JMAP
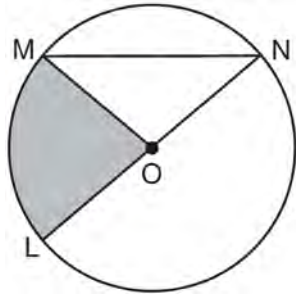# REGENTS BY TYPE

The NY Geometry CCSS Regents Exam Questions
from Spring 2014 to August 2017 Sorted by Type

Geometry Common Core State Standards Multiple Choice Regents Exam Questions

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

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

2 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) $(10,2)$

3 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

4 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

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

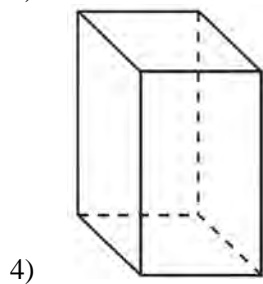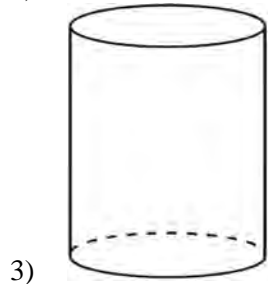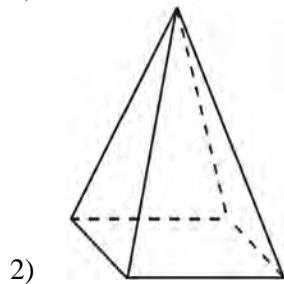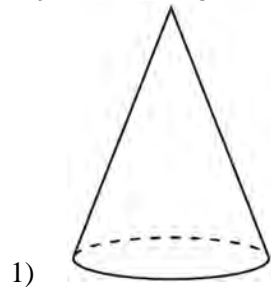6 In the diagram of right triangle ABC, $\overline{CD}$ intersects hypotenuse $\overline{AB}$ at D.
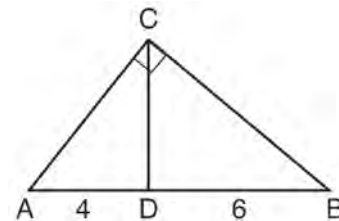
If $AD = 4$ and $DB = 6$, which length of $\overline{AC}$ makes $\overline{CD} \perp \overline{AB}$?
1) $2\sqrt{6}$
2) $2\sqrt{10}$
3) $2\sqrt{15}$
4) $4\sqrt{2}$

7 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)

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

9 In $\triangle SCU$ shown below, points *T* and *O* are on $\overline{SU}$ and $\overline{CU}$, respectively. Segment *OT* is drawn so that $\angle C \cong \angle OTU$.
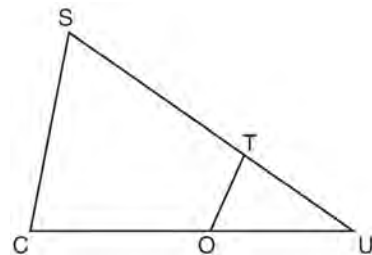
If $TU = 4$, $OU = 5$, and $OC = 7$, what is the length of $\overline{ST}$?
1) 5.6
2) 8.75
3) 11
4) 15

10 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

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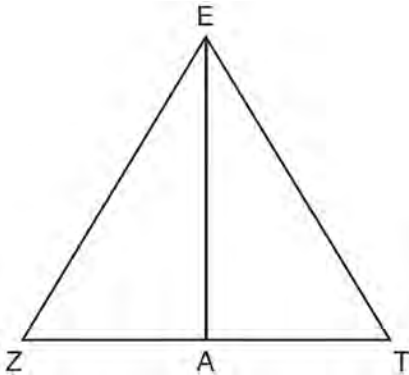

Which conclusion can *not* be proven?

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*.

12 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

13 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

14 The pyramid shown below has a square base, a height of 7, and a volume of 84.
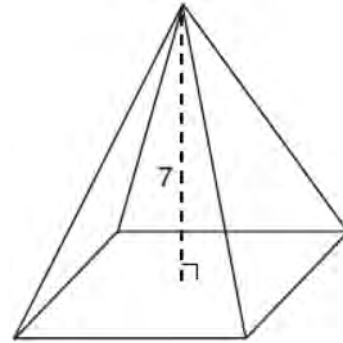
What is the length of the side of the base?

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

15 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.
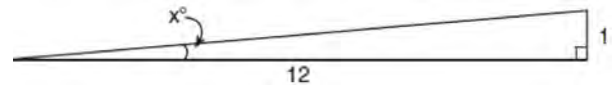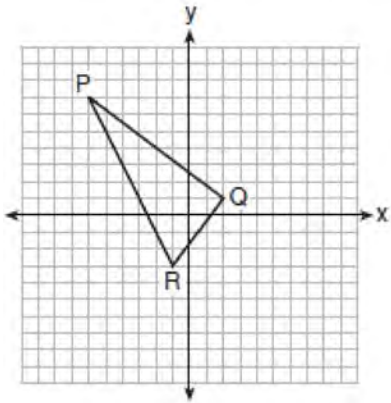

What is the angle of inclination, *x*, of this ramp, to the *nearest hundredth of a degree*?

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

3

16 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

17 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

18 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

19 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
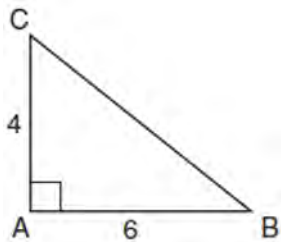
20 Which regular polygon has a minimum rotation of $45°$ to carry the polygon onto itself?
1) octagon
2) decagon
3) hexagon
4) pentagon

21 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
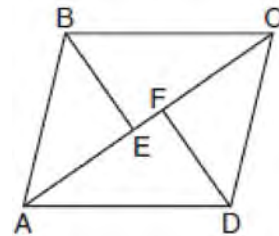

1) square
2) rhombus
3) rectangle
4) parallelogram

4

22 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

23 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."
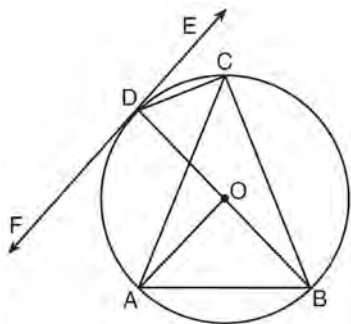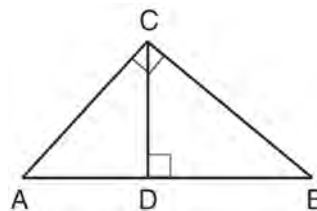

Which angle is Sam referring to?

1) $\angle AOB$
2) $\angle BAC$
3) $\angle DCB$
4) $\angle FDB$

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

1) $\dfrac{\sqrt{21}}{5}$

2) $\dfrac{\sqrt{21}}{2}$

3) $\dfrac{2}{5}$

4) $\dfrac{5}{\sqrt{21}}$

25 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 $AB = 17$

26 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

5

27 In the diagram below, lines ℓ, m, n, and p intersect line r.
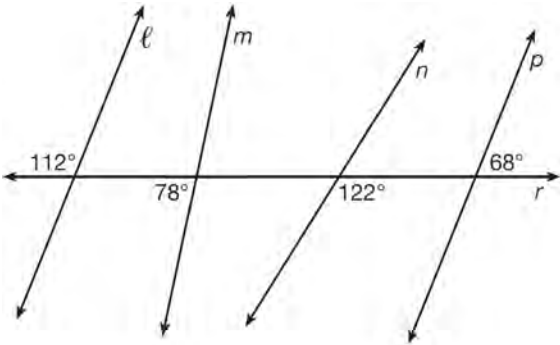
Which statement is true?
1) $\ell \parallel n$
2) $\ell \parallel p$
3) $m \parallel p$
4) $m \parallel n$

28 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) $\dfrac{8\pi}{3}$
2) $\dfrac{16\pi}{3}$
3) $\dfrac{32\pi}{3}$
4) $\dfrac{64\pi}{3}$

29 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) $3x - 2y = 5$

30 In the diagram below of triangle MNO, $\angle M$ and $\angle O$ are bisected by $\overline{MS}$ and $\overline{OR}$, respectively. Segments MS and OR intersect at T, and m$\angle N = 40°$.
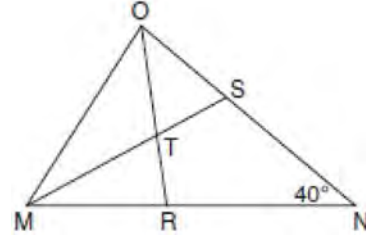
If m$\angle TMR = 28°$, the measure of angle OTS is
1) 40°
2) 50°
3) 60°
4) 70°

31 Quadrilateral $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$ is shown in the diagram below.
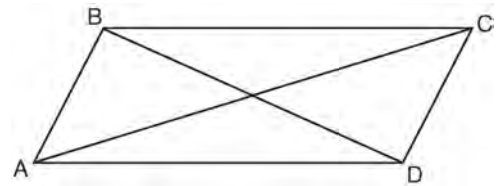
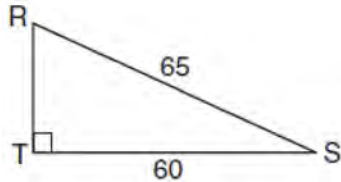Which information is *not* enough to prove $ABCD$ is a parallelogram?
1) $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{DC}$
2) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$
3) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$
4) $\overline{AB} \parallel \overline{DC}$ and $\overline{BC} \parallel \overline{AD}$
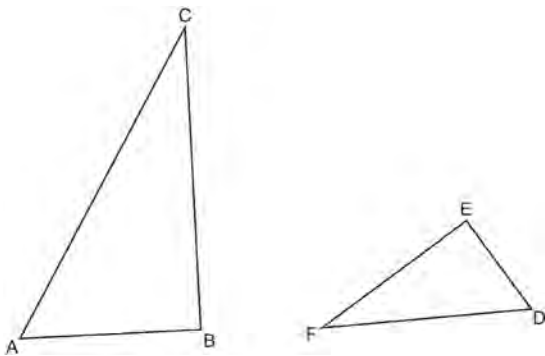
32 In the diagram of $\triangle RST$ below, $m\angle T = 90°$, $RS = 65$, and $ST = 60$.

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

33 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) $\dfrac{AB}{CB} = \dfrac{FE}{DE}$
3) $\triangle ABC \sim \triangle DEF$
4) $\dfrac{AB}{DE} = \dfrac{FE}{CB}$

34 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.
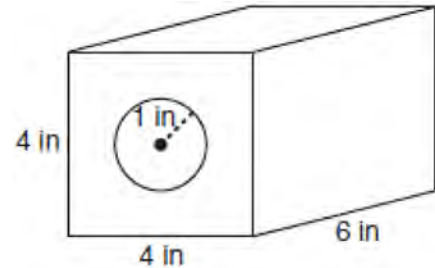
What is the approximate volume of the remaining solid, in cubic inches?
1) 19
2) 77
3) 93
4) 96

35 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

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

37 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.
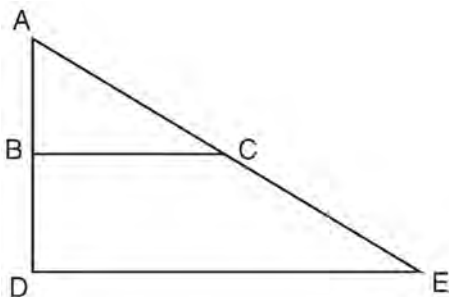
Which statement is always true?
1) $2AB = AD$
2) $\overline{AD} \perp \overline{DE}$
3) $AC = CE$
4) $\overline{BC} \parallel \overline{DE}$

38 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) $25\sqrt{2}$

39 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
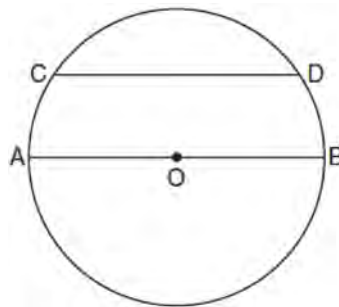1) $\angle A$ onto $\angle D$, and $\angle C$ onto $\angle F$
2) $\overline{AC}$ onto $\overline{DF}$, and $\overline{BC}$ onto $\overline{EF}$
3) $\angle C$ onto $\angle F$, and $\overline{BC}$ onto $\overline{EF}$
4) point A onto point D, and $\overline{AB}$ onto $\overline{DE}$

40 In the diagram below of circle O, chord $\overline{CD}$ is parallel to diameter $\overline{AOB}$ and $m\overset{\frown}{CD} = 130$.
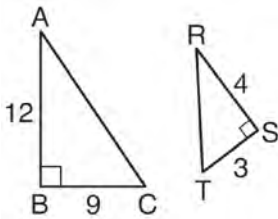
What is $m\overset{\frown}{AC}$?
1) 25
2) 50
3) 65
4) 115

41 Kirstie is testing values that would make triangle KLM a right triangle when $\overline{LN}$ is an altitude, and $KM = 16$, as shown below.
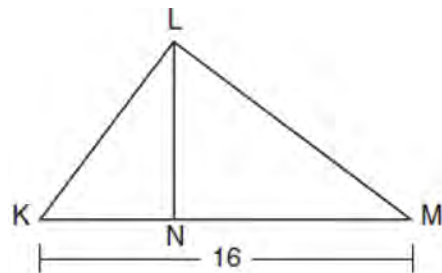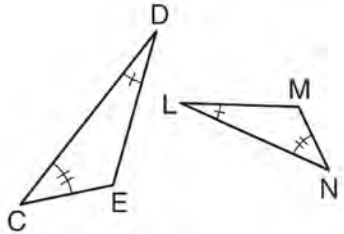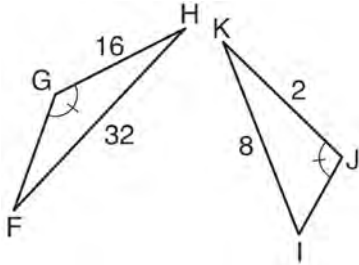
Which lengths would make triangle KLM a right triangle?
1) $LM = 13$ and $KN = 6$
2) $LM = 12$ and $NM = 9$
3) $KL = 11$ and $KN = 7$
4) $LN = 8$ and $NM = 10$
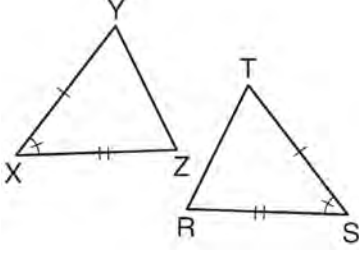
42 Using the information given below, which set of triangles can *not* be proven similar?

1)

2)

3)

4)

43 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

44 As shown in the graph below, the quadrilateral is a rectangle.
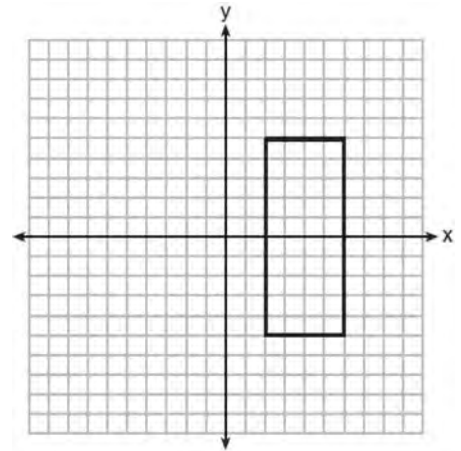
Which transformation would *not* map the rectangle onto itself?
1) a reflection over the *x*-axis
2) a reflection over the line $x = 4$
3) a rotation of $180°$ about the origin
4) a rotation of $180°$ about the point $(4,0)$

45 The diagram below shows two similar triangles.
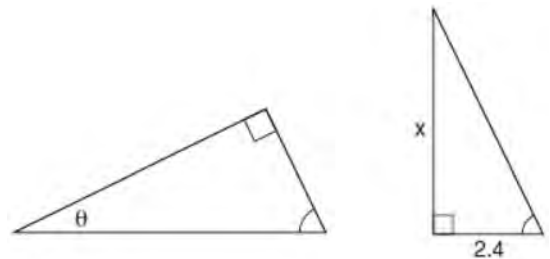
If $\tan \theta = \dfrac{3}{7}$, what is the value of *x*, to the *nearest tenth*?
1) 1.2
2) 5.6
3) 7.6
4) 8.8

46 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

47 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

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

49 Line segment NY has endpoints $N(-11,5)$ and $Y(5,-7)$. What is the equation of the perpendicular bisector of $\overline{NY}$?
1) $y+1=\dfrac{4}{3}(x+3)$
2) $y+1=-\dfrac{3}{4}(x+3)$
3) $y-6=\dfrac{4}{3}(x-8)$
4) $y-6=-\dfrac{3}{4}(x-8)$

50 In the diagram below, $ABCD$ is a parallelogram, $\overline{AB}$ is extended through B to E, and $\overline{CE}$ is drawn.
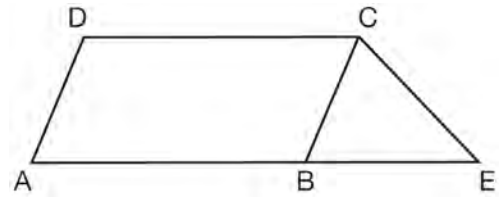
If $\overline{CE}\cong\overline{BE}$ and m$\angle D=112°$, what is m$\angle E$?
1) $44°$
2) $56°$
3) $68°$
4) $112°$

51 In $\triangle RST$ shown below, altitude $\overline{SU}$ is drawn to $\overline{RT}$ at U.
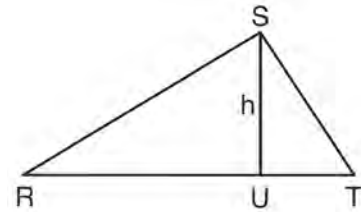
If $SU=h$, $UT=12$, and $RT=42$, which value of h will make $\triangle RST$ a right triangle with $\angle RST$ as a right angle?
1) $6\sqrt{3}$
2) $6\sqrt{10}$
3) $6\sqrt{14}$
4) $6\sqrt{35}$

52 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

53 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

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

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

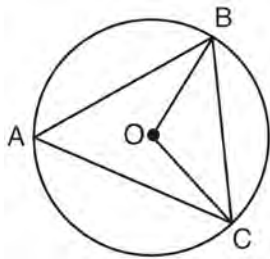56 In right triangle ABC, $m\angle A = 32°$, $m\angle B = 90°$, and $AE = 6.2$ cm. What is the length of $\overline{BC}$, to the *nearest tenth of a centimeter*?
1) 3.3
2) 3.9
3) 5.3
4) 11.7

57 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

58 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

11

59 On the set of axes below, rectangle *ABCD* can be proven congruent to rectangle *KLMN* using which transformation?
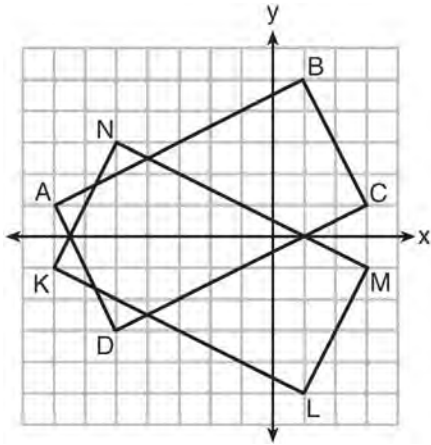
1) rotation
2) translation
3) reflection over the *x*-axis
4) reflection over the *y*-axis

60 In the diagram below, $\overleftrightarrow{FE}$ bisects $\overline{AC}$ at *B*, and $\overleftrightarrow{GE}$ bisects $\overline{BD}$ at *C*.
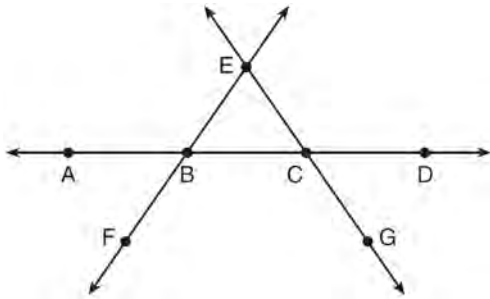
Which statement is always true?
1) $\overline{AB} \cong \overline{DC}$
2) $\overline{FB} \cong \overline{EB}$
3) $\overleftrightarrow{BD}$ bisects $\overline{GE}$ at *C*.
4) $\overleftrightarrow{AC}$ bisects $\overline{FE}$ at *B*.

61 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.
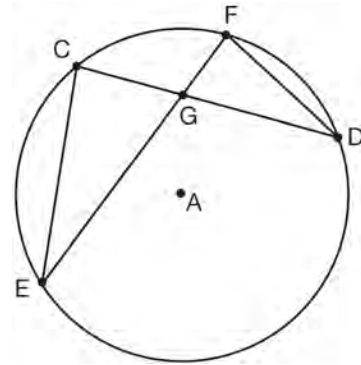
Which statement is *not* always true?
1) $\overline{CG} \cong \overline{FG}$
2) $\angle CEG \cong \angle FDG$
3) $\dfrac{CE}{EG} = \dfrac{FD}{DG}$
4) $\triangle CEG \sim \triangle FDG$

62 In the diagram of $\triangle ABC$, points *D* and *E* are on $\overline{AB}$ and $\overline{CB}$, respectively, such that $\overline{AC} \parallel \overline{DE}$.
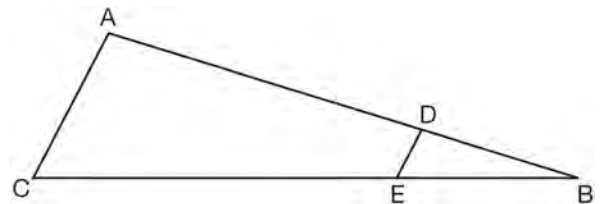
If *AD* = 24, *DB* = 12, and *DE* = 4, what is the length of $\overline{AC}$?
1) 8
2) 12
3) 16
4) 72

12

63 In the diagram below, congruent figures 1, 2, and 3 are drawn.
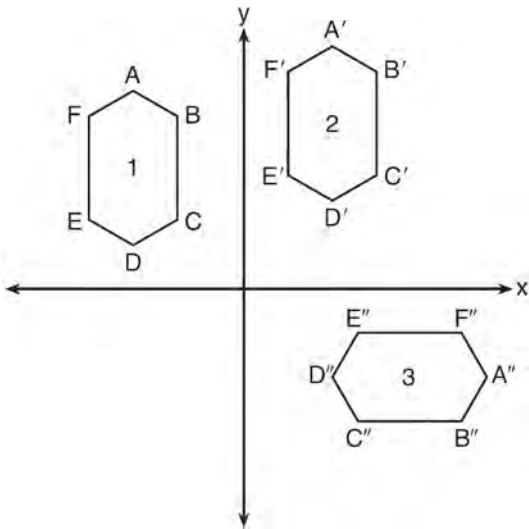
Which sequence of transformations maps figure 1 onto figure 2 and then figure 2 onto figure 3?
1) a reflection followed by a translation
2) a rotation followed by a translation
3) a translation followed by a reflection
4) a translation followed by a rotation

64 Given the right triangle in the diagram below, what is the value of x, to the *nearest foot*?
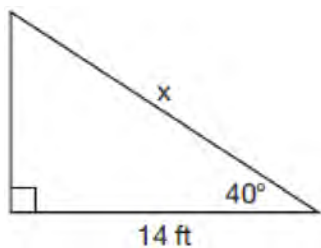
1) 11
2) 17
3) 18
4) 22

65 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

66 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

67 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

68 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

13

69 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 $PC = 10$.
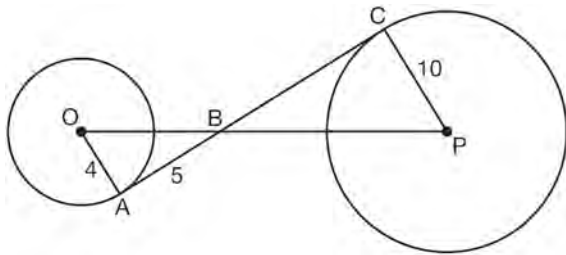
What is the length of $\overline{BC}$?
1) 6.4
2) 8
3) 12.5
4) 16

70 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) $(8.5)^3 - \frac{1}{3}\pi(4)^2(8)$

71 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

72 In the diagram below of circle O, $GO = 8$ and $m\angle GOJ = 60°$.
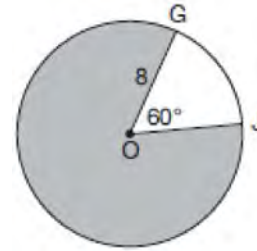
What is the area, in terms of π, of the shaded region?
1) $\dfrac{4\pi}{3}$
2) $\dfrac{20\pi}{3}$
3) $\dfrac{32\pi}{3}$
4) $\dfrac{160\pi}{3}$

73 As shown in the diagram below, the angle of elevation from a point on the ground to the top of the tree is 34°.
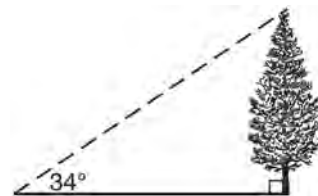
If the point is 20 feet from the base of the tree, what is the height of the tree, to the *nearest tenth of a foot*?
1) 29.7
2) 16.6
3) 13.5
4) 11.2

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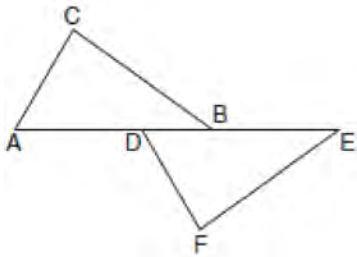
She was given that $\angle A \cong \angle EDF$, and has already proven $\overline{AB} \cong \overline{DE}$. Which pair of corresponding parts and triangle congruency method would *not* prove $\triangle ABC \cong \triangle DEF$?
1) $\overline{AC} \cong \overline{DF}$ and SAS
2) $\overline{BC} \cong \overline{EF}$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

75 In the diagram below, $m\widehat{ABC} = 268°$.
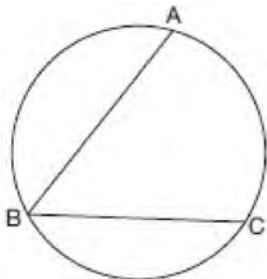
What is the number of degrees in the measure of $\angle ABC$?
1) 134°
2) 92°
3) 68°
4) 46°

76 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 $E(0,4)$.
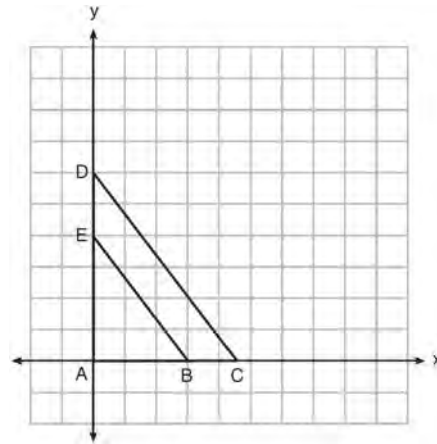
The ratio of the lengths of $\overline{BE}$ to $\overline{CD}$ is
1) $\dfrac{2}{3}$
2) $\dfrac{3}{2}$
3) $\dfrac{3}{4}$
4) $\dfrac{4}{3}$

77 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

15

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

State	Population Density $\left(\dfrac{\text{people}}{\text{mi}^2}\right)$	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

79 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) $(6,0)$

80 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) $4x + 3y = 9$

81 A regular pentagon is shown in the diagram below.
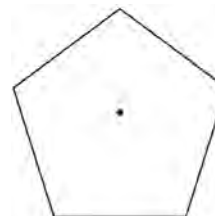
If the pentagon is rotated clockwise around its center, the minimum number of degrees it must be rotated to carry the pentagon onto itself is
1) 54°
2) 72°
3) 108°
4) 360°

82 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

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

84 In the diagram below of parallelogram $ROCK$, $m\angle C$ is 70° and $m\angle ROS$ is 65°.
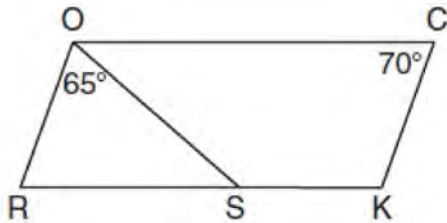
What is $m\angle KSO$?
1)   45°
2)   110°
3)   115°
4)   135°

85 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

86 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.
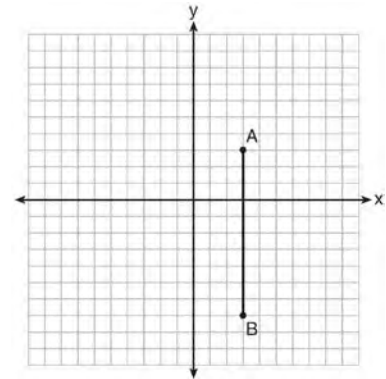
What could be a correct equation for circle O?
1) $(x-1)^2 + (y+2)^2 = 29$
2) $(x+5)^2 + (y-2)^2 = 29$
3) $(x-1)^2 + (y-2)^2 = 25$
4) $(x-5)^2 + (y+2)^2 = 25$

17

87 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) $y = 3x - 6$

88 In the diagram below, $\overline{CD}$ is the image of $\overline{AB}$ after a dilation of scale factor k with center E.
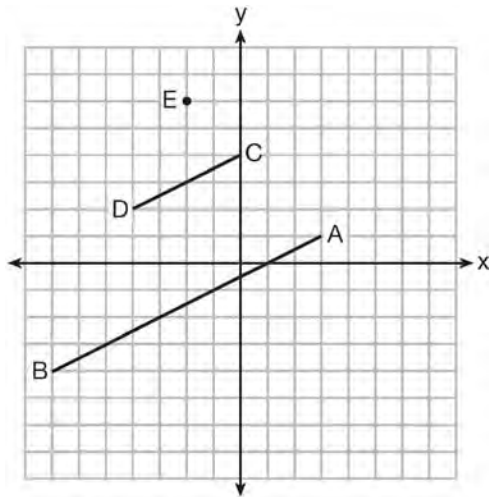
Which ratio is equal to the scale factor k of the dilation?
1) $\dfrac{EC}{EA}$
2) $\dfrac{BA}{EA}$
3) $\dfrac{EA}{BA}$
4) $\dfrac{EA}{EC}$

89 In the diagram below, $\angle GRS \cong \angle ART$, $GR = 36$, $SR = 45$, $AR = 15$, and $RT = 18$.
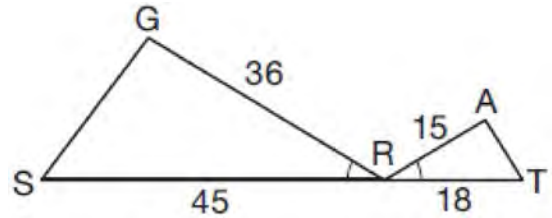
Which triangle similarity statement is correct?
1) $\triangle GRS \sim \triangle ART$ by AA.
2) $\triangle GRS \sim \triangle ART$ by SAS.
3) $\triangle GRS \sim \triangle ART$ by SSS.
4) $\triangle GRS$ is not similar to $\triangle ART$.

90 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

91 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

18

92 In the diagram below, $\triangle ABC \sim \triangle ADE$.
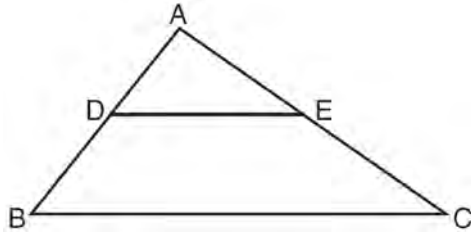
Which measurements are justified by this similarity?
1) $AD = 3$, $AB = 6$, $AE = 4$, and $AC = 12$
2) $AD = 5$, $AB = 8$, $AE = 7$, and $AC = 10$
3) $AD = 3$, $AB = 9$, $AE = 5$, and $AC = 10$
4) $AD = 2$, $AB = 6$, $AE = 5$, and $AC = 15$

93 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 $EF = 11$.
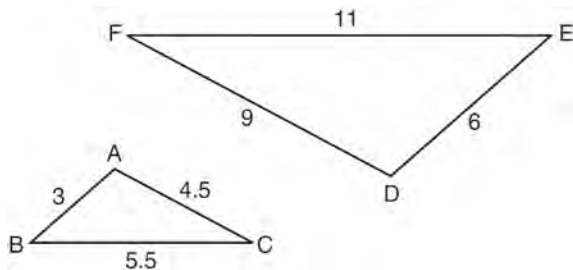
Which relationship must always be true?
1) $\dfrac{m\angle A}{m\angle D} = \dfrac{1}{2}$

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

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

95 Which transformation of $\overline{OA}$ would result in an image parallel to $\overline{OA}$?
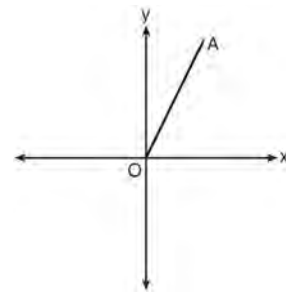
1) a translation of two units down
2) a reflection over the x-axis
3) a reflection over the y-axis
4) a clockwise rotation of $90°$ about the origin

96 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) $252°$

19

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

98 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

99 Given: $\triangle ABE$ and $\triangle CBD$ shown in the diagram below with $\overline{DB} \cong \overline{BE}$
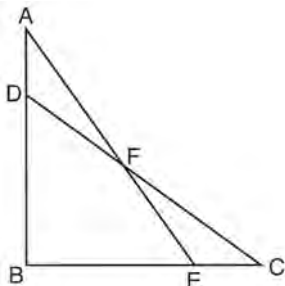
Which statement is needed to prove
$\triangle ABE \cong \triangle CBD$ using only SAS $\cong$ SAS?
1) $\angle CDB \cong \angle AEB$
2) $\angle AFD \cong \angle EFC$
3) $\overline{AD} \cong \overline{CE}$
4) $\overline{AE} \cong \overline{CD}$

100 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.
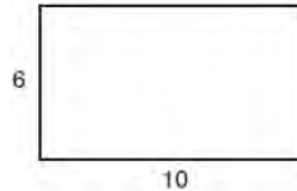
Which line could the rectangle be rotated around?
1) a long side
2) a short side
3) the vertical line of symmetry
4) the horizontal line of symmetry

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

102 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

20

103 In the diagram below of circle O, chord $\overline{DF}$ bisects chord $\overline{BC}$ at E.
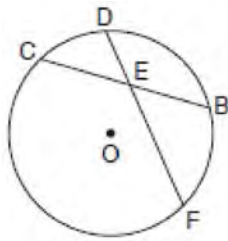
If $BC = 12$ and FE is 5 more than DE, then FE is
1) 13
2) 9
3) 6
4) 4

104 In the diagram below, quadrilateral $ABCD$ is inscribed in circle P.
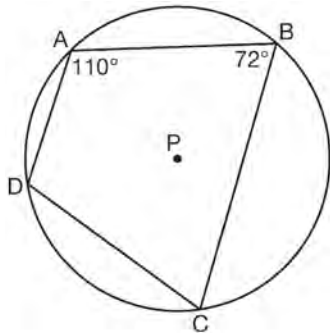
What is m∠ADC?
1) 70°
2) 72°
3) 108°
4) 110°

105 Identify which sequence of transformations could map pentagon $ABCDE$ onto pentagon $A"B"C"D"E"$, as shown below.
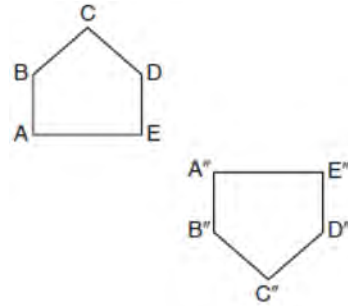
1) dilation followed by a rotation
2) translation followed by a rotation
3) line reflection followed by a translation
4) line reflection followed by a line reflection

106 In the diagram below, $\triangle ERM \sim \triangle JTM$.
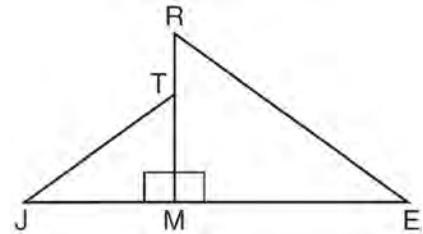
Which statement is always true?
1) $\cos J = \dfrac{RM}{RE}$
2) $\cos R = \dfrac{JM}{JT}$
3) $\tan T = \dfrac{RM}{EM}$
4) $\tan E = \dfrac{TM}{JM}$

21

107 As shown in the diagram below, $\overline{AB}$ and $\overline{CD}$ intersect at E, and $\overline{AC} \parallel \overline{BD}$.
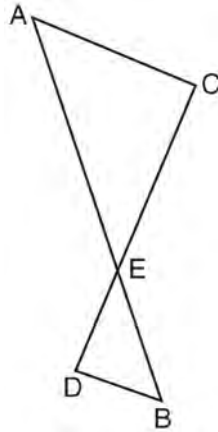
Given $\triangle AEC \sim \triangle BED$, which equation is true?

1) $\dfrac{CE}{DE} = \dfrac{EB}{EA}$

2) $\dfrac{AE}{BE} = \dfrac{AC}{BD}$

3) $\dfrac{EC}{AE} = \dfrac{BE}{ED}$

4) $\dfrac{ED}{EC} = \dfrac{AC}{BD}$

108 In scalene triangle ABC shown in the diagram below, $m\angle C = 90°$.
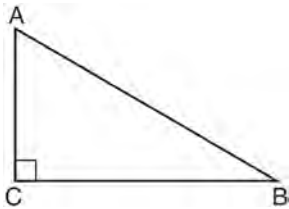
Which equation is always true?
1) $\sin A = \sin B$
2) $\cos A = \cos B$
3) $\cos A = \sin C$
4) $\sin A = \cos B$

109 The diagram shows rectangle $ABCD$, with diagonal $\overline{BD}$.
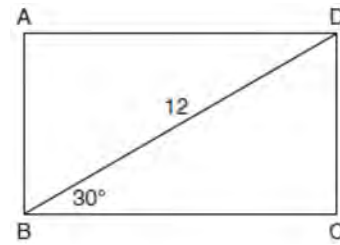
What is the perimeter of rectangle $ABCD$, to the *nearest tenth*?
1) 28.4
2) 32.8
3) 48.0
4) 62.4

110 Triangle FGH is inscribed in circle O, the length of radius $\overline{OH}$ is 6, and $\overline{FH} \cong \overline{OG}$.
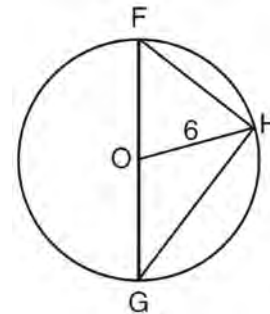
What is the area of the sector formed by angle FOH?
1) 2π

2) $\dfrac{3}{2}\pi$

3) 6π
4) 24π

22

111 William is drawing pictures of cross sections of the right circular cone below.
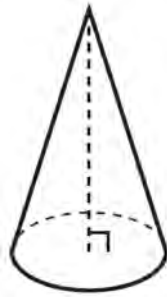
Which drawing can *not* be a cross section of a cone?

1)

2)

3)

4)

112 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) $y = 3x - 1$

113 What is an equation of the perpendicular bisector of the line segment shown in the diagram below?
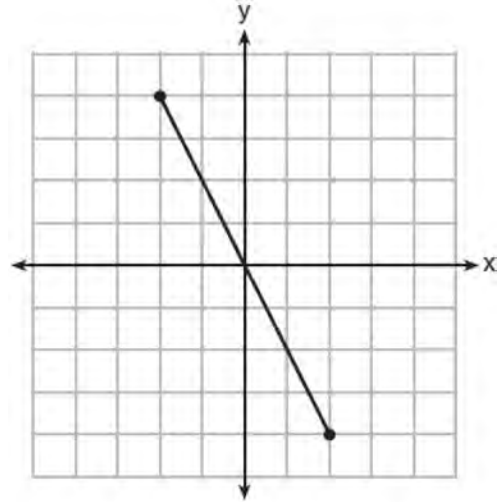
1) $y + 2x = 0$
2) $y - 2x = 0$
3) $2y + x = 0$
4) $2y - x = 0$

114 In the diagram of $\triangle ADC$ below, $\overline{EB} \parallel \overline{DC}$, $AE = 9$, $ED = 5$, and $AB = 9.2$.
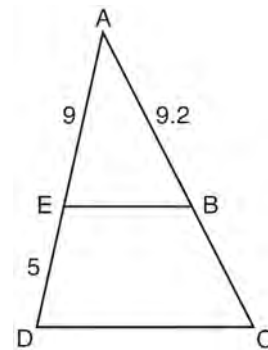
What is the length of $\overline{AC}$, to the *nearest tenth*?
1) 5.1
2) 5.2
3) 14.3
4) 14.4

115 In the diagram below, $\overline{DB}$ and $\overline{AF}$ intersect at point C, and $\overline{AD}$ and $\overline{FBE}$ are drawn.
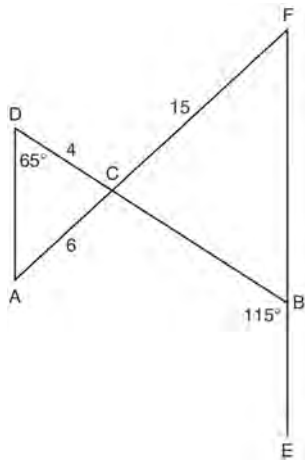
If $AC = 6$, $DC = 4$, $FC = 15$, m$\angle D = 65°$, and m$\angle CBE = 115°$, what is the length of $\overline{CB}$?
1) 10
2) 12
3) 17
4) 22.5

116 In the diagram of parallelogram $FRED$ shown below, $\overline{ED}$ is extended to A, and $\overline{AF}$ is drawn such that $\overline{AF} \cong \overline{DF}$.
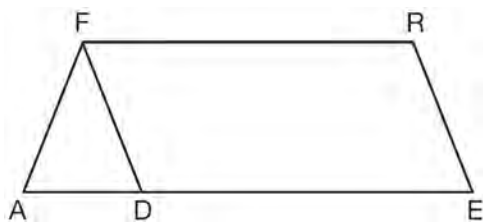
If m$\angle R = 124°$, what is m$\angle AFD$?
1) 124°
2) 112°
3) 68°
4) 56°

117 In the diagram below, which single transformation was used to map triangle A onto triangle B?
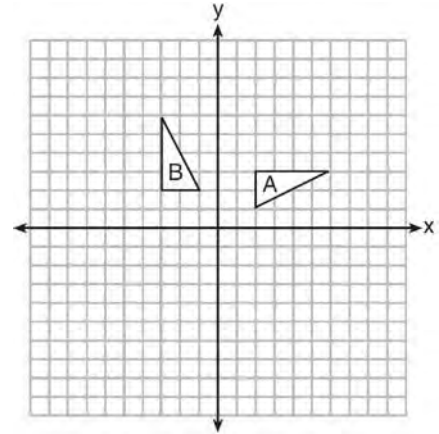
1) line reflection
2) rotation
3) dilation
4) translation

118 In the diagram below, $\overline{BC}$ is the diameter of circle A.
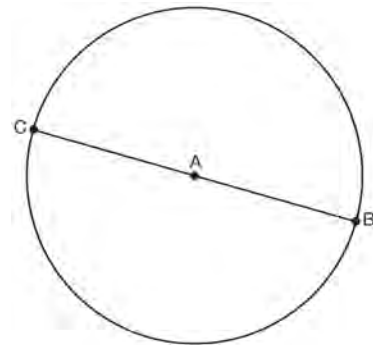
Point D, which is unique from points B and C, is plotted on circle A. Which statement must always be true?
1) $\triangle BCD$ is a right triangle.
2) $\triangle BCD$ is an isosceles triangle.
3) $\triangle BAD$ and $\triangle CBD$ are similar triangles.
4) $\triangle BAD$ and $\triangle CAD$ are congruent triangles.

24

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

120 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 $\triangle DEF$

121 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) $(6,3)$

122 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

123 Given $\triangle ABC$ with $m\angle B = 62°$ and side $\overline{AC}$ extended to D, as shown below.
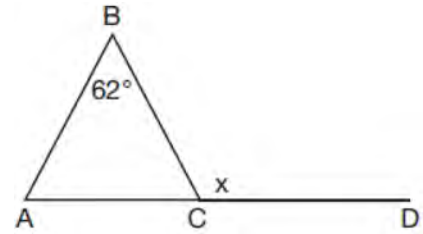
Which value of x makes $\overline{AB} \cong \overline{CB}$?
1) 59°
2) 62°
3) 118°
4) 121°

124 As shown in the diagram below, a regular pyramid has a square base whose side measures 6 inches.
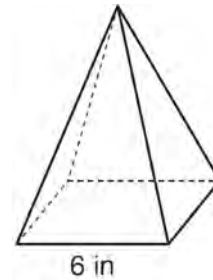
If the altitude of the pyramid measures 12 inches, its volume, in cubic inches, is
1) 72
2) 144
3) 288
4) 432

125 In the diagram below, $\overline{AD}$ intersects $\overline{BE}$ at C, and $\overline{AB} \| \overline{DE}$.
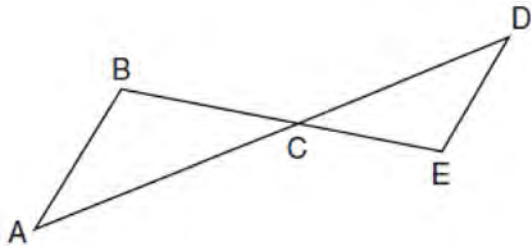
If $CD = 6.6$ cm, $DE = 3.4$ cm, $CE = 4.2$ cm, and $BC = 5.25$ cm, what is the length of $\overline{AC}$, to the *nearest hundredth of a centimeter*?
1) 2.70
2) 3.34
3) 5.28
4) 8.25

126 In the diagram below, a square is graphed in the coordinate plane.
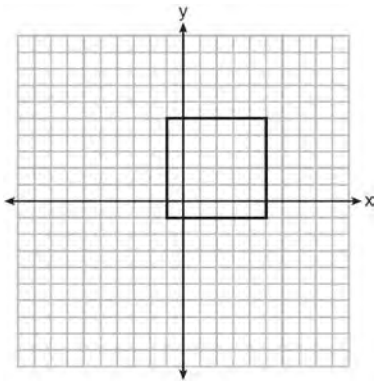
A reflection over which line does *not* carry the square onto itself?
1) $x = 5$
2) $y = 2$
3) $y = x$
4) $x + y = 4$

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

128 The image of $\triangle ABC$ after a rotation of 90° clockwise about the origin is $\triangle DEF$, as shown below.
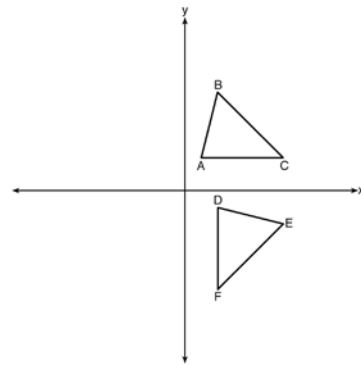
Which statement is true?
1) $\overline{BC} \cong \overline{DE}$
2) $\overline{AB} \cong \overline{DF}$
3) $\angle C \cong \angle E$
4) $\angle A \cong \angle D$

129 In the diagram below, $AC = 7.2$ and $CE = 2.4$.
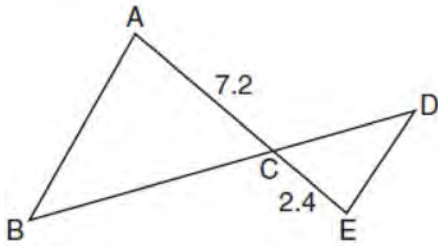
Which statement is *not* sufficient to prove
$\triangle ABC \sim \triangle EDC$?
1) $\overline{AB} \parallel \overline{ED}$
2) $DE = 2.7$ and $AB = 8.1$
3) $CD = 3.6$ and $BC = 10.8$
4) $DE = 3.0$, $AB = 9.0$, $CD = 2.9$, and $BC = 8.7$

130 Which sequence of transformations will map
$\triangle ABC$ onto $\triangle A'B'C'$?
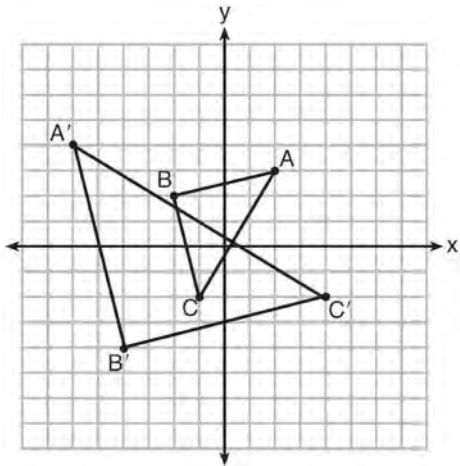
1) reflection and translation
2) rotation and reflection
3) translation and dilation
4) dilation and rotation

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

132 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 $\dfrac{AE}{AC}$ centered at point
A.
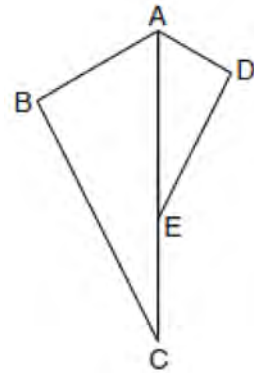
Which statement must be true?
1) $m\angle BAC \cong m\angle AED$
2) $m\angle ABC \cong m\angle ADE$
3) $m\angle DAE \cong \dfrac{1}{2} m\angle BAC$
4) $m\angle ACB \cong \dfrac{1}{2} m\angle DAB$

27

133 On the graph below, point $A(3,4)$ and $\overline{BC}$ with coordinates $B(4,3)$ and $C(2,1)$ are graphed.
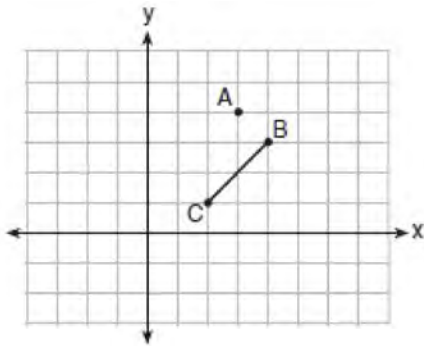
What are the coordinates of B' and C' after $\overline{BC}$ undergoes a dilation centered at point A with a scale factor of 2?
1) $B'(5,2)$ and $C'(1,-2)$
2) $B'(6,1)$ and $C'(0,-1)$
3) $B'(5,0)$ and $C'(1,-2)$
4) $B'(5,2)$ and $C'(3,0)$

134 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 $AD = 18$.
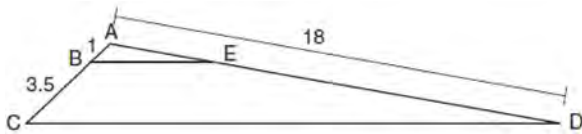
What is the length of $\overline{AE}$, to the *nearest tenth*?
1) 14.0
2) 5.1
3) 3.3
4) 4.0

135 In the diagram of right triangle ABC shown below, $AB = 14$ and $AC = 9$.
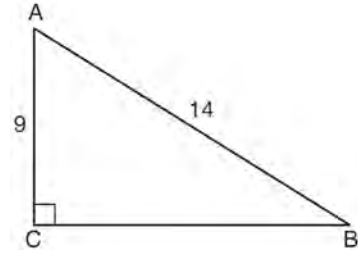
What is the measure of $\angle A$, to the *nearest degree*?
1) 33
2) 40
3) 50
4) 57

136 In the diagram below, $m\angle BDC = 100°$, $m\angle A = 50°$, and $m\angle DBC = 30°$.
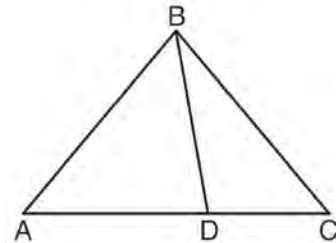
Which statement is true?
1) $\triangle ABD$ is obtuse.
2) $\triangle ABC$ is isosceles.
3) $m\angle ABD = 80°$
4) $\triangle ABD$ is scalene.

28

137 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

138 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

139 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*.
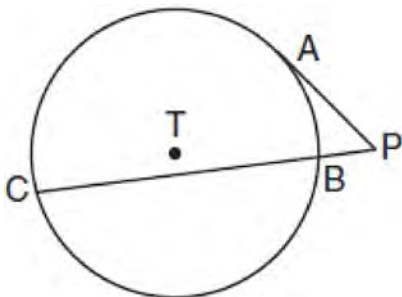
If *PB* = 3 and *BC* = 15, what is the length of $\overline{PA}$?
1) $3\sqrt{5}$
2) $3\sqrt{6}$
3) 3
4) 9

140 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

141 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

142 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.
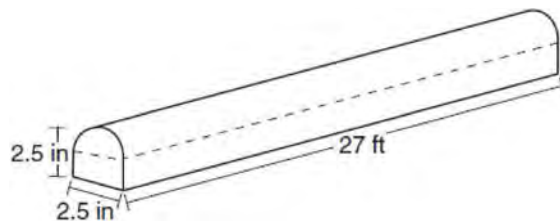
How much metal, to the *nearest cubic inch*, will the railing contain?
1) 151
2) 795
3) 1808
4) 2025

29

143 In circle O, diameter $\overline{AB}$, chord $\overline{BC}$, and radius $\overline{OC}$ are drawn, and the measure of arc BC is 108°.
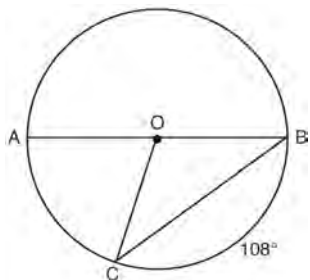
Some students wrote these formulas to find the area of sector COB:

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

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

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

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

Which students wrote correct formulas?
1) Amy and Dex
2) Beth and Carl
3) Carl and Amy
4) Dex and Beth

144 In the diagram below, $\triangle ABC \sim \triangle DEF$.
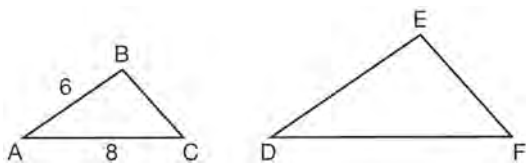
If $AB = 6$ and $AC = 8$, which statement will justify similarity by SAS?
1) $DE = 9$, $DF = 12$, and $\angle A \cong \angle D$
2) $DE = 8$, $DF = 10$, and $\angle A \cong \angle D$
3) $DE = 36$, $DF = 64$, and $\angle C \cong \angle F$
4) $DE = 15$, $DF = 20$, and $\angle C \cong \angle F$

145 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) $(6.4,2.8)$

146 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 $\angle DCB$

147 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) $(-8,5\sqrt{21})$

148 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) $y = 2x + 6$

149 In triangle *CHR*, *O* is on $\overline{HR}$, and *D* is on $\overline{CR}$ so that $\angle H \cong \angle RDO$.
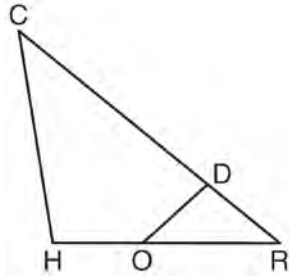
If *RD* = 4, *RO* = 6, and *OH* = 4, what is the length of $\overline{CD}$?

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

2) $6\frac{2}{3}$

3) 11

4) 15

150 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.

151 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 $\overline{MN}$?
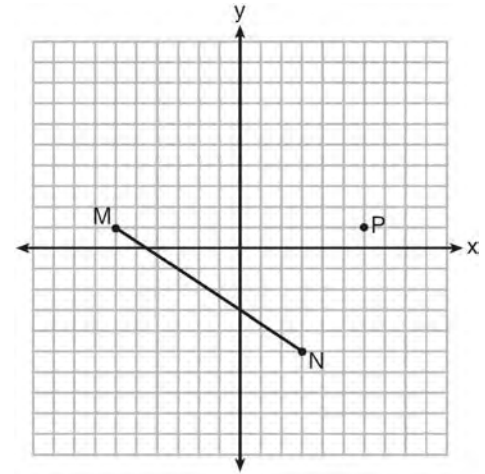
1) $y = -\frac{2}{3}x + 5$

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

3) $y = \frac{3}{2}x + 7$

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

152 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

31

153 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.
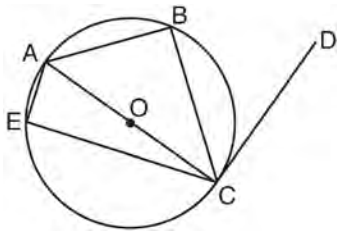
Which statement is *not* always true?
1) $\angle ACB \cong \angle BCD$
2) $\angle ABC \cong \angle ACD$
3) $\angle BAC \cong \angle DCB$
4) $\angle CBA \cong \angle AEC$

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

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

156 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

157 Kevin's work for deriving the equation of a circle is shown below.
$$x^2 + 4x = -(y^2 - 20)$$
STEP 1 $x^2 + 4x = -y^2 + 20$
STEP 2 $x^2 + 4x + 4 = -y^2 + 20 - 4$
STEP 3 $(x + 2)^2 = -y^2 + 20 - 4$
STEP 4 $(x + 2)^2 + y^2 = 16$
In which step did he make an error in his work?
1) Step 1
2) Step 2
3) Step 3
4) Step 4

158 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

32

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

160 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) $y = 2x + 1$

161 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

162 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

163 In the diagram of right triangle ADE below, $\overline{BC} \parallel \overline{DE}$.
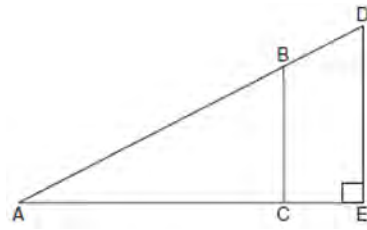
Which ratio is always equivalent to the sine of $\angle A$?
1) $\dfrac{AD}{DE}$
2) $\dfrac{AE}{AD}$
3) $\dfrac{BC}{AB}$
4) $\dfrac{AB}{AC}$

164 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

33

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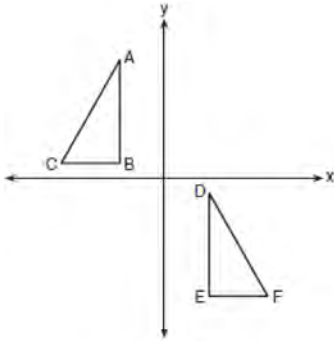
Which sequence of transformations maps $\triangle ABC$ onto $\triangle DEF$?
1) a reflection over the *x*-axis followed by a translation
2) a reflection over the *y*-axis followed by a translation
3) a rotation of 180° about the origin followed by a translation
4) a counterclockwise rotation of 90° about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

166 Which statement is sufficient evidence that $\triangle DEF$ is congruent to $\triangle ABC$?
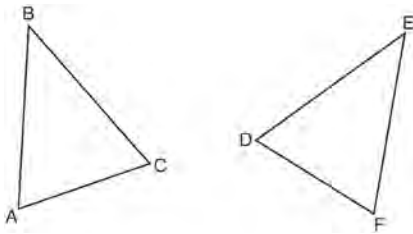
1) $AB = DE$ and $BC = EF$
2) $\angle D \cong \angle A$, $\angle B \cong \angle E$, $\angle C \cong \angle F$
3) There is a sequence of rigid motions that maps $\overline{AB}$ onto $\overline{DE}$, $\overline{BC}$ onto $\overline{EF}$, and $\overline{AC}$ onto $\overline{DF}$.
4) There is a sequence of rigid motions that maps point *A* onto point *D*, $\overline{AB}$ onto $\overline{DE}$, and $\angle B$ onto $\angle E$.

167 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*.
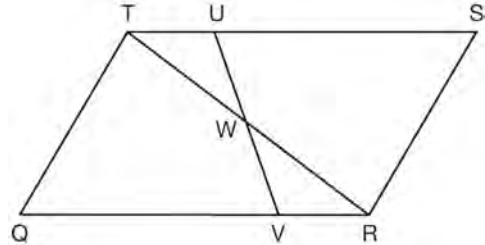
If m$\angle S = 60°$, m$\angle SRT = 83°$, and m$\angle TWU = 35°$, what is m$\angle WVQ$?
1) 37°
2) 60°
3) 72°
4) 83°

168 In the diagram below, the circle shown has radius 10. Angle *B* intercepts an arc with a length of 2π.
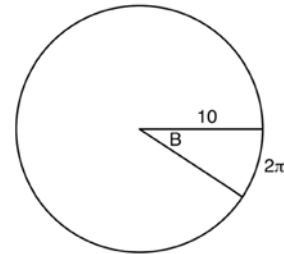
What is the measure of angle *B*, in radians?
1) $10 + 2\pi$
2) 20π
3) $\dfrac{\pi}{5}$
4) $\dfrac{5}{\pi}$

34

169 In the diagram below, $\triangle ABC$ has vertices $A(4,5)$, $B(2,1)$, and $C(7,3)$.
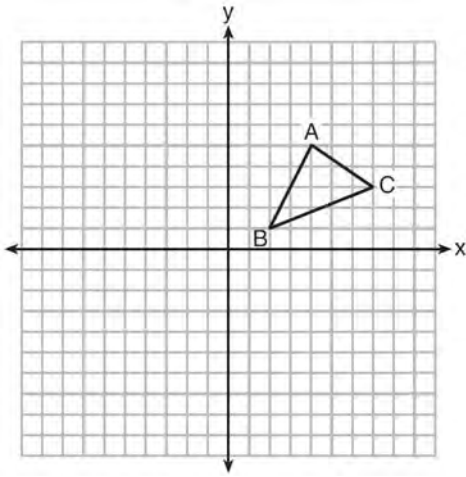
What is the slope of the altitude drawn from A to $\overline{BC}$?

1) $\dfrac{2}{5}$

2) $\dfrac{3}{2}$

3) $-\dfrac{1}{2}$

4) $-\dfrac{5}{2}$

170 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.

171 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

172 In the diagram below, $\overline{DE}$, $\overline{DF}$, and $\overline{EF}$ are midsegments of $\triangle ABC$.
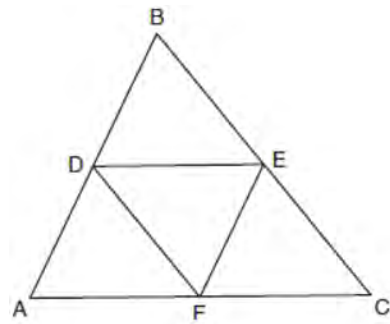
The perimeter of quadrilateral $ADEF$ is equivalent to
1) $AB + BC + AC$
2) $\dfrac{1}{2}AB + \dfrac{1}{2}AC$
3) $2AB + 2AC$
4) $AB + AC$

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

1) $y = \dfrac{1}{2}x$

2) $y = -2x - 3$

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

4) $y = -2x + 3$

35

174 Quadrilateral *ABCD* is graphed on the set of axes below.
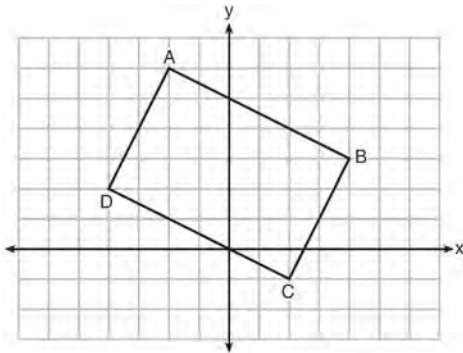
When *ABCD* is rotated 90° in a counterclockwise direction about the origin, its image is quadrilateral *A'B'C'D'*. Is distance preserved under this rotation, and which coordinates are correct for the given vertex?
1) no and $C'(1,2)$
2) no and $D'(2,4)$
3) yes and $A'(6,2)$
4) yes and $B'(-3,4)$

175 Which object is formed when right triangle *RST* shown below is rotated around leg $\overline{RS}$?
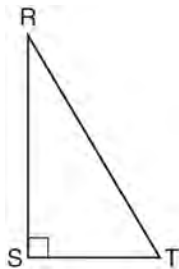
1) a pyramid with a square base
2) an isosceles triangle
3) a right triangle
4) a cone

176 A circle with a radius of 5 was divided into 24 congruent sectors. The sectors were then rearranged, as shown in the diagram below.
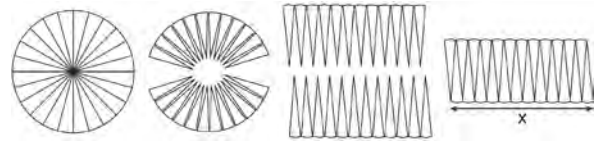
To the *nearest integer*, the value of *x* is
1) 31
2) 16
3) 12
4) 10

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

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

178 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

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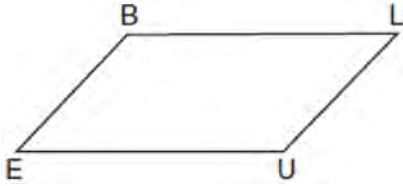
Which information would be sufficient to prove quadrilateral *BLUE* is a parallelogram?
1) $\overline{BL} \parallel \overline{EU}$
2) $\overline{LU} \parallel \overline{BE}$
3) $\overline{BE} \cong \overline{BL}$
4) $\overline{LU} \cong \overline{EU}$

180 In the diagram below, $\overline{DE}$ divides $\overline{AB}$ and $\overline{AC}$ proportionally, m∠C = 26°, m∠A = 82°, and $\overline{DF}$ bisects ∠*BDE*.
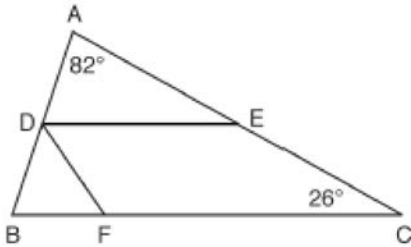
The measure of angle *DFB* is
1) 36°
2) 54°
3) 72°
4) 82°

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

182 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

183 In the diagram below, △*ABC* ∼ △*DEC*.
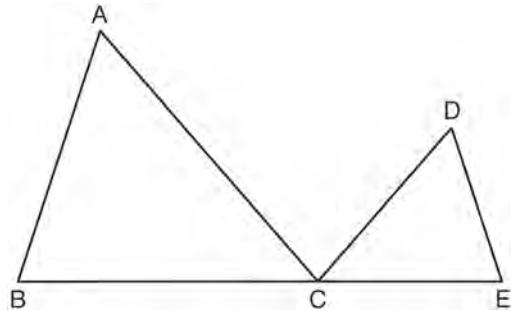
If *AC* = 12, *DC* = 7, *DE* = 5, and the perimeter of △*ABC* is 30, what is the perimeter of △*DEC*?
1) 12.5
2) 14.0
3) 14.8
4) 17.5

184 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 $= \sqrt{35}$

185 Given $\triangle MRO$ shown below, with trapezoid $PTRO$, $MR = 9$, $MP = 2$, and $PO = 4$.
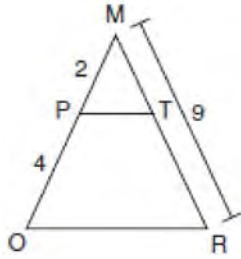
What is the length of $\overline{TR}$?
1) 4.5
2) 5
3) 3
4) 6

186 A sequence of transformations maps rectangle $ABCD$ onto rectangle $A''B''C''D''$, as shown in the diagram below.
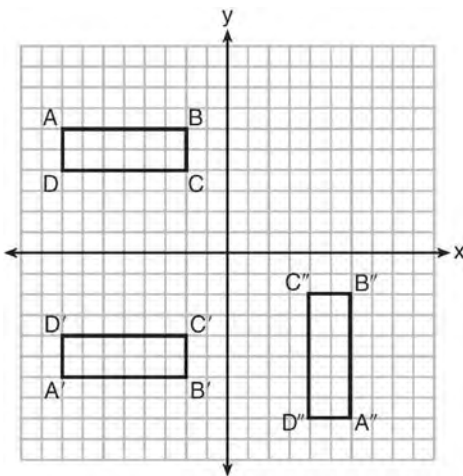
Which sequence of transformations maps $ABCD$ onto $A'B'C'D'$ and then maps $A'B'C'D'$ onto $A''B''C''D''$?
1) a reflection followed by a rotation
2) a reflection followed by a translation
3) a translation followed by a rotation
4) a translation followed by a reflection

187 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

188 Triangle RST is graphed on the set of axes below.
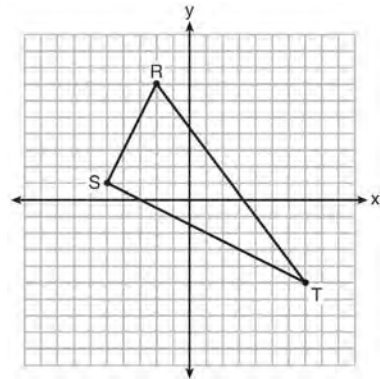
How many square units are in the area of $\triangle RST$?
1) $9\sqrt{3} + 15$
2) $9\sqrt{5} + 15$
3) 45
4) 90

189 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

190 Which point shown in the graph below is the image of point *P* after a counterclockwise rotation of 90° about the origin?
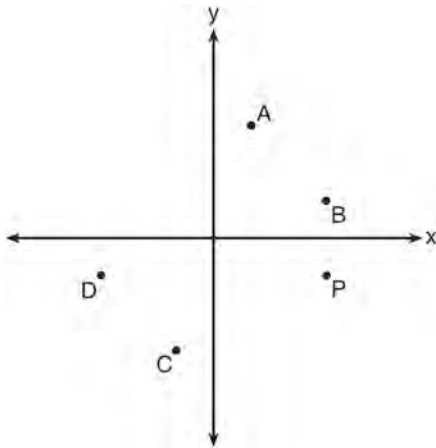
1) *A*
2) *B*
3) *C*
4) *D*

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

192 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) $y = 2x - 16$

193 Steve drew line segments *ABCD*, *EFG*, *BF*, and *CF* as shown in the diagram below. Scalene $\triangle BFC$ is formed.
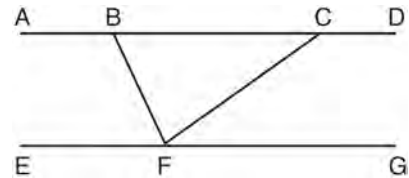
Which statement will allow Steve to prove $\overline{ABCD} \parallel \overline{EFG}$?
1) $\angle CFG \cong \angle FCB$
2) $\angle ABF \cong \angle BFC$
3) $\angle EFB \cong \angle CFB$
4) $\angle CBF \cong \angle GFC$

194 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

195 Given: $\triangle AEC$, $\triangle DEF$, and $\overline{FE} \perp \overline{CE}$
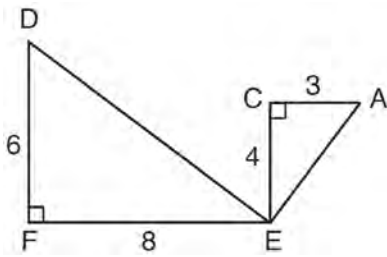
What is a correct sequence of similarity transformations that shows $\triangle AEC \sim \triangle DEF$?
1) a rotation of 180 degrees about point E followed by a horizontal translation
2) a counterclockwise rotation of 90 degrees about point E followed by a horizontal translation
3) a rotation of 180 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

196 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) $y = -x - 3$

197 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) $4\sqrt{40}$

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

1)

2)

3)

4)
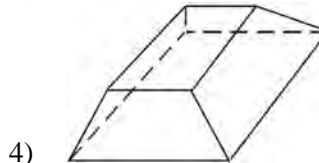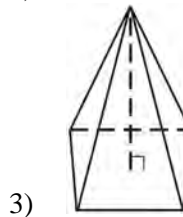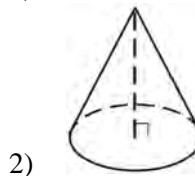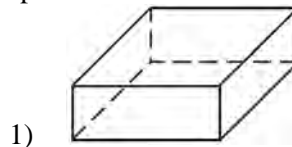
199 Triangle *ABC* and triangle *DEF* are graphed on the set of axes below.
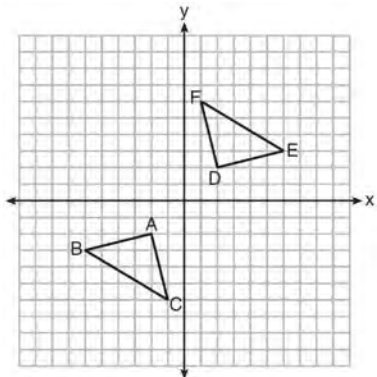
Which sequence of transformations maps triangle *ABC* onto triangle *DEF*?

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

Geometry Common Core State Standards 2 Point Regents Exam Questions

200 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.
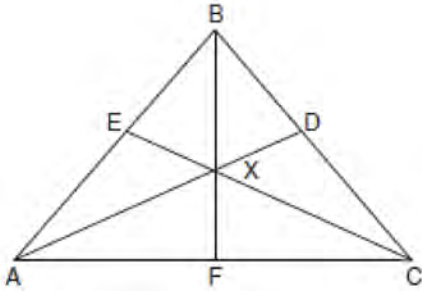
If $m\angle BAC = 50°$, find $m\angle AXC$.

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

202 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 $PQRS$.
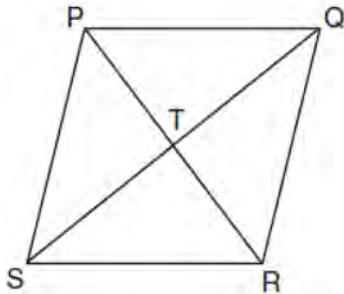
203 Describe a sequence of transformations that will map $\triangle ABC$ onto $\triangle DEF$ as shown below.
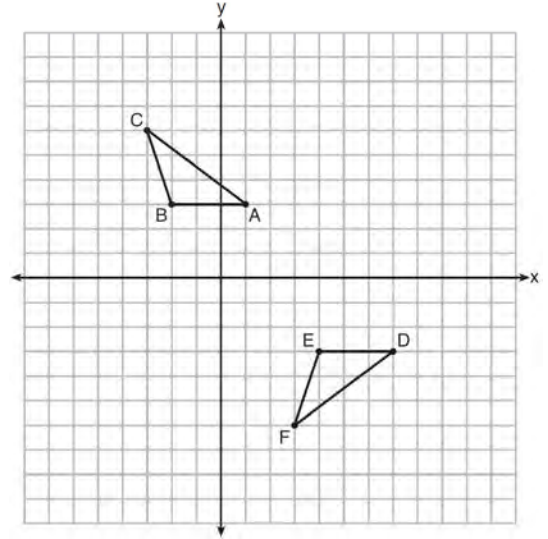
204 In the diagram of $\triangle ABC$ shown below, use a compass and straightedge to construct the median to $\overline{AB}$. [Leave all construction marks.]
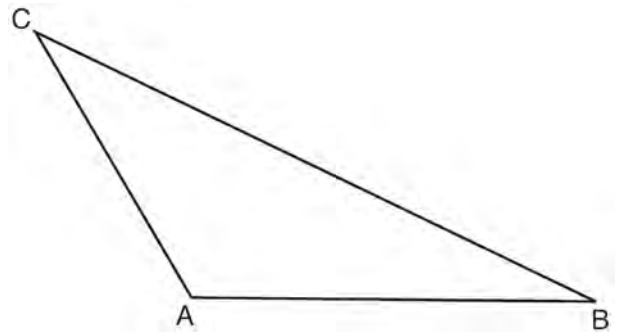
205 The diagram below shows two figures. Figure *A* is a right triangular prism and figure *B* is an oblique triangular prism. The base of figure *A* has a height of 5 and a length of 8 and the height of prism *A* is 14. The base of figure *B* has a height of 8 and a length of 5 and the height of prism *B* is 14.

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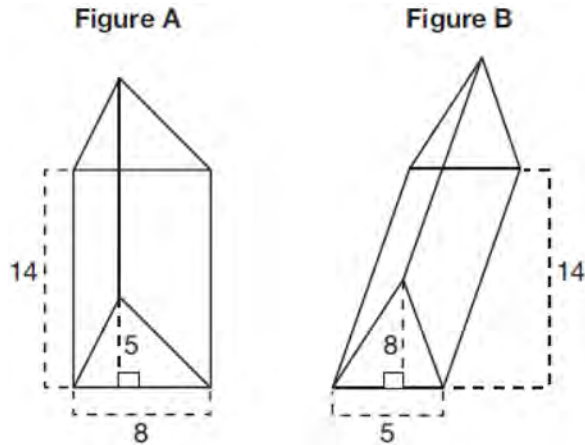
Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

206 In the diagram below, $\overline{GI}$ is parallel to $\overline{NT}$, and $\overline{IN}$ intersects $\overline{GT}$ at *A*.
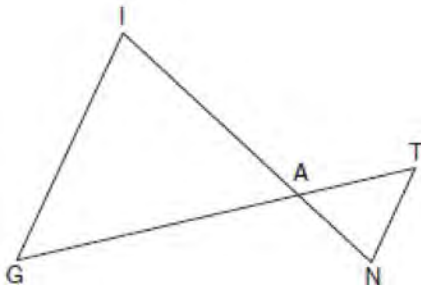
Prove: $\triangle GIA \sim \triangle TNA$

207 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.

208 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.]
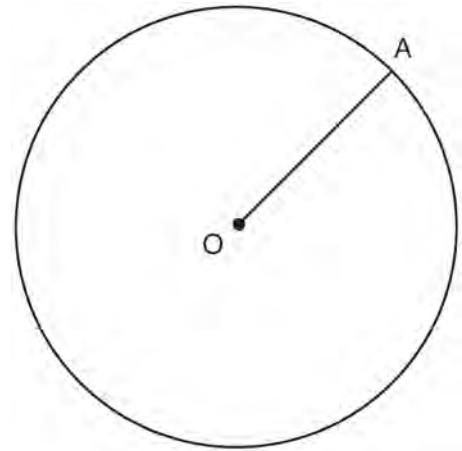
209 A ladder leans against a building. The top of the ladder touches the building 10 feet above the ground. The foot of the ladder is 4 feet from the building. Find, to the *nearest degree*, the angle that the ladder makes with the level ground.

210 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.

211 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 $x = 1$.
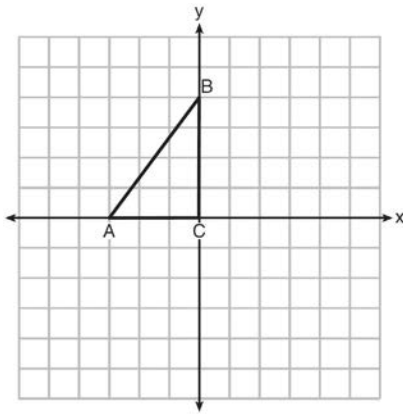
214 Use a compass and straightedge to construct an inscribed square in circle *T* shown below. [Leave all construction marks.]
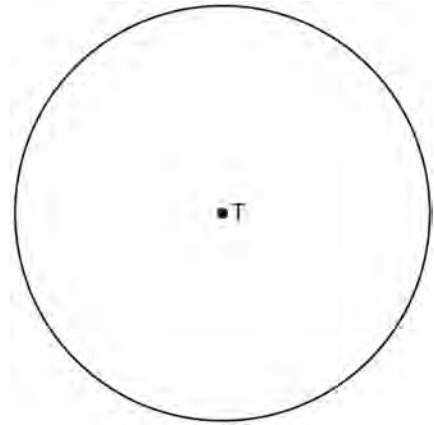
212 To find the distance across a pond from point *B* to point *C*, a surveyor drew the diagram below. The measurements he made are indicated on his diagram.

215 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.
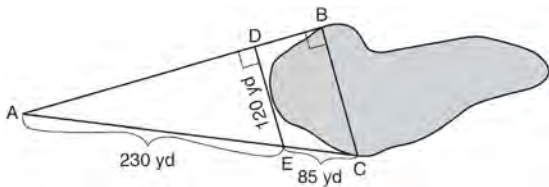
Use the surveyor's information to determine and state the distance from point *B* to point *C*, to the *nearest yard*.
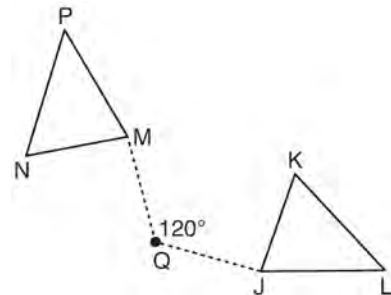
213 After a reflection over a line, $\triangle A'B'C'$ is the image of $\triangle ABC$. Explain why triangle *ABC* is congruent to triangle $\triangle A'B'C'$.

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

217 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 $\overline{CD}$.

220 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.
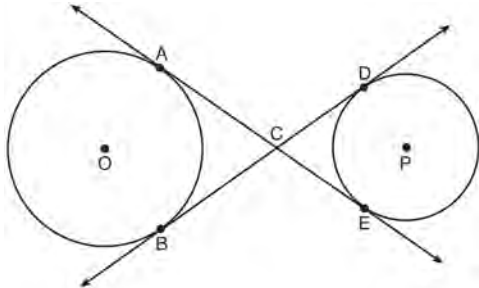
218 Point *P* is on segment *AB* such that $AP:PB$ is $4:5$. If *A* has coordinates $(4,2)$, and *B* has coordinates $(22,2)$, determine and state the coordinates of *P*.

221 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 $y = 0$.

219 As graphed on the set of axes below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a sequence of transformations.
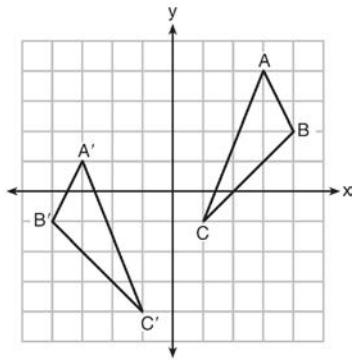
Is $\triangle A'B'C'$ congruent to $\triangle ABC$? Use the properties of rigid motion to explain your answer.
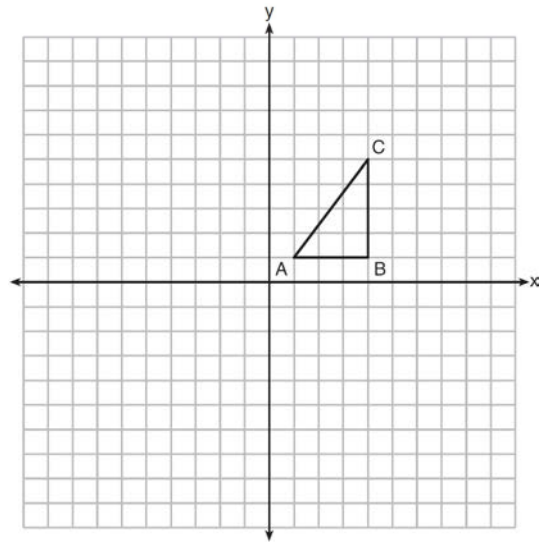
222 The coordinates of the endpoints of $\overline{AB}$ are
$A(-6,-5)$ and $B(4,0)$. Point P is on $\overline{AB}$. Determine
and state the coordinates of point P, such that
$AP:PB$ is $2:3$. [The use of the set of axes below is
optional.]

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

225 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.

226 Two stacks of 23 quarters each are shown below.
One stack forms a cylinder but the other stack does
not form a cylinder.
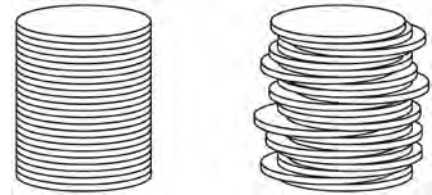
Use Cavelieri's principle to explain why the
volumes of these two stacks of quarters are equal.

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

227 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 $\triangle ABC \cong \triangle DEF$.
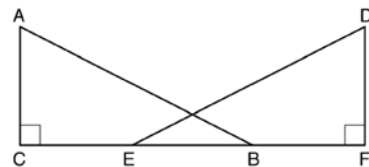
228 In the diagram below, a window of a house is 15 feet above the ground. A ladder is placed against the house with its base at an angle of 75° with the ground. Determine and state the length of the ladder to the *nearest tenth of a foot*.
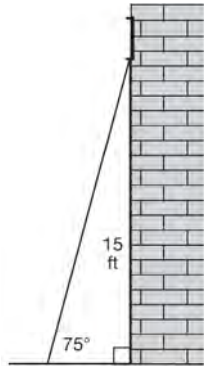
229 Construct an equilateral triangle inscribed in circle *T* shown below. [Leave all construction marks.]
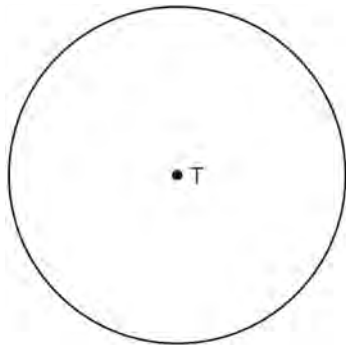
230 A flagpole casts a shadow 16.60 meters long. Tim stands at a distance of 12.45 meters from the base of the flagpole, such that the end of Tim's shadow meets the end of the flagpole's shadow. If Tim is 1.65 meters tall, determine and state the height of the flagpole to the *nearest tenth of a meter*.

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

232 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 $BD = 6$.
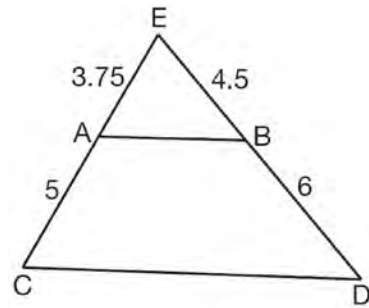
Explain why $\overline{AB}$ is parallel to $\overline{CD}$.

233 In the diagram below, tangent $\overline{DA}$ and secant $\overline{DBC}$ are drawn to circle *O* from external point *D*, such that $\overset{\frown}{AC} \cong \overset{\frown}{BC}$.
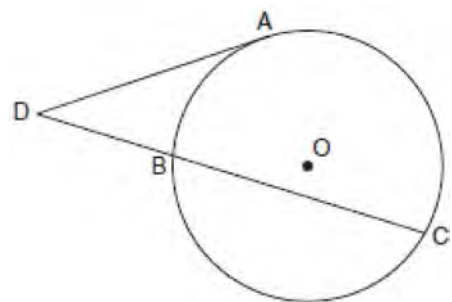
If $m\overset{\frown}{BC} = 152°$, determine and state $m\angle D$.

234 The graph below shows △*ABC* and its image, △*A"B"C"*.
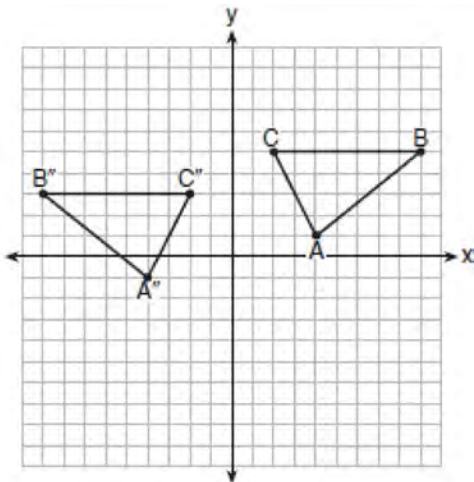
Describe a sequence of rigid motions which would map △*ABC* onto △*A"B"C"*.

235 Triangles *RST* and *XYZ* are drawn below. If *RS* = 6, *ST* = 14, *XY* = 9, *YZ* = 21, and ∠*S* ≅ ∠*Y*, is △*RST* similar to △*XYZ*? Justify your answer.
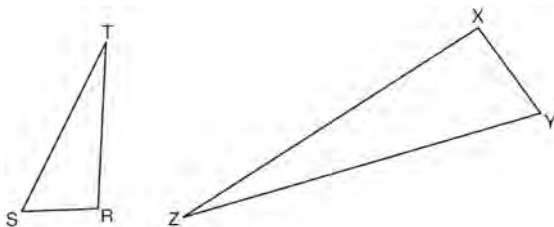
236 In right triangle *ABC* with the right angle at *C*, $\sin A = 2x + 0.1$ and $\cos B = 4x - 0.7$. Determine and state the value of *x*. Explain your answer.

237 In right triangle *ABC* shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. Explain why △*ABC* ~ △*ACD*.
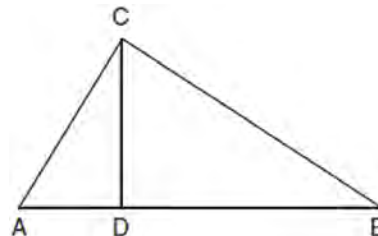
238 The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.
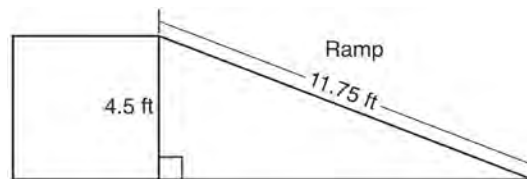
Determine and state, to the *nearest degree*, the angle of elevation formed by the ramp and the ground.

239 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.]

48
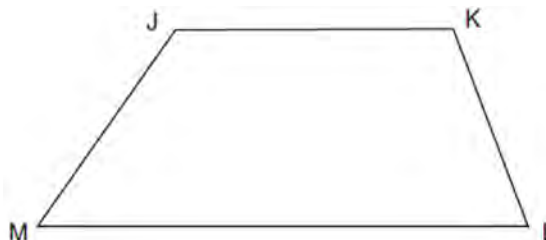
240 A wooden cube has an edge length of 6 centimeters and a mass of 137.8 grams. Determine the density of the cube, to the *nearest thousandth*. State which type of wood the cube is made of, using the density table below.

Type of Wood	Density (g/cm³)
Pine	0.373
Hemlock	0.431
Elm	0.554
Birch	0.601
Ash	0.638
Maple	0.676
Oak	0.711

241 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.]
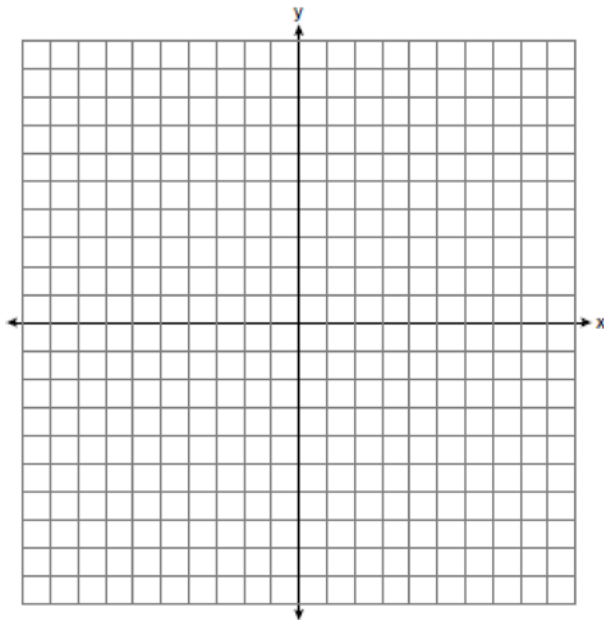
242 In the diagram below of circle *O*, the area of the shaded sector *AOC* is 12π in² and the length of $\overline{OA}$ is 6 inches. Determine and state m$\angle AOC$.
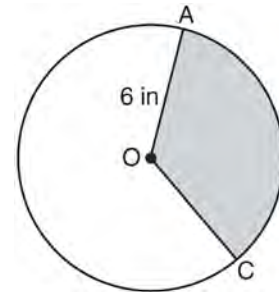
243 In parallelogram *ABCD* shown below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E*.

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

49
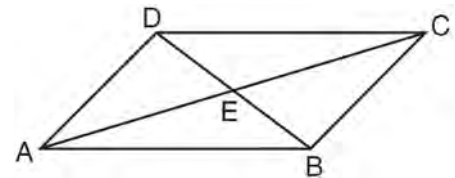
244 A contractor needs to purchase 500 bricks. The dimensions of each brick are 5.1 cm by 10.2 cm by 20.3 cm, and the density of each brick is $1920 \text{ kg}/\text{m}^3$. The maximum capacity of the contractor's trailer is 900 kg. Can the trailer hold the weight of 500 bricks? Justify your answer.

245 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.]
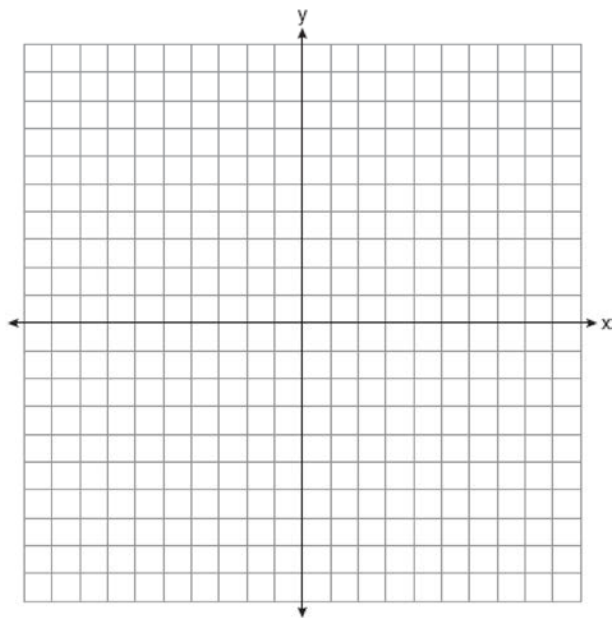
246 Line ℓ is mapped onto line m by a dilation centered at the origin with a scale factor of 2. The equation of line ℓ is $3x - y = 4$. Determine and state an equation for line m.

247 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in³. After being fully inflated, its volume is approximately 294 in³. To the *nearest tenth of an inch*, how much does the radius increase when the volleyball is fully inflated?

248 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.

249 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 $\frac{13\pi}{8}$.
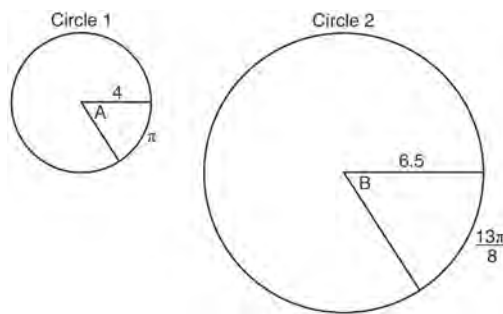
Dominic thinks that angles A and B have the same radian measure. State whether Dominic is correct or not. Explain why.

250 As shown in the diagram below, circle A has a radius of 3 and circle B has a radius of 5.
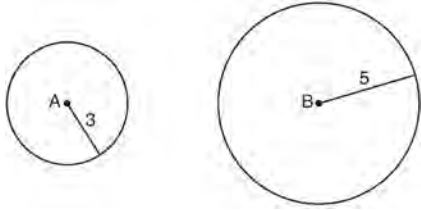
Use transformations to explain why circles A and B are similar.

251 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.
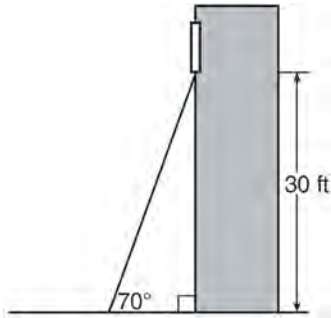
252 Using a compass and straightedge, construct a regular hexagon inscribed in circle O. [Leave all construction marks.]
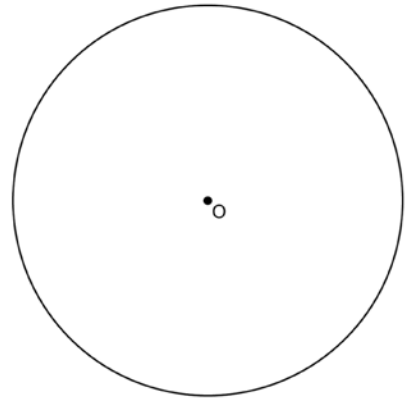
253 Line n is represented by the equation $3x + 4y = 20$. Determine and state the equation of line p, the image of line n, after a dilation of scale factor $\frac{1}{3}$ centered at the point $(4,2)$. [The use of the set of axes below is optional.] Explain your answer.
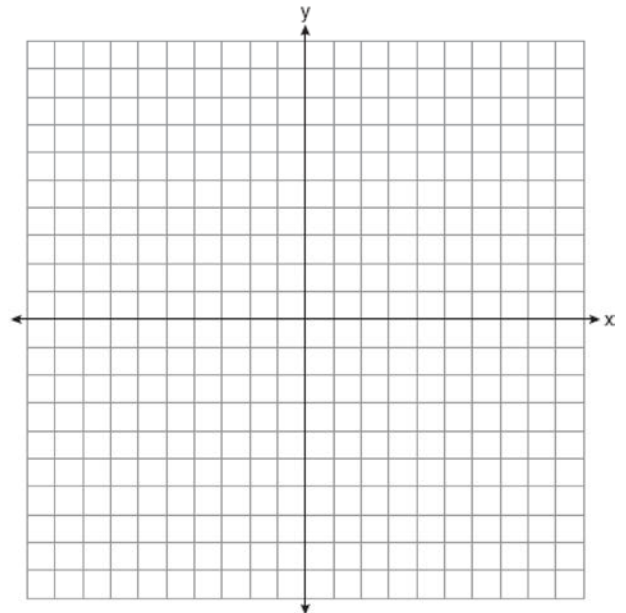
254 Quadrilateral *MATH* and its image *M"A"T"H"* are graphed on the set of axes below.
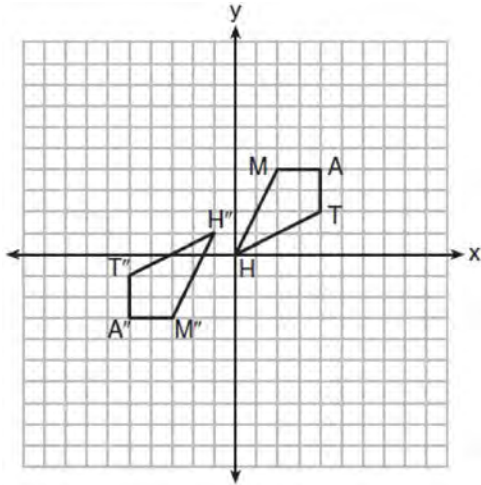
Describe a sequence of transformations that maps quadrilateral *MATH* onto quadrilateral *M"A"T"H"*.

255 In the diagram below, triangles *XYZ* and *UVZ* are drawn such that $\angle X \cong \angle U$ and $\angle XZY \cong \angle UZV$.
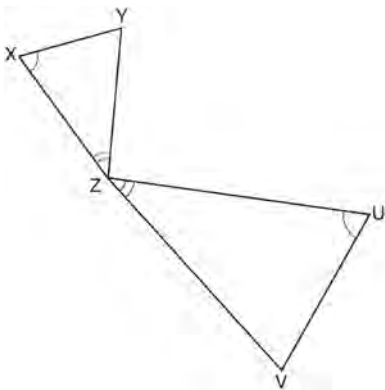
Describe a sequence of similarity transformations that shows $\triangle XYZ$ is similar to $\triangle UVZ$.

256 In the diagram below, $\triangle ABC$ and $\triangle XYZ$ are graphed.
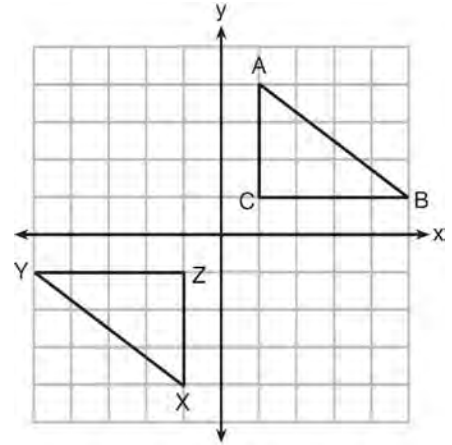
Use the properties of rigid motions to explain why $\triangle ABC \cong \triangle XYZ$.

257 In the diagram below of circle *O* with diameter $\overline{BC}$ and radius $\overline{OA}$, chord $\overline{DC}$ is parallel to chord $\overline{BA}$.
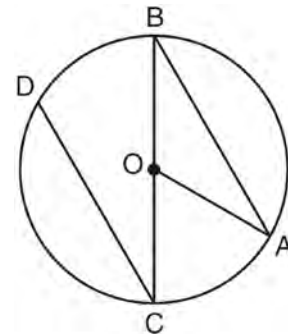
If m$\angle BCD = 30°$, determine and state m$\angle AOB$.

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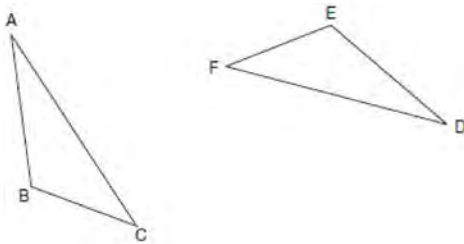
If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle *ABC* onto triangle *DEF*.

259 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.]
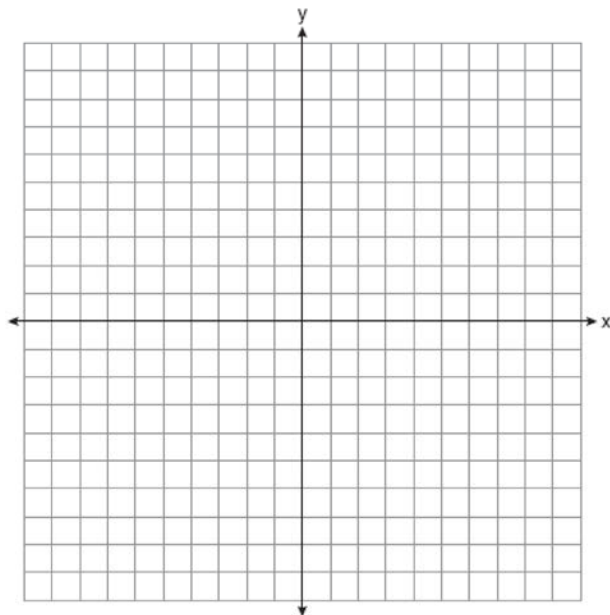
260 The diagram below shows parallelogram *LMNO* with diagonal $\overline{LN}$, m$\angle M = 118°$, and m$\angle LNO = 22°$.
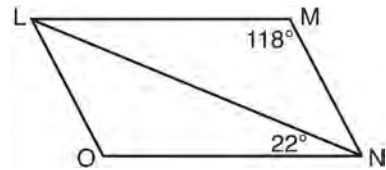
Explain why m$\angle NLO$ is 40 degrees.

261 Sue believes that the two cylinders shown in the diagram below have equal volumes.
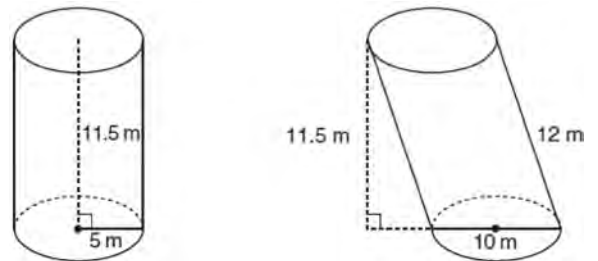
Is Sue correct? Explain why.

262 When instructed to find the length of $\overline{HJ}$ in right triangle *HJG*, Alex wrote the equation $\sin 28° = \dfrac{HJ}{20}$ while Marlene wrote $\cos 62° = \dfrac{HJ}{20}$. Are both students' equations correct? Explain why.
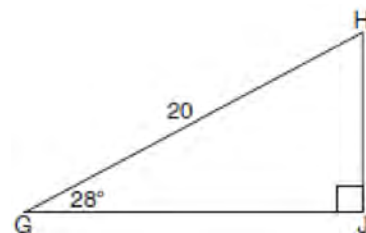
263 During an experiment, the same type of bacteria is
grown in two petri dishes. Petri dish *A* has a
diameter of 51 mm and has approximately 40,000
bacteria after 1 hour. Petri dish *B* has a diameter of
75 mm and has approximately 72,000 bacteria after
1 hour.
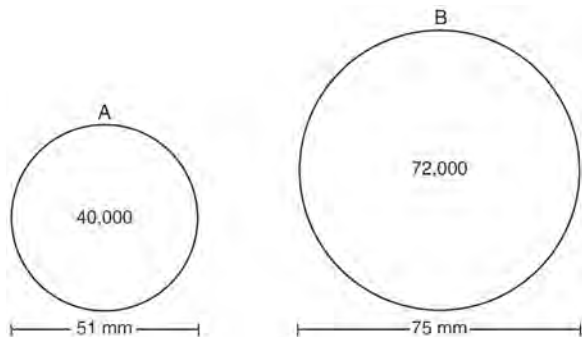
Determine and state which petri dish has the
greater population density of bacteria at the end of
the first hour.

264 Using a compass and straightedge, construct the
line of reflection over which triangle *RST* reflects
onto triangle R'S'T'. [Leave all construction
marks.]
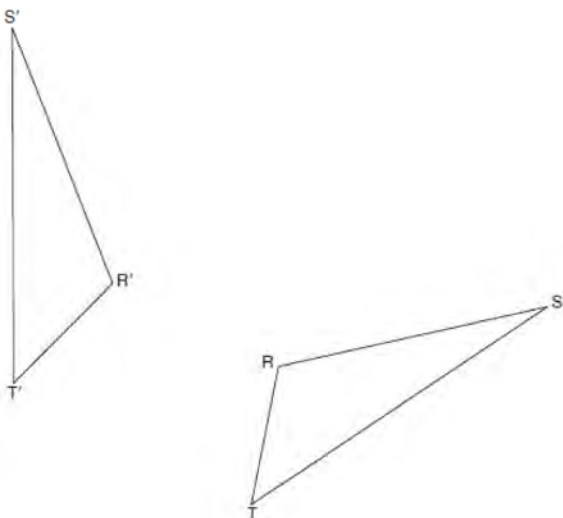
Geometry Common Core State Standards 4 Point Regents Exam Questions

265 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.]

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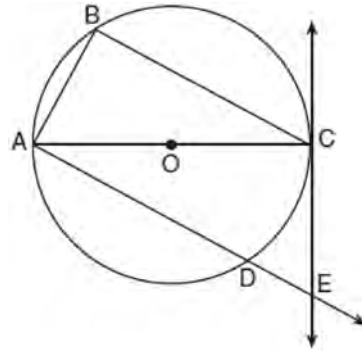
Prove: $\dfrac{BC}{CA} = \dfrac{AB}{EC}$

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

266 Given: $\triangle XYZ$, $\overline{XY} \cong \overline{ZY}$, and $\overline{YW}$ bisects $\angle XYZ$
Prove that $\angle YWZ$ is a right angle.
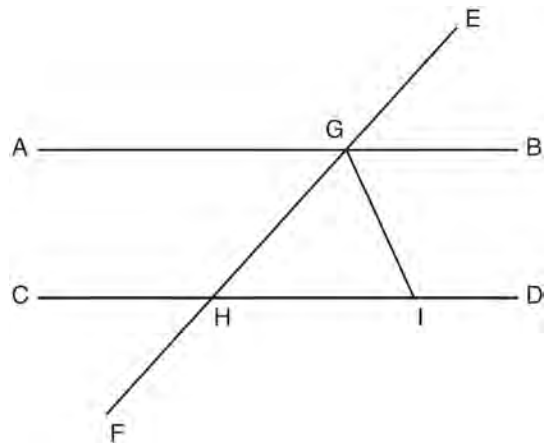
If $m\angle EGB = 50°$ and $m\angle DIG = 115°$, explain why $\overline{AB} \parallel \overline{CD}$.

65

269 Given the theorem, "The sum of the measures of the interior angles of a triangle is 180°," complete the proof for this theorem.
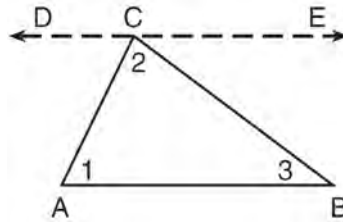
Given: $\triangle ABC$
Prove: m∠1 + m∠2 + m∠3 = 180°
Fill in the missing reasons below.

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

270 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.
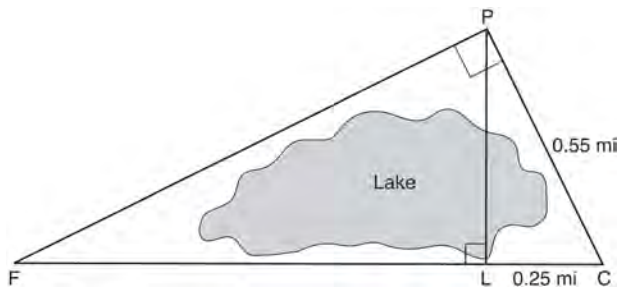
If the path from the park ranger station to the campground is 0.55 mile, determine and state, to the *nearest hundredth of a mile*, the distance between the park ranger station and the lifeguard chair. Gerald believes the distance from the first aid station to the campground is at least 1.5 miles. Is Gerald correct? Justify your answer.

271 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.

272 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.
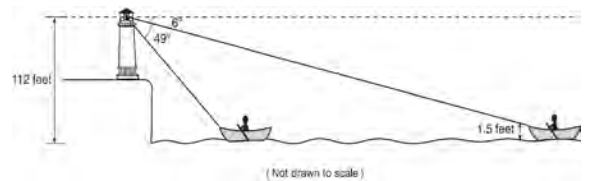
At 5:00, the observer in the lighthouse measured the angle of depression to the front of the canoe to be 6°. Five minutes later, the observer measured and saw the angle of depression to the front of the canoe had increased by 49°. Determine and state, to the *nearest foot per minute*, the average speed at which the canoe traveled toward the lighthouse.

273 In the diagram below, $\overline{AC} \cong \overline{DF}$ and points *A*, *C*, *D*, and *F* are collinear on line ℓ.
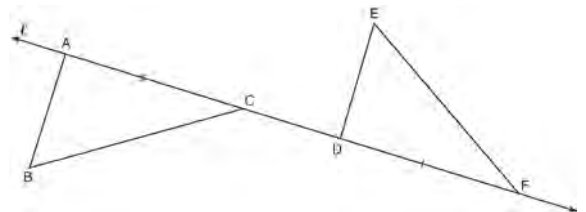
Let $\triangle D'E'F'$ be the image of $\triangle DEF$ after a translation along ℓ, such that point *D* is mapped onto point *A*. Determine and state the location of *F'*. Explain your answer. Let $\triangle D''E''F''$ be the image of $\triangle D'E'F'$ after a reflection across line ℓ. Suppose that *E''* is located at *B*. Is $\triangle DEF$ congruent to $\triangle ABC$? Explain your answer.

67

274 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 $\overline{A'C'}$.
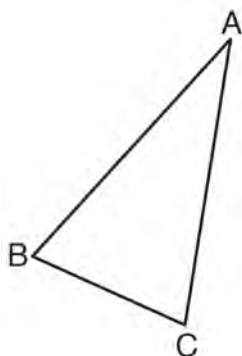
276 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below. Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$. Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.
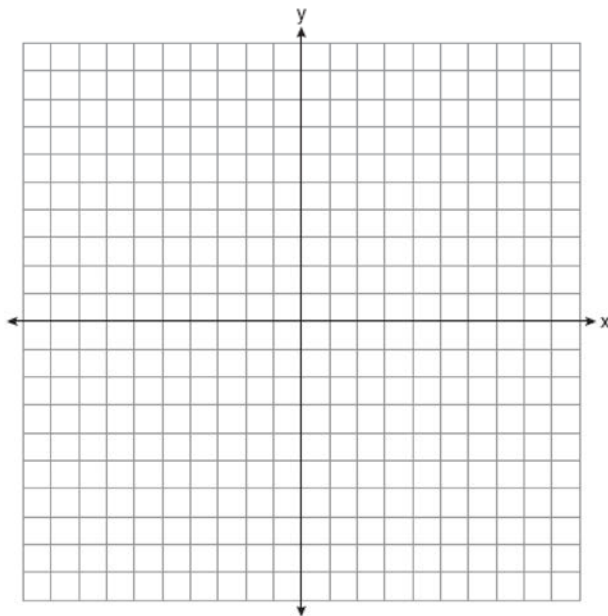
275 A candle maker uses a mold to make candles like the one shown below.

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.

277 In the diagram of $\triangle LAC$ and $\triangle DNC$ below, $\overline{LA} \cong \overline{DN}$, $\overline{CA} \cong \overline{CN}$, and $\overline{DAC} \perp \overline{LCN}$.
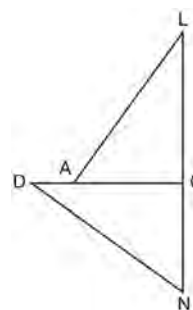
a) Prove that $\triangle LAC \cong \triangle DNC$.
b) Describe a sequence of rigid motions that will map $\triangle LAC$ onto $\triangle DNC$.

278 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.]
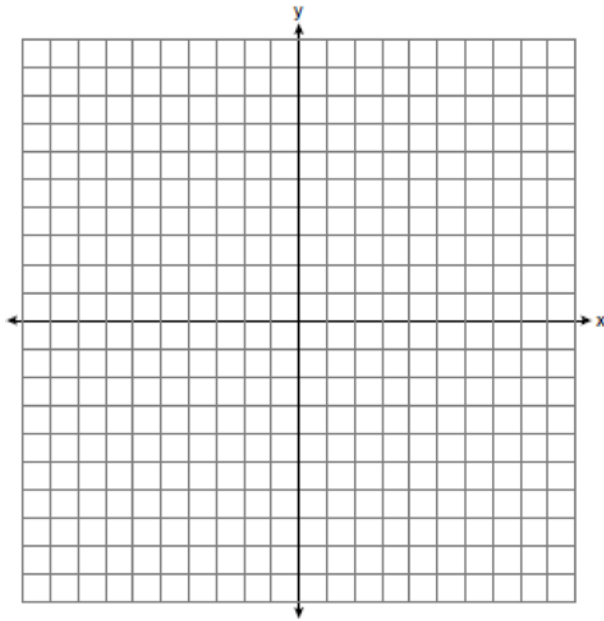
279 Prove the sum of the exterior angles of a triangle is 360°.
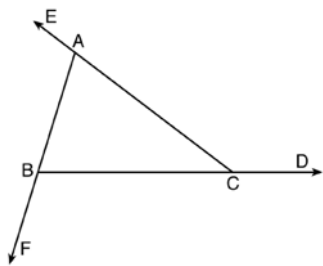
280 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.
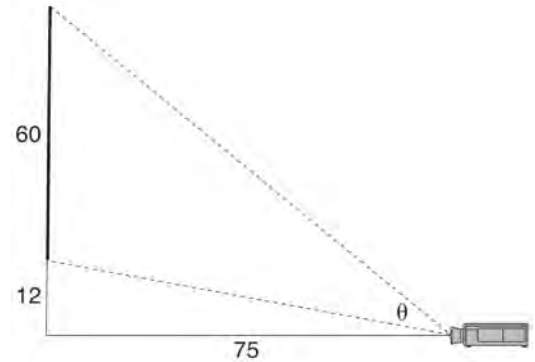
Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

281 In the diagram below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a transformation.
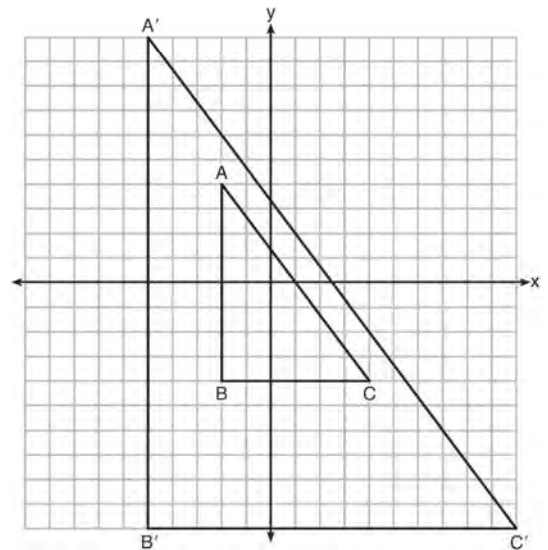
Describe the transformation that was performed. Explain why $\triangle A'B'C' \sim \triangle ABC$.

69

282 Using a straightedge and compass, construct a square inscribed in circle O below. [Leave all construction marks.]
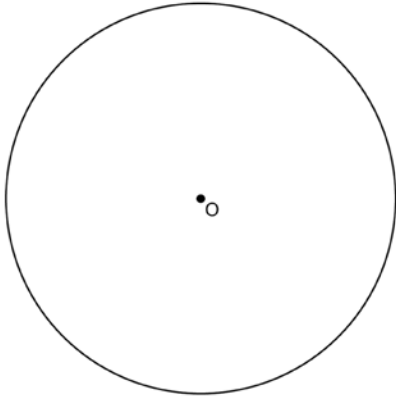
Determine the measure of the arc intercepted by two adjacent sides of the constructed square. Explain your reasoning.

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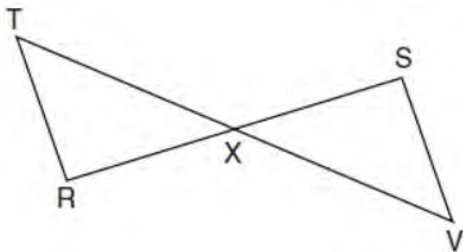
Prove: $\overline{TR} \parallel \overline{SV}$

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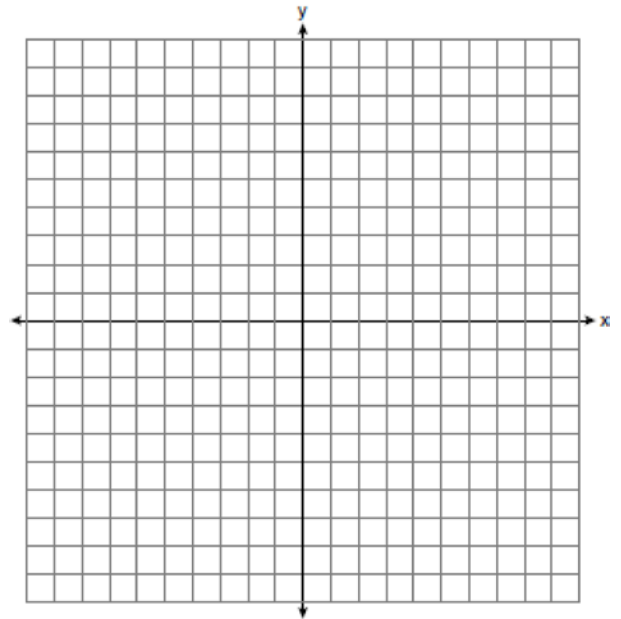
285 A barrel of fuel oil is a right circular cylinder where the inside measurements of the barrel are a diameter of 22.5 inches and a height of 33.5 inches. There are 231 cubic inches in a liquid gallon. Determine and state, to the *nearest tenth*, the gallons of fuel that are in a barrel of fuel oil.

286 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.

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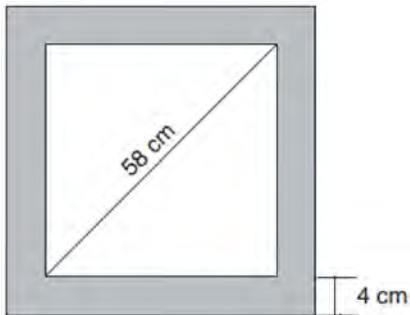
Determine and state the total area of the poster and frame to the *nearest tenth of a square centimeter*.

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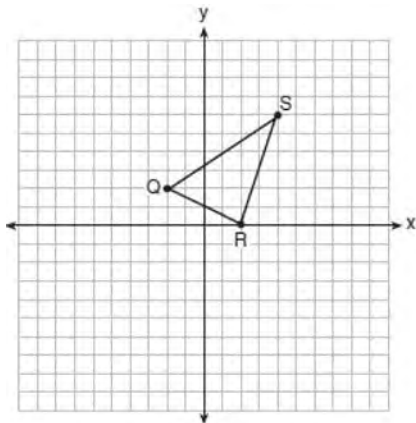
On the same set of axes, graph and label $\triangle Q'R'S'$, the image of $\triangle QRS$ after a dilation with a scale factor of $\frac{3}{2}$ centered at the origin. Use slopes to explain why $Q'R' \parallel QR$.

288 Given: Parallelogram *ABCD*, $\overline{EFG}$, and diagonal $\overline{DFB}$
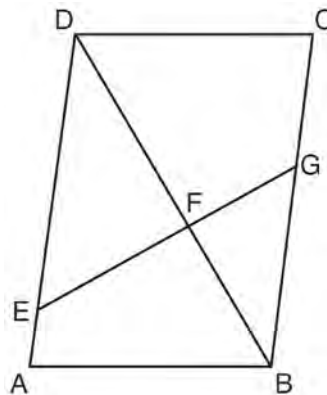
Prove: $\triangle DEF \sim \triangle BGF$

289 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.
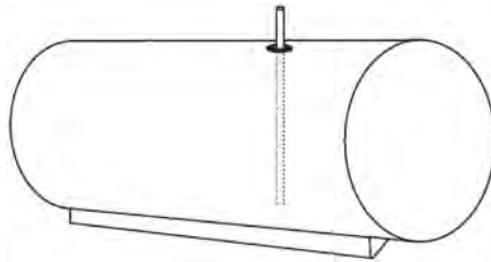
A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft³=7.48 gallons]

290 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.
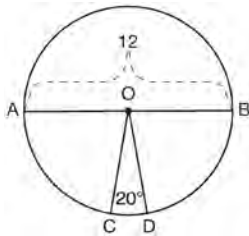
If $\overarc{AC} \cong \overarc{BD}$, find the area of sector BOD in terms of π.

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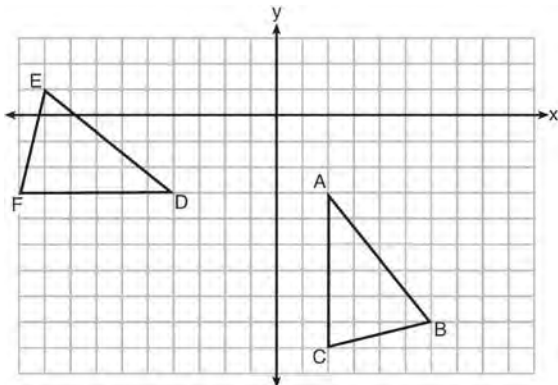
Let $\triangle A'B'C'$ be the image of $\triangle ABC$ after a rotation about point A. Determine and state the location of B' if the location of point C' is $(8, -3)$. Explain your answer. Is $\triangle DEF$ congruent to $\triangle A'B'C'$? Explain your answer.

292 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.

293 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 $\triangle XYZ$.
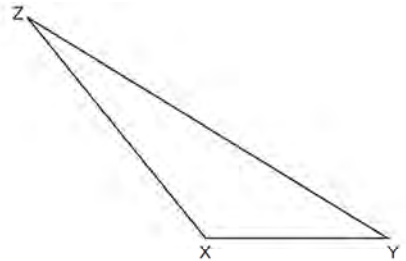
294 Given: Quadrilateral *ABCD* is a parallelogram with diagonals $\overline{AC}$ and $\overline{BD}$ intersecting at *E*
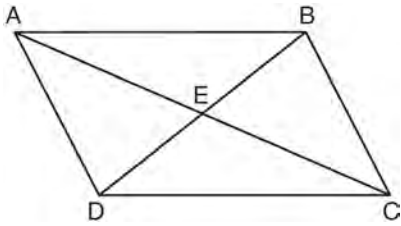
Prove: $\triangle AED \cong \triangle CEB$
Describe a single rigid motion that maps $\triangle AED$ onto $\triangle CEB$.

295 Using a compass and straightedge, construct a regular hexagon inscribed in circle *O* below. Label it *ABCDEF*. [Leave all construction marks.]
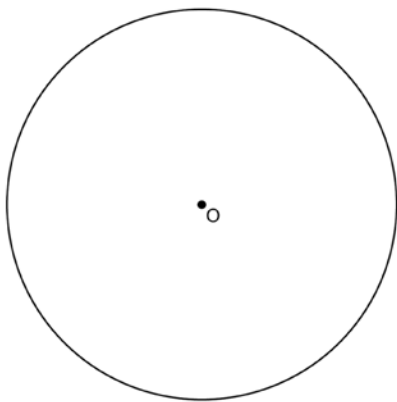
If chords $\overline{FB}$ and $\overline{FC}$ are drawn, which type of triangle, according to its angles, would $\triangle FBC$ be? Explain your answer.

296 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°.
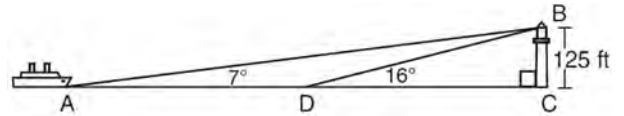
To the *nearest foot*, determine and state how far the ship traveled from point *A* to point *D*.

Geometry 6 Point Regents Exam Questions

297 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.

8.3 cm

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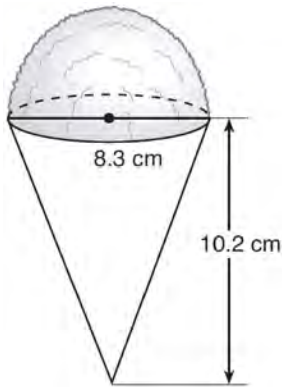
The desired density of the shaved ice is 0.697 g/cm^3, and the cost, per kilogram, of ice is $3.83. Determine and state the cost of the ice needed to make 50 snow cones.

298 Given: Parallelogram $ANDR$ with $\overline{AW}$ and $\overline{DE}$ bisecting $\overline{NWD}$ and $\overline{REA}$ at points W and E, respectively
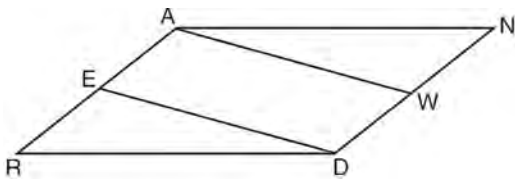
Prove that $\triangle ANW \cong \triangle DRE$. Prove that quadrilateral $AWDE$ is a parallelogram.

299 In the diagram below, secant $\overline{ACD}$ and tangent $\overline{AB}$ are drawn from external point A to circle O.
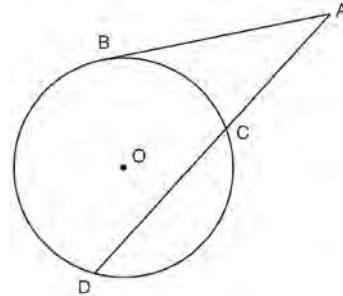
Prove the theorem: If a secant and a tangent are drawn to a circle from an external point, the product of the lengths of the secant segment and its external segment equals the length of the tangent segment squared. $(AC \cdot AD = AB^2)$

300 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: $\triangle ABC \cong \triangle DEC$
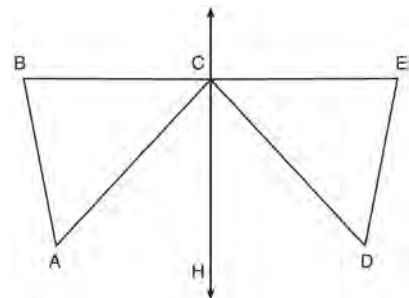
301 Cathy wants to determine the height of the flagpole shown in the diagram below. She uses a survey instrument to measure the angle of elevation to the top of the flagpole, and determines it to be 34.9°. She walks 8 meters closer and determines the new measure of the angle of elevation to be 52.8°. At each measurement, the survey instrument is 1.7 meters above the ground.
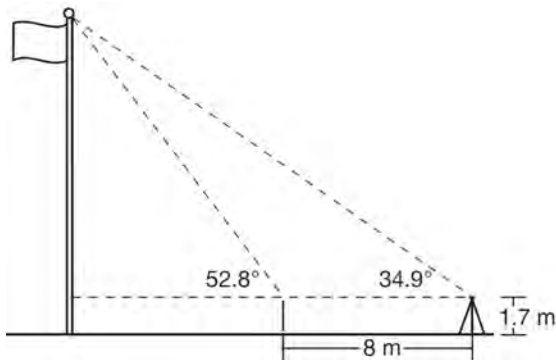
Determine and state, to the *nearest tenth of a meter*, the height of the flagpole.

302 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?

303 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?
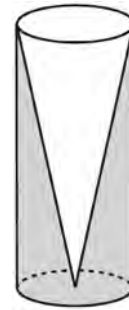
Walter goes to a hobby store to buy the wax for his candles. The wax costs $0.10 per ounce. If the weight of the wax is 0.52 ounce per cubic inch, how much will it cost Walter to buy the wax for 100 candles? If Walter spent a total of $37.83 for the molds and charges $1.95 for each candle, what is Walter's profit after selling 100 candles?

304 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E
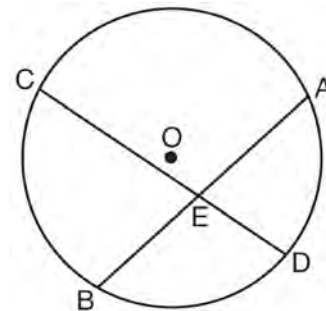
Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord. Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

305 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.
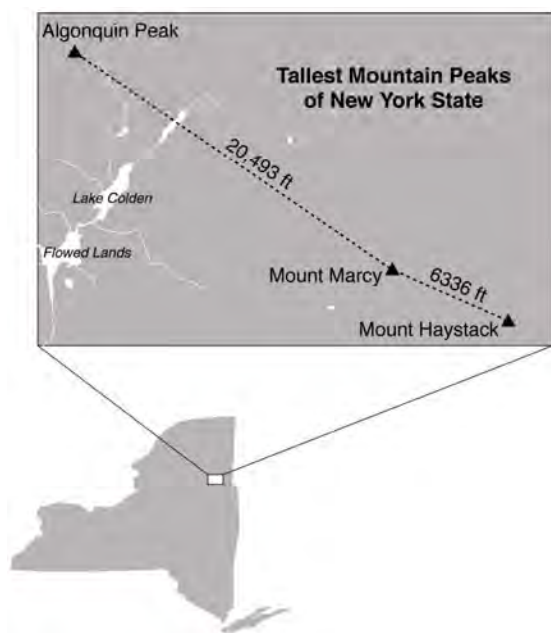
The angle of depression from the peak of Mount Marcy to the peak of Mount Haystack is 3.47 degrees. The angle of elevation from the peak of Algonquin Peak to the peak of Mount Marcy is 0.64 degrees. What are the heights, to the *nearest foot*, of Mount Marcy and Algonquin Peak? Justify your answer.

306 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.
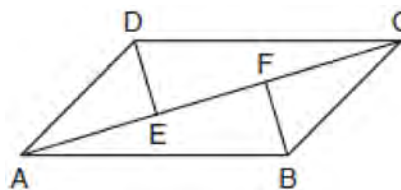
Prove: $\overline{AE} \cong \overline{CF}$

307 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.]
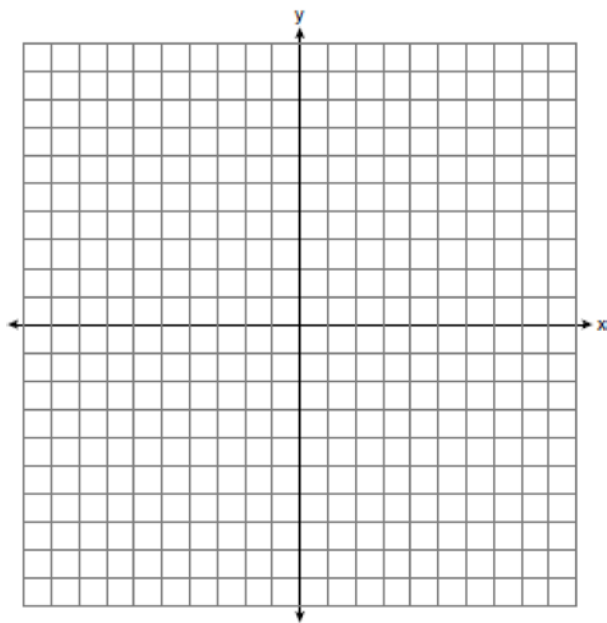
308 Quadrilateral *PQRS* has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$. Prove that *PQRS* is a rhombus. Prove that *PQRS* is *not* a square. [The use of the set of axes below is optional.]
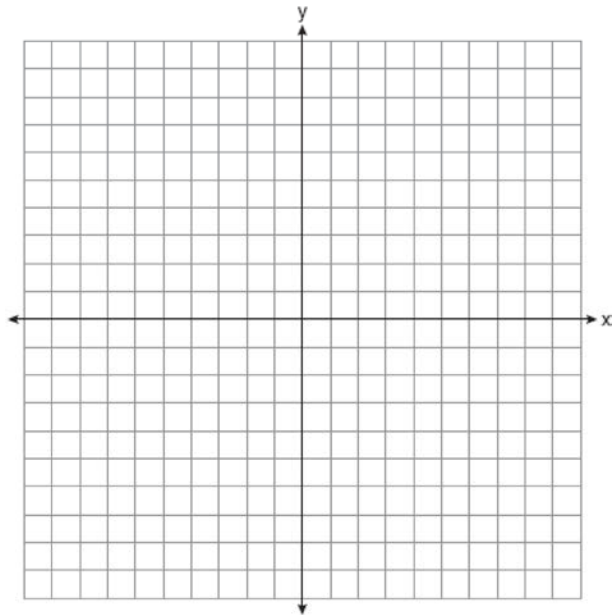
309 Isosceles trapezoid *ABCD* has bases $\overline{DC}$ and $\overline{AB}$ with nonparallel legs $\overline{AD}$ and $\overline{BC}$. Segments *AE*, *BE*, *CE*, and *DE* are drawn in trapezoid *ABCD* such that $\angle CDE \cong \angle DCE$, $\overline{AE} \perp \overline{DE}$, and $\overline{BE} \perp \overline{CE}$.
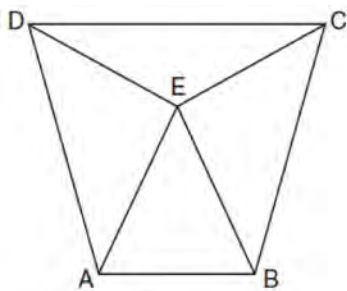
Prove $\triangle ADE \cong \triangle BCE$ and prove $\triangle AEB$ is an isosceles triangle.

310 The water tower in the picture below is modeled by the two-dimensional figure beside it. The water tower is composed of a hemisphere, a cylinder, and a cone. Let *C* be the center of the hemisphere and let *D* be the center of the base of the cone.
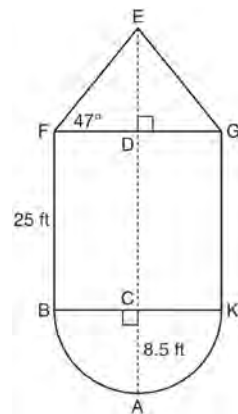
If $AC = 8.5$ feet, $BF = 25$ feet, and $m\angle EFD = 47°$, determine and state, to the *nearest cubic foot*, the volume of the water tower. The water tower was constructed to hold a maximum of 400,000 pounds of water. If water weighs 62.4 pounds per cubic foot, can the water tower be filled to 85% of its volume and *not* exceed the weight limit? Justify your answer.

311 Given: Quadrilateral *ABCD* with diagonals $\overline{AC}$ and $\overline{BD}$ that bisect each other, and $\angle 1 \cong \angle 2$
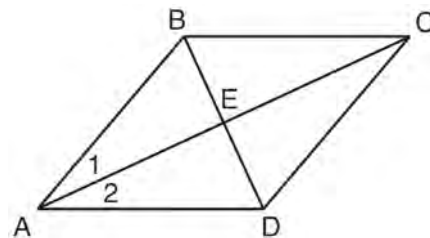
Prove: $\triangle ACD$ is an isosceles triangle and $\triangle AEB$ is a right triangle

312   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.
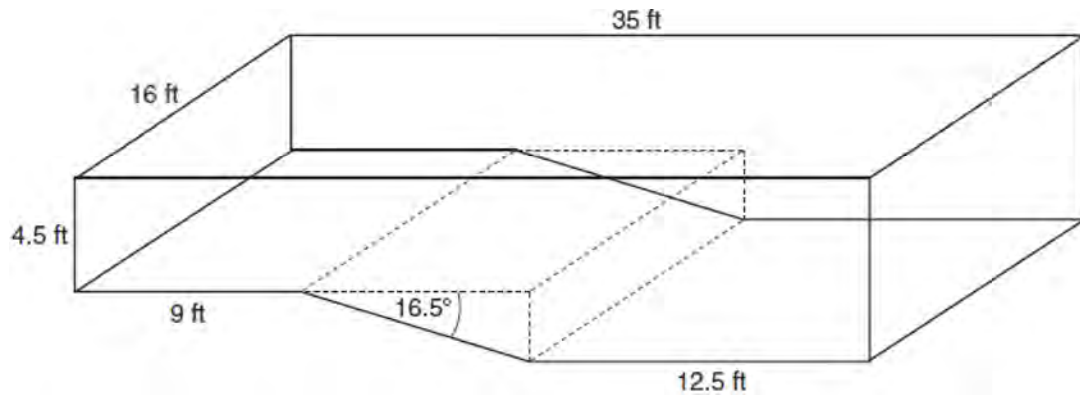
If the sloped floor has an angle of depression of 16.5 degrees, what is the depth of the pool at the deep end, to the *nearest tenth of a foot*? Find the volume of the inside of the pool to the *nearest cubic foot*. A garden hose is used to fill the pool. Water comes out of the hose at a rate of 10 .5 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]

313   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*.

314   In the diagram of parallelogram *ABCD* below, $\overline{BE} \perp \overline{CED}$, $\overline{DF} \perp \overline{BFC}$, $\overline{CE} \cong \overline{CF}$.
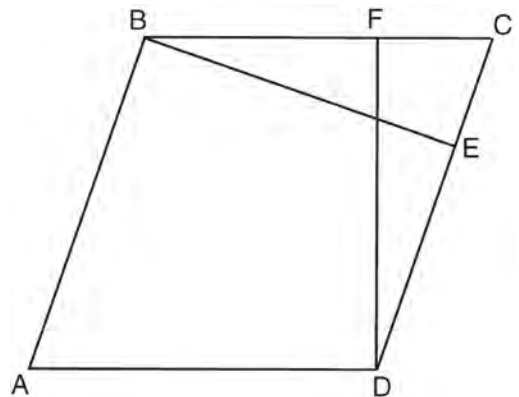
Prove *ABCD* is a rhombus.

315 A water glass can be modeled by a truncated right cone (a cone which is cut parallel to its base) as shown below.
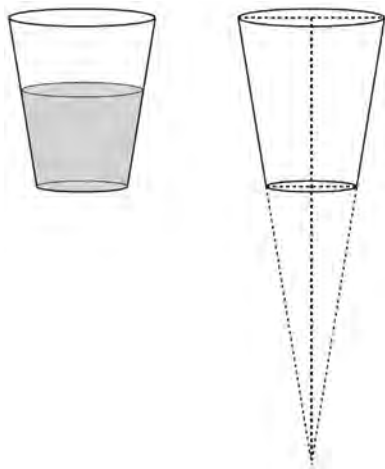
The diameter of the top of the glass is 3 inches, the diameter at the bottom of the glass is 2 inches, and the height of the glass is 5 inches. The base with a diameter of 2 inches must be parallel to the base with a diameter of 3 inches in order to find the height of the cone. Explain why. Determine and state, in inches, the height of the larger cone. Determine and state, to the *nearest tenth of a cubic inch*, the volume of the water glass.

Geometry Common Core State Standards Multiple Choice Regents Exam Questions
Answer Section

1 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

2 ANS: 2

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

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

3 ANS: 2

$$s^2 + s^2 = 7^2$$

$$2s^2 = 49$$

$$s^2 = 24.5$$

$$s \approx 4.9$$

   PTS: 2   REF: 081511geo   TOP: Pythagorean Theorem

4 ANS: 4   PTS: 2   REF: 061502geo   TOP: Identifying Transformations
   KEY: basic

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

6 ANS: 2

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

$$x = \sqrt{40}$$

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

   PTS: 2   REF: 081610geo   TOP: Similarity   KEY: leg

7 ANS: 3   PTS: 2   REF: 061601geo   TOP: Rotations of Two-Dimensional Objects

8 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

9 ANS: 3

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

$$x = 15$$

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

10 ANS: 4   PTS: 2   REF: 061711geo   TOP: Special Quadrilaterals

11 ANS: 2
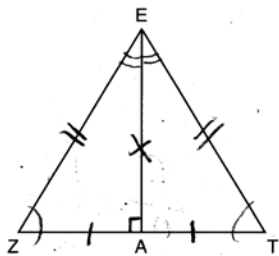
PTS: 2   REF: 061619geo   TOP: Triangle Proofs

12 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

13 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

14 ANS: 1

$84 = \dfrac{1}{3} \cdot s^2 \cdot 7$

$6 = s$

PTS: 2   REF: 061716geo   TOP: Volume   KEY: pyramids

15 ANS: 1

$\tan x = \dfrac{1}{12}$

$x \approx 4.76$

PTS: 2   REF: 081715geo   TOP: Using Trigonometry to Find an Angle

16 ANS: 3   PTS: 2   REF: 061702geo   TOP: Polygons in the Coordinate Plane

17 ANS: 2

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

PTS: 2   REF: 011619geo   TOP: Density

18 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
19 ANS: 3   PTS: 2   REF: 081613geo
TOP: Cross-Sections of Three-Dimensional Objects
20 ANS: 1
$$\frac{360°}{45°} = 8$$

PTS: 2   REF: 061510geo   TOP: Mapping a Polygon onto Itself
21 ANS: 4   PTS: 2   REF: 011705geo   TOP: Special Quadrilaterals
22 ANS: 1
$$V = \frac{1}{3}\pi(4)^2(6) = 32\pi$$

PTS: 2   REF: 061718geo   TOP: Rotations of Two-Dimensional Objects
23 ANS: 3   PTS: 2   REF: 011621geo   TOP: Chords, Secants and Tangents
KEY: inscribed
24 ANS: 1   PTS: 2   REF: 081606geo   TOP: Cofunctions
25 ANS: 2
$$\sqrt{3 \cdot 21} = \sqrt{63} = 3\sqrt{7}$$

PTS: 2   REF: 011622geo   TOP: Similarity   KEY: altitude
26 ANS: 4   PTS: 2   REF: 011706geo   TOP: Identifying Transformations
KEY: basic
27 ANS: 2   PTS: 2   REF: 081601geo   TOP: Lines and Angles
28 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
29 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

30 ANS: 4
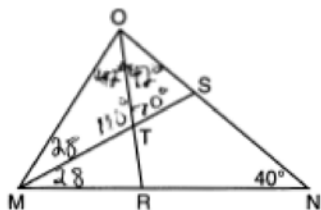
PTS: 2   REF: 061717geo   TOP: Interior and Exterior Angles of Triangles

31 ANS: 3
(3) Could be a trapezoid.

PTS: 2   REF: 081607geo   TOP: Parallelograms

32 ANS: 1
$$\cos S = \frac{60}{65}$$
$$S \approx 23$$

PTS: 2   REF: 061713geo   TOP: Using Trigonometry to Find an Angle

33 ANS: 3
$$\frac{AB}{BC} = \frac{DE}{EF}$$
$$\frac{9}{15} = \frac{6}{10}$$
$$90 = 90$$

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

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

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

35 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

36 ANS: 3

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

PTS: 2   REF: 011614geo   TOP: Volume   KEY: spheres

37 ANS: 4   PTS: 2   REF: 081506geo   TOP: Dilations

38 ANS: 2

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

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

39 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

40 ANS: 1

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

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

KEY: parallel lines

41 ANS: 2

$$12^2 = 9 \cdot 16$$

$$144 = 144$$

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

42 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

43 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

44 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

5

45 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

46 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

47 ANS: 3

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

PTS: 2   REF: 061503geo   TOP: Circles in the Coordinate Plane

48 ANS: 4

$$-5 + \frac{3}{5}(5--5) \quad -4 + \frac{3}{5}(1--4)$$

$$-5 + \frac{3}{5}(10) \qquad -4 + \frac{3}{5}(5)$$

$$-5+6 \qquad\qquad -4+3$$

$$1 \qquad\qquad\quad -1$$

PTS: 2   REF: spr1401geo   TOP: Directed Line Segments

49 ANS: 1

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

PTS: 2   REF: 061612geo   TOP: Parallel and Perpendicular Lines
KEY: perpendicular bisector

50 ANS: 1
$$180 - (68 \cdot 2)$$

PTS: 2   REF: 081624geo   TOP: Parallelograms

51 ANS: 2
$$h^2 = 30 \cdot 12$$

$$h^2 = 360$$

$$h = 6\sqrt{10}$$

PTS: 2   REF: 061613geo   TOP: Similarity   KEY: altitude

6

52 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

53 ANS: 4

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

$3x - 1 = 2x + 6$

$x = 7$

PTS: 2   REF: 011620geo TOP: Similarity KEY: basic

54 ANS: 2   PTS: 2   REF: 061610geo TOP: Chords, Secants and Tangents
KEY: inscribed

55 ANS: 4   PTS: 2   REF: 061513geo TOP: Parallelograms

56 ANS: 1

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

$x \approx 3.3$

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

57 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

58 ANS: 3   PTS: 2   REF: 081502geo TOP: Identifying Transformations
KEY: basic

59 ANS: 3   PTS: 2   REF: 061616geo TOP: Identifying Transformations
KEY: graphics

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

61 ANS: 1   PTS: 2   REF: 061508geo TOP: Chords, Secants and Tangents
KEY: inscribed

62 ANS: 2

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

$12x = 144$

$x = 12$

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

63 ANS: 4 PTS: 2 REF: 061504geo TOP: Compositions of Transformations
   KEY: identify

64 ANS: 3

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

$$x \approx 18$$

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

65 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

66 ANS: 2

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

   PTS: 2 REF: 011604geo TOP: Volume KEY: prisms

67 ANS: 4

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

   PTS: 2 REF: 081621geo TOP: Line Dilations

68 ANS: 1

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

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

69 ANS: 3

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

   PTS: 2 REF: 081512geo TOP: Chords, Secants and Tangents
   KEY: common tangents

70 ANS: 4 PTS: 2 REF: 061606geo TOP: Volume
   KEY: compositions

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

72 ANS: 4

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

   PTS: 2 REF: 011721geo TOP: Sectors

73 ANS: 3

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

$$T \approx 13.5$$

PTS: 2 REF: 061505geo TOP: Using Trigonometry to Find a Side
KEY: graphics

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

75 ANS: 4

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

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

76 ANS: 1

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

PTS: 2 REF: 081523geo TOP: Dilations

77 ANS: 3

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

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

PTS: 2 REF: 061507geo TOP: Density

78 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

79 ANS: 1

$$3 + \frac{2}{5}(8 - 3) = 3 + \frac{2}{5}(5) = 3 + 2 = 5 \quad 5 + \frac{2}{5}(-5 - 5) = 5 + \frac{2}{5}(-10) = 5 - 4 = 1$$

PTS: 2 REF: 011720geo TOP: Directed Line Segments

80 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

81 ANS: 2
Segments drawn from the center of the regular pentagon bisect each angle of the pentagon, and create five isosceles triangles as shown in the diagram below. Since each exterior angle equals the angles formed by the segments drawn from the center of the regular pentagon, the minimum degrees necessary to carry a regular polygon onto itself are equal to the measure of an exterior angle of the regular polygon.

$\frac{360}{5} = 72.$
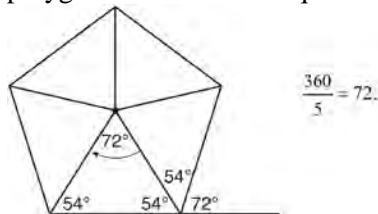
PTS: 2   REF: spr1402geo   TOP: Mapping a Polygon onto Itself

82 ANS: 2

$$\frac{11}{1.2\,\text{oz}}\left(\frac{16\,\text{oz}}{1\,\text{lb}}\right) = \frac{13.\overline{3}1}{\text{lb}} \quad \frac{13.\overline{3}1}{\text{lb}}\left(\frac{1\,\text{g}}{3.785\,\text{l}}\right) \approx \frac{3.5\,\text{g}}{1\,\text{lb}}$$

PTS: 2   REF: 061618geo   TOP: Density

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

84 ANS: 4
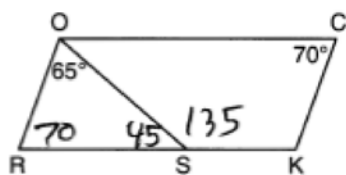
PTS: 2   REF: 081708geo   TOP: Parallelograms

85 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

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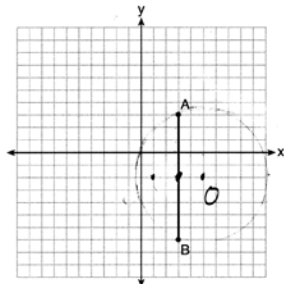
Since the midpoint of $\overline{AB}$ is $(3,-2)$, the center must be either $(5,-2)$ or $(1,-2)$.

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

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

10

87 ANS: 2

The line $y = 2x - 4$ does not pass through the center of dilation, so the dilated line will be distinct from $y = 2x - 4$. Since a dilation preserves parallelism, the line $y = 2x - 4$ and its image will be parallel, with slopes of 2. To obtain the y-intercept of the dilated line, the scale factor of the dilation, $\frac{3}{2}$, can be applied to the y-intercept, $(0, -4)$. Therefore, $\left(0 \cdot \frac{3}{2}, -4 \cdot \frac{3}{2}\right) \rightarrow (0, -6)$. So the equation of the dilated line is $y = 2x - 6$.

PTS: 2   REF: fall1403geo   TOP: Line Dilations

88 ANS: 1   PTS: 2   REF: 061518geo   TOP: Line Dilations

89 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

90 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

91 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

92 ANS: 4

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

PTS: 2   REF: 081517geo   TOP: Side Splitter Theorem

93 ANS: 4   PTS: 2   REF: 081514geo   TOP: Compositions of Transformations
KEY: grids

94 ANS: 3   PTS: 2   REF: 011605geo
TOP: Analytical Representations of Transformations   KEY: basic

95 ANS: 1   PTS: 2   REF: 061604geo   TOP: Identifying Transformations
KEY: graphics

96 ANS: 4

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

   PTS: 2   REF: 081722geo   TOP: Mapping a Polygon onto Itself
97 ANS: 4

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

   PTS: 2   REF: 081618geo   TOP: Directed Line Segments
98 ANS: 2   PTS: 2   REF: 081501geo   TOP: Special Quadrilaterals
99 ANS: 3   PTS: 2   REF: 081622geo   TOP: Triangle Proofs
   KEY: statements
100 ANS: 3

   $v = \pi r^2 h$ (1) $6^2 \cdot 10 = 360$

   $150\pi = \pi r^2 h$ (2) $10^2 \cdot 6 = 600$

   $150 = r^2 h$ (3) $5^2 \cdot 6 = 150$

                (4) $3^2 \cdot 10 = 900$

   PTS: 2   REF: 081713geo   TOP: Rotations of Two-Dimensional Objects
101 ANS: 3

$\dfrac{7-1}{0-2} = \dfrac{6}{-2} = -3$ The diagonals of a rhombus are perpendicular.

   PTS: 2   REF: 011719geo   TOP: Quadrilaterals in the Coordinate Plane
102 ANS: 1

$V = \dfrac{1}{3}\pi\left(\dfrac{1.5}{2}\right)^2\left(\dfrac{4}{2}\right) \approx 1.2$

   PTS: 2   REF: 011724geo   TOP: Volume   KEY: cones
103 ANS: 2

   $6 \cdot 6 = x(x - 5)$

   $36 = x^2 - 5x$

   $0 = x^2 - 5x - 36$

   $0 = (x - 9)(x + 4)$

   $x = 9$

   PTS: 2   REF: 061708geo   TOP: Chords, Secants and Tangents
   KEY: intersecting chords, length
104 ANS: 3   PTS: 2   REF: 081515geo   TOP: Inscribed Quadrilaterals
105 ANS: 3   PTS: 2   REF: 011710geo   TOP: Compositions of Transformations
   KEY: identify

106 ANS: 4   PTS: 2   REF: 061615geo   TOP: Trigonometric Ratios
107 ANS: 2   PTS: 2   REF: 081519geo   TOP: Similarity
     KEY: basic
108 ANS: 4   PTS: 2   REF: 061512geo   TOP: Cofunctions
109 ANS: 2
$6 + 6\sqrt{3} + 6 + 6\sqrt{3} \approx 32.8$

     PTS: 2   REF: 011709geo   TOP: 30-60-90 Triangles
110 ANS: 3
$\dfrac{60}{360} \cdot 6^2 \pi = 6\pi$

     PTS: 2   REF: 081518geo   TOP: Sectors
111 ANS: 1   PTS: 2   REF: 011601geo
     TOP: Cross-Sections of Three-Dimensional Objects
112 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
113 ANS: 4

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

     PTS: 2   REF: 081724geo   TOP: Parallel and Perpendicular Lines
     KEY: perpendicular bisector
114 ANS: 3
$\dfrac{9}{5} = \dfrac{9.2}{x}$ $5.1 + 9.2 = 14.3$

$9x = 46$

$x \approx 5.1$

     PTS: 2   REF: 061511geo   TOP: Side Splitter Theorem
115 ANS: 1
$\dfrac{f}{4} = \dfrac{15}{6}$

$f = 10$

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

116 ANS: 3
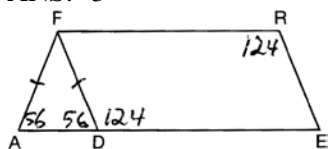
    PTS: 2   REF: 081508geo   TOP: Parallelograms

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

118 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

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

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

121 ANS: 3

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

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

$$a = 6$$

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

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

123 ANS: 4
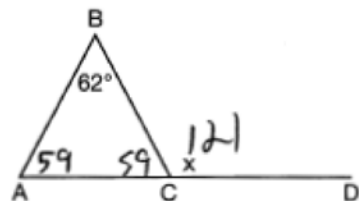
    PTS: 2   REF: 081711geo   TOP: Exterior Angle Theorem

124 ANS: 2

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

    PTS: 2   REF: 011607geo   TOP: Volume   KEY: pyramids

125 ANS: 4

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

$$4.2x = 34.65$$

$$x = 8.25$$

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

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

127 ANS: 2

$$\frac{\dfrac{512\pi}{3}}{\left(\dfrac{32}{2}\right)^2 \pi} \cdot 2\pi = \frac{4\pi}{3}$$

PTS: 2   REF: 081723geo   TOP: Sectors

128 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

129 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

130 ANS: 4   PTS: 2   REF: 061608geo   TOP: Compositions of Transformations

KEY: grids

131 ANS: 4

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

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

132 ANS: 2   PTS: 2   REF: 011702geo   TOP: Compositions of Transformations

KEY: basic

133 ANS: 1

B: $(4-3, 3-4) \rightarrow (1,-1) \rightarrow (2,-2) \rightarrow (2+3, -2+4)$

C: $(2-3, 1-4) \rightarrow (-1,-3) \rightarrow (-2,-6) \rightarrow (-2+3, -6+4)$

PTS: 2   REF: 011713geo   TOP: Line Dilations

134 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

135 ANS: 3

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

$$A \approx 50°$$

PTS: 2   REF: 011616geo   TOP: Using Trigonometry to Find an Angle

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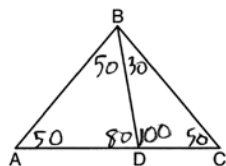
PTS: 2   REF: 081604geo   TOP: Interior and Exterior Angles of Triangles

137 ANS: 1

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

PTS: 2   REF: 011623geo   TOP: Circumference

138 ANS: 2

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

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

PTS: 2   REF: 061519geo   TOP: Surface Area

139 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

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

141 ANS: 2   PTS: 2   REF: 081701geo
TOP: Cross-Sections of Three-Dimensional Objects

142 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

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

144 ANS: 1
$$\frac{6}{8} = \frac{9}{12}$$

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

145 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

146 ANS: 1
1) opposite sides; 2) adjacent sides; 3) perpendicular diagonals; 4) diagonal bisects angle

PTS: 2   REF: 061609geo   TOP: Special Quadrilaterals

147 ANS: 3
$$\sqrt{(-5)^2 + 12^2} = \sqrt{169} \quad \sqrt{11^2 + (2\sqrt{12})^2} = \sqrt{121 + 48} = \sqrt{169}$$

PTS: 2   REF: 011722geo   TOP: Circles in the Coordinate Plane

148 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

149 ANS: 3
$$\frac{x}{10} = \frac{6}{4} \quad \overline{CD} = 15 - 4 = 11$$
$$x = 15$$

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

150 ANS: 3   PTS: 2   REF: 061706geo   TOP: Line Dilations

151 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

152 ANS: 4
$$3 \times 6 = 18$$

PTS: 2   REF: 061602geo   TOP: Line Dilations

153 ANS: 1 PTS: 2 REF: 061520geo TOP: Chords, Secants and Tangents
KEY: mixed

154 ANS: 2 PTS: 2 REF: 081602geo TOP: Identifying Transformations
KEY: basic

155 ANS: 2

$$m = \frac{3}{2} \qquad 1 = -\frac{2}{3}(-6) + b$$

$$m_\perp = -\frac{2}{3} \qquad \begin{array}{l} 1 = 4 + b \\ -3 = b \end{array}$$

PTS: 2 REF: 061719geo TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

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

157 ANS: 2 PTS: 2 REF: 061603geo TOP: Equations of Circles
KEY: find center and radius | completing the square

158 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

159 ANS: 4

$$40 - x + 3x = 90$$

$$2x = 50$$

$$x = 25$$

PTS: 2 REF: 081721geo TOP: Cofunctions

160 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

161 ANS: 3

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

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

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

163 ANS: 3 PTS: 2 REF: 011714geo TOP: Trigonometric Ratios

164 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

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

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

167 ANS: 3
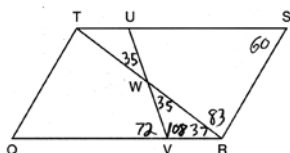
PTS: 2   REF: 011603geo   TOP: Parallelograms

168 ANS: 3
$$\theta = \frac{s}{r} = \frac{2\pi}{10} = \frac{\pi}{5}$$

PTS: 2   REF: fall1404geo   TOP: Arc Length   KEY: angle

169 ANS: 4
The slope of $\overline{BC}$ is $\frac{2}{5}$. Altitude is perpendicular, so its slope is $-\frac{5}{2}$.

PTS: 2   REF: 061614geo   TOP: Parallel and Perpendicular Lines
KEY: find slope of perpendicular line

170 ANS: 1
$3^2 = 9$

PTS: 2   REF: 081520geo   TOP: Dilations

171 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

172 ANS: 4   PTS: 2   REF: 011704geo   TOP: Midsegments

173 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

174 ANS: 4   PTS: 2   REF: 011611geo   TOP: Properties of Transformations
    KEY: graphics
175 ANS: 4   PTS: 2   REF: 061501geo   TOP: Rotations of Two-Dimensional Objects
176 ANS: 2

x is $\frac{1}{2}$ the circumference. $\frac{C}{2} = \frac{10\pi}{2} \approx 16$

    PTS: 2   REF: 061523geo   TOP: Circumference
177 ANS: 4   PTS: 2   REF: 081503geo   TOP: Rotations of Two-Dimensional Objects
178 ANS: 4

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

$230 \approx s$

    PTS: 2   REF: 081521geo   TOP: Volume   KEY: pyramids
179 ANS: 2   PTS: 2   REF: 061720geo   TOP: Parallelograms
180 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
181 ANS: 2   PTS: 2   REF: 061516geo   TOP: Dilations
182 ANS: 4   PTS: 2   REF: 011723geo
    TOP: Cross-Sections of Three-Dimensional Objects
183 ANS: 4

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

    PTS: 2   REF: 061521geo   TOP: Similarity   KEY: perimeter and area
184 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
185 ANS: 4

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

$36 - 4x = 2x$

$x = 6$

    PTS: 2   REF: 061705geo   TOP: Side Splitter Theorem
186 ANS: 1   PTS: 2   REF: 081507geo   TOP: Compositions of Transformations
    KEY: identify

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

188 ANS: 3
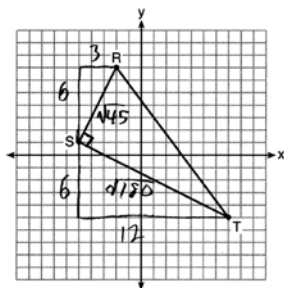
$$\sqrt{45} = 3\sqrt{5} \quad a = \frac{1}{2}\left(3\sqrt{5}\right)\left(6\sqrt{5}\right) = \frac{1}{2}(18)(5) = 45$$
$$\sqrt{180} = 6\sqrt{5}$$

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

189 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

190 ANS: 1   PTS: 2   REF: 081605geo   TOP: Rotations
KEY: grids

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

192 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

193 ANS: 1
Alternate interior angles

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

194 ANS: 1

$$\frac{64}{4} = 16 \quad 16^2 = 256 \quad 2w + 2(w + 2) = 64 \quad 15 \times 17 = 255 \quad 2w + 2(w + 4) = 64 \quad 14 \times 18 = 252 \quad 2w + 2(w + 6) = 64$$
$$w = 15 \quad\quad\quad\quad\quad\quad w = 14 \quad\quad\quad\quad\quad\quad w = 13$$
$$13 \times 19 = 247$$

PTS: 2   REF: 011708geo   TOP: Area of Polygons

195 ANS: 4   PTS: 2   REF: 081609geo   TOP: Compositions of Transformations
KEY: grids

196 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

197 ANS: 3

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

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

198 ANS: 2   PTS: 2   REF: 061506geo
TOP: Cross-Sections of Three-Dimensional Objects

199 ANS: 1   PTS: 2   REF: 011608geo   TOP: Compositions of Transformations
KEY: identify

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

200 ANS:
$180 - 2(25) = 130$

PTS: 2 REF: 011730geo TOP: Isosceles Triangle Theorem

201 ANS:
$\frac{2}{5} \cdot (16 - 1) = 6 \quad \frac{2}{5} \cdot (14 - 4) = 4 \quad (1 + 6, 4 + 4) = (7,8)$

PTS: 2 REF: 081531geo TOP: Directed Line Segments

202 ANS:
The four small triangles are 8-15-17 triangles. $4 \times 17 = 68$

PTS: 2 REF: 081726geo TOP: Special Quadrilaterals

203 ANS:
$T_{6,0} \circ r_{x\text{-axis}}$

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

204 ANS:
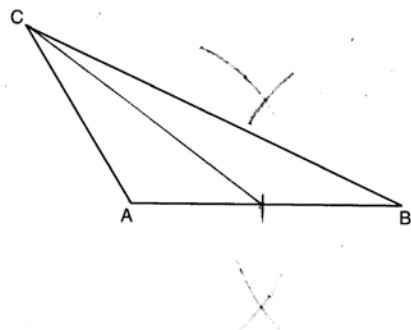
PTS: 2 REF: 081628geo TOP: Constructions
KEY: line bisector

205 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

206 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

207 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

208 ANS:
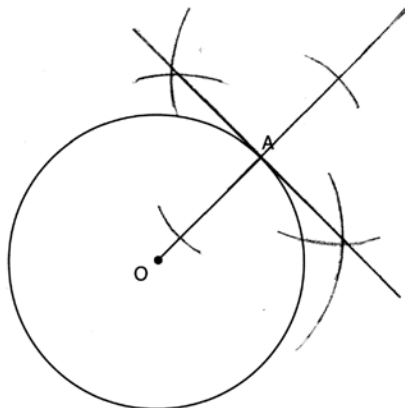
PTS: 2   REF: 061631geo   TOP: Constructions
KEY: parallel and perpendicular lines

209 ANS:

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

$x \approx 68$

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

210 ANS:

$\dfrac{40}{360} \cdot \pi(4.5)^2 = 2.25\pi$

PTS: 2   REF: 061726geo   TOP: Sectors

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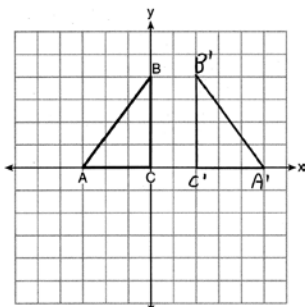
PTS: 2   REF: 011625geo   TOP: Reflections   KEY: grids

212 ANS:

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

$x = 164$

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

213 ANS:

Reflections are rigid motions that preserve distance.

PTS: 2 REF: 061530geo TOP: Triangle Congruency

214 ANS:
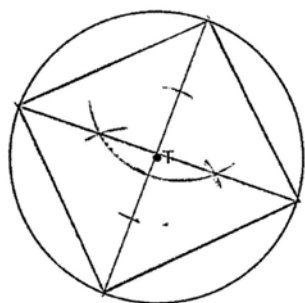
PTS: 2 REF: 061525geo TOP: Constructions

215 ANS:

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

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

216 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

217 ANS:

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

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

218 ANS:

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

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

$\qquad 4 + 8 \qquad\qquad 2 + 0$

$\qquad\quad 12 \qquad\qquad\quad 2$

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

219 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

220 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

221 ANS:
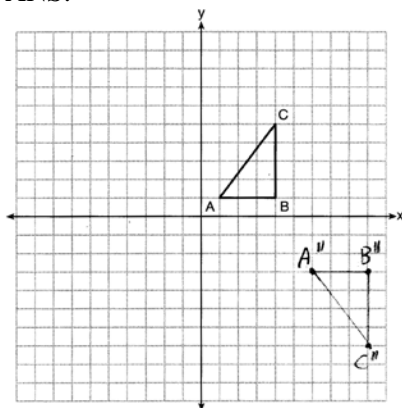
PTS: 2   REF: 081626geo   TOP: Compositions of Transformations
KEY: grids

4

222 ANS:
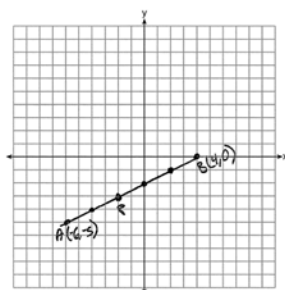
$-6 + \dfrac{2}{5}(4 - -6)$ $-5 + \dfrac{2}{5}(0 - -5)$ $(-2, -3)$

$-6 + \dfrac{2}{5}(10)$ $-5 + \dfrac{2}{5}(5)$

$-6 + 4$ $-5 + 2$

-2 -3

PTS: 2   REF: 061527geo   TOP: Directed Line Segments

223 ANS:
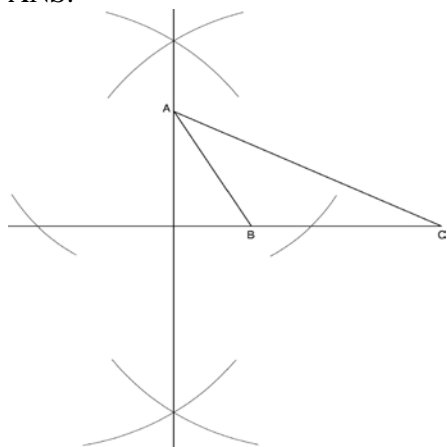
PTS: 2   REF: fall1409geo   TOP: Constructions
KEY: parallel and perpendicular lines

224 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

225 ANS:
$\dfrac{360}{6} = 60$

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

226 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

227 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

228 ANS:

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

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

$x \approx 15.5$

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

229 ANS:
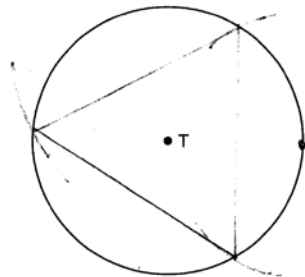
PTS: 2   REF: 081526geo   TOP: Constructions

230 ANS:
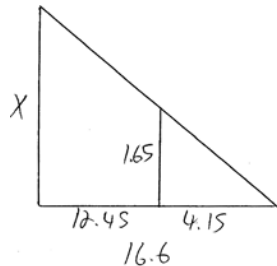
$\dfrac{1.65}{4.15} = \dfrac{x}{16.6}$

$4.15x = 27.39$

$x = 6.6$

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

231 ANS:

$73 + R = 90$ Equal cofunctions are complementary.

$R = 17$

PTS: 2   REF: 061628geo   TOP: Cofunctions

232 ANS:

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

$39.375 = 39.375$

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

233 ANS:

$\dfrac{152 - 56}{2} = 48$

PTS: 2   REF: 011728geo   TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

234 ANS:

$T_{0,-2} \circ r_{y\text{-axis}}$

PTS: 2   REF: 011726geo   TOP: Compositions of Transformations
KEY: identify

235 ANS:

$\dfrac{6}{14} = \dfrac{9}{21}$ SAS

$126 = 126$

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

236 ANS:

$4x - .07 = 2x + .01$ $\operatorname{Sin} A$ 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

237 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

238 ANS:

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

$$x \approx 23$$

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

239 ANS:
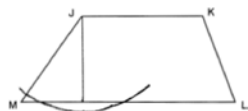
PTS: 2 REF: 061725geo TOP: Constructions
KEY: parallel and perpendicular lines

240 ANS:

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

PTS: 2 REF: 081525geo TOP: Density

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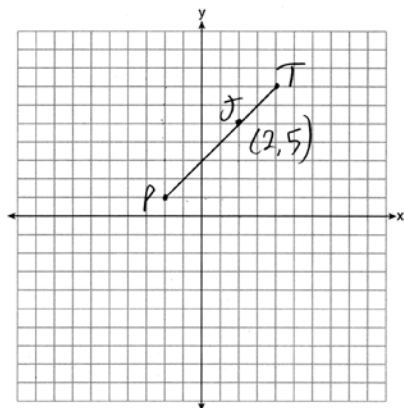
$$x = \frac{2}{3}(4 - -2) = 4 \quad -2 + 4 = 2 \quad J(2,5)$$

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

$$1 + 4 = 5$$

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

242 ANS:

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

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

$$x = 120$$

PTS: 2 REF: 061529geo TOP: Sectors

243 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

244 ANS:

No, the weight of the bricks is greater than 900 kg. $500 \times (5.1 \, \text{cm} \times 10.2 \, \text{cm} \times 20.3 \, \text{cm}) = 528{,}003 \, \text{cm}^3$.

$528{,}003 \, \text{cm}^3 \times \dfrac{1 \, \text{m}^3}{100 \, \text{cm}^3} = 0.528003 \, \text{m}^3$. $\dfrac{1920 \, \text{kg}}{\text{m}^3} \times 0.528003 \, \text{m}^3 \approx 1013 \, \text{kg}$.

PTS: 2   REF: fall1406geo   TOP: Density

245 ANS:
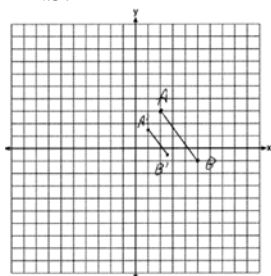
$\sqrt{(2.5-1)^2 + (-.5-1.5)^2} = \sqrt{2.25+4} = 2.5$

PTS: 2   REF: 081729geo   TOP: Dilations

246 ANS:

$\ell: y = 3x - 4$

$m: y = 3x - 8$

PTS: 2   REF: 011631geo   TOP: Line Dilations

247 ANS:

$\sqrt[3]{\dfrac{3V_f}{4\pi}} - \sqrt[3]{\dfrac{3V_p}{4\pi}} = \sqrt[3]{\dfrac{3(294)}{4\pi}} - \sqrt[3]{\dfrac{3(180)}{4\pi}} \approx 0.6$

PTS: 2   REF: 061728geo   TOP: Volume   KEY: spheres

248 ANS:

$\triangle MNO$ is congruent to $\triangle PNO$ by SAS. Since $\triangle MNO \cong \triangle PNO$, then $\overline{MO} \cong \overline{PO}$ by CPCTC. So $\overline{NO}$ must divide $\overline{MP}$ in half, and $MO = 8$.

PTS: 2   REF: fall1405geo   TOP: Isosceles Triangle Theorem

249 ANS:

$s = \theta \cdot r$ $s = \theta \cdot r$ Yes, both angles are equal.

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

$\dfrac{\pi}{4} = A$

       $\dfrac{\pi}{4} = B$

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

250 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 $\dfrac{5}{3}$. 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

251 ANS:

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

    $L \approx 32$

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

252 ANS:
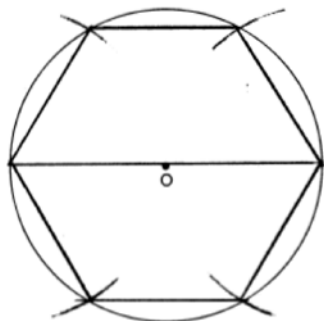
PTS: 2   REF: 081728geo   TOP: Constructions

253 ANS:
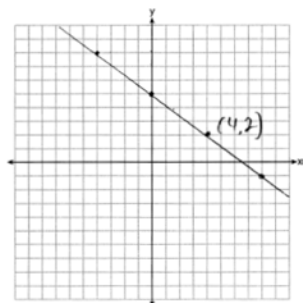
The line is on the center of dilation, so the line does not change. $p: 3x + 4y = 20$

PTS: 2   REF: 061731geo   TOP: Line Dilations

254 ANS:

$R_{180°}$ about $\left(-\dfrac{1}{2},\dfrac{1}{2}\right)$

PTS: 2   REF: 081727geo   TOP: Compositions of Transformations
KEY: identify

255 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 $\dfrac{ZU}{ZX}$ 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

256 ANS:

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

PTS: 2   REF: 081530geo   TOP: Triangle Congruency

257 ANS:
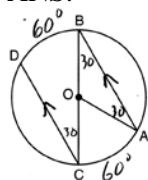
$180 - 2(30) = 120$

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

258 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

259 ANS:
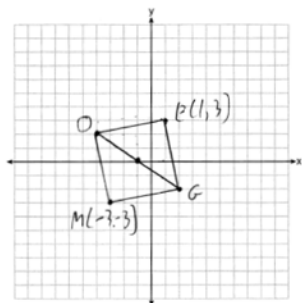
PTS: 2   REF: 011731geo   TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

260 ANS:
Opposite angles in a parallelogram are congruent, so m∠*O* = 118°. The interior angles of a triangle equal 180°.
$180 - (118 + 22) = 40.$

PTS: 2   REF: 061526geo   TOP: Parallelograms

261 ANS:
Yes. The bases of the cylinders have the same area and the cylinders have the same height.

PTS: 2   REF: 081725geo   TOP: Volume

262 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

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

PTS: 2   REF: 011630geo   TOP: Density

264 ANS:
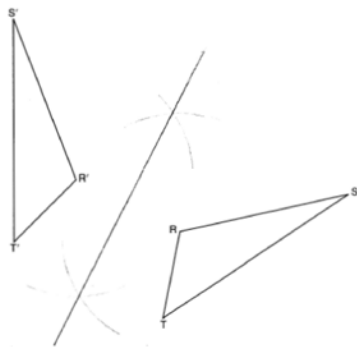
PTS: 2   REF: 011725geo   TOP: Constructions
KEY: line bisector

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

265 ANS:
The slopes of perpendicular line are opposite reciprocals. Since the lines are perpendicular, they form right angles
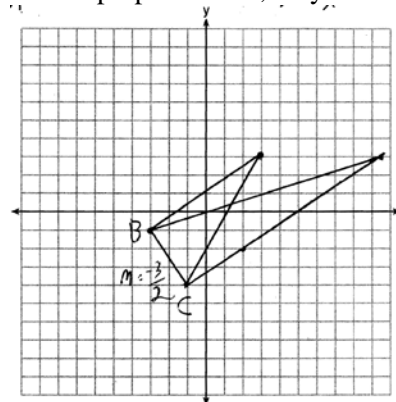
and a right triangle. $m_{\overline{BC}} = -\frac{3}{2}$ $-1 = \frac{2}{3}(-3) + b$ or $-4 = \frac{2}{3}(-1) + b$

$$m_\perp = \frac{2}{3} \qquad -1 = -2 + b \qquad\qquad \frac{-12}{3} = \frac{-2}{3} + b$$

$$1 = b \qquad\qquad -\frac{10}{3} = b$$

$$3 = \frac{2}{3}x + 1$$

$$2 = \frac{2}{3}x \qquad\qquad 3 = \frac{2}{3}x - \frac{10}{3}$$

$$3 = x \qquad\qquad 9 = 2x - 10$$

$$19 = 2x$$

$$9.5 = x$$

PTS: 4   REF: 081533geo   TOP: Triangles in the Coordinate Plane

266 ANS:
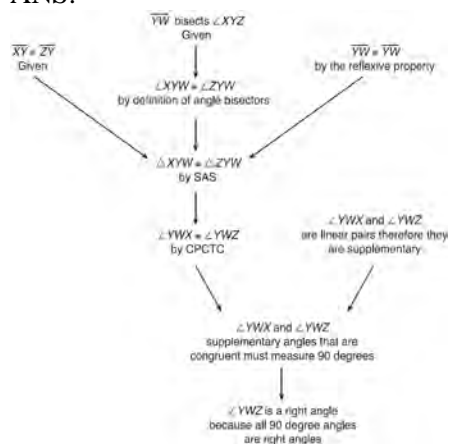
$\triangle XYZ$, $\overline{XY} \cong \overline{ZY}$, and $\overline{YW}$ bisects $\angle XYZ$ (Given). $\triangle XYZ$ is isosceles (Definition of isosceles triangle). $\overline{YW}$ is an altitude of $\triangle XYZ$ (The angle bisector of the vertex of an isosceles triangle is also the altitude of 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

267 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

268 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

269 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

270 ANS:

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

$\qquad\qquad\qquad\qquad .9604 = y$

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

271 ANS:

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

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

PTS: 4   REF: spr1412geo   TOP: Density

272 ANS:

x represents the distance between the lighthouse and the canoe at 5:00; *y* represents the distance between the lighthouse and the canoe at 5:05. $\tan 6 = \dfrac{112 - 1.5}{x}$ $\tan(49 + 6) = \dfrac{112 - 1.5}{y}$ $\dfrac{1051.3 - 77.4}{5} \approx 195$

$x \approx 1051.3$ $y \approx 77.4$

PTS: 4   REF: spr1409geo   TOP: Using Trigonometry to Find a Side
KEY: advanced

273 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

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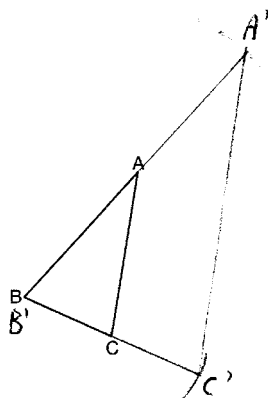
The length of $\overline{A'C'}$ is twice $\overline{AC}$.

PTS: 4   REF: 081632geo   TOP: Constructions
KEY: congruent and similar figures

275 ANS:

$$C = 2\pi r \quad V = \frac{1}{3}\pi \cdot 5^2 \cdot 13 \approx 340$$

$$31.416 = 2\pi r$$

$$5 \approx r$$

PTS: 4   REF: 011734geo   TOP: Volume   KEY: cones

276 ANS:
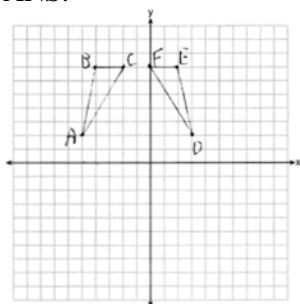
$r_{x=-1}$ Reflections are rigid motions that preserve distance, so $\triangle ABC \cong \triangle DEF$.

PTS: 4 REF: 061732geo TOP: Identifying Transformations
KEY: graphics

277 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

278 ANS:
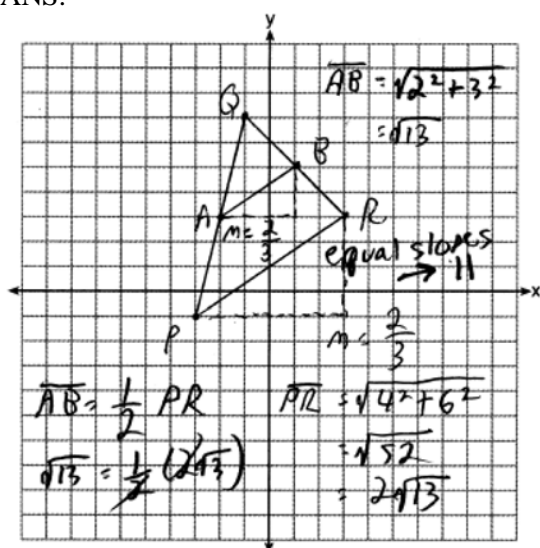
PTS: 4 REF: 081732geo TOP: Triangles in the Coordinate Plane

279 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

280 ANS:

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

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

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

281 ANS:

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

PTS: 4   REF: 061634geo   TOP: Similarity Proofs

282 ANS:
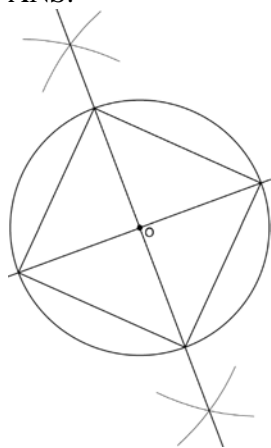
Since the square is inscribed, each vertex of the square is on the circle and the diagonals of the square are diameters of the circle. Therefore, each angle of the square is an inscribed angle in the circle that intercepts the circle at the endpoints of the diameters. Each angle of the square, which 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

283 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

284 ANS:

$M\left(\dfrac{4+0}{2}, \dfrac{6-1}{2}\right) = M\left(2, \dfrac{5}{2}\right)$ $m = \dfrac{6--1}{4-0} = \dfrac{7}{4}$ $m_\perp = -\dfrac{4}{7}$ $y - 2.5 = -\dfrac{4}{7}(x-2)$ 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

285 ANS:

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

    PTS: 4   REF: 061632geo   TOP: Volume   KEY: cylinders

286 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

287 ANS:
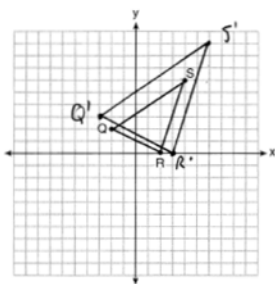
A dilation preserves slope, so the slopes of $\overline{QR}$ and $\overline{Q'R'}$ are equal. Because the slopes are equal, $Q'R' \parallel QR$.

    PTS: 4   REF: 011732geo   TOP: Dilations   KEY: grids

288 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

289 ANS:

$$20000 \text{ g}\left(\frac{1 \text{ ft}^3}{7.48 \text{ g}}\right) = 2673.8 \text{ ft}^3 \quad 2673.8 = \pi r^2(34.5) \quad 9.9 + 1 = 10.9$$
$$r \approx 4.967$$
$$d \approx 9.9$$

    PTS: 4   REF: 061734geo   TOP: Volume   KEY: cylinders

290 ANS:

$$\frac{\left(\dfrac{180 - 20}{2}\right)}{360} \times \pi(6)^2 = \frac{80}{360} \times 36\pi = 8\pi$$

    PTS: 4   REF: spr1410geo   TOP: Sectors

291 ANS:

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

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

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

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

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

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

292 ANS:

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

$x \approx 36.6$

PTS: 4   REF: 011632geo   TOP: Pythagorean Theorem
KEY: without graphics

293 ANS:

$SAS \cong SAS$
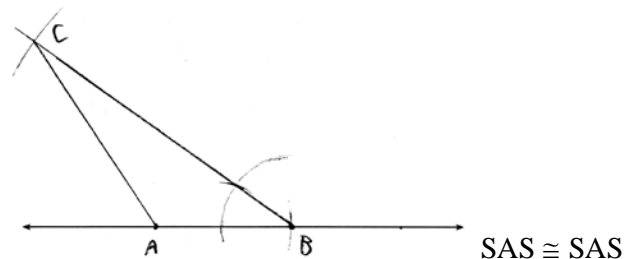
PTS: 4   REF: 011634geo   TOP: Constructions
KEY: congruent and similar figures

294 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

295 ANS:
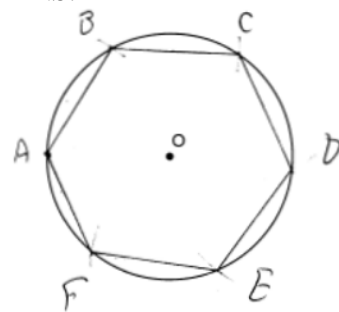
Right triangle because $\angle CBF$ is inscribed in a semi-circle.

PTS: 4   REF: 011733geo   TOP: Constructions

296 ANS:

$\tan 7 = \dfrac{125}{x}$ $\tan 16 = \dfrac{125}{y}$ $1018 - 436 \approx 582$

$x \approx 1018$ $y \approx 436$

PTS: 4   REF: 081532geo   TOP: Using Trigonometry to Find a Side
KEY: advanced

Geometry 6 Point Regents Exam Questions
Answer Section

297 ANS:

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

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

PTS: 6   REF: 081636geo   TOP: Density

298 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

299 ANS:

Circle *O*, secant $\overline{ACD}$, tangent $\overline{AB}$ (Given). Chords $\overline{BC}$ and $\overline{BD}$ are drawn (Auxiliary lines). $\angle A \cong \angle A$,

$\overset{\frown}{BC} \cong \overset{\frown}{BC}$ (Reflexive property). $m\angle BDC = \frac{1}{2}m\overset{\frown}{BC}$ (The measure of an inscribed angle is half the measure of the

intercepted arc). $m\angle CBA = \frac{1}{2}m\overset{\frown}{BC}$ (The measure of an angle formed by a tangent and a chord is half the

measure of the intercepted arc). $\angle BDC \cong \angle CBA$ (Angles equal to half of the same arc are congruent).

$\triangle ABC \sim \triangle ADB$ (AA). $\dfrac{AB}{AC} = \dfrac{AD}{AB}$ (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

300 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

301 ANS:

$$\tan 52.8 = \frac{h}{x}$$

$$h = x \tan 52.8$$

$$\tan 34.9 = \frac{h}{x+8}$$

$$h = (x+8)\tan 34.9$$

$x \tan 52.8 = x \tan 34.9 + 8 \tan 34.9 \quad \tan 52.8 \approx \frac{h}{9} \quad 11.86 + 1.7 \approx 13.6$

$x \tan 52.8 - x \tan 34.9 = 8 \tan 34.9$

$x(\tan 52.8 - \tan 34.9) = 8 \tan 34.9 \qquad x \approx 11.86$

$$x = \frac{8 \tan 34.9}{\tan 52.8 - \tan 34.9}$$

$$x \approx 9$$

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

302 ANS:

C: $V = \pi(26.7)^2(750) - \pi(24.2)^2(750) = 95{,}437.5\pi$

$$95{,}437.5\pi \ \mathrm{cm}^3 \left(\frac{2.7\,\mathrm{g}}{\mathrm{cm}^3} \right)\left(\frac{1\,\mathrm{kg}}{1000\,\mathrm{g}} \right)\left(\frac{\$0.38}{\mathrm{kg}} \right) = \$307.62$$

P: $V = 40^2(750) - 35^2(750) = 281{,}250$ $\qquad\qquad \$307.62 - 288.56 = \$19.06$

$$281{,}250 \ \mathrm{cm}^3 \left(\frac{2.7\,\mathrm{g}}{\mathrm{cm}^3} \right)\left(\frac{1\,\mathrm{kg}}{1000\,\mathrm{g}} \right)\left(\frac{\$0.38}{\mathrm{kg}} \right) = \$288.56$$

PTS: 6   REF: 011736geo   TOP: Density

303 ANS:

$$V = \frac{1}{3}\pi\left(\frac{3}{2}\right)^2 \cdot 8 \approx 18.85 \cdot 100 = 1885 \quad 1885 \cdot 0.52 \cdot 0.10 = 98.02 \quad 1.95(100) - (37.83 + 98.02) = 59.15$$

PTS: 6   REF: 081536geo   TOP: Density

304 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

305 ANS:
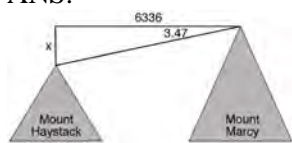
$$\tan 3.47 = \frac{M}{6336}$$

$$M \approx 384$$

$$4960 + 384 = 5344$$

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

$$A \approx 229$$

$$5344 - 229 = 5115$$

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

306 ANS:

Quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$, $\overline{AB} \| \overline{CD}$, and $\overline{BF}$ and $\overline{DE}$ are perpendicular to diagonal $\overline{AC}$ at points F and E (given). $\angle AED$ and $\angle CFB$ are right angles (perpendicular lines form right angles). $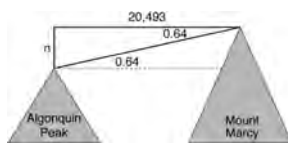\angle AED \cong \angle CFB$ (All right angles are congruent). $ABCD$ is a parallelogram (A quadrilateral with one pair of sides congruent and parallel is a parallelogram). $\overline{AD} \| \overline{BC}$ (Opposite sides of a parallelogram are parallel). $\angle DAE \cong \angle BCF$ (Parallel lines cut by a transversal form congruent alternate interior angles). $\overline{DA} \cong \overline{BC}$ (Opposite sides of a parallelogram are congruent). $\triangle ADE \cong \triangle CBF$ (AAS). $\overline{AE} \cong \overline{CF}$ (CPCTC).

PTS: 6   REF: 011735geo   TOP: Quadrilateral Proofs

307 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.
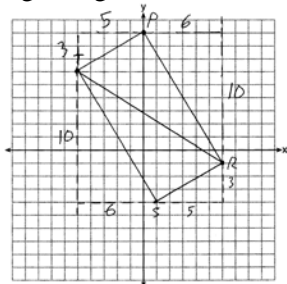
PTS: 6   REF: 061536geo   TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

308 ANS:

$\overline{PQ}$ $\sqrt{(8-3)^2 + (3--2)^2} = \sqrt{50}$ $\overline{QR}$ $\sqrt{(1-8)^2 + (4-3)^2} = \sqrt{50}$ $\overline{RS}$ $\sqrt{(-4-1)^2 + (-1-4)^2} = \sqrt{50}$

$\overline{PS}$ $\sqrt{(-4-3)^2 + (-1--2)^2} = \sqrt{50}$ *PQRS* is a rhombus because all sides are congruent. $m_{\overline{PQ}} = \dfrac{8-3}{3--2} = \dfrac{5}{5} = 1$

$m_{\overline{QR}} = \dfrac{1-8}{4-3} = -7$ Because the slopes of adjacent sides are not opposite reciprocals, they are not perpendicular
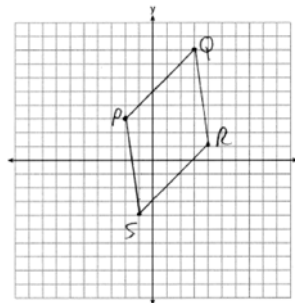
and do not form a right angle. Therefore *PQRS* is not a square.

PTS: 6   REF: 061735geo   TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

309 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

310 ANS:

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

$x \approx 9.115$

$V = \dfrac{1}{2}\left(\dfrac{4}{3}\pi(8.5)^3\right) \approx 1286.3$ $689.6 + 5674.5 + 1286.3 \approx 7650$ 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

311 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

312 ANS:

$\tan 16.5 = \dfrac{x}{13.5}$ $9 \times 16 \times 4.5 = 648$ $3752 - (35 \times 16 \times .5) = 3472$

$x \approx 4$ $13.5 \times 16 \times 4.5 = 972$ $3472 \times 7.48 \approx 25971$

$4 + 4.5 = 8.5$ $\dfrac{1}{2} \times 13.5 \times 16 \times 4 = 432$ $\dfrac{25971}{10.5} \approx 2473.4$

$12.5 \times 16 \times 8.5 = \underline{1700}$ $\dfrac{2473.4}{60} \approx 41$

3752

PTS: 6   REF: 081736geo   TOP: Volume   KEY: compositions

313 ANS:

$\tan 15 = \dfrac{6250}{x}$ $\tan 52 = \dfrac{6250}{y}$ $23325.3 - 4883 = 18442$ $\dfrac{18442 \text{ ft}}{1 \text{ min}} \left(\dfrac{1 \text{ mi}}{5280 \text{ ft}} \right) \left(\dfrac{60 \text{ min}}{1 \text{ h}} \right) \approx 210$

$x \approx 23325.3$ $y \approx 4883$

PTS: 6   REF: 061736geo   TOP: Using Trigonometry to Find a Side
KEY: advanced

314 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

315 ANS:

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

$x + 5 = 1.5x$

$5 = .5x$

$10 = x$

$10 + 5 = 15$

PTS: 6   REF: 061636geo   TOP: Volume   KEY: cones