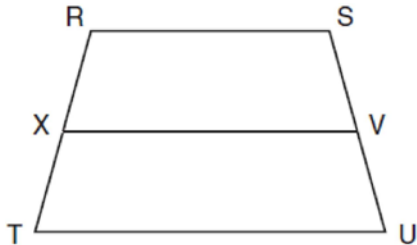


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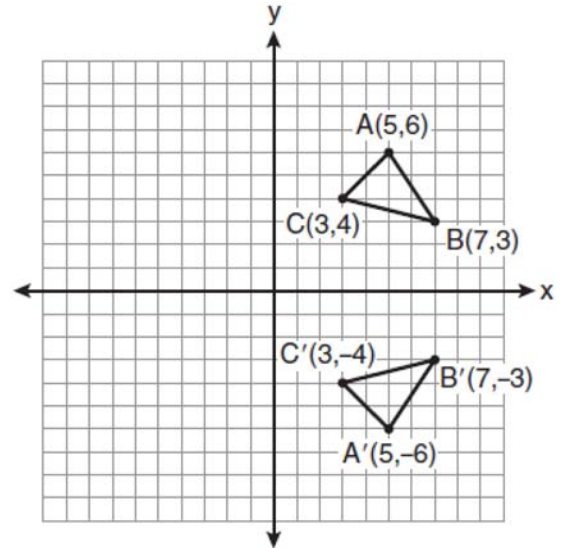
- 1 In the diagram below of trapezoid $RSUT$, $\overline{RS} \parallel \overline{TU}$, X is the midpoint of \overline{RT} , and V is the midpoint of \overline{SU} .



If $RS = 30$ and $XV = 44$, what is the length of \overline{TU} ?

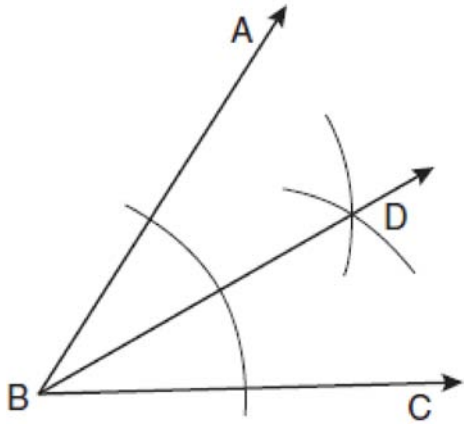
- 1) 37
 - 2) 58
 - 3) 74
 - 4) 118
- 2 In $\triangle ABC$, $m\angle A = x$, $m\angle B = 2x + 2$, and $m\angle C = 3x + 4$. What is the value of x ?
- 1) 29
 - 2) 31
 - 3) 59
 - 4) 61

- 3 Which expression best describes the transformation shown in the diagram below?



- 1) same orientation; reflection
- 2) opposite orientation; reflection
- 3) same orientation; translation
- 4) opposite orientation; translation

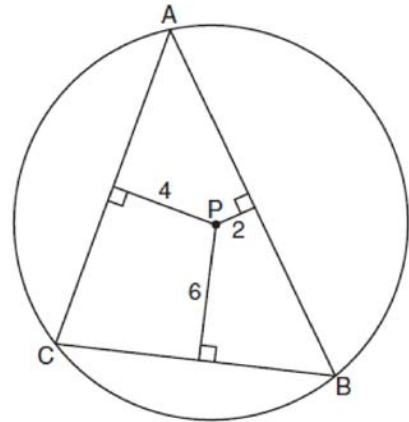
- 4 Based on the construction below, which statement must be true?



Which statement is *not* true?

- 1) $m\angle ABD = \frac{1}{2} m\angle CBD$
- 2) $m\angle ABD = m\angle CBD$
- 3) $m\angle ABD = m\angle ABC$
- 4) $m\angle CBD = \frac{1}{2} m\angle ABD$

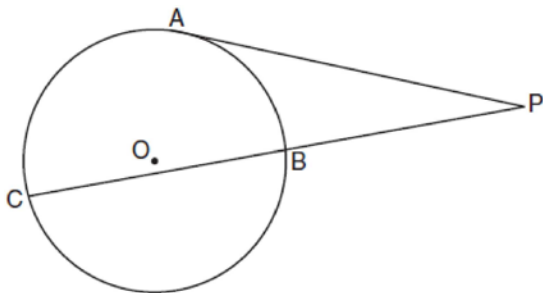
- 5 In the diagram below, $\triangle ABC$ is inscribed in circle P . The distances from the center of circle P to each side of the triangle are shown.



Which statement about the sides of the triangle is true?

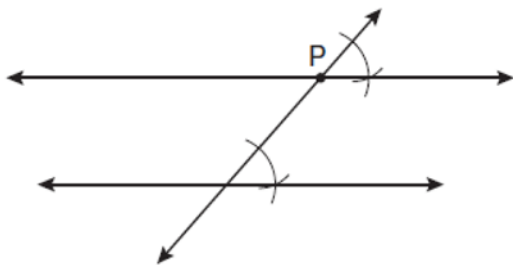
- 1) $AB > AC > BC$
 - 2) $AB < AC$ and $AC > BC$
 - 3) $AC > AB > BC$
 - 4) $AC = AB$ and $AB > BC$
- 6 Which transformation is *not* always an isometry?
- 1) rotation
 - 2) dilation
 - 3) reflection
 - 4) translation
- 7 In $\triangle ABC$, $\overline{AB} \cong \overline{BC}$. An altitude is drawn from B to \overline{AC} and intersects \overline{AC} at D . Which conclusion is *not* always true?
- 1) $\angle ABD \cong \angle CBD$
 - 2) $\angle BDA \cong \angle BDC$
 - 3) $\overline{AD} \cong \overline{BD}$
 - 4) $\overline{AD} \cong \overline{DC}$

- 8 In the diagram below, tangent \overline{PA} and secant \overline{PBC} are drawn to circle O from external point P .



If $PB = 4$ and $BC = 5$, what is the length of \overline{PA} ?

- 1) 20
 - 2) 9
 - 3) 8
 - 4) 6
- 9 Which geometric principle is used to justify the construction below?



- 1) A line perpendicular to one of two parallel lines is perpendicular to the other.
- 2) Two lines are perpendicular if they intersect to form congruent adjacent angles.
- 3) When two lines are intersected by a transversal and alternate interior angles are congruent, the lines are parallel.
- 4) When two lines are intersected by a transversal and the corresponding angles are congruent, the lines are parallel.

- 10 Which equation represents the circle whose center is $(-2,3)$ and whose radius is 5?

- 1) $(x-2)^2 + (y+3)^2 = 5$
- 2) $(x+2)^2 + (y-3)^2 = 5$
- 3) $(x+2)^2 + (y-3)^2 = 25$
- 4) $(x-2)^2 + (y+3)^2 = 25$

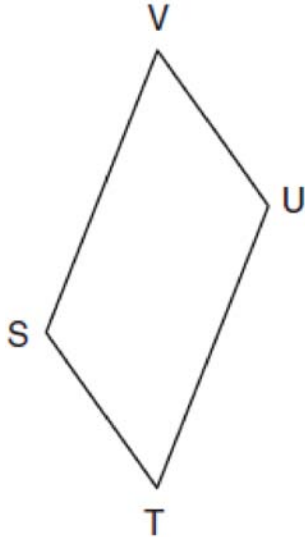
- 11 Towns A and B are 16 miles apart. How many points are 10 miles from town A and 12 miles from town B ?

- 1) 1
- 2) 2
- 3) 3
- 4) 0

- 12 Lines j and k intersect at point P . Line m is drawn so that it is perpendicular to lines j and k at point P . Which statement is correct?

- 1) Lines j and k are in perpendicular planes.
- 2) Line m is in the same plane as lines j and k .
- 3) Line m is parallel to the plane containing lines j and k .
- 4) Line m is perpendicular to the plane containing lines j and k .

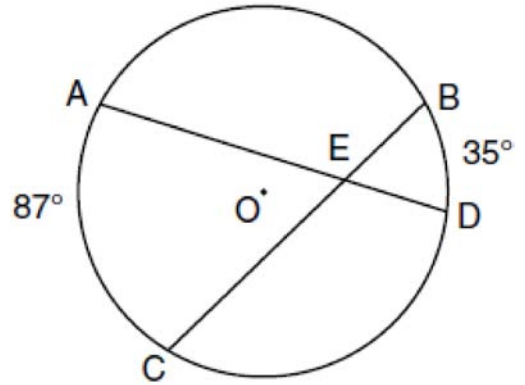
- 13 In the diagram below of parallelogram $STUV$, $SV = x + 3$, $VU = 2x - 1$, and $TU = 4x - 3$.



What is the length of \overline{SV} ?

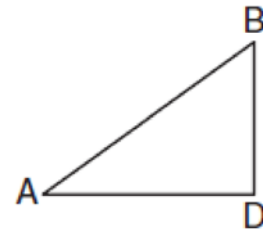
- 1) 5
 - 2) 2
 - 3) 7
 - 4) 4
- 14 Which equation represents a line parallel to the line whose equation is $2y - 5x = 10$?
- 1) $5y - 2x = 25$
 - 2) $5y + 2x = 10$
 - 3) $4y - 10x = 12$
 - 4) $2y + 10x = 8$

- 15 In the diagram below of circle O , chords \overline{AD} and \overline{BC} intersect at E , $m\widehat{AC} = 87$, and $m\widehat{BD} = 35$.



What is the degree measure of $\angle CEA$?

- 1) 87
 - 2) 61
 - 3) 43.5
 - 4) 26
- 16 In the diagram below of $\triangle ADB$, $m\angle BDA = 90$, $AD = 5\sqrt{2}$, and $AB = 2\sqrt{15}$.



What is the length of \overline{BD} ?

- 1) $\sqrt{10}$
- 2) $\sqrt{20}$
- 3) $\sqrt{50}$
- 4) $\sqrt{110}$

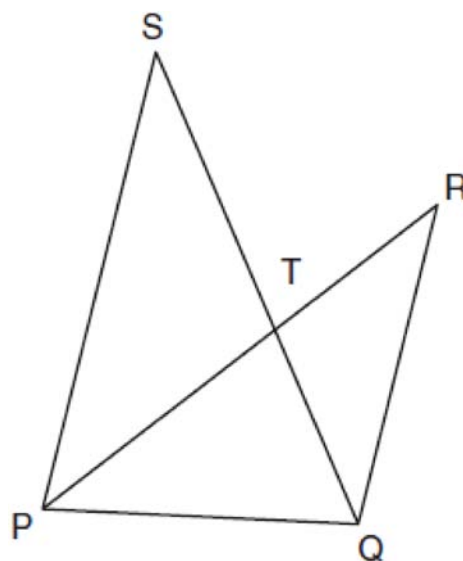
17 What is the distance between the points $(-3,2)$ and $(1,0)$?

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

18 What is an equation of the line that contains the point $(3,-1)$ and is perpendicular to the line whose equation is $y = -3x + 2$?

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

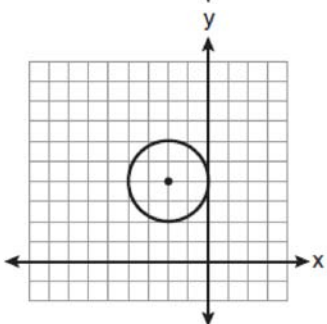
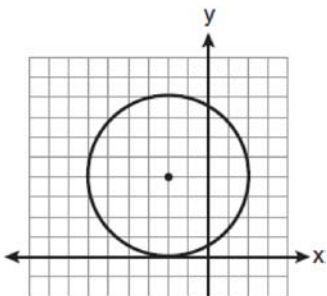
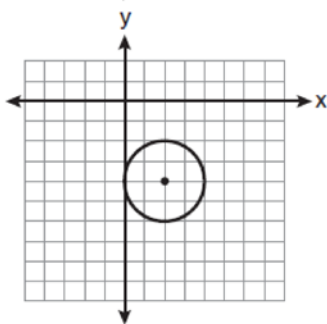
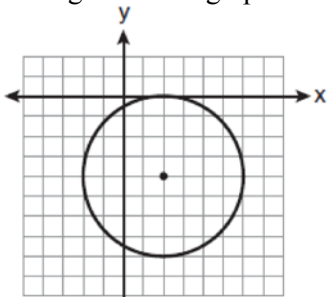
19 In the diagram below, \overline{SQ} and \overline{PR} intersect at T , \overline{PQ} is drawn, and $\overline{PS} \parallel \overline{QR}$.



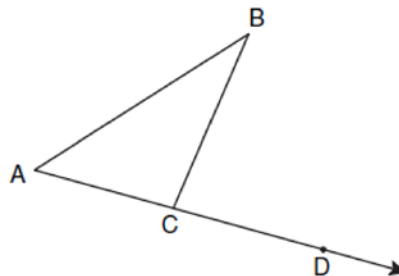
What technique can be used to prove that $\triangle PST \sim \triangle RQT$?

- 1) SAS
- 2) SSS
- 3) ASA
- 4) AA

- 20 The equation of a circle is $(x - 2)^2 + (y + 4)^2 = 4$. Which diagram is the graph of the circle?



- 21 In the diagram below, $\triangle ABC$ is shown with \overline{AC} extended through point D .



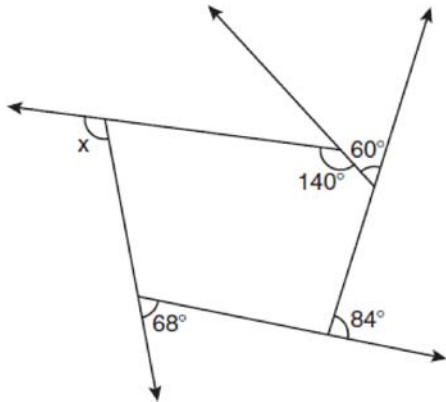
If $m\angle BCD = 6x + 2$, $m\angle BAC = 3x + 15$, and $m\angle ABC = 2x - 1$, what is the value of x ?

- 1) 12
- 2) $14\frac{10}{11}$
- 3) 16
- 4) $18\frac{1}{9}$

- 22 Given $\triangle ABC \sim \triangle DEF$ such that $\frac{AB}{DE} = \frac{3}{2}$. Which statement is *not* true?

- 1) $\frac{BC}{EF} = \frac{3}{2}$
- 2) $\frac{m\angle A}{m\angle D} = \frac{3}{2}$
- 3) $\frac{\text{area of } \triangle ABC}{\text{area of } \triangle DEF} = \frac{9}{4}$
- 4) $\frac{\text{perimeter of } \triangle ABC}{\text{perimeter of } \triangle DEF} = \frac{3}{2}$

- 23 The pentagon in the diagram below is formed by five rays.

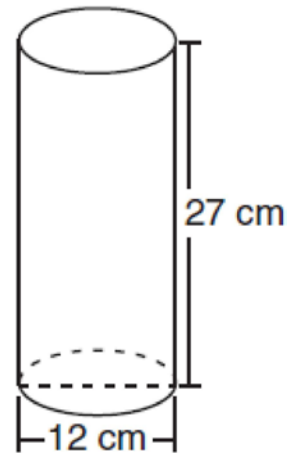


What is the degree measure of angle x ?

- 1) 72
 - 2) 96
 - 3) 108
 - 4) 112
- 24 Through a given point, P , on a plane, how many lines can be drawn that are perpendicular to that plane?
- 1) 1
 - 2) 2
 - 3) more than 2
 - 4) none
- 25 What is the slope of a line that is perpendicular to the line whose equation is $3x + 4y = 12$?
- 1) $\frac{3}{4}$
 - 2) $-\frac{3}{4}$
 - 3) $\frac{4}{3}$
 - 4) $-\frac{4}{3}$

- 26 What is the image of point $A(4,2)$ after the composition of transformations defined by $R_{90^\circ} \circ r_{y=x}$?
- 1) $(-4,2)$
 - 2) $(4,-2)$
 - 3) $(-4,-2)$
 - 4) $(2,-4)$

- 27 Which expression represents the volume, in cubic centimeters, of the cylinder represented in the diagram below?

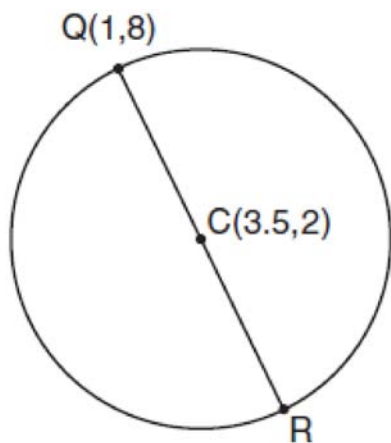


- 1) 162π
 - 2) 324π
 - 3) 972π
 - 4) $3,888\pi$
- 28 What is the inverse of the statement “If two triangles are not similar, their corresponding angles are not congruent”?
- 1) If two triangles are similar, their corresponding angles are not congruent.
 - 2) If corresponding angles of two triangles are not congruent, the triangles are not similar.
 - 3) If two triangles are similar, their corresponding angles are congruent.
 - 4) If corresponding angles of two triangles are congruent, the triangles are similar.

29 In $\triangle RST$, $m\angle RST = 46$ and $\overline{RS} \cong \overline{ST}$. Find $m\angle STR$.

30 Tim has a rectangular prism with a length of 10 centimeters, a width of 2 centimeters, and an unknown height. He needs to build another rectangular prism with a length of 5 centimeters and the same height as the original prism. The volume of the two prisms will be the same. Find the width, in centimeters, of the new prism.

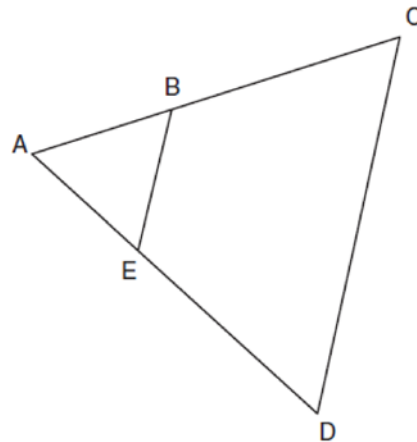
31 In the diagram below of circle C , \overline{QR} is a diameter, and $Q(1,8)$ and $C(3.5,2)$ are points on a coordinate plane. Find and state the coordinates of point R .



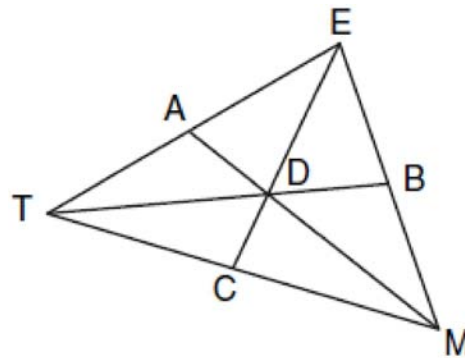
32 Using a compass and straightedge, and \overline{AB} below, construct an equilateral triangle with all sides congruent to \overline{AB} . [Leave all construction marks.]



33 In the diagram below of $\triangle ACD$, E is a point on \overline{AD} and B is a point on \overline{AC} , such that $\overline{EB} \parallel \overline{DC}$. If $\overline{AE} = 3$, $\overline{ED} = 6$, and $\overline{DC} = 15$, find the length of \overline{EB} .



34 In the diagram below of $\triangle TEM$, medians \overline{TB} , \overline{EC} , and \overline{MA} intersect at D , and $\overline{TB} = 9$. Find the length of \overline{TD} .



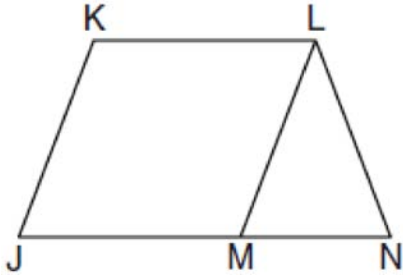
35 In $\triangle KLM$, $m\angle K = 36$ and $KM = 5$. The transformation D_2 is performed on $\triangle KLM$ to form $\triangle K'L'M'$. Find $m\angle K'$. Justify your answer. Find the length of $\overline{K'M'}$. Justify your answer.

36 Given: \overline{JKLM} is a parallelogram.

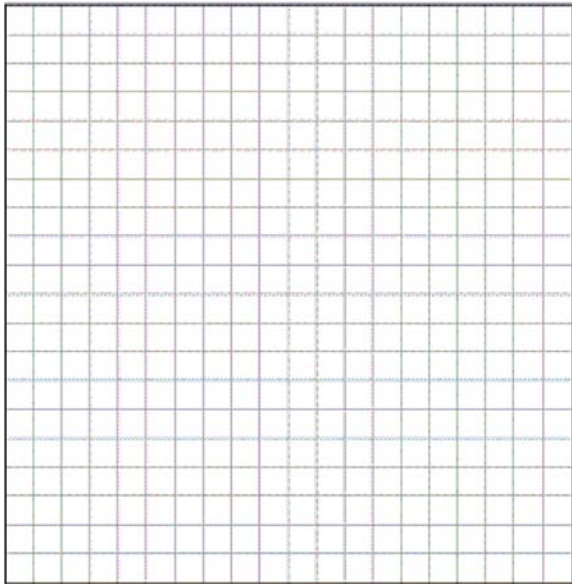
$$\overline{JM} \cong \overline{LN}$$

$$\angle LMN \cong \angle LNM$$

Prove: \overline{JKLM} is a rhombus.



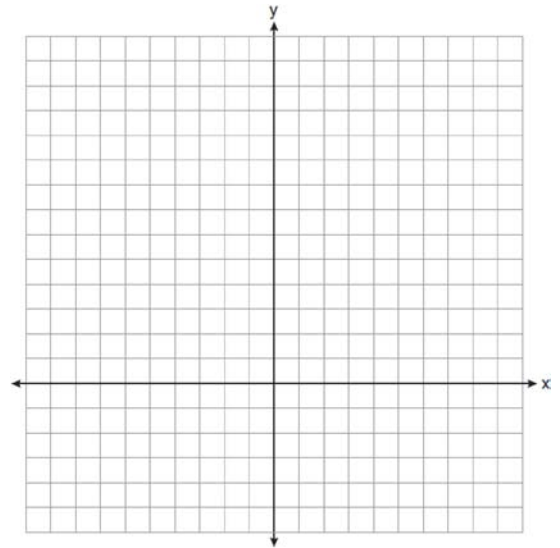
37 On the grid below, graph the points that are equidistant from both the x and y axes and the points that are 5 units from the origin. Label with an **X** all points that satisfy both conditions.



38 On the set of axes below, solve the following system of equations graphically for all values of x and y .

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

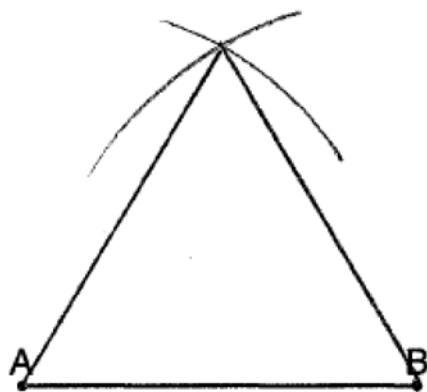
$$4x + 2y = 14$$



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Answer Section

1	ANS: 2 TOP: Trapezoids	PTS: 2	REF: 011001ge	STA: G.G.40
2	ANS: 1 TOP: Interior and Exterior Angles of Triangles	PTS: 2	REF: 011002ge	STA: G.G.30
3	ANS: 2 TOP: Properties of Isometries	PTS: 2	REF: 011003ge	STA: G.G.55
4	ANS: 2 TOP: Constructions	PTS: 2	REF: 011004ge	STA: G.G.17
5	ANS: 1 TOP: Chords	PTS: 2	REF: 011005ge	STA: G.G.49
6	ANS: 2 TOP: Isometries	PTS: 2	REF: 011006ge	STA: G.G.58
7	ANS: 3 TOP: Isosceles Triangles	PTS: 2	REF: 011007ge	STA: G.G.31
8	ANS: 4 TOP: Chords, Secants and Tangents	PTS: 2	REF: 011008ge	STA: G.G.53
9	ANS: 4 TOP: Constructions	PTS: 2	REF: 011009ge	STA: G.G.19
10	ANS: 3 TOP: Writing Equations of Circles	PTS: 2	REF: 011010ge	STA: G.G.71
11	ANS: 2 TOP: Locus-2	PTS: 2	REF: 011011ge	STA: G.G.22
12	ANS: 4 TOP: Planes	PTS: 2	REF: 011012ge	STA: G.G.1
13	ANS: 1 TOP: Parallelograms and Rhombuses	PTS: 2	REF: 011013ge	STA: G.G.38
14	ANS: 3 TOP: Parallel and Perpendicular Lines	PTS: 2	REF: 011014ge	STA: G.G.63
15	ANS: 2 TOP: Chords	PTS: 2	REF: 011015ge	STA: G.G.51
16	ANS: 1 TOP: Pythagoras-GE	PTS: 2	REF: 011016ge	STA: G.G.48
17	ANS: 4 TOP: Distance	PTS: 2	REF: 011017ge	STA: G.G.67
18	ANS: 4 TOP: Parallel and Perpendicular Lines	PTS: 2	REF: 011018ge	STA: G.G.64
19	ANS: 4 TOP: Similarity Proofs	PTS: 2	REF: 011019ge	STA: G.G.44
20	ANS: 2 TOP: Graphing Circles	PTS: 2	REF: 011020ge	STA: G.G.74
21	ANS: 1 TOP: Interior and Exterior Angles of Triangles	PTS: 2	REF: 011021ge	STA: G.G.32
22	ANS: 2 TOP: Similarity	PTS: 2	REF: 011022ge	STA: G.G.45

- 23 ANS: 3 PTS: 2 REF: 011023ge STA: G.G.37
TOP: Interior and Exterior Angles of Other Polygons
- 24 ANS: 1 PTS: 2 REF: 011024ge STA: G.G.3
TOP: Planes
- 25 ANS: 3 PTS: 2 REF: 011025ge STA: G.G.62
TOP: Parallel and Perpendicular Lines
- 26 ANS: 1 PTS: 2 REF: 011023ge STA: G.G.58
TOP: Compositions of Transformations
- 27 ANS: 3 PTS: 2 REF: 011027ge STA: G.G.14
TOP: Volume
- 28 ANS: 3 PTS: 2 REF: 011028ge STA: G.G.26
TOP: Inverse
- 29 ANS:
67
- PTS: 2 REF: 011029ge STA: G.G.31 TOP: Isosceles Triangles
- 30 ANS:
4
- PTS: 2 REF: 011030ge STA: G.G.11 TOP: Volume
- 31 ANS:
(6, -4)
- PTS: 2 REF: 011031ge STA: G.G.66 TOP: Midpoint
- 32 ANS:



- PTS: 2 REF: 011032ge STA: G.G.20 TOP: Constructions
- 33 ANS:
5
- PTS: 2 REF: 011033ge STA: G.G.46 TOP: Similarity
- 34 ANS:
6
- PTS: 2 REF: 011034ge STA: G.G.43
TOP: Medians, Altitudes, Bisectors and Midsegments

35 ANS:

36, because a dilation does not affect angle measure. 10, because a dilation does affect distance.

PTS: 4

REF: 011035ge

STA: G.G.59

TOP: Dilations

36 ANS:

$\overline{JK} \cong \overline{LM}$ because opposite sides of a parallelogram are congruent. $\overline{LM} \cong \overline{LN}$ because of the Isosceles Triangle Theorem. $\overline{LM} \cong \overline{JM}$ because of the transitive property. $JKLM$ is a rhombus because all sides are congruent.

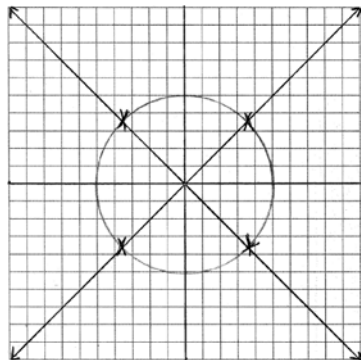
PTS: 4

REF: 011036ge

STA: G.G.41

TOP: Parallelograms and Rhombuses

37 ANS:



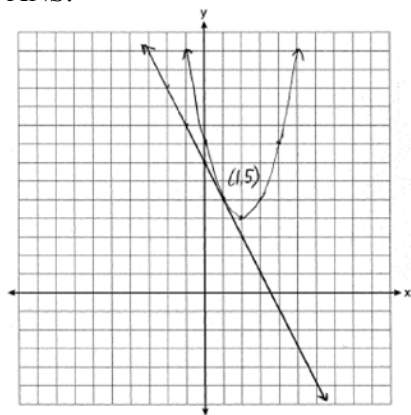
PTS: 4

REF: 011037ge

STA: G.G.23

TOP: Locus-2

38 ANS:



PTS: 6

REF: 011038ge

STA: G.G.70

TOP: Quadratic-Linear Systems