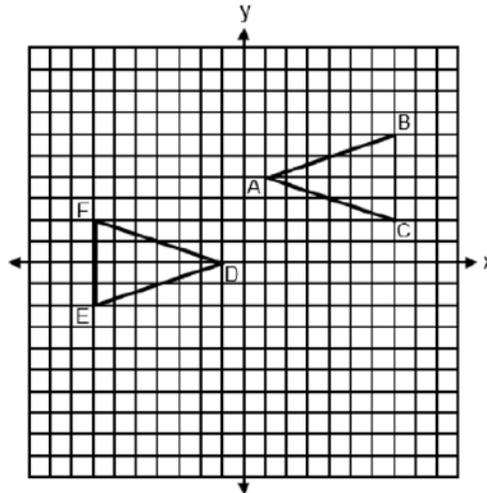# JMAP
REGENTS BY DATE

NY Geometry Regents Exam Questions
from Spring 2014 to August 2025 Sorted by Date

<u>www.jmap.org</u>

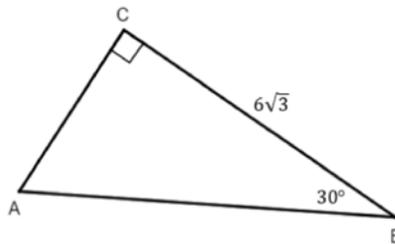## 2024 Geometry Sample Items

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

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

1) A reflection over $y = -x + 2$.

2) A point reflection through $(0,2)$.

3) A translation 2 units left followed by a reflection over the *x*-axis.

4) A translation 4 units down followed by a reflection over the *y*-axis.

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

The length of $\overline{AB}$ is

1) $3\sqrt{3}$

2) 9

3) 12

4) $12\sqrt{3}$

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

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

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

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

5   A triangle with vertices at $(-2,3)$, $(3,6)$, and $(2,1)$, is graphed on the set of axes below. A horizontal stretch of scale factor 2 with respect to $x = 0$, is represented by $(x,y) \rightarrow (2x,y)$. Graph the image of this triangle, after the horizontal stretch on the same set of axes.
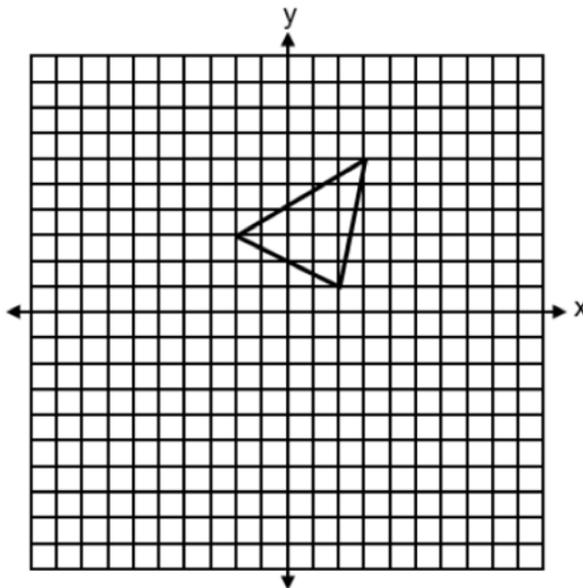
6   Triangle XYZ is shown below. Using a compass and straightedge, construct the circumcenter of $\triangle XYZ$.
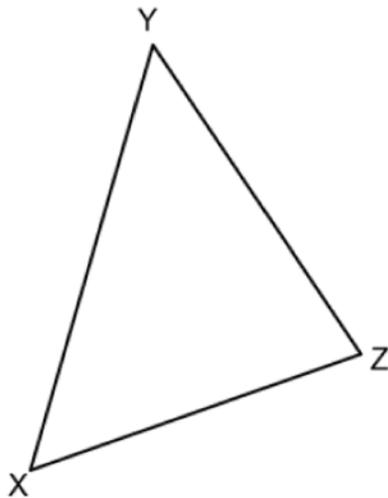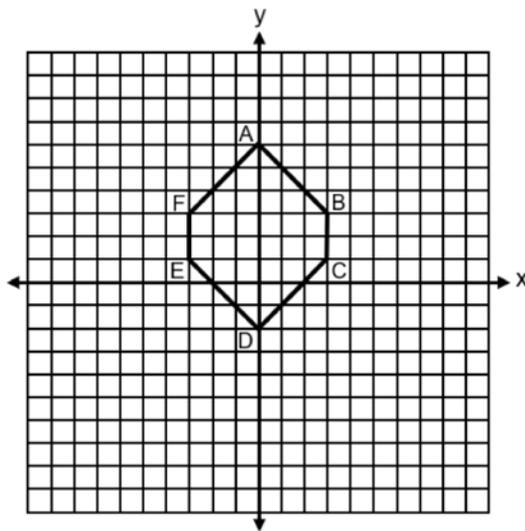
7   In the diagram below, $\triangle ABC \sim \triangle DEF$.
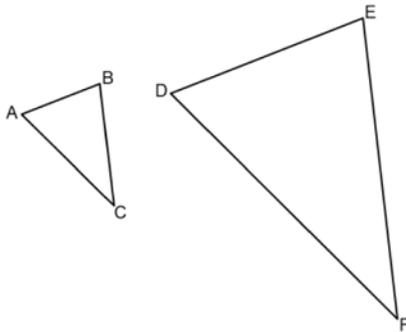
If $AB = 4$, $BC = x - 1$, $DE = x + 3$, and $EF = 15$, determine and state the length of $\overline{DE}$.

8   Hexagon $ABCDEF$ with coordinates at $A(0,6)$, $B(3,3)$, $C(3,1)$, $D(0,-2)$, $E(-3,1)$, and $F(-3,3)$ is graphed on the set of axes below.


Determine and state the perimeter of $ABCDEF$ in simplest radical form.

0625geo

1 The perimeter of a triangle is 18. What is the perimeter of a similar triangle after a dilation with scale factor of 3?
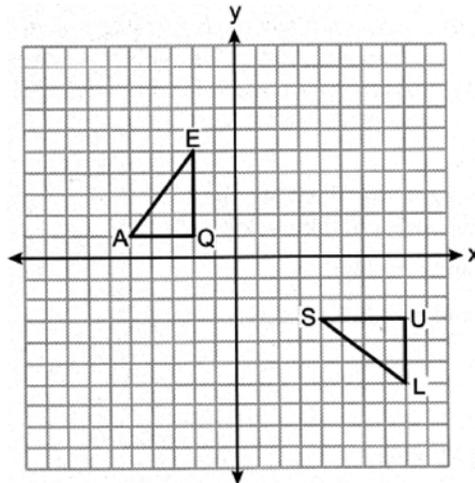1) 6
2) 18
3) 54
4) 162

2 The Washington Monument, shown below, is in Washington, D.C. At a point on the ground 200 feet from the center of the base of the monument, the angle of elevation to the top of the monument is 70.19°.
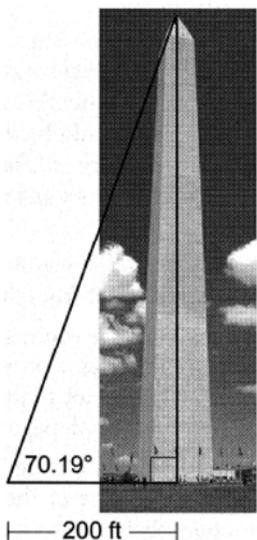
What is the height of the monument, to the *nearest foot*?
1) 188
2) 213
3) 555
4) 590

3 On the set of axes below, $\triangle EQA$ and $\triangle SUL$ are graphed.

Which sequence of transformations shows that $\triangle EQA \cong \triangle SUL$?
1) Rotate $\triangle EQA$ 90° counterclockwise about the origin and then translate 9 units right and 1 unit down.
2) Rotate $\triangle EQA$ 90° counterclockwise about the origin and then reflect over the line $x = 4$.
3) Reflect $\triangle EQA$ over the x-axis and then rotate clockwise about the origin.
4) Translate $\triangle EQA$ 10 units right and then reflect over the line $x = -1$.

4 If two sides of a triangle have lengths of 2 and 8, the length of the third side could be
1) 10
2) 7
3) 6
4) 4

5 A regular octagon is rotated about its center. Which angle measure will carry the octagon onto itself?
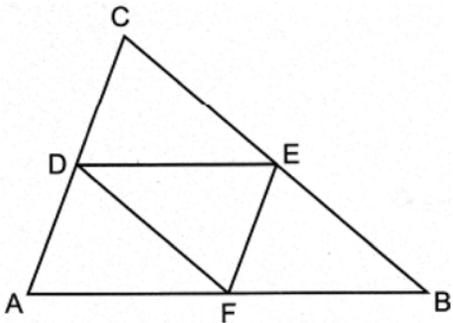1) 36°
2) 90°
3) 144°
4) 160°

1

6 An equation of a circle is $x^2 + y^2 - 6x + 2y = 14$. What are the coordinates of the center and the length of the radius of this circle?
1) $(-3,1)$ and $r = 5$
2) $(3,-1)$ and $r = 5$
3) $(-3,1)$ and $r = \sqrt{24}$
4) $(3,-1)$ and $r = \sqrt{24}$

7 In $\triangle HSF$ below, $m\angle S = 90°$, $HF = 30$, and $FS = 23$.
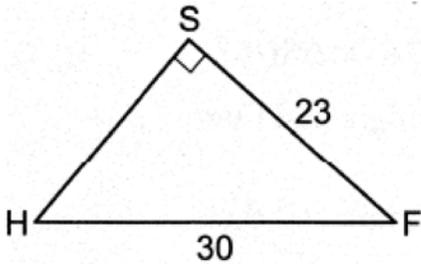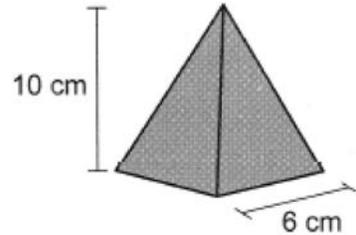

What is $m\angle F$, to the *nearest degree*?
1) 53°
2) 50°
3) 40°
4) 37°

8 In $\triangle CAB$ below, midsegments $\overline{DE}$, $\overline{EF}$, and $\overline{FD}$ are drawn.

If $CA = 14$, $CB = 20$, and $FB = 9$, what is the perimeter of quadrilateral $DEFA$?
1) 26
2) 32
3) 44
4) 52

9 A candle can be modeled by a pyramid with a square base, as shown below. The height of the candle is 10 cm, and each side of the base measures 6 cm.

If the candle wax burns at a rate of 3.5 cubic centimeters per hour, what is the approximate number of hours this candle could burn?
1) 103
2) 51
3) 34
4) 11

10 In the diagram below, tangent $\overline{SR}$ and secant $\overline{STU}$ are drawn to circle O from external point S.
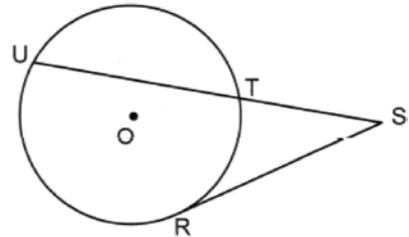
If $\overparen{TU} \cong \overparen{RU}$ and $m\overparen{TR} = 68°$, what is $m\angle S$?
1) 22°
2) 34°
3) 39°
4) 78°

11 Triangle RST has $m\angle S = 33°$, $RS = 7$, and $ST = 12$. What is the area of $\triangle RST$, to the *nearest tenth*?
1) 22.9
2) 27.3
3) 35.2
4) 45.7

2

12 Triangle ABC, with vertices whose coordinates are $A(-3,-2)$, $B(-1,2)$, and $C(4,1)$, is graphed on the set of axes below.
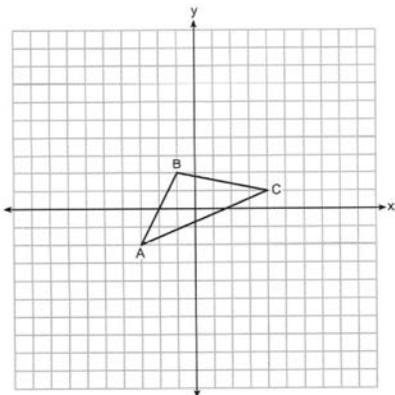
Triangle $A'B'C'$, whose vertices have coordinates $A'(-6,-2)$, $B'(-2,2)$, and $C'(8,1)$, is the image of $\triangle ABC$. The transformation that maps $\triangle ABC$ onto $\triangle A'B'C'$ is a
1) dilation
2) translation
3) vertical stretch
4) horizontal stretch

13 Which equation represents a line parallel to the line represented $y = 4x + 6$ and passing through the point $(-3,2)$?
1) $y - 2 = 4(x + 3)$
2) $y + 3 = 4(x - 2)$
3) $y - 2 = -\dfrac{1}{4}(x + 3)$
4) $y + 3 = -\dfrac{1}{4}(x - 2)$

14 Which two-dimensional figure is always formed when a plane intersects a right cylinder perpendicular to its base?
1) circle
2) triangle
3) rhombus
4) rectangle

15 In $\triangle KMP$ below, $\overline{CE}$ is drawn parallel to $\overline{MP}$.
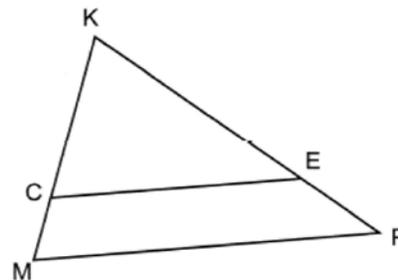
If $KC = 8$, $CM = 3$, and $CE = 12$, what is the length of $\overline{MP}$?
1) 24
2) 16.5
3) 15
4) 4.5

16 A parallelogram must be a rectangle if its diagonals
1) are perpendicular
2) bisect each other
3) bisect its angles
4) are congruent

17 Point O divides $\overline{COA}$ such that $CO:OA = 1{:}4$. If C has coordinates $(-2,-9)$ and A has coordinates $(3,6)$, the coordinates of O are
1) $(2,3)$
2) $(1,0)$
3) $(0,-3)$
4) $(-1,-6)$

18 A spherical balloon is fully inflated with helium to a diameter of 1.7 feet. If helium costs $0.80 per cubic foot, what is the cost to completely fill the balloon with helium?
1) $2.06
2) $2.42
3) $3.22
4) $16.46

19 In right triangle ABD below, altitude $\overline{BC}$ is drawn to hypotenuse $\overline{AD}$, $AC = 2.5$, and $CD = 4.3$.
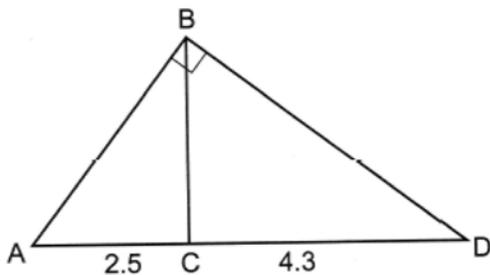
What is the length of $\overline{BA}$, to the *nearest tenth*?
1) 3.3
2) 3.4
3) 4.1
4) 5.4

20 Trapezoid $ZOYD$ has parallel sides $\overline{ZO}$ and $\overline{DY}$. If $m\angle Z = 141°$ and $m\angle Y = 73°$, what is $m\angle D$?
1) 39º
2) 73º
3) 107º
4) 141º

21 Triangle ABC is translated 5 units to the left and 2 units up to map onto $\triangle PQR$. Which statement is *not* always true?
1) $\triangle PQR \cong \triangle ABC$
2) $\angle A \cong \angle Q$
3) $BQ = \sqrt{29}$
4) $RQ = CB$

22 In the diagram below, congruent triangles PEN and PAL are drawn.
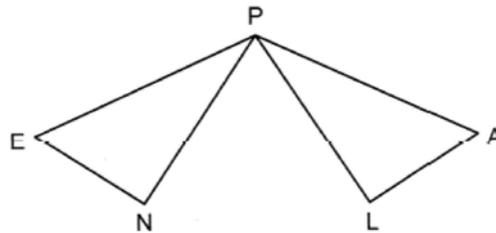
Which rigid motion maps $\triangle PEN$ onto $\triangle PAL$?
1) a point reflection of $\triangle PEN$ through P
2) a reflection of $\triangle PEN$ over the angle bisector of $\angle EPA$
3) a rotation of $\triangle PEN$ about point P, mapping $\overline{PE}$ onto $\overline{PA}$
4) a translation of $\triangle PEN$ along $\overline{EA}$, mapping point E onto A

23 A cone has a height of 8 inches and volume of 75.4 cubic inches. What is the diameter of the cone, to the *nearest inch*?
1) 9
2) 2
3) 3
4) 6

24 The line represented by the equation $5x - 2y = 10$ is transformed by a dilation centered at $(2,0)$ with a scale factor of 2. The image of the line
1) is the original line
2) passes through the point $(4,0)$
3) passes through the point $(0,-10)$
4) is perpendicular to the original line

25 In the year 2020, the village of Depew, New York had an area of 5.1 square miles and a population of 15,069. In the same year, the village of Lancaster, New York had an area of 2.7 square miles and a population of 10,087. Which village had the larger population density in 2020? Justify your answer.

4

26 In $\triangle ABC$ below, $\overline{AC}$ is extended through C to D, $m\angle A = (3x - 22)°$, $m\angle B = (4x - 18)°$, and $m\angle BCD = (6x - 23)°$.
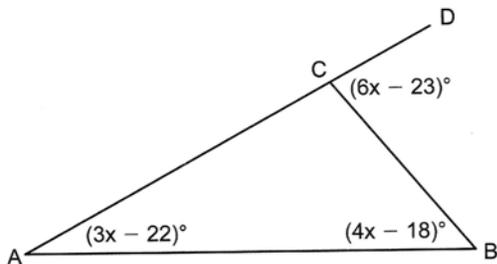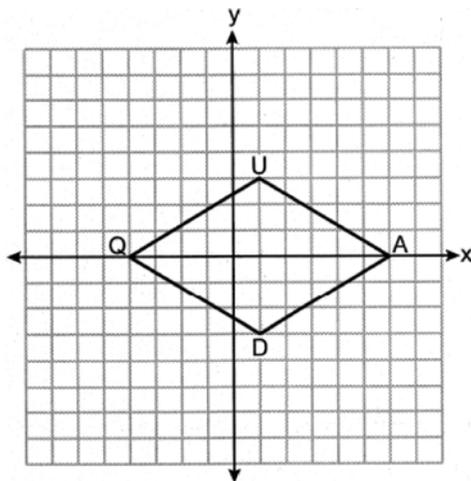

Determine and state $m\angle ACB$.

27 Parallelogram $ABCD$ is shown below. Using a compass and straightedge, construct the altitude from point A to side $\overline{DC}$. [Leave all construction marks.]
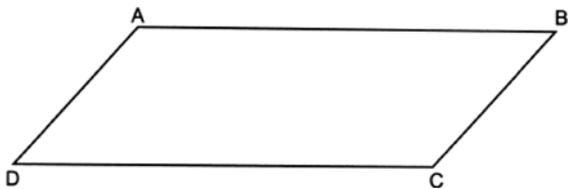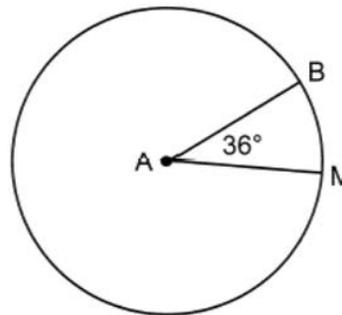

28 Quadrilateral $QUAD$ is graphed on the set of axes below.

Determine and state the area of quadrilateral $QUAD$.

29 In a right triangle, the acute angles have the relationship $\sin(3x - 7)° = \cos(x + 1)°$. Determine and state the value of x.

30 In circle A below, $m\angle BAM = 36°$.

If $AB = 20$, determine and state the length of $\overset{\frown}{MB}$. [Leave your answer in terms of π.]

31 In triangles ANT and ELM below, $AN = 6$, $NT = 5.6$, $TA = 4$, $EL = 9$, $LM = 8.4$, and $ME = 6$.
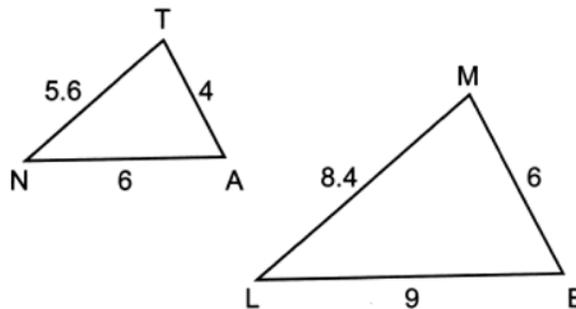
Explain why $\triangle ANT \sim \triangle ELM$.

32 A store sells colored craft sand in the three different containers below.
   Container 1: A square prism with a base length of 4 inches and a height of 7.5 inches.
   Container 2: A cylinder with a diameter of 5 inches and a height of 6 inches.
   Container 3: A cone with a diameter of 7.5 inches and a height of 8.5 inches.
If the containers are filled to the top, which container will hold the most sand? Justify your answer.

33 Quadrilateral *MIKE* has vertices with coordinates
    M(−1,−3), *I*(−3,3), *K*(5,4), and *E*(7,−2). Prove
    MIKE is a parallelogram, and prove *MIKE* is *not* a
    rhombus. [The use of the set of axes below is
    optional.]
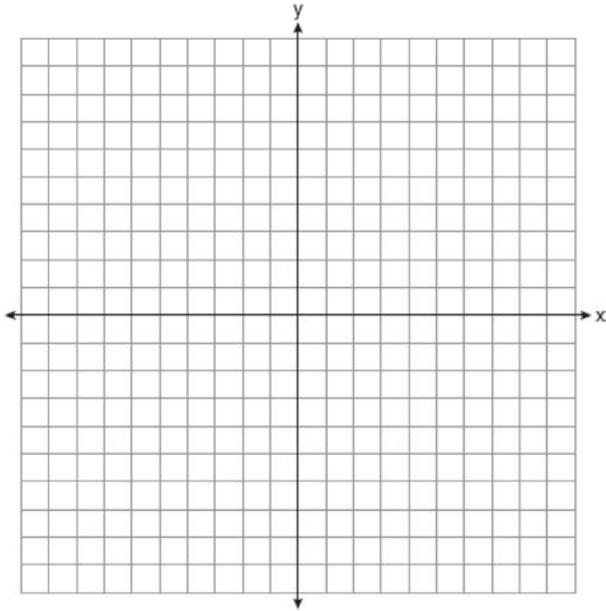
34 A park ranger needs to secure two different trees with wire. A wire is to be attached from a stake in the ground to
    each tree. The wire is attached at two different heights and two different angles of elevation, as indicated in the
    model below.
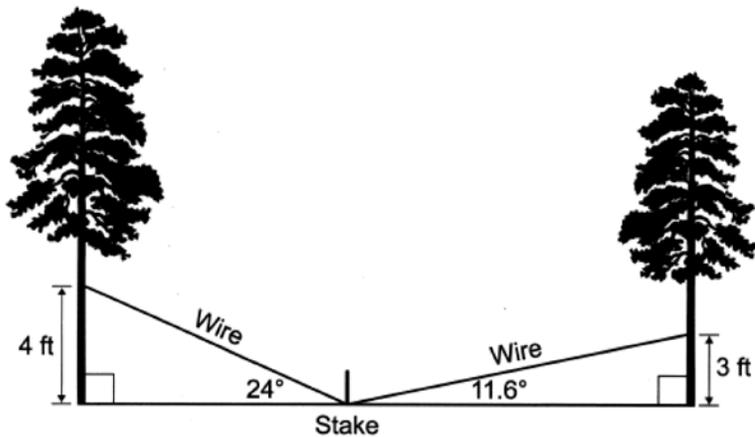
The park ranger has 20 feet of wire. Does the park ranger have enough wire to secure both trees? Justify your
answer.

35   Given: Quadrilateral $CARI$ with $\overline{CA} \cong \overline{RI}$ and $\overline{CI} \cong \overline{RA}$, and $\overline{AEI}$ and $\overline{LEH}$ are drawn
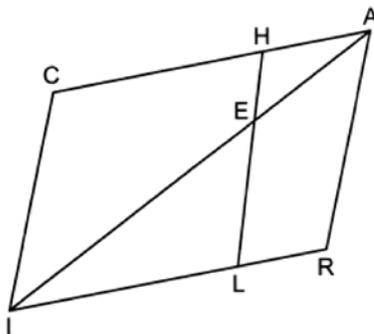
Prove: $HA \bullet EL = LI \bullet EH$

0825geo

1 An equilateral triangle is continuously rotated around one of its altitudes. The three-dimensional object formed is a
1) cone
2) sphere
3) cylinder
4) pyramid

2 On the set of axes below, quadrilateral *BDGF* is rotated 90 degrees clockwise about the origin and then reflected over the *y*-axis. The image of quadrilateral *BDGF* is quadrilateral *MQSP*.

Side $\overline{BD}$ will always map onto
1) $\overline{MP}$
2) $\overline{PS}$
3) $\overline{MQ}$
4) $\overline{SQ}$

3 In right triangle *JOE*, hypotenuse *JO* = 31.8 and m∠*J* = 38°. To the *nearest tenth*, the length of $\overline{EJ}$ is
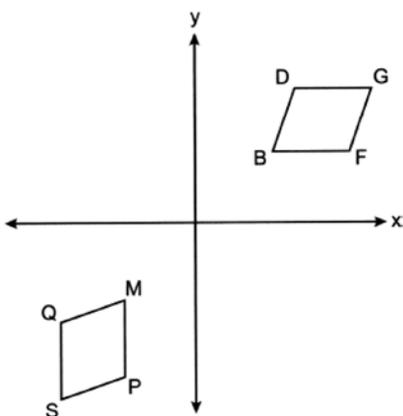1) 19.6
2) 25.1
3) 40.4
4) 51.7

4 The hemisphere below has a radius of 8 cm.
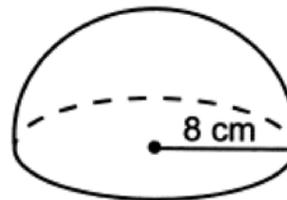
To the *nearest cubic centimeter*, the volume of the hemisphere is
1) 201
2) 268
3) 1072
4) 2145

5 In parallelogram *ABCD*, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E*. Which information is sufficient to prove *ABCD* is a rhombus?
1) $\overline{AE} \cong \overline{EC}$
2) $\overline{AC} \cong \overline{BD}$
3) $\overline{AB} \perp \overline{BC}$
4) $\overline{AC} \perp \overline{BD}$

6 Trapezoid *JOSH*, shown below, has non-parallel sides $\overline{JH}$ and $\overline{OS}$, m∠*J* = 65°, m∠*O* = 30°, m∠*OSA* = 80°, and m∠*SHU* = 60°.
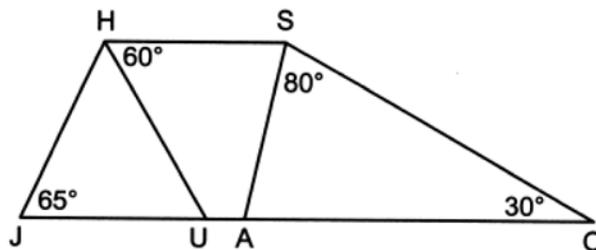
What is m∠*HSA*?
1) 55°
2) 60°
3) 65°
4) 70°

1

7   In $\triangle ABC$ below, points D and E are on $\overline{AB}$ and $\overline{CB}$, respectively, such that $\overline{DE} \parallel \overline{AC}$.
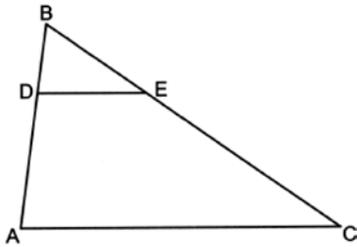
If $AD = 8$, $DB = 4$, and $DE = 6$, what is the length of $\overline{AC}$?
1)   24
2)   18
3)   12
4)   10

8   On the set of axes below, circle C has a center with coordinates $(2,-1)$.
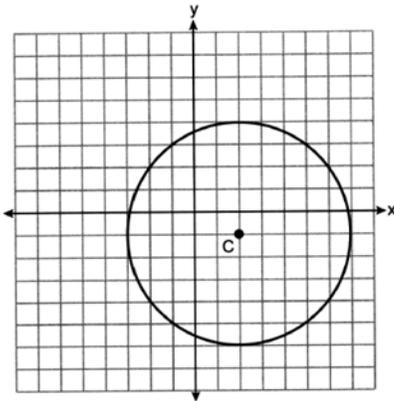
Which equation represents circle C?
1) $(x-2)^2 + (y+1)^2 = 25$
2) $(x-2)^2 + (y+1)^2 = 16$
3) $(x+2)^2 + (y-1)^2 = 25$
4) $(x+2)^2 + (y-1)^2 = 16$

9   On the set of axes below, $\triangle D'E'F'$ is the image of $\triangle DEF$.
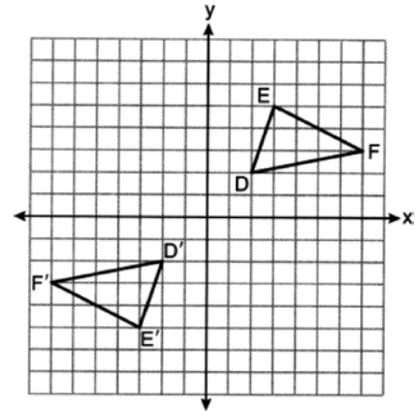
A transformation that maps $\triangle DEF$ onto $\triangle D'E'F'$ is a
1)   reflection over the line $y = x$
2)   reflection over the line $y = -x$
3)   point reflection through the origin
4)   translation 4 units left and 4 units down

10   In circle O below, secants $\overline{PCA}$ and $\overline{PDB}$ are drawn from external point P.
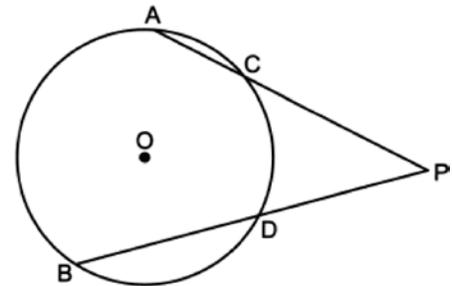
If $PA = 17$, $PD = 10$, and $BD = 12$, what is the length of $\overline{PC}$, to the *nearest tenth*?
1)   7.1
2)   7.7
3)   12.9
4)   14.2

2

11 In the diagram below, $\overline{CD} \parallel \overline{AB}$, and $\overline{CB}$ bisects $\angle ABD$.
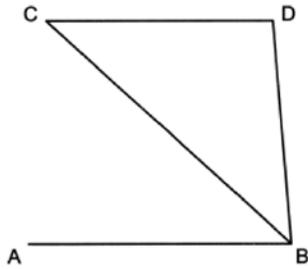
Which statement must be true?
1) $\overline{CD} \cong \overline{AB}$
2) $\overline{AB} \cong \overline{BD}$
3) $\triangle CDB$ is a right triangle
4) $\triangle CDB$ is an isosceles triangle

12 Line h is represented by the equation $y = \frac{2}{3}x - 4$.

Which equation represents the line that is perpendicular to line h and passes through the point $(6,1)$?

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

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

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

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

13 A wooden toy block can be modeled by a pyramid with a square base, as shown below. The height of the block is 17.4 cm and the square base has a side length of 8.2 cm.
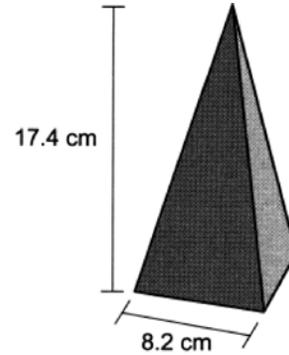
The block is made of solid oak, which has a density of 0.77 g/cm³. What is the mass of the block, to the *nearest gram*?
1) 300
2) 506
3) 637
4) 901

14 In $\triangle ABC$ below, midsegment $\overline{DE}$ is drawn.
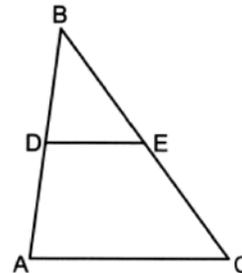
If $DE = x + 3$ and $AC = 3x - 5$, what is the length of $\overline{DE}$?
1) 28
2) 14
3) 7
4) 4

3

15 Triangle *DUG* is an isosceles right triangle with the right angle at *G*. If $DU = 10\sqrt{2}$, what is the length of $\overline{GU}$?
1) 5
2) $5\sqrt{2}$
3) 10
4) $10\sqrt{2}$

16 In $\triangle RST$ below, $RS = 9$ cm, $RT = 8$ cm, and $m\angle TRS = 55°$.
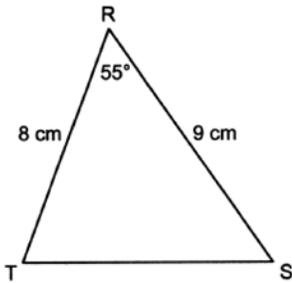
What is the area of $\triangle RST$, to the *nearest square centimeter*?
1) 59
2) 36
3) 29
4) 21

17 Triangle *ABC* is dilated by a scale factor of 2 to map onto its image, $\triangle RST$, on the set of axes below.
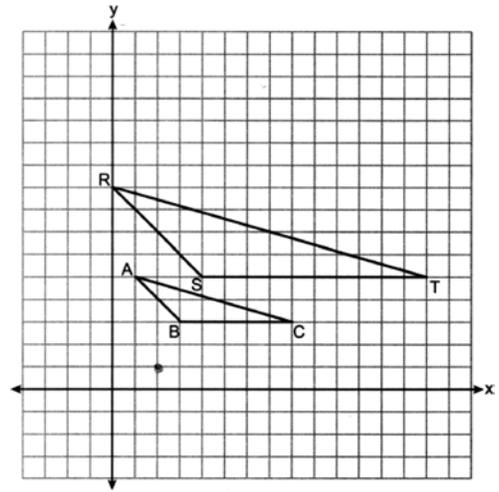
What are the coordinates of the center of this dilation?
1) $(1,-1)$
2) $(2,1)$
3) $(3,3)$
4) $(0,0)$

18 What is the perimeter of $\triangle ABC$, where the vertices have coordinates $A(-2,3)$, $B(-2,-1)$, and $C(6,-1)$?
1) 16
2) 92
3) $16\sqrt{5}$
4) $12 + 4\sqrt{5}$

4

19 In the diagram below, $\overline{GT}$ and $\overline{PF}$ intersect at E, and $\angle P \cong \angle F$.
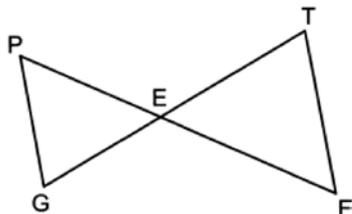
Which equation is always true?

1) $\dfrac{PE}{FE} = \dfrac{FT}{PG}$

2) $\dfrac{GE}{TE} = \dfrac{FT}{PG}$

3) $\dfrac{PE}{GE} = \dfrac{TE}{FE}$

4) $\dfrac{PE}{FE} = \dfrac{PG}{FT}$

20 A section of sidewalk in the shape of a rectangular prism is being replaced. The sidewalk is 10 feet long, 4 feet wide, and 4 inches deep. A brand of concrete mix yields 0.6 cubic foot of concrete per bag. What is the minimum number of bags of concrete mix that must be purchased to completely replace this sidewalk?
1) 22
2) 23
3) 26
4) 27

21 The line $4x - 6y = 24$ is transformed by a dilation of scale factor 3 centered at the origin. Which equation represents the image of the line after this dilation?

1) $y = \dfrac{2}{3}x - 12$

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

3) $y = 2x - 12$

4) $y = 2x - 4$

22 A rhombus is graphed on the set of axes below.
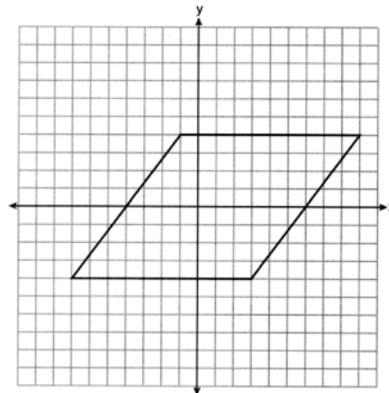
Which transformation does *not* carry the rhombus onto itself?
1) a rotation of 180° about the origin
2) a rotation of 180° about point $(1,0)$
3) a reflection over the line $y = \dfrac{1}{2}x - \dfrac{1}{2}$
4) a reflection over the line $y = -2x + 2$

23 In right triangle HAY below, altitude $\overline{AL}$ is drawn to hypotenuse $\overline{HY}$.
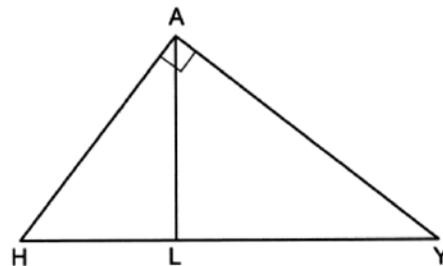
If $HY = 25$ and $YA = 20$, the length of $\overline{AL}$ is
1) 9
2) 12
3) 15
4) 16

5

24 Square $ABCD$ has an area of 36. If the square is dilated by a scale factor of $\frac{1}{2}$ centered at A, what is the area of its image?
1) 9
2) 18
3) 72
4) 144

25 Triangle $D'A'N'$ is the image of $\triangle DAN$ after a translation. Explain why $\triangle D'A'N'$ must be congruent to $\triangle DAN$.

26 The table below lists five metals and their densities.

Metal	Density (g/cm³)
Zinc	7.14
Tin	7.31
Iron	7.86
Copper	8.96
Silver	10.5

A solid metal cube has an edge length of 5 cm and a mass of 982.5 grams. Using the table above, determine and state the type of metal from which this cube is made.

27 The endpoints of $\overline{CAS}$ are $C(-3,1)$ and $S(7,6)$. Determine and state the coordinates of point A such that the ratio of $CA:AS$ is $3:2$. [The use of the set of axes below is optional.]
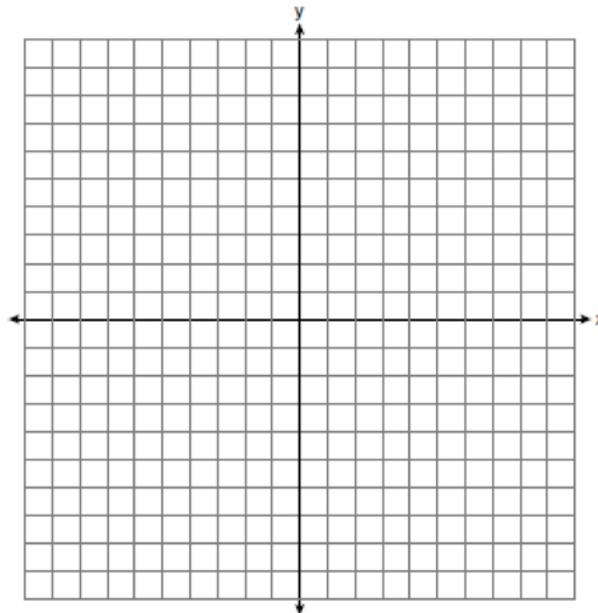
28 The ramp shown in the diagram below has an angle of elevation of 4.8°. The ramp is built to a landing 0.6 m above the ground.

Landing

0.6 m

Ramp

4.8°
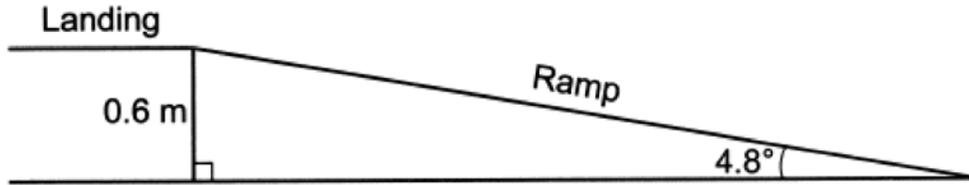
Determine and state the length of the ramp, to the *nearest tenth of a meter*.

29 Angle *KML* is the vertex angle of isosceles triangle *KLM* below. Side $\overline{LM}$ is extended through vertex *M* to point *N*.

K

N   M   L
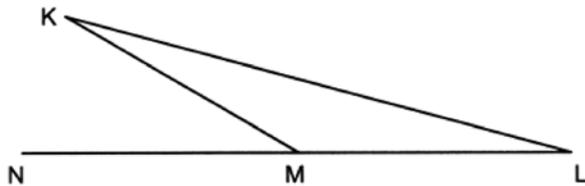
If m∠*K* = 15°, determine and state m∠*KMN*.

30 In the diagram below of circle *L*, the area of the shaded sector *KLM* is 7.5π and *LK* = 5.

K

5

7.5π

L

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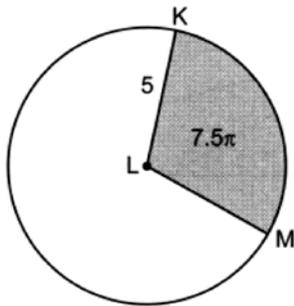
Determine and state the degree measure of angle *KLM*, the central angle of the shaded sector.

31 Using a compass and straightedge, construct the image of point *A* after a reflection over $\overline{BC}$. [Leave all construction marks.]

B

A

C
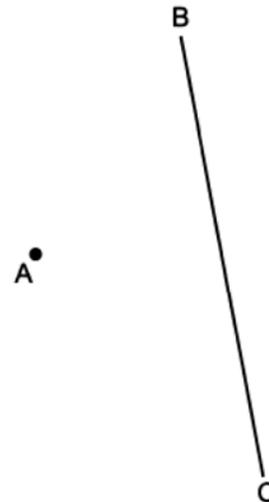
32 Joan wants to fill an empty 75-liter fish tank with water. She uses a cylindrical bucket with a diameter of 20 cm. Determine and state the maximum number of buckets of water, filled to an exact height of 26 cm, Joan can put into the fish tank before it overflows. [1000 cm³=1 liter]

7

33
As modeled in the diagram below, two cables are attached from a point on a tree 12 feet above the ground. The longer cable is anchored on the ground 3 feet farther from the tree than the shorter cable is anchored. The angle of elevation between the shorter cable and the ground is 50º.

12 ft

50°

⊢3 ft⊣
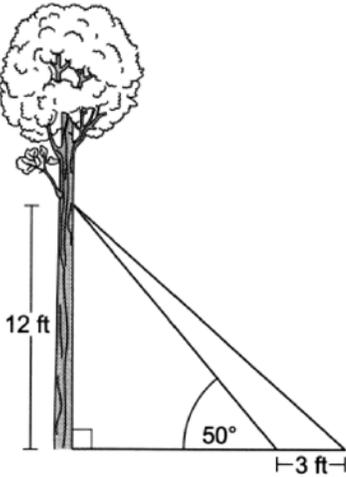
Determine and state, to the *nearest foot*, the distance from the base of the tree to the point where the longer cable is attached to the ground. Determine and state, to the *nearest degree*, the angle of elevation between the longer cable and the ground.

34 Quadrilateral *READ* has vertices with coordinates $R(-1,3)$, $E(2,7)$, $A(10,1)$, and $D(7,-3)$. Prove *READ* is a rectangle. [The use of the set of axes below is optional.]
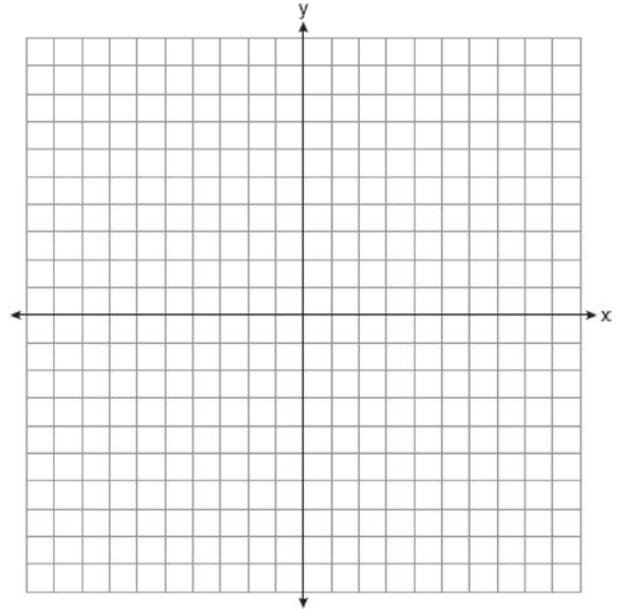
35 In quadrilateral *ABCD* below, side $\overline{CD}$ is extended through *D* to point *E* such that $\overline{AFD}$ and $\overline{BFE}$ bisect each other, and $\overline{DE} \cong \overline{DC}$.
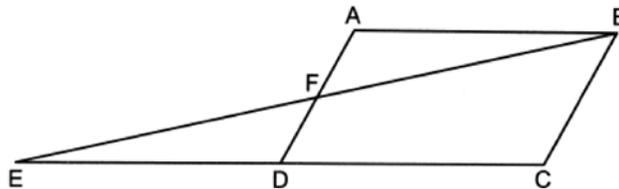
Prove *ABCD* is a parallelogram.

2024 Geometry Sample Items
Answer Section

1 ANS: 2   PTS: 2   REF: spr2401geo   NAT: G.CO.A.2
   TOP: Identifying Transformations

2 ANS: 3

$$\frac{6\sqrt{3}}{x} = \frac{\sqrt{3}}{2}$$

$$x = 12$$

   PTS: 2   REF: spr2402geo   NAT: G.SRT.C.8   TOP: 30-60-90 Triangles

3 ANS: 2

$$K = \frac{1}{2}(8)(5)\sin 57 \approx 16.8$$

   PTS: 2   REF: spr2403geo   NAT: G.SRT.D.9   TOP: Using Trigonometry to Find Area
   KEY: basic

4 ANS: 4   PTS: 2   REF: spr2404geo   NAT: G.GPE.A.1
   TOP: Equations of Circles   KEY: write equation, given graph

5 ANS:
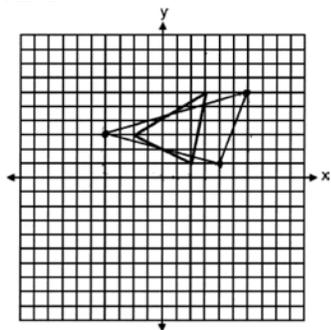
   PTS: 2   REF: spr2405geo   NAT: G.CO.A.2
   TOP: Analytical Representations of Transformations   KEY: graphics

6 ANS:

PTS: 2   REF: spr2406geo   NAT: G.CO.D.12   TOP: Constructions
KEY: line bisector

7 ANS:

$$\frac{4}{x+3} = \frac{x-1}{15} \quad 7+3 = 10$$

$$x^2 - x + 3x - 3 = 60$$

$$x^2 + 2x - 63 = 0$$

$$(x+9)(x-7) = 0$$

$$x = 7$$

PTS: 4   REF: spr2407geo   NAT: G.SRT.B.5   TOP: Similarity
KEY: basic

8 ANS:

$$4\sqrt{3^2 + 3^2} + 2(2) = 4\sqrt{18} + 4 = 12\sqrt{2} + 4$$

PTS: 2   REF: spr2408geo   NAT: G.GPE.B.7   TOP: Polygons in the Coordinate Plane

0625geo
Answer Section

1 ANS: 3   PTS: 2   REF: 062501geo   NAT: G.SRT.A.2
   TOP: Dilations

2 ANS: 3

$$\tan 70.19 = \frac{h}{200}$$

$$h \approx 555$$

   PTS: 2   REF: 062502geo   NAT: G.SRT.C.8   TOP: Using Trigonometry to Find a Side

3 ANS: 1   PTS: 2   REF: 062503geo   NAT: G.CO.A.5
   TOP: Compositions of Transformations

4 ANS: 2

$$2 + 7 > 8$$

   PTS: 2   REF: 062504geo   NAT: G.CO.C.10   TOP: Triangle Inequality Theorem

5 ANS: 2

$$\frac{360°}{8} = 45°\ \ 90° \text{ is a multiple of } 45°$$

   PTS: 2   REF: 062505geo   NAT: G.CO.A.3   TOP: Mapping a Polygon onto Itself

6 ANS: 4

$$x^2 - 6x + 9 + y^2 + 2y + 1 = 14 + 9 + 1$$

$$(x - 3)^2 + (y + 1)^2 = 24$$

   PTS: 2   REF: 062506geo   NAT: G.GPE.A.1   TOP: Equations of Circles
   KEY: completing the square

7 ANS: 3

$$\cos F = \frac{23}{30}$$

$$F \approx 40°$$

   PTS: 2   REF: 062507geo   NAT: G.SRT.C.8   TOP: Using Trigonometry to Find an Angle

8 ANS: 2

$$\frac{14}{2} + 9 + \frac{14}{2} + 9 = 32$$

   PTS: 2   REF: 062508geo   NAT: G.CO.C.10   TOP: Midsegments

9 ANS: 3

$$\frac{\frac{1}{3}(6^2)(10)}{3.5} \approx 34.3$$

   PTS: 2   REF: 062509geo   NAT: G.GMD.A.3   TOP: Volume
   KEY: pyramids

10 ANS: 3

$$\frac{\frac{360-68}{2}-68}{2}=39$$

PTS: 2   REF: 062510geo   NAT: G.C.A.2   TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

11 ANS: 1

$$\frac{1}{2}(7)(12)\sin(33)\approx 22.9$$

PTS: 2   REF: 062511geo   NAT: G.SRT.D.9   TOP: Using Trigonometry to Find Area
KEY: basic

12 ANS: 4   PTS: 2   REF: 062512geo   NAT: G.CO.A.2
TOP: Identifying Transformations

13 ANS: 1

$m=4$

PTS: 2   REF: 062513geo   NAT: G.GPE.B.5   TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

14 ANS: 4   PTS: 2   REF: 062514geo   NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

15 ANS: 2

$$\frac{8}{12}=\frac{11}{x}$$

$8x=132$

$x=16.5$

PTS: 2   REF: 062515geo   NAT: G.SRT.B.4   TOP: Side Splitter Theorem

16 ANS: 4   PTS: 2   REF: 062516geo   NAT: G.CO.C.11
TOP: Special Quadrilaterals

17 ANS: 4

$$-2+\frac{1}{5}(3--2)=-2+\frac{1}{5}(5)=-2+1=-1 \quad -9+\frac{1}{5}(6--9)=-9+\frac{1}{5}(15)=-9+3=-6$$

PTS: 2   REF: 062517geo   NAT: G.GPE.B.6   TOP: Directed Line Segments

18 ANS: 1

$$\frac{4}{3}\pi\left(\frac{1.7}{2}\right)^{3}\times.8\approx 2.06$$

PTS: 2   REF: 062518geo   NAT: G.GMD.A.3 TOP: Volume
KEY: spheres

19 ANS: 3

$$x^2 = 2.5 \times (2.5 + 4.3)$$

$$x \approx 4.1$$

PTS: 2   REF: 062519geo   NAT: G.SRT.B.4   TOP: Similarity

20 ANS: 1

$$180 - 141 = 39$$

PTS: 2   REF: 062520geo   NAT: G.CO.C.11   TOP: Trapezoids

21 ANS: 2   PTS: 2   REF: 062521geo   NAT: G.CO.B.6
TOP: Properties of Transformations

22 ANS: 2   PTS: 2   REF: 062522geo   NAT: G.CO.A.2
TOP: Identifying Transformations

23 ANS: 4

$$75.4 = \frac{1}{3}\pi r^2 (8)$$

$$r \approx 3$$

PTS: 2   REF: 062523geo   NAT: G.GMD.A.3 TOP: Volume
KEY: cones

24 ANS: 1

$$5(2) - 2(0) = 10$$

PTS: 2   REF: 062524geo   NAT: G.SRT.A.1   TOP: Line Dilations

25 ANS:

Lancaster $\dfrac{10087}{2.7} > \dfrac{15069}{5.1}$

PTS: 2   REF: 062525geo   NAT: G.MG.A.2   TOP: Density

26 ANS:

$3x - 22 + 4x - 18 = 6x - 23$ $180 - (6(17) - 23) = 180 - (102 - 23) = 180 - 79 = 101$

$$7x - 40 = 6x - 23$$

$$x = 17$$

PTS: 2   REF: 062526geo   NAT: G.CO.C.10   TOP: Exterior Angle Theorem

27 ANS:
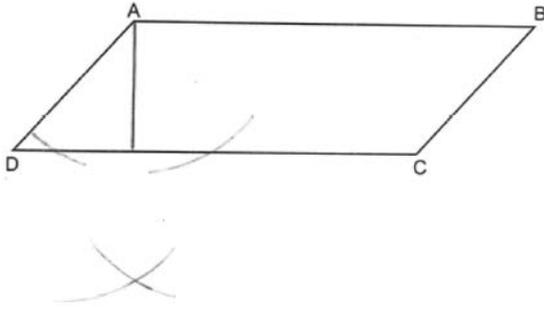
PTS: 2   REF: 062527geo   NAT: G.CO.D.12   TOP: Constructions
KEY: parallel and perpendicular lines

28 ANS:
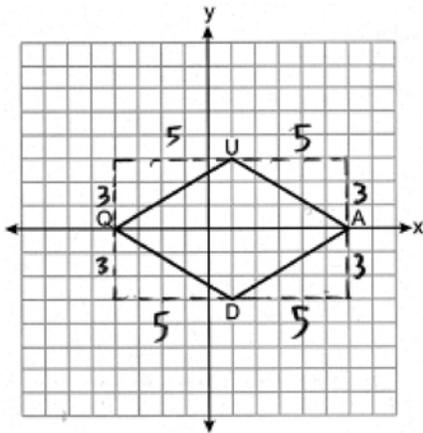
$(10 \times 6) - 4\left(\dfrac{1}{2}(5)(3)\right) = 60 - 30 = 30$

PTS: 2   REF: 062528geo   NAT: G.GPE.B.7   TOP: Polygons in the Coordinate Plane

29 ANS:

$3x - 7 + x + 1 = 90$

$4x - 6 = 90$

$4x = 96$

$x = 24$

PTS: 2   REF: 062529geo   NAT: G.SRT.C.7   TOP: Cofunctions

30 ANS:

$40\pi\left(\dfrac{36}{360}\right) = 4\pi$

PTS: 2   REF: 062530geo   NAT: G.C.B.5   TOP: Arc Length

31 ANS:

$\dfrac{5.6}{6} = \dfrac{8.4}{9} \rightarrow 50.4 = 50.4$ $\dfrac{4}{6} = \dfrac{6}{9} \rightarrow 36 = 36$ $\dfrac{4}{5.6} = \dfrac{6}{8.4} \rightarrow 33.6 = 33.6$ The corresponding sides are proportional.

PTS: 2   REF: 062531geo   NAT: G.SRT.B.5   TOP: Similarity
KEY: basic

32 ANS:

The cone: 1) $4 \times 4 \times 7.5 = 120$; 2) $\pi(2.5)^2(6) \approx 118$; 3) $\dfrac{1}{3}\pi(3.75)^2(8.5) \approx 125$

PTS: 4   REF: 062532geo   NAT: G.GMD.A.3   TOP: Volume
KEY: cones

33 ANS:

$m_{\overline{MI}} = \dfrac{-3-3}{-1--3} = \dfrac{-6}{2} = -3$; $m_{\overline{KE}} = \dfrac{4--2}{5-7} = \dfrac{6}{-2} = -3$; $m_{\overline{IK}} = \dfrac{4-3}{5--3} = \dfrac{1}{8}$;

$m_{\overline{ME}} = \dfrac{-2--3}{7--1} = \dfrac{1}{8}$. Because opposite side of Quadrilateral *MIKE* have the same slope, the sides are parallel.

The opposite sides of a parallelogram are parallel, so *MIKE* is a parallelogram. $MI = \sqrt{6^2 + 2^2} = \sqrt{40}$;

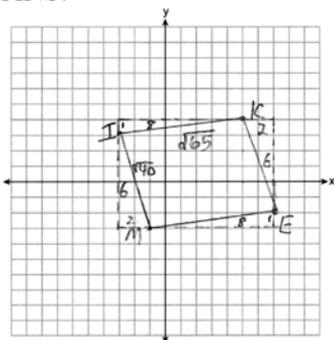$IK = \sqrt{8^2 + 1^2} = \sqrt{65}$. Because two sides of Quadrilateral *MIKE* have different lengths, they are not congruent. All the sides of a rhombus are congruent, so *MIKE* is not a rhombus.

PTS: 4   REF: 062533geo   NAT: G.GPE.B.4   TOP: Quadrilaterals in the Coordinate Plane

34 ANS:

$\sin 24 = \dfrac{4}{x}$. $\sin 11.6 = \dfrac{3}{y}$ No, because $9.8 + 14.9 > 20$.

$x \approx 9.8$ $y \approx 14.9$

PTS: 4   REF: 062534geo   NAT: G.SRT.C.8   TOP: Using Trigonometry to Find a Side

35 ANS:

1) Quadrilateral *CARI* with $\overline{CA} \cong \overline{RI}$ and $\overline{CI} \cong \overline{RA}$, and $\overline{AEI}$ and $\overline{LEH}$ are drawn (Given); 2) Quadrilateral *CARI* is a parallelogram (Opposite sides of a parallelogram are congruent); 3) $\overline{CA} \parallel \overline{RI}$ and $\overline{CI} \parallel \overline{RA}$ (Opposite sides of a parallelogram are parallel); 4) $\angle AHE \cong \angle ILE$ and $\angle HAE \cong \angle LIE$ (Parallel lines cut by a transversal create congruent alternate interior angles); 5) $\triangle HAE \sim \triangle LIE$ (AA); 6) $\dfrac{HA}{EH} = \dfrac{LI}{EL}$ (Corresponding sides of similar triangles are proportional); 7) $HA \bullet EL = LI \bullet EH$ (The product of the means equals the product of the extremes).

PTS: 6   REF: 062535geo   NAT: G.SRT.B.5   TOP: Quadrilateral Proofs

0825geo
Answer Section

1   ANS: 1   PTS: 2   REF: 082501geo   NAT: G.GMD.B.4
    TOP: Rotations of Two-Dimensional Objects

2   ANS: 3   PTS: 2   REF: 082502geo   NAT: G.CO.B.6
    TOP: Properties of Transformations

3   ANS: 2

$$\cos 38 = \frac{x}{31.8}$$

$$x \approx 25.1$$

    PTS: 2   REF: 082503geo   NAT: G.SRT.C.8   TOP: Using Trigonometry to Find a Side

4   ANS: 3

$$V = \frac{1}{2} \times \frac{4}{3}\pi \cdot (8)^3 \approx 1072$$

    PTS: 2   REF: 082504geo   NAT: G.GMD.A.3   TOP: Volume
    KEY: spheres

5   ANS: 4   PTS: 2   REF: 082505geo   NAT: G.CO.C.11
    TOP: Special Quadrilaterals

6   ANS: 4
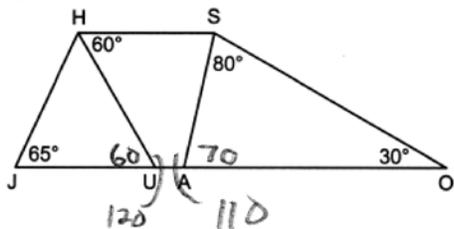
    PTS: 2   REF: 082506geo   NAT: G.CO.C.11   TOP: Interior and Exterior Angles of Polygons

7   ANS: 2

$$\frac{4}{6} = \frac{12}{x}$$

$$4x = 72$$

$$x = 18$$

    PTS: 2   REF: 082507geo   NAT: G.SRT.B.4   TOP: Side Splitter Theorem

8   ANS: 1   PTS: 2   REF: 082508geo   NAT: G.GPE.A.1
    TOP: Equations of Circles   KEY: write equation, given graph

9   ANS: 3   PTS: 2   REF: 082509geo   NAT: G.CO.A.2
    TOP: Identifying Transformations   KEY: graphics

10 ANS: 3

$17x = 22 \cdot 10$

$x \approx 12.9$

PTS: 2   REF: 082510geo   NAT: G.C.A.2   TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

11 ANS: 4   PTS: 2   REF: 082511geo   NAT: G.CO.C.10
TOP: Interior and Exterior Angles of Triangles

12 ANS: 3

The slope of line h is $\frac{2}{3}$. The perpendicular slope is $-\frac{3}{2}$.

PTS: 2   REF: 082512geo   NAT: G.GPE.B.5   TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

13 ANS: 1

$\frac{1}{3}(8.2)^2(17.4)(0.77) \approx 300$

PTS: 2   REF: 082513geo   NAT: G.MG.A.2   TOP: Density

14 ANS: 2

$3x - 5 = 2(x + 3)$

$3x - 5 = 2x + 6$

$x = 11$

PTS: 2   REF: 082514geo   NAT: G.CO.C.10   TOP: Midsegments

15 ANS: 3

$x^2 + x^2 = (10\sqrt{2})^2$

$2x^2 = 200$

$x^2 = 100$

$x = 10$

PTS: 2   REF: 082515geo   NAT: G.SRT.C.8   TOP: Special Right Triangles

16 ANS: 3

$K = \frac{1}{2}(8)(9)\sin 55 \approx 29$

PTS: 2   REF: 082516geo   NAT: G.SRT.D.9   TOP: Using Trigonometry to Find Area
KEY: basic

17 ANS: 2

$x_0 = \dfrac{kx_1 - x_2}{k - 1} = \dfrac{2(3) - 4}{2 - 1} = 2 \quad y_0 = \dfrac{ky_1 - y_2}{k - 1} = \dfrac{2(3) - 5}{2 - 1} = 1$

PTS: 2   REF: 082517geo   NAT: G.SRT.A.2   TOP: Dilations

18 ANS: 4

$$4 + 8 + \sqrt{4^2 + 8^2} = 12 + \sqrt{80} = 12 + 4\sqrt{5}$$

PTS: 2   REF: 082518geo   NAT: G.GPE.B.7   TOP: Polygons in the Coordinate Plane

19 ANS: 4   PTS: 2   REF: 082519geo   NAT: G.SRT.B.5

TOP: Similarity   KEY: basic

20 ANS: 2

$$\frac{10 \cdot 4 \cdot \frac{1}{3}}{0.6} \approx 22.2$$

PTS: 2   REF: 082520geo   NAT: G.GMD.A.3   TOP: Volume

KEY: prisms

21 ANS: 1

$$4x - 6y = 24$$

$$-6y = -4x + 24$$

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

PTS: 2   REF: 082521geo   NAT: G.SRT.A.1   TOP: Line Dilations

22 ANS: 1   PTS: 2   REF: 082522geo   NAT: G.CO.A.3

TOP: Mapping a Polygon onto Itself

23 ANS: 2

$$\frac{x}{20} = \frac{15}{25}$$

$$25x = 300$$

$$x = 12$$

PTS: 2   REF: 082523geo   NAT: G.SRT.B.4   TOP: Similarity

24 ANS: 1

$$\left(\frac{\sqrt{36}}{2}\right)^2 = 9$$

PTS: 2   REF: 082524geo   NAT: G.SRT.B.5   TOP: Similarity

KEY: perimeter and area

25 ANS:

Translations preserve distance.

PTS: 2   REF: 082525geo   NAT: G.CO.B.6   TOP: Properties of Transformations

26 ANS:

$$\frac{982.5}{5^3} = 7.86 \text{ Iron}$$

PTS: 2   REF: 082526geo   NAT: G.MG.A.2   TOP: Density

27 ANS:

$-3 + \dfrac{3}{5}(7 - -3) = -3 + \dfrac{3}{5}(10) = -3 + 6 = 3$ $1 + \dfrac{3}{5}(6 - 1) = 1 + \dfrac{3}{5}(5) = 1 + 3 = 4$ $(3,4)$

PTS: 2　　　REF: 082527geo　　NAT: G.GPE.B.6　　TOP: Directed Line Segments

28 ANS:

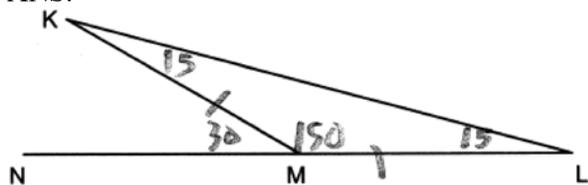$\sin 4.8 = \dfrac{.6}{x}$

$\quad x \approx 7.2$

PTS: 2　　　REF: 082528geo　　NAT: G.SRT.C.8　　TOP: Using Trigonometry to Find a Side

29 ANS:

PTS: 2　　　REF: 082529geo　　NAT: G.CO.C.10　　TOP: Exterior Angle Theorem

30 ANS:

$\dfrac{7.5\pi}{25\pi} \cdot 360 = 108$
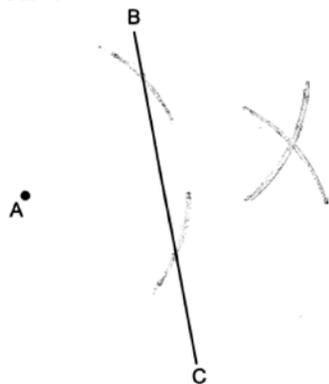
PTS: 2　　　REF: 082530geo　　NAT: G.C.B.5　　TOP: Sectors

31 ANS:

PTS: 2　　　REF: 082531geo　　NAT: G.CO.D.12　　TOP: Constructions
KEY: line bisector

32 ANS:

$\dfrac{75000}{\pi(10)^2(26)} \approx 9$

PTS: 4　　　REF: 082532geo　　NAT: G.GMD.A.3　TOP: Volume
KEY: cylinders

33 ANS:

$\tan 50 = \dfrac{12}{x}$ $10 + 3 = 13$ $\tan \theta = \dfrac{12}{13}$
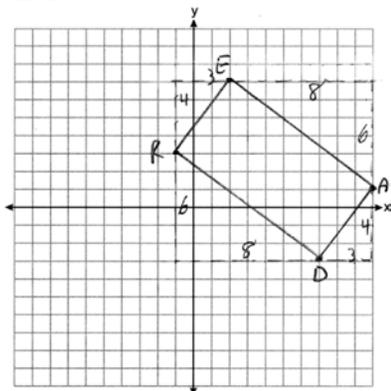
$x \approx 10$ $\theta \approx 43$

PTS: 4   REF: 082533geo   NAT: G.SRT.C.8   TOP: Using Trigonometry to Find an Angle

34 ANS:

$m_{\overline{RE}} = \dfrac{4}{3}$ $m_{\overline{EA}} = -\dfrac{6}{8} = -\dfrac{3}{4}$ $m_{\overline{AD}} = \dfrac{4}{3}$ $m_{\overline{DR}} = -\dfrac{6}{8} = -\dfrac{3}{4}$ Adjacent sides have

slopes that are opposite reciprocals, so are perpendicular. Perpendicular lines form right angles. A quadrilateral with four right angles is a rectangle.

PTS: 4   REF: 082534geo   NAT: G.GPE.B.4   TOP: Quadrilaterals in the Coordinate Plane

35 ANS:

1) Quadrilateral $ABCD$, side $\overline{CD}$ is extended through D to point E such that $\overline{AFD}$ and $\overline{BFE}$ bisect each other, and $\overline{DE} \cong \overline{DC}$ (given); 2) $\overline{FE} \cong \overline{FB}$ and $\overline{FD} \cong \overline{FA}$ (bisected lines form two congruent segments); 3) $\angle EFD \cong \angle BFA$ (vertical angles are congruent); 4) $\triangle EFD \cong \triangle BFA$ (SAS); 5) $\overline{AB} \cong \overline{DE}, \angle E \cong \angle ABF$ (CPCTC); 6) $\overline{AB} \cong \overline{DC}$ (Substitution); 7) $\overline{AB} \parallel \overline{DC}$ (if the alternate interior angles formed by a transversal crossing two lines are congruent, the lines are parallel); 8) $ABCD$ is a parallelogram (if a pair of opposite sides of a quadrilateral are parallel and congruent, it is a parallelogram).

PTS: 6   REF: 082535geo   NAT: G.SRT.B.5   TOP: Quadrilateral Proofs