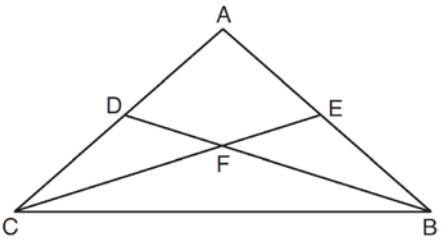
0815ge

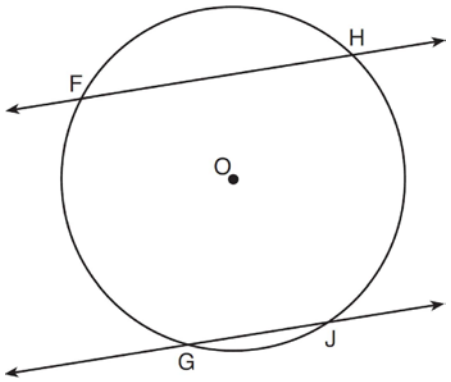
1 In $\triangle ABC$ shown below with $\overline{ADC}$, $\overline{AEB}$, $\overline{CFE}$, and $\overline{BFD}$, $\triangle ACE \cong \triangle ABD$.



Which statement must be true?
1) $\angle ACF \cong \angle BCF$
2) $\angle DAE \cong \angle DFE$
3) $\angle BCD \cong \angle ABD$
4) $\angle AEF \cong \angle ADF$

2 In a circle whose equation is $(x-1)^2 + (y+3)^2 = 9$, the coordinates of the center and length of its radius are
1) $(1,-3)$ and $r = 81$
2) $(-1,3)$ and $r = 81$
3) $(1,-3)$ and $r = 3$
4) $(-1,3)$ and $r = 3$

3 Parallel secants $\overleftrightarrow{FH}$ and $\overleftrightarrow{GJ}$ intersect circle O, as shown in the diagram below.

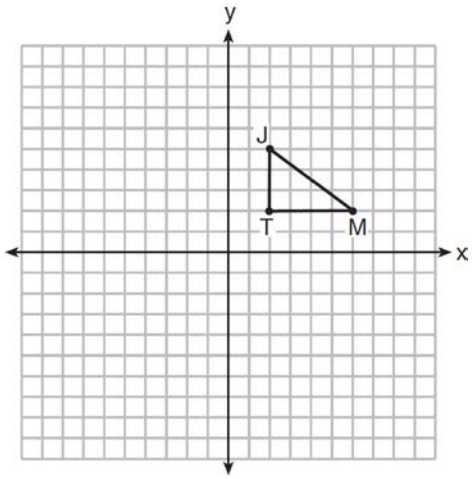


If $m\overset{\frown}{FH} = 106$ and $m\overset{\frown}{GJ} = 24$, then $m\overset{\frown}{FG}$ equals
1) 106
2) 115
3) 130
4) 156

4 What are the coordinates of P', the image of point $P(x,y)$ after translation $T_{4,4}$?
1) $(x-4, y-4)$
2) $(x+4, y+4)$
3) $(4x, 4y)$
4) $(4,4)$

5 The statement "$x > 5$ or $x < 3$" is *false* when x is equal to
1) 1
2) 2
3) 7
4) 4

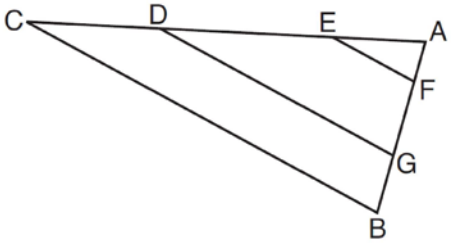
6 Triangle JTM is shown on the graph below.



Which transformation would result in an image that is *not* congruent to $\triangle JTM$?

1) $r_{y=x}$
2) $R_{90°}$
3) $T_{0,-3}$
4) D_2

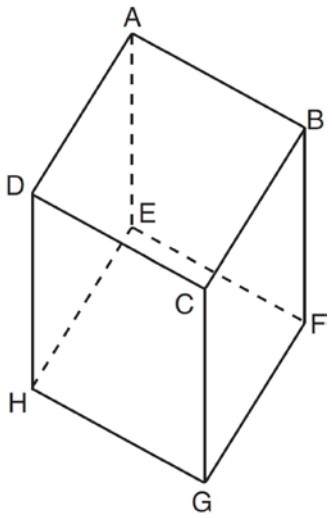
7 In the diagram below of $\triangle ABC$, with $\overline{CDEA}$ and $\overline{BGFA}$, $\overline{EF} \parallel \overline{DG} \parallel \overline{CB}$.



Which statement is *false*?

1) $\frac{AC}{AD} = \frac{AB}{AG}$
2) $\frac{AE}{AF} = \frac{AC}{AB}$
3) $\frac{AE}{AD} = \frac{EC}{AC}$
4) $\frac{BG}{BA} = \frac{CD}{CA}$

8 Which pair of edges is *not* coplanar in the cube shown below?



1) $\overline{EH}$ and $\overline{CD}$
2) $\overline{AD}$ and $\overline{FG}$
3) $\overline{DH}$ and $\overline{AE}$
4) $\overline{AB}$ and $\overline{EF}$

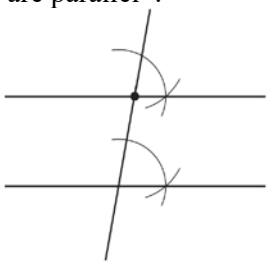
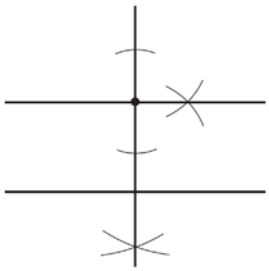
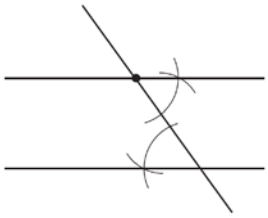
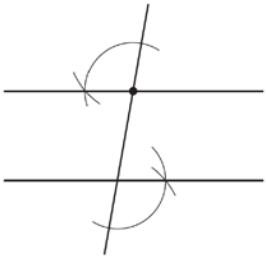
9 What is an equation of the line that passes through the point $(-2, 1)$ and is parallel to the line whose equation is $4x - 2y = 8$?

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

10 In $\triangle JKL$, $\overline{JL} \cong \overline{KL}$. If $m\angle J = 58$, then $m\angle L$ is

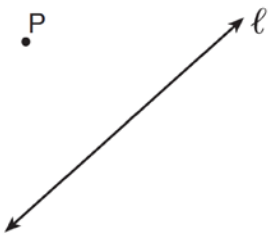
1) 61
2) 64
3) 116
4) 122

11 The corresponding medians of two similar triangles are 8 and 20. If the perimeter of the larger triangle is 45, what is the perimeter of the *smaller* triangle?
1) 14
2) 18
3) 33
4) 37

12 Which construction of parallel lines is justified by the theorem "If two lines are cut by a transversal to form congruent alternate interior angles, then the lines are parallel"?
1) 
2) 
3) 
4) 

13 Given: "If a polygon is a triangle, then the sum of its interior angles is 180°." What is the contrapositive of this statement?
1) "If the sum of the interior angles of a polygon is not 180°, then it is not a triangle."
2) "A polygon is a triangle if and only if the sum of its interior angles is 180°."
3) "If a polygon is not a triangle, then the sum of the interior angles is not 180°."
4) "If the sum of the interior angles of a polygon is 180°, then it is a triangle."

14 In the diagram below, point P is not on line ℓ.



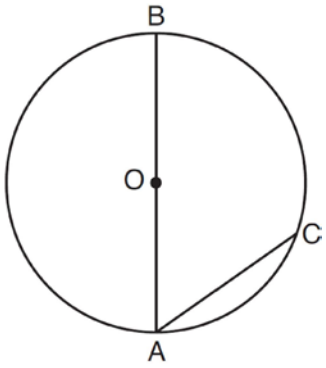
How many distinct planes that contain point P are also perpendicular to line ℓ?
1) 1
2) 2
3) 0
4) an infinite amount

15 The image of $\triangle ABC$ after the transformation $r_{y-\text{axis}}$ is $\triangle A'B'C'$. Which property is *not* preserved?
1) distance
2) orientation
3) collinearity
4) angle measure

16 The equations $y = 2x + 3$ and $y = -x^2 - x + 1$ are graphed on the same set of axes. The coordinates of a point in the solution of this system of equations are
1) $(0,1)$
2) $(1,5)$
3) $(-1,-2)$
4) $(-2,-1)$

17 Which quadrilateral has diagonals that are always perpendicular bisectors of each other?
1) square
2) rectangle
3) trapezoid
4) parallelogram

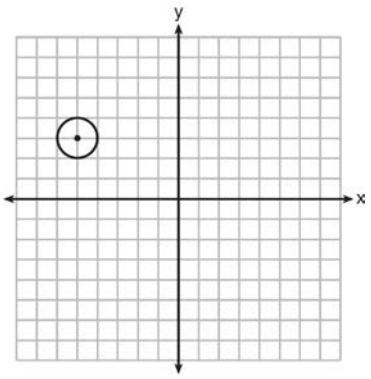
18 As shown in the diagram below, $\overline{AB}$ is a diameter of circle O, and chord $\overline{AC}$ is drawn.



If $m\angle BAC = 70$, then $m\overset{\frown}{AC}$ is
1) 40
2) 70
3) 110
4) 140

19 In parallelogram $JKLM$, $m\angle L$ exceeds $m\angle M$ by 30 degrees. What is the measure of $m\angle J$?
1) 75°
2) 105°
3) 165°
4) 195°

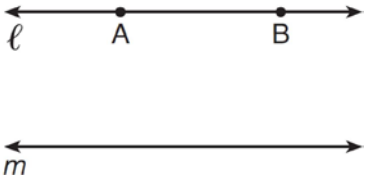
20 Which equation represents the circle shown in the graph below?



1) $(x-5)^2 + (y+3)^2 = 1$
2) $(x+5)^2 + (y-3)^2 = 1$
3) $(x-5)^2 + (y+3)^2 = 2$
4) $(x+5)^2 + (y-3)^2 = 2$

21 What is the measure of each interior angle in a regular octagon?
1) 108°
2) 135°
3) 144°
4) 1080°

22 Points A and B are on line ℓ, and line ℓ is parallel to line m, as shown in the diagram below.

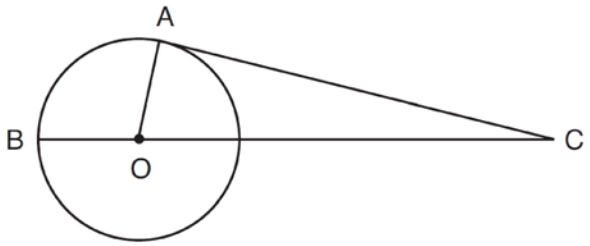


How many points are in the same plane as ℓ and m and equidistant from ℓ and m, and also equidistant from A and B?
1) 1
2) 2
3) 3
4) 0

23 A carpenter made a storage container in the shape of a rectangular prism. It is 5 feet high and has a volume of 720 cubic feet. He wants to make a second container with the same height and volume as the first one, but in the shape of a triangular prism. What will be the number of square feet in the area of the base of the new container?
1) 36
2) 72
3) 144
4) 288

24 In $\triangle ABC$, $m\angle B < m\angle A < m\angle C$. Which statement is *false*?
1) $AC > BC$
2) $BC > AC$
3) $AC < AB$
4) $BC < AB$

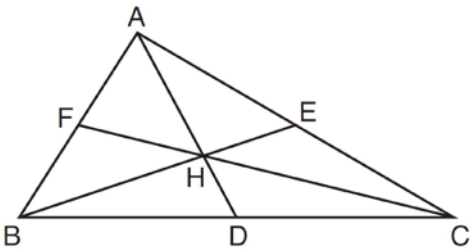
25 In the diagram below of circle O with radius $\overline{OA}$, tangent $\overline{CA}$ and secant $\overline{COB}$ are drawn.



(Not drawn to scale)

If $AC = 20$ cm and $OA = 7$ cm, what is the length of $\overline{OC}$, to the *nearest centimeter*?
1) 19
2) 20
3) 21
4) 27

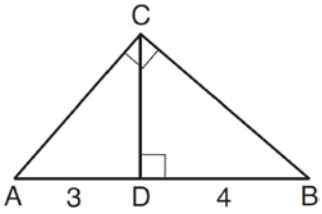
26 In the diagram below of $\triangle ABC$, point H is the intersection of the three medians.



If $\overline{DH}$ measures 2.4 centimeters, what is the length, in centimeters, of $\overline{AD}$?
1) 3.6
2) 4.8
3) 7.2
4) 9.6

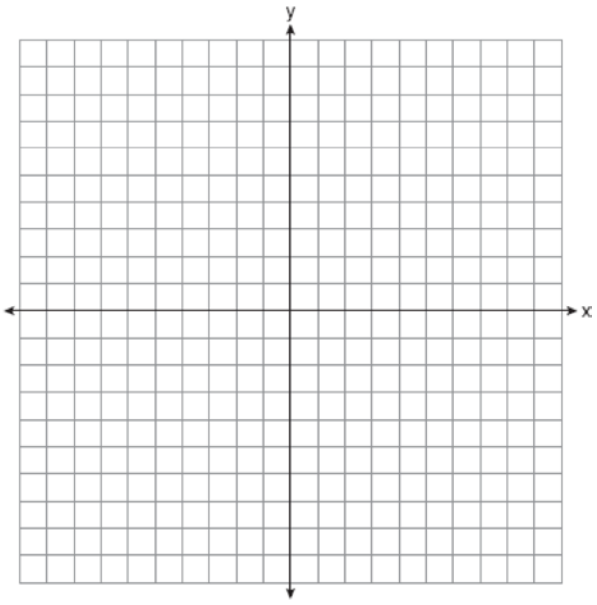
27 Which set of numbers could be the lengths of the sides of an isosceles triangle?
1) $\{1,1,2\}$
2) $\{3,3,5\}$
3) $\{3,4,5\}$
4) $\{4,4,9\}$

28 In the diagram below of right triangle ABC, $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$, $AD = 3$, and $DB = 4$.



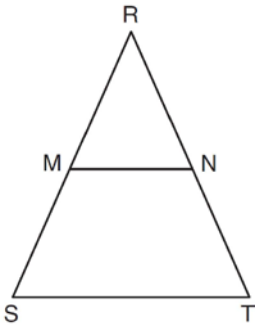
What is the length of $\overline{CB}$?
1) $2\sqrt{3}$
2) $\sqrt{21}$
3) $2\sqrt{7}$
4) $4\sqrt{3}$

29 The image of $\overline{RS}$ after a reflection through the origin is $\overline{R'S'}$. If the coordinates of the endpoints of $\overline{RS}$ are $R(2,-3)$ and $S(5,1)$, state and label the coordinates of R' and S'. [The use of the set of axes below is optional.]

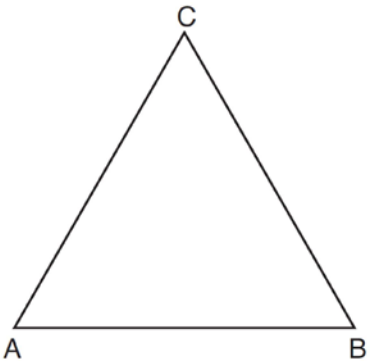


30 A paper container in the shape of a right circular cone has a radius of 3 inches and a height of 8 inches. Determine and state the number of cubic inches in the volume of the cone, in terms of π.

31 In isosceles triangle RST shown below, $\overline{RS} \cong \overline{RT}$, M and N are midpoints of $\overline{RS}$ and $\overline{RT}$, respectively, and $\overline{MN}$ is drawn. If $MN = 3.5$ and the perimeter of $\triangle RST$ is 25, determine and state the length of $\overline{NT}$.



32 In the diagram below, $\triangle ABC$ is equilateral.

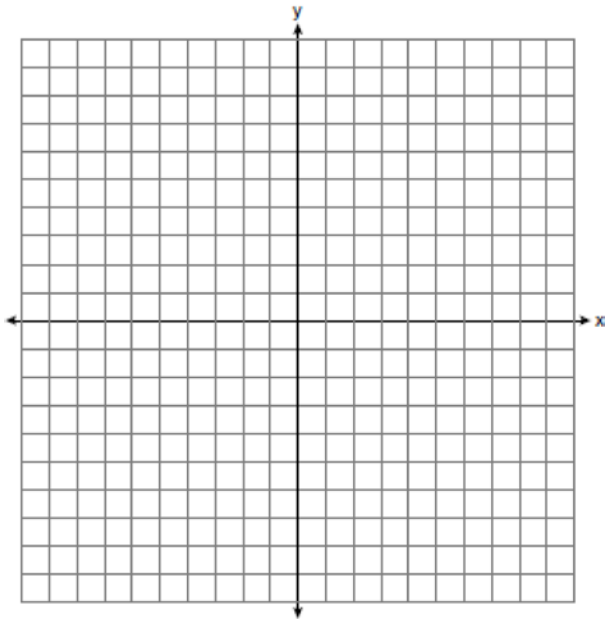


Using a compass and straightedge, construct a new equilateral triangle congruent to $\triangle ABC$ in the space below. [Leave all construction marks.]

33 Write an equation of the line that is perpendicular to the line whose equation is $2y = 3x + 12$ and that passes through the origin.

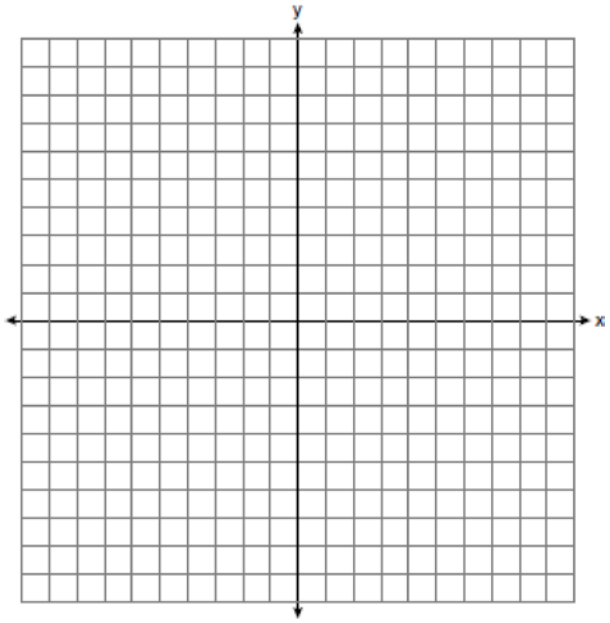
34 Rectangle $KLMN$ has vertices $K(0,4)$, $L(4,2)$, $M(1,-4)$, and $N(-3,-2)$. Determine and state the coordinates of the point of intersection of the diagonals.

35 On the set of axes below, graph the locus of points 5 units from the point $(2,-3)$ and the locus of points 2 units from the line whose equation is $y=-1$. State the coordinates of all points that satisfy *both* conditions.

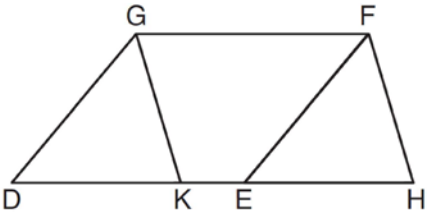


36 If $\overline{AB}$ is defined by the endpoints $A(4,2)$ and $B(8,6)$, write an equation of the line that is the perpendicular bisector of $\overline{AB}$.

37 On the set of axes below, graph and label circle A whose equation is $(x+4)^2+(y-2)^2=16$ and circle B whose equation is $x^2+y^2=9$. Determine, in simplest radical form, the length of the line segment with endpoints at the centers of circles A and B.



38 Given: Parallelogram $DEFG$, K and H are points on $\overrightarrow{DE}$ such that $\angle DGK \cong \angle EFH$ and $\overline{GK}$ and $\overline{FH}$ are drawn.



Prove: $\overline{DK} \cong \overline{EH}$

0815ge
Answer Section

1 ANS: 4 PTS: 2 REF: 081501ge STA: G.G.29
TOP: Triangle Congruency

2 ANS: 3 PTS: 2 REF: 081502ge STA: G.G.73
TOP: Equations of Circles

3 ANS: 2

Parallel secants intercept congruent arcs. $\frac{360-(106+24)}{2}=\frac{230}{2}=115$

PTS: 2 REF: 081503ge STA: G.G.52 TOP: Chords and Secants

4 ANS: 2 PTS: 2 REF: 081504ge STA: G.G.61
TOP: Analytical Representations of Transformations

5 ANS: 4 PTS: 2 REF: 081505ge STA: G.G.25
TOP: Compound Statements KEY: disjunction

6 ANS: 4 PTS: 2 REF: 081506ge STA: G.G.59
TOP: Properties of Transformations

7 ANS: 3 PTS: 2 REF: 081507ge STA: G.G.46
TOP: Side Splitter Theorem

8 ANS: 1 PTS: 2 REF: 081508ge STA: G.G.10
TOP: Solids

9 ANS: 3

$m=\frac{-A}{B}=\frac{-4}{-2}=2$ $y=mx+b$

$1=2(-2)+b$

$1=-4+b$

$5=b$

PTS: 2 REF: 081509ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

10 ANS: 2

$180-2(58)=64$

PTS: 2 REF: 081510ge STA: G.G.31 TOP: Isosceles Triangle Theorem

11 ANS: 2

$45\cdot\frac{8}{20}=18$

PTS: 2 REF: 081511ge STA: G.G.45 TOP: Similarity
KEY: perimeter and area

12 ANS: 3 PTS: 2 REF: 081512ge STA: G.G.19
TOP: Constructions

13 ANS: 1 PTS: 2 REF: 081513ge STA: G.G.26
TOP: Contrapositive

14 ANS: 1 PTS: 2 REF: 081514ge STA: G.G.2
TOP: Planes

15 ANS: 2 PTS: 2 REF: 081515ge STA: G.G.55
TOP: Properties of Transformations

16 ANS: 4

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

$x^2 + 3x + 2 = 0$

$(x + 2)(x + 1) = 0$

$x = -2, -1$

PTS: 2 REF: 081516ge STA: G.G.70 TOP: Quadratic-Linear Systems

17 ANS: 1 PTS: 2 REF: 081517ge STA: G.G.41
TOP: Special Quadrilaterals

18 ANS: 1 PTS: 2 REF: 081518ge STA: G.G.51
TOP: Arcs Determined by Angles KEY: inscribed

19 ANS: 2

$L + L - 30 = 180$

$2L = 210$

$L = 105$

PTS: 2 REF: 081519ge STA: G.G.38 TOP: Parallelograms

20 ANS: 2 PTS: 2 REF: 081520ge STA: G.G.72
TOP: Equations of Circles

21 ANS: 2

$(n - 2)180 = (8 - 2)180 = 1080. \quad \frac{1080}{8} = 135.$

PTS: 2 REF: 081521ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

22 ANS: 1 PTS: 2 REF: 081522ge STA: G.G.22
TOP: Locus

23 ANS: 3

$720 = 5B$

$144 = B$

PTS: 2 REF: 081523ge STA: G.G.11 TOP: Volume

24 ANS: 1 PTS: 2 REF: 081524ge STA: G.G.34
TOP: Angle Side Relationship

25 ANS: 3

$\sqrt{20^2 + 7^2} \approx 21$

PTS: 2 REF: 081525ge STA: G.G.50 TOP: Tangents
KEY: point of tangency

26 ANS: 3

$2.4 + 2(2.4) = 7.2$

PTS: 2 REF: 081526ge STA: G.G.43 TOP: Centroid

27 ANS: 2 PTS: 2 REF: 081527ge STA: G.G.33
TOP: Triangle Inequality Theorem

28 ANS: 3

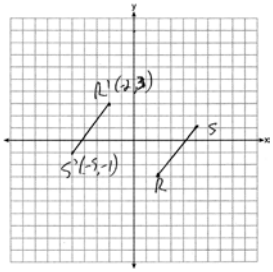
$x^2 = 4 \cdot 7$

$x = \sqrt{4} \cdot \sqrt{7}$

$x = 2\sqrt{7}$

PTS: 2 REF: 081528ge STA: G.G.47 TOP: Similarity
KEY: leg

29 ANS:



PTS: 2 REF: 081529ge STA: G.G.54 TOP: Reflections
KEY: grids

30 ANS:

$V = \frac{1}{3}\pi(3^2)(8) = 24\pi$

PTS: 2 REF: 081530ge STA: G.G.15 TOP: Volume and Lateral Area

31 ANS:

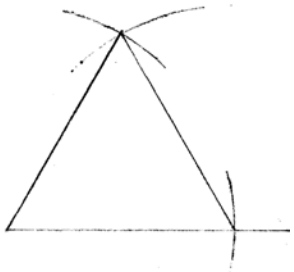
$2x + 7 = 25 \quad NT = 4.5$

$2x = 18$

$x = 9$

PTS: 2 REF: 081531ge STA: G.G.42 TOP: Midsegments

32 ANS:



PTS: 2 REF: 081532ge STA: G.G.20 TOP: Constructions

33 ANS:

$m = \frac{3}{2}; m_{\perp} = -\frac{2}{3} \quad y = -\frac{2}{3}x$

PTS: 2 REF: 081533ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

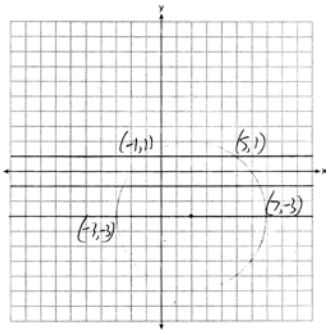
34 ANS:

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

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

PTS: 2 REF: 081534ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

35 ANS:



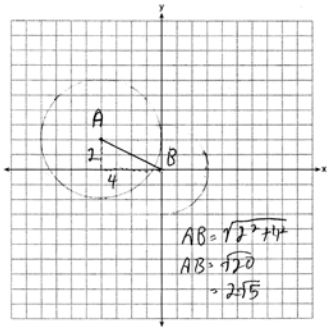
PTS: 4 REF: 081535ge STA: G.G.23 TOP: Locus

36 ANS:

$M = \left(\frac{4+8}{2}, \frac{2+6}{2}\right) = (6,4) \quad m = \frac{6-2}{8-4} = \frac{4}{4} = 1 \quad m_{\perp} = -1 \quad y - 4 = -(x-6)$

PTS: 4 REF: 081536ge STA: G.G.68 TOP: Perpendicular Bisector

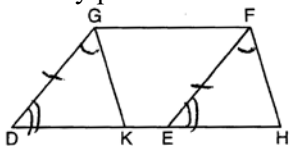
37 ANS:



PTS: 4 REF: 081537ge STA: G.G.74 TOP: Graphing Circles

38 ANS:

Parallelogram $DEFG$, K and H are points on $\overleftrightarrow{DE}$ such that $\angle DGK \cong \angle EFH$ and $\overline{GK}$ and $\overline{FH}$ are drawn (given). $\overline{DG} \cong \overline{EF}$ (opposite sides of a parallelogram are congruent). $\overline{DG} \parallel \overline{EF}$ (opposite sides of a parallelogram are parallel). $\angle D \cong \angle FEH$ (corresponding angles formed by parallel lines and a transversal are congruent).



$\triangle DGK \cong \triangle EFH$ (ASA). $\overline{DK} \cong \overline{EH}$ (CPCTC).

PTS: 6 REF: 081538ge STA: G.G.27 TOP: Quadrilateral Proofs