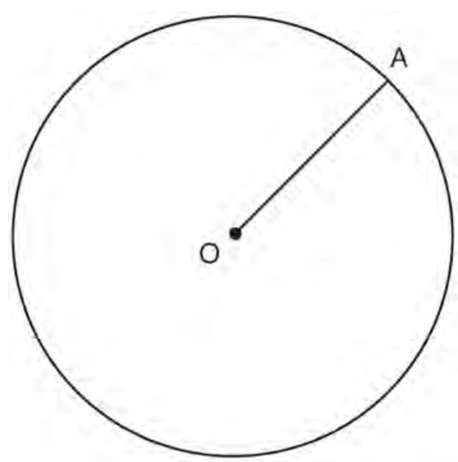


567 In the diagram below of isosceles triangle ABC, $\overline{AB} \cong \overline{CB}$ and angle bisectors $\overline{AD}$, $\overline{BF}$, and $\overline{CE}$ are drawn and intersect at X.



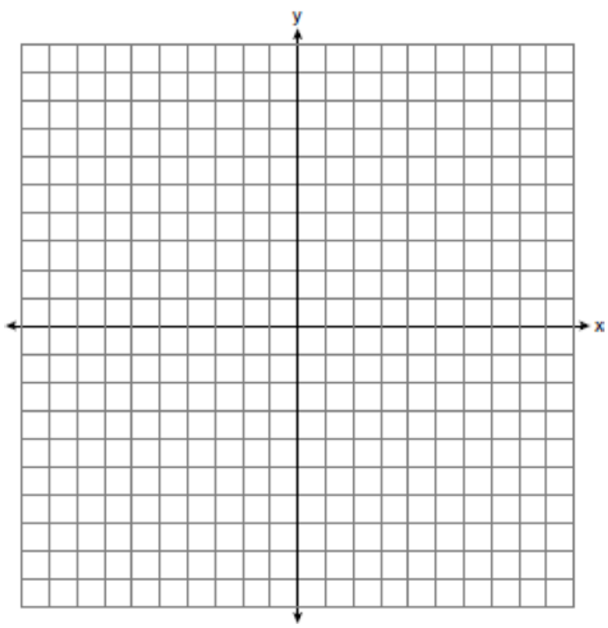
If $m\angle BAC = 50°$, find $m\angle AXC$.

568 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.]

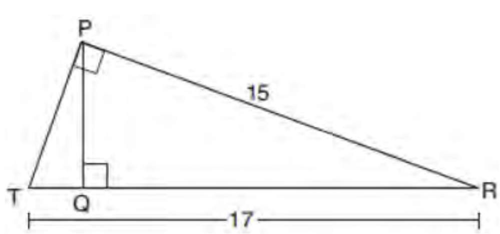


569 A flagpole casts a shadow on the ground 91 feet long, with a 53° angle of elevation from the end of the shadow to the top of the flagpole. Determine and state, to the *nearest tenth of a foot*, the height of the flagpole.

570 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.]

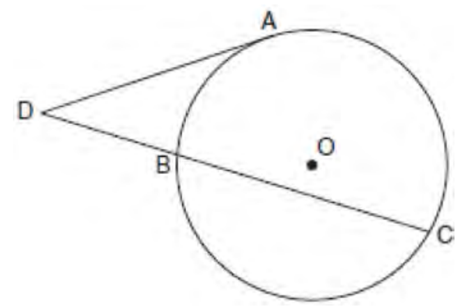


571 In right triangle PRT, $m\angle P = 90°$, altitude $\overline{PQ}$ is drawn to hypotenuse $\overline{RT}$, $RT = 17$, and $PR = 15$.



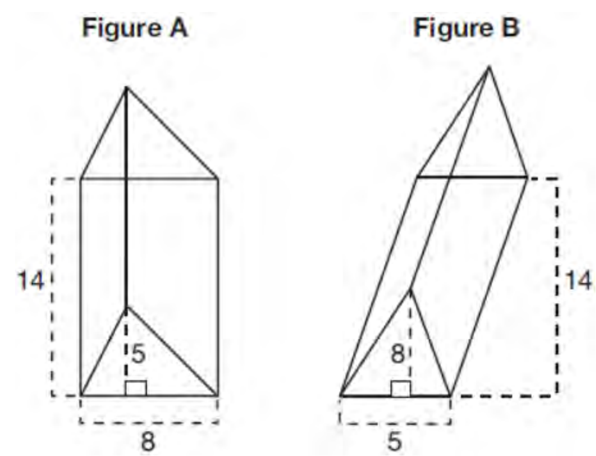
Determine and state, to the *nearest tenth*, the length of $\overline{RQ}$.

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



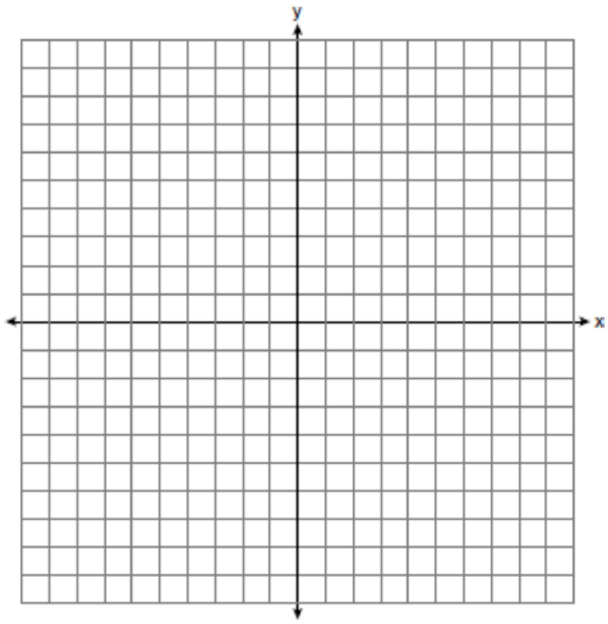
If $m\overparen{BC} = 152°$, determine and state $m\angle D$.

573 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.

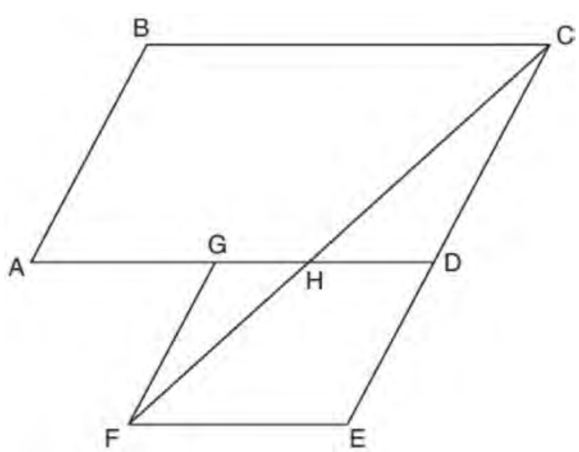


Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

574 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.]

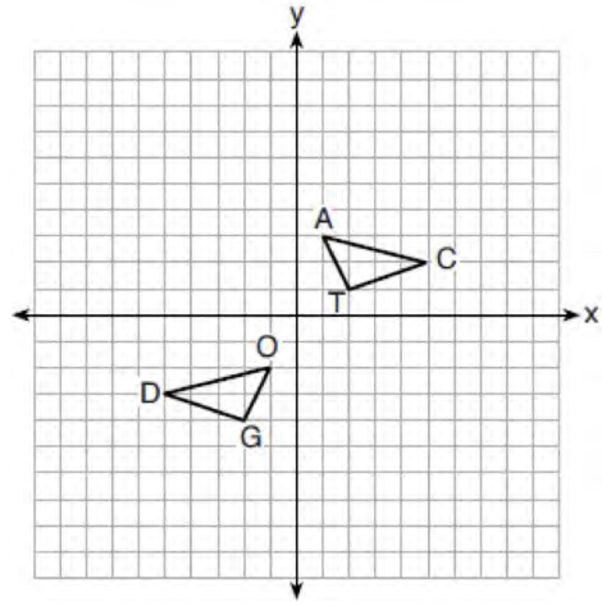


575 Parallelogram $ABCD$ is adjacent to rhombus $DEFG$, as shown below, and $\overline{FC}$ intersects $\overline{AGD}$ at H.



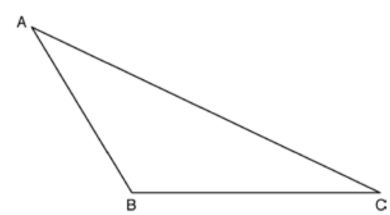
If $m\angle B = 118°$ and $m\angle AHC = 138°$, determine and state $m\angle GFH$.

576 On the set of axes below, $\triangle DOG \cong \triangle CAT$.

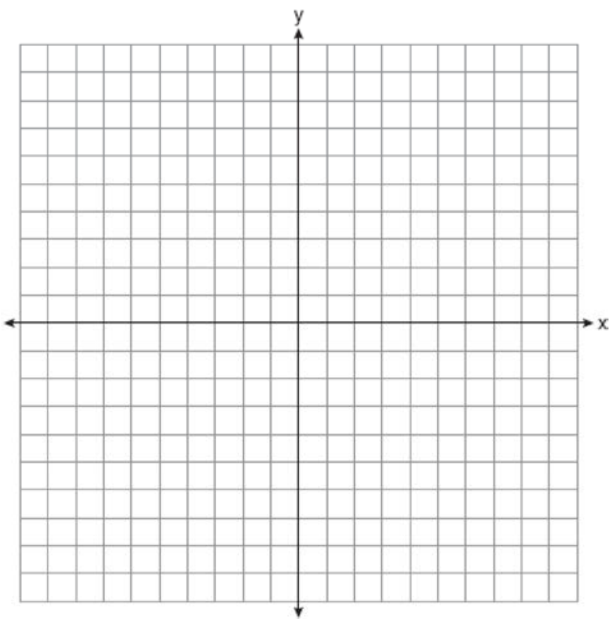


Describe a sequence of transformations that maps $\triangle DOG$ onto $\triangle CAT$.

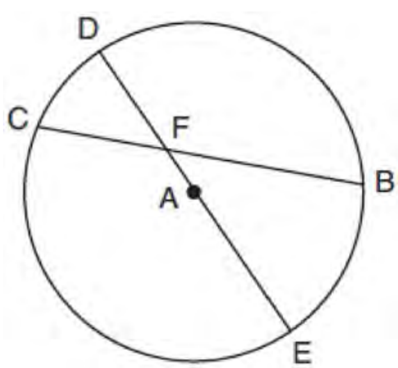
577 Using a compass and straightedge, construct an altitude of triangle ABC below. [Leave all construction marks.]



578 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.]

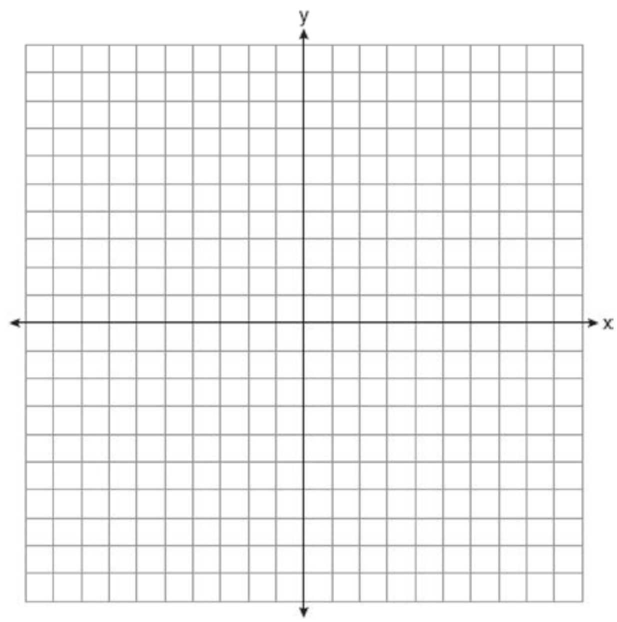


579 In circle A below, chord $\overline{BC}$ and diameter $\overline{DAE}$ intersect at F.

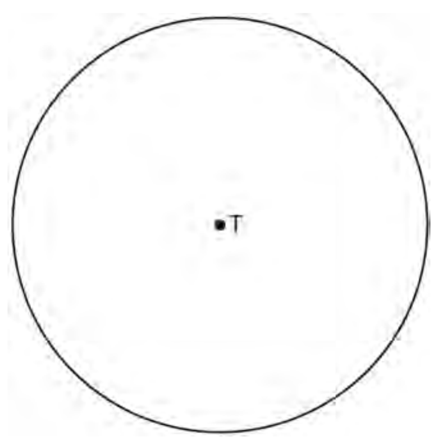


If $m\overset{\frown}{CD} = 46°$ and $m\overset{\frown}{DB} = 102°$, what is $m\angle CFE$?

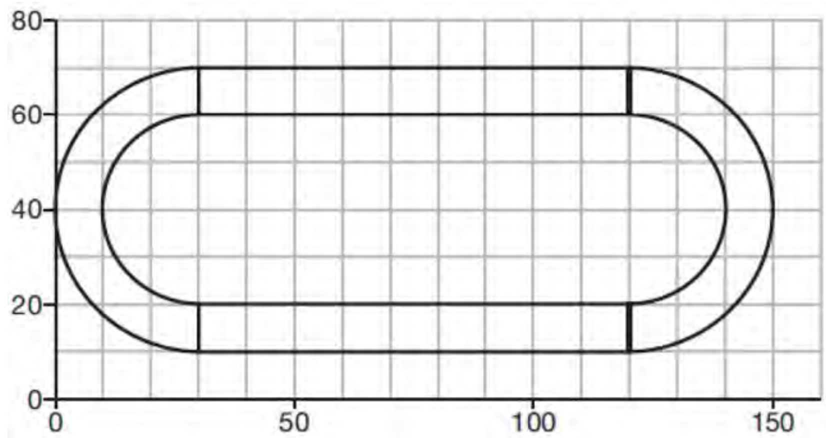
580 Aliyah says that when the line $4x + 3y = 24$ is dilated by a scale factor of 2 centered at the point $(3,4)$, the equation of the dilated line is $y = -\frac{4}{3}x + 16$. Is Aliyah correct? Explain why. [The use of the set of axes below is optional.]



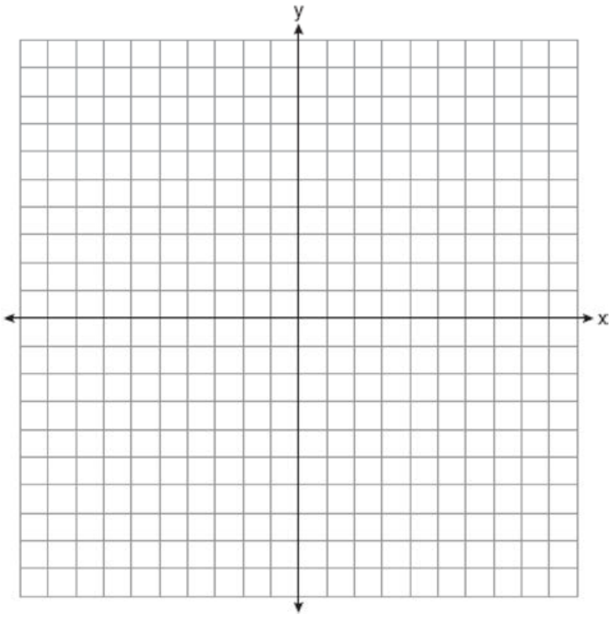
581 Use a compass and straightedge to construct an inscribed square in circle T shown below. [Leave all construction marks.]



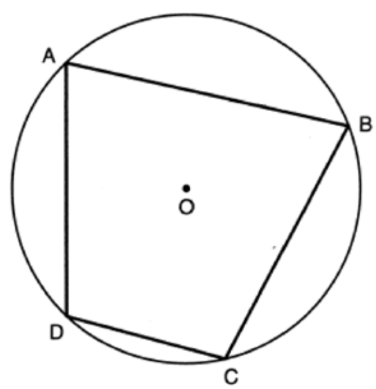
582 A walking path at a local park is modeled on the grid below, where the length of each grid square is 10 feet. The town needs to submit paperwork to pave the walking path. Determine and state, to the *nearest square foot*, the area of the walking path.



583 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.]



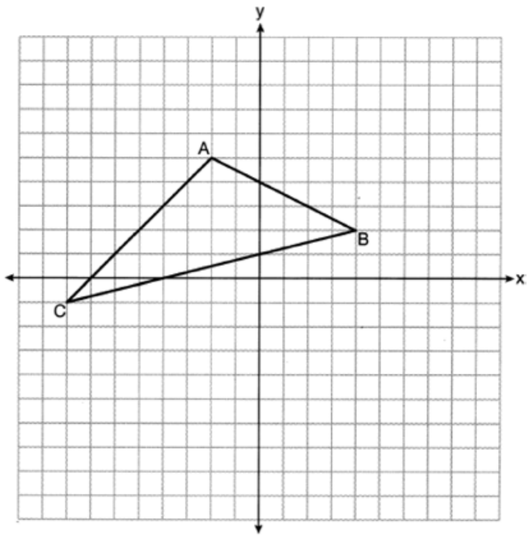
584 In the diagram below, quadrilateral *ABCD* is inscribed in circle *O*, and $m\overset{\frown}{CD}:m\overset{\frown}{DA}:m\overset{\frown}{AB}:m\overset{\frown}{BC} = 2:3:5:5$.



Determine and state $m\angle B$.

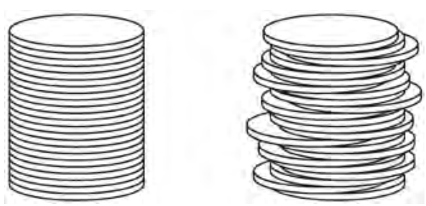
585 Determine and state the coordinates of the center and the length of the radius of the circle whose equation is $x^2 + y^2 + 6x = 6y + 63$.

586 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 $\triangle ABC$.

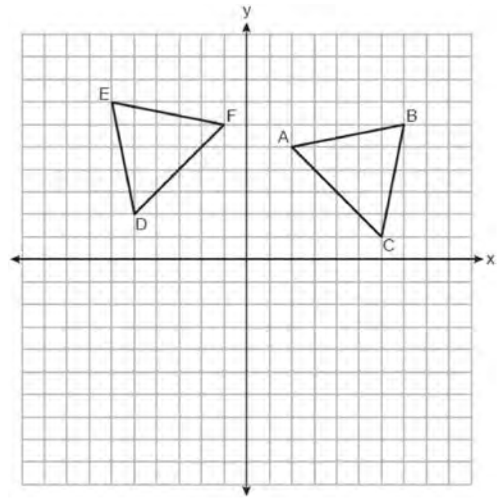
587 Two stacks of 23 quarters each are shown below. One stack forms a cylinder but the other stack does not form a cylinder.



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

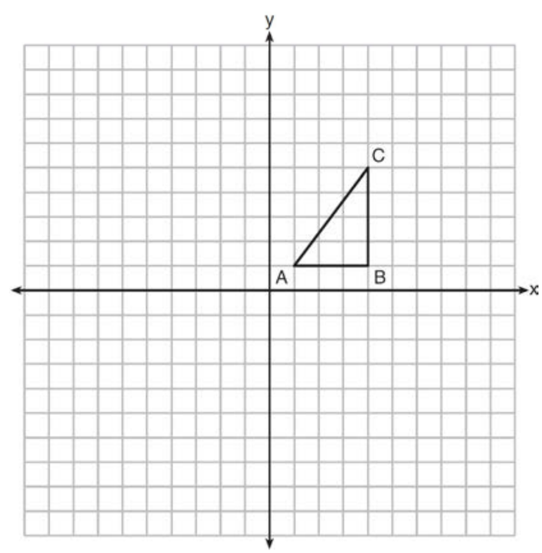
588 Bob places an 18-foot ladder 6 feet from the base of his house and leans it up against the side of his house. Find, to the *nearest degree*, the measure of the angle the bottom of the ladder makes with the ground.

589 On the set of axes below, congruent triangles ABC and DEF are graphed.

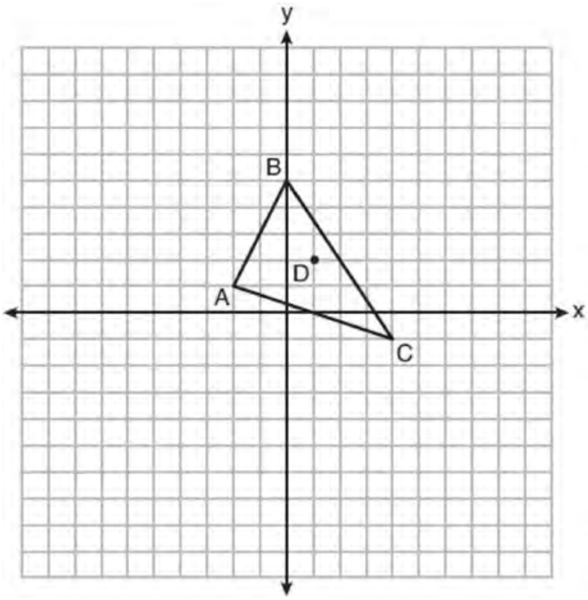


Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle DEF$.

590 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 $y=0$.

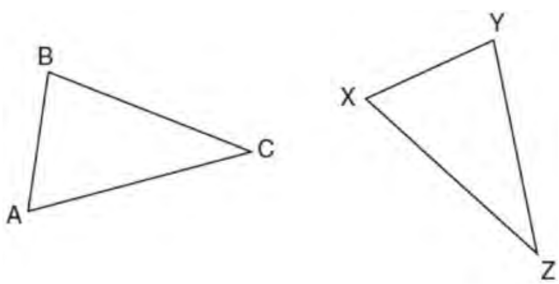


591 Triangle ABC and point $D(1,2)$ are graphed on the set of axes below.



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

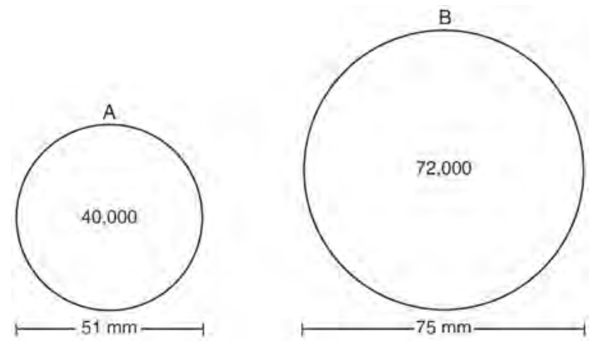
592 In the diagram below of $\triangle ABC$ and $\triangle XYZ$, a sequence of rigid motions maps $\angle A$ onto $\angle X$, $\angle C$ onto $\angle Z$, and $\overline{AC}$ onto $\overline{XZ}$.



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

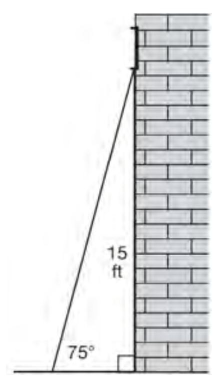
593 In triangle CEM, $CE = 3x + 10$, $ME = 5x - 14$, and $CM = 2x - 6$. Determine and state the value of x that would make CEM an isosceles triangle with the vertex angle at E.

594 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.



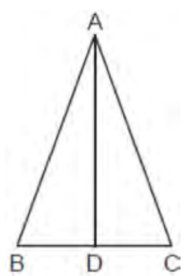
Determine and state which petri dish has the greater population density of bacteria at the end of the first hour.

595 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*.



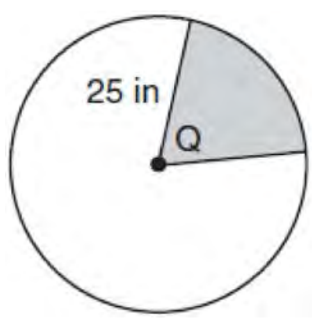
596 Determine and state the coordinates of the center and the length of the radius of the circle represented by the equation $x^2 + 16x + y^2 + 12y - 44 = 0$.

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



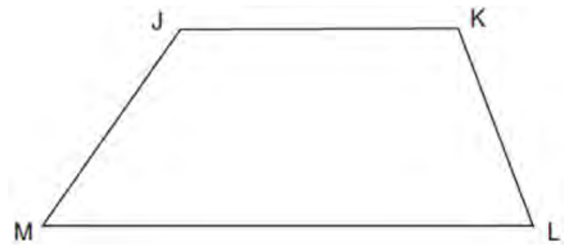
The length of $\overline{AD}$ is 12 cm and the length of $\overline{BC}$ is 10 cm. Determine and state, to the *nearest cubic centimeter*, the volume of the solid formed by continuously rotating $\triangle ABC$ about $\overline{AD}$.

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

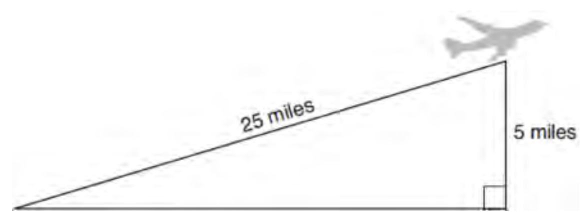


Determine and state the degree measure of angle Q, the central angle of the shaded sector.

599 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.]

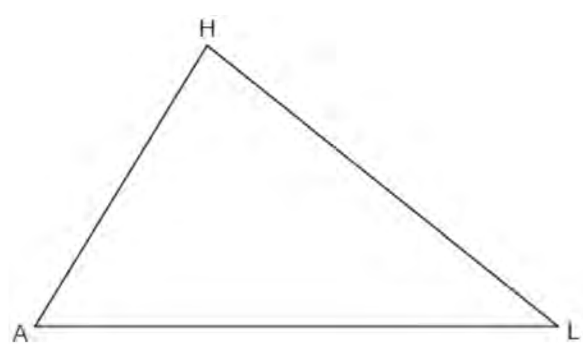


600 An airplane took off at a constant angle of elevation. After the plane traveled for 25 miles, it reached an altitude of 5 miles, as modeled below.

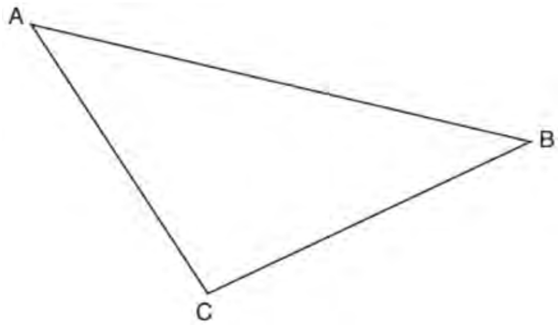


To the *nearest tenth of a degree*, what was the angle of elevation?

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

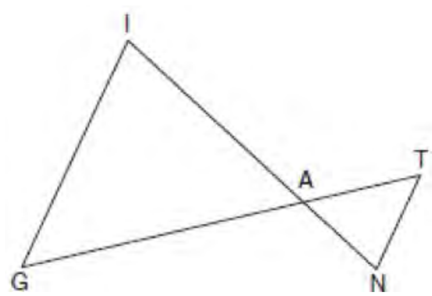


602 Using a compass and straightedge, construct the median to side $\overline{AC}$ in $\triangle ABC$ below. [Leave all construction marks.]



603 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.]

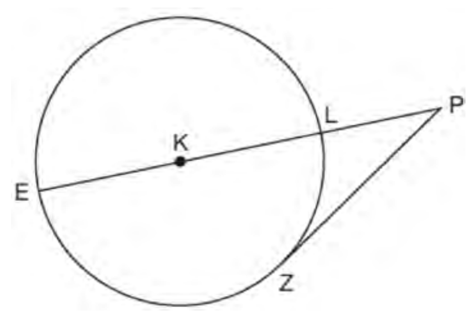
604 In the diagram below, $\overline{GI}$ is parallel to $\overline{NT}$, and $\overline{IN}$ intersects $\overline{GT}$ at *A*.



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

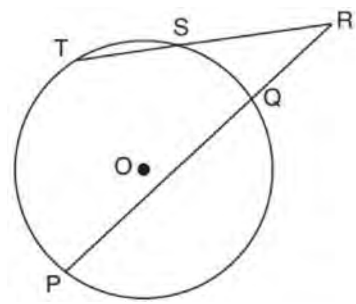
605 A contractor needs to purchase 500 bricks. The dimensions of each brick are 5.1 cm by 10.2 cm by 20.3 cm, and the density of each brick is $1920\ \text{kg}/\text{m}^3$. The maximum capacity of the contractor's trailer is 900 kg. Can the trailer hold the weight of 500 bricks? Justify your answer.

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



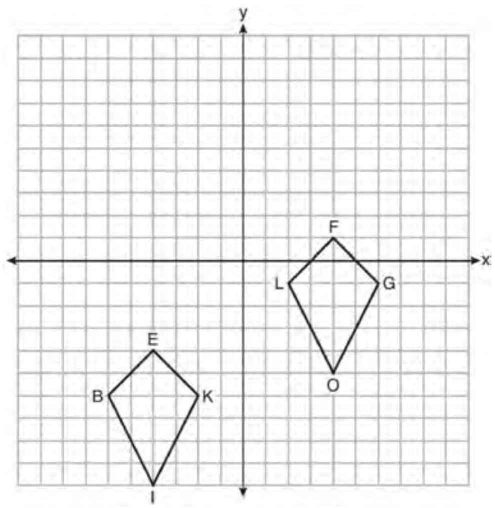
If $m\overparen{LZ} = 56°$, determine and state the degree measure of angle *P*.

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



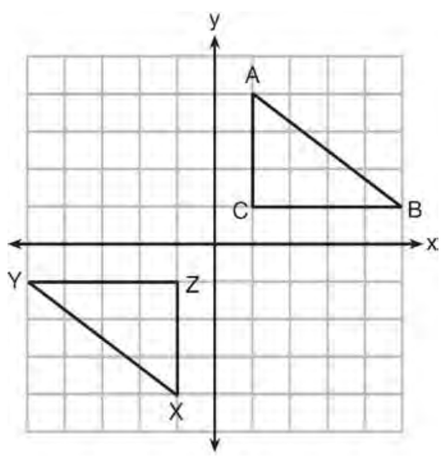
If $RS = 6$, $ST = 4$, and $RP = 15$, what is the length of $\overline{RQ}$?

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



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

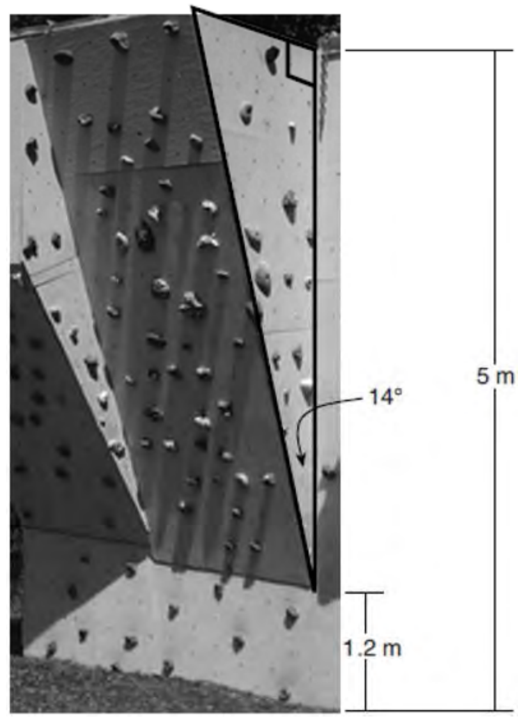
609 In the diagram below, $\triangle ABC$ and $\triangle XYZ$ are graphed.



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

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

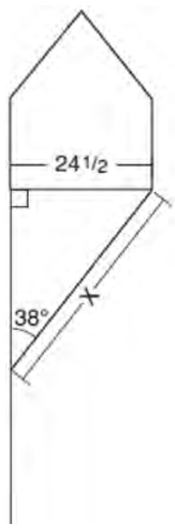
611 A rock-climbing wall at a local park has a right triangular section that slants toward the climber, as shown in the picture below. The height of the wall is 5 meters and the slanted section begins 1.2 meters up the wall at an angle of 14 degrees.



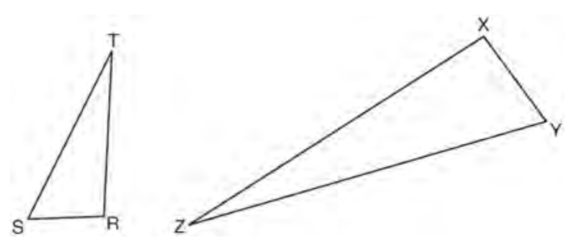
Determine and state, to the *nearest hundredth*, the number of meters in the length of the section of the wall that is slanted (hypotenuse).

612 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°.

613 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*.



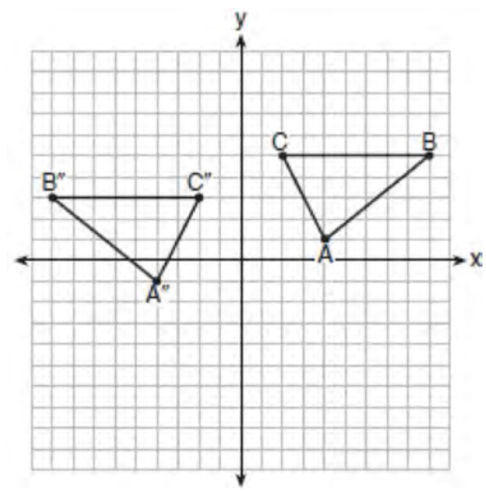
614 Triangles RST and XYZ are drawn below. If $RS = 6$, $ST = 14$, $XY = 9$, $YZ = 21$, and $\angle S \cong \angle Y$, is $\triangle RST$ similar to $\triangle XYZ$? Justify your answer.



615 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.

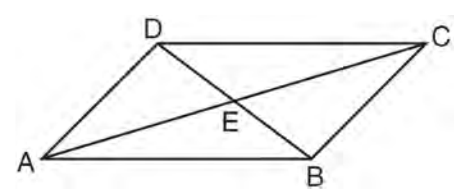
616 Write an equation of the line that is parallel to the line whose equation is $3y + 7 = 2x$ and passes through the point $(2,6)$.

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



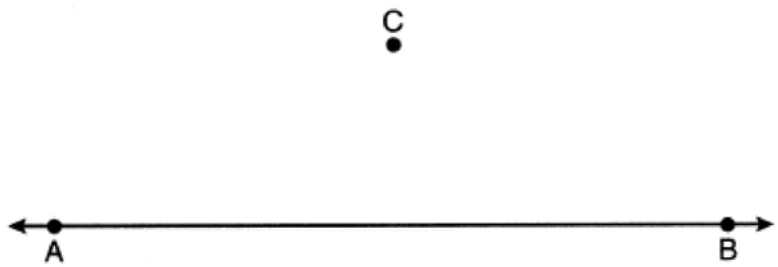
Describe a sequence of rigid motions which would map $\triangle ABC$ onto $\triangle A''B''C''$.

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

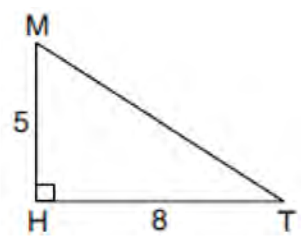


Prove: $\angle ACD \cong \angle CAB$

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



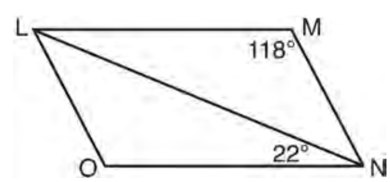
620 In right triangle MTH shown below, $m\angle H = 90°$, $HT = 8$, and $HM = 5$.



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

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

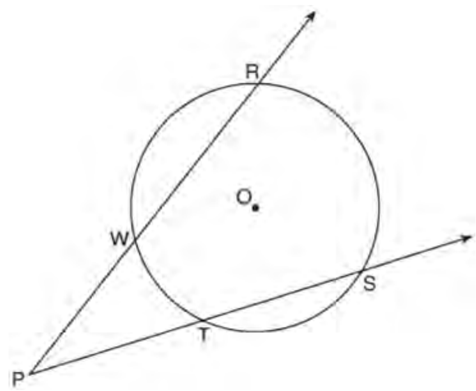
622 The diagram below shows parallelogram $LMNO$ with diagonal $\overline{LN}$, $m\angle M = 118°$, and $m\angle LNO = 22°$.



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

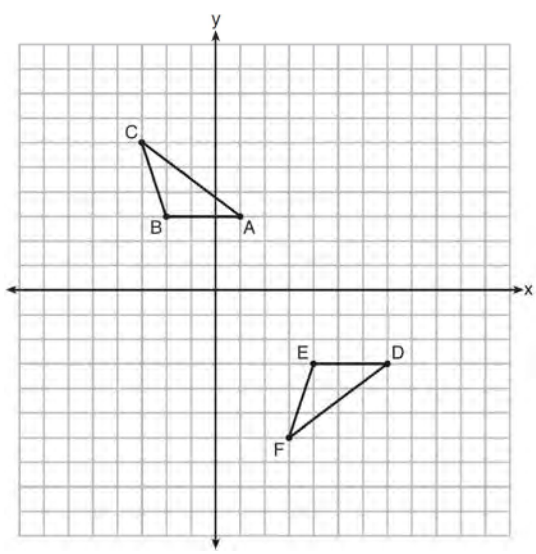
623 In $\triangle ABC$, $AB = 5$, $AC = 12$, and $m\angle A = 90°$. In $\triangle DEF$, $m\angle D = 90°$, $DF = 12$, and $EF = 13$. Brett claims $\triangle ABC \cong \triangle DEF$ and $\triangle ABC \sim \triangle DEF$. Is Brett correct? Explain why.

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

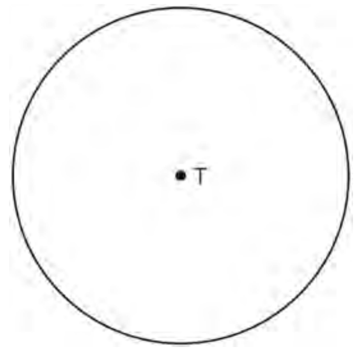


If $m\angle RPS = 35°$ and $m\overset{\frown}{RS} = 121°$, determine and state $m\overset{\frown}{WT}$.

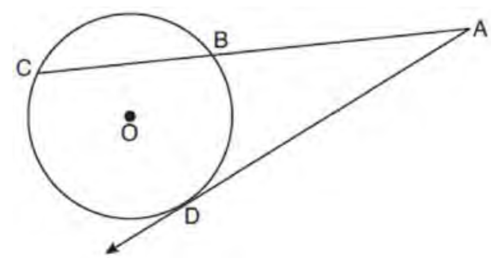
625 Describe a sequence of transformations that will map $\triangle ABC$ onto $\triangle DEF$ as shown below.



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

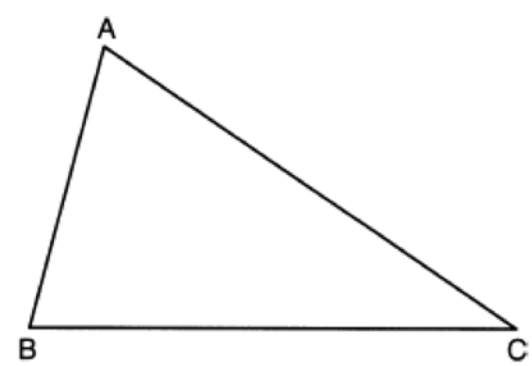


627 In the diagram below of circle O, secant $\overline{ABC}$ and tangent $\overline{AD}$ are drawn.

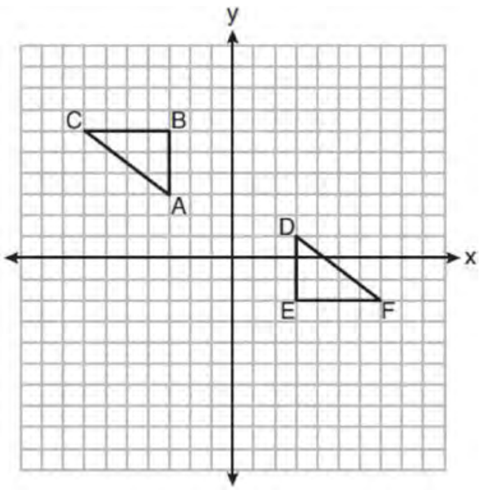


If $CA = 12.5$ and $CB = 4.5$, determine and state the length of $\overline{DA}$.

628 Using a compass and straightedge, construct the angle bisector of $\angle ABC$. [Leave all construction marks.]

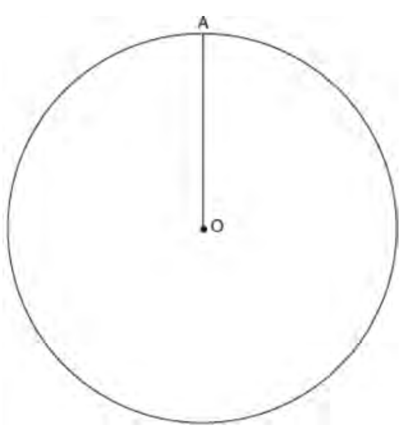


629 On the set of axes below, $\triangle ABC \cong \triangle DEF$.



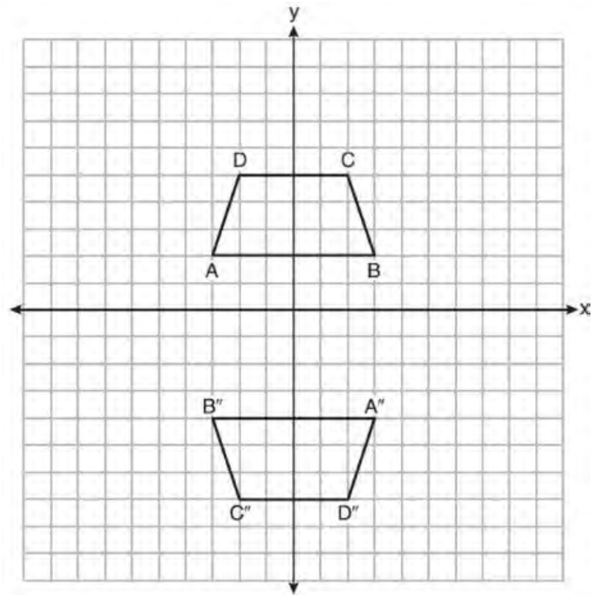
Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle DEF$.

630 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.]



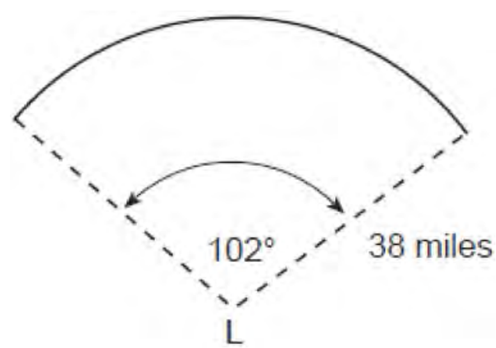
631 Given: Right triangle ABC with right angle at C. If $\sin A$ increases, does $\cos B$ increase or decrease? Explain why.

632 Trapezoids $ABCD$ and $A''B''C''D''$ are graphed on the set of axes below.



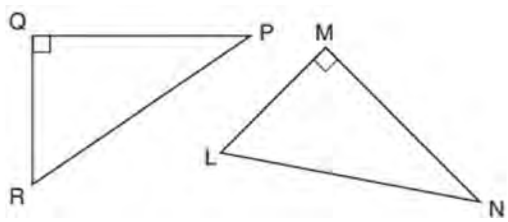
Describe a sequence of transformations that maps trapezoid $ABCD$ onto trapezoid $A''B''C''D''$.

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



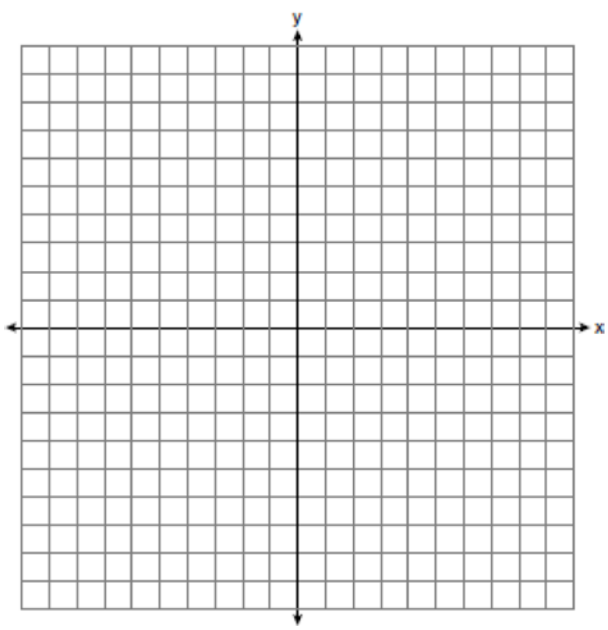
Determine and state the area of the sector, to the *nearest square mile*.

634 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.

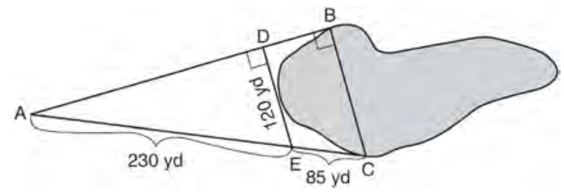
635 The vertices of $\triangle ABC$ have coordinates $A(-2,-1)$, $B(10,-1)$, and $C(4,4)$. Determine and state the area of $\triangle ABC$. [The use of the set of axes below is optional.]



636 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.

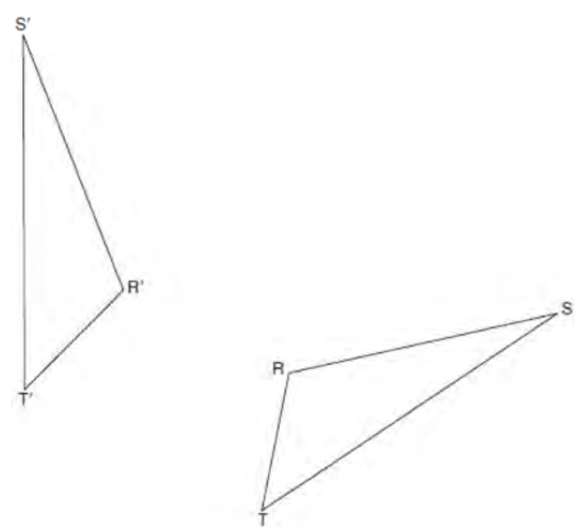
637 In right triangle ABC with the right angle at C, $\sin A = 2x + 0.1$ and $\cos B = 4x - 0.7$. Determine and state the value of x. Explain your answer.

638 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*.

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



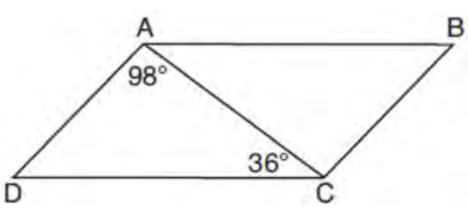
640 Line AB is dilated by a scale factor of 2 centered at point A.

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

641 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.

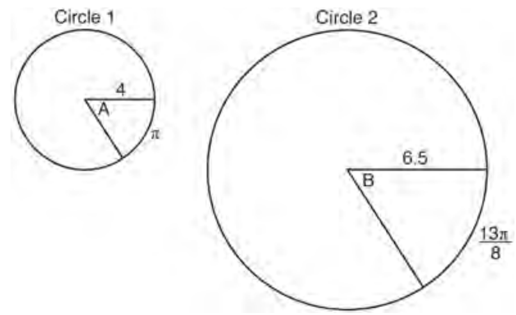
How much clay, to the *nearest cubic centimeter*, does Izzy need to make 100 pendants?

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



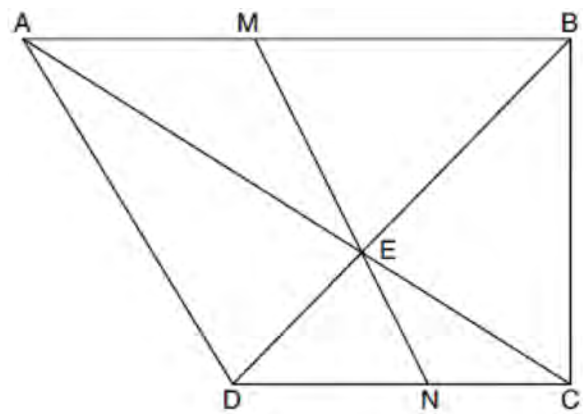
What is the measure of angle B? Explain why.

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



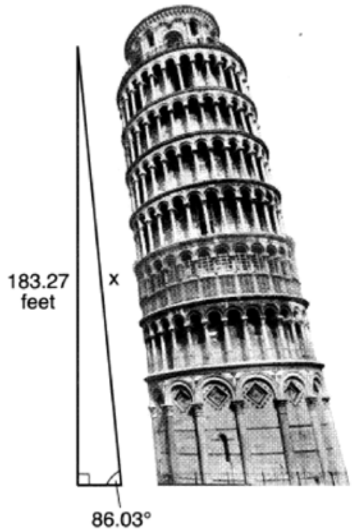
Dominic thinks that angles A and B have the same radian measure. State whether Dominic is correct or not. Explain why.

644 Trapezoid $ABCD$, where $\overline{AB} \parallel \overline{CD}$, is shown below. Diagonals $\overline{AC}$ and $\overline{DB}$ intersect $\overline{MN}$ at E, and $\overline{AD} \cong \overline{AE}$.



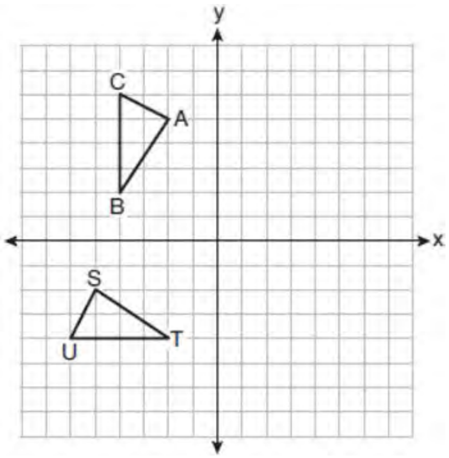
If $m\angle DAE = 35°$, $m\angle DCE = 25°$, and $m\angle NEC = 30°$, determine and state $m\angle ABD$.

645 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.



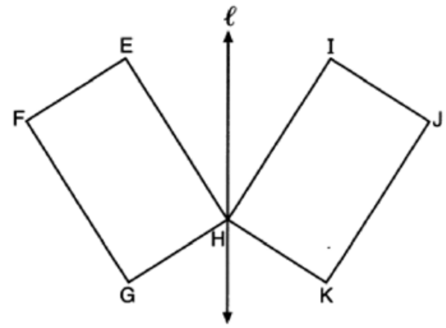
Determine and state the slant height, x, of the low side of the tower, to the *nearest hundredth of a foot*.

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



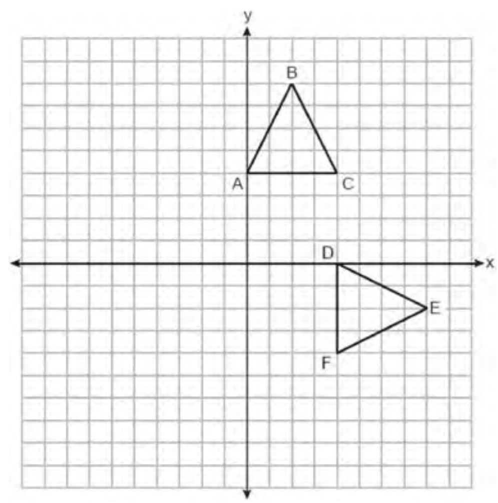
Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle STU$.

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



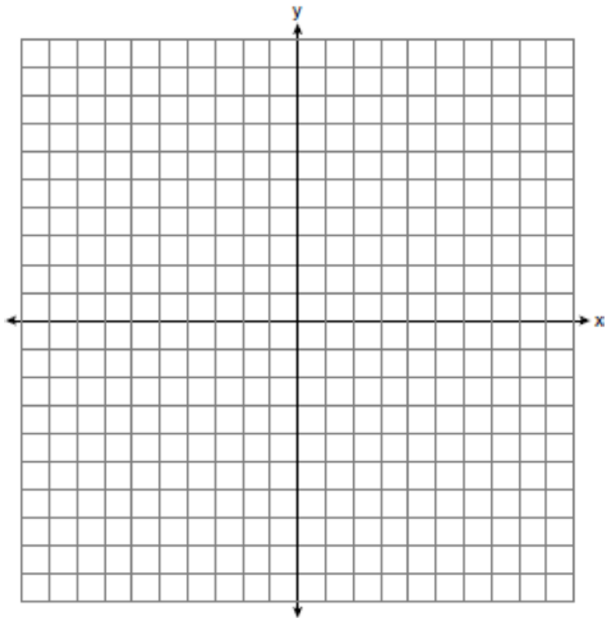
Use the properties of rigid motions to explain why parallelogram $EFGH$ is congruent to parallelogram $IJKH$.

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

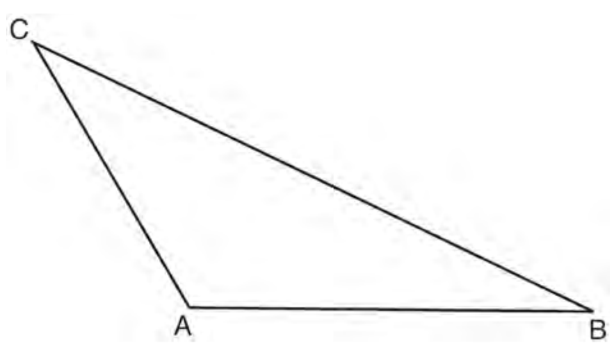


Describe a sequence of transformations that maps $\triangle ABC$ onto $\triangle DEF$.

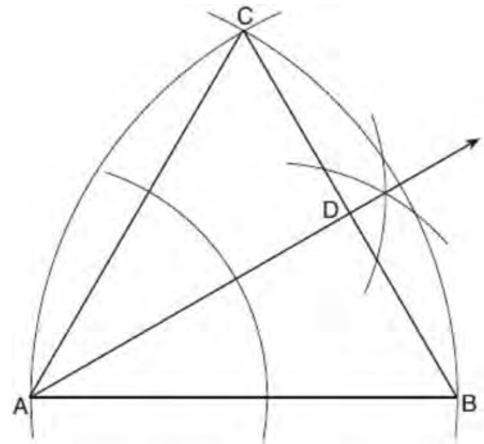
649 The coordinates of the endpoints of $\overline{AB}$ are $A(-6,-5)$ and $B(4,0)$. Point P is on $\overline{AB}$. Determine and state the coordinates of point P, such that $AP:PB$ is $2:3$. [The use of the set of axes below is optional.]



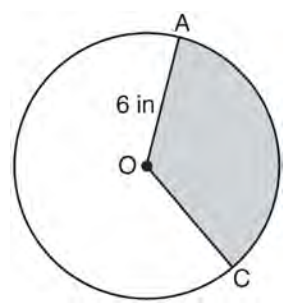
650 In the diagram of $\triangle ABC$ shown below, use a compass and straightedge to construct the median to $\overline{AB}$. [Leave all construction marks.]



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



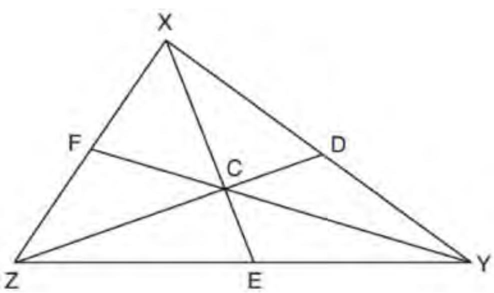
652 In the diagram below of circle O, the area of the shaded sector AOC is 12π in^2 and the length of $\overline{OA}$ is 6 inches. Determine and state m$\angle AOC$.



653 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.

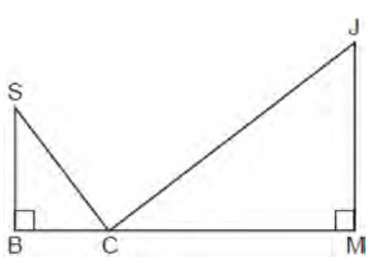
654 In isosceles $\triangle MNP$, line segment NO bisects vertex $\angle MNP$, as shown below. If $MP = 16$, find the length of $\overline{MO}$ and explain your answer.

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



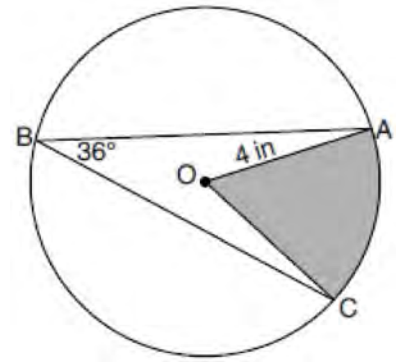
If $CE = 5$, $YF = 21$, and $XZ = 15$, determine and state the perimeter of triangle CFX.

656 In the diagram below, $\triangle SBC \sim \triangle CMJ$ and $\cos J = \frac{3}{5}$.



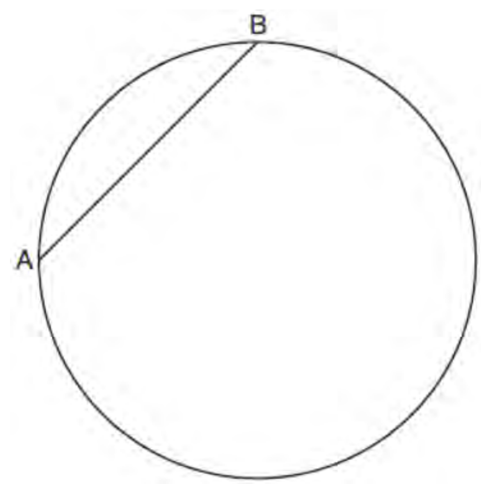
Determine and state $m\angle S$, to the *nearest degree*.

657 In the diagram below of circle O, the measure of inscribed angle ABC is 36° and the length of $\overline{OA}$ is 4 inches.



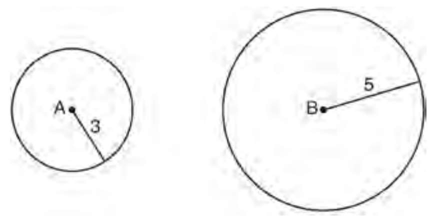
Determine and state, to the *nearest tenth of a square inch*, the area of the shaded sector.

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



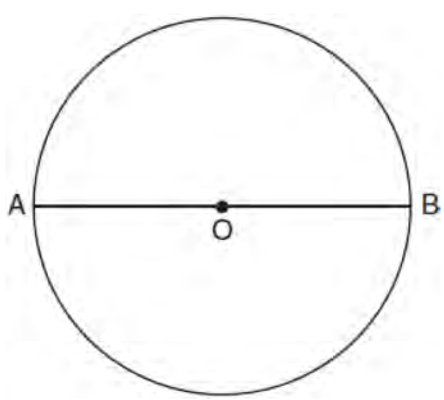
659 A rectangular tabletop will be made of maple wood that weighs 43 pounds per cubic foot. The tabletop will have a length of eight feet, a width of three feet, and a thickness of one inch. Determine and state the weight of the tabletop, in pounds.

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

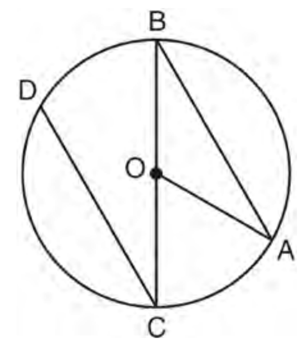


Use transformations to explain why circles A and B are similar.

661 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.]

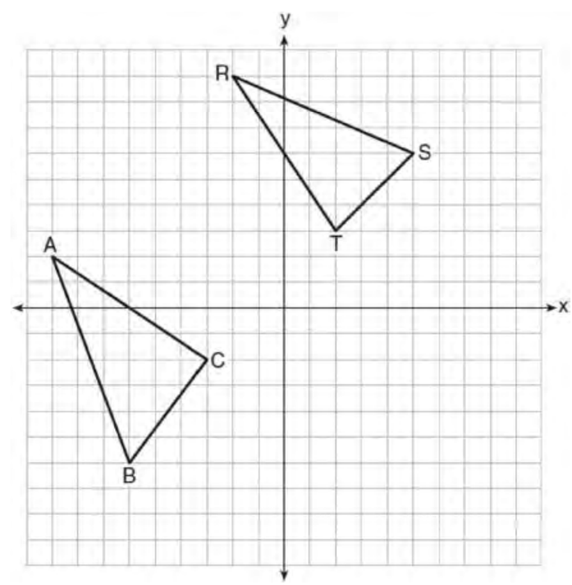


662 In the diagram below of circle O with diameter $\overline{BC}$ and radius $\overline{OA}$, chord $\overline{DC}$ is parallel to chord $\overline{BA}$.



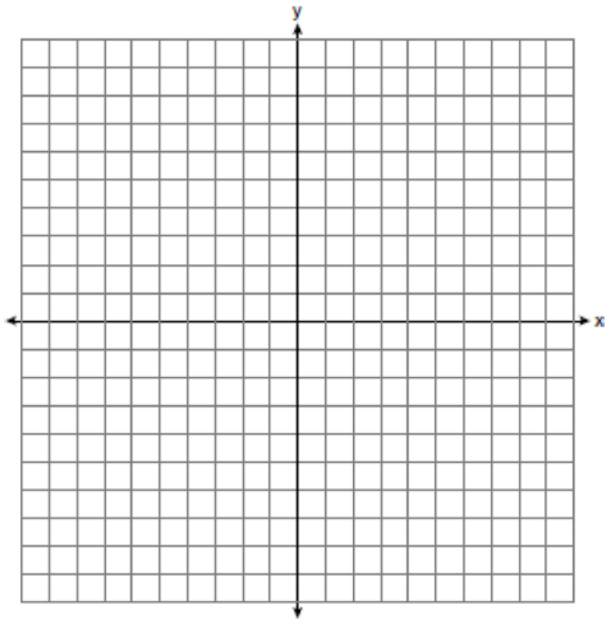
If $m\angle BCD = 30°$, determine and state $m\angle AOB$.

663 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 $T(2,3)$.

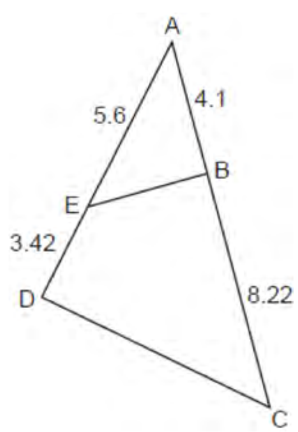


Is $\triangle ABC$ congruent to $\triangle RST$? Use the properties of rigid motions to explain your reasoning.

664 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.]

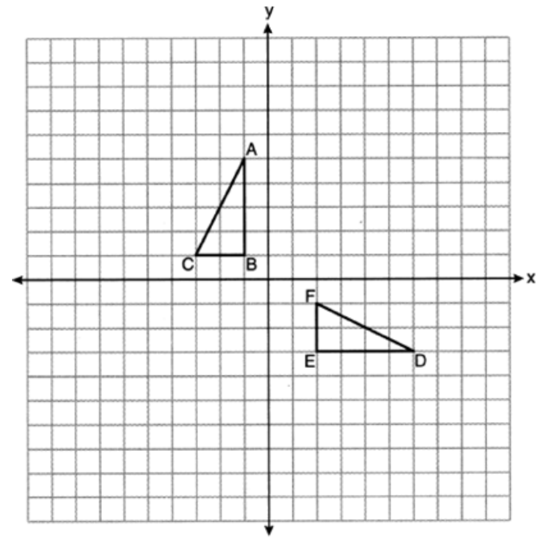


665 In $\triangle ADC$ below, $\overline{EB}$ is drawn such that $AB = 4.1$, $AE = 5.6$, $BC = 8.22$, and $ED = 3.42$.



Is $\triangle ABE$ similar to $\triangle ADC$? Explain why.

666 On the set of axes below, $\triangle ABC$ and $\triangle DEF$ are graphed.

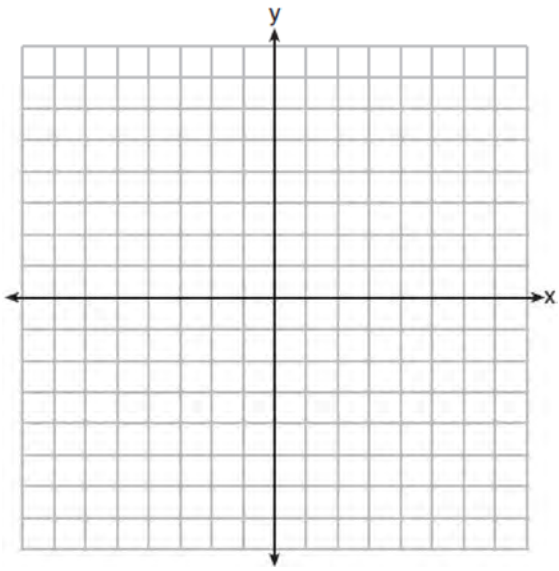


Describe a sequence of rigid motions that would map $\triangle ABC$ onto $\triangle DEF$.

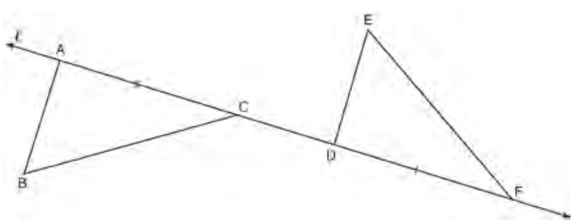
667 A large snowman is made of three spherical snowballs with radii of 1 foot, 2 feet, and 3 feet, respectively. Determine and state the amount of snow, in cubic feet, that is used to make the snowman. [Leave your answer in terms of π.]

Geometry 4 Point Regents Exam Questions

668 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.]

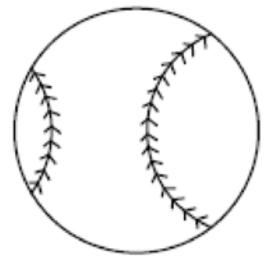


669 In the diagram below, $\overline{AC} \cong \overline{DF}$ and points A, C, D, and F are collinear on line ℓ.



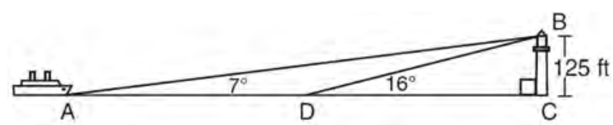
Let $\triangle D'E'F'$ be the image of $\triangle DEF$ after a translation along ℓ, such that point D is mapped onto point A. Determine and state the location of F'. Explain your answer. Let $\triangle D''E''F''$ be the image of $\triangle D'E'F'$ after a reflection across line ℓ. Suppose that E'' is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

670 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.



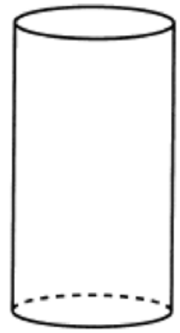
Determine and state the maximum number of baseballs that can be packed in the box if they are stacked in layers and each layer contains an equal number of baseballs. The weight of a baseball is approximately 0.025 pound per cubic inch. Determine and state, to the *nearest pound*, the total weight of all the baseballs in the fully packed box.

671 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°.



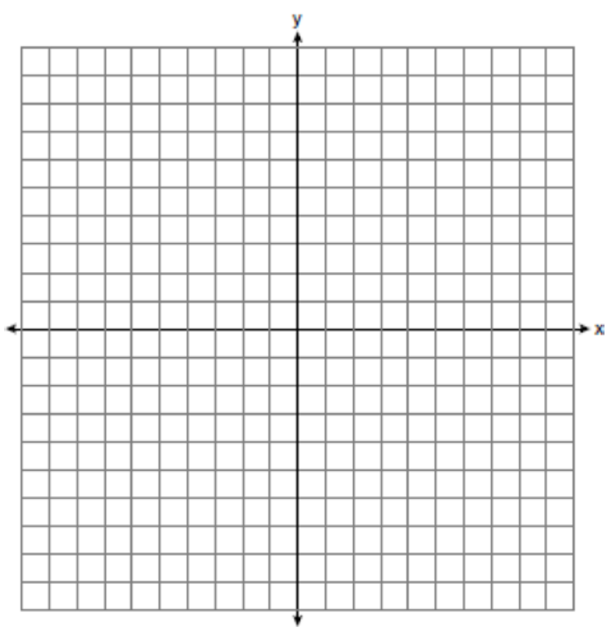
To the *nearest foot*, determine and state how far the ship traveled from point A to point D.

672 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.

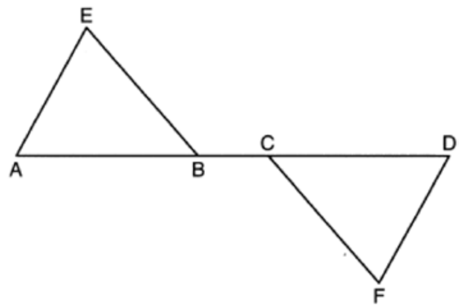
673 Triangle *ABC* has vertices with coordinates $A(-1,-1)$, $B(4,0)$, and $C(0,4)$. Prove that $\triangle ABC$ is an isosceles triangle but *not* an equilateral triangle. [The use of the set of axes below is optional.]



674 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.

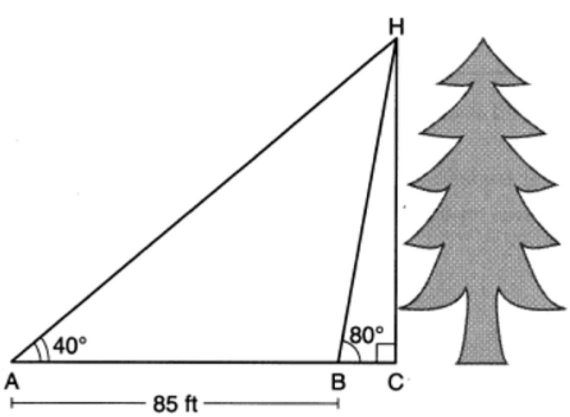
675 A barrel of fuel oil is a right circular cylinder where the inside measurements of the barrel are a diameter of 22.5 inches and a height of 33.5 inches. There are 231 cubic inches in a liquid gallon. Determine and state, to the *nearest tenth*, the gallons of fuel that are in a barrel of fuel oil.

676 Given: $\triangle AEB$ and $\triangle DFC$, $\overline{ABCD}$, $\overline{AE} \parallel \overline{DF}$, $\overline{EB} \parallel \overline{FC}$, $\overline{AC} \cong \overline{DB}$



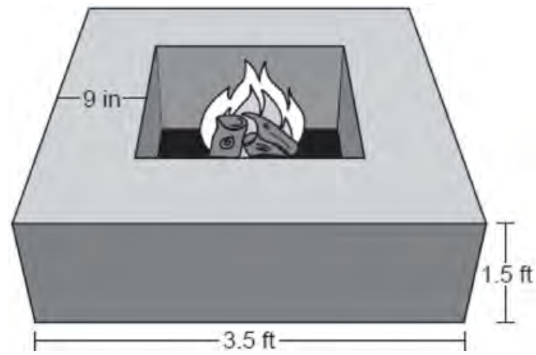
Prove: $\triangle EAB \cong \triangle FDC$

677 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.



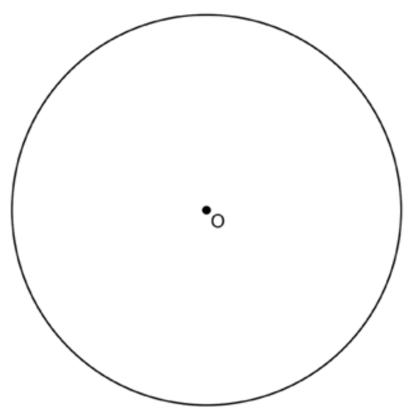
Barry claims that $\triangle ABH$ is isosceles. Explain why Barry is correct. Determine and state, to the *nearest foot*, the height of the tree.

678 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.



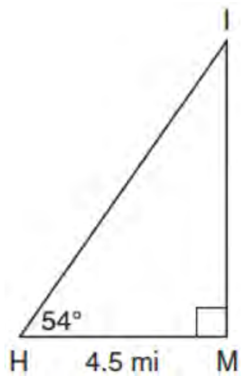
If a bag of concrete mix will fill 0.6 ft^3, determine and state the minimum number of bags needed to build the fire pit.

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



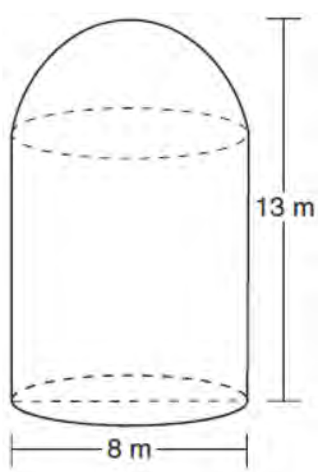
If chords $\overline{FB}$ and $\overline{FC}$ are drawn, which type of triangle, according to its angles, would $\triangle FBC$ be? Explain your answer.

680 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.

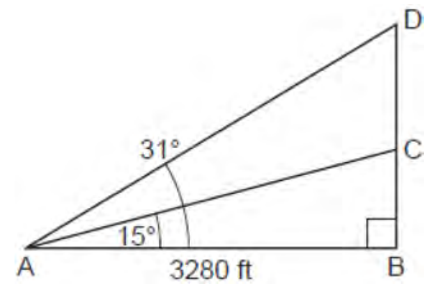


Determine and state, to the *nearest tenth of a mile*, the distance from the boat house (H) to the island (I). Determine and state, to the *nearest tenth of a mile*, the distance from the island (I) to the marina (M).

681 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.

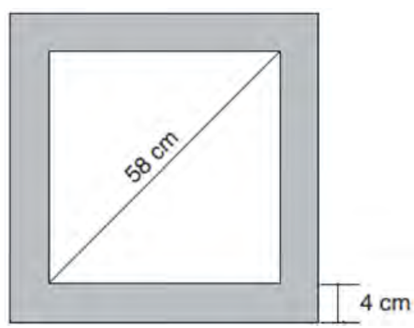


682 Cape Canaveral, Florida is where NASA launches rockets into space. As modeled in the diagram below, a person views the launch of a rocket from observation area A, 3280 feet away from launch pad B. After launch, the rocket was sighted at C with an angle of elevation of 15°. The rocket was later sighted at D with an angle of elevation of 31°.



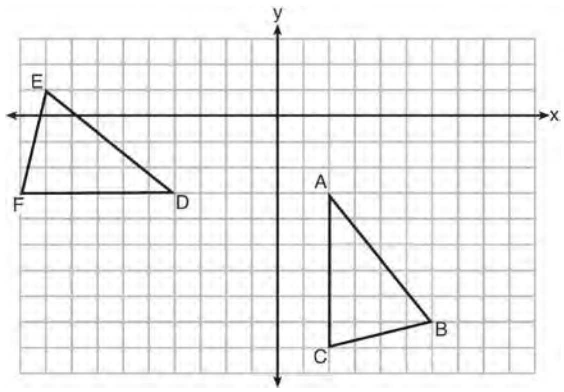
Determine and state, to the *nearest foot*, the distance the rocket traveled between the two sightings, C and D.

683 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.



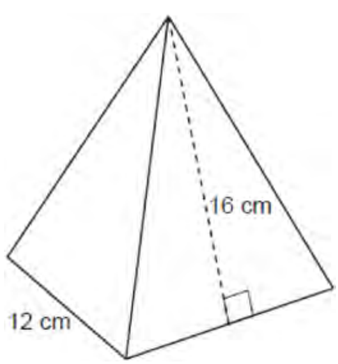
Determine and state the total area of the poster and frame to the *nearest tenth of a square centimeter*.

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



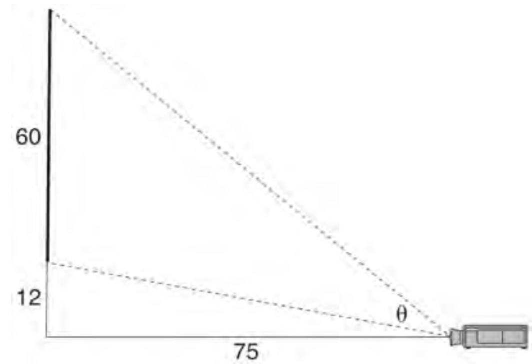
Let $\triangle A'B'C'$ be the image of $\triangle ABC$ after a rotation about point A. Determine and state the location of B' if the location of point C' is $(8,-3)$. Explain your answer. Is $\triangle DEF$ congruent to $\triangle A'B'C'$? Explain your answer.

685 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.



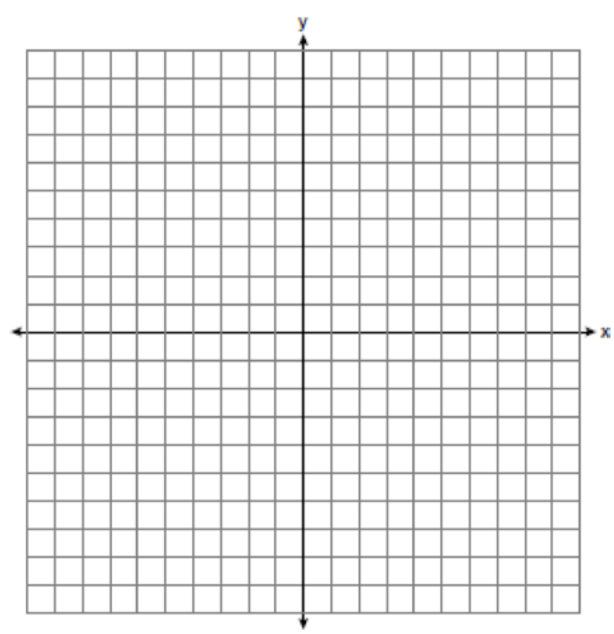
Determine and state the volume of the candle, to the *nearest cubic centimeter*. The wax used to make the candle weighs 0.032 ounce per cubic centimeter. Determine and state the weight of the candle, to the *nearest ounce*.

686 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.

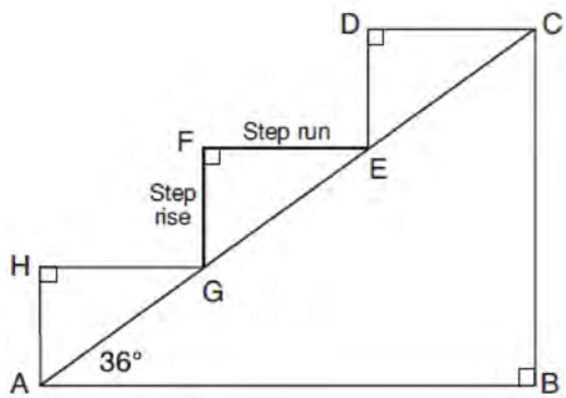


Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

687 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.]

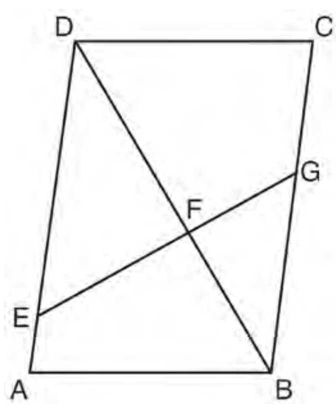


688 A homeowner is building three steps leading to a deck, as modeled by the diagram below. All three step rises, $\overline{HA}$, $\overline{FG}$, and $\overline{DE}$, are congruent, and all three step runs, $\overline{HG}$, $\overline{FE}$, and $\overline{DC}$, are congruent. Each step rise is perpendicular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



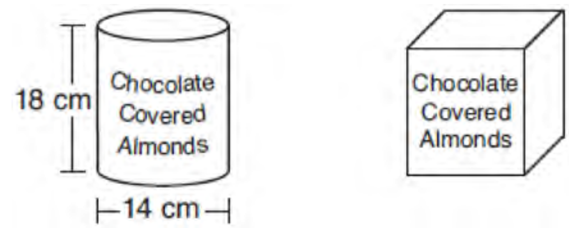
If each step run is parallel to $\overline{AB}$ and has a length of 10 inches, determine and state the length of each step rise, to the *nearest tenth of an inch*. Determine and state the length of $\overline{AC}$, to the *nearest inch*.

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



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

690 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.

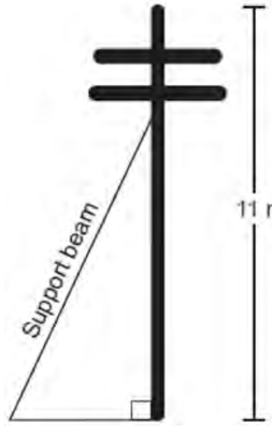


If the new container's height is 16 cm, determine and state, to the *nearest tenth of a centimeter*, the side length of the new container if both containers contain the same amount of almonds. A store owner who sells the chocolate-covered almonds displays them on a shelf whose dimensions are 80 cm long 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.

691 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.

[1 ft^3 water = 7.48 gallons]

692 A telephone pole 11 meters tall needs to be stabilized with a support beam, as modeled below.

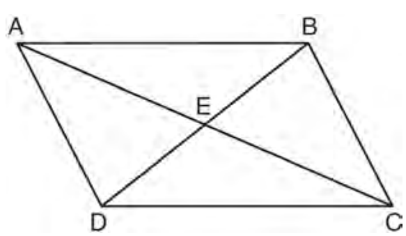


Two conditions for proper support are:

- 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.

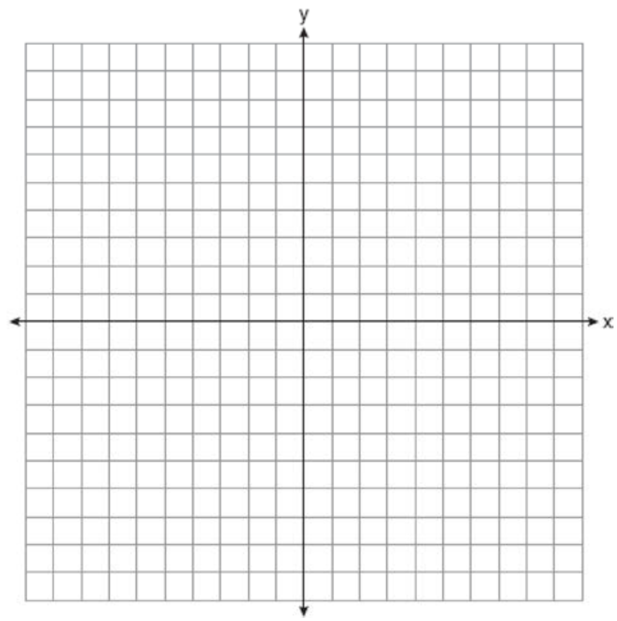
Determine and state, to the *nearest tenth of a meter*, the length of the support beam that meets these conditions for this telephone pole. Determine and state, to the *nearest tenth of a meter*, how far the support beam must be placed from the base of the pole to meet the conditions.

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

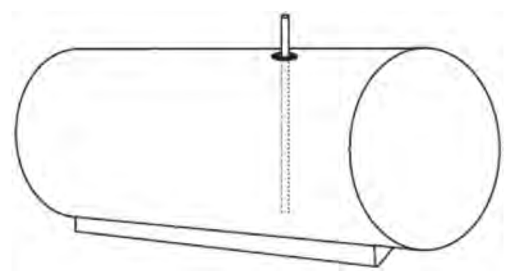


Prove: $\triangle AED \cong \triangle CEB$
Describe a single rigid motion that maps $\triangle AED$ onto $\triangle CEB$.

694 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.]

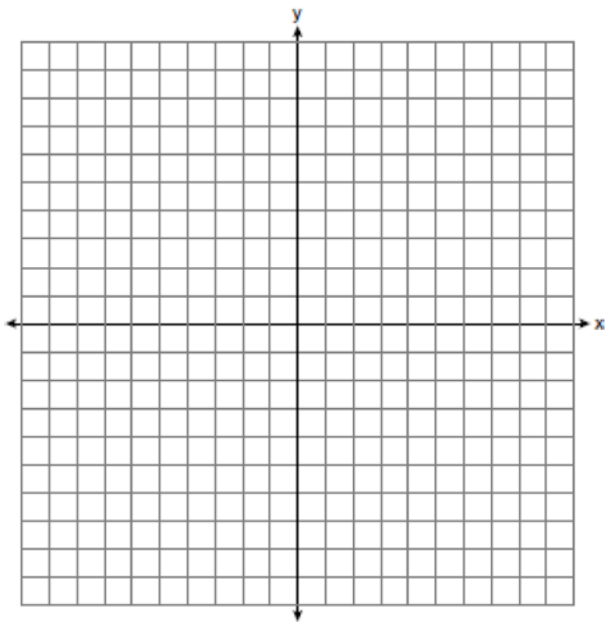


695 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.

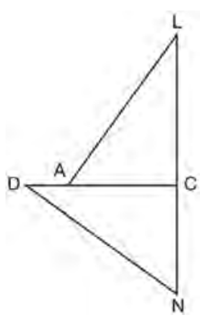


A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3=7.48 gallons]

696 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 $\overline{AH}$.

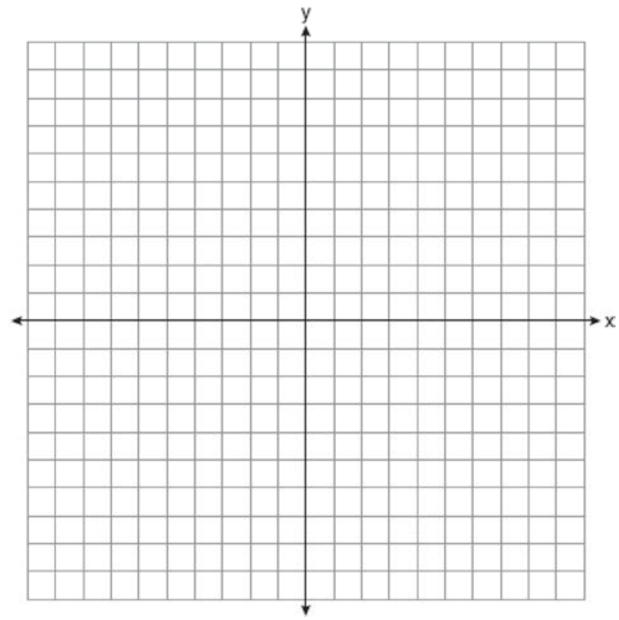


697 In the diagram of $\triangle LAC$ and $\triangle DNC$ below, $\overline{LA} \cong \overline{DN}$, $\overline{CA} \cong \overline{CN}$, and $\overline{DAC} \perp \overline{LCN}$.

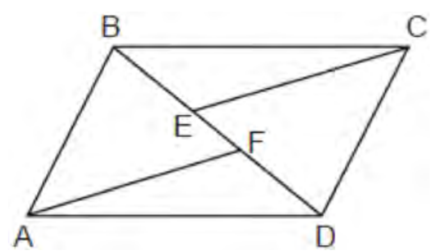


a) Prove that $\triangle LAC \cong \triangle DNC$.
b) Describe a sequence of rigid motions that will map $\triangle LAC$ onto $\triangle DNC$.

698 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.]

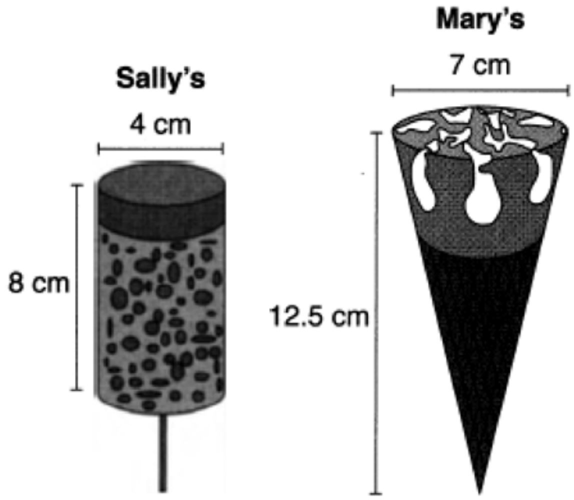


699 In the diagram of quadrilateral $ABCD$ below, $\overline{AB} \cong \overline{CD}$, and $\overline{AB} \parallel \overline{CD}$. Segments CE and AF are drawn to diagonal $\overline{BD}$ such that $\overline{BE} \cong \overline{DF}$.



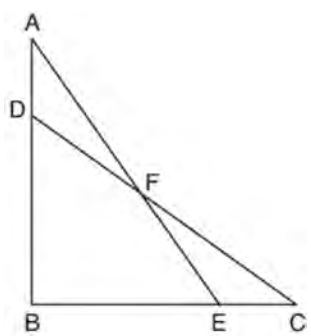
Prove: $\overline{CE} \cong \overline{AF}$

700 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.



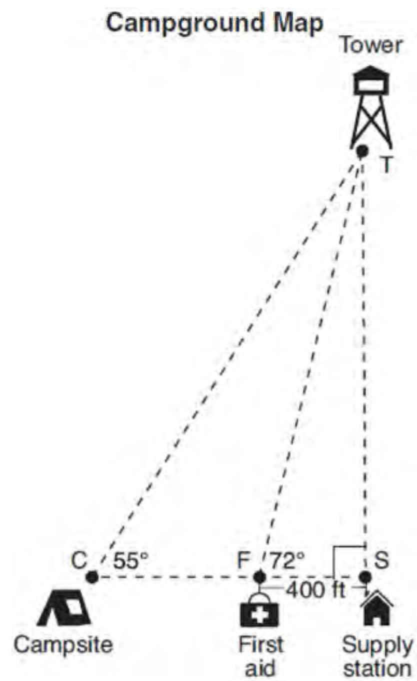
Who was served more ice cream, Sally or Mary? Justify your answer. Determine and state how much more is served in the larger ice cream than the smaller ice cream, to the *nearest cubic centimeter*.

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



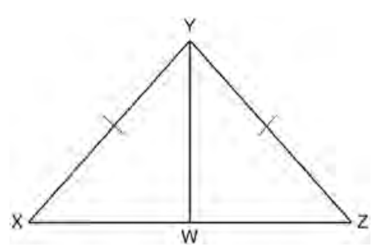
Prove: $\triangle AFD \cong \triangle CFE$

702 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°.

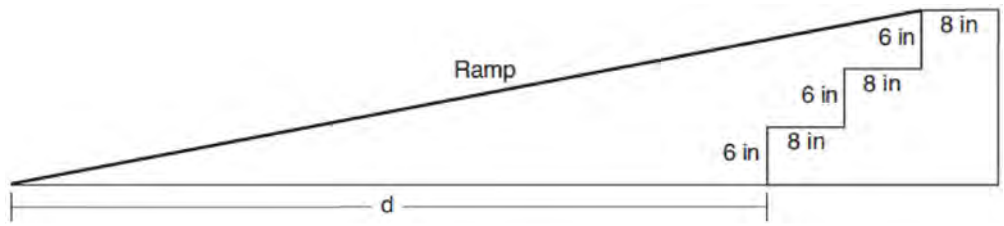


Determine and state, to the *nearest foot*, the distance from the campsite to the tower.

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

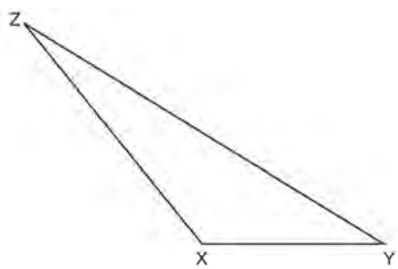


704 As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep.

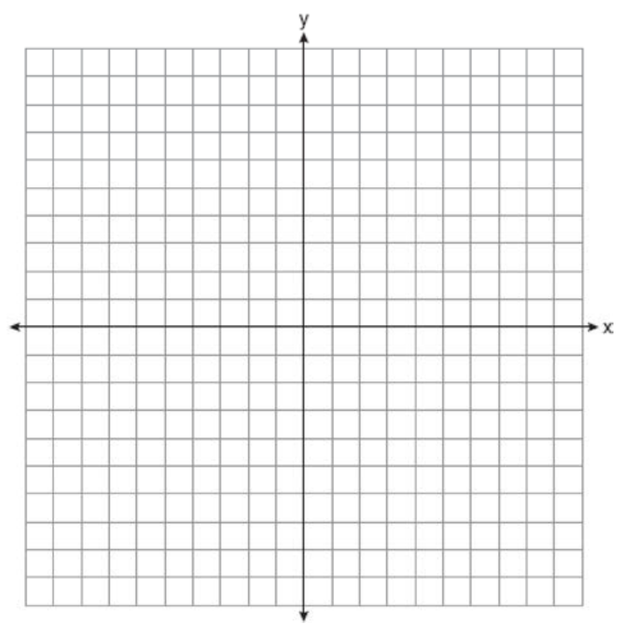


If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the *nearest tenth of a foot*. Determine and state, to the *nearest tenth of a foot*, the horizontal distance, *d*, from the bottom of the stairs to the bottom of the ramp.

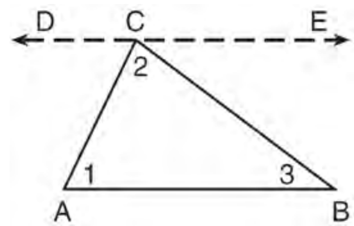
705 Triangle *XYZ* is shown below. Using a compass and straightedge, on the line below, construct and label $\triangle ABC$, such that $\triangle ABC \cong \triangle XYZ$. [Leave all construction marks.] Based on your construction, state the theorem that justifies why $\triangle ABC$ is congruent to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



706 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.



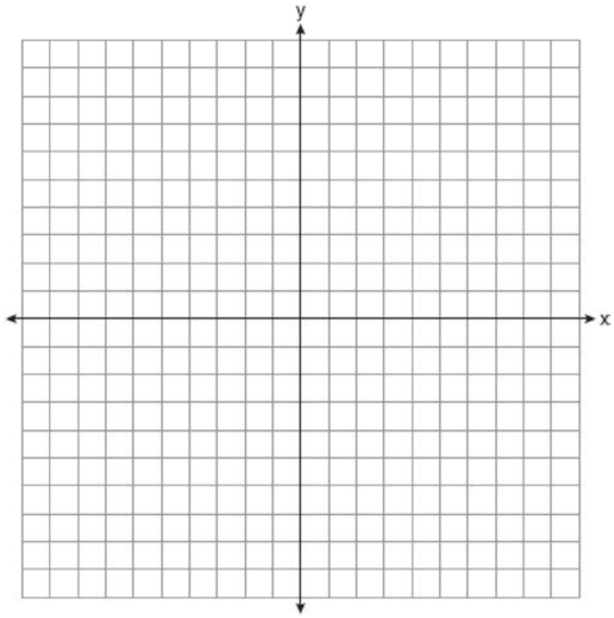
707 Given the theorem, “The sum of the measures of the interior angles of a triangle is 180°,” complete the proof for this theorem.



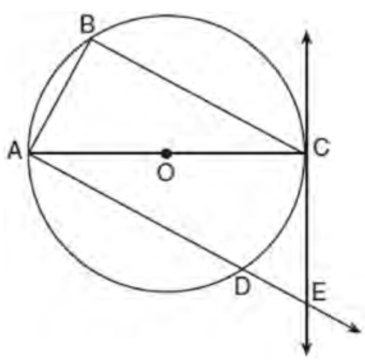
Given: $\triangle ABC$
Prove: $m\angle 1 + m\angle 2 + m\angle 3 = 180°$
Fill in the missing reasons below.

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) ______

708 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*.

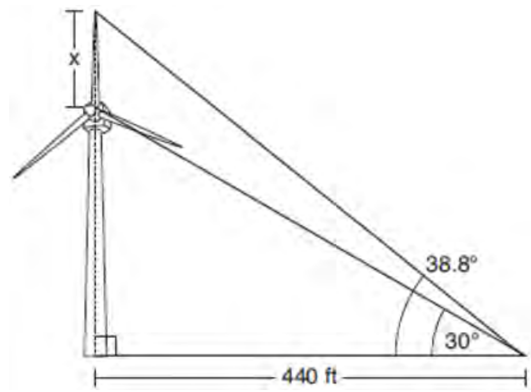


709 In the diagram below of circle O, tangent $\overleftrightarrow{EC}$ is drawn to diameter $\overline{AC}$. Chord $\overline{BC}$ is parallel to secant $\overline{ADE}$, and chord $\overline{AB}$ is drawn.



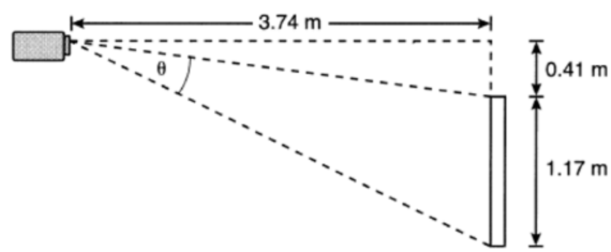
Prove: $\frac{BC}{CA} = \frac{AB}{EC}$

710 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°.



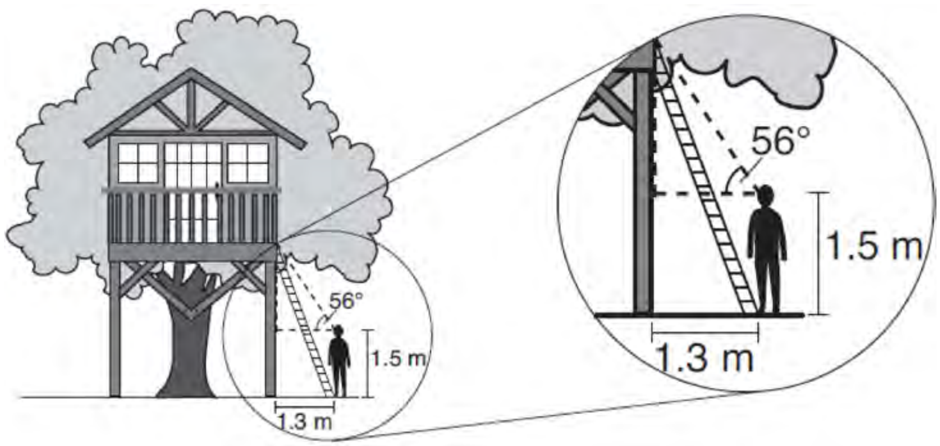
Determine and state a blade's length, x, to the *nearest foot*.

711 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.



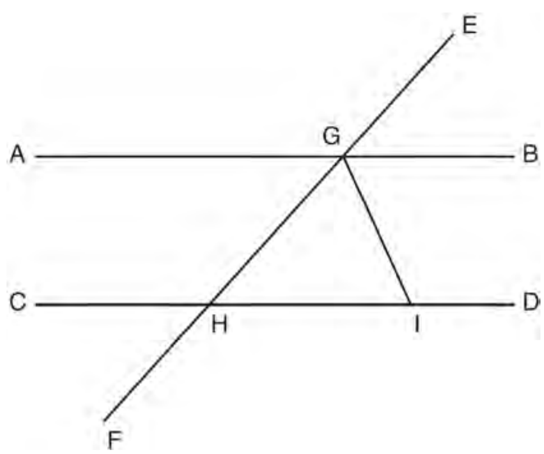
Determine and state the projection angle, θ, to the *nearest tenth of a degree*.

712 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.



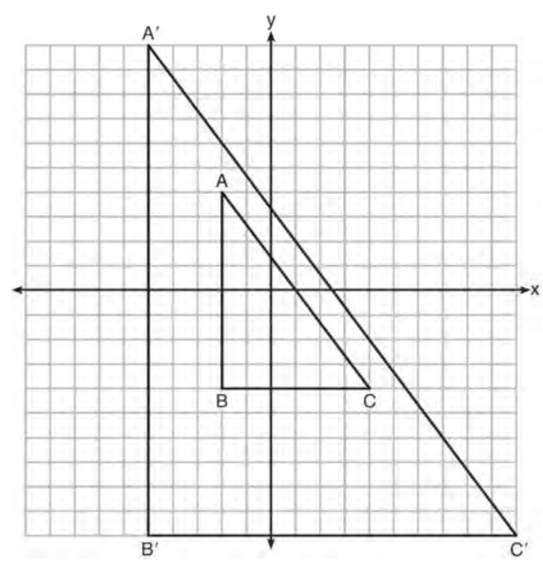
Determine and state the minimum length of a ladder, to the *nearest tenth of a meter*, that David will need to buy for his treehouse.

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



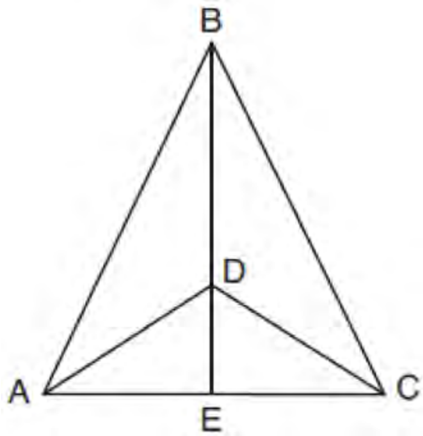
If $m\angle EGB = 50°$ and $m\angle DIG = 115°$, explain why $\overline{AB} \parallel \overline{CD}$.

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

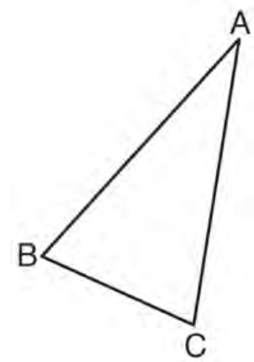
715 Given: $\triangle ABC$, $\overline{AEC}$, $\overline{BDE}$ with $\angle ABE \cong \angle CBE$, and $\angle ADE \cong \angle CDE$
Prove: $\overline{BDE}$ is the perpendicular bisector of $\overline{AC}$



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

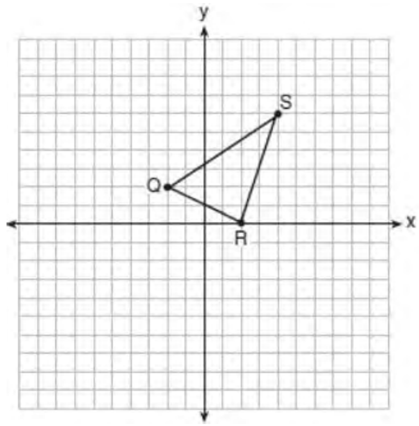
716 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B. [Leave all construction marks.] Describe the relationship between the lengths of $\overline{AC}$ and $\overline{A'C'}$.



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

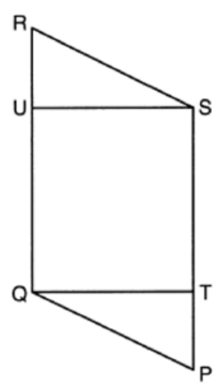
The height of the candle is 13 cm and the circumference of the candle at its widest measure is 31.416 cm. Use modeling to approximate how much wax, to the *nearest cubic centimeter*, is needed to make this candle. Justify your answer.

718 Triangle QRS is graphed on the set of axes below.



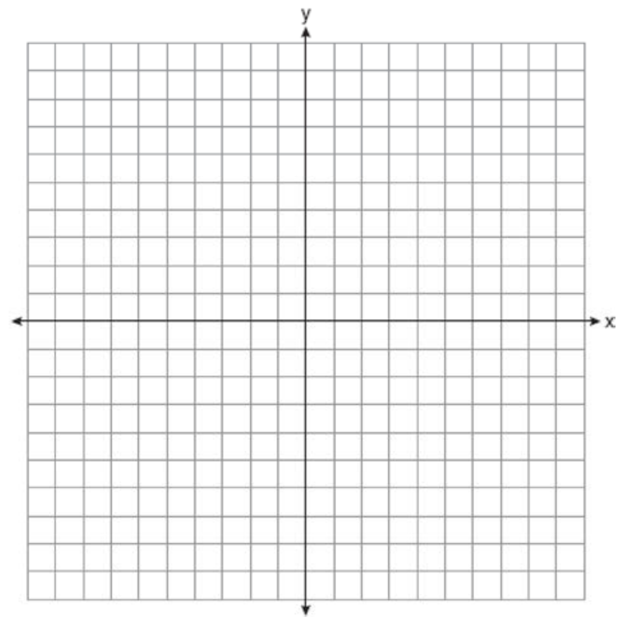
On the same set of axes, graph and label $\triangle Q'R'S'$, the image of $\triangle QRS$ after a dilation with a scale factor of $\frac{3}{2}$ centered at the origin. Use slopes to explain why $Q'R' \parallel QR$.

719 Given: Parallelogram $PQRS$, $\overline{QT} \perp \overline{PS}$, $\overline{SU} \perp \overline{QR}$

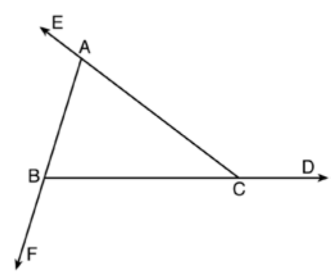


Prove: $\overline{PT} \cong \overline{RU}$

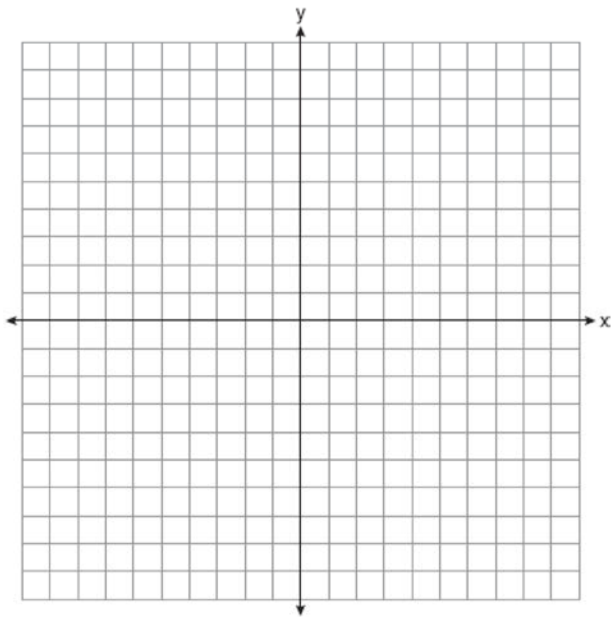
720 The coordinates of the vertices of quadrilateral $ABCD$ are $A(0,4)$, $B(3,8)$, $C(8,3)$, and $D(5,-1)$. Prove that $ABCD$ is a parallelogram, but not a rectangle. [The use of the set of axes below is optional.]



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

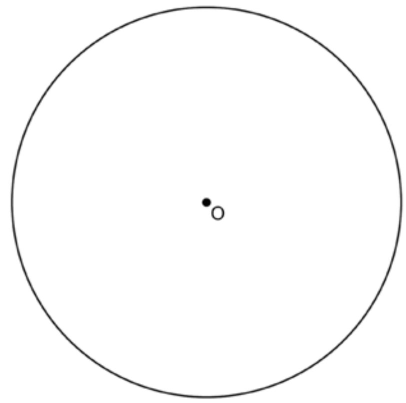


722 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below. Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle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



723 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.

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



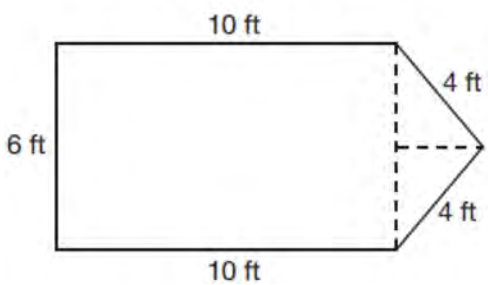
Determine the measure of the arc intercepted by two adjacent sides of the constructed square. Explain your reasoning.

725 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.

726 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

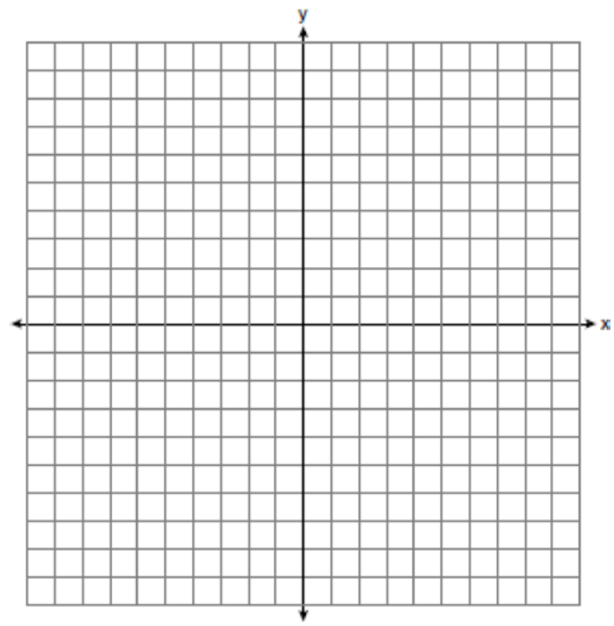
Cargo Trailer Floor



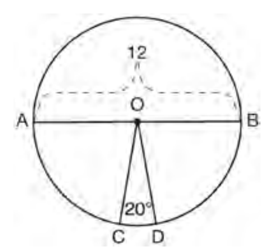
If the inside height of the trailer is 6.5 feet, what is the total volume of the inside of the trailer, to the *nearest cubic foot*?

727 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.

728 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.]

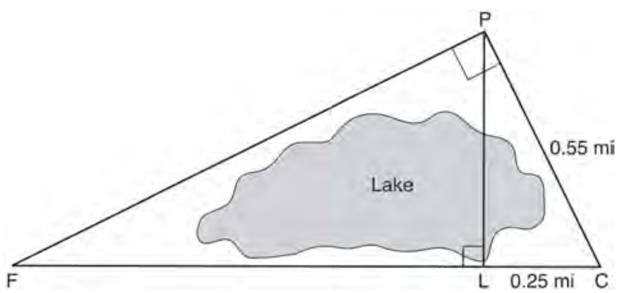


729 In the diagram below of circle O, diameter $\overline{AB}$ and radii $\overline{OC}$ and $\overline{OD}$ are drawn. The length of $\overline{AB}$ is 12 and the measure of $\angle COD$ is 20 degrees.



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

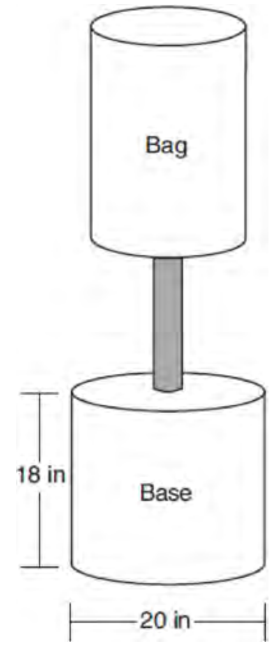
730 In the diagram below, the line of sight from the park ranger station, P, to the lifeguard chair, L, on the beach of a lake is perpendicular to the path joining the campground, C, and the first aid station, F. The campground is 0.25 mile from the lifeguard chair. The straight paths from both the campground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

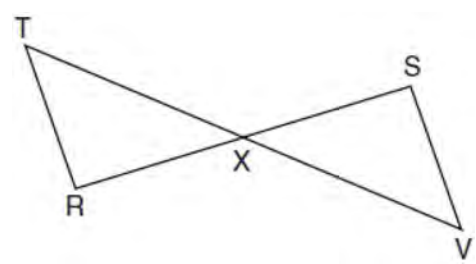
731 A small can of soup is a right circular cylinder with a base diameter of 7 cm and a height of 9 cm. A large container is also a right circular cylinder with a base diameter of 9 cm and a height of 13cm. Determine and state the volume of the small can and the volume of the large container to the *nearest cubic centimeter*. What is the minimum number of small cans that must be opened to fill the large container? Justify your answer.

732 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.



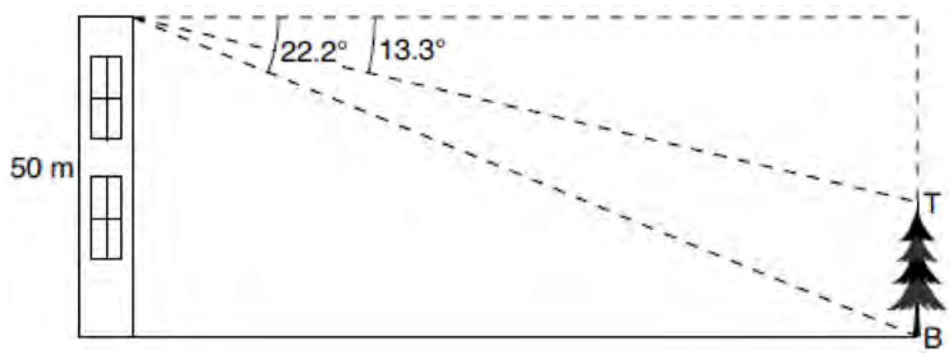
To the *nearest pound*, determine and state the total weight of the training equipment if the base is filled to 85% of its capacity.

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



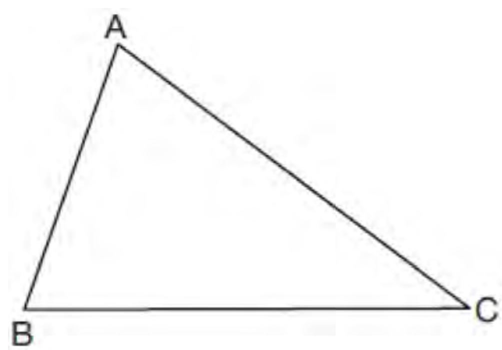
Prove: $\overline{TR} \parallel \overline{SV}$

734 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°.



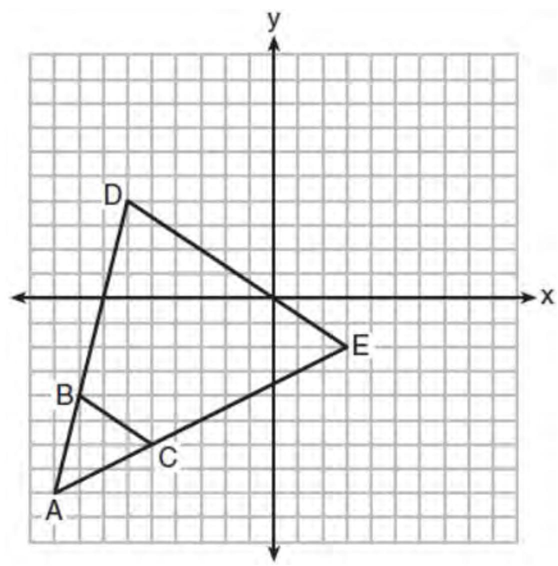
Determine and state, to the *nearest meter*, the height of the tree.

735 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.]



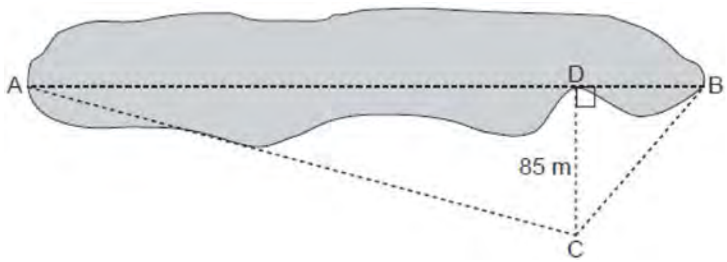
Is the image of $\triangle ABC$ similar to the original triangle? Explain why.

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



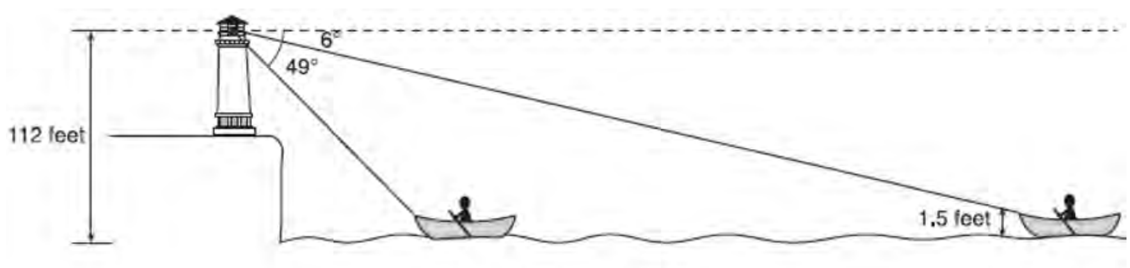
Describe a transformation that maps triangle *ABC* onto triangle *ADE*. Explain why this transformation makes triangle *ADE* similar to triangle *ABC*.

737 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*.

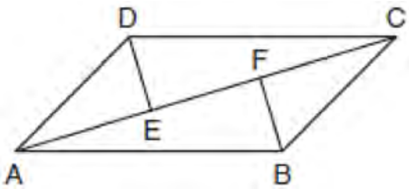
738 As shown below, a canoe is approaching a lighthouse on the coastline of a lake. The front of the canoe is 1.5 feet above the water and an observer in the lighthouse is 112 feet above the water.



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.

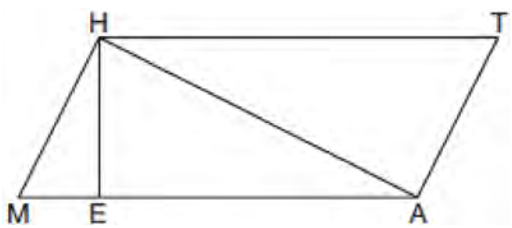
Geometry 6 Point Regents Exam Questions

739 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.



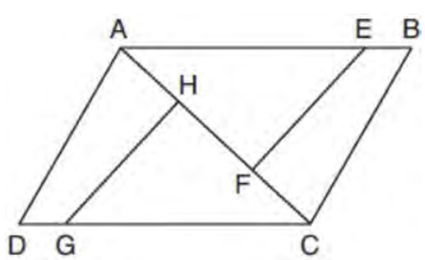
Prove: $\overline{AE} \cong \overline{CF}$

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



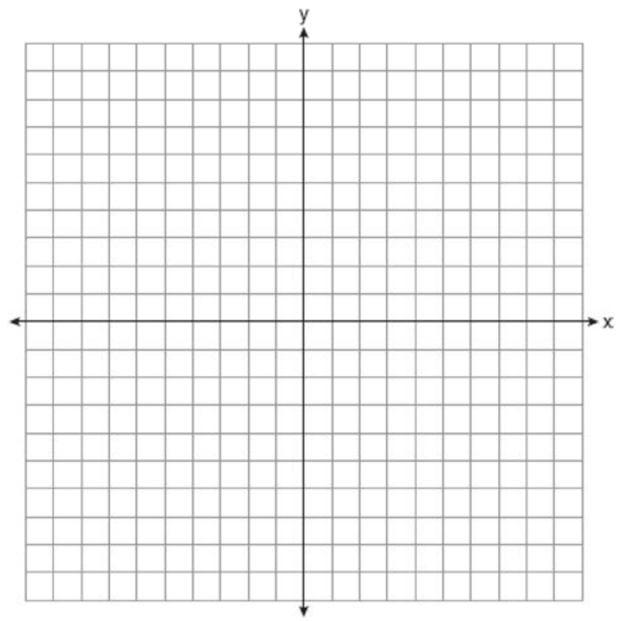
Prove: $TA \bullet HA = HE \bullet TH$

741 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 $\overline{AD} \cong \overline{CB}$.

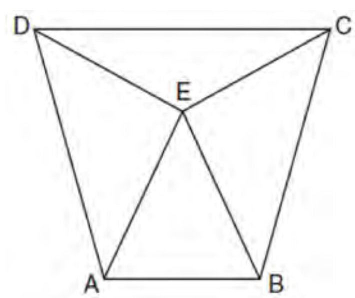


Prove: $\overline{EF} \cong \overline{GH}$

742 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.]

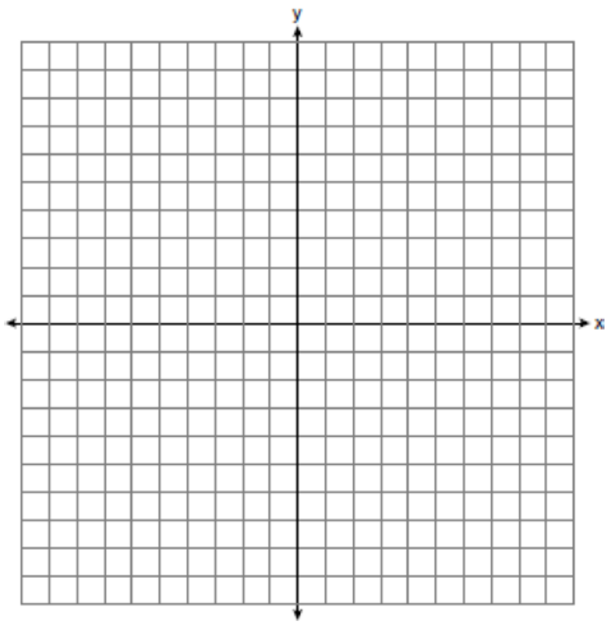


743 Isosceles trapezoid $ABCD$ has bases $\overline{DC}$ and $\overline{AB}$ with nonparallel legs $\overline{AD}$ and $\overline{BC}$. Segments AE, BE, CE, and DE are drawn in trapezoid $ABCD$ such that $\angle CDE \cong \angle DCE$, $\overline{AE} \perp \overline{DE}$, and $\overline{BE} \perp \overline{CE}$.

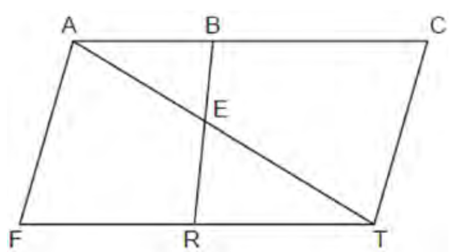


Prove $\triangle ADE \cong \triangle BCE$ and prove $\triangle AEB$ is an isosceles triangle.

744 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.]

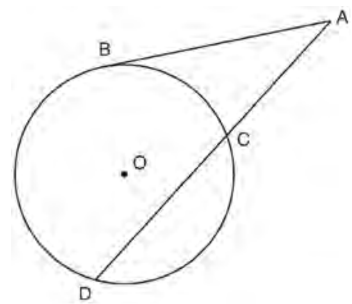


745 In the diagram below of quadrilateral $FACT$, $\overline{BR}$ intersects diagonal $\overline{AT}$ at E, $\overline{AF} \parallel \overline{CT}$, and $\overline{AF} \cong \overline{CT}$.



Prove: $(AB)(TE) = (AE)(TR)$

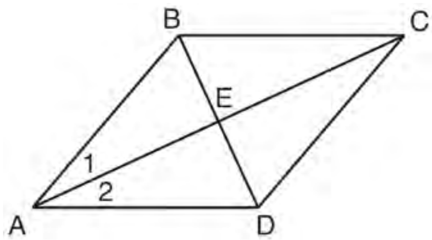
746 In the diagram below, secant $\overline{ACD}$ and tangent $\overline{AB}$ are drawn from external point A to circle O.



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

747 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?

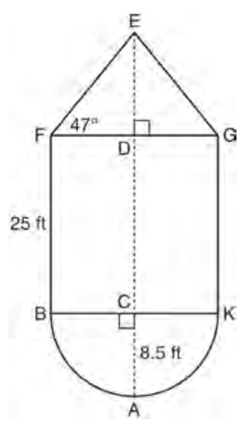
748 Given: Quadrilateral $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$ that bisect each other, and $\angle 1 \cong \angle 2$



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

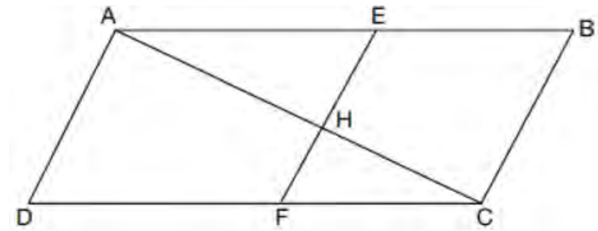
749 The water tower in the picture below is modeled by the two-dimensional figure beside it. The water tower is composed of a hemisphere, a cylinder, and a cone. Let C be the center of the hemisphere and let D be the center of the base of the cone.

Source: http://en.wikipedia.org



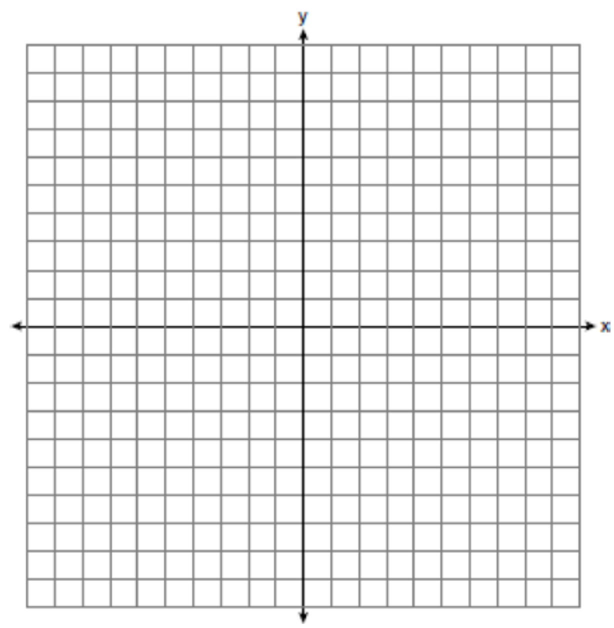
If $AC = 8.5$ feet, $BF = 25$ feet, and $m\angle EFD = 47°$, determine and state, to the *nearest cubic foot*, the volume of the water tower. The water tower was constructed to hold a maximum of 400,000 pounds of water. If water weighs 62.4 pounds per cubic foot, can the water tower be filled to 85%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

750 Given: Quadrilateral $ABCD$, $\overline{AC}$ and $\overline{EF}$ intersect at H, $\overline{EF} \parallel \overline{AD}$, $\overline{EF} \parallel \overline{BC}$, and $\overline{AD} \cong \overline{BC}$.

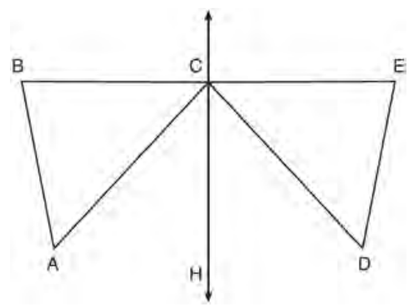


Prove: $(EH)(CH) = (FH)(AH)$

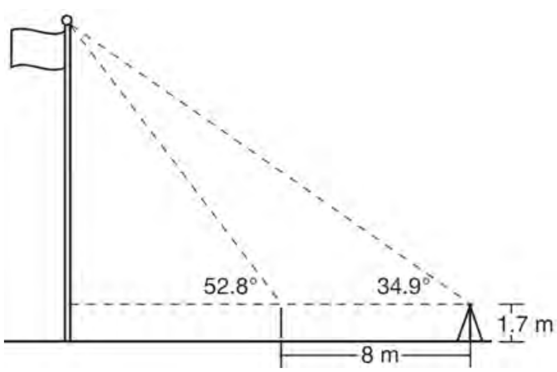
751 In the coordinate plane, the vertices of $\triangle RST$ are $R(6,-1)$, $S(1,-4)$, and $T(-5,6)$. Prove that $\triangle RST$ is a right triangle. State the coordinates of point P such that quadrilateral $RSTP$ is a rectangle. Prove that your quadrilateral $RSTP$ is a rectangle. [The use of the set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



752 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: $\triangle ABC \cong \triangle DEC$

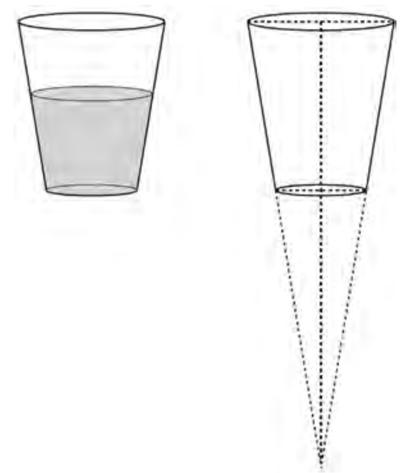


753 Cathy wants to determine the height of the flagpole shown in the diagram below. She uses a survey instrument to measure the angle of elevation to the top of the flagpole, and determines it to be 34.9°. She walks 8 meters closer and determines the new measure of the angle of elevation to be 52.8°.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



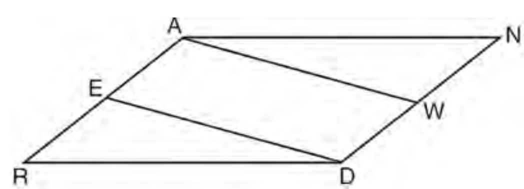
Determine and state, to the *nearest tenth of a meter*, the height of the flagpole.

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



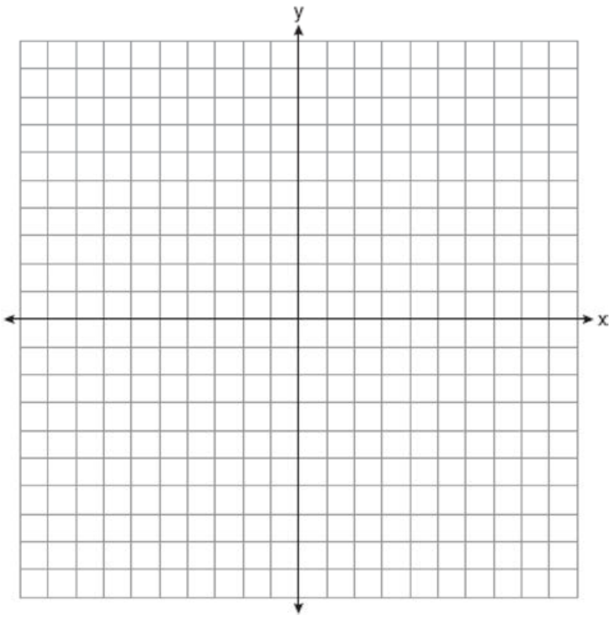
The diameter of the top of the glass is 3 inches, the diameter at the bottom of the glass is 2 inches, and the height of the glass is 5 inches. The base with a diameter of 2 inches must be parallel to the base with a diameter of 3 inches in order to find the height of the cone. Explain why. Determine 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.

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



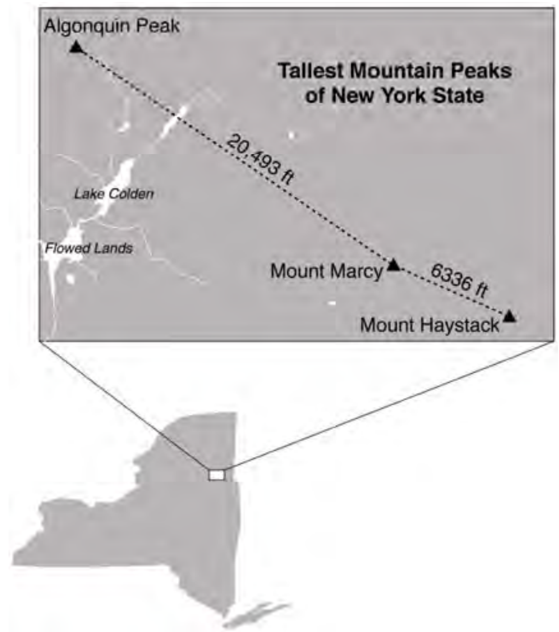
Prove that $\triangle ANW \cong \triangle DRE$. Prove that quadrilateral $AWDE$ is a parallelogram.

756 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.]



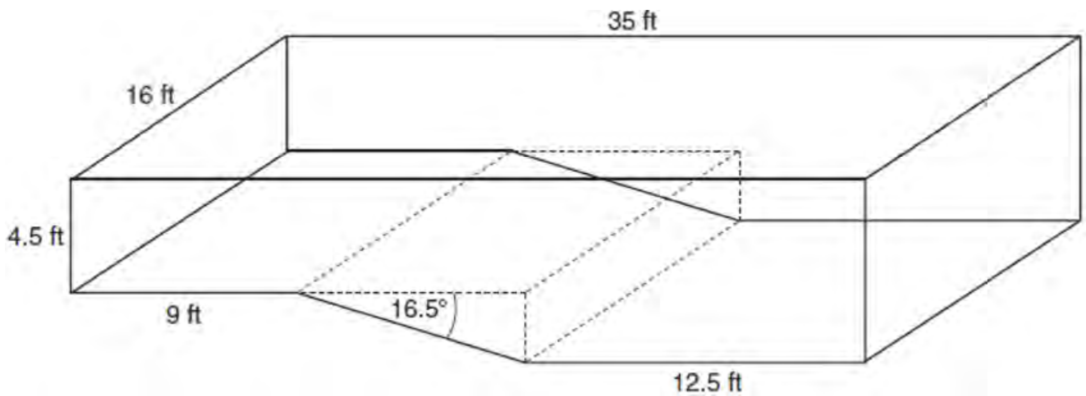
757 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later,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

758 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.



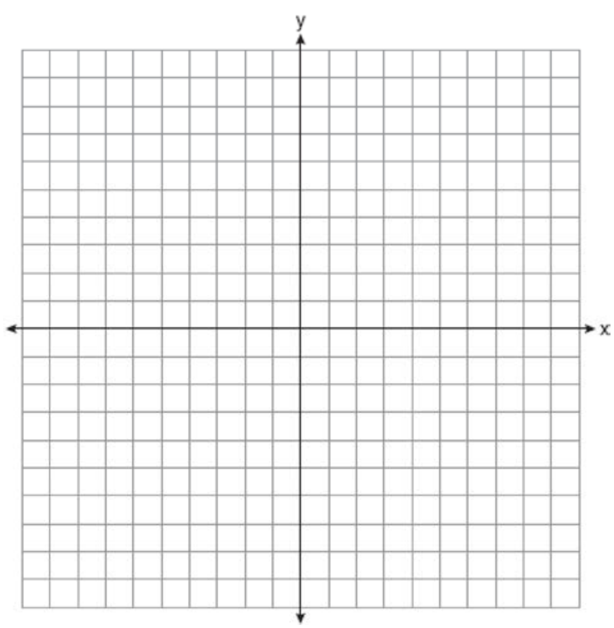
The angle of depression from the peak of Mount Marcy to the peak of Mount Haystack is 3.47 degrees. The angle of elevation from the peak of Algonquin Peak to the peak of Mount Marcy is 0.64 degrees. What are the heights, to the *nearest foot*, of Mount Marcy and Algonquin Peak? Justify your answer.

759 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.

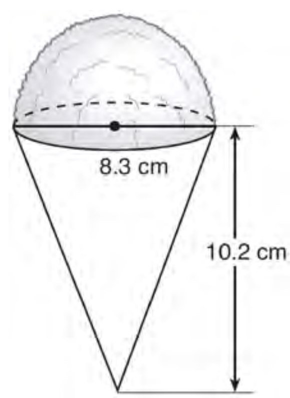


If the sloped floor has an angle of depression of 16.5 degrees, what is the depth of the pool at the deep end, to the *nearest tenth of a foot*? Find the volume of the inside of the pool to the *nearest cubic foot*. A garden hose is used to fill the pool. Water comes out of the hose at a rate of 10 .5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

760 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.]

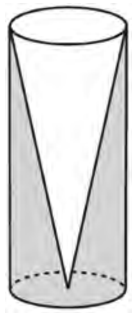


761 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.



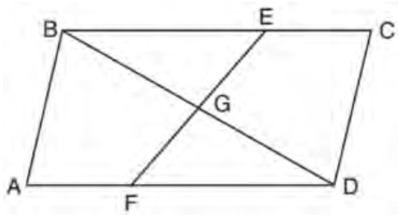
The desired density of the shaved ice is $0.697\ g/cm^3$, and the cost, per kilogram, of ice is \$3.83. Determine and state the cost of the ice needed to make 50 snow cones.

762 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?



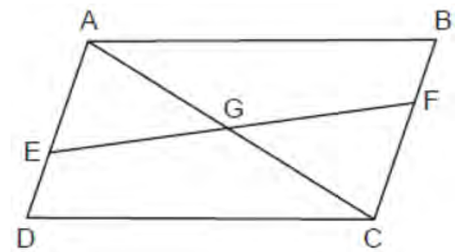
Walter goes to a hobby store to buy the wax for his candles. The wax costs \$0.10 per ounce. If the weight of the wax is 0.52 ounce per cubic inch, how much will it cost Walter to buy the wax for 100 candles? If Walter spent a total of \$37.83 for the molds and charges \$1.95 for each candle, what is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

763 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 $\overline{CE} \cong \overline{AF}$.



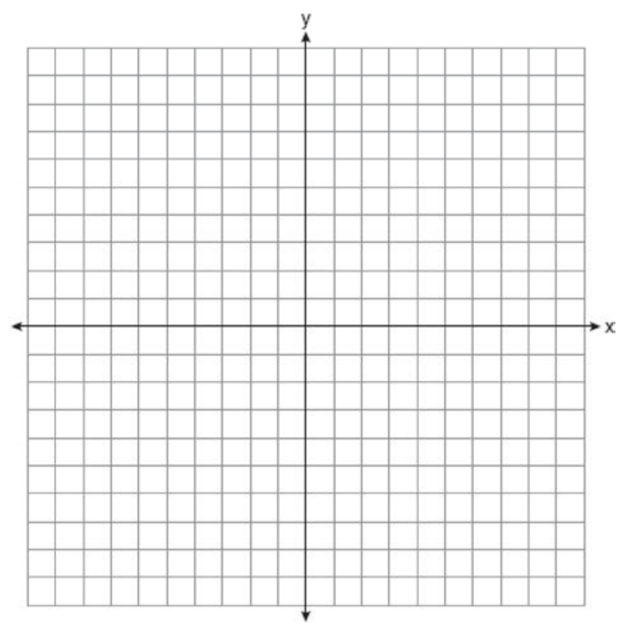
Prove: $\overline{FG} \cong \overline{EG}$

764 Given: Quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$, $\overline{AB} \parallel \overline{CD}$, diagonal $\overline{AC}$ intersects $\overline{EF}$ at G, and $\overline{DE} \cong \overline{BF}$

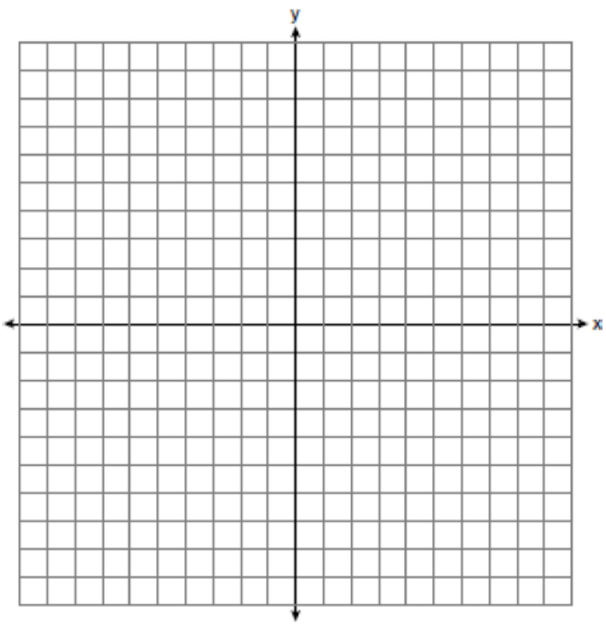


Prove: G is the midpoint of $\overline{EF}$

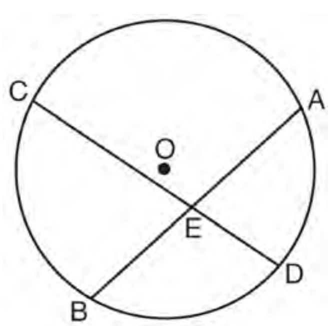
765 The coordinates of the vertices of $\triangle ABC$ are $A(-2,4)$, $B(-7,-1)$, and $C(-3,-3)$. Prove that $\triangle ABC$ is isosceles. State the coordinates of $\triangle A'B'C'$, the image of $\triangle ABC$, after a translation 5 units to the right and 5 units down. Prove that quadrilateral $AA'C'C$ is a rhombus. [The use of the set of axes below is optional.]



766 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.]

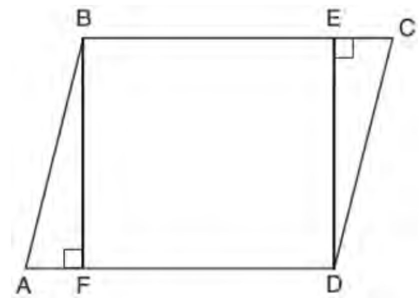


767 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E



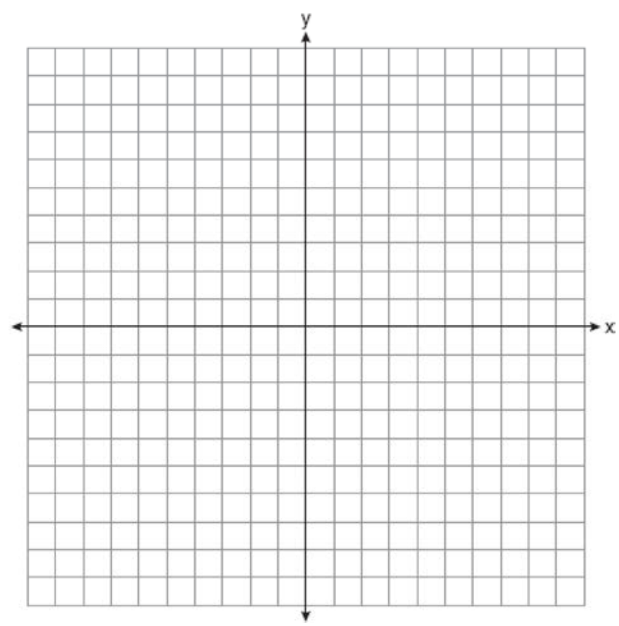
Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord. Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

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

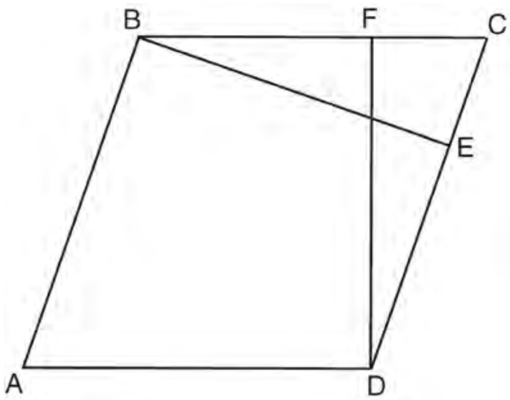


Prove: $BEDF$ is a rectangle

769 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.]



770 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.

Geometry Multiple Choice Regents Exam Questions
Answer Section

1 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

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

3 ANS: 2

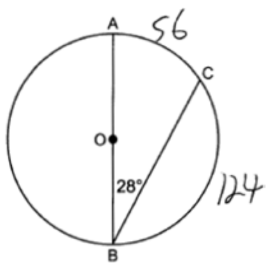
$$V=\frac{1}{3}\cdot 197^2\cdot 107=1,384,188$$

PTS: 2 REF: 082208geo TOP: Volume KEY: pyramids

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

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

6 ANS: 2



PTS: 2 REF: 062305geo TOP: Chords, Secants and Tangents
KEY: inscribed

7 ANS: 3

$$\frac{150}{360}\cdot 9^2\pi=33.75\pi$$

PTS: 2 REF: 012013geo TOP: Sectors

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

9 ANS: 4

$$\frac{140}{360}\cdot 9^2\pi=31.5\pi$$

PTS: 2 REF: 012317geo TOP: Sectors

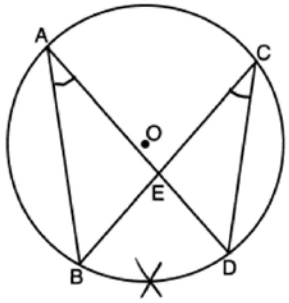
10 ANS: 3

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

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

12 ANS: 4



PTS: 2 REF: 082218geo TOP: Chords, Secants and Tangents
KEY: inscribed

13 ANS: 3

$90 - 30 = 60$

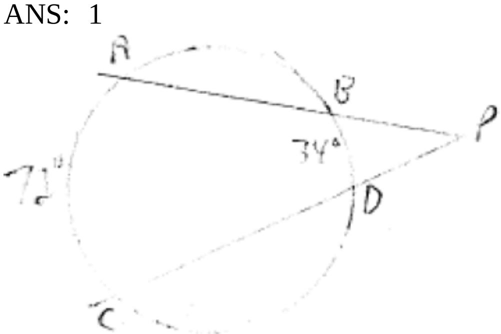
PTS: 2 REF: 012401geo TOP: Cofunctions

14 ANS: 4

1) SAS; 2) AAS; 3) SSS

PTS: 2 REF: 062216geo TOP: Triangle Congruency

15 ANS: 1



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

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

16 ANS: 1

$\cos 65 = \frac{x}{15}$

$x \approx 6.3$

PTS: 2 REF: 081924geo TOP: Using Trigonometry to Find a Side

17 ANS: 4

$$\left(\frac{360-120}{360}\right)(\pi)\left(9^2\right)=54\pi$$

PTS: 2 REF: 081912geo TOP: Sectors

18 ANS: 1

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

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

19 ANS: 3
A dilation does not preserve distance.

PTS: 2 REF: 062210geo TOP: Analytical Representations of Transformations
KEY: basic

20 ANS: 4 PTS: 2 REF: 062318geo TOP: Lines and Angles

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

22 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

23 ANS: 1

$$V=\pi r^2h=\pi\cdot 5^2\cdot 8\approx 200\pi$$

PTS: 2 REF: 082304geo TOP: Volume KEY: cylinders

24 ANS: 1 PTS: 2 REF: 062208geo TOP: Rotations of Two-Dimensional Objects

25 ANS: 3

$$V=\pi(8)^2(4-0.5)(7.48)\approx 5264$$

PTS: 2 REF: 012320geo TOP: Volume KEY: cylinders

26 ANS: 3

$2(2x+8)=7x-2$ $AB=7(6)-2=40$. Since $\overline{EF}$ is a midsegment, $EF=\frac{40}{2}=20$. Since $\triangle ABC$ is equilateral,

$$4x+16=7x-2$$

$$18=3x$$

$$6=x$$

$AE=BF=\frac{40}{2}=20$. $40+20+20+20=100$

PTS: 2 REF: 061923geo TOP: Midsegments

27 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

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

29 ANS: 2

$$\frac{7.5}{3.5} = \frac{9.5}{x}$$

$$x \approx 4.4$$

PTS: 2 REF: 012303geo TOP: Side Splitter Theorem

30 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

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

32 ANS: 2

$$-4 + \frac{2}{5}(6 - -4) = -4 + \frac{2}{5}(10) = -4 + 4 = 0 \quad -1 + \frac{2}{5}(4 - -1) = -1 + \frac{2}{5}(5) = -1 + 2 = 1$$

PTS: 2 REF: 062222geo TOP: Directed Line Segments

33 ANS: 3 PTS: 2 REF: 081817geo TOP: Mapping a Polygon onto Itself

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

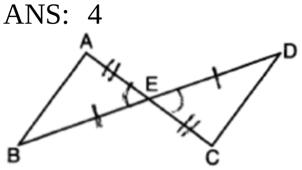
35 ANS: 1 PTS: 2 REF: 081904geo
TOP: Centroid, Orthocenter, Incenter and Circumcenter

36 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

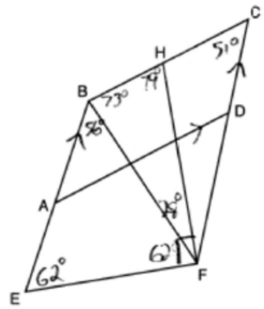
37 ANS: 4



PTS: 2 REF: 061908geo TOP: Triangle Proofs
KEY: statements

38 ANS: 2 PTS: 2 REF: 082322geo TOP: Identifying Transformations

39 ANS: 1



m$\angle CBE = 180 - 51 = 129$

PTS: 2 REF: 062221geo TOP: Interior and Exterior Angles of Polygons

40 ANS: 1

A dilation by a scale factor of 4 centered at the origin preserves parallelism and $(0,-2) \to (0,-8)$.

PTS: 2 REF: 081910geo TOP: Line Dilations

41 ANS: 2

The slope of $-3x + 4y = 8$ is $\frac{3}{4}$.

PTS: 2 REF: 061907geo TOP: Line Dilations

42 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

43 ANS: 1 PTS: 2 REF: 012403geo TOP: Mapping a Polygon onto Itself

44 ANS: 2

$3y = -6x + 3$

$y = -2x + 1$

PTS: 2 REF: 062319geo TOP: Line Dilations

45 ANS: 2 PTS: 2 REF: 082311geo TOP: Cofunctions

46 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

47 ANS: 4 PTS: 2 REF: 011916geo TOP: Exterior Angle Theorem

48 ANS: 3 PTS: 2 REF: 081913geo TOP: Special Quadrilaterals

49 ANS: 3

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

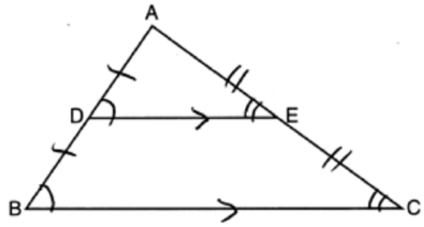
$GM = 16 \qquad IM = 20$

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

50 ANS: 1 PTS: 2 REF: 062312geo TOP: Cofunctions

51 ANS: 1 PTS: 2 REF: 082209geo TOP: Mapping a Polygon onto Itself

52 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

53 ANS: 3

$\frac{360°}{6} = 60°$ 120º is a multiple of 60º

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

54 ANS: 3

$$\frac{10}{x} = \frac{15}{12}$$
$$x = 8$$

PTS: 2 REF: 081918geo TOP: Side Splitter Theorem

55 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

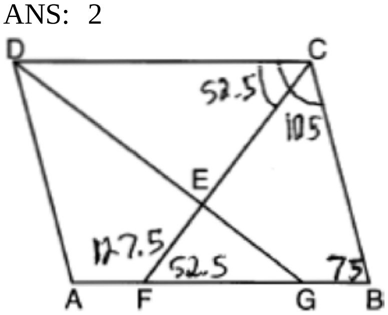
56 ANS: 4

$$x^2 = 3 \times 24$$
$$x = \sqrt{72}$$

PTS: 2 REF: 012315geo TOP: Similarity KEY: altitude

57 ANS: 1 PTS: 2 REF: 012316geo TOP: Medians, Altitudes and Bisectors

58 ANS: 2



PTS: 2 REF: 081907geo TOP: Interior and Exterior Angles of Polygons

59 ANS: 4

$$\cos 47 = \frac{50}{x}$$

$$x \approx 73$$

PTS: 2 REF: 012406geo TOP: Using Trigonometry to Find a Side

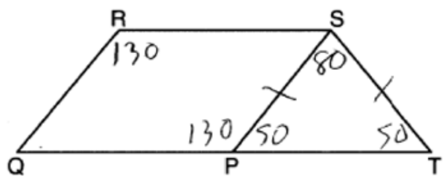
60 ANS: 3

$$2 \times \frac{40 \times 16}{33\frac{1}{3}} = 38.4$$

PTS: 2 REF: 012404geo TOP: Area of Polygons

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

62 ANS: 2



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

63 ANS: 3 PTS: 2 REF: 012309geo TOP: Special Quadrilaterals

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

65 ANS: 3 PTS: 2 REF: 062302geo TOP: Properties of Transformations
KEY: graphics

66 ANS: 3

Therefore $\angle 2 \cong \angle 7$. Since opposite angles are congruent, *ABCD* is a parallelogram.

PTS: 2 REF: 062209geo TOP: Parallelograms

67 ANS: 2

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

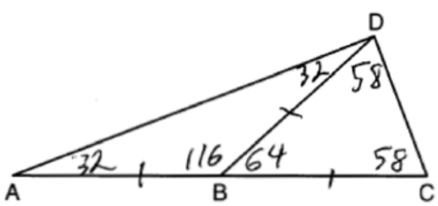
PTS: 2 REF: 061917geo TOP: Special Quadrilaterals

68 ANS: 1

$$8 \times 3.5 \times 2.25 \times 1.055 = 66.465$$

PTS: 2 REF: 012014geo TOP: Density

69 ANS: 3



PTS: 2 REF: 081905geo TOP: Exterior Angle Theorem

70 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

71 ANS: 4

Another equation of line t is $y = 3x - 6$. $-6 \bullet \frac{1}{2} = -3$

PTS: 2 REF: 012319geo TOP: Line Dilations

72 ANS: 1

$\frac{36}{4} = 9$

PTS: 2 REF: 012321geo TOP: Midsegments

73 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

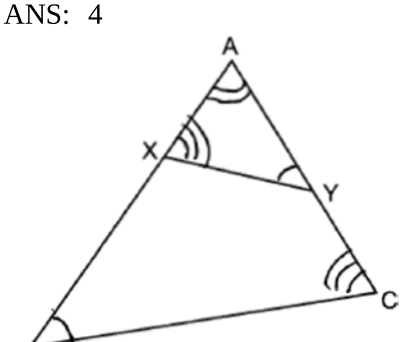
74 ANS: 3

$$x^2 + 12x + 36 + y^2 = -27 + 36$$
$$(x+6)^2 + y^2 = 9$$

PTS: 2 REF: 082313geo TOP: Equations of Circles
KEY: completing the square

75 ANS: 4 PTS: 2 REF: 081911geo TOP: Rotations of Two-Dimensional Objects

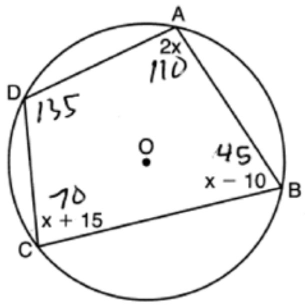
76 ANS: 4



$\triangle BAC \sim \triangle YAX$

PTS: 2 REF: 082324geo TOP: Similarity KEY: basic

77 ANS: 4



$$2x+x+15=180 \quad 180-45=135$$
$$3x=165$$
$$x=55$$

PTS: 2 REF: 082224geo TOP: Inscribed Quadrilaterals

78 ANS: 2

$$\frac{x}{360}(15)^2\pi=75\pi$$
$$x=120$$

PTS: 2 REF: 011914geo TOP: Sectors

79 ANS: 2

$$\frac{4}{3}\pi\times\left(\frac{1.68}{2}\right)^3\times0.6523\approx1.62$$

PTS: 2 REF: 081914geo TOP: Density

80 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

81 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

82 ANS: 3

$$\frac{1}{2}\times24=12$$

PTS: 2 REF: 012009geo TOP: Midsegments

83 ANS: 3
$5x - 10 = 4x - 4$ $4(6) - 4 = 20$

$x = 6$

PTS: 2 REF: 012408geo TOP: Properties of Transformations
KEY: graphics
84 ANS: 1 PTS: 2 REF: 012004geo TOP: Special Quadrilaterals
85 ANS: 1 PTS: 2 REF: 012022geo TOP: Compositions of Transformations
KEY: grids
86 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
87 ANS: 3 PTS: 2 REF: 011904geo TOP: Mapping a Polygon onto Itself
88 ANS: 2
$8 \times 8 \times 9 + \frac{1}{3}(8 \times 8 \times 3) = 640$

PTS: 2 REF: 011909geo TOP: Volume KEY: compositions
89 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
90 ANS: 1
$\frac{360°}{5} = 72°$

PTS: 2 REF: 062204geo TOP: Mapping a Polygon onto Itself
91 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
92 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
93 ANS: 4
$\frac{54}{360} \cdot 10^2 \pi = 15\pi$

PTS: 2 REF: 062224geo TOP: Sectors

94 ANS: 2 PTS: 2 REF: 062202geo
TOP: Cross-Sections of Three-Dimensional Objects

95 ANS: 2

$$\frac{(-4,2)}{(-2,1)}=2$$

PTS: 2 REF: 062201geo TOP: Dilations

96 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

97 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

98 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

99 ANS: 2

$$180-(180-42-42)$$

PTS: 2 REF: 062317geo TOP: Exterior Angle Theorem

100 ANS: 1

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

PTS: 2 REF: 012008geo TOP: Line Dilations

101 ANS: 1 PTS: 2 REF: 012304geo TOP: Cofunctions

102 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

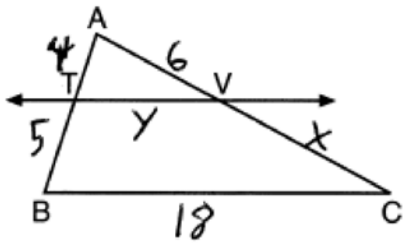
103 ANS: 3 PTS: 2 REF: 082307geo TOP: Rotations of Two-Dimensional Objects

104 ANS: 2

$\angle ADE \cong \angle ABC$ and $\angle AED \cong \angle ACB$

PTS: 2 REF: 062214geo TOP: Side Splitter Theorem

105 ANS: 4



$$\frac{4}{5} = \frac{6}{x} \quad \frac{4}{9} = \frac{y}{18} \quad 5 + 18 + 7.5 + 8 = 38.5$$

$$x = 7.5 \quad y = 8$$

PTS: 2 REF: 082222geo TOP: Side Splitter Theorem

106 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 KEY: altitude

107 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

108 ANS: 3

3) Could be an isosceles trapezoid.

PTS: 2 REF: 012318geo TOP: Parallelograms

109 ANS: 3 PTS: 2 REF: 012302geo TOP: Rotations of Two-Dimensional Objects

110 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

111 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

112 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

113 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

114 ANS: 2 PTS: 2 REF: 082220geo TOP: Compositions of Transformations
KEY: identify

115 ANS: 2

$\frac{x}{15} = \frac{5}{12}$

$x = 6.25$

PTS: 2 REF: 011906geo TOP: Side Splitter Theorem

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

117 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

118 ANS: 2

$\triangle ACB \sim \triangle AED$

PTS: 2 REF: 012308geo TOP: Side Splitter Theorem

119 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

120 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

121 ANS: 1

$\triangle ABC \sim \triangle RST$

PTS: 2 REF: 011908geo TOP: Similarity KEY: basic

122 ANS: 2

$\left(\frac{1}{4}\right)^2=\frac{1}{16}$

PTS: 2 REF: 082216geo TOP: Similarity KEY: perimeter and area

123 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

124 ANS: 4 PTS: 2 REF: 062321geo TOP: Side Splitter Theorem

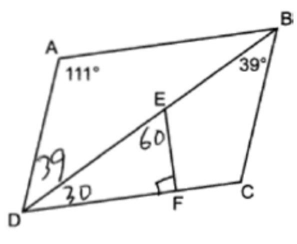
125 ANS: 1

$\cos C=\frac{15}{17}$

$C\approx 28$

PTS: 2 REF: 012007geo TOP: Using Trigonometry to Find an Angle

126 ANS: 3



PTS: 2 REF: 062306geo TOP: Interior and Exterior Angles of Polygons

127 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

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

129 ANS: 3 PTS: 2 REF: 062215geo TOP: Exterior Angle Theorem

130 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

131 ANS: 3 PTS: 2 REF: 062310geo TOP: Special Quadrilaterals

132 ANS: 2 PTS: 2 REF: 082204geo TOP: Special Quadrilaterals

133 ANS: 1

$\frac{9}{6} = \frac{3}{2}$

PTS: 2 REF: 061905geo TOP: Line Dilations

134 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

135 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

136 ANS: 3

$3 - 1 = 2$

$1 - 2 = -1$

PTS: 2 REF: 082317geo TOP: Reflections

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

138 ANS: 2

$\frac{4}{x} = \frac{6}{9}$

$x = 6$

PTS: 2 REF: 061915geo TOP: Similarity KEY: basic

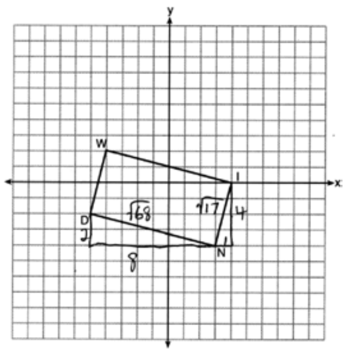
139 ANS: 2 PTS: 2 REF: 061903geo TOP: Rotations of Two-Dimensional Objects

140 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

141 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

142 ANS: 3 PTS: 2 REF: 062323geo TOP: Trapezoids

143 ANS: 2 PTS: 2 REF: 062301geo
TOP: Cross-Sections of Three-Dimensional Objects

144 ANS: 4

A: $(-3-3,4-5)\to(-6,-1)\to(-12,-2)\to(-12+3,-2+5)$

B: $(5-3,2-5)\to(2,-3)\to(4,-6)\to(4+3,-6+5)$

PTS: 2 REF: 012322geo TOP: Line Dilations

145 ANS: 3

Sine and cosine are cofunctions.

PTS: 2 REF: 062206geo TOP: Cofunctions

146 ANS: 4

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

$$x\approx 56$$

PTS: 2 REF: 061922geo TOP: Using Trigonometry to Find an Angle

147 ANS: 2

$$\frac{10}{x}=\frac{8}{6}$$

$$8x=60$$

$$x=7.5$$

PTS: 2 REF: 012402geo TOP: Side Splitter Theorem

148 ANS: 3

$$\cos x = \frac{8}{25}$$
$$x \approx 71$$

PTS: 2 REF: 082303geo TOP: Using Trigonometry to Find an Angle

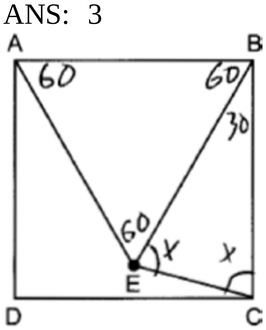
149 ANS: 2 PTS: 2 REF: 082305geo TOP: Special Quadrilaterals

150 ANS: 1 PTS: 2 REF: 082320geo TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

151 ANS: 4 PTS: 2 REF: 082210geo TOP: Cofunctions

152 ANS: 4 PTS: 2 REF: 011905geo TOP: Chords, Secants and Tangents
KEY: inscribed

153 ANS: 3



$$30 + 2x = 180$$
$$2x = 150$$
$$x = 75$$

PTS: 2 REF: 082315geo TOP: Interior and Exterior Angles of Polygons

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

155 ANS: 2

$$\frac{1}{3}(36)(10)(2.7) = 324$$

PTS: 2 REF: 082312geo TOP: Density

156 ANS: 3
Since orientation is preserved, a reflection has not occurred.

PTS: 2 REF: 062205geo TOP: Identifying Transformations
KEY: graphics

157 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

158 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

159 ANS: 1

$$\cos S = \frac{12.3}{13.6}$$
$$S \approx 25°$$

PTS: 2 REF: 062304geo TOP: Using Trigonometry to Find an Angle

160 ANS: 1

$$5x = 12 \cdot 7 \quad 16.8 + 7 = 23.8$$
$$5x = 84$$
$$x = 16.8$$

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

161 ANS: 2

$$\tan 11.87 = \frac{x}{0.5(5280)}$$
$$x \approx 555$$

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

162 ANS: 4 PTS: 2 REF: 081922geo TOP: Chords, Secants and Tangents
KEY: intersecting chords, length

163 ANS: 3 PTS: 2 REF: 082203geo TOP: Properties of Transformations
KEY: basic

164 ANS: 3 PTS: 2 REF: 062307geo TOP: Side Splitter Theorem

165 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

166 ANS: 1

$$\sin N = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{12}{20}$$

PTS: 2 REF: 012307geo TOP: Trigonometric Ratios

167 ANS: 4

$\sin A = \frac{13}{16}$

$A \approx 54°$

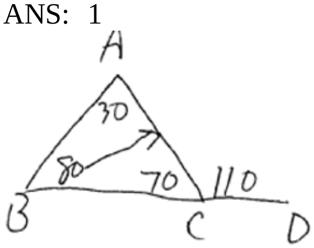
PTS: 2 REF: 082207geo TOP: Using Trigonometry to Find an Angle

168 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

169 ANS: 1



PTS: 2 REF: 082310geo TOP: Angle Side Relationship

170 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

171 ANS: 4 PTS: 2 REF: 062223geo TOP: Line Dilations

172 ANS: 2

$\frac{70}{360} \cdot 6^2 \pi = 7\pi$

PTS: 2 REF: 082309geo TOP: Sectors

173 ANS: 1

A dilation preserves angle measure, so $\angle A \cong \angle CDE$.

PTS: 2 REF: 062203geo TOP: Trigonometric Ratios

174 ANS: 2

$90 - 57 = 33$

PTS: 2 REF: 061909geo TOP: Cofunctions

175 ANS: 2

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

PTS: 2 REF: 011907geo TOP: Special Quadrilaterals

176 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
177 ANS: 4
Isosceles triangle theorem.

PTS: 2 REF: 062207geo TOP: Isosceles Triangle Theorem
178 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
179 ANS: 3 PTS: 2 REF: 082212geo TOP: Line Dilations
180 ANS: 2
$\triangle ABC \sim \triangle BDC$

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

PTS: 2 REF: 012023geo TOP: Trigonometric Ratios
181 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
182 ANS: 1
$m_{\overline{AB}} = \frac{-3-5}{-1-6} = \frac{-8}{-7} = \frac{8}{7}$

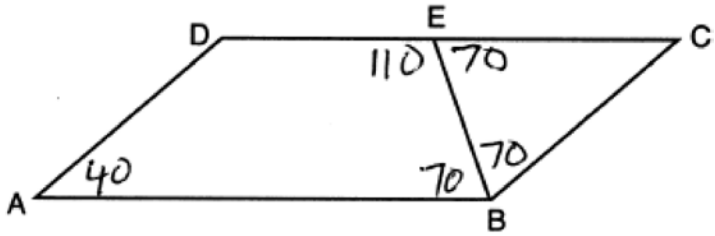
PTS: 2 REF: 062315geo TOP: Polygons in the Coordinate Plane
183 ANS: 1 PTS: 2 REF: 082211geo
TOP: Cross-Sections of Three-Dimensional Objects
184 ANS: 4
$\left(\frac{-4+0}{2}, \frac{6+4}{2}\right) \to (-2,5)$; $\frac{6-4}{-4-0} = \frac{2}{-4} = -\frac{1}{2}$; $m_{\perp} = 2$; $y - 5 = 2(x+2)$

$$y = 2x + 4 + 5$$

$$y = 2x + 9$$

PTS: 2 REF: 062324geo TOP: Parallel and Perpendicular Lines
KEY: perpendicular bisector

185 ANS: 3



PTS: 2 REF: 082215geo TOP: Interior and Exterior Angles of Polygons

186 ANS: 1 PTS: 2 REF: 062308geo TOP: Compositions of Transformations

187 ANS: 4

$\sin 18 = \frac{8}{x}$

$x \approx 25.9$

PTS: 2 REF: 062316geo TOP: Using Trigonometry to Find a Side

188 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

189 ANS: 1

$\frac{1}{3}, \frac{3}{9}, \frac{\sqrt{10}}{\sqrt{90}}$

PTS: 2 REF: 082206geo TOP: Dilations

190 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

191 ANS: 4 PTS: 2 REF: 082301geo
TOP: Cross-Sections of Three-Dimensional Objects

192 ANS: 4

$\frac{x}{10} = \frac{12}{8}$ $\quad 15 + 10 = 25$

$x = 15$

PTS: 2 REF: 082314geo TOP: Side Splitter Theorem

193 ANS: 1

$$\sin 10 = \frac{x}{140}$$

$$x \approx 24$$

PTS: 2 REF: 062217geo TOP: Using Trigonometry to Find a Side

194 ANS: 4

d) is SSA

PTS: 2 REF: 061914geo TOP: Triangle Congruency

195 ANS: 4

$$\frac{18}{4.5} = 4$$

PTS: 2 REF: 011901geo TOP: Line Dilations

196 ANS: 1

2) 90°; 3) 360°; 4) 72°

PTS: 2 REF: 012311geo TOP: Mapping a Polygon onto Itself

197 ANS: 4

$$\frac{360°}{n} = 36$$

$$n = 10$$

PTS: 2 REF: 082205geo TOP: Mapping a Polygon onto Itself

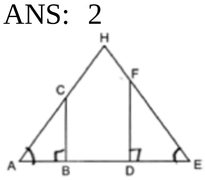
198 ANS: 2

$$19.9 = \pi d \quad \frac{4}{3}\pi\left(\frac{19.9}{2\pi}\right)^3 \approx 133$$

$$\frac{19.9}{\pi} = d$$

PTS: 2 REF: 012310geo TOP: Volume KEY: spheres

199 ANS: 2



PTS: 2 REF: 062314geo TOP: Similarity KEY: basic

200 ANS: 3

$8 \cdot 15 = 16 \cdot 7.5$

PTS: 2 REF: 061913geo TOP: Chords, Secants and Tangents

KEY: intersecting chords, length

201 ANS: 4
$2x - 1 = 16$

$x = 8.5$

PTS: 2 REF: 011902geo TOP: Properties of Transformations
KEY: graphics

202 ANS: 4
$\frac{2}{4} = \frac{8}{x+2}$ $14 + 2 = 16$

$2x + 4 = 32$

$x = 14$

PTS: 2 REF: 012024geo TOP: Side Splitter Theorem

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

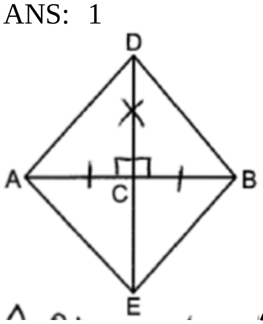
204 ANS: 2
$V = \frac{1}{3}(8)^2 \cdot 6 = 128$

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

205 ANS: 4
$90 - 35 = 55$ $55 \times 2 = 110$

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

206 ANS: 1



$\triangle ADC \cong \triangle BDC$ by SAS

PTS: 2 REF: 082316geo TOP: Triangle Congruency

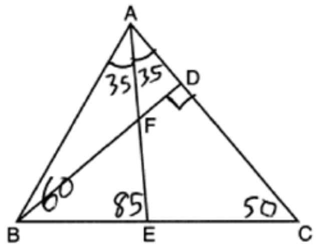
207 ANS: 4 PTS: 2 REF: 011921geo TOP: Triangles in the Coordinate Plane

208 ANS: 4
$x^2 = 10.2 \times 14.3$

$x \approx 12.1$

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

209 ANS: 4



PTS: 2 REF: 012305geo TOP: Interior and Exterior Angles of Triangles

210 ANS: 1

$\frac{1}{3}(4.5)^2(10)(0.676) \approx 45.6$

PTS: 2 REF: 062212geo TOP: Density

211 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

212 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

213 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

214 ANS: 4 PTS: 2 REF: 012019geo
TOP: Cross-Sections of Three-Dimensional Objects

215 ANS: 3

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

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

216 ANS: 2

$$18^2 = 12(x+12)$$
$$324 = 12(x+12)$$
$$27 = x+12$$
$$x = 15$$

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

217 ANS: 1

$$\frac{6.5}{10.5} = \frac{5.2}{x}$$
$$x = 8.4$$

PTS: 2 REF: 012006geo TOP: Trapezoids

218 ANS: 2

$$180 - 40 - 95 = 45$$

PTS: 2 REF: 082201geo TOP: Properties of Transformations
KEY: graphics

219 ANS: 3

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

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

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

221 ANS: 4

$\frac{360}{6} = 60$ and 300 is a multiple of 60.

PTS: 2 REF: 082306geo TOP: Mapping a Polygon onto Itself

222 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

223 ANS: 4

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

PTS: 2 REF: 011917geo TOP: Trigonometric Ratios

Geometry Multiple Choice Regents Exam Questions
Answer Section

224 ANS: 1

$24x = 10^2$

$24x = 100$

$x \approx 4.2$

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

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

226 ANS: 2

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

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

227 ANS: 1

$2x + 4 + 46 = 90$

$2x = 40$

$x = 20$

PTS: 2 REF: 061808geo TOP: Cofunctions

228 ANS: 4

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

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

229 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

230 ANS: 2 PTS: 2 REF: 012409geo TOP: Dilations

231 ANS: 1

$6^2 = 4x$

$x = 9$

PTS: 2 REF: 012412geo TOP: Similarity KEY: altitude

232 ANS: 2 PTS: 2 REF: 061701geo TOP: Compositions of Transformations

KEY: identify

233 ANS: 4

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

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

234 ANS: 4

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

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

235 ANS: 3 PTS: 2 REF: 061706geo TOP: Line Dilations

236 ANS: 3

$$\begin{aligned} x(x-6) &= 4^2 \\ x^2-6x-16 &= 0 \\ (x-8)(x+2) &= 0 \\ x &= 8 \end{aligned}$$

PTS: 2 REF: 081807geo TOP: Similarity KEY: altitude

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

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

239 ANS: 4

$$\begin{aligned} \frac{6.6}{x} &= \frac{4.2}{5.25} \\ 4.2x &= 34.65 \\ x &= 8.25 \end{aligned}$$

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

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

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

242 ANS: 1

B: $(4-3,3-4) \to (1,-1) \to (2,-2) \to (2+3,-2+4)$

C: $(2-3,1-4) \to (-1,-3) \to (-2,-6) \to (-2+3,-6+4)$

PTS: 2 REF: 011713geo TOP: Line Dilations

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

244 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

245 ANS: 1

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

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

246 ANS: 4 PTS: 2 REF: 081803geo TOP: Rotations of Two-Dimensional Objects

247 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

248 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

249 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

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

251 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

252 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

253 ANS: 4 PTS: 2 REF: 011808geo

TOP: Analytical Representations of Transformations KEY: basic

254 ANS: 1

$V=\frac{1}{3}\pi(4)^2(6)=32\pi$

PTS: 2 REF: 061718geo TOP: Rotations of Two-Dimensional Objects

255 ANS: 2

$$\begin{aligned} 6\cdot 6 &= x(x-5) \\ 36 &= x^2-5x \\ 0 &= x^2-5x-36 \\ 0 &= (x-9)(x+4) \\ x &= 9 \end{aligned}$$

PTS: 2 REF: 061708geo TOP: Chords, Secants and Tangents

KEY: intersecting chords, length

256 ANS: 2

$$\begin{aligned} x^2 &= 12(12-8) \\ x^2 &= 48 \\ x &= 4\sqrt{3} \end{aligned}$$

PTS: 2 REF: 011823geo TOP: Similarity KEY: leg

257 ANS: 3 PTS: 2 REF: 081805geo

TOP: Cross-Sections of Three-Dimensional Objects

258 ANS: 3

$6\cdot 3^2=54 \quad 12\cdot 3=36$

PTS: 2 REF: 081823geo TOP: Dilations

259 ANS: 3 PTS: 2 REF: 011714geo TOP: Trigonometric Ratios

260 ANS: 2

$$\begin{aligned} \frac{x}{x+3} &= \frac{14}{21} \qquad 14-6=8 \\ 21x &= 14x+42 \\ 7x &= 42 \\ x &= 6 \end{aligned}$$

PTS: 2 REF: 081812geo TOP: Side Splitter Theorem

261 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

262 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

263 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

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

265 ANS: 1

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

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

266 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

267 ANS: 4 PTS: 2 REF: 061803geo TOP: Identifying Transformations
KEY: graphics

268 ANS: 3

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

$24x = 600$

$x = 25$

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

269 ANS: 1

$\frac{64}{4} = 16$ $16^2 = 256$ $\begin{array}{c} 2w + 2(w+2) = 64 \\ w = 15 \end{array}$ $15 \times 17 = 255$ $\begin{array}{c} 2w + 2(w+4) = 64 \\ w = 14 \end{array}$ $14 \times 18 = 252$ $\begin{array}{c} 2w + 2(w+6) = 64 \\ w = 13 \end{array}$

$13 \times 19 = 247$

PTS: 2 REF: 011708geo TOP: Area of Polygons

270 ANS: 4
Opposite angles of an inscribed quadrilateral are supplementary.

PTS: 2 REF: 011821geo TOP: Inscribed Quadrilaterals
271 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
272 ANS: 4

$$\sin 16.5=\frac{8}{x}$$
$$x\approx 28.2$$

PTS: 2 REF: 081806ai TOP: Using Trigonometry to Find a Side
273 ANS: 4 PTS: 2 REF: 081810geo TOP: Triangle Proofs
KEY: statements
274 ANS: 1

$$\cos x=\frac{12}{13}$$
$$x\approx 23$$

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

$$\cos B=\frac{17.6}{26}$$
$$B\approx 47$$

PTS: 2 REF: 061806geo TOP: Using Trigonometry to Find an Angle
276 ANS: 1
Distance and angle measure are preserved after a reflection and translation.

PTS: 2 REF: 081802geo TOP: Properties of Transformations
KEY: basic
277 ANS: 4 PTS: 2 REF: 081702geo TOP: Identifying Transformations
KEY: basic
278 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

279 ANS: 3

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

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

280 ANS: 1 PTS: 2 REF: 011814geo TOP: Line Dilations

281 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

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

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

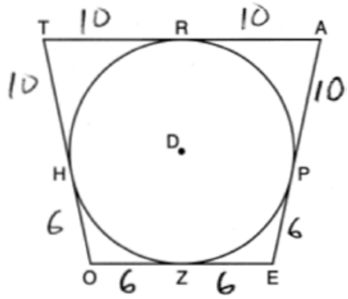
284 ANS: 3 PTS: 2 REF: 061702geo TOP: Polygons in the Coordinate Plane

285 ANS: 3

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

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

286 ANS: 2



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

287 ANS: 3

$\frac{x}{6.3}=\frac{3}{5}$ $\frac{y}{9.4}=\frac{6.3}{6.3+3.78}$

$x=3.78$ $y\approx 5.9$

PTS: 2 REF: 081816geo TOP: Side Splitter Theorem

288 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

289 ANS: 1

$$82.8 = \frac{1}{3}(4.6)(9)h$$
$$h = 6$$

PTS: 2 REF: 061810geo TOP: Volume KEY: pyramids

290 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

291 ANS: 4

$$\frac{360^\circ}{10} = 36^\circ \quad 252^\circ \text{ is a multiple of } 36^\circ$$

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

292 ANS: 4

$$\frac{2}{4} = \frac{9 - x}{x}$$
$$36 - 4x = 2x$$
$$x = 6$$

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

293 ANS: 1

$$84 = \frac{1}{3} \cdot s^2 \cdot 7$$
$$6 = s$$

PTS: 2 REF: 061716geo TOP: Volume KEY: pyramids

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

295 ANS: 1

$$\cos S = \frac{60}{65}$$
$$S \approx 23$$

PTS: 2 REF: 061713geo TOP: Using Trigonometry to Find an Angle

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

$3.6 = x$

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

297 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

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

299 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

300 ANS: 1

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

$O \approx 68.6$

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

301 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

302 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

303 ANS: 1
$360-(82+104+121)=53$

PTS: 2 REF: 011801geo TOP: Properties of Transformations
KEY: graph

304 ANS: 4
$\frac{300}{360}\cdot 8^2\pi=\frac{160\pi}{3}$

PTS: 2 REF: 011721geo TOP: Sectors

305 ANS: 2 PTS: 2 REF: 061720geo TOP: Parallelograms

306 ANS: 4
$\sin 30=\frac{x}{75}$

$x=37.5$

PTS: 2 REF: 012411geo TOP: Using Trigonometry to Find a Side

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

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

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

309 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

310 ANS: 4
$C=12\pi$ $\frac{120}{360}(12\pi)=\frac{1}{3}(12\pi)$

PTS: 2 REF: 061822geo TOP: Arc Length KEY: arc length

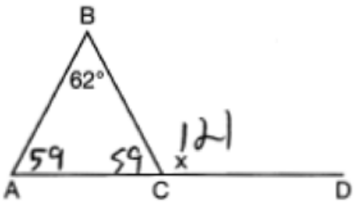
311 ANS: 1
$3+\frac{2}{5}(8-3)=3+\frac{2}{5}(5)=3+2=5$ $5+\frac{2}{5}(-5-5)=5+\frac{2}{5}(-10)=5-4=1$

PTS: 2 REF: 011720geo TOP: Directed Line Segments

312 ANS: 2 PTS: 2 REF: 012416geo TOP: Line Dilations

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

314 ANS: 4



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

315 ANS: 2

$$\frac{\frac{512\pi}{3}}{\left(\frac{32}{2}\right)^2\pi}\cdot 2\pi=\frac{4\pi}{3}$$

PTS: 2 REF: 081723geo TOP: Sectors

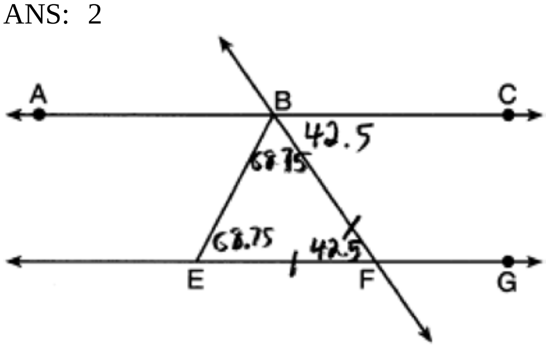
316 ANS: 1

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

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

318 ANS: 2



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

319 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

320 ANS: 4

$\frac{5}{7} = \frac{x}{x+5}$ $12\frac{1}{2} + 5 = 17\frac{1}{2}$

$5x + 25 = 7x$

$2x = 25$

$x = 12\frac{1}{2}$

PTS: 2 REF: 061821geo TOP: Side Splitter Theorem

321 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

322 ANS: 3

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

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

323 ANS: 3

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

$10x = 200$

$x = 20$

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

324 ANS: 4

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

PTS: 2 REF: 061805geo TOP: Dilations

325 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

326 ANS: 1 PTS: 2 REF: 081804geo TOP: Compositions of Transformations
KEY: grids

327 ANS: 4 PTS: 2 REF: 011704geo TOP: Midsegments
328 ANS: 3

$$\triangle CFB \sim \triangle CAD \quad \frac{CB}{CF} = \frac{CD}{CA}$$
$$\frac{x}{21.6} = \frac{7.2}{9.6}$$
$$x = 16.2$$

PTS: 2 REF: 061804geo TOP: Similarity KEY: basic
329 ANS: 3 PTS: 2 REF: 011710geo TOP: Compositions of Transformations
KEY: identify
330 ANS: 2 PTS: 2 REF: 011805geo
TOP: Cross-Sections of Three-Dimensional Objects
331 ANS: 3

$$\begin{aligned} v &= \pi r^2 h & (1)\ 6^2 \cdot 10 = 360 \\ 150\pi &= \pi r^2 h & (2)\ 10^2 \cdot 6 = 600 \\ 150 &= r^2 h & (3)\ 5^2 \cdot 6 = 150 \\ & & (4)\ 3^2 \cdot 10 = 900 \end{aligned}$$

PTS: 2 REF: 081713geo TOP: Rotations of Two-Dimensional Objects
332 ANS: 3

$$\begin{aligned} V &= \frac{1}{3}\pi r^2 h \\ 54.45\pi &= \frac{1}{3}\pi(3.3)^2 h \\ h &= 15 \end{aligned}$$

PTS: 2 REF: 011807geo TOP: Volume KEY: cones
333 ANS: 2
$\triangle ACB \sim \triangle AED$

PTS: 2 REF: 061811geo TOP: Side Splitter Theorem
334 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
335 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

336 ANS: 1

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

$x \approx 3.3$

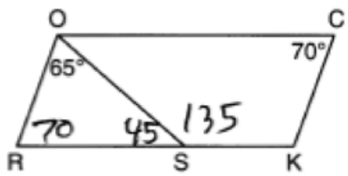
PTS: 2 REF: 081719geo TOP: Using Trigonometry to Find a Side

337 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

338 ANS: 4



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

339 ANS: 4 PTS: 2 REF: 011810geo TOP: Rotations of Two-Dimensional Objects

340 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

341 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

342 ANS: 3 PTS: 2 REF: 011815geo TOP: Mapping a Polygon onto Itself

343 ANS: 2 PTS: 2 REF: 061709geo TOP: Triangle Proofs

KEY: statements

344 ANS: 2

$\frac{30}{360}(5)^2(\pi) \approx 6.5$

PTS: 2 REF: 081818geo TOP: Sectors

345 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

346 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

347 ANS: 3 PTS: 2 REF: 012413geo TOP: Special Quadrilaterals

348 ANS: 3

$$\cos 40=\frac{14}{x}$$
$$x\approx 18$$

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

349 ANS: 1

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

PTS: 2 REF: 011806geo TOP: Directed Line Segments

350 ANS: 2

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

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

351 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

352 ANS: 2 PTS: 2 REF: 081701geo
TOP: Cross-Sections of Three-Dimensional Objects

353 ANS: 4

AA

PTS: 2 REF: 061809geo TOP: Similarity Proofs

354 ANS: 1 PTS: 2 REF: 061801geo TOP: Properties of Transformations
KEY: graphics

355 ANS: 1

$$\tan x=\frac{1}{12}$$
$$x\approx 4.76$$

PTS: 2 REF: 081715geo TOP: Using Trigonometry to Find an Angle

356 ANS: 4 PTS: 2 REF: 012415geo
TOP: Cross-Sections of Three-Dimensional Objects
357 ANS: 4 PTS: 2 REF: 011817geo TOP: Similarity
KEY: basic
358 ANS: 4 PTS: 2 REF: 011723geo
TOP: Cross-Sections of Three-Dimensional Objects
359 ANS: 2

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

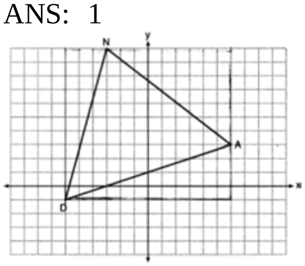
PTS: 2 REF: 081819geo TOP: Volume KEY: pyramids
360 ANS: 1
M is a centroid, and cuts each median 2:1.

PTS: 2 REF: 061818geo TOP: Centroid, Orthocenter, Incenter and Circumcenter
361 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
362 ANS: 4 PTS: 2 REF: 061711geo TOP: Special Quadrilaterals
363 ANS: 3 PTS: 2 REF: 061703geo TOP: Cofunctions
364 ANS: 2 PTS: 2 REF: 011702geo TOP: Compositions of Transformations
KEY: grids
365 ANS: 2

$$\begin{aligned} 2x + 7 + 4x - 7 &= 90 \\ 6x &= 90 \\ x &= 15 \end{aligned}$$

PTS: 2 REF: 081824geo TOP: Cofunctions
366 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
367 ANS: 4 PTS: 2 REF: 011706geo TOP: Identifying Transformations
KEY: basic

368 ANS: 4

$$40 - x + 3x = 90$$
$$2x = 50$$
$$x = 25$$

PTS: 2 REF: 081721geo TOP: Cofunctions

369 ANS: 2

$$(x-5)^2 + (y-2)^2 = 16$$
$$x^2 - 10x + 25 + y^2 - 4y + 4 = 16$$
$$x^2 - 10x + y^2 - 4y = -13$$

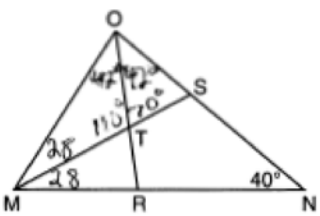
PTS: 2 REF: 061820geo TOP: Equations of Circles
KEY: write equation, given graph

370 ANS: 2

$$12^2 = 9 \cdot 16$$
$$144 = 144$$

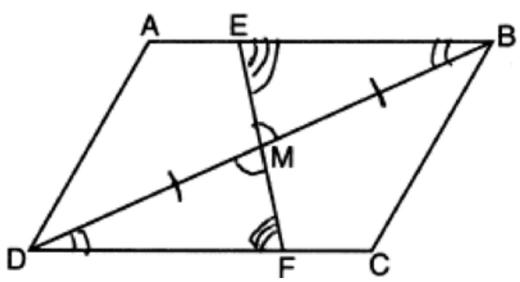
PTS: 2 REF: 081718geo TOP: Similarity KEY: leg

371 ANS: 4



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

372 ANS: 3



PTS: 2 REF: 082217geo TOP: Triangle Proofs
KEY: statements

Geometry Multiple Choice Regents Exam Questions
Answer Section

373 ANS: 4 PTS: 2 REF: 011611geo TOP: Properties of Transformations
KEY: graphics

374 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

375 ANS: 1

$$\frac{360°}{45°} = 8$$

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

376 ANS: 2 PTS: 2 REF: 061610geo TOP: Chords, Secants and Tangents
KEY: inscribed

377 ANS: 1 PTS: 2 REF: 012418geo TOP: Similarity
KEY: altitude

378 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

379 ANS: 1

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

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

380 ANS: 3 PTS: 2 REF: 081613geo
TOP: Cross-Sections of Three-Dimensional Objects

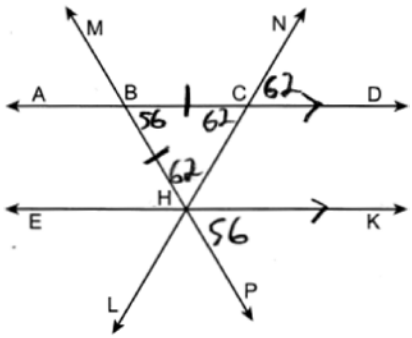
381 ANS: 4 PTS: 2 REF: 081611geo TOP: Lines and Angles

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

383 ANS: 3 PTS: 2 REF: 081622geo TOP: Triangle Proofs
KEY: statements

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

385 ANS: 4



PTS: 2 REF: 012421geo TOP: Lines and Angles

386 ANS: 2

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

PTS: 2 REF: 011604geo TOP: Volume KEY: prisms

387 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

388 ANS: 4 PTS: 2 REF: 061606geo TOP: Volume
KEY: compositions

389 ANS: 2

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

$$12x = 144$$

$$x = 12$$

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

390 ANS: 3 PTS: 2 REF: 011621geo TOP: Chords, Secants and Tangents
KEY: inscribed

391 ANS: 4

$3 \times 6 = 18$

PTS: 2 REF: 061602geo TOP: Line Dilations

392 ANS: 1 PTS: 2 REF: 081605geo TOP: Rotations
KEY: grids

393 ANS: 2 PTS: 2 REF: 012420geo TOP: Special Quadrilaterals

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

395 ANS: 2

$$h^2 = 30 \cdot 12$$
$$h^2 = 360$$
$$h = 6\sqrt{10}$$

PTS: 2 REF: 061613geo TOP: Similarity KEY: altitude

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

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

398 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

399 ANS: 1 PTS: 2 REF: 081606geo TOP: Cofunctions

400 ANS: 3

$$\cos A = \frac{9}{14}$$
$$A \approx 50°$$

PTS: 2 REF: 011616geo TOP: Using Trigonometry to Find an Angle

401 ANS: 1

$$m = -\frac{2}{3} \quad 1 = \left(-\frac{2}{3}\right)6 + b$$
$$1 = -4 + b$$
$$5 = b$$

PTS: 2 REF: 081510geo TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

402 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

403 ANS: 3

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

PTS: 2 REF: 081512geo TOP: Chords, Secants and Tangents
KEY: common tangents

404 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

405 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

406 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

407 ANS: 4

$$\frac{12}{6.1x - 6.5} = \frac{5}{1.4x + 3} \qquad 6.1(5) - 6.5 = 24$$

$$16.8x + 36 = 30.5x - 32.5$$

$$68.5 = 13.7x$$

$$5 = x$$

PTS: 2 REF: 062211geo TOP: Similarity KEY: basic

408 ANS: 1

Alternate interior angles

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

409 ANS: 3

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

PTS: 2 REF: 081608geo TOP: 30-60-90 Triangles

410 ANS: 2 PTS: 2 REF: 081501geo TOP: Special Quadrilaterals

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

412 ANS: 2

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

PTS: 2 REF: 011619geo TOP: Density

413 ANS: 2 PTS: 2 REF: 081519geo TOP: Similarity
KEY: basic

414 ANS: 2

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

PTS: 2 REF: 011607geo TOP: Volume KEY: pyramids

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

416 ANS: 3 PTS: 2 REF: 011605geo
TOP: Analytical Representations of Transformations KEY: basic

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

418 ANS: 3
The half diagonals have lengths of 6 and 8, so each side of *ABCD* is 10.

PTS: 2 REF: 012417geo TOP: Parallelograms

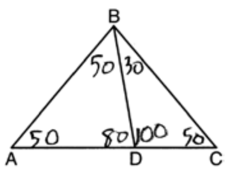
419 ANS: 4

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

$$230 \approx s$$

PTS: 2 REF: 081521geo TOP: Volume KEY: pyramids

420 ANS: 2



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

421 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

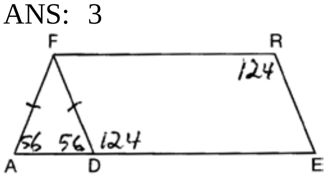
422 ANS: 2

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

PTS: 2 REF: 011622geo TOP: Similarity KEY: altitude

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

424 ANS: 3



PTS: 2 REF: 081508geo TOP: Interior and Exterior Angles of Polygons

425 ANS: 2

$x^2 = 4 \cdot 10$

$x = \sqrt{40}$

$x = 2\sqrt{10}$

PTS: 2 REF: 081610geo TOP: Similarity KEY: leg

426 ANS: 2 PTS: 2 REF: 081602geo TOP: Identifying Transformations
KEY: basic

427 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

428 ANS: 2

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

PTS: 2 REF: 061523geo TOP: Circumference

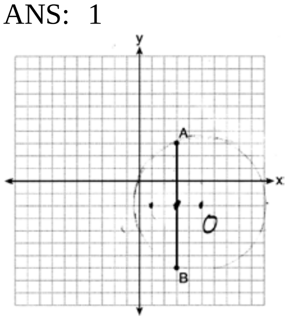
429 ANS: 3 PTS: 2 REF: 081502geo TOP: Identifying Transformations
KEY: basic

430 ANS: 1

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

PTS: 2 REF: 011623geo TOP: Circumference

431 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

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

433 ANS: 1

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

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

434 ANS: 4 PTS: 2 REF: 081609geo TOP: Compositions of Transformations
KEY: grids

435 ANS: 4 PTS: 2 REF: 081514geo TOP: Compositions of Transformations
KEY: grids

436 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

437 ANS: 2

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

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

PTS: 2 REF: 061519geo TOP: Surface Area

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

439 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

440 ANS: 1

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

$$f=10$$

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

441 ANS: 3

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

PTS: 2 REF: 081518geo TOP: Sectors

442 ANS: 4

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

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

$$x=7$$

PTS: 2 REF: 011620geo TOP: Similarity KEY: basic

443 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

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

445 ANS: 3

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

$$x=15$$

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

446 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

447 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

448 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

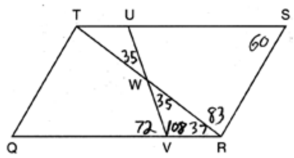
449 ANS: 1
$180-(68\cdot 2)$

PTS: 2 REF: 081624geo TOP: Interior and Exterior Angles of Polygons

450 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

451 ANS: 3


PTS: 2 REF: 011603geo TOP: Interior and Exterior Angles of Polygons

452 ANS: 4
$\frac{2}{6}=\frac{5}{15}$

PTS: 2 REF: 081517geo TOP: Side Splitter Theorem

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

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

455 ANS: 3
$\tan 34=\frac{T}{20}$

$T\approx 13.5$

PTS: 2 REF: 061505geo TOP: Using Trigonometry to Find a Side
KEY: graphics

456 ANS: 3 PTS: 2 REF: 061601geo TOP: Rotations of Two-Dimensional Objects

457 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

458 ANS: 4 PTS: 2 REF: 081506geo TOP: Dilations

459 ANS: 4
$x=-6+\frac{1}{6}(6--6)=-6+2=-4 \qquad y=-2+\frac{1}{6}(7--2)=-2+\frac{9}{6}=-\frac{1}{2}$

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

460 ANS: 3

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

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

$$a = 6$$

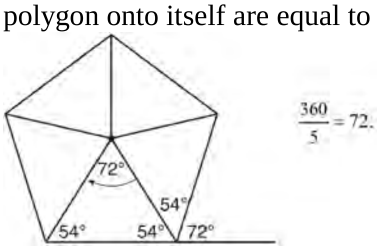
PTS: 2 REF: 081615geo TOP: Polygons in the Coordinate Plane

461 ANS: 4 PTS: 2 REF: 061615geo TOP: Trigonometric Ratios

462 ANS: 4 PTS: 2 REF: 061504geo TOP: Compositions of Transformations
KEY: identify

463 ANS: 2

Segments drawn from the center of the regular pentagon bisect each angle of the pentagon, and create five isosceles triangles as shown in the diagram below. Since each exterior angle equals the angles formed by the segments drawn from the center of the regular pentagon, the minimum degrees necessary to carry a regular polygon onto itself are equal to the measure of an exterior angle of the regular polygon.



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

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

465 ANS: 1

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

PTS: 2 REF: 081523geo TOP: Dilations

466 ANS: 3

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

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

PTS: 2 REF: 061507geo TOP: Density

467 ANS: 1

1) opposite sides; 2) adjacent sides; 3) perpendicular diagonals; 4) diagonal bisects angle

PTS: 2 REF: 061609geo TOP: Special Quadrilaterals

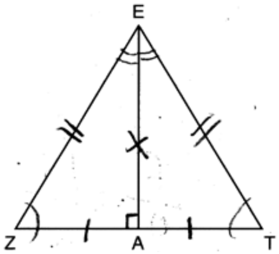
468 ANS: 4

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

469 ANS: 1 PTS: 2 REF: 061508geo TOP: Chords, Secants and Tangents
KEY: inscribed

470 ANS: 2



PTS: 2 REF: 061619geo TOP: Triangle Proofs

471 ANS: 3 PTS: 2 REF: 061616geo TOP: Identifying Transformations
KEY: graphics

472 ANS: 4

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

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

473 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

474 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

475 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

476 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

477 ANS: 4 PTS: 2 REF: 061502geo TOP: Identifying Transformations
KEY: basic

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

479 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

480 ANS: 4

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

PTS: 2 REF: 081621geo TOP: Line Dilations

481 ANS: 3

(3) Could be a trapezoid.

PTS: 2 REF: 081607geo TOP: Parallelograms

482 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

483 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

484 ANS: 1 PTS: 2 REF: 061518geo TOP: Line Dilations

485 ANS: 3

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

PTS: 2 REF: 061503geo TOP: Circles in the Coordinate Plane

486 ANS: 1 PTS: 2 REF: 011601geo
TOP: Cross-Sections of Three-Dimensional Objects

487 ANS: 2

$6+6\sqrt{3}+6+6\sqrt{3}\approx 32.8$

PTS: 2 REF: 011709geo TOP: 30-60-90 Triangles

488 ANS: 2

$\frac{1\text{ l}}{1.2\text{ oz}}\left(\frac{16\text{ oz}}{1\text{ lb}}\right)=\frac{13.\overline{3}\text{ l}}{\text{lb}}\quad \frac{13.\overline{3}\text{ l}}{\text{lb}}\left(\frac{1\text{ g}}{3.785\text{ l}}\right)\approx\frac{3.5\text{ g}}{1\text{ lb}}$

PTS: 2 REF: 061618geo TOP: Density

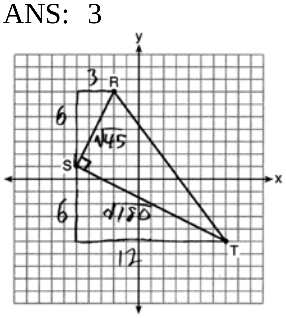
489 ANS: 1

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

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

PTS: 2 REF: 061509geo TOP: Parallel and Perpendicular Lines
KEY: identify perpendicular lines

490 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

491 ANS: 4 PTS: 2 REF: 011816geo TOP: Chords, Secants and Tangents
KEY: inscribed

492 ANS: 1 PTS: 2 REF: 011608geo TOP: Compositions of Transformations
KEY: identify

493 ANS: 2

$m=\frac{-(-2)}{3}=\frac{2}{3}$

PTS: 2 REF: 061916geo TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

494 ANS: 4 PTS: 2 REF: 061608geo TOP: Compositions of Transformations
KEY: grids

495 ANS: 3

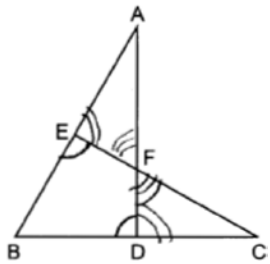
$\theta=\frac{s}{r}=\frac{2\pi}{10}=\frac{\pi}{5}$

PTS: 2 REF: fall1404geo TOP: Arc Length KEY: angle

496 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

497 ANS: 1



PTS: 2 REF: 012423geo TOP: Triangle Proofs
KEY: statements

498 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. $\tan x = \dfrac{69}{102}$

$x \approx 34.1$

PTS: 2 REF: fall1401geo TOP: Using Trigonometry to Find an Angle

499 ANS: 3
$\dfrac{x}{10} = \dfrac{6}{4}$ $\overline{CD} = 15-4 = 11$

$x = 15$

PTS: 2 REF: 081612geo TOP: Similarity KEY: basic

500 ANS: 2 PTS: 2 REF: 061506geo
TOP: Cross-Sections of Three-Dimensional Objects

501 ANS: 1 PTS: 2 REF: 061604geo TOP: Identifying Transformations
KEY: graphics

502 ANS: 3
$\dfrac{AB}{BC} = \dfrac{DE}{EF}$

$\dfrac{9}{15} = \dfrac{6}{10}$

$90 = 90$

PTS: 2 REF: 061515geo TOP: Similarity KEY: basic

503 ANS: 1 PTS: 2 REF: 061520geo TOP: Chords, Secants and Tangents
KEY: mixed

504 ANS: 1 PTS: 2 REF: 081507geo TOP: Compositions of Transformations
KEY: identify

505 ANS: 2

$$s^2 + s^2 = 7^2$$
$$2s^2 = 49$$
$$s^2 = 24.5$$
$$s \approx 4.9$$

PTS: 2 REF: 081511geo TOP: Inscribed Quadrilaterals

506 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

507 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

508 ANS: 2 PTS: 2 REF: 061603geo TOP: Equations of Circles
KEY: find center and radius | completing the square

509 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

510 ANS: 2

$$\sqrt{(-1-2)^2 + (4-3)^2} = \sqrt{10}$$

PTS: 2 REF: 011615geo TOP: Polygons in the Coordinate Plane

511 ANS: 1

$$3^2 = 9$$

PTS: 2 REF: 081520geo TOP: Dilations

Geometry 2 Point Regents Exam Questions
Answer Section

512 ANS:
Yes. The bases of the cylinders have the same area and the cylinders have the same height.

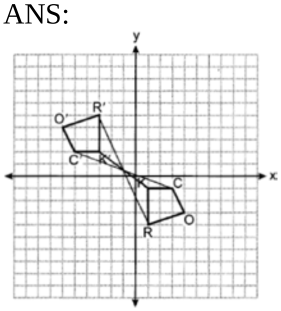
PTS: 2 REF: 081725geo TOP: Volume

513 ANS:
If an altitude is drawn to the hypotenuse of a triangle, it divides the triangle into two right triangles similar to each other and the original triangle.

PTS: 2 REF: 061729geo TOP: Similarity KEY: altitude

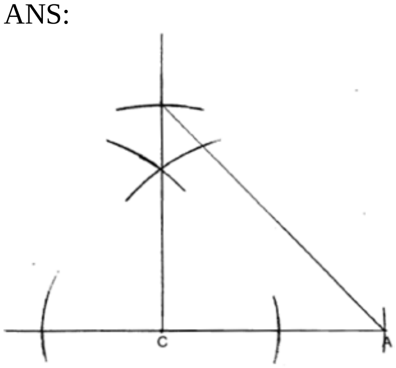
514 ANS:
$$\sin x = \frac{4.5}{11.75}$$
$$x \approx 23$$

PTS: 2 REF: 061528geo TOP: Using Trigonometry to Find an Angle

515 ANS:


Rotate 180º about $\left(-1,\frac{1}{2}\right)$.

PTS: 2 REF: 082325geo TOP: Compositions of Transformations

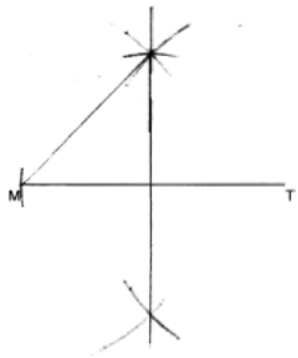
516 ANS:


PTS: 2 REF: 012427geo TOP: Constructions
KEY: polygons

517 ANS:
No, because dilations do not preserve distance.

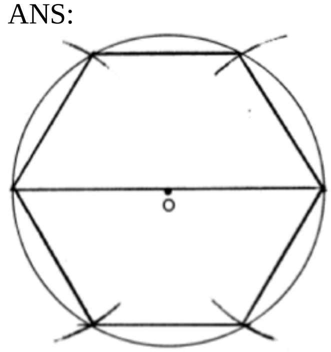
PTS: 2 REF: 061925geo TOP: Dilations

518 ANS:



PTS: 2 REF: 012029geo TOP: Constructions
KEY: parallel and perpendicular lines

519 ANS:



PTS: 2 REF: 081728geo TOP: Constructions

520 ANS:
Yes, as translations do not change angle measurements.

PTS: 2 REF: 061825geo TOP: Properties of Transformations
KEY: basic

521 ANS:
$6^2 = 2(x+2)$; $16+2=18$

$36 = 2x+4$

$32 = 2x$

$16 = x$

PTS: 2 REF: 062330geo TOP: Similarity KEY: altitude

522 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

523 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

524 ANS:
$$\frac{72}{360}(\pi)\left(10^2\right) = 20\pi$$

PTS: 2 REF: 061928geo TOP: Sectors

525 ANS:
$$R_{(-5,2),90^\circ} \circ T_{-3,1} \circ r_{\text{x-axis}}$$

PTS: 2 REF: 011928geo TOP: Compositions of Transformations
KEY: identify

526 ANS:
Reflections are rigid motions that preserve distance.

PTS: 2 REF: 061530geo TOP: Triangle Congruency

527 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

528 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, $\triangle XYZ \sim \triangle UVZ$.

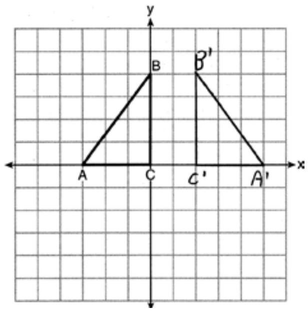
PTS: 2 REF: spr1406geo TOP: Compositions of Transformations
KEY: grids

529 ANS:
$\ell: y = 3x - 4$

$m: y = 3x - 8$

PTS: 2 REF: 011631geo TOP: Line Dilations

530 ANS:



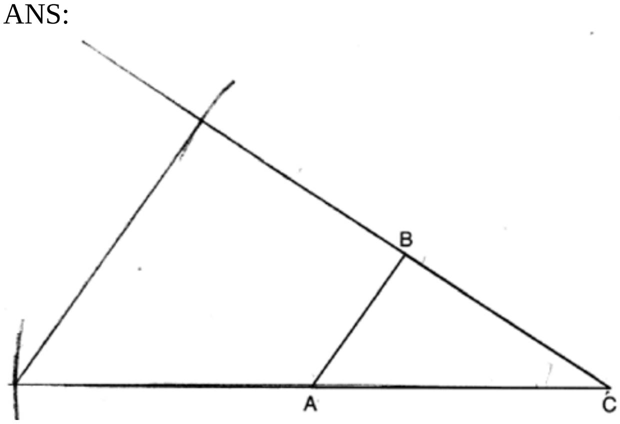
PTS: 2 REF: 011625geo TOP: Reflections KEY: grids

531 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

532 ANS:



PTS: 2 REF: 082227geo TOP: Constructions
KEY: congruent and similar figures

533 ANS:

$\frac{3}{8}\cdot 56=21$

PTS: 2 REF: 081625geo TOP: Chords, Secants and Tangents
KEY: common tangents

534 ANS:

$\frac{5\pi(2)^2+5(6)(4)}{25}\approx 7.3$ 8 cans

PTS: 2 REF: 082328geo TOP: Compositions of Polygons and Circles
KEY: area

535 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

536 ANS:

$M = 180 - (47 + 57) = 76$ Rotations do not change angle measurements.

PTS: 2 REF: 081629geo TOP: Properties of Transformations

537 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

538 ANS:

$$\tan^{-1}\left(\frac{4}{12}\right) \approx 18$$

PTS: 2 REF: 012327geo TOP: Using Trigonometry to Find an Angle

539 ANS:

$29.5 = 2\pi r$ $V = \frac{4}{3}\pi \cdot \left(\frac{29.5}{2\pi}\right)^3 \approx 434$

$r = \frac{29.5}{2\pi}$

PTS: 2 REF: 061831geo TOP: Volume KEY: spheres

540 ANS:

$$\frac{1}{2}(5)(L)(4) = 70$$
$$10L = 70$$
$$L = 7$$

PTS: 2 REF: 012330geo TOP: Volume KEY: prisms

541 ANS:

$$4x \cdot x = 6^2$$
$$4x^2 = 36$$
$$x^2 = 9$$
$$x = 3$$

PTS: 2 REF: 082229geo TOP: Similarity KEY: altitude

542 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

543 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

544 ANS:
$\frac{2}{5}\cdot(16-1)=6\ \ \frac{2}{5}\cdot(14-4)=4\quad(1+6,4+4)=(7,8)$

PTS: 2 REF: 081531geo TOP: Directed Line Segments

545 ANS:
$\sin 70=\frac{30}{L}$

$L\approx 32$

PTS: 2 REF: 011629geo TOP: Using Trigonometry to Find a Side
KEY: graphics

546 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

547 ANS:
$\frac{360}{6}=60$

PTS: 2 REF: 081627geo TOP: Mapping a Polygon onto Itself

548 ANS:
$\frac{137.8}{6^3}\approx 0.638$ Ash

PTS: 2 REF: 081525geo TOP: Density

549 ANS:
R_{180° about $\left(-\frac{1}{2},\frac{1}{2}\right)$

PTS: 2 REF: 081727geo TOP: Compositions of Transformations
KEY: identify

550 ANS:

$$4+\frac{4}{9}(22-4) \quad 2+\frac{4}{9}(2-2) \quad (12,2)$$

$$4+\frac{4}{9}(18) \qquad 2+\frac{4}{9}(0)$$

$$4+8 \qquad 2+0$$

$$12 \qquad 2$$

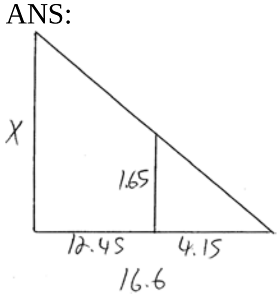
PTS: 2 REF: 061626geo TOP: Directed Line Segments

551 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

552 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

553 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 KEY: altitude

554 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

555 ANS:

$$\cos 68 = \frac{10}{x}$$
$$x \approx 27$$

PTS: 2 REF: 061927geo TOP: Using Trigonometry to Find a Side

556 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

557 ANS:

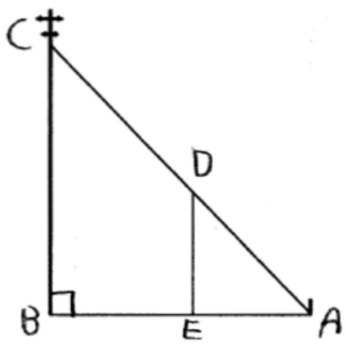
Translate $\triangle ABC$ along $\overline{CF}$ such that point C maps onto point F, resulting in image $\triangle A'B'C'$. Then reflect $\triangle A'B'C'$ over $\overline{DF}$ such that $\triangle A'B'C'$ maps onto $\triangle DEF$.

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

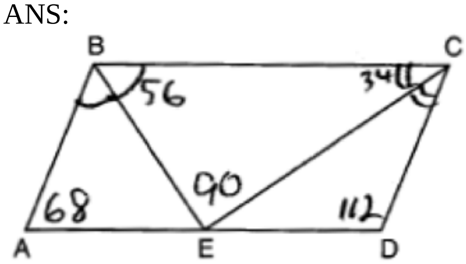
558 ANS:



$\triangle ABC \sim \triangle AED$ 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.

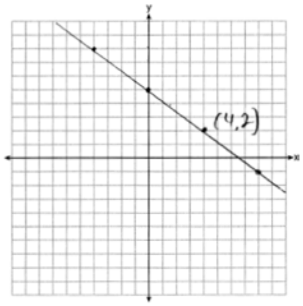
PTS: 2 REF: 081829geo TOP: Similarity KEY: basic

559 ANS:



PTS: 2 REF: 081826geo TOP: Interior and Exterior Angles of Polygons

560 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

561 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

562 ANS:

The four small triangles are 8-15-17 triangles. $4 \times 17 = 68$

PTS: 2 REF: 081726geo TOP: Special Quadrilaterals

563 ANS:

$$500 \times 1015 \text{ cc} \times \frac{\$0.29}{\text{kg}} \times \frac{7.95 \text{ g}}{\text{cc}} \times \frac{1 \text{ kg}}{1000 \text{ g}} = \$1170$$

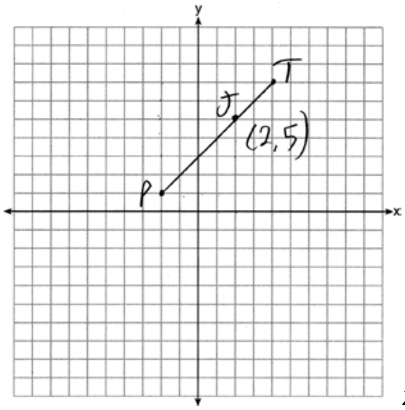
PTS: 2 REF: 011829geo TOP: Density

564 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

565 ANS:

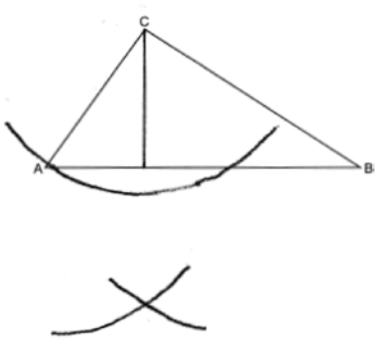


$x = \frac{2}{3}(4 - -2) = 4 \quad -2 + 4 = 2 \quad J(2,5)$

$y = \frac{2}{3}(7 - 1) = 4 \quad 1 + 4 = 5$

PTS: 2 REF: 011627geo TOP: Directed Line Segments

566 ANS:

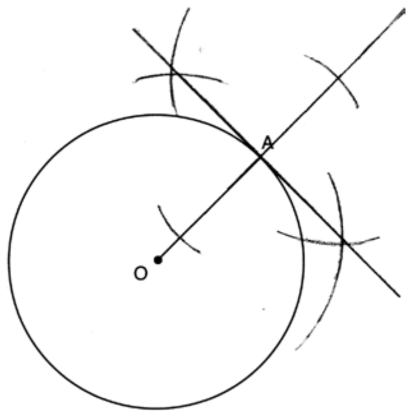


PTS: 2 REF: 062325geo TOP: Constructions
KEY: parallel and perpendicular lines

567 ANS:
$180 - 2(25) = 130$

PTS: 2 REF: 011730geo TOP: Centroid, Orthocenter, Incenter and Circumcenter

568 ANS:



PTS: 2 REF: 061631geo TOP: Constructions
KEY: parallel and perpendicular lines

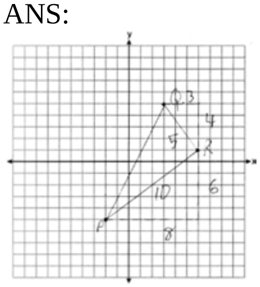
569 ANS:

$$\tan 53 = \frac{f}{91}$$

$$f \approx 120.8$$

PTS: 2 REF: 082327geo TOP: Using Trigonometry to Find a Side

570 ANS:



$$\frac{1}{2}(5)(10) = 25$$

PTS: 2 REF: 061926geo TOP: Polygons in the Coordinate Plane

571 ANS:

$$17x = 15^2$$

$$17x = 225$$

$$x \approx 13.2$$

PTS: 2 REF: 061930geo TOP: Similarity KEY: altitude

572 ANS:

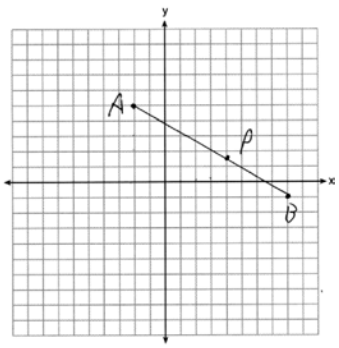
$$\frac{152 - 56}{2} = 48$$

PTS: 2 REF: 011728geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

573 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

574 ANS:

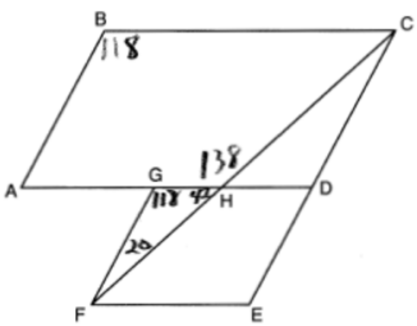


$$x = -2 + \frac{3}{5}(8+2) = -2+6 = 4$$

$$y = 5 + \frac{3}{5}(-1-5) = \frac{25}{5} - \frac{18}{5} = \frac{7}{5}$$

PTS: 2 REF: 012328geo TOP: Directed Line Segments

575 ANS:



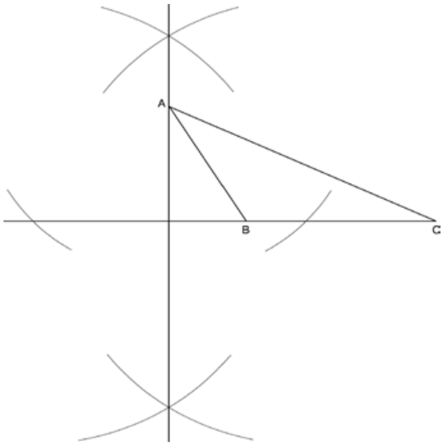
20º

PTS: 2 REF: 011926geo TOP: Interior and Exterior Angles of Polygons

576 ANS:
$T_{0,5} \circ r_{\text{y-axis}}$

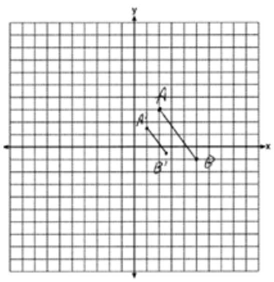
PTS: 2 REF: 082225geo TOP: Compositions of Transformations
KEY: identify

577 ANS:



PTS: 2 REF: fall1409geo TOP: Constructions
KEY: parallel and perpendicular lines

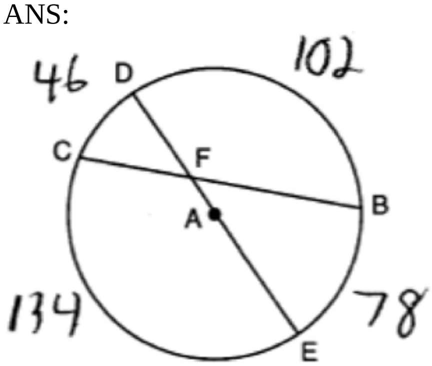
578 ANS:



$$\sqrt{(2.5-1)^2+(-.5-1.5)^2} = \sqrt{2.25+4} = 2.5$$

PTS: 2 REF: 081729geo TOP: Line Dilations

579 ANS:



$$\frac{134+102}{2} = 118$$

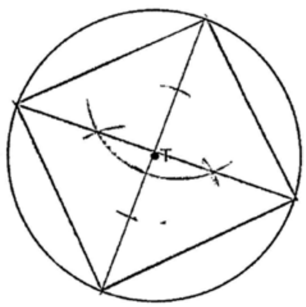
PTS: 2 REF: 081827geo TOP: Chords, Secants and Tangents
KEY: intersecting chords, angle

580 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

581 ANS:



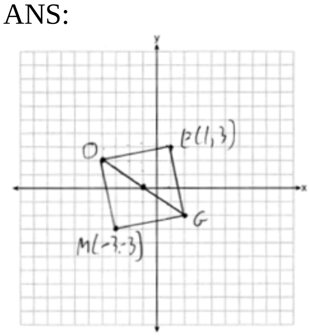
PTS: 2 REF: 061525geo TOP: Constructions

582 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

583 ANS:



PTS: 2 REF: 011731geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

584 ANS:

$$\frac{2+3}{15} \cdot 360 = 120 \quad \frac{120}{2} = 60$$

PTS: 2 REF: 062226geo TOP: Inscribed Quadrilaterals

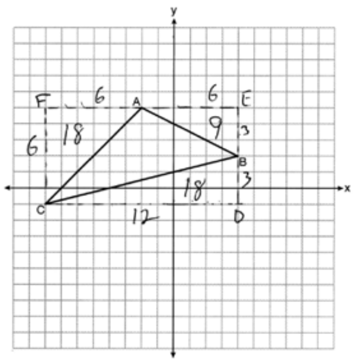
585 ANS:

$x^2 + 6x + 9 + y^2 - 6y + 9 = 63 + 9 + 9 \quad (-3,3);\ r = 9$

$(x + 3)^2 + (y - 3)^2 = 81$

PTS: 2 REF: 062230geo TOP: Equations of Circles
KEY: completing the square

586 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

587 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

588 ANS:

$\cos W = \frac{6}{18}$

$W \approx 71$

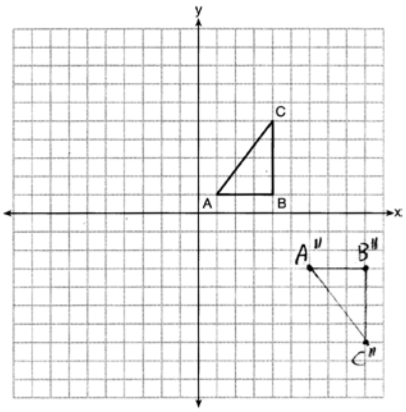
PTS: 2 REF: 011831geo TOP: Using Trigonometry to Find an Angle

589 ANS:

Rotation of 90º counterclockwise about the origin.

PTS: 2 REF: 012428geo TOP: Identifying Transformations

590 ANS:



PTS: 2 REF: 081626geo TOP: Compositions of Transformations
KEY: grids

591 ANS:
$A(-2,1) \to (-3,-1) \to (-6,-2) \to (-5,0)$, $B(0,5) \to (-1,3) \to (-2,6) \to (-1,8)$,
$C(4,-1) \to (3,-3) \to (6,-6) \to (7,-4)$

PTS: 2 REF: 061826geo TOP: Dilations

592 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

593 ANS:

$$\begin{aligned} 5x - 14 &= 3x + 10 \\ 2x &= 24 \\ x &= 12 \end{aligned}$$

PTS: 2 REF: 082326geo TOP: Isosceles Triangle Theorem

594 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

595 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

596 ANS:

$$x^2 + 16x + +64 + y^2 + 12y + 36 = 44 + 64 + 36 \quad (-8,-6);\ r = 12$$

$$(x+8)^2 + (y+6)^2 = 144$$

PTS: 2 REF: 012430geo TOP: Equations of Circles
KEY: completing the square

597 ANS:

$$\frac{1}{3}\pi \times 5^2 \times 12 = 100\pi \approx 314$$

PTS: 2 REF: 012425geo TOP: Rotations of Two-Dimensional Objects

598 ANS:

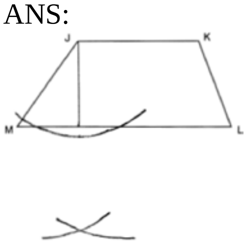
$$\frac{Q}{360}(\pi)\left(25^2\right) = (\pi)\left(25^2\right) - 500\pi$$

$$Q = \frac{125\pi(360)}{625\pi}$$

$$Q = 72$$

PTS: 2 REF: 011828geo TOP: Sectors

599 ANS:



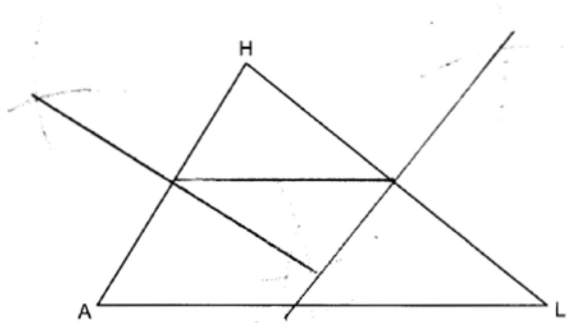
PTS: 2 REF: 061725geo TOP: Constructions
KEY: parallel and perpendicular lines

600 ANS:

$$\sin^{-1}\left(\frac{5}{25}\right) \approx 11.5$$

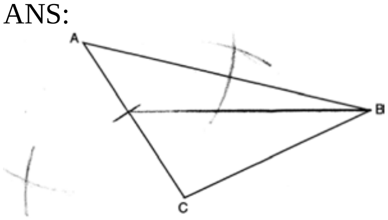
PTS: 2 REF: 081926geo TOP: Using Trigonometry to Find an Angle

601 ANS:



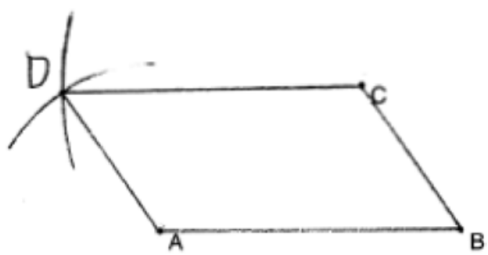
PTS: 2 REF: 082329geo TOP: Constructions
KEY: line bisector

602 ANS:



PTS: 2 REF: 061829geo TOP: Constructions
KEY: line bisector

603 ANS:



PTS: 2 REF: 011929geo TOP: Constructions
KEY: polygons

604 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

605 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

606 ANS:
$\frac{124-56}{2}=34$

PTS: 2 REF: 081930geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

607 ANS:
$10\cdot 6=15x$

$x=4$

PTS: 2 REF: 061828geo TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

608 ANS:
Reflection across the y-axis, then translation up 5.

PTS: 2 REF: 061827geo TOP: Compositions of Transformations
KEY: identify

609 ANS:
The transformation is a rotation, which is a rigid motion.

PTS: 2 REF: 081530geo TOP: Triangle Congruency

610 ANS:
$73+R=90$ Equal cofunctions are complementary.

$R=17$

PTS: 2 REF: 061628geo TOP: Cofunctions

611 ANS:
$\cos 14=\frac{5-1.2}{x}$

$x\approx 3.92$

PTS: 2 REF: 082228geo TOP: Using Trigonometry to Find a Side

612 ANS:
$\frac{80}{360}\cdot\pi(6.4)^2\approx 29$

PTS: 2 REF: 062328geo TOP: Sectors

613 ANS:
$\sin 38=\frac{24.5}{x}$

$x\approx 40$

PTS: 2 REF: 012026geo TOP: Using Trigonometry to Find a Side
KEY: graphics

614 ANS:

$$\frac{6}{14} = \frac{9}{21} \quad \text{SAS}$$

$$126 = 126$$

PTS: 2 REF: 081529geo TOP: Similarity KEY: basic

615 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

616 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

617 ANS:

$T_{0,-2} \circ r_{y\text{-axis}}$

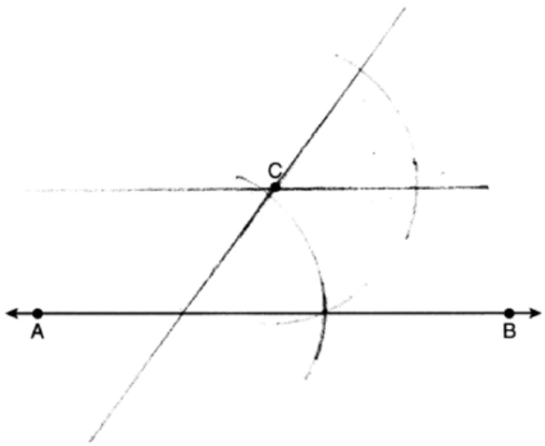
PTS: 2 REF: 011726geo TOP: Compositions of Transformations
KEY: identify

618 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

619 ANS:



PTS: 2 REF: 062231geo TOP: Constructions
KEY: parallel and perpendicular lines

620 ANS:

$\frac{1}{3}\pi \times 8^2 \times 5 \approx 335.1$

PTS: 2 REF: 082226geo TOP: Rotations of Two-Dimensional Objects

621 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

622 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

623 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

624 ANS:

$$\frac{121-x}{2}=35$$

$$121-x=70$$

$$x=51$$

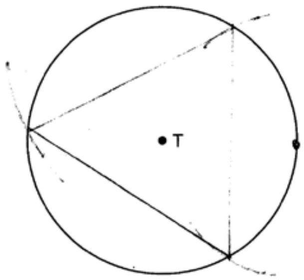
PTS: 2 REF: 011927geo TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, angle

625 ANS:

$T_{6,0} \circ r_{x\text{-axis}}$

PTS: 2 REF: 061625geo TOP: Compositions of Transformations
KEY: identify

626 ANS:



PTS: 2 REF: 081526geo TOP: Constructions

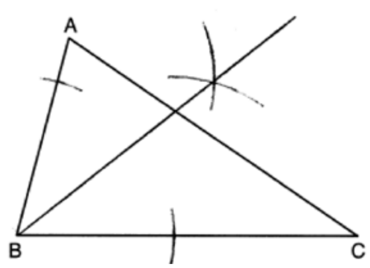
627 ANS:

$$x^2=8\times 12.5$$

$$x=10$$

PTS: 2 REF: 012028geo TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, length

628 ANS:



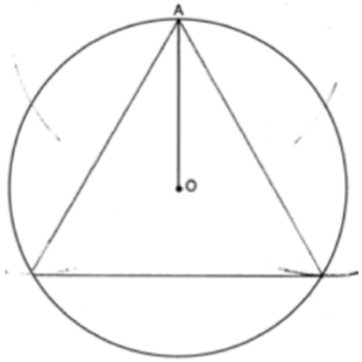
PTS: 2 REF: 012325geo TOP: Constructions
KEY: angle bisector

629 ANS:

$r_{y=2} \circ r_{y\text{-axis}}$

PTS: 2 REF: 081927geo TOP: Compositions of Transformations
KEY: identify

630 ANS:



PTS: 2 REF: 061931geo TOP: Constructions

631 ANS:

$\cos B$ increases because $\angle A$ and $\angle B$ are complementary and $\sin A = \cos B$.

PTS: 2 REF: 011827geo TOP: Cofunctions

632 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

633 ANS:

$\frac{102}{360}(\pi)\left(38^2\right) \approx 1285$

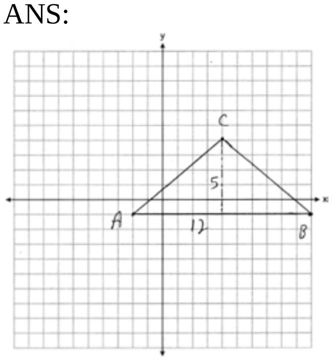
PTS: 2 REF: 012426geo TOP: Sectors

634 ANS:

$\angle Q \cong \angle M$ $\angle P \cong \angle N$ $\overline{QP} \cong \overline{MN}$

PTS: 2 REF: 012025geo TOP: Triangle Congruency

635 ANS:



$\frac{1}{2}(5)(12) = 30$

PTS: 2 REF: 081928geo TOP: Polygons in the Coordinate Plane

636 ANS:
$$\frac{40}{360}\cdot\pi(4.5)^2=2.25\pi$$

PTS: 2 REF: 061726geo TOP: Sectors

637 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

$2x=0.8$

$x=0.4$

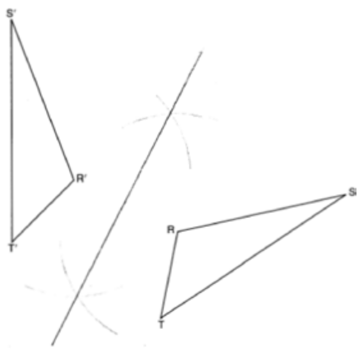
side and the hypotenuse. The side opposite angle A is the same side as the side adjacent to angle B. Therefore, $\sin A=\cos B$.

PTS: 2 REF: fall1407geo TOP: Cofunctions

638 ANS:
$$\frac{120}{230}=\frac{x}{315}$$
$$x=164$$

PTS: 2 REF: 081527geo TOP: Similarity KEY: basic

639 ANS:



PTS: 2 REF: 011725geo TOP: Constructions
KEY: line bisector

640 ANS:
Nathan, because a line dilated through a point on the line results in the same line.

PTS: 2 REF: 082331geo TOP: Line Dilations

641 ANS:
$$100\times\frac{1}{2}\times\frac{4}{3}\times\pi\times2.8^3\approx4598$$

PTS: 2 REF: 062229geo TOP: Volume KEY: spheres

642 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

643 ANS:

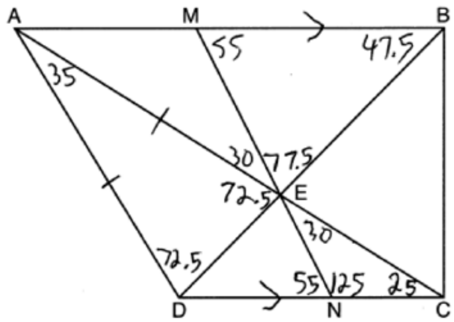
$s = \theta \cdot r \qquad s = \theta \cdot r$ Yes, both angles are equal.

$\pi = A \cdot 4 \quad \frac{13\pi}{8} = B \cdot 6.5$

$\frac{\pi}{4} = A \qquad \frac{\pi}{4} = B$

PTS: 2 REF: 061629geo TOP: Arc Length KEY: arc length

644 ANS:



47.5°

PTS: 2 REF: 082230geo TOP: Interior and Exterior Angles of Polygons

645 ANS:

$\sin 86.03 = \frac{183.27}{x}$

$x \approx 183.71$

PTS: 2 REF: 062225geo TOP: Using Trigonometry to Find a Side

646 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

647 ANS:

Reflections preserve distance and angle measure.

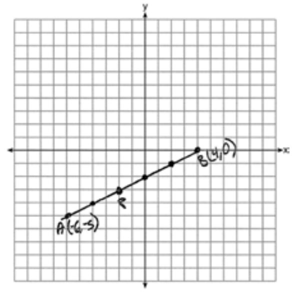
PTS: 2 REF: 062228geo TOP: Properties of Transformations
KEY: graphics

648 ANS:

$T_{4,-4}$, followed by a 90º clockwise rotation about point D.

PTS: 2 REF: 062326geo TOP: Compositions of Transformations

649 ANS:



$-6+\frac{2}{5}(4--6)$ $-5+\frac{2}{5}(0--5)$ $(-2,-3)$

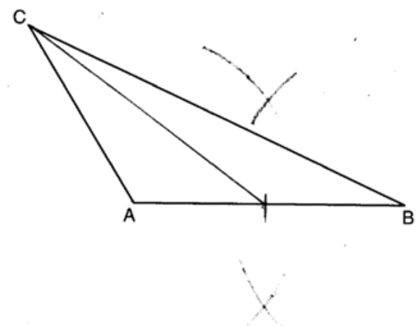
$-6+\frac{2}{5}(10)$ $-5+\frac{2}{5}(5)$

$-6+4$ $-5+2$

-2 -3

PTS: 2 REF: 061527geo TOP: Directed Line Segments

650 ANS:



PTS: 2 REF: 081628geo TOP: Constructions
KEY: line bisector

651 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

652 ANS:

$A = 6^2\pi = 36\pi$ $36\pi \cdot \frac{x}{360} = 12\pi$

$x = 360 \cdot \frac{12}{36}$

$x = 120$

PTS: 2 REF: 061529geo TOP: Sectors

653 ANS:

$$\tan x = \frac{10}{4}$$

$$x \approx 68$$

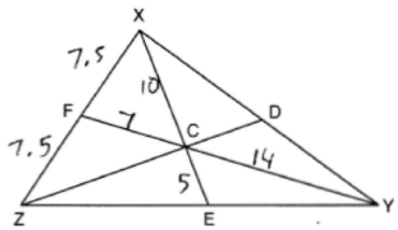
PTS: 2 REF: 061630geo TOP: Using Trigonometry to Find an Angle

654 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

655 ANS:



$7.5 + 7 + 10 = 24.5$

PTS: 2 REF: 012030geo STA: G.G.43
TOP: Centroid, Orthocenter, Incenter and Circumcenter

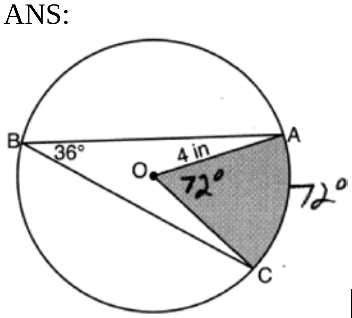
656 ANS:

$\cos J = \frac{3}{5}$ $S \approx 90 - 53 = 37$

$J \approx 53$

PTS: 2 REF: 012431geo TOP: Using Trigonometry to Find an Angle

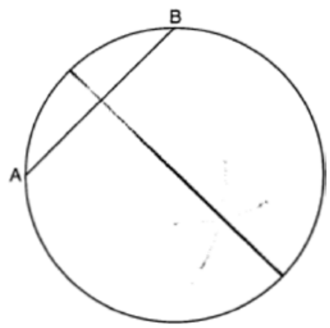
657 ANS:



$$\left(\frac{72}{360}\right)\pi(4)^2 \approx 10.1$$

PTS: 2 REF: 082231geo TOP: Sectors

658 ANS:



PTS: 2 REF: 081825geo TOP: Constructions
KEY: parallel and perpendicular lines

659 ANS:

$8 \times 3 \times \frac{1}{12} \times 43 = 86$

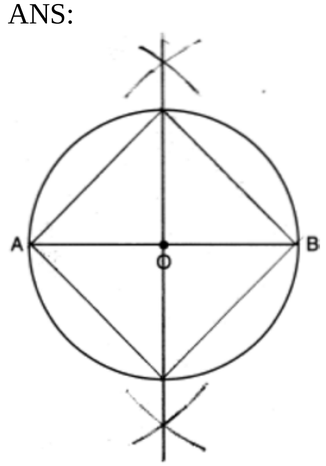
PTS: 2 REF: 012027geo TOP: Density

660 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*.

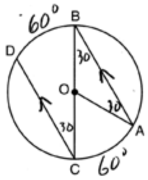
PTS: 2 REF: spr1404geo TOP: Similarity Proofs

661 ANS:



PTS: 2 REF: 011826geo TOP: Constructions

662 ANS:



$180 - 2(30) = 120$

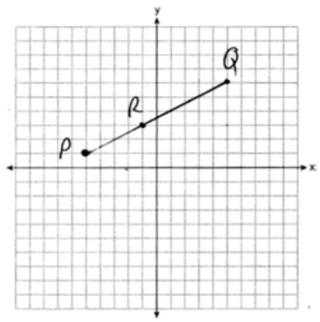
PTS: 2 REF: 011626geo TOP: Chords, Secants and Tangents
KEY: parallel lines

663 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

664 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

665 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

666 ANS:

Rotate 90° clockwise about B and translate down 4 and right 3.

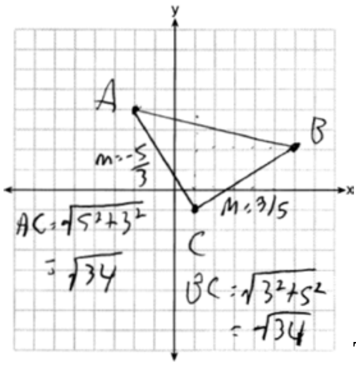
PTS: 2 REF: 012326geo TOP: Compositions of Transformations
KEY: identify

667 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

Geometry 4 Point Regents Exam Questions
Answer Section

668 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

669 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

670 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

671 ANS:

$\tan 7 = \frac{125}{x}$ $\quad \tan 16 = \frac{125}{y}$ $\quad 1018 - 436 \approx 582$

$x \approx 1018$ $\quad y \approx 436$

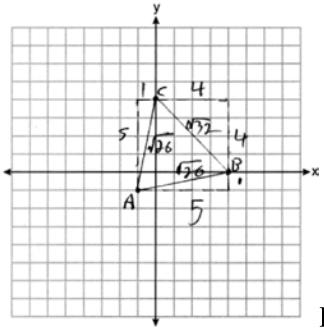
PTS: 4 REF: 081532geo TOP: Using Trigonometry to Find a Side
KEY: advanced

672 ANS:

$\frac{10\pi(.5)^2 4}{\frac{2}{3}} \approx 47.1$ 48 bags

PTS: 4 REF: 062234geo TOP: Volume KEY: cylinders

673 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

674 ANS:

$$r = 25\,\text{cm}\left(\frac{1\,\text{m}}{100\,\text{cm}}\right) = 0.25\,\text{m} \quad V = \pi(0.25\,\text{m})^2(10\,\text{m}) = 0.625\pi\,\text{m}^3 \quad W = 0.625\pi\,\text{m}^3\left(\frac{380\,\text{K}}{1\,\text{m}^3}\right) \approx 746.1\,K$$

$$n = \frac{\$50{,}000}{\left(\frac{\$4.75}{\text{K}}\right)(746.1\,\text{K})} = 14.1 \quad 15 \text{ trees}$$

PTS: 4 REF: spr1412geo TOP: Density

675 ANS:

$$\frac{\pi \cdot 11.25^2 \cdot 33.5}{231} \approx 57.7$$

PTS: 4 REF: 061632geo TOP: Volume KEY: cylinders

676 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

677 ANS:

Since $\angle ABH$ is 100°, $\angle AHB$ is 40°. An isosceles triangle has two congruent angles. $\cos 80 = \frac{x}{85}$

$x \approx 14.8$

$$\tan 40 = \frac{y}{85 + 14.8}$$

$y \approx 84$

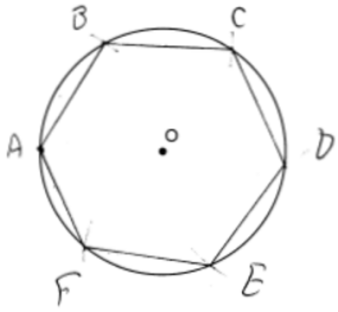
PTS: 4 REF: 012334geo TOP: Using Trigonometry to Find a Side

678 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

679 ANS:



Right triangle because $\angle CBF$ is inscribed in a semi-circle.

PTS: 4 REF: 011733geo TOP: Constructions

680 ANS:

$$\cos 54 = \frac{4.5}{m} \quad \tan 54 = \frac{h}{4.5}$$

$$m \approx 7.7 \qquad h \approx 6.2$$

PTS: 4 REF: 011834geo TOP: Using Trigonometry to Find a Side

681 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

682 ANS:

$$\tan 15 = \frac{x}{3280};\ \tan 31 = \frac{y}{3280}\ ;\ 1970.8 - 878.9 \approx 1092$$

$$x \approx 878.9 \qquad x \approx 1970.8$$

PTS: 4 REF: 062332geo TOP: Using Trigonometry to Find a Side

683 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

684 ANS:

$ABC -$ point of reflection $\rightarrow (-y, x) +$ point of reflection $\quad \triangle DEF \cong \triangle A'B'C'$ 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

685 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

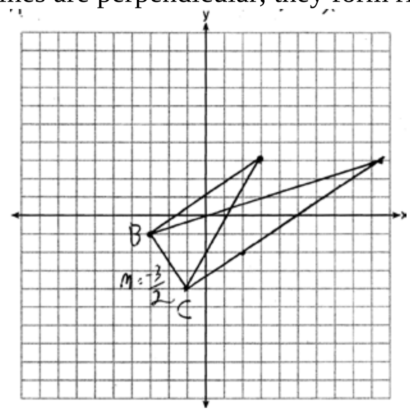
686 ANS:

$$\tan x = \frac{12}{75} \quad \tan y = \frac{72}{75} \quad 43.83 - 9.09 \approx 34.7$$

$$x \approx 9.09 \quad y \approx 43.83$$

PTS: 4 REF: 081634geo TOP: Using Trigonometry to Find an Angle

687 ANS:
The slopes of perpendicular line are opposite reciprocals. Since the lines are perpendicular, they form right angles



and a right triangle. $m_{\overline{BC}} = -\frac{3}{2}$ $-1 = \frac{2}{3}(-3) + b$ or $-4 = \frac{2}{3}(-1) + b$

$m_{\perp} = \frac{2}{3}$

$-1 = -2 + b$

$1 = b$

$3 = \frac{2}{3}x + 1$

$2 = \frac{2}{3}x$

$3 = x$

$\frac{-12}{3} = \frac{-2}{3} + b$

$-\frac{10}{3} = b$

$3 = \frac{2}{3}x - \frac{10}{3}$

$9 = 2x - 10$

$19 = 2x$

$9.5 = x$

PTS: 4 REF: 081533geo TOP: Triangles in the Coordinate Plane

688 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

689 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

690 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

691 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

692 ANS:

$\sin 65 = \frac{7.7}{x}$. $\tan 65 = \frac{7.7}{y}$

$x \approx 8.5$ $y \approx 3.6$

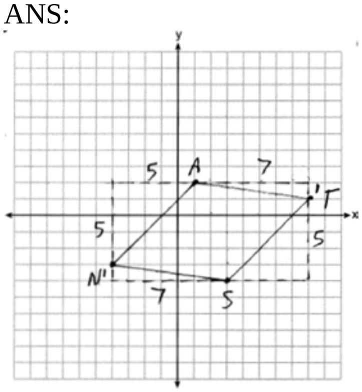
PTS: 4 REF: 082333geo TOP: Using Trigonometry to Find a Side

693 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

694 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

695 ANS:

$20000\ \text{g}\left(\frac{1\ \text{ft}^3}{7.48\ \text{g}}\right) = 2673.8\ \text{ft}^3$ $2673.8 = \pi r^2(34.5)$ $9.9 + 1 = 10.9$

$r \approx 4.967$

$d \approx 9.9$

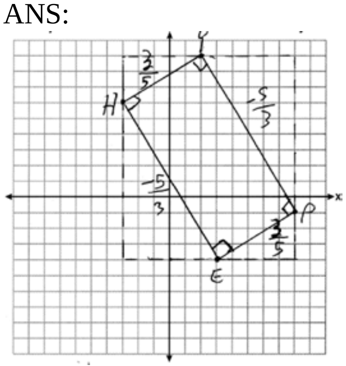
PTS: 4 REF: 061734geo TOP: Volume KEY: cylinders

696 ANS:
$M\left(\frac{4+0}{2},\frac{6-1}{2}\right)=M\left(2,\frac{5}{2}\right)$ $m=\frac{6--1}{4-0}=\frac{7}{4}$ $m_{\perp}=-\frac{4}{7}$ $y-2.5=-\frac{4}{7}(x-2)$ The diagonals, $\overline{MT}$ and $\overline{AH}$, of rhombus *MATH* are perpendicular bisectors of each other.

PTS: 4 REF: fall1411geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

697 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

698 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

699 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

700 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

701 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

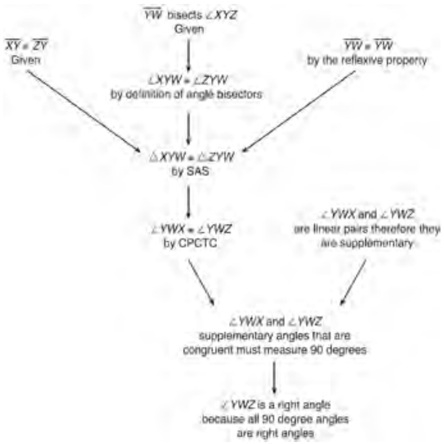
702 ANS:

$$\tan 72 = \frac{x}{400} \qquad \sin 55 = \frac{400\tan 72}{y}$$

$$x = 400\tan 72 \qquad y = \frac{400\tan 72}{\sin 55} \approx 1503$$

PTS: 4 REF: 061833geo TOP: Using Trigonometry to Find a Side
KEY: advanced

703 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

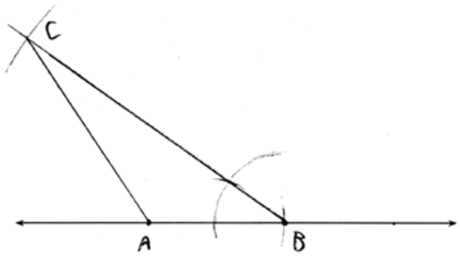
704 ANS:

$$\sin 4.76 = \frac{1.5}{x} \quad \tan 4.76 = \frac{1.5}{x} \quad 18 - \frac{16}{12} \approx 16.7$$

$$x \approx 18.1 \qquad x \approx 18$$

PTS: 4 REF: 011934geo TOP: Using Trigonometry to Find a Side

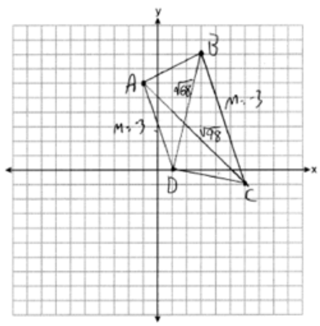
705 ANS:



SAS ≅ SAS

PTS: 4 REF: 011634geo TOP: Constructions
KEY: congruent and similar figures

706 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

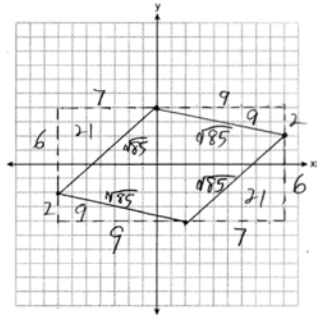
707 ANS:

(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

708 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

709 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

710 ANS:

$\tan 30 = \dfrac{y}{440}$ $\tan 38.8 = \dfrac{h}{440}$ $353.8 - 254 \approx 100$

$y \approx 254$ $h \approx 353.8$

PTS: 4 REF: 061934geo TOP: Using Trigonometry to Find a Side
KEY: advanced

711 ANS:

$\tan y = \dfrac{1.58}{3.74}$ $\tan x = \dfrac{.41}{3.74}$ $22.90 - 6.26 = 16.6$

$y \approx 22.90$ $x \approx 6.26$

PTS: 4 REF: 062232geo TOP: Using Trigonometry to Find an Angle

712 ANS:

$\tan 56 = \dfrac{x}{1.3}$ $\sqrt{(1.3\tan 56)^2 + 1.5^2} \approx 3.7$

$x = 1.3\tan 56$

PTS: 4 REF: 012033geo TOP: Using Trigonometry to Find a Side
KEY: advanced

713 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 $\overline{AB} \parallel \overline{CD}$.

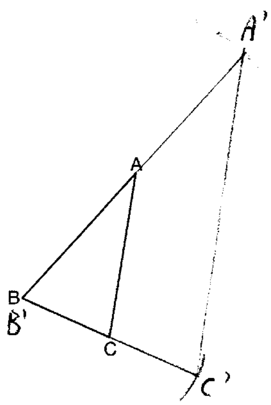
PTS: 4 REF: 061532geo TOP: Lines and Angles

714 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

715 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

716 ANS:


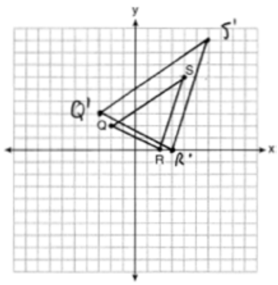
The length of $\overline{A'C'}$ is twice $\overline{AC}$.

PTS: 4 REF: 081632geo TOP: Constructions
KEY: congruent and similar figures

717 ANS:
$C = 2\pi r$ $V = \frac{1}{3}\pi \cdot 5^2 \cdot 13 \approx 340$
$31.416 = 2\pi r$
$5 \approx r$

PTS: 4 REF: 011734geo TOP: Volume KEY: cones

718 ANS:



A dilation preserves slope, so the slopes of $\overline{QR}$ and $\overline{Q'R'}$ are equal. Because the slopes are equal, $Q'R' \parallel QR$.

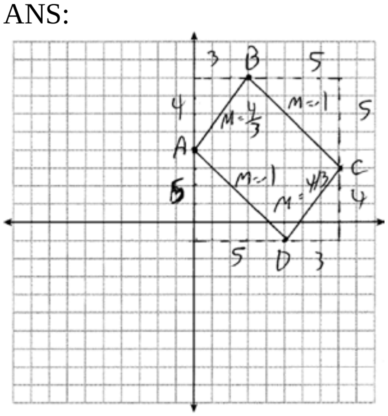
PTS: 4 REF: 011732geo TOP: Dilations KEY: grids

719 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

720 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.

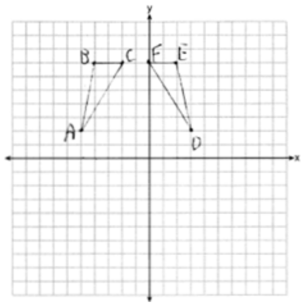
PTS: 4 REF: 082334geo TOP: Quadrilaterals in the Coordinate Plane

721 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

722 ANS:



$r_{x=-1}$ Reflections are rigid motions that preserve distance, so $\triangle ABC \cong \triangle DEF$.

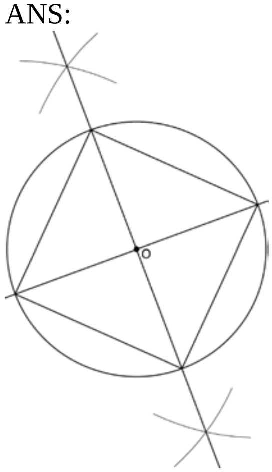
PTS: 4 REF: 061732geo TOP: Identifying Transformations
KEY: graphics

723 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

724 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

725 ANS:

$$\frac{4\pi}{3}(2^3 - 1.5^3) \approx 19.4 \quad 19.4 \cdot 1.308 \cdot 8 \approx 203$$

PTS: 4 REF: 081834geo TOP: Density

726 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

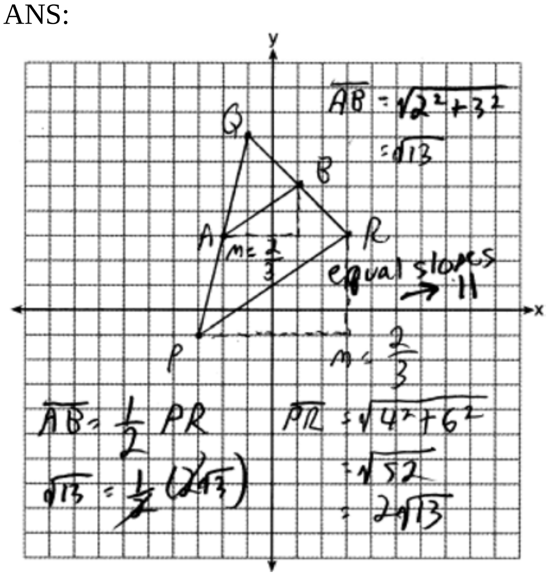
727 ANS:

$$\frac{16}{9}=\frac{x}{20.6} \quad D=\sqrt{36.6^2+20.6^2}\approx 42$$

$$x\approx 36.6$$

PTS: 4 REF: 011632geo TOP: Similarity KEY: basic

728 ANS:



PTS: 4 REF: 081732geo TOP: Triangles in the Coordinate Plane

729 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

730 ANS:

$$x=\sqrt{.55^2-.25^2}\cong 0.49 \quad \text{No,} \quad .49^2=.25y \quad .9604+.25<1.5$$

$$.9604=y$$

PTS: 4 REF: 061534geo TOP: Similarity KEY: altitude

731 ANS:

$$\pi(3.5)^2(9)\approx 346;\ \ \pi(4.5)^2(13)\approx 827;\ \ \frac{827}{346}\approx 2.4;\ \ 3\text{ cans}$$

PTS: 4 REF: 062333geo TOP: Volume KEY: cylinders

732 ANS:

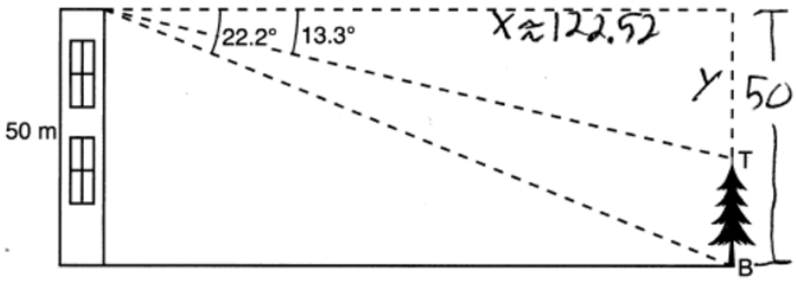
$$V=\pi(10)^2(18)=1800\pi\text{ in}^3 \quad 1800\pi\text{ in}^3\left(\frac{1\text{ ft}^3}{12^3\text{ in}^3}\right)=\frac{25}{24}\pi\text{ ft}^3 \quad \frac{25}{24}\pi(95.46)(0.85)\approx 266 \quad 266+270=536$$

PTS: 4 REF: 061834geo TOP: Density

733 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

734 ANS:



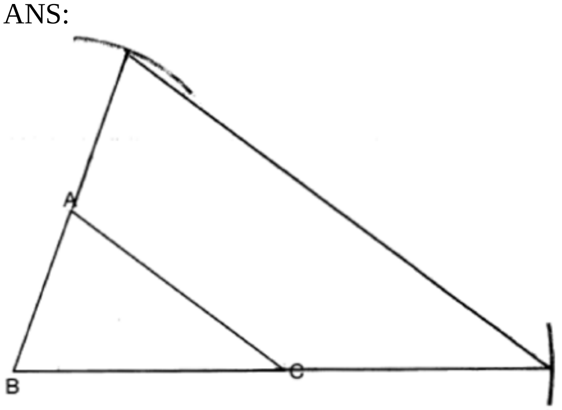
$\tan 22.2 = \frac{50}{x}$ $\quad$ $\tan 13.3 = \frac{y}{122.52}$

$x \approx 122.52$ $\quad$ $y \approx 29$

$50 - 29 = 21$

PTS: 4 REF: 082232geo TOP: Using Trigonometry to Find a Side
KEY: advanced

735 ANS:



Yes, because a dilation preserves angle measure.

PTS: 4 REF: 081932geo TOP: Constructions
KEY: congruent and similar figures

736 ANS:
A dilation of 3 centered at A. A dilation preserves angle measure, so the triangles are similar.

PTS: 4 REF: 011832geo TOP: Dilations

737 ANS:

$\tan 75 = \frac{y}{85}$ $\quad \tan 35 = \frac{x}{85}$ $\quad 317.2 + 59.5 \approx 377$

$y \approx 317.2$ $\quad h \approx 59.5$

PTS: 4 REF: 012432geo TOP: Using Trigonometry to Find a Side

738 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. $\tan 6 = \frac{112 - 1.5}{x}$ $\quad \tan(49 + 6) = \frac{112 - 1.5}{y}$ $\quad \frac{1051.3 - 77.4}{5} \approx 195$

$x \approx 1051.3$ $\quad y \approx 77.4$

PTS: 4 REF: spr1409geo TOP: Using Trigonometry to Find a Side
KEY: advanced

Geometry 6 Point Regents Exam Questions
Answer Section

739 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

740 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

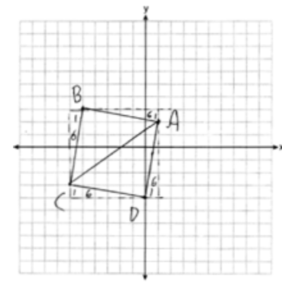
741 ANS:

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

742 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). $(0,-4)$. $AD=\sqrt{(1-0)^2+(2--4)^2}=\sqrt{37}$, $CD=\sqrt{(-6-0)^2+(-3--4)^2}=\sqrt{37}$,
$m_{\overline{AB}}=\dfrac{3-2}{-5-1}=-\dfrac{1}{6}$, $m_{\overline{CB}}=\dfrac{3--3}{-5--6}=6$ ($ABCD$ 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

743 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);

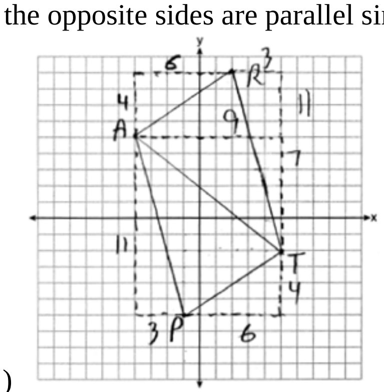
$\angle EDA \cong \angle ECB$

$\triangle AEB$ is an isosceles triangle (an isosceles triangle has two congruent sides).

PTS: 6 REF: 081735geo TOP: Quadrilateral Proofs

744 ANS:

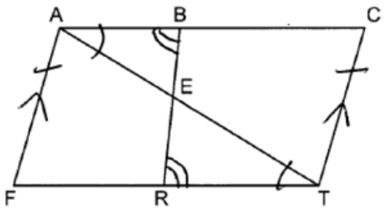
$\triangle PAT$ is an isosceles triangle because sides $\overline{AP}$ and $\overline{AT}$ are congruent ($\sqrt{3^2+11^2}=\sqrt{7^2+9^2}=\sqrt{130}$).
$R(2,9)$. Quadrilateral $PART$ is a parallelogram because the opposite sides are parallel since they have equal slopes



($m_{\overline{AR}}=\dfrac{4}{6}=\dfrac{2}{3}$; $m_{\overline{PT}}=\dfrac{4}{6}=\dfrac{2}{3}$; $m_{\overline{PA}}=-\dfrac{11}{3}$; $m_{\overline{RT}}=-\dfrac{11}{3}$)

PTS: 6 REF: 011835geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

745 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); $\frac{AB}{AE} = \frac{TR}{TE}$ (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

746 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

747 ANS:

C: $V = \pi(26.7)^2(750) - \pi(24.2)^2(750) = 95{,}437.5\pi$

$$95{,}437.5\pi \text{ cm}^3 \left(\frac{2.7 \text{ g}}{\text{cm}^3}\right)\left(\frac{1 \text{ kg}}{1000 \text{ g}}\right)\left(\frac{\$0.38}{\text{kg}}\right) = \$307.62$$

P: $V = 40^2(750) - 35^2(750) = 281{,}250$ $\$307.62 - 288.56 = \$19.06$

$$281{,}250 \text{ cm}^3 \left(\frac{2.7 \text{ g}}{\text{cm}^3}\right)\left(\frac{1 \text{ kg}}{1000 \text{ g}}\right)\left(\frac{\$0.38}{\text{kg}}\right) = \$288.56$$

PTS: 6 REF: 011736geo TOP: Density

748 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

749 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:

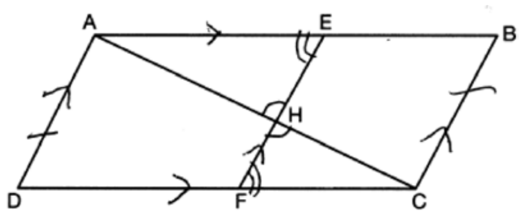
$x \approx 9.115$

$V = \frac{1}{2}\left(\frac{4}{3}\pi(8.5)^3\right) \approx 1286.3$ $689.6 + 5674.5 + 1286.3 \approx 7650$ 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

750 ANS:

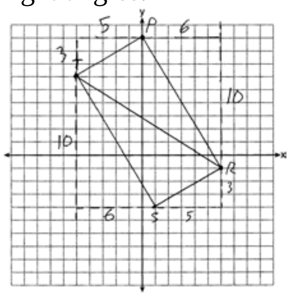


1) Quadrilateral $ABCD$, $\overline{AC}$ and $\overline{EF}$ intersect at H, $\overline{EF} \parallel \overline{AD}$, $\overline{EF} \parallel \overline{BC}$, and $\overline{AD} \cong \overline{BC}$ (Given); 2) $\angle EHA \cong \angle FHC$ (Vertical angles are congruent); 3) $\overline{AD} \parallel \overline{BC}$ (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

751 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

752 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

753 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

754 ANS:

Similar triangles are required to model and solve a proportion. $\frac{x+5}{1.5}=\frac{x}{1}$ $\frac{1}{3}\pi(1.5)^2(15)-\frac{1}{3}\pi(1)^2(10)\approx 24.9$

$$x+5=1.5x$$
$$5=.5x$$
$$10=x$$
$$10+5=15$$

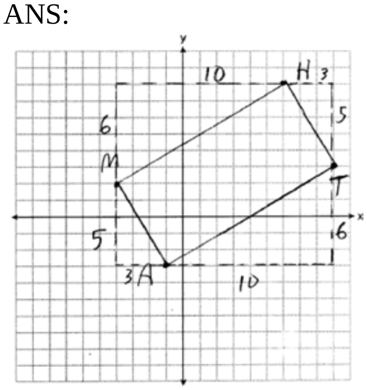
PTS: 6 REF: 061636geo TOP: Volume KEY: cones

755 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

756 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

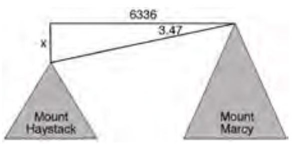
757 ANS:

$$\tan 15 = \frac{6250}{x} \qquad \tan 52 = \frac{6250}{y} \qquad 23325.3 - 4883 = 18442 \quad \frac{18442\text{ ft}}{1\text{ min}}\left(\frac{1\text{ mi}}{5280\text{ ft}}\right)\left(\frac{60\text{ min}}{1\text{ h}}\right) \approx 210$$

$$x \approx 23325.3 \qquad y \approx 4883$$

PTS: 6 REF: 061736geo TOP: Using Trigonometry to Find a Side
KEY: advanced

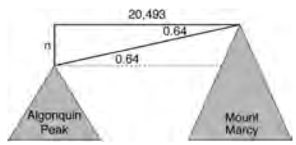
758 ANS:



$$\tan 3.47 = \frac{M}{6336}$$

$$M \approx 384$$

$$4960 + 384 = 5344$$



$$\tan 0.64 = \frac{A}{20,493}$$

$$A \approx 229$$

$$5344 - 229 = 5115$$

PTS: 6 REF: fall1413geo TOP: Using Trigonometry to Find a Side
KEY: advanced

759 ANS:

$$\tan 16.5 = \frac{x}{13.5} \qquad 9 \times 16 \times 4.5 = 648 \quad 3752 - (35 \times 16 \times .5) = 3472$$

$$x \approx 4 \qquad 13.5 \times 16 \times 4.5 = 972 \quad 3472 \times 7.48 \approx 25971$$

$$4 + 4.5 = 8.5 \qquad \frac{1}{2} \times 13.5 \times 16 \times 4 = 432 \quad \frac{25971}{10.5} \approx 2473.4$$

$$12.5 \times 16 \times 8.5 = \underline{1700} \quad \frac{2473.4}{60} \approx 41$$

$$3752$$

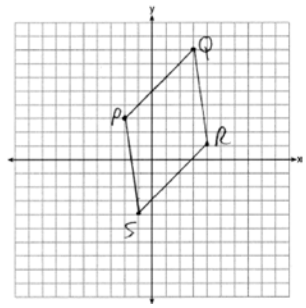
PTS: 6 REF: 081736geo TOP: Volume KEY: compositions

760 ANS:

$\overline{PQ}$ $\sqrt{(8-3)^2+(3--2)^2}=\sqrt{50}$ $\overline{QR}$ $\sqrt{(1-8)^2+(4-3)^2}=\sqrt{50}$ $\overline{RS}$ $\sqrt{(-4-1)^2+(-1-4)^2}=\sqrt{50}$

$\overline{PS}$ $\sqrt{(-4-3)^2+(-1--2)^2}=\sqrt{50}$ *PQRS* is a rhombus because all sides are congruent. $m_{\overline{PQ}}=\frac{8-3}{3--2}=\frac{5}{5}=1$

$m_{\overline{QR}}=\frac{1-8}{4-3}=-7$ Because the slopes of adjacent sides are not opposite reciprocals, they are not perpendicular



and do not form a right angle. Therefore *PQRS* is not a square.

PTS: 6 REF: 061735geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

761 ANS:

$V=\frac{1}{3}\pi\left(\frac{8.3}{2}\right)^2(10.2)+\frac{1}{2}\cdot\frac{4}{3}\pi\left(\frac{8.3}{2}\right)^3\approx 183.961+149.693\approx 333.65\text{ cm}^3$ $333.65\times 50=16682.7\text{ cm}^3$

$16682.7\times 0.697=11627.8\text{ g}$ $11.6278\times 3.83=\$44.53$

PTS: 6 REF: 081636geo TOP: Density

762 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

763 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).

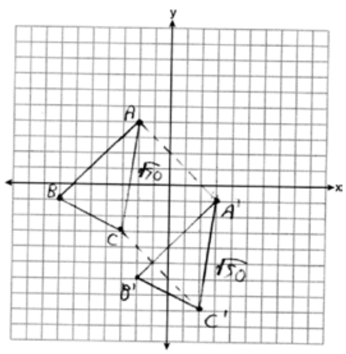
PTS: 6 REF: 012035geo TOP: Quadrilateral Proofs

764 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

765 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.
$\sqrt{50} = \sqrt{50}$

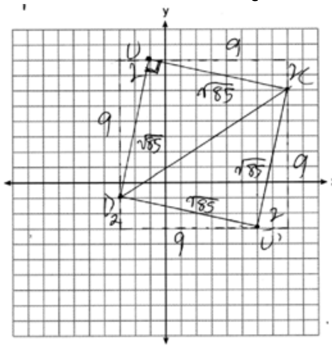
$A'(3,-1)$, $B'(-2,-6)$, $C'(2,-8)$. $AC = \sqrt{50}$ $AA' = \sqrt{(-2-3)^2+(4--1)^2}$, $A'C' = \sqrt{50}$ (translation preserves
$= \sqrt{50}$
distance), $CC' = \sqrt{(-3-2)^2+(-3--8)^2}$ Since all four sides are congruent, $AA'C'C$ is a rhombus.
$= \sqrt{50}$



PTS: 6 REF: 062235geo TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

766 ANS:

$m_{\overline{DU}} = \dfrac{9}{2}$ $m_{\overline{UC}} = -\dfrac{2}{9}$ 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

767 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); $\dfrac{AE}{CE} = \dfrac{ED}{EB}$ (Corresponding sides of similar triangles are proportional); $AE \cdot EB = CE \cdot ED$ (The product of the means equals the product of the extremes).

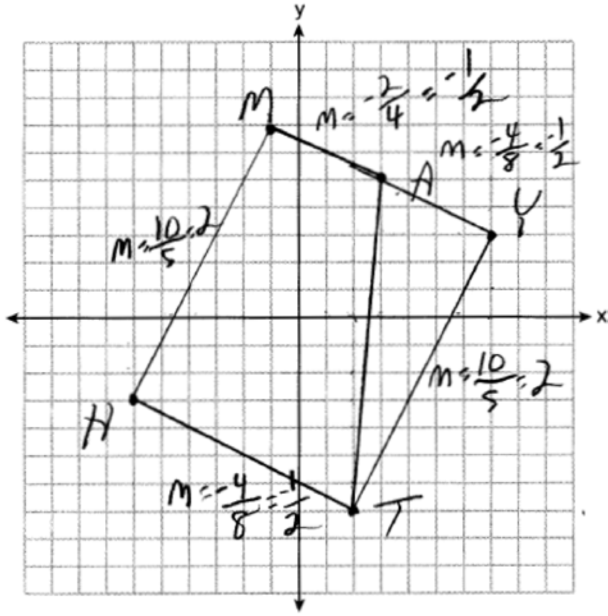
PTS: 6 REF: 081635geo TOP: Circle Proofs

768 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

769 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

770 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