JEFFERSON MATH PROJECT REGENTS BY TYPE

The NY Geometry Regents Exams
Fall 2008-August 2012

www.jmap.org

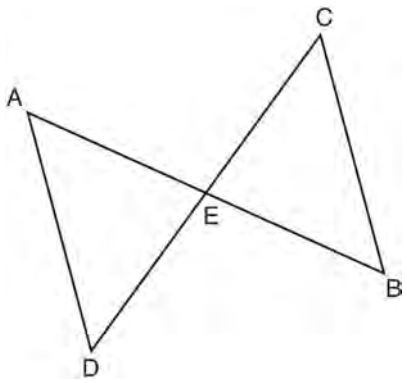
Dear Sir

I have to acknolege the reciept of your favor of May 14. in which you mention that you have finished the 6. first books of Euclid, plane trigonometry, surveying & algebra and ask whether I think a further pursuit of that branch of science would be useful to you. there are some propositions in the latter books of Euclid, & some of Archimedes, which are useful, & I have no doubt you have been made acquainted with them. trigonometry, so far as this, is most valuable to every man, there is scarcely a day in which he will not resort to it for some of the purposes of common life. the science of calculation also is indispensible as far as the extraction of the square & cube roots; Algebra as far as the quadratic equation & the use of logarithms are often of value in ordinary cases: but all beyond these is but a luxury; a delicious luxury indeed; but not to be indulged in by one who is to have a profession to follow for his subsistence. in this light I view the conic sections, curves of the higher orders, perhaps even spherical trigonometry, Algebraical operations beyond the 2d dimension, and fluxions.

Letter from Thomas Jefferson to William G. Munford, Monticello, June 18, 1799.

Geometry Multiple Choice Regents Exam Questions

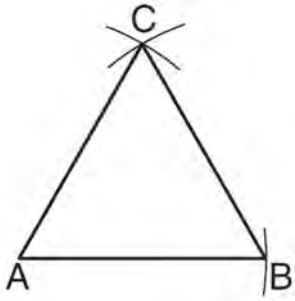
1 In the diagram below of $\triangle DAE$ and $\triangle BCE$, $\overline{AB}$ and $\overline{CD}$ intersect at E, such that $\overline{AE} \cong \overline{CE}$ and $\angle BCE \cong \angle DAE$.



Triangle DAE can be proved congruent to triangle BCE by
1) ASA
2) SAS
3) SSS
4) HL

2 A circle has the equation $(x-2)^2 + (y+3)^2 = 36$. What are the coordinates of its center and the length of its radius?
1) $(-2,3)$ and 6
2) $(2,-3)$ and 6
3) $(-2,3)$ and 36
4) $(2,-3)$ and 36

3 Which diagram represents a correct construction of equilateral $\triangle ABC$, given side $\overline{AB}$?

1)


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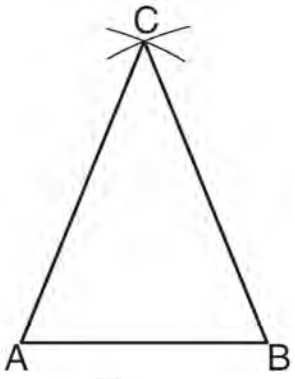

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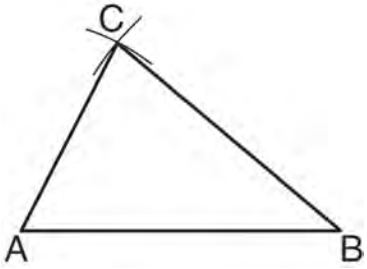

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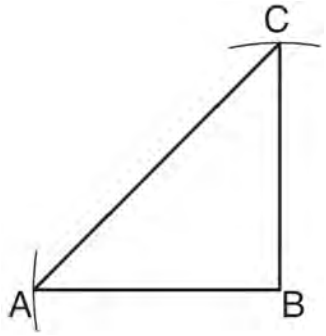


4 What is the slope of a line that is perpendicular to the line represented by the equation $x + 2y = 3$?
1) -2
2) 2
3) $-\frac{1}{2}$
4) $\frac{1}{2}$

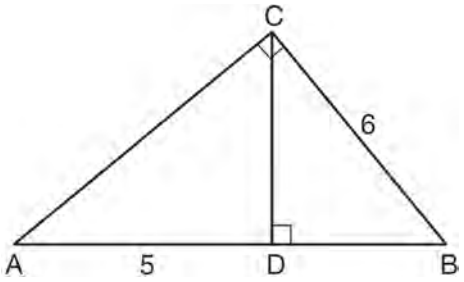
5 What is the image of the point $(2,-3)$ after the transformation $r_{y-\text{axis}}$?
1) $(2,3)$
2) $(-2,-3)$
3) $(-2,3)$
4) $(-3,2)$

6 When a dilation is performed on a hexagon, which property of the hexagon will *not* be preserved in its image?
1) parallelism
2) orientation
3) length of sides
4) measure of angles

7 How many points are both 4 units from the origin and also 2 units from the line $y = 4$?
1) 1
2) 2
3) 3
4) 4

8 A line segment has endpoints $(4,7)$ and $(1,11)$. What is the length of the segment?
1) 5
2) 7
3) 16
4) 25

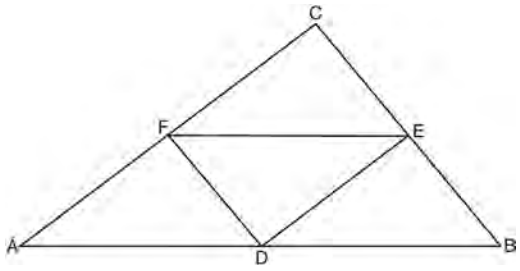
9 In the diagram below of right triangle ABC, $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$, $CB = 6$, and $AD = 5$.



What is the length of $\overline{BD}$?
1) 5
2) 9
3) 3
4) 4

10 Plane $\mathcal{A}$ is parallel to plane $\mathcal{B}$. Plane C intersects plane $\mathcal{A}$ in line m and intersects plane $\mathcal{B}$ in line n. Lines m and n are
1) intersecting
2) parallel
3) perpendicular
4) skew

11 In the diagram of $\triangle ABC$ shown below, D is the midpoint of $\overline{AB}$, E is the midpoint of $\overline{BC}$, and F is the midpoint of $\overline{AC}$.



If $AB = 20$, $BC = 12$, and $AC = 16$, what is the perimeter of trapezoid $ABEF$?

1) 24
2) 36
3) 40
4) 44

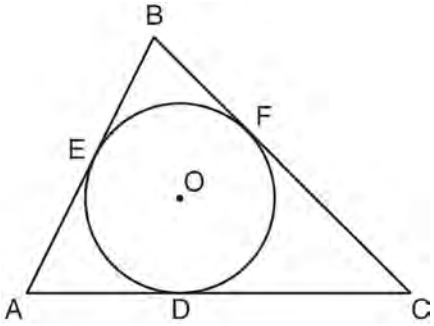
12 What is an equation of a circle with center $(7,-3)$ and radius 4?

1) $(x-7)^2+(y+3)^2=4$
2) $(x+7)^2+(y-3)^2=4$
3) $(x-7)^2+(y+3)^2=16$
4) $(x+7)^2+(y-3)^2=16$

13 Which equation represents circle O with center $(2,-8)$ and radius 9?

1) $(x+2)^2+(y-8)^2=9$
2) $(x-2)^2+(y+8)^2=9$
3) $(x+2)^2+(y-8)^2=81$
4) $(x-2)^2+(y+8)^2=81$

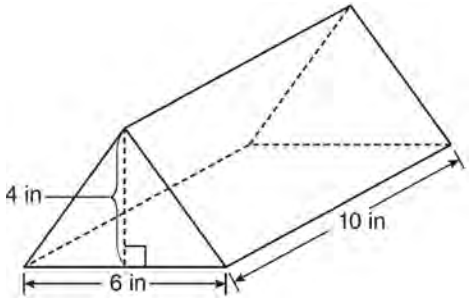
14 In the diagram below, $\triangle ABC$ is circumscribed about circle O and the sides of $\triangle ABC$ are tangent to the circle at points D, E, and F.



If $AB = 20$, $AE = 12$, and $CF = 15$, what is the length of $\overline{AC}$?

1) 8
2) 15
3) 23
4) 27

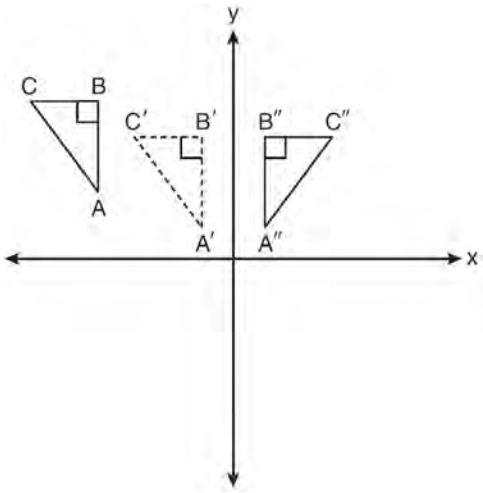
15 A packing carton in the shape of a triangular prism is shown in the diagram below.



What is the volume, in cubic inches, of this carton?

1) 20
2) 60
3) 120
4) 240

16 In the diagram below, $\triangle A'B'C'$ is a transformation of $\triangle ABC$, and $\triangle A''B''C''$ is a transformation of $\triangle A'B'C'$.

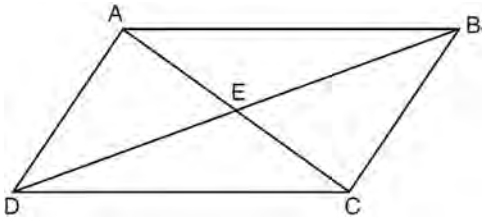


The composite transformation of $\triangle ABC$ to $\triangle A''B''C''$ is an example of a
1) reflection followed by a rotation
2) reflection followed by a translation
3) translation followed by a rotation
4) translation followed by a reflection

17 Which statement is the negation of "Two is a prime number" and what is the truth value of the negation?
1) Two is not a prime number; false
2) Two is not a prime number; true
3) A prime number is two; false
4) A prime number is two; true

18 When a quadrilateral is reflected over the line $y = x$, which geometric relationship is *not* preserved?
1) congruence
2) orientation
3) parallelism
4) perpendicularity

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

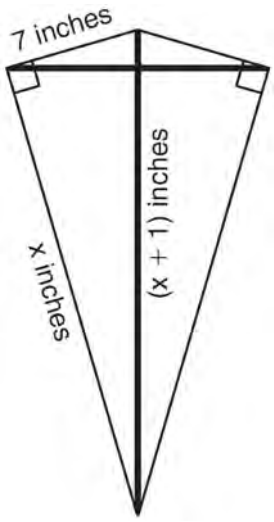


Which statement must be true?
1) $\overline{AC} \cong \overline{DB}$
2) $\angle ABD \cong \angle CBD$
3) $\triangle AED \cong \triangle CEB$
4) $\triangle DCE \cong \triangle BCE$

20 What is the equation of a line passing through $(2,-1)$ and parallel to the line represented by the equation $y = 2x + 1$?
1) $y = -\frac{1}{2}x$
2) $y = -\frac{1}{2}x + 1$
3) $y = 2x - 5$
4) $y = 2x - 1$

21 If $\triangle JKL \cong \triangle MNO$, which statement is always true?
1) $\angle KLJ \cong \angle NMO$
2) $\angle KJL \cong \angle MON$
3) $\overline{JL} \cong \overline{MO}$
4) $\overline{JK} \cong \overline{ON}$

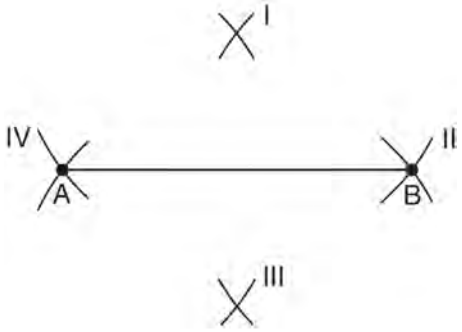
22 As shown in the diagram below, a kite needs a vertical and a horizontal support bar attached at opposite corners. The upper edges of the kite are 7 inches, the side edges are x inches, and the vertical support bar is $(x+1)$ inches.



What is the measure, in inches, of the vertical support bar?
1) 23
2) 24
3) 25
4) 26

23 Triangle PQR has angles in the ratio of $2:3:5$. Which type of triangle is $\triangle PQR$?
1) acute
2) isosceles
3) obtuse
4) right

24 Line segment AB is shown in the diagram below.

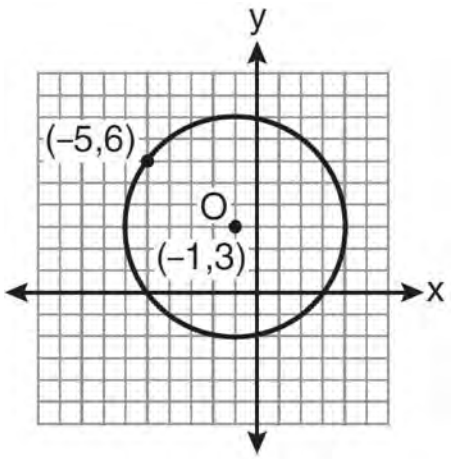


Which two sets of construction marks, labeled I, II, III, and IV, are part of the construction of the perpendicular bisector of line segment AB?
1) I and II
2) I and III
3) II and III
4) II and IV

25 A sphere is inscribed inside a cube with edges of 6 cm. In cubic centimeters, what is the volume of the sphere, in terms of π?
1) 12π
2) 36π
3) 48π
4) 288π

26 A line segment has endpoints $A(7,-1)$ and $B(-3,3)$. What are the coordinates of the midpoint of $\overline{AB}$?
1) $(1,2)$
2) $\left(2,1\right)$
3) $(-5,2)$
4) $\left(5,-2\right)$

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



1) $(x+1)^2+(y-3)^2=25$
2) $(x-1)^2+(y+3)^2=25$
3) $(x-5)^2+(y+6)^2=25$
4) $(x+5)^2+(y-6)^2=25$

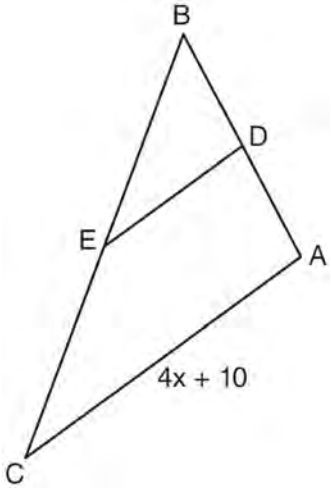
28 The statement "*x* is a multiple of 3, and *x* is an even integer" is true when *x* is equal to
1) 9
2) 8
3) 3
4) 6

29 In a given triangle, the point of intersection of the three medians is the same as the point of intersection of the three altitudes. Which classification of the triangle is correct?
1) scalene triangle
2) isosceles triangle
3) equilateral triangle
4) right isosceles triangle

30 Which equation represents the line parallel to the line whose equation is $4x+2y=14$ and passing through the point $(2,2)$?
1) $y=-2x$
2) $y=-2x+6$
3) $y=\frac{1}{2}x$
4) $y=\frac{1}{2}x+1$

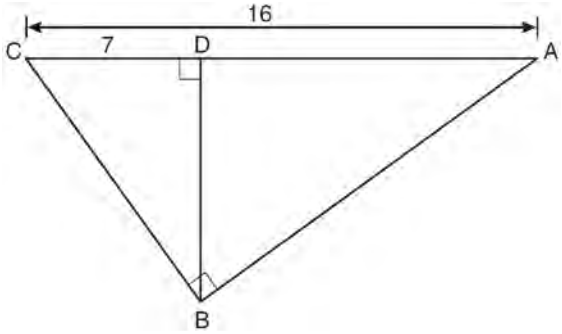
31 Scalene triangle *ABC* is similar to triangle *DEF*. Which statement is *false*?
1) $AB:BC=DE:EF$
2) $AC:DF=BC:EF$
3) $\angle ACB\cong\angle DFE$
4) $\angle ABC\cong\angle EDF$

32 In the diagram below of $\triangle ABC$, D is the midpoint of $\overline{AB}$, and E is the midpoint of $\overline{BC}$.



If $AC=4x+10$, which expression represents DE?
1) $x+2.5$
2) $2x+5$
3) $2x+10$
4) $8x+20$

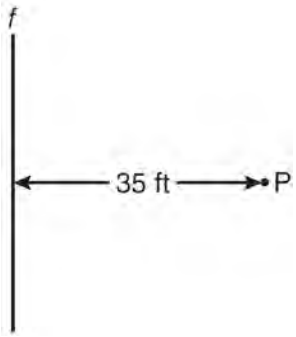
33 In the diagram below of right triangle *ABC*, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$, $AC = 16$, and $CD = 7$.



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

1) $3\sqrt{7}$
2) $4\sqrt{7}$
3) $7\sqrt{3}$
4) 12

34 A man wants to place a new bird bath in his yard so that it is 30 feet from a fence, *f*, and also 10 feet from a light pole, *P*. As shown in the diagram below, the light pole is 35 feet away from the fence.



How many locations are possible for the bird bath?

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

35 Pentagon *PQRST* has $\overline{PQ}$ parallel to $\overline{TS}$. After a translation of $T_{2,-5}$, which line segment is parallel to $\overline{P'Q'}$?

1) $\overline{R'Q'}$
2) $\overline{R'S'}$
3) $\overline{T'S'}$
4) $\overline{T'P'}$

36 The diameter of a sphere is 15 inches. What is the volume of the sphere, to the *nearest tenth of a cubic inch*?

1) 706.9
2) 1767.1
3) 2827.4
4) 14,137.2

37 In the diagram below of $\overline{ABCD}$, $\overline{AC} \cong \overline{BD}$.

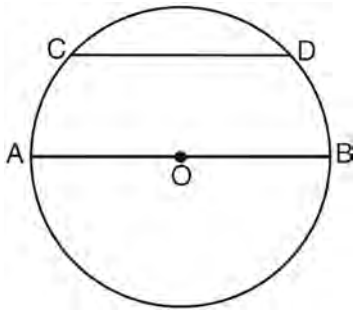
Using this information, it could be proven that

1) $BC = AB$
2) $AB = CD$
3) $AD - BC = CD$
4) $AB + CD = AD$

38 A student wrote the sentence "4 is an odd integer." What is the negation of this sentence and the truth value of the negation?

1) 3 is an odd integer; true
2) 4 is not an odd integer; true
3) 4 is not an even integer; false
4) 4 is an even integer; false

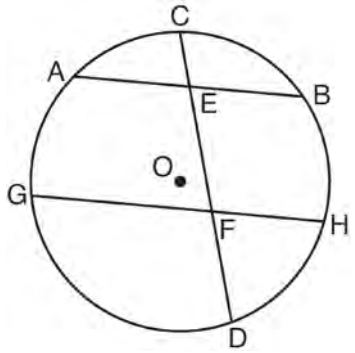
39 In the diagram below of circle O, diameter $\overline{AB}$ is parallel to chord $\overline{CD}$.



If $m\overset{\frown}{CD} = 70$, what is $m\overset{\frown}{AC}$?

1) 110
2) 70
3) 55
4) 35

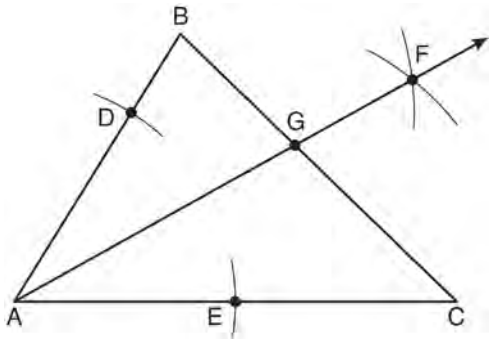
40 In the diagram below of circle O, chord $\overline{AB}$ is parallel to chord $\overline{GH}$. Chord $\overline{CD}$ intersects $\overline{AB}$ at E and $\overline{GH}$ at F.



Which statement must always be true?

1) $\overset{\frown}{AC} \cong \overset{\frown}{CB}$
2) $\overset{\frown}{DH} \cong \overset{\frown}{BH}$
3) $\overset{\frown}{AB} \cong \overset{\frown}{GH}$
4) $\overset{\frown}{AG} \cong \overset{\frown}{BH}$

41 As shown in the diagram below of $\triangle ABC$, a compass is used to find points D and E, equidistant from point A. Next, the compass is used to find point F, equidistant from points D and E. Finally, a straightedge is used to draw $\overrightarrow{AF}$. Then, point G, the intersection of $\overrightarrow{AF}$ and side $\overline{BC}$ of $\triangle ABC$, is labeled.



Which statement must be true?

1) $\overrightarrow{AF}$ bisects side $\overline{BC}$
2) $\overrightarrow{AF}$ bisects $\angle BAC$
3) $\overrightarrow{AF} \perp \overline{BC}$
4) $\triangle ABG \sim \triangle ACG$

42 The two lines represented by the equations below are graphed on a coordinate plane.

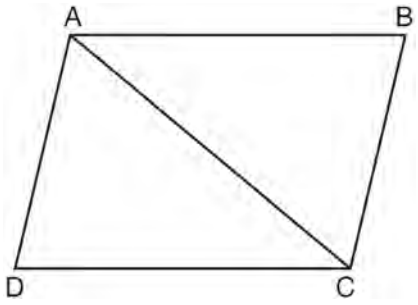
$$x + 6y = 12$$

$$3(x - 2) = -y - 4$$

Which statement best describes the two lines?

1) The lines are parallel.
2) The lines are the same line.
3) The lines are perpendicular.
4) The lines intersect at an angle other than 90°.

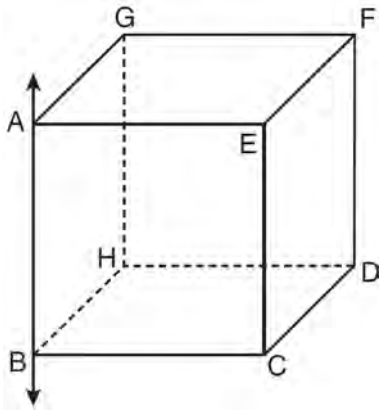
43 In the diagram of quadrilateral $ABCD$, $\overline{AB} \parallel \overline{CD}$, $\angle ABC \cong \angle CDA$, and diagonal $\overline{AC}$ is drawn.



Which method can be used to prove $\triangle ABC$ is congruent to $\triangle CDA$?

1) AAS
2) SSA
3) SAS
4) SSS

44 In the diagram below, $\overleftrightarrow{AB}$ is perpendicular to plane $AEFG$.



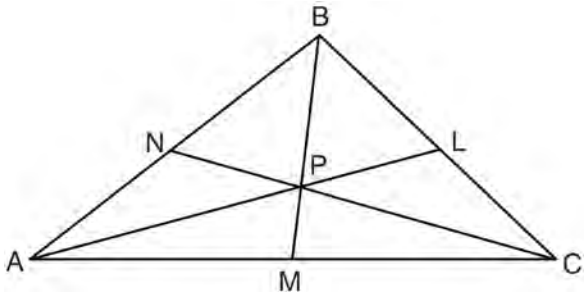
Which plane must be perpendicular to plane $AEFG$?

1) $ABCE$
2) $BCDH$
3) $CDFE$
4) $HDFG$

45 What is the equation of a circle whose center is 4 units above the origin in the coordinate plane and whose radius is 6?

1) $x^2 + (y-6)^2 = 16$
2) $(x-6)^2 + y^2 = 16$
3) $x^2 + (y-4)^2 = 36$
4) $(x-4)^2 + y^2 = 36$

46 In the diagram below, point P is the centroid of $\triangle ABC$.



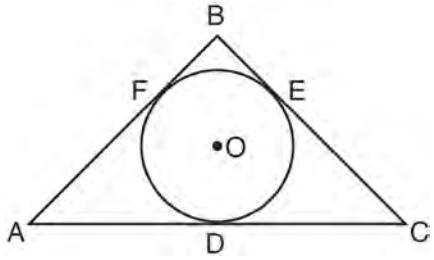
If $PM = 2x + 5$ and $BP = 7x + 4$, what is the length of $\overline{PM}$?

1) 9
2) 2
3) 18
4) 27

47 The equation of line k is $y = \frac{1}{3}x - 2$. The equation of line m is $-2x + 6y = 18$. Lines k and m are

1) parallel
2) perpendicular
3) the same line
4) neither parallel nor perpendicular

48 In the diagram below, $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$ are tangents to circle O at points F, E, and D, respectively, $AF = 6$, $CD = 5$, and $BE = 4$.



What is the perimeter of $\triangle ABC$?

1) 15
2) 25
3) 30
4) 60

49 When solved graphically, what is the solution to the following system of equations?

$$y = x^2 - 4x + 6$$

$$y = x + 2$$

1) $(1,4)$
2) $(4,6)$
3) $(1,3)$ and $(4,6)$
4) $(3,1)$ and $(6,4)$

50 Which statement is true about every parallelogram?

1) All four sides are congruent.
2) The interior angles are all congruent.
3) Two pairs of opposite sides are congruent.
4) The diagonals are perpendicular to each other.

51 If two distinct planes, $\mathcal{A}$ and $\mathcal{B}$, are perpendicular to line c, then which statement is true?

1) Planes $\mathcal{A}$ and $\mathcal{B}$ are parallel to each other.
2) Planes $\mathcal{A}$ and $\mathcal{B}$ are perpendicular to each other.
3) The intersection of planes $\mathcal{A}$ and $\mathcal{B}$ is a line parallel to line c.
4) The intersection of planes $\mathcal{A}$ and $\mathcal{B}$ is a line perpendicular to line c.

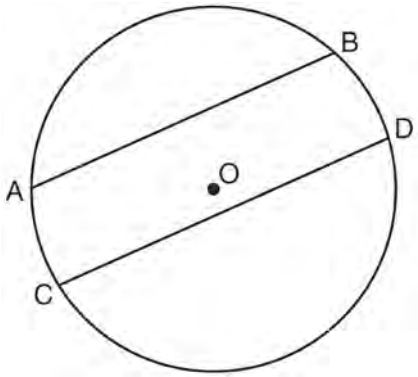
52 What is the slope of a line perpendicular to the line whose equation is $20x - 2y = 6$?

1) -10
2) $-\frac{1}{10}$
3) 10
4) $\frac{1}{10}$

53 An equation of the line that passes through $(2,-1)$ and is parallel to the line $2y + 3x = 8$ is

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

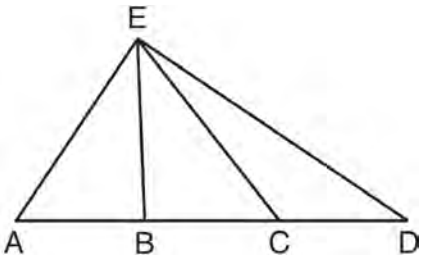
54 In the diagram below of circle O, chord $\overline{AB}$ is parallel to chord $\overline{CD}$.



Which statement must be true?

1) $\overset{\frown}{AC} \cong \overset{\frown}{BD}$
2) $\overset{\frown}{AB} \cong \overset{\frown}{CD}$
3) $\overline{AB} \cong \overline{CD}$
4) $\overset{\frown}{ABD} \cong \overset{\frown}{CDB}$

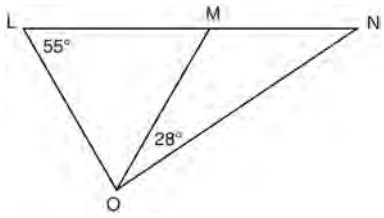
55 In $\triangle AED$ with $\overline{ABCD}$ shown in the diagram below, $\overline{EB}$ and $\overline{EC}$ are drawn.



If $\overline{AB} \cong \overline{CD}$, which statement could always be proven?

1) $\overline{AC} \cong \overline{DB}$
2) $\overline{AE} \cong \overline{ED}$
3) $\overline{AB} \cong \overline{BC}$
4) $\overline{EC} \cong \overline{EA}$

56 In the diagram below, $\triangle LMO$ is isosceles with $LO = MO$.



If $m\angle L = 55$ and $m\angle NOM = 28$, what is $m\angle N$?

1) 27
2) 28
3) 42
4) 70

57 The volume of a rectangular prism is 144 cubic inches. The height of the prism is 8 inches. Which measurements, in inches, could be the dimensions of the base?

1) 3.3 by 5.5
2) 2.5 by 7.2
3) 12 by 8
4) 9 by 9

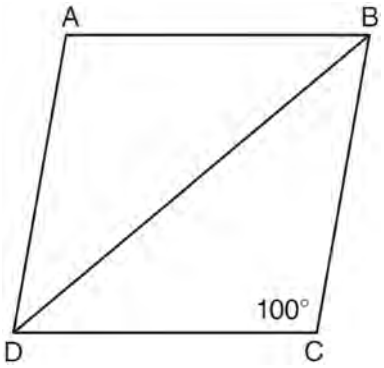
58 The angle formed by the radius of a circle and a tangent to that circle has a measure of

1) 45°
2) 90°
3) 135°
4) 180°

59 What is the image of the point $(-5, 2)$ under the translation $T_{3,-4}$?

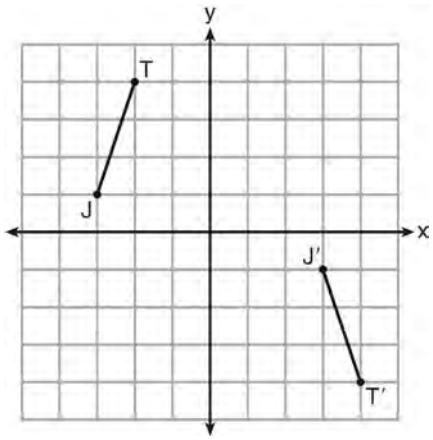
1) $(-9, 5)$
2) $(-8, 6)$
3) $(-2, -2)$
4) $(-15, -8)$

60 In the diagram below of rhombus *ABCD*, m∠*C* = 100.



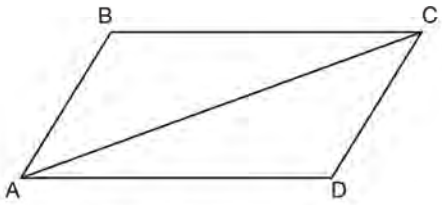
What is m∠*DBC*?
1) 40
2) 45
3) 50
4) 80

61 The graph below shows $\overline{JT}$ and its image, $\overline{J'T'}$, after a transformation.



Which transformation would map $\overline{JT}$ onto $\overline{J'T'}$?
1) translation
2) glide reflection
3) rotation centered at the origin
4) reflection through the origin

62 Given that *ABCD* is a parallelogram, a student wrote the proof below to show that a pair of its opposite angles are congruent.

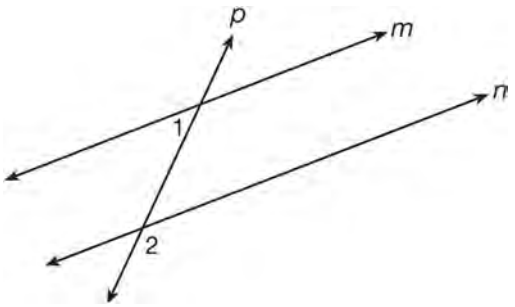


Statement	Reason
1. ABCD is a parallelogram.	1. Given
2. $\overline{BC} \cong \overline{AD}$, $\overline{AB} \cong \overline{DC}$	2. Opposite sides of a parallelogram are congruent.
3. $\overline{AC} \cong \overline{CA}$	3. Reflexive Postulate of Congruency
4. △ABC ≅ △CDA	4. Side-Side-Side
5. ∠B ≅ ∠D	5. _____

What is the reason justifying that ∠*B* ≅ ∠*D*?
1) Opposite angles in a quadrilateral are congruent.
2) Parallel lines have congruent corresponding angles.
3) Corresponding parts of congruent triangles are congruent.
4) Alternate interior angles in congruent triangles are congruent.

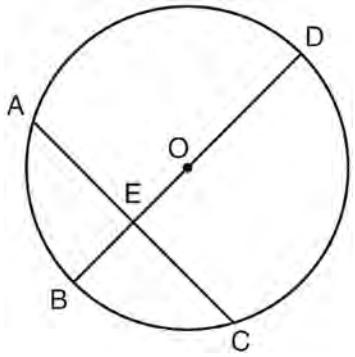
63 If $\overleftrightarrow{AB}$ is contained in plane $\mathcal{P}$, and $\overleftrightarrow{AB}$ is perpendicular to plane $\mathcal{R}$, which statement is true?
1) $\overleftrightarrow{AB}$ is parallel to plane $\mathcal{R}$.
2) Plane $\mathcal{P}$ is parallel to plane $\mathcal{R}$.
3) $\overleftrightarrow{AB}$ is perpendicular to plane $\mathcal{P}$.
4) Plane $\mathcal{P}$ is perpendicular to plane $\mathcal{R}$.

64 As shown in the diagram below, lines *m* and *n* are cut by transversal *p*.



If $m\angle 1 = 4x + 14$ and $m\angle 2 = 8x + 10$, lines *m* and *n* are parallel when *x* equals
1) 1
2) 6
3) 13
4) 17

65 In circle *O* shown below, diameter $\overline{DB}$ is perpendicular to chord $\overline{AC}$ at *E*.



If $DB = 34$, $AC = 30$, and $DE > BE$, what is the length of $\overline{BE}$?
1) 8
2) 9
3) 16
4) 25

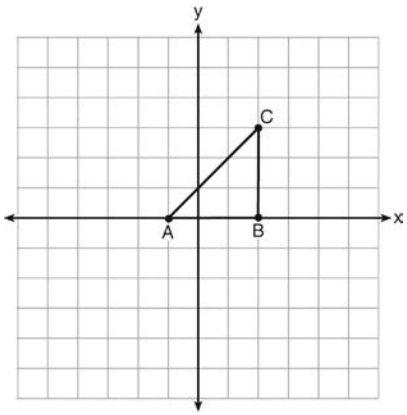
66 Plane $\mathcal{R}$ is perpendicular to line *k* and plane $\mathcal{D}$ is perpendicular to line *k*. Which statement is correct?
1) Plane $\mathcal{R}$ is perpendicular to plane $\mathcal{D}$.
2) Plane $\mathcal{R}$ is parallel to plane $\mathcal{D}$.
3) Plane $\mathcal{R}$ intersects plane $\mathcal{D}$.
4) Plane $\mathcal{R}$ bisects plane $\mathcal{D}$.

67 In $\triangle ABC$, $AB = 5$ feet and $BC = 3$ feet. Which inequality represents all possible values for the length of $\overline{AC}$, in feet?
1) $2 \le AC \le 8$
2) $2 < AC < 8$
3) $3 \le AC \le 7$
4) $3 < AC < 7$

68 The vertices of parallelogram *ABCD* are $A(2,0)$, $B(0,-3)$, $C(3,-3)$, and $D(5,0)$. If *ABCD* is reflected over the *x*-axis, how many vertices remain invariant?
1) 1
2) 2
3) 3
4) 0

69 The coordinates of the endpoints of $\overline{AB}$ are $A(0,0)$ and $B(0,6)$. The equation of the perpendicular bisector of $\overline{AB}$ is
1) $x = 0$
2) $x = 3$
3) $y = 0$
4) $y = 3$

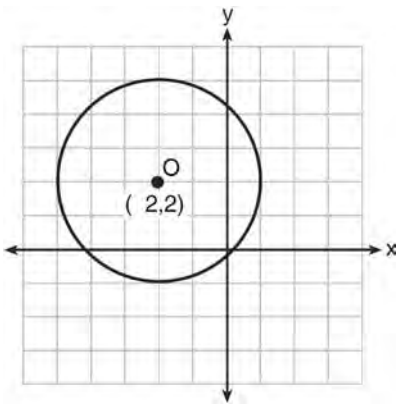
70 Triangle *ABC* is graphed on the set of axes below.



Which transformation produces an image that is similar to, but *not* congruent to, $\triangle ABC$?

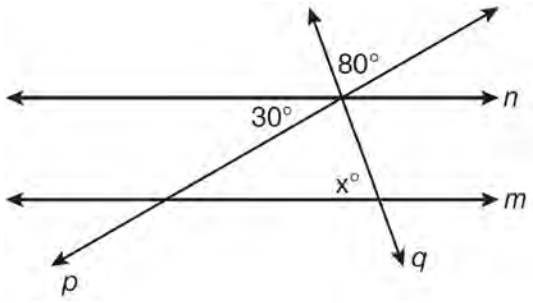
1) $T_{2,3}$
2) D_2
3) $r_{y=x}$
4) R_{90}

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



1) $(x+2)^2+(y-2)^2=9$
2) $(x+2)^2+(y-2)^2=3$
3) $(x-2)^2+(y+2)^2=9$
4) $(x-2)^2+(y+2)^2=3$

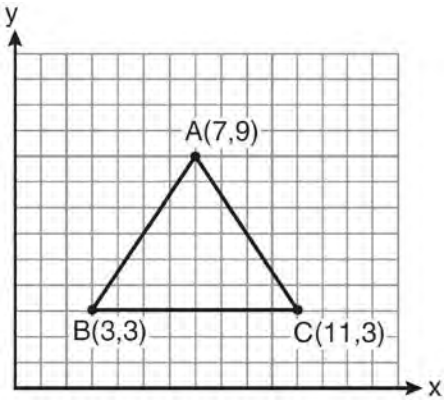
72 In the diagram below, lines *n* and *m* are cut by transversals *p* and *q*.



What value of *x* would make lines *n* and *m* parallel?

1) 110
2) 80
3) 70
4) 50

73 The vertices of the triangle in the diagram below are $A(7,9)$, $B(3,3)$, and $C(11,3)$.



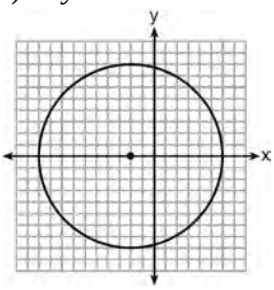
What are the coordinates of the centroid of $\triangle ABC$?

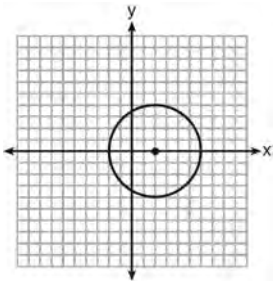
1) $(5,6)$
2) $(7,3)$
3) $(7,5)$
4) $(9,6)$

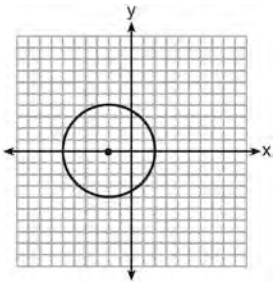
74 What is the length of the line segment whose endpoints are $A(-1,9)$ and $B(7,4)$?

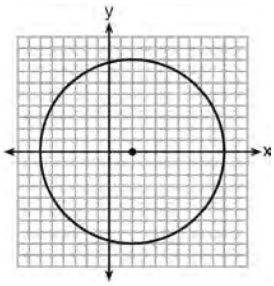
1) $\sqrt{61}$
2) $\sqrt{89}$
3) $\sqrt{205}$
4) $\sqrt{233}$

75 Which graph represents a circle whose equation is $(x+2)^2+y^2=16$?

1) 

2) 

3) 

4) 

76 In $\triangle DEF$, $m\angle D = 3x+5$, $m\angle E = 4x-15$, and $m\angle F = 2x+10$. Which statement is true?

1) $DF = FE$
2) $DE = FE$
3) $m\angle E = m\angle F$
4) $m\angle D = m\angle F$

77 For which polygon does the sum of the measures of the interior angles equal the sum of the measures of the exterior angles?

1) hexagon
2) pentagon
3) quadrilateral
4) triangle

78 What is the volume, in cubic centimeters, of a cylinder that has a height of 15 cm and a diameter of 12 cm?

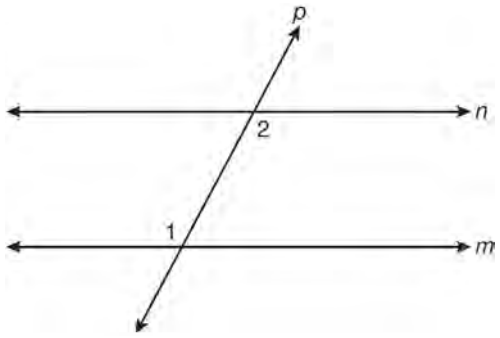
1) 180π
2) 540π
3) 675π
4) $2,160\pi$

79 What is the equation of the line that passes through the point $(-9,6)$ and is perpendicular to the line $y = 3x-5$?

1) $y = 3x+21$
2) $y = -\frac{1}{3}x-3$
3) $y = 3x+33$
4) $y = -\frac{1}{3}x+3$

80 If the vertex angles of two isosceles triangles are congruent, then the triangles must be
1) acute
2) congruent
3) right
4) similar

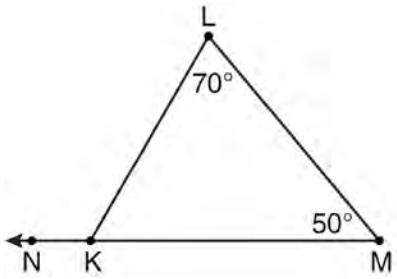
81 In the diagram below, line *p* intersects line *m* and line *n*.



If $m\angle 1 = 7x$ and $m\angle 2 = 5x + 30$, lines *m* and *n* are parallel when *x* equals
1) 12.5
2) 15
3) 87.5
4) 105

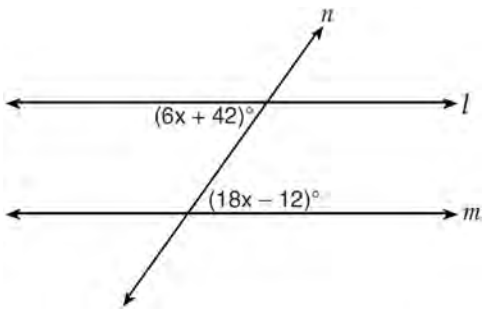
82 In scalene triangle *ABC*, $m\angle B = 45$ and $m\angle C = 55$. What is the order of the sides in length, from longest to shortest?
1) $\overline{AB}$, $\overline{BC}$, $\overline{AC}$
2) $\overline{BC}$, $\overline{AC}$, $\overline{AB}$
3) $\overline{AC}$, $\overline{BC}$, $\overline{AB}$
4) $\overline{BC}$, $\overline{AB}$, $\overline{AC}$

83 In the diagram of $\triangle KLM$ below, $m\angle L = 70$, $m\angle M = 50$, and $\overline{MK}$ is extended through *N*.



What is the measure of $\angle LKN$?
1) 60°
2) 120°
3) 180°
4) 300°

84 Line *n* intersects lines *l* and *m*, forming the angles shown in the diagram below.



Which value of *x* would prove $l \parallel m$?
1) 2.5
2) 4.5
3) 6.25
4) 8.75

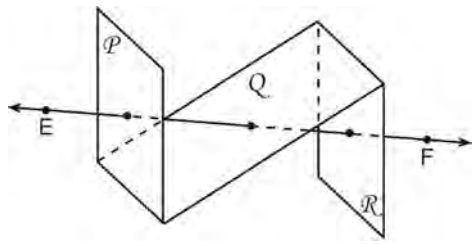
85 Point M is the midpoint of $\overline{AB}$. If the coordinates of A are $(-3,6)$ and the coordinates of M are $(-5,2)$, what are the coordinates of B?

1) $(1,2)$
2) $(7,10)$
3) $(-4,4)$
4) $(-7,-2)$

86 Which type of triangle can be drawn using the points $(-2,3)$, $(-2,-7)$, and $(4,-5)$?

1) scalene
2) isosceles
3) equilateral
4) no triangle can be drawn

87 As shown in the diagram below, $\overleftrightarrow{EF}$ intersects planes $\mathcal{P}$, Q, and $\mathcal{R}$.



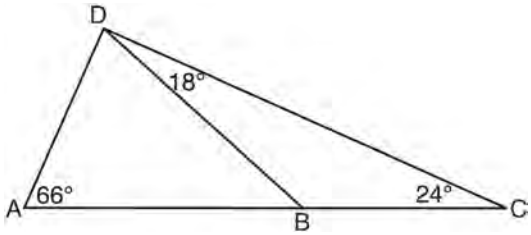
If $\overleftrightarrow{EF}$ is perpendicular to planes $\mathcal{P}$ and $\mathcal{R}$, which statement must be true?

1) Plane $\mathcal{P}$ is perpendicular to plane Q.
2) Plane $\mathcal{R}$ is perpendicular to plane $\mathcal{P}$.
3) Plane $\mathcal{P}$ is parallel to plane Q.
4) Plane $\mathcal{R}$ is parallel to plane $\mathcal{P}$.

88 The equation of a circle with its center at $(-3,5)$ and a radius of 4 is

1) $(x+3)^2+(y-5)^2=4$
2) $(x-3)^2+(y+5)^2=4$
3) $(x+3)^2+(y-5)^2=16$
4) $(x-3)^2+(y+5)^2=16$

89 As shown in the diagram of $\triangle ACD$ below, B is a point on $\overline{AC}$ and $\overline{DB}$ is drawn.



If $m\angle A = 66$, $m\angle CDB = 18$, and $m\angle C = 24$, what is the longest side of $\triangle ABD$?

1) $\overline{AB}$
2) $\overline{DC}$
3) $\overline{AD}$
4) $\overline{BD}$

90 What is an equation of the line that passes through the point $(-2,3)$ and is parallel to the line whose equation is $y=\frac{3}{2}x-4$?

1) $y=\frac{-2}{3}x$
2) $y=\frac{-2}{3}x+\frac{5}{3}$
3) $y=\frac{3}{2}x$
4) $y=\frac{3}{2}x+6$

91 The diagonals of a quadrilateral are congruent but do not bisect each other. This quadrilateral is
1) an isosceles trapezoid
2) a parallelogram
3) a rectangle
4) a rhombus

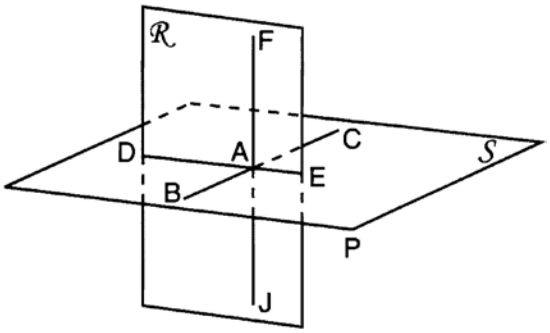
92 Parallelogram $ABCD$ has coordinates $A(1,5)$, $B(6,3)$, $C(3,-1)$, and $D(-2,1)$. What are the coordinates of E, the intersection of diagonals $\overline{AC}$ and $\overline{BD}$?
1) $(2,2)$
2) $(4.5,1)$
3) $(3.5,2)$
4) $(-1,3)$

93 In circle O, a diameter has endpoints $(-5,4)$ and $(3,-6)$. What is the length of the diameter?
1) $\sqrt{2}$
2) $2\sqrt{2}$
3) $\sqrt{10}$
4) $2\sqrt{41}$

94 Which equation represents the perpendicular bisector of $\overline{AB}$ whose endpoints are $A(8,2)$ and $B(0,6)$?
1) $y = 2x - 4$
2) $y = -\frac{1}{2}x + 2$
3) $y = -\frac{1}{2}x + 6$
4) $y = 2x - 12$

95 The point $(3,-2)$ is rotated 90° about the origin and then dilated by a scale factor of 4. What are the coordinates of the resulting image?
1) $(-12,8)$
2) (12,-8)
3) $(8,12)$
4) $(-8,-12)$

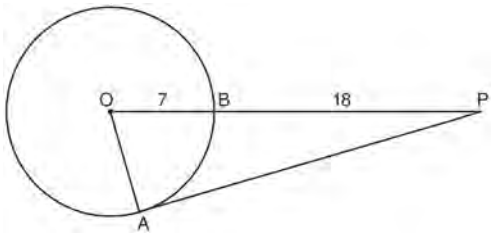
96 As shown in the diagram below, $\overline{FJ}$ is contained in plane $\mathcal{R}$, $\overline{BC}$ and $\overline{DE}$ are contained in plane $\mathcal{S}$, and $\overline{FJ}$, $\overline{BC}$, and $\overline{DE}$ intersect at A.



Which fact is *not* sufficient to show that planes $\mathcal{R}$ and $\mathcal{S}$ are perpendicular?
1) $\overline{FA} \perp \overline{DE}$
2) $\overline{AD} \perp \overline{AF}$
3) $\overline{BC} \perp \overline{FJ}$
4) $\overline{DE} \perp \overline{BC}$

97 Point A lies in plane $\mathcal{B}$. How many lines can be drawn perpendicular to plane $\mathcal{B}$ through point A?
1) one
2) two
3) zero
4) infinite

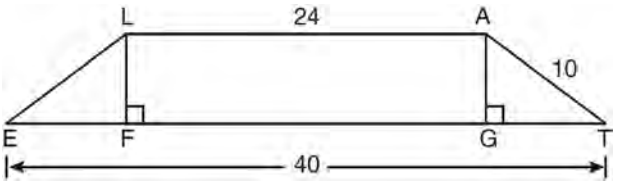
98 In the diagram below of $\triangle PAO$, $\overline{AP}$ is tangent to circle O at point A, $OB = 7$, and $BP = 18$.



What is the length of $\overline{AP}$?
1) 10
2) 12
3) 17
4) 24

99 Which line is parallel to the line whose equation is $4x + 3y = 7$ and also passes through the point $(-5, 2)$?
1) $4x + 3y = -26$
2) $4x + 3y = -14$
3) $3x + 4y = -7$
4) $3x + 4y = 14$

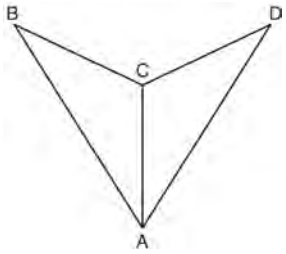
100 In the diagram below, $LATE$ is an isosceles trapezoid with $\overline{LE} \cong \overline{AT}$, $LA = 24$, $ET = 40$, and $AT = 10$. Altitudes $\overline{LF}$ and $\overline{AG}$ are drawn.



What is the length of $\overline{LF}$?
1) 6
2) 8
3) 3
4) 4

101 Which quadrilateral has diagonals that always bisect its angles and also bisect each other?
1) rhombus
2) rectangle
3) parallelogram
4) isosceles trapezoid

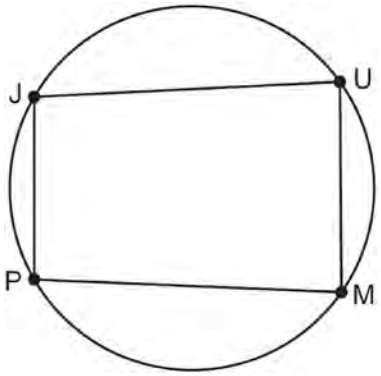
102 As shown in the diagram below, $\overline{AC}$ bisects $\angle BAD$ and $\angle B \cong \angle D$.



Which method could be used to prove $\triangle ABC \cong \triangle ADC$?
1) SSS
2) AAA
3) SAS
4) AAS

103 What is the slope of a line that is perpendicular to the line whose equation is $3x + 5y = 4$?
1) $-\frac{3}{5}$
2) $\frac{3}{5}$
3) $-\frac{5}{3}$
4) $\frac{5}{3}$

104 In the diagram below, quadrilateral *JUMP* is inscribed in a circle..

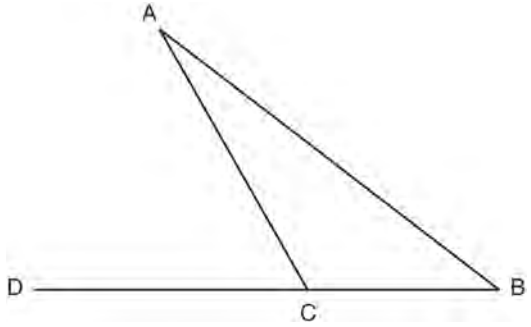


Opposite angles *J* and *M* must be
1) right
2) complementary
3) congruent
4) supplementary

105 In $\triangle FGH$, $m\angle F = 42$ and an exterior angle at vertex *H* has a measure of 104. What is $m\angle G$?
1) 34
2) 62
3) 76
4) 146

106 Which equation represents a line that is parallel to the line whose equation is $y = \frac{3}{2}x - 3$ and passes through the point $(1,2)$?
1) $y = \frac{3}{2}x + \frac{1}{2}$
2) $y = \frac{2}{3}x + \frac{4}{3}$
3) $y = \frac{3}{2}x - 2$
4) $y = -\frac{2}{3}x + \frac{8}{3}$

107 In the diagram below of $\triangle ABC$, side $\overline{BC}$ is extended to point *D*, $m\angle A = x$, $m\angle B = 2x + 15$, and $m\angle ACD = 5x + 5$.



What is $m\angle B$?
1) 5
2) 20
3) 25
4) 55

108 In $\triangle RST$, $m\angle R = 58$ and $m\angle S = 73$. Which inequality is true?
1) $RT < TS < RS$
2) $RS < RT < TS$
3) $RT < RS < TS$
4) $RS < TS < RT$

109 The coordinates of point *A* are $(-3a, 4b)$. If point *A'* is the image of point *A* reflected over the line $y = x$, the coordinates of *A'* are
1) $(4b, -3a)$
2) $(3a, 4b)$
3) $(-3a, -4b)$
4) $(-4b, -3a)$

110 Point P lies on line m. Point P is also included in distinct planes Q, R, S, and T. At most, how many of these planes could be perpendicular to line m?
1) 1
2) 2
3) 3
4) 4

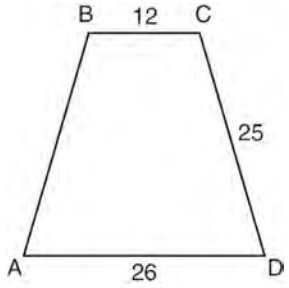
111 Triangle ABC has vertices $A(0,0)$, $B(3,2)$, and $C(0,4)$. The triangle may be classified as
1) equilateral
2) isosceles
3) right
4) scalene

112 Which set of numbers does *not* represent the sides of a right triangle?
1) $\{6,8,10\}$
2) $\{8,15,17\}$
3) $\{8,24,25\}$
4) $\{15,36,39\}$

113 What are the center and the radius of the circle whose equation is $(x-5)^2+(y+3)^2=16$?
1) $(-5,3)$ and 16
2) $(5,-3)$ and 16
3) $(-5,3)$ and 4
4) $(5,-3)$ and 4

114 Which equation represents the line that is perpendicular to $2y=x+2$ and passes through the point $(4,3)$?
1) $y=\frac{1}{2}x-5$
2) $y=\frac{1}{2}x+1$
3) $y=-2x+11$
4) $y=-2x-5$

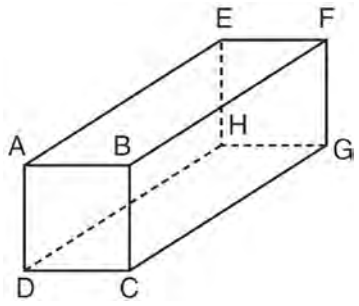
115 In the diagram below of isosceles trapezoid $ABCD$, $AB=CD=25$, $AD=26$, and $BC=12$.



What is the length of an altitude of the trapezoid?
1) 7
2) 14
3) 19
4) 24

116 The number of degrees in the sum of the interior angles of a pentagon is
1) 72
2) 360
3) 540
4) 720

117 The diagram below represents a rectangular solid.



Which statement must be true?

1) $\overline{EH}$ and $\overline{BC}$ are coplanar
2) $\overline{FG}$ and $\overline{AB}$ are coplanar
3) $\overline{EH}$ and $\overline{AD}$ are skew
4) $\overline{FG}$ and $\overline{CG}$ are skew

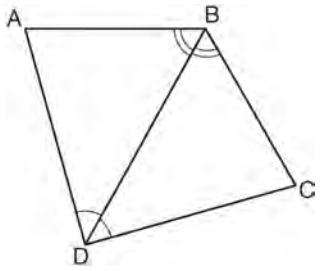
118 Given three distinct quadrilaterals, a square, a rectangle, and a rhombus, which quadrilaterals must have perpendicular diagonals?

1) the rhombus, only
2) the rectangle and the square
3) the rhombus and the square
4) the rectangle, the rhombus, and the square

119 Segment AB is the diameter of circle M. The coordinates of A are $(-4,3)$. The coordinates of M are $(1,5)$. What are the coordinates of B?

1) $(6,7)$
2) $(5,8)$
3) $(-3,8)$
4) $(-5,2)$

120 The diagram below shows a pair of congruent triangles, with $\angle ADB \cong \angle CDB$ and $\angle ABD \cong \angle CBD$.



Which statement must be true?

1) $\angle ADB \cong \angle CBD$
2) $\angle ABC \cong \angle ADC$
3) $\overline{AB} \cong \overline{CD}$
4) $\overline{AD} \cong \overline{CD}$

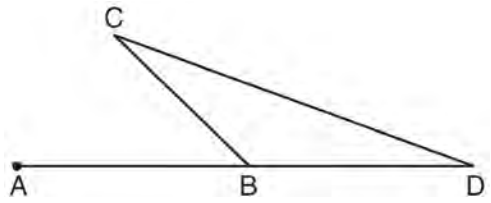
121 Which compound statement is true?

1) A triangle has three sides and a quadrilateral has five sides.
2) A triangle has three sides if and only if a quadrilateral has five sides.
3) If a triangle has three sides, then a quadrilateral has five sides.
4) A triangle has three sides or a quadrilateral has five sides.

122 Lines a and b intersect at point P. Line c passes through P and is perpendicular to the plane containing lines a and b. Which statement must be true?

1) Lines a, b, and c are coplanar.
2) Line a is perpendicular to line b.
3) Line c is perpendicular to both line a and line b.
4) Line c is perpendicular to line a or line b, but not both.

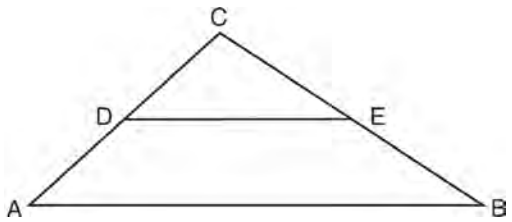
123 In the diagram below of $\triangle BCD$, side $\overline{DB}$ is extended to point A.



Which statement must be true?

1) $m\angle C > m\angle D$
2) $m\angle ABC < m\angle D$
3) $m\angle ABC > m\angle C$
4) $m\angle ABC > m\angle C + m\angle D$

124 In the diagram below, $\overline{DE}$ joins the midpoints of two sides of $\triangle ABC$.



Which statement is *not* true?

1) $CE = \frac{1}{2} CB$
2) $DE = \frac{1}{2} AB$
3) area of $\triangle CDE = \frac{1}{2}$ area of $\triangle CAB$
4) perimeter of $\triangle CDE = \frac{1}{2}$ perimeter of $\triangle CAB$

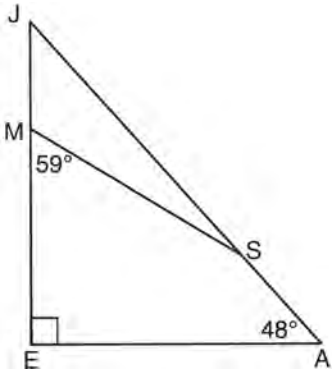
125 What is the measure of each interior angle of a regular hexagon?

1) 60°
2) 120°
3) 135°
4) 270°

126 What is an equation of the line that is perpendicular to the line whose equation is $y = \frac{3}{5}x - 2$ and that passes through the point $(3, -6)$?

1) $y = \frac{5}{3}x - 11$
2) $y = -\frac{5}{3}x + 11$
3) $y = -\frac{5}{3}x - 1$
4) $y = \frac{5}{3}x + 1$

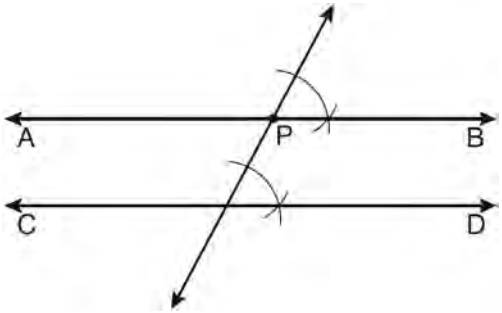
127 In the diagram of $\triangle JEA$ below, $m\angle JEA = 90$ and $m\angle EAJ = 48$. Line segment MS connects points M and S on the triangle, such that $m\angle EMS = 59$.



What is $m\angle JSM$?

1) 163
2) 121
3) 42
4) 17

128 The diagram below shows the construction of $\overleftrightarrow{AB}$ through point P parallel to $\overleftrightarrow{CD}$.



Which theorem justifies this method of construction?

1) If two lines in a plane are perpendicular to a transversal at different points, then the lines are parallel.
2) If two lines in a plane are cut by a transversal to form congruent corresponding angles, then the lines are parallel.
3) If two lines in a plane are cut by a transversal to form congruent alternate interior angles, then the lines are parallel.
4) If two lines in a plane are cut by a transversal to form congruent alternate exterior angles, then the lines are parallel.

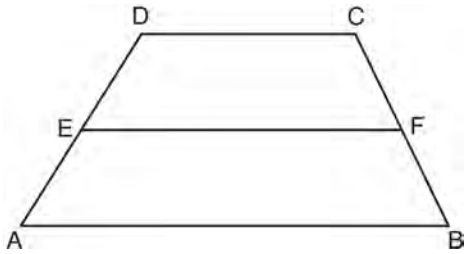
129 Which reason could be used to prove that a parallelogram is a rhombus?

1) Diagonals are congruent.
2) Opposite sides are parallel.
3) Diagonals are perpendicular.
4) Opposite angles are congruent.

130 The angles of triangle ABC are in the ratio of $8:3:4$. What is the measure of the *smallest* angle?

1) 12°
2) 24°
3) 36°
4) 72°

131 In the diagram below, $\overline{EF}$ is the median of trapezoid $ABCD$.



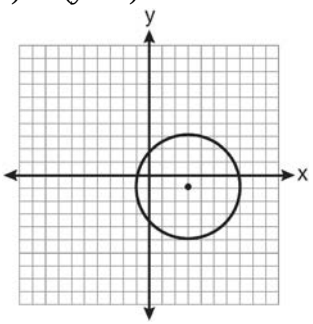
If $AB = 5x - 9$, $DC = x + 3$, and $EF = 2x + 2$, what is the value of x?

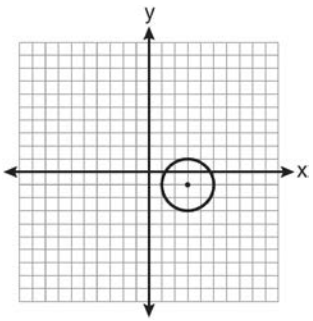
1) 5
2) 2
3) 7
4) 8

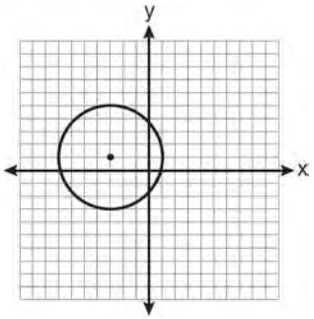
132 What is the length of $\overline{AB}$ with endpoints $A(-1,0)$ and $B(4,-3)$?

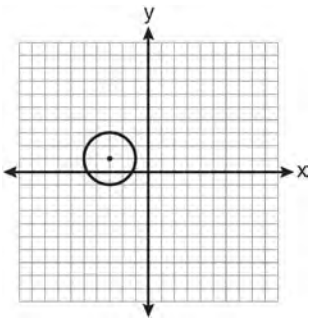
1) $\sqrt{6}$
2) $\sqrt{18}$
3) $\sqrt{34}$
4) $\sqrt{50}$

133 Which graph represents a circle with the equation $(x-3)^2+(y+1)^2=4$?

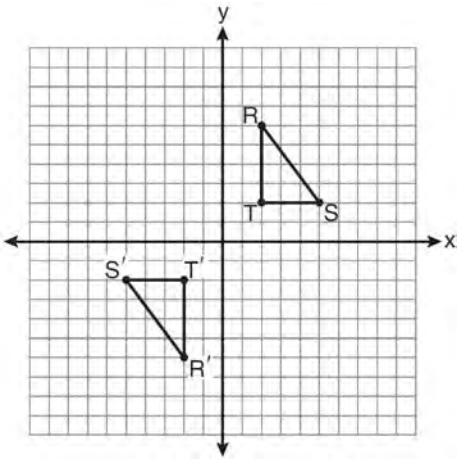
1) 

2) 

3) 

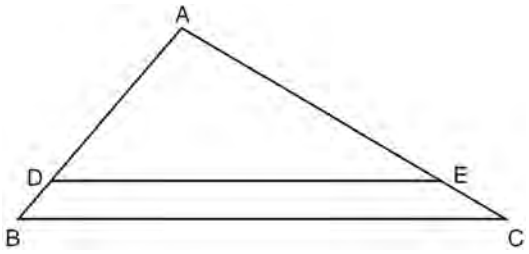
4) 

134 As shown on the graph below, $\triangle R'S'T'$ is the image of $\triangle RST$ under a single transformation.



Which transformation does this graph represent?
1) glide reflection
2) line reflection
3) rotation
4) translation

135 In the diagram of $\triangle ABC$ shown below, $\overline{DE} \parallel \overline{BC}$.



If $AB = 10$, $AD = 8$, and $AE = 12$, what is the length of $\overline{EC}$?
1) 6
2) 2
3) 3
4) 15

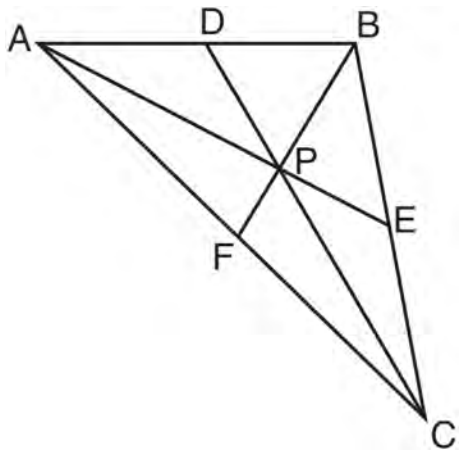
136 What is an equation of the circle with a radius of 5 and center at (1,–4)?

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

137 The sum of the interior angles of a polygon of n sides is

1) 360
2) $\frac{360}{n}$
3) $(n-2)\cdot 180$
4) $\frac{(n-2)\cdot 180}{n}$

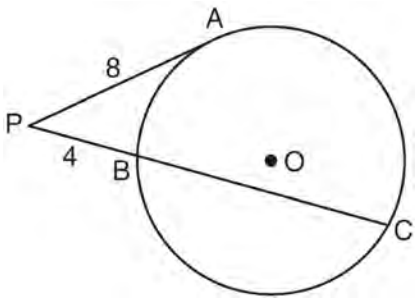
138 In $\triangle ABC$ shown below, P is the centroid and $BF = 18$.



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

1) 6
2) 9
3) 3
4) 12

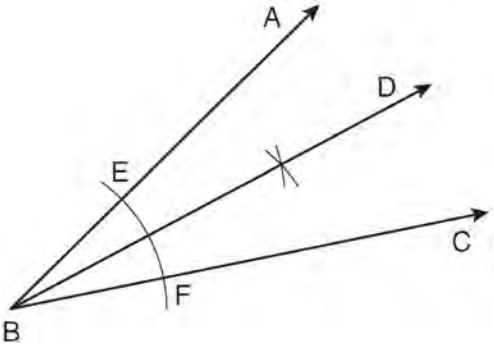
139 In the diagram below of circle O, $\overline{PA}$ is tangent to circle O at A, and $\overline{PBC}$ is a secant with points B and C on the circle.



If $PA = 8$ and $PB = 4$, what is the length of $\overline{BC}$?

1) 20
2) 16
3) 15
4) 12

140 .A straightedge and compass were used to create the construction below. Arc EF was drawn from point B, and arcs with equal radii were drawn from E and F.



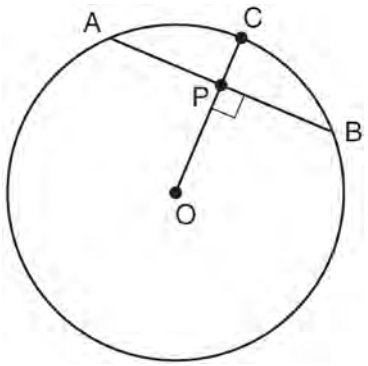
Which statement is *false*?

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

141 Which equation of a circle will have a graph that lies entirely in the first quadrant?

1) $(x-4)^2+(y-5)^2=9$
2) $(x+4)^2+(y+5)^2=9$
3) $(x+4)^2+(y+5)^2=25$
4) $(x-5)^2+(y-4)^2=25$

142 In the diagram below of circle O, radius $\overline{OC}$ is 5 cm. Chord $\overline{AB}$ is 8 cm and is perpendicular to $\overline{OC}$ at point P.



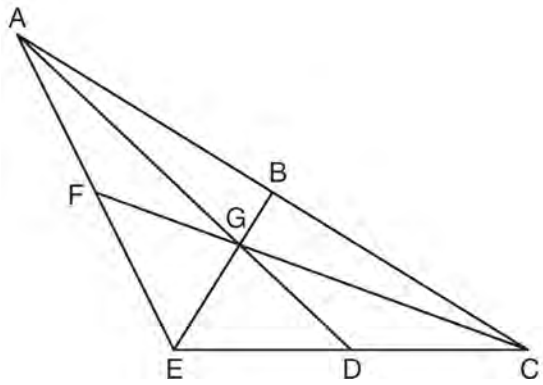
What is the length of $\overline{OP}$, in centimeters?

1) 8
2) 2
3) 3
4) 4

143 The slope of line ℓ is $-\frac{1}{3}$. What is an equation of a line that is perpendicular to line ℓ?

1) $y+2=\frac{1}{3}x$
2) $-2x+6=6y$
3) $9x-3y=27$
4) $3x+y=0$

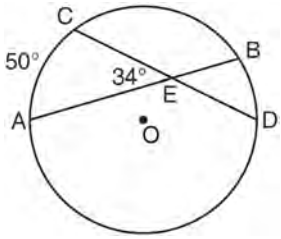
144 In the diagram below of $\triangle ACE$, medians $\overline{AD}$, $\overline{EB}$, and $\overline{CF}$ intersect at G. The length of $\overline{FG}$ is 12 cm.



What is the length, in centimeters, of $\overline{GC}$?

1) 24
2) 12
3) 6
4) 4

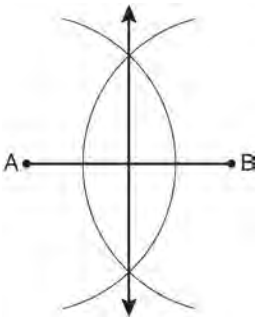
145 In the diagram below of circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E.

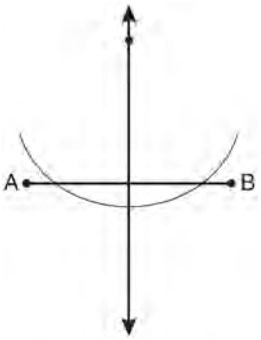


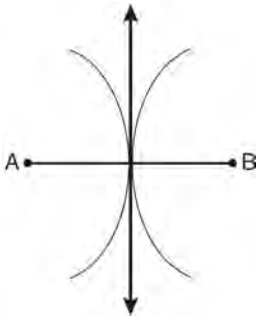
If $m\angle AEC = 34$ and $m\overset{\frown}{AC} = 50$, what is $m\overset{\frown}{DB}$?

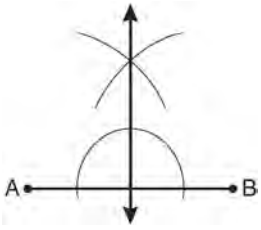
1) 16
2) 18
3) 68
4) 118

146 Which diagram shows the construction of the perpendicular bisector of $\overline{AB}$?

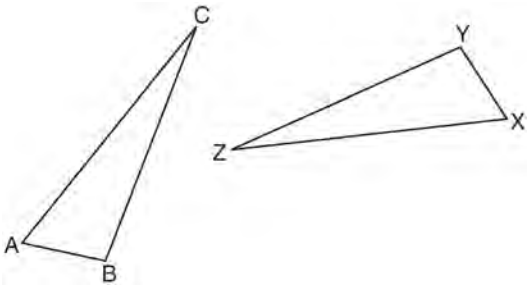
1) 

2) 

3) 

4) 

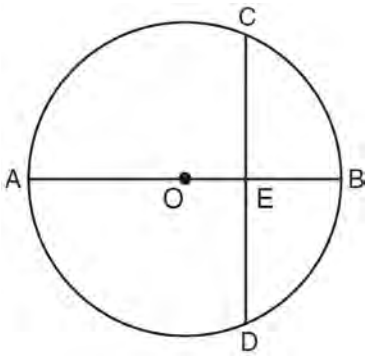
147 In the diagram below, $\triangle ABC \cong \triangle XYZ$.



Which statement must be true?

1) $\angle C \cong \angle Y$
2) $\angle A \cong \angle X$
3) $\overline{AC} \cong \overline{YZ}$
4) $\overline{CB} \cong \overline{XZ}$

148 In the diagram below of circle O, diameter $\overline{AOB}$ is perpendicular to chord $\overline{CD}$ at point E, $OA = 6$, and $OE = 2$.

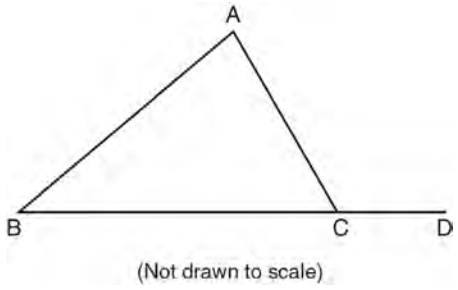


What is the length of $\overline{CE}$?

1) $4\sqrt{3}$
2) $2\sqrt{3}$
3) $8\sqrt{2}$
4) $4\sqrt{2}$

149 In $\triangle ABC$ and $\triangle DEF$, $\frac{AC}{DF} = \frac{CB}{FE}$. Which additional information would prove $\triangle ABC \sim \triangle DEF$?
1) $AC = DF$
2) $CB = FE$
3) $\angle ACB \cong \angle DFE$
4) $\angle BAC \cong \angle EDF$

150 In the diagram below of $\triangle ABC$, $\overline{BC}$ is extended to D.



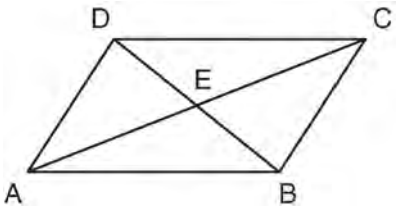
(Not drawn to scale)

If $m\angle A = x^2 - 6x$, $m\angle B = 2x - 3$, and $m\angle ACD = 9x + 27$, what is the value of x?
1) 10
2) 2
3) 3
4) 15

151 In rhombus $ABCD$, the diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E. If $AE = 5$ and $BE = 12$, what is the length of $\overline{AB}$?
1) 7
2) 10
3) 13
4) 17

152 When $\triangle ABC$ is dilated by a scale factor of 2, its image is $\triangle A'B'C'$. Which statement is true?
1) $\overline{AC} \cong \overline{A'C'}$
2) $\angle A \cong \angle A'$
3) perimeter of $\triangle ABC$ = perimeter of $\triangle A'B'C'$
4) 2(area of $\triangle ABC$) = area of $\triangle A'B'C'$

153 In the diagram below, parallelogram $ABCD$ has diagonals $\overline{AC}$ and $\overline{BD}$ that intersect at point E.



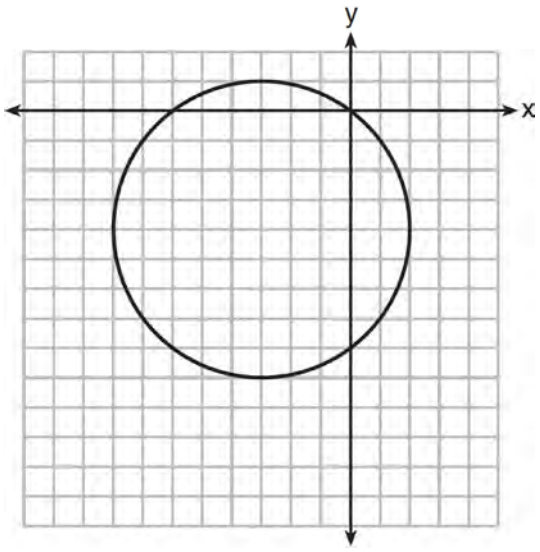
Which expression is *not* always true?
1) $\angle DAE \cong \angle BCE$
2) $\angle DEC \cong \angle BEA$
3) $\overline{AC} \cong \overline{DB}$
4) $\overline{DE} \cong \overline{EB}$

154 What is the length of the line segment whose endpoints are $(1,-4)$ and $(9,2)$?
1) 5
2) $2\sqrt{17}$
3) 10
4) $2\sqrt{26}$

155 Quadrilateral *MNOP* is a trapezoid with $\overline{MN} \parallel \overline{OP}$. If $M'N'O'P'$ is the image of *MNOP* after a reflection over the *x*-axis, which two sides of quadrilateral $M'N'O'P'$ are parallel?

1) $\overline{M'N'}$ and $\overline{O'P'}$
2) $\overline{M'N'}$ and $\overline{N'O'}$
3) $\overline{P'M'}$ and $\overline{O'P'}$
4) $\overline{P'M'}$ and $\overline{N'O'}$

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



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

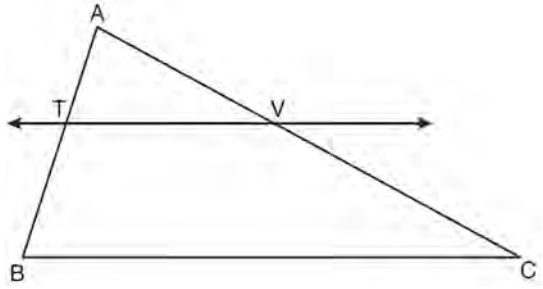
157 Lines *m* and *n* intersect at point *A*. Line *k* is perpendicular to both lines *m* and *n* at point *A*. Which statement *must* be true?

1) Lines *m*, *n*, and *k* are in the same plane.
2) Lines *m* and *n* are in two different planes.
3) Lines *m* and *n* are perpendicular to each other.
4) Line *k* is perpendicular to the plane containing lines *m* and *n*.

158 When writing a geometric proof, which angle relationship could be used alone to justify that two angles are congruent?

1) supplementary angles
2) linear pair of angles
3) adjacent angles
4) vertical angles

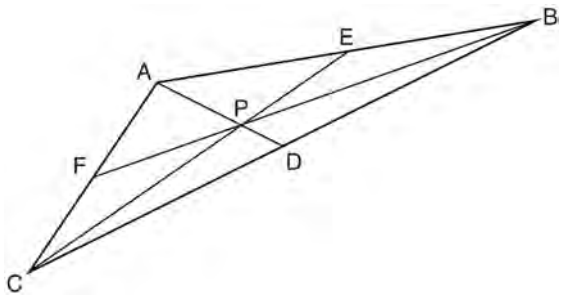
159 In the diagram below of $\triangle ABC$, $\overleftrightarrow{TV} \parallel \overline{BC}$, $AT = 5$, $TB = 7$, and $AV = 10$.



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

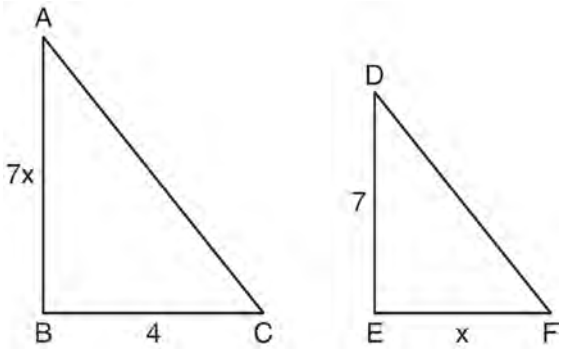
1) $3\frac{1}{2}$
2) $7\frac{1}{7}$
3) 14
4) 24

160 In the diagram below of $\triangle ABC$, $\overline{AE} \cong \overline{BE}$, $\overline{AF} \cong \overline{CF}$, and $\overline{CD} \cong \overline{BD}$.



Point P must be the
1) centroid
2) circumcenter
3) Incenter
4) orthocenter

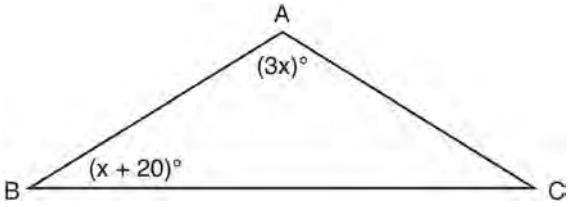
161 As shown in the diagram below, $\triangle ABC \sim \triangle DEF$, $AB = 7x$, $BC = 4$, $DE = 7$, and $EF = x$.



What is the length of $\overline{AB}$?
1) 28
2) 2
3) 14
4) 4

162 For a triangle, which two points of concurrence could be located outside the triangle?
1) incenter and centroid
2) centroid and orthocenter
3) incenter and circumcenter
4) circumcenter and orthocenter

163 In the diagram below of $\triangle ABC$, $\overline{AB} \cong \overline{AC}$, $m\angle A = 3x$, and $m\angle B = x + 20$.



What is the value of x?
1) 10
2) 28
3) 32
4) 40

164 The volume, in cubic centimeters, of a sphere whose diameter is 6 centimeters is
1) 12π
2) 36π
3) 48π
4) 288π

165 In $\triangle PQR$, $\angle PRQ$ is a right angle and $\overline{RT}$ is drawn perpendicular to hypotenuse $\overline{PQ}$. If $PT = x$, $RT = 6$, and $TQ = 4x$, what is the length of $\overline{PQ}$?
1) 9
2) 12
3) 3
4) 15

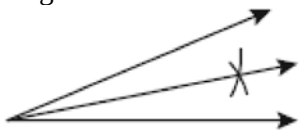
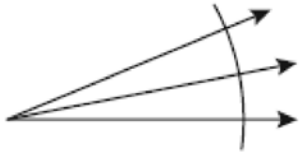
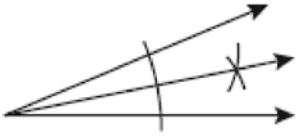
Geometry Multiple Choice Regents Exam Questions

166 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

167 What is the equation of a line that passes through the point $(-3,-11)$ and is parallel to the line whose equation is $2x - y = 4$?
1) $y = 2x + 5$
2) $y = 2x - 5$
3) $y = \frac{1}{2}x + \frac{25}{2}$
4) $y = -\frac{1}{2}x - \frac{25}{2}$

168 In isosceles trapezoid $ABCD$, $\overline{AB} \cong \overline{CD}$. If $BC = 20$, $AD = 36$, and $AB = 17$, what is the length of the altitude of the trapezoid?
1) 10
2) 12
3) 15
4) 16

169 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

170 Which illustration shows the correct construction of an angle bisector?
1) 
2) 
3) 
4) 

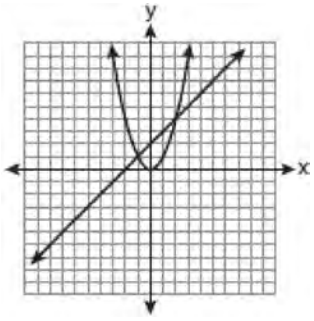
171 What is the length of the line segment with endpoints $(-6,4)$ and $(2,-5)$?
1) $\sqrt{13}$
2) $\sqrt{17}$
3) $\sqrt{72}$
4) $\sqrt{145}$

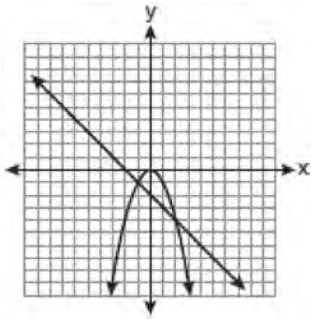
172 A transformation of a polygon that always preserves both length and orientation is
1) dilation
2) translation
3) line reflection
4) glide reflection

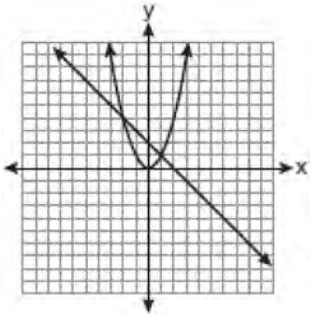
173 Which graph could be used to find the solution to the following system of equations?

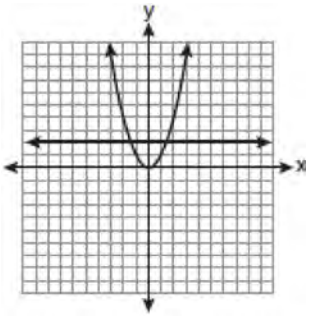
$$y = -x + 2$$

$$y = x^2$$

1) 

2) 

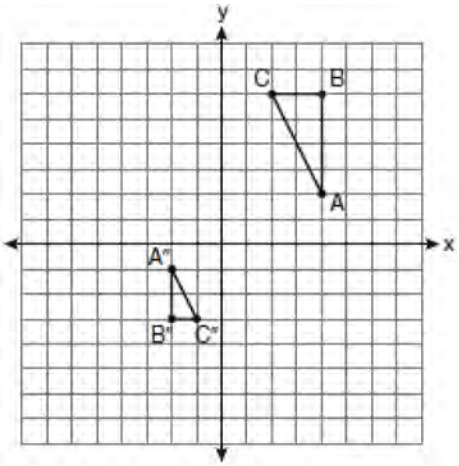
3) 

4) 

174 In $\triangle ABC$, point D is on $\overline{AB}$, and point E is on $\overline{BC}$ such that $\overline{DE} \parallel \overline{AC}$. If $DB = 2$, $DA = 7$, and $DE = 3$, what is the length of $\overline{AC}$?

1) 8
2) 9
3) 10.5
4) 13.5

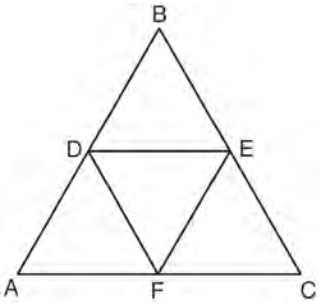
175 After a composition of transformations, the coordinates $A(4,2)$, $B(4,6)$, and $C(2,6)$ become $A''(-2,-1)$, $B''(-2,-3)$, and $C''(-1,-3)$, as shown on the set of axes below.



Which composition of transformations was used?

1) $R_{180^\circ} \circ D_2$
2) $R_{90^\circ} \circ D_2$
3) $D_{\frac{1}{2}} \circ R_{180^\circ}$
4) $D_{\frac{1}{2}} \circ R_{90^\circ}$

176 In the diagram below, the vertices of $\triangle DEF$ are the midpoints of the sides of equilateral triangle ABC, and the perimeter of $\triangle ABC$ is 36 cm.

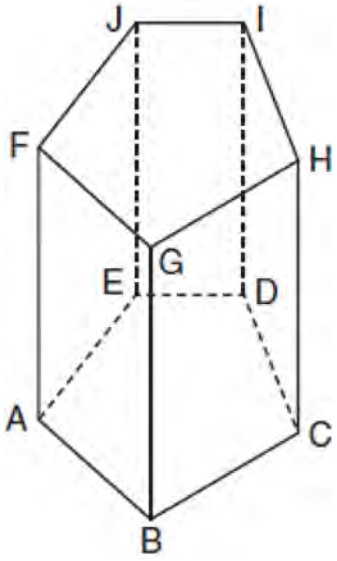


What is the length, in centimeters, of $\overline{EF}$?
1) 6
2) 12
3) 18
4) 4

177 What is the slope of a line perpendicular to the line whose equation is $y = 3x + 4$?
1) $\frac{1}{3}$
2) $-\frac{1}{3}$
3) 3
4) –3

178 Line segment AB has endpoints $A(2,-3)$ and $B(-4,6)$. What are the coordinates of the midpoint of $\overline{AB}$?
1) $(-2,3)$
2) $\left(-1,1\frac{1}{2}\right)$
3) $(-1,3)$
4) $\left(3,4\frac{1}{2}\right)$

179 The diagram below shows a right pentagonal prism.



Which statement is always true?
1) $\overline{BC} \parallel \overline{ED}$
2) $\overline{FG} \parallel \overline{CD}$
3) $\overline{FJ} \parallel \overline{IH}$
4) $\overline{GB} \parallel \overline{HC}$

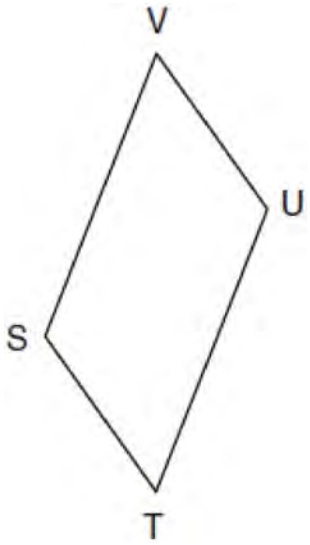
180 Which transformation is *not* always an isometry?
1) rotation
2) dilation
3) reflection
4) translation

181 What is the slope of a line perpendicular to the line whose equation is $2y = -6x + 8$?
1) –3
2) $\frac{1}{6}$
3) $\frac{1}{3}$
4) –6

182 The diagonal $\overline{AC}$ is drawn in parallelogram $ABCD$. Which method can *not* be used to prove that $\triangle ABC \cong \triangle CDA$?
1) SSS
2) SAS
3) SSA
4) ASA

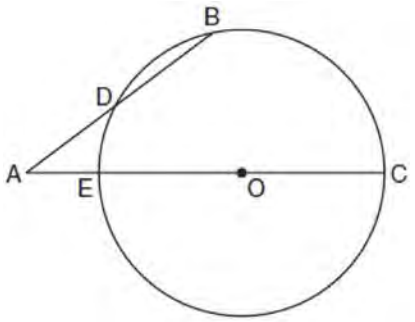
183 What is the measure of an interior angle of a regular octagon?
1) 45°
2) 60°
3) 120°
4) 135°

184 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

185 In the diagram below of circle O, secant $\overline{AB}$ intersects circle O at D, secant $\overline{AOC}$ intersects circle O at E, $AE = 4$, $AB = 12$, and $DB = 6$.



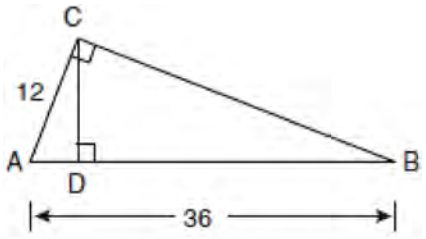
(Not drawn to scale)

What is the length of $\overline{OC}$?
1) 4.5
2) 7
3) 9
4) 14

186 Point A is located at $(4,-7)$. The point is reflected in the x-axis. Its image is located at
1) $(-4,7)$
2) $(-4,-7)$
3) $(4,7)$
4) $(7,-4)$

187 The diameter of a circle has endpoints at $(-2,3)$ and $(6,3)$. What is an equation of the circle?
1) $(x-2)^2 + (y-3)^2 = 16$
2) $(x-2)^2 + (y-3)^2 = 4$
3) $(x+2)^2 + (y+3)^2 = 16$
4) $(x+2)^2 + (y+3)^2 = 4$

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



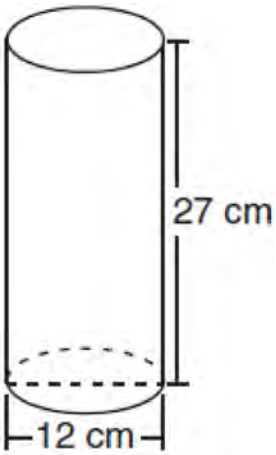
If $AB = 36$ and $AC = 12$, what is the length of $\overline{AD}$?
1) 32
2) 6
3) 3
4) 4

189 If two different lines are perpendicular to the same plane, they are
1) collinear
2) coplanar
3) congruent
4) consecutive

190 Point *P* is on line *m*. What is the total number of planes that are perpendicular to line *m* and pass through point *P*?
1) 1
2) 2
3) 0
4) infinite

191 A circle is represented by the equation $x^2 + (y+3)^2 = 13$. What are the coordinates of the center of the circle and the length of the radius?
1) $(0,3)$ and 13
2) $(0,3)$ and $\sqrt{13}$
3) $(0,-3)$ and 13
4) $(0,-3)$ and $\sqrt{13}$

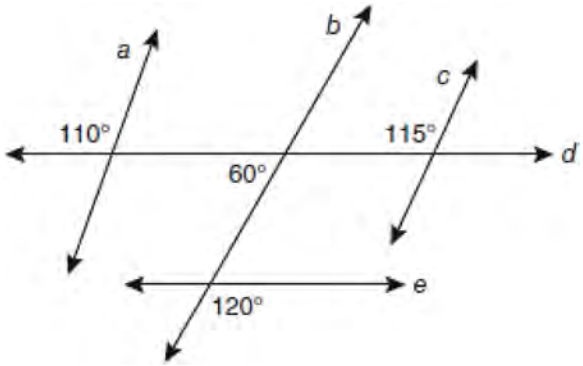
192 Which expression represents the volume, in cubic centimeters, of the cylinder represented in the diagram below?



1) 162π
2) 324π
3) 972π
4) $3,888\pi$

193 Which equation represents a line perpendicular to the line whose equation is $2x + 3y = 12$?
1) $6y = -4x + 12$
2) $2y = 3x + 6$
3) $2y = -3x + 6$
4) $3y = -2x + 12$

194 Based on the diagram below, which statement is true?

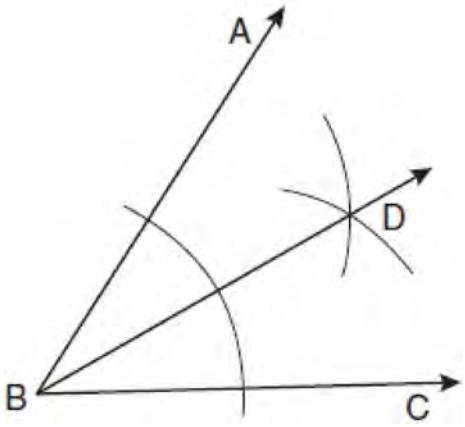


1) $a \parallel b$
2) $a \parallel c$
3) $b \parallel c$
4) $d \parallel e$

195 If the diagonals of a quadrilateral do *not* bisect each other, then the quadrilateral could be a
1) rectangle
2) rhombus
3) square
4) trapezoid

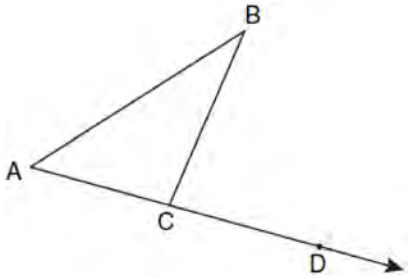
196 What is the inverse of the statement "If two triangles are not similar, their corresponding angles are not congruent"?
1) If two triangles are similar, their corresponding angles are not congruent.
2) If corresponding angles of two triangles are not congruent, the triangles are not similar.
3) If two triangles are similar, their corresponding angles are congruent.
4) If corresponding angles of two triangles are congruent, the triangles are similar.

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



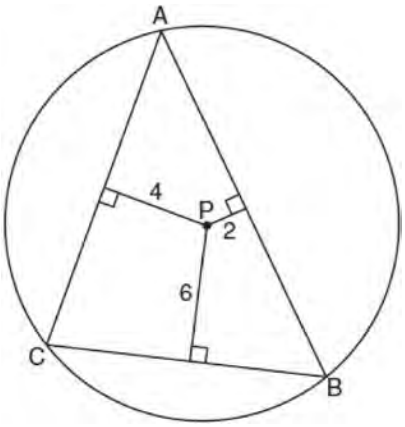
1) $\text{m}\angle ABD = \frac{1}{2}\text{m}\angle CBD$
2) $\text{m}\angle ABD = \text{m}\angle CBD$
3) $\text{m}\angle ABD = \text{m}\angle ABC$
4) $\text{m}\angle CBD = \frac{1}{2}\text{m}\angle ABD$

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



If $\text{m}\angle BCD = 6x + 2$, $\text{m}\angle BAC = 3x + 15$, and $\text{m}\angle ABC = 2x - 1$, what is the value of x?
1) 12
2) $14\frac{10}{11}$
3) 16
4) $18\frac{1}{9}$

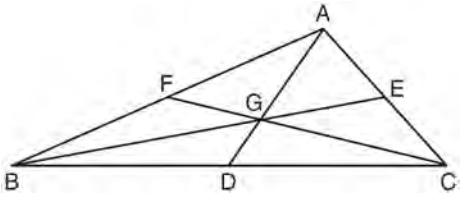
199 In the diagram below, $\triangle ABC$ is inscribed in circle P. The distances from the center of circle P to each side of the triangle are shown.



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 $AB > BC$

200 In the diagram below of $\triangle ABC$, medians $\overline{AD}$, $\overline{BE}$, and $\overline{CF}$ intersect at G.



If $CF = 24$, what is the length of $\overline{FG}$?

1) 8
2) 10
3) 12
4) 16

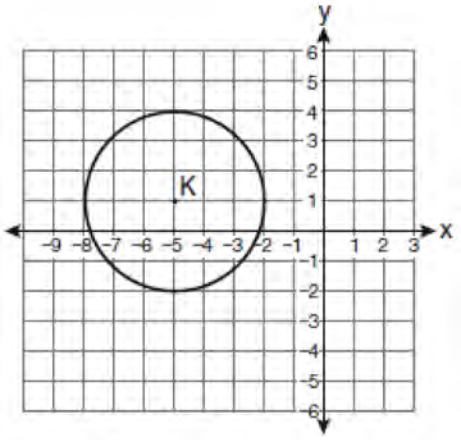
201 If the endpoints of $\overline{AB}$ are $A(-4,5)$ and $B(2,-5)$, what is the length of $\overline{AB}$?

1) $2\sqrt{34}$
2) 2
3) $\sqrt{61}$
4) 8

202 The equation of a circle is $x^2 + (y-7)^2 = 16$. What are the center and radius of the circle?

1) center = $(0,7)$; radius = 4
2) center = $(0,7)$; radius = 16
3) center = $(0,-7)$; radius = 4
4) center = $(0,-7)$; radius = 16

203 Which equation represents circle K shown in the graph below?

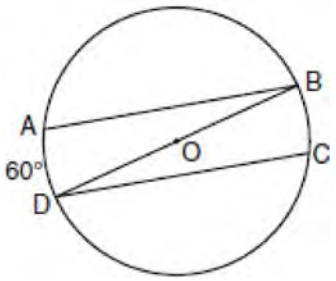


1) $(x+5)^2 + (y-1)^2 = 3$
2) $(x+5)^2 + (y-1)^2 = 9$
3) $(x-5)^2 + (y+1)^2 = 3$
4) $(x-5)^2 + (y+1)^2 = 9$

204 A right circular cylinder has an altitude of 11 feet and a radius of 5 feet. What is the lateral area, in square feet, of the cylinder, to the *nearest tenth*?
1) 172.7
2) 172.8
3) 345.4
4) 345.6

205 Juliann plans on drawing $\triangle ABC$, where the measure of $\angle A$ can range from 50° to 60° and the measure of $\angle B$ can range from 90° to 100°. Given these conditions, what is the correct range of measures possible for $\angle C$?
1) 20° to 40°
2) 30° to 50°
3) 80° to 90°
4) 120° to 130°

206 In the diagram of circle O below, chords $\overline{AB}$ and $\overline{CD}$ are parallel, and $\overline{BD}$ is a diameter of the circle.

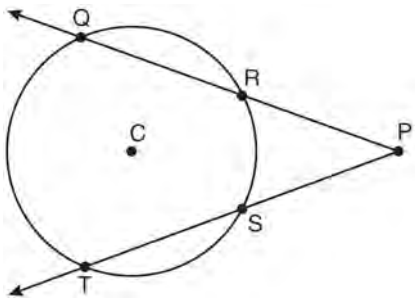


If $m\overset{\frown}{AD} = 60$, what is $m\angle CDB$?
1) 20
2) 30
3) 60
4) 120

207 In three-dimensional space, two planes are parallel and a third plane intersects both of the parallel planes. The intersection of the planes is a
1) plane
2) point
3) pair of parallel lines
4) pair of intersecting lines

208 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) $2\sqrt{5}$

209 In the diagram below of circle C, $m\overset{\frown}{QT} = 140$, and $m\angle P = 40$.



What is $m\overset{\frown}{RS}$?
1) 50
2) 60
3) 90
4) 110

210 The endpoints of $\overline{AB}$ are $A(3,2)$ and $B(7,1)$. If $\overline{A''B''}$ is the result of the transformation of $\overline{AB}$ under $D_2 \circ T_{-4,3}$ what are the coordinates of A'' and B''?

1) $A''(-2,10)$ and $B''(6,8)$
2) $A''(-1,5)$ and $B''(3,4)$
3) $A''(2,7)$ and $B''(10,5)$
4) $A''(14,-2)$ and $B''(22,-4)$

211 Side $\overline{PQ}$ of $\triangle PQR$ is extended through Q to point T. Which statement is *not* always true?

1) $m\angle RQT > m\angle R$
2) $m\angle RQT > m\angle P$
3) $m\angle RQT = m\angle P + m\angle R$
4) $m\angle RQT > m\angle PQR$

212 Two lines are represented by the equations $-\frac{1}{2}y = 6x + 10$ and $y = mx$. For which value of m will the lines be parallel?

1) -12
2) -3
3) 3
4) 12

213 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) $-\frac{4}{3}$

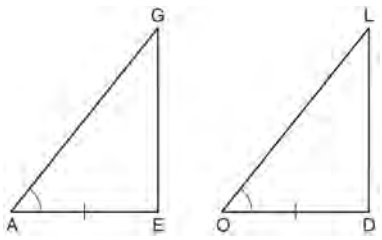
214 If the surface area of a sphere is represented by 144π, what is the volume in terms of π?

1) 36π
2) 48π
3) 216π
4) 288π

215 The coordinates of the vertices of parallelogram $ABCD$ are $A(-3,2)$, $B(-2,-1)$, $C(4,1)$, and $D(3,4)$. The slopes of which line segments could be calculated to show that $ABCD$ is a rectangle?

1) $\overline{AB}$ and $\overline{DC}$
2) $\overline{AB}$ and $\overline{BC}$
3) $\overline{AD}$ and $\overline{BC}$
4) $\overline{AC}$ and $\overline{BD}$

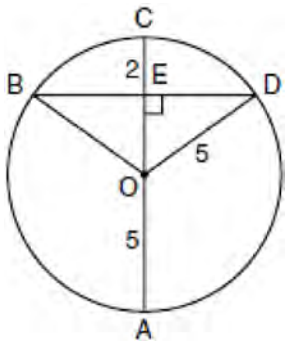
216 In the diagram below of $\triangle AGE$ and $\triangle OLD$, $\angle GAE \cong \angle LOD$, and $\overline{AE} \cong \overline{OD}$.



To prove that $\triangle AGE$ and $\triangle OLD$ are congruent by SAS, what other information is needed?

1) $\overline{GE} \cong \overline{LD}$
2) $\overline{AG} \cong \overline{OL}$
3) $\angle AGE \cong \angle OLD$
4) $\angle AEG \cong \angle ODL$

217 In the diagram below, circle O has a radius of 5, and $CE = 2$. Diameter $\overline{AC}$ is perpendicular to chord $\overline{BD}$ at E.

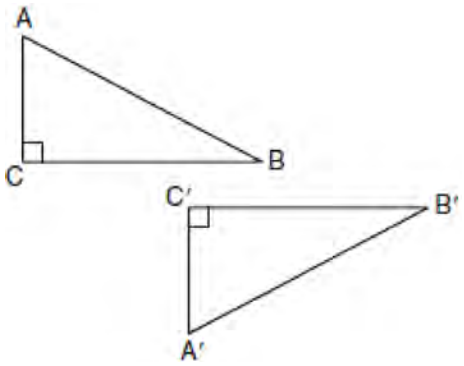


What is the length of $\overline{BD}$?
1) 12
2) 10
3) 8
4) 4

218 What is the slope of a line perpendicular to the line whose equation is $5x + 3y = 8$?
1) $\frac{5}{3}$
2) $\frac{3}{5}$
3) $-\frac{3}{5}$
4) $-\frac{5}{3}$

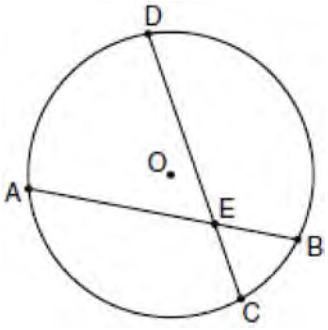
219 Which equation represents the circle whose center is $(-2,3)$ and whose radius is 5?
1) $(x-2)^2 + (y+3)^2 = 5$
2) $(x+2)^2 + (y-3)^2 = 5$
3) $(x+2)^2 + (y-3)^2 = 25$
4) $(x-2)^2 + (y+3)^2 = 25$

220 In the diagram below, which transformation was used to map $\triangle ABC$ to $\triangle A'B'C'$?



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

221 In the diagram of circle O below, chord $\overline{AB}$ intersects chord $\overline{CD}$ at E, $DE = 2x + 8$, $EC = 3$, $AE = 4x - 3$, and $EB = 4$.

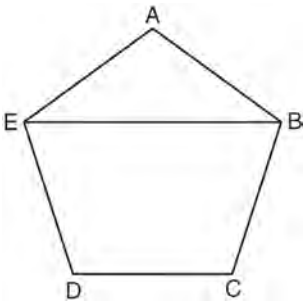


What is the value of x?
1) 1
2) 3.6
3) 5
4) 10.25

222 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) $2y + 10x = 8$

223 In the diagram below of regular pentagon $ABCDE$, $\overline{EB}$ is drawn.



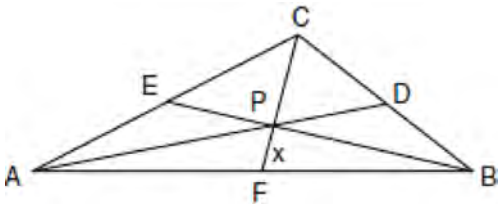
What is the measure of $\angle AEB$?

1) 36°
2) 54°
3) 72°
4) 108°

224 What is the slope of a line perpendicular to the line whose equation is $y = -\frac{2}{3}x - 5$?

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

225 In the diagram of $\triangle ABC$ below, Jose found centroid P by constructing the three medians. He measured $\overline{CF}$ and found it to be 6 inches.



If $PF = x$, which equation can be used to find x?

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

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

1) $(-4,2)$
2) $(4,-2)$
3) $(-4,-2)$
4) $(2,-4)$

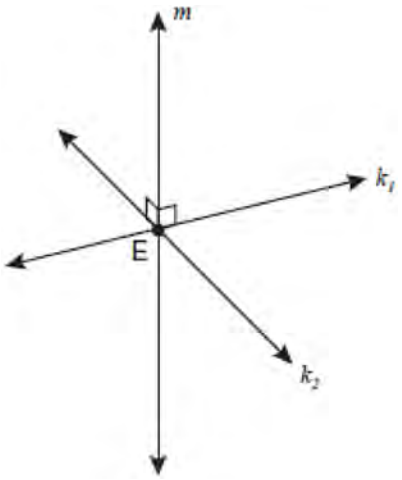
227 A right circular cylinder has a volume of 1,000 cubic inches and a height of 8 inches. What is the radius of the cylinder to the *nearest tenth of an inch*?

1) 6.3
2) 11.2
3) 19.8
4) 39.8

228 Which set of numbers represents the lengths of the sides of a triangle?

1) $\{5,18,13\}$
2) $\{6,17,22\}$
3) $\{16,24,7\}$
4) $\{26,8,15\}$

229 Lines k_1 and k_2 intersect at point E. Line m is perpendicular to lines k_1 and k_2 at point E.



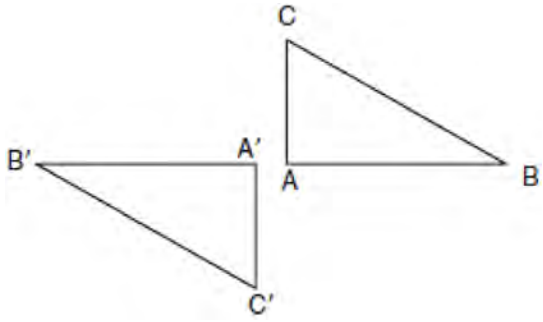
Which statement is always true?

1) Lines k_1 and k_2 are perpendicular.
2) Line m is parallel to the plane determined by lines k_1 and k_2.
3) Line m is perpendicular to the plane determined by lines k_1 and k_2.
4) Line m is coplanar with lines k_1 and k_2.

230 What is the negation of the statement "The Sun is shining"?

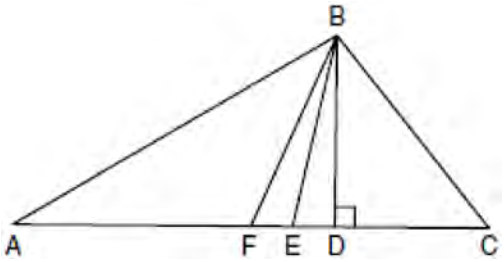
1) It is cloudy.
2) It is daytime.
3) It is not raining.
4) The Sun is not shining.

231 In the diagram below, under which transformation will $\triangle A'B'C'$ be the image of $\triangle ABC$?



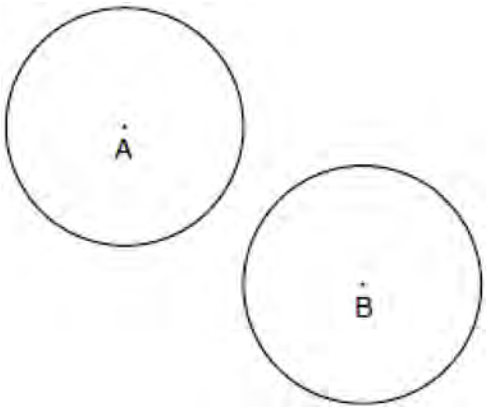
1) rotation
2) dilation
3) translation
4) glide reflection

232 Given $\triangle ABC$ with base $\overline{AFEDC}$, median $\overline{BF}$, altitude $\overline{BD}$, and $\overline{BE}$ bisects $\angle ABC$, which conclusion is valid?



1) $\angle FAB \cong \angle ABF$
2) $\angle ABF \cong \angle CBD$
3) $\overline{CE} \cong \overline{EA}$
4) $\overline{CF} \cong \overline{FA}$

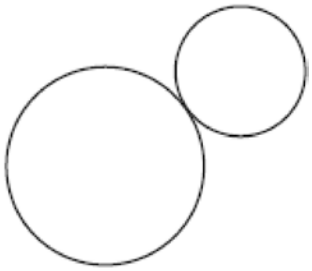
233 In the diagram below, circle *A* and circle *B* are shown.



What is the total number of lines of tangency that are common to circle *A* and circle *B*?

1) 1
2) 2
3) 3
4) 4

234 How many common tangent lines can be drawn to the two externally tangent circles shown below?



1) 1
2) 2
3) 3
4) 4

235 In which triangle do the three altitudes intersect outside the triangle?

1) a right triangle
2) an acute triangle
3) an obtuse triangle
4) an equilateral triangle

236 A transversal intersects two lines. Which condition would always make the two lines parallel?

1) Vertical angles are congruent.
2) Alternate interior angles are congruent.
3) Corresponding angles are supplementary.
4) Same-side interior angles are complementary.

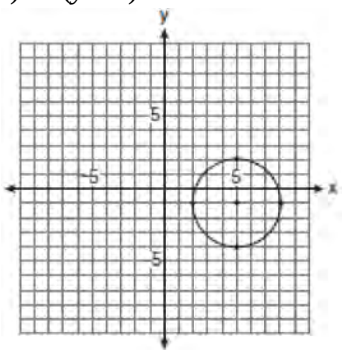
237 The lines represented by the equations $y + \frac{1}{2}x = 4$ and $3x + 6y = 12$ are

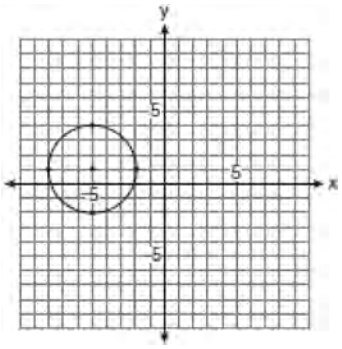
1) the same line
2) parallel
3) perpendicular
4) neither parallel nor perpendicular

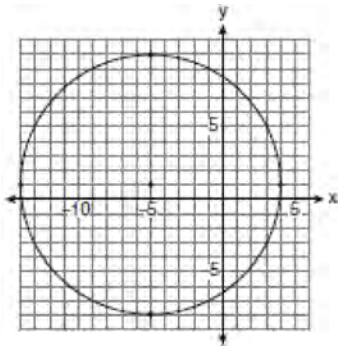
238 Point *A* is not contained in plane $\mathcal{B}$. How many lines can be drawn through point *A* that will be perpendicular to plane $\mathcal{B}$?

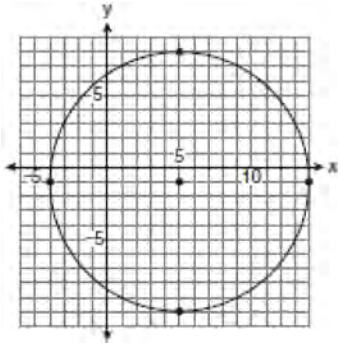
1) one
2) two
3) zero
4) infinite

239 Which graph represents a circle with the equation $(x-5)^2+(y+1)^2=9$?

1) 

2) 

3) 

4) 

240 One step in a construction uses the endpoints of $\overline{AB}$ to create arcs with the same radii. The arcs intersect above and below the segment. What is the relationship of $\overline{AB}$ and the line connecting the points of intersection of these arcs?

1) collinear
2) congruent
3) parallel
4) perpendicular

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

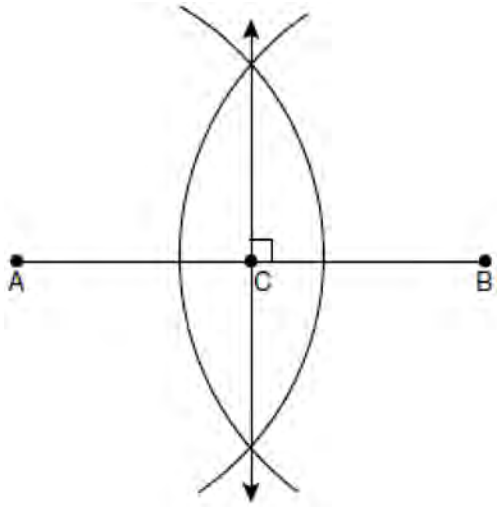
242 Which transformation can map the letter **S** onto itself?

1) glide reflection
2) translation
3) line reflection
4) rotation

243 What is the converse of the statement "If Bob does his homework, then George gets candy"?

1) If George gets candy, then Bob does his homework.
2) Bob does his homework if and only if George gets candy.
3) If George does not get candy, then Bob does not do his homework.
4) If Bob does not do his homework, then George does not get candy.

244 The diagram below shows the construction of the perpendicular bisector of $\overline{AB}$.



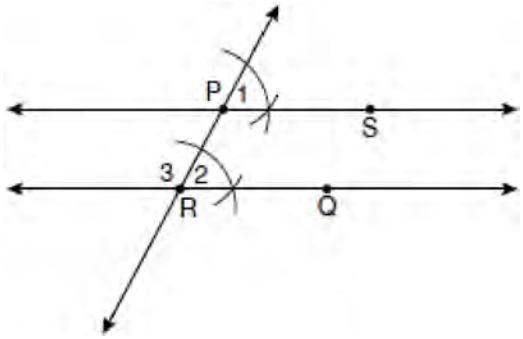
Which statement is *not* true?

1) $AC = CB$
2) $CB = \frac{1}{2}AB$
3) $AC = 2AB$
4) $AC + CB = AB$

245 Line k is drawn so that it is perpendicular to two distinct planes, P and R. What must be true about planes P and R?

1) Planes P and R are skew.
2) Planes P and R are parallel.
3) Planes P and R are perpendicular.
4) Plane P intersects plane R but is not perpendicular to plane R.

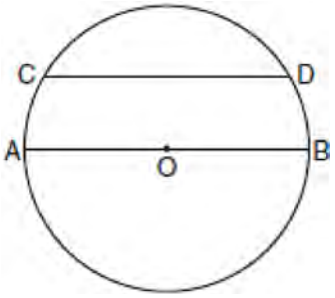
246 The diagram below illustrates the construction of $\overleftrightarrow{PS}$ parallel to $\overleftrightarrow{RQ}$ through point P.



Which statement justifies this construction?

1) $m\angle 1 = m\angle 2$
2) $m\angle 1 = m\angle 3$
3) $\overline{PR} \cong \overline{RQ}$
4) $\overline{PS} \cong \overline{RQ}$

247 In the diagram of circle O below, chord $\overline{CD}$ is parallel to diameter $\overline{AOB}$ and $m\overset{\frown}{AC} = 30$.



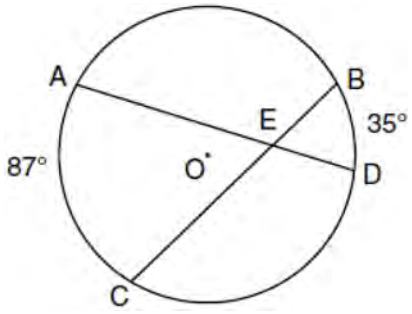
What is $m\overset{\frown}{CD}$?

1) 150
2) 120
3) 100
4) 60

248 Line segment AB is tangent to circle O at A. Which type of triangle is always formed when points A, B, and O are connected?

1) right
2) obtuse
3) scalene
4) isosceles

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



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

1) 87
2) 61
3) 43.5
4) 26

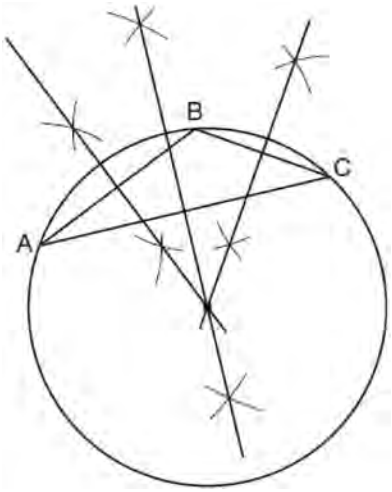
250 What is the solution of the following system of equations?

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

$$y = 2x + 5$$

1) $(0,-4)$
2) $(-4,0)$
3) $(-4,-3)$ and $(0,5)$
4) $(-3,-4)$ and $(5,0)$

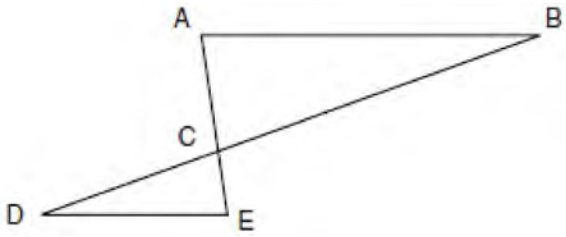
251 The diagram below shows the construction of the center of the circle circumscribed about $\triangle ABC$.



This construction represents how to find the intersection of

1) the angle bisectors of $\triangle ABC$
2) the medians to the sides of $\triangle ABC$
3) the altitudes to the sides of $\triangle ABC$
4) the perpendicular bisectors of the sides of $\triangle ABC$

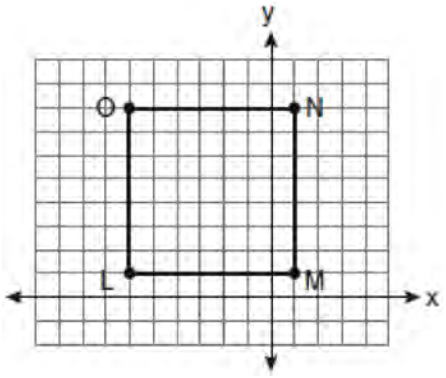
252 In the diagram of $\triangle ABC$ and $\triangle EDC$ below, $\overline{AE}$ and $\overline{BD}$ intersect at C, and $\angle CAB \cong \angle CED$.



Which method can be used to show that $\triangle ABC$ must be similar to $\triangle EDC$?

1) SAS
2) AA
3) SSS
4) HL

253 Square *LMNO* is shown in the diagram below.



What are the coordinates of the midpoint of diagonal $\overline{LN}$?

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

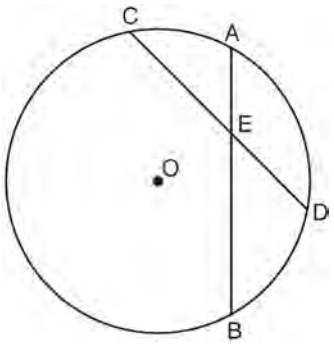
254 A quadrilateral whose diagonals bisect each other and are perpendicular is a

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

255 What is the equation of a line that is parallel to the line whose equation is $y = x + 2$?

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

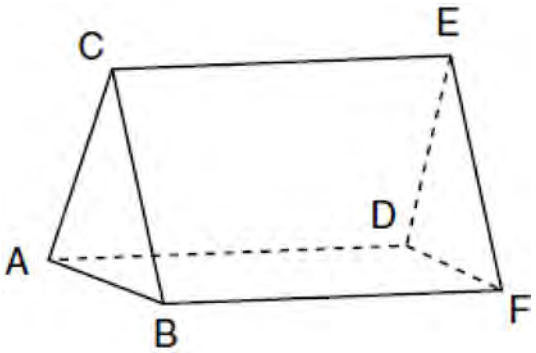
256 In the diagram below of circle *O*, chords $\overline{AB}$ and $\overline{CD}$ intersect at *E*.



If $CE = 10$, $ED = 6$, and $AE = 4$, what is the length of $\overline{EB}$?

1) 15
2) 12
3) 6.7
4) 2.4

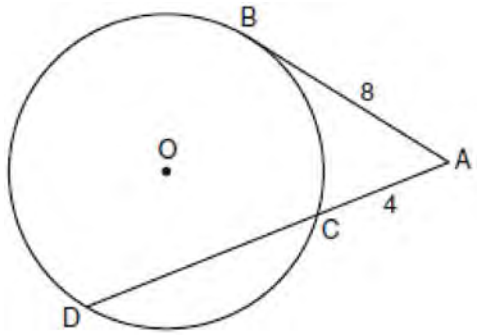
257 The figure in the diagram below is a triangular prism.



Which statement must be true?

1) $\overline{DE} \cong \overline{AB}$
2) $\overline{AD} \cong \overline{BC}$
3) $\overline{AD} \parallel \overline{CE}$
4) $\overline{DE} \parallel \overline{BC}$

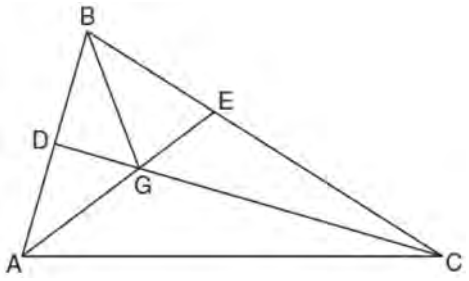
258 In the diagram below, tangent $\overline{AB}$ and secant $\overline{ACD}$ are drawn to circle O from an external point A, $AB = 8$, and $AC = 4$.



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

1) 16
2) 13
3) 12
4) 10

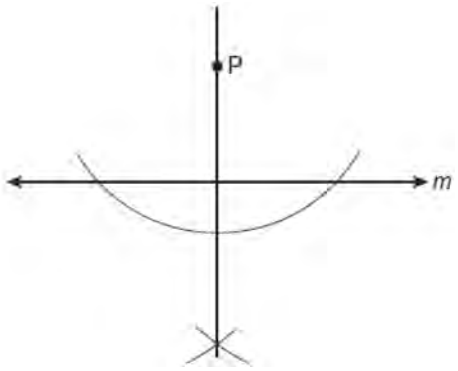
259 In the diagram below of $\triangle ABC$, $\overline{CD}$ is the bisector of $\angle BCA$, $\overline{AE}$ is the bisector of $\angle CAB$, and $\overline{BG}$ is drawn.



Which statement must be true?

1) $DG = EG$
2) $AG = BG$
3) $\angle AEB \cong \angle AEC$
4) $\angle DBG \cong \angle EBG$

260 The diagram below shows the construction of a line through point P perpendicular to line m.



Which statement is demonstrated by this construction?

1) If a line is parallel to a line that is perpendicular to a third line, then the line is also perpendicular to the third line.
2) The set of points equidistant from the endpoints of a line segment is the perpendicular bisector of the segment.
3) Two lines are perpendicular if they are equidistant from a given point.
4) Two lines are perpendicular if they intersect to form a vertical line.

261 In $\triangle ABC$, $m\angle A = 95$, $m\angle B = 50$, and $m\angle C = 35$. Which expression correctly relates the lengths of the sides of this triangle?

1) $AB < BC < CA$
2) $AB < AC < BC$
3) $AC < BC < AB$
4) $BC < AC < AB$

262 The vertices of $\triangle ABC$ are $A(-1,-2)$, $B(-1,2)$ and $C(6,0)$. Which conclusion can be made about the angles of $\triangle ABC$?

1) $m\angle A = m\angle B$
2) $m\angle A = m\angle C$
3) $m\angle ACB = 90$
4) $m\angle ABC = 60$

263 Given: $y = \frac{1}{4}x - 3$

$$y = x^2 + 8x + 12$$

In which quadrant will the graphs of the given equations intersect?

1) I
2) II
3) III
4) IV

264 Given the equations: $y = x^2 - 6x + 10$

$$y + x = 4$$

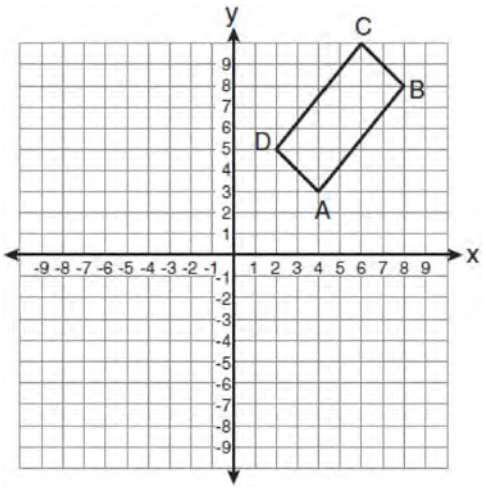
What is the solution to the given system of equations?

1) $(2,3)$
2) $(3,2)$
3) $(2,2)$ and $(1,3)$
4) $(2,2)$ and $(3,1)$

265 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) $\overline{AD} \cong \overline{DC}$

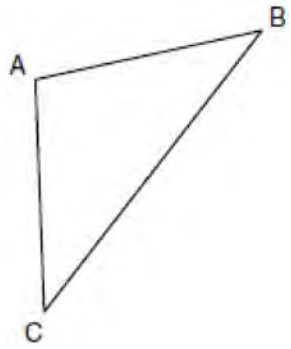
266 The rectangle $ABCD$ shown in the diagram below will be reflected across the x-axis.



What will *not* be preserved?

1) slope of $\overline{AB}$
2) parallelism of $\overline{AB}$ and $\overline{CD}$
3) length of $\overline{AB}$
4) measure of $\angle A$

267 In the diagram of $\triangle ABC$ below, $\overline{AB} \cong \overline{AC}$. The measure of $\angle B$ is 40°.

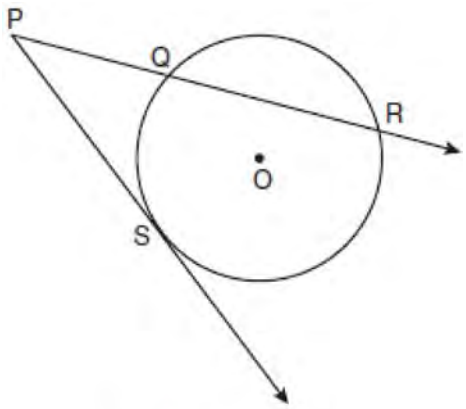


What is the measure of $\angle A$?

1) 40°
2) 50°
3) 70°
4) 100°

268 The lateral faces of a regular pyramid are composed of
1) squares
2) rectangles
3) congruent right triangles
4) congruent isosceles triangles

269 In the diagram below, $\overline{PS}$ is a tangent to circle O at point S, $\overline{PQR}$ is a secant, $PS = x$, $PQ = 3$, and $PR = x + 18$.

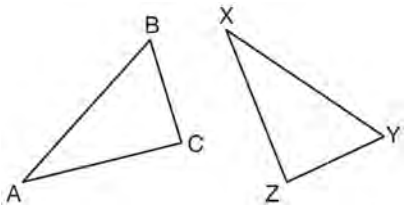


(Not drawn to scale)

What is the length of $\overline{PS}$?
1) 6
2) 9
3) 3
4) 27

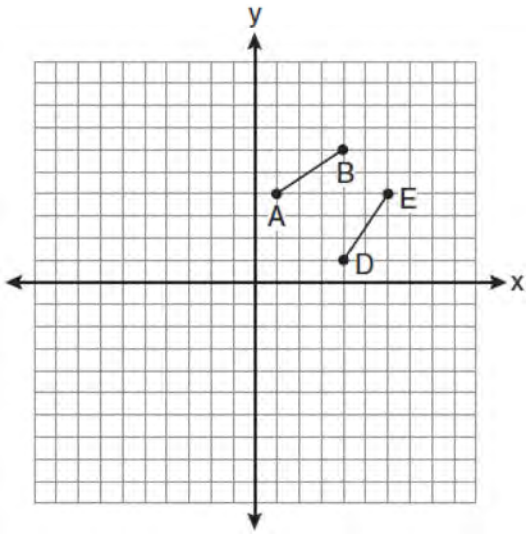
270 In $\triangle PQR$, $PQ = 8$, $QR = 12$, and $RP = 13$. Which statement about the angles of $\triangle PQR$ must be true?
1) $m\angle Q > m\angle P > m\angle R$
2) $m\angle Q > m\angle R > m\angle P$
3) $m\angle R > m\angle P > m\angle Q$
4) $m\angle P > m\angle R > m\angle Q$

271 In the diagram below, $\triangle ABC \cong \triangle XYZ$.



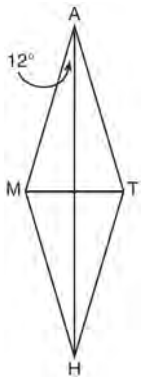
Which two statements identify corresponding congruent parts for these triangles?
1) $\overline{AB} \cong \overline{XY}$ and $\angle C \cong \angle Y$
2) $\overline{AB} \cong \overline{YZ}$ and $\angle C \cong \angle X$
3) $\overline{BC} \cong \overline{XY}$ and $\angle A \cong \angle Y$
4) $\overline{BC} \cong \overline{YZ}$ and $\angle A \cong \angle X$

272 The diagram below shows $\overline{AB}$ and $\overline{DE}$.



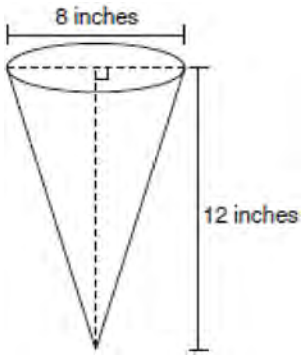
Which transformation will move $\overline{AB}$ onto $\overline{DE}$ such that point D is the image of point A and point E is the image of point B?
1) $T_{3,-3}$
2) $D_{\frac{1}{2}}$
3) $R_{90°}$
4) $r_{y=x}$

273 In the diagram below, *MATH* is a rhombus with diagonals $\overline{AH}$ and $\overline{MT}$.



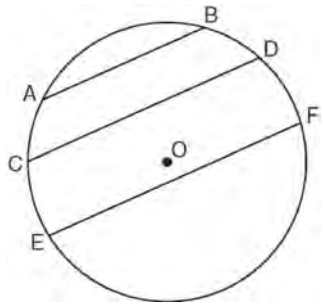
If m∠*HAM* = 12, what is m∠*AMT*?
1) 12
2) 78
3) 84
4) 156

274 In the diagram below, a right circular cone has a diameter of 8 inches and a height of 12 inches.



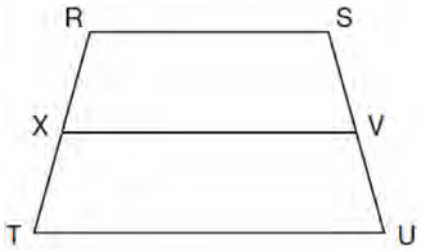
What is the volume of the cone to the *nearest cubic inch*?
1) 201
2) 481
3) 603
4) 804

275 In the diagram below of circle *O*, chord $\overline{AB} \parallel$ chord $\overline{CD}$, and chord $\overline{CD} \parallel$ chord $\overline{EF}$.



Which statement must be true?
1) $\overset{\frown}{CE} \cong \overset{\frown}{DF}$
2) $\overset{\frown}{AC} \cong \overset{\frown}{DF}$
3) $\overset{\frown}{AC} \cong \overset{\frown}{CE}$
4) $\overset{\frown}{EF} \cong \overset{\frown}{CD}$

276 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 $\overline{SU}$.

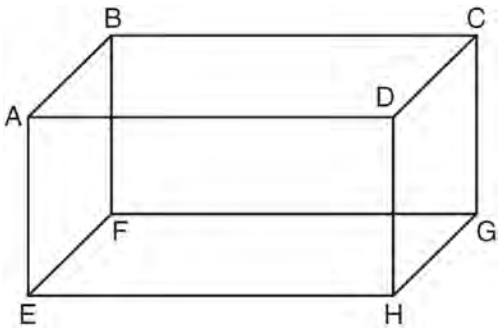


If *RS* = 30 and *XV* = 44, what is the length of $\overline{TU}$?
1) 37
2) 58
3) 74
4) 118

277 Which transformation produces a figure similar but not congruent to the original figure?

1) $T_{1,3}$
2) $D_{\frac{1}{2}}$
3) $R_{90°}$
4) $r_{y=x}$

278 The diagram below shows a rectangular prism.



Which pair of edges are segments of lines that are coplanar?

1) $\overline{AB}$ and $\overline{DH}$
2) $\overline{AE}$ and $\overline{DC}$
3) $\overline{BC}$ and $\overline{EH}$
4) $\overline{CG}$ and $\overline{EF}$

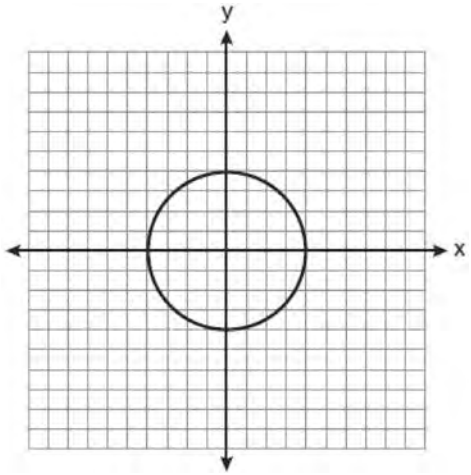
279 What is an equation of the line that passes through the point $(-2,5)$ and is perpendicular to the line whose equation is $y = \frac{1}{2}x + 5$?

1) $y = 2x + 1$
2) $y = -2x + 1$
3) $y = 2x + 9$
4) $y = -2x - 9$

280 What is the length, to the *nearest tenth,* of the line segment joining the points $(-4,2)$ and $(146,52)$?

1) 141.4
2) 150.5
3) 151.9
4) 158.1

281 What is an equation for the circle shown in the graph below?

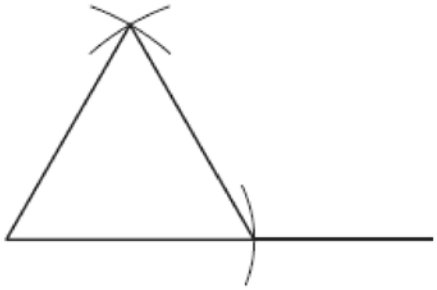


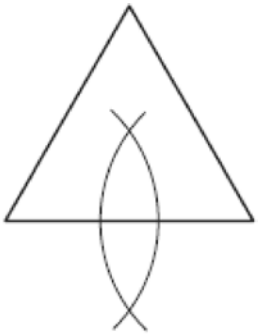
1) $x^2 + y^2 = 2$
2) $x^2 + y^2 = 4$
3) $x^2 + y^2 = 8$
4) $x^2 + y^2 = 16$

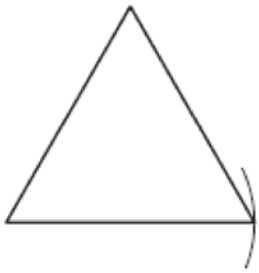
282 Triangle ABC has vertices $A(1,3)$, $B(0,1)$, and $C(4,0)$. Under a translation, A', the image point of A, is located at $(4,4)$. Under this same translation, point C' is located at

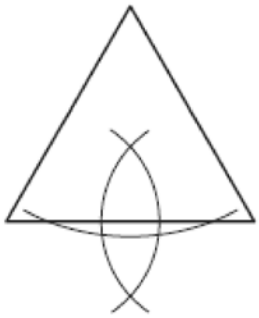
1) $(7,1)$
2) $(5,3)$
3) $(3,2)$
4) $(1,-1)$

283 Which diagram shows the construction of an equilateral triangle?

1) 

2) 

3) 

4) 

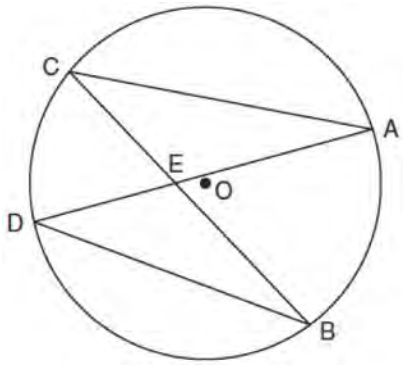
284 Which statement is logically equivalent to "If it is warm, then I go swimming"

1) If I go swimming, then it is warm.
2) If it is warm, then I do not go swimming.
3) If I do not go swimming, then it is not warm.
4) If it is not warm, then I do not go swimming.

285 What is the negation of the statement “I am not going to eat ice cream”?

1) I like ice cream.
2) I am going to eat ice cream.
3) If I eat ice cream, then I like ice cream.
4) If I don’t like ice cream, then I don’t eat ice cream.

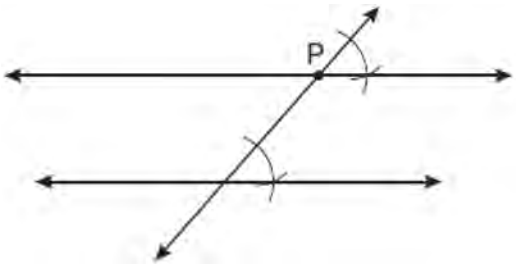
286 In the diagram below of circle O, chords $\overline{AD}$ and $\overline{BC}$ intersect at E.



Which relationship must be true?

1) $\triangle CAE \cong \triangle DBE$
2) $\triangle AEC \sim \triangle BED$
3) $\angle ACB \cong \angle CBD$
4) $\overset{\frown}{CA} \cong \overset{\frown}{DB}$

287 Which geometric principle is used to justify the construction below?

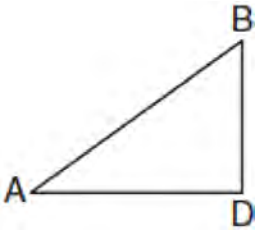


1) A line perpendicular to one of two parallel lines is perpendicular to the other.
2) Two lines are perpendicular if they intersect to form congruent adjacent angles.
3) When two lines are intersected by a transversal and alternate interior angles are congruent, the lines are parallel.
4) When two lines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

288 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) $\frac{\text{perimeter of } \triangle ABC}{\text{perimeter of } \triangle DEF} = \frac{3}{2}$

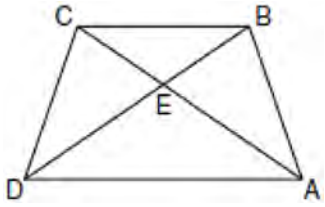
289 In the diagram below of $\triangle ADB$, $m\angle BDA = 90$, $AD = 5\sqrt{2}$, and $AB = 2\sqrt{15}$.



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

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

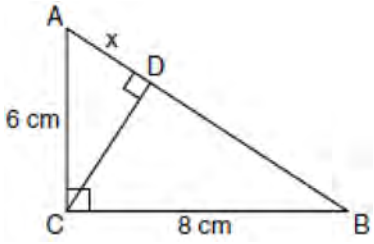
290 In the diagram of trapezoid *ABCD* below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E* and $\triangle ABC \cong \triangle DCB$.



Which statement is true based on the given information?

1) $\overline{AC} \cong \overline{BC}$
2) $\overline{CD} \cong \overline{AD}$
3) $\angle CDE \cong \angle BAD$
4) $\angle CDB \cong \angle BAC$

291 In the diagram below, the length of the legs $\overline{AC}$ and $\overline{BC}$ of right triangle ABC are 6 cm and 8 cm, respectively. Altitude $\overline{CD}$ is drawn to the hypotenuse of $\triangle ABC$.



What is the length of $\overline{AD}$ to the *nearest tenth of a centimeter*?

1) 3.6
2) 6.0
3) 6.4
4) 4.0

292 In which polygon does the sum of the measures of the interior angles equal the sum of the measures of the exterior angles?

1) triangle
2) hexagon
3) octagon
4) quadrilateral

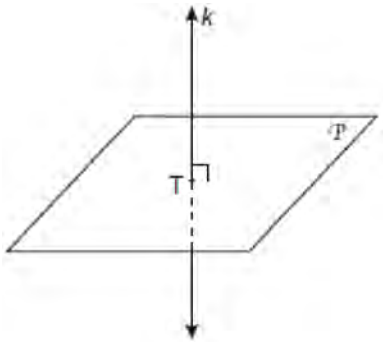
293 What is an equation of a circle with its center at $(-3,5)$ and a radius of 4?

1) $(x-3)^2+(y+5)^2=16$
2) $(x+3)^2+(y-5)^2=16$
3) $(x-3)^2+(y+5)^2=4$
4) $(x+3)^2+(y-5)^2=4$

294 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

295 In the diagram below, line *k* is perpendicular to plane $\mathcal{P}$ at point *T*.



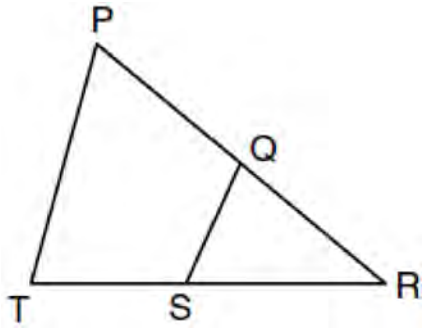
Which statement is true?

1) Any point in plane $\mathcal{P}$ also will be on line *k*.
2) Only one line in plane $\mathcal{P}$ will intersect line *k*.
3) All planes that intersect plane $\mathcal{P}$ will pass through *T*.
4) Any plane containing line *k* is perpendicular to plane $\mathcal{P}$.

296 In plane $\mathcal{P}$, lines *m* and *n* intersect at point *A*. If line *k* is perpendicular to line *m* and line *n* at point *A*, then line *k* is

1) contained in plane $\mathcal{P}$
2) parallel to plane $\mathcal{P}$
3) perpendicular to plane $\mathcal{P}$
4) skew to plane $\mathcal{P}$

297 In the diagram below of $\triangle PRT$, Q is a point on $\overline{PR}$, S is a point on $\overline{TR}$, $\overline{QS}$ is drawn, and $\angle RPT \cong \angle RSQ$.



Which reason justifies the conclusion that $\triangle PRT \sim \triangle SRQ$?

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

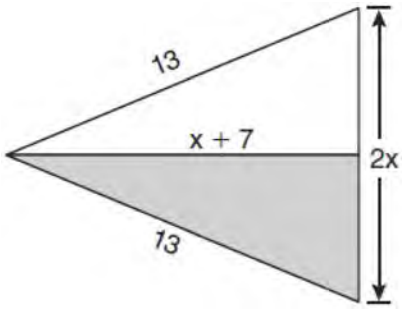
298 In $\triangle ABC$, $AB = 7$, $BC = 8$, and $AC = 9$. Which list has the angles of $\triangle ABC$ in order from smallest to largest?

1) $\angle A, \angle B, \angle C$
2) $\angle B, \angle A, \angle C$
3) $\angle C, \angle B, \angle A$
4) $\angle C, \angle A, \angle B$

299 What is an equation of the line that passes through the point $(7,3)$ and is parallel to the line $4x + 2y = 10$?

1) $y = \frac{1}{2}x - \frac{1}{2}$
2) $y = -\frac{1}{2}x + \frac{13}{2}$
3) $y = 2x - 11$
4) $y = -2x + 17$

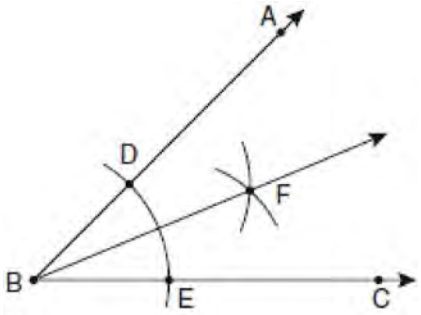
300 The diagram below shows a pennant in the shape of an isosceles triangle. The equal sides each measure 13, the altitude is $x + 7$, and the base is $2x$.



What is the length of the base?

1) 5
2) 10
3) 12
4) 24

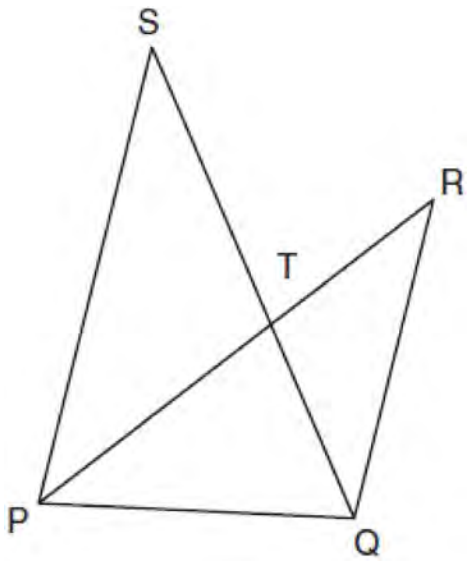
301 The diagram below shows the construction of the bisector of $\angle ABC$.



Which statement is *not* true?

1) $m\angle EBF = \frac{1}{2} m\angle ABC$
2) $m\angle DBF = \frac{1}{2} m\angle ABC$
3) $m\angle EBF = m\angle ABC$
4) $m\angle DBF = m\angle EBF$

302 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

303 What are the center and the radius of the circle whose equation is $(x-3)^2+(y+3)^2=36$

1) center = $(3,-3)$; radius = 6
2) center = $(-3,3)$; radius = 6
3) center = $(3,-3)$; radius = 36
4) center = $(-3,3)$; radius = 36

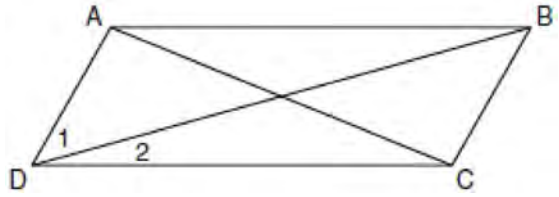
304 In a coordinate plane, how many points are both 5 units from the origin and 2 units from the x-axis?

1) 1
2) 2
3) 3
4) 4

305 The endpoints of $\overline{CD}$ are $C(-2,-4)$ and $D(6,2)$. What are the coordinates of the midpoint of $\overline{CD}$?

1) $(2,3)$
2) $(2,-1)$
3) $(4,-2)$
4) $(4,3)$

306 In the diagram below of parallelogram $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$, $m\angle 1 = 45$ and $m\angle DCB = 120$.



What is the measure of $\angle 2$?

1) 15°
2) 30°
3) 45°
4) 60°

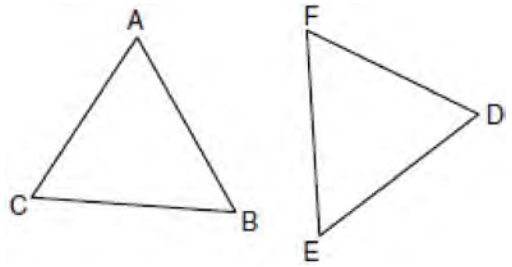
307 If a line segment has endpoints $A(3x+5, 3y)$ and $B(x-1, -y)$, what are the coordinates of the midpoint of $\overline{AB}$?

1) $(x+3, 2y)$
2) $(2x+2, y)$
3) $(2x+3, y)$
4) $(4x+4, 2y)$

308 Which transformation of the line $x = 3$ results in an image that is perpendicular to the given line?

1) $r_{x\text{-axis}}$
2) $r_{y\text{-axis}}$
3) $r_{y=x}$
4) $r_{x=1}$

309 In the diagram of $\triangle ABC$ and $\triangle DEF$ below, $\overline{AB} \cong \overline{DE}$, $\angle A \cong \angle D$, and $\angle B \cong \angle E$.



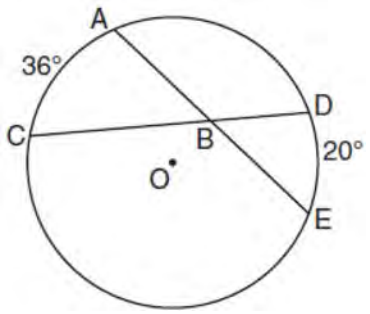
Which method can be used to prove $\triangle ABC \cong \triangle DEF$?

1) SSS
2) SAS
3) ASA
4) HL

310 A polygon is transformed according to the rule: $(x, y) \rightarrow (x+2, y)$. Every point of the polygon moves two units in which direction?

1) up
2) down
3) left
4) right

311 In the diagram below of circle O, chords $\overline{AE}$ and $\overline{DC}$ intersect at point B, such that $m\overset{\frown}{AC} = 36$ and $m\overset{\frown}{DE} = 20$.



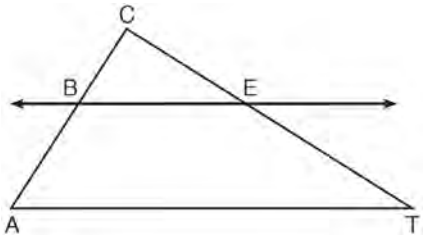
What is $m\angle ABC$?

1) 56
2) 36
3) 28
4) 8

312 Tangents $\overline{PA}$ and $\overline{PB}$ are drawn to circle O from an external point, P, and radii $\overline{OA}$ and $\overline{OB}$ are drawn. If $m\angle APB = 40$, what is the measure of $\angle AOB$?

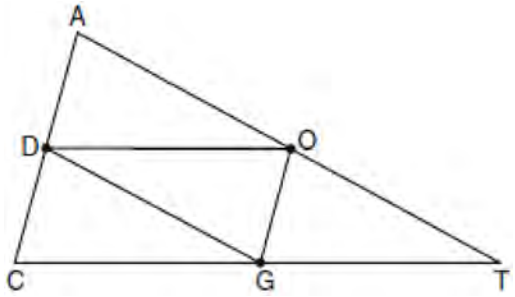
1) 140°
2) 100°
3) 70°
4) 50°

313 In the diagram below of $\triangle ACT$, $\overleftrightarrow{BE} \parallel \overline{AT}$.



If $CB = 3$, $CA = 10$, and $CE = 6$, what is the length of $\overline{ET}$?
1) 5
2) 14
3) 20
4) 26

314 In the diagram below of $\triangle ACT$, D is the midpoint of $\overline{AC}$, O is the midpoint of $\overline{AT}$, and G is the midpoint of $\overline{CT}$.



If $AC = 10$, $AT = 18$, and $CT = 22$, what is the perimeter of parallelogram $CDOG$?
1) 21
2) 25
3) 32
4) 40

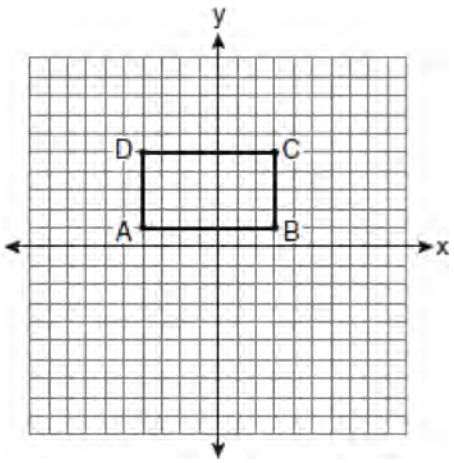
315 If $\triangle ABC \sim \triangle ZXY$, $m\angle A = 50$, and $m\angle C = 30$, what is $m\angle X$?
1) 30
2) 50
3) 80
4) 100

316 What is the negation of the statement "Squares are parallelograms"?
1) Parallelograms are squares.
2) Parallelograms are not squares.
3) It is not the case that squares are parallelograms.
4) It is not the case that parallelograms are squares.

317 Isosceles trapezoid $ABCD$ has diagonals $\overline{AC}$ and $\overline{BD}$. If $AC = 5x + 13$ and $BD = 11x - 5$, what is the value of x?
1) 28
2) $10\frac{3}{4}$
3) 3
4) $\frac{1}{2}$

318 In isosceles triangle ABC, $AB = BC$. Which statement will always be true?
1) $m\angle B = m\angle A$
2) $m\angle A > m\angle B$
3) $m\angle A = m\angle C$
4) $m\angle C < m\angle B$

319 On the set of axes below, Geoff drew rectangle *ABCD*. He will transform the rectangle by using the translation $(x,y) \rightarrow (x+2, y+1)$ and then will reflect the translated rectangle over the *x*-axis.



What will be the area of the rectangle after these transformations?

1) exactly 28 square units
2) less than 28 square units
3) greater than 28 square units
4) It cannot be determined from the information given.

320 $\triangle ABC$ is similar to $\triangle DEF$. The ratio of the length of $\overline{AB}$ to the length of $\overline{DE}$ is 3:1. Which ratio is also equal to 3:1?

1) $\frac{m\angle A}{m\angle D}$
2) $\frac{m\angle B}{m\angle F}$
3) $\frac{\text{area of } \triangle ABC}{\text{area of } \triangle DEF}$
4) $\frac{\text{perimeter of } \triangle ABC}{\text{perimeter of } \triangle DEF}$

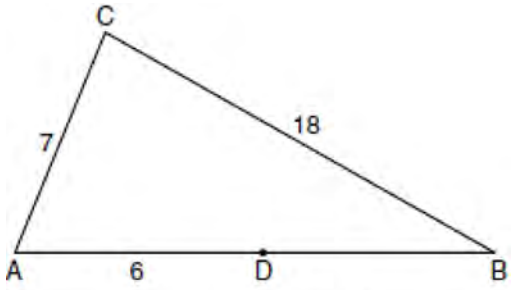
321 What are the center and radius of a circle whose equation is $(x-A)^2 + (y-B)^2 = C$?

1) center = (A,B); radius = C
2) center = $(-A,-B)$; radius = C
3) center = (A,B); radius = $\sqrt{C}$
4) center = $(-A,-B)$; radius = $\sqrt{C}$

322 A support beam between the floor and ceiling of a house forms a 90º angle with the floor. The builder wants to make sure that the floor and ceiling are parallel. Which angle should the support beam form with the ceiling?

1) 45º
2) 60º
3) 90º
4) 180º

323 In the diagram below of $\triangle ABC$, *D* is a point on $\overline{AB}$, $AC = 7$, $AD = 6$, and $BC = 18$.



(Not drawn to scale)

The length of $\overline{DB}$ could be

1) 5
2) 12
3) 19
4) 25

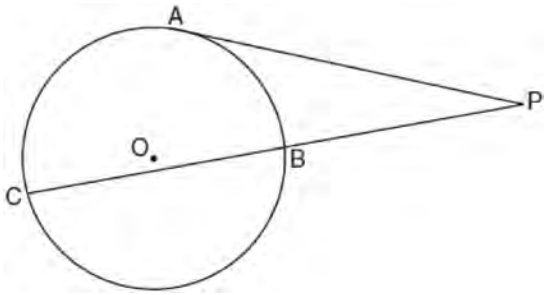
324 Given the system of equations: $y = x^2 - 4x$

$x = 4$

The number of points of intersection is

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

325 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 $\overline{PA}$?

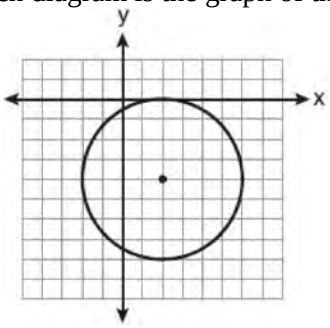
1) 20
2) 9
3) 8
4) 6

326 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?

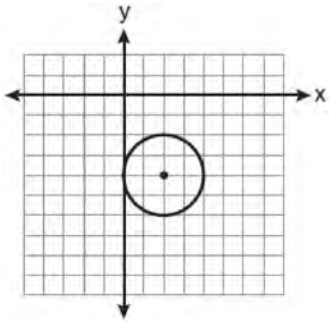
1) Lines j and k are in perpendicular planes.
2) Line m is in the same plane as lines j and k.
3) Line m is parallel to the plane containing lines j and k.
4) Line m is perpendicular to the plane containing lines j and k.

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

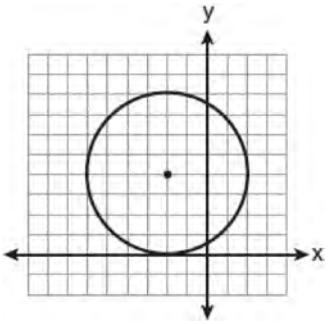
1)



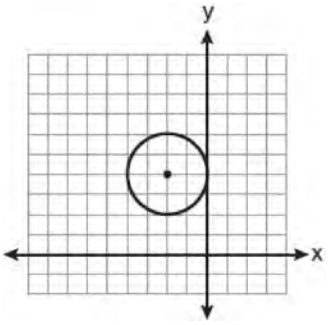
2)



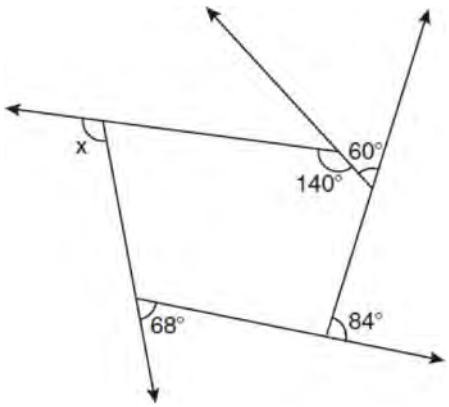
3)



4)



328 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

329 The lines $3y + 1 = 6x + 4$ and $2y + 1 = x - 9$ are

1) parallel
2) perpendicular
3) the same line
4) neither parallel nor perpendicular

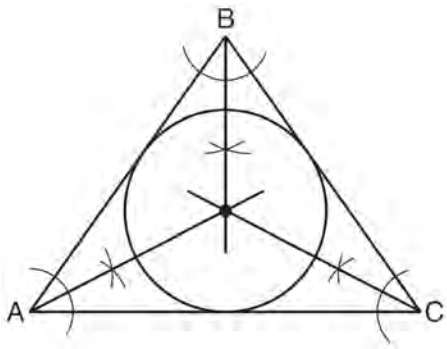
330 A rectangular prism has a volume of $3x^2 + 18x + 24$. Its base has a length of $x + 2$ and a width of 3. Which expression represents the height of the prism?

1) $x + 4$
2) $x + 2$
3) 3
4) $x^2 + 6x + 8$

331 Two triangles are similar, and the ratio of each pair of corresponding sides is 2:1. Which statement regarding the two triangles is *not* true?

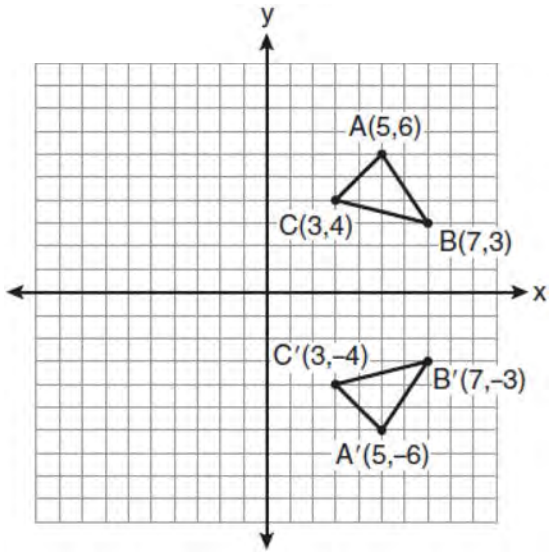
1) Their areas have a ratio of 4:1.
2) Their altitudes have a ratio of 2:1.
3) Their perimeters have a ratio of 2:1.
4) Their corresponding angles have a ratio of 2:1.

332 Which geometric principle is used in the construction shown below?



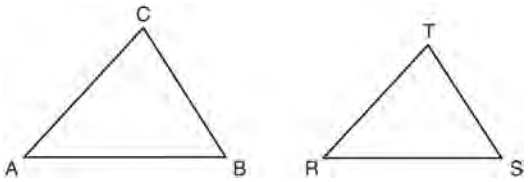
1) The intersection of the angle bisectors of a triangle is the center of the inscribed circle.
2) The intersection of the angle bisectors of a triangle is the center of the circumscribed circle.
3) The intersection of the perpendicular bisectors of the sides of a triangle is the center of the inscribed circle.
4) The intersection of the perpendicular bisectors of the sides of a triangle is the center of the circumscribed circle.

333 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

334 In the diagram below, $\triangle ABC \sim \triangle RST$.



Which statement is *not* true?

1) $\angle A \cong \angle R$
2) $\frac{AB}{RS} = \frac{BC}{ST}$
3) $\frac{AB}{BC} = \frac{ST}{RS}$
4) $\frac{AB+BC+AC}{RS+ST+RT} = \frac{AB}{RS}$

335 In an equilateral triangle, what is the difference between the sum of the exterior angles and the sum of the interior angles?

1) 180°
2) 120°
3) 90°
4) 60°

336 What is the contrapositive of the statement, “If I am tall, then I will bump my head”?

1) If I bump my head, then I am tall.
2) If I do not bump my head, then I am tall.
3) If I am tall, then I will not bump my head.
4) If I do not bump my head, then I am not tall.

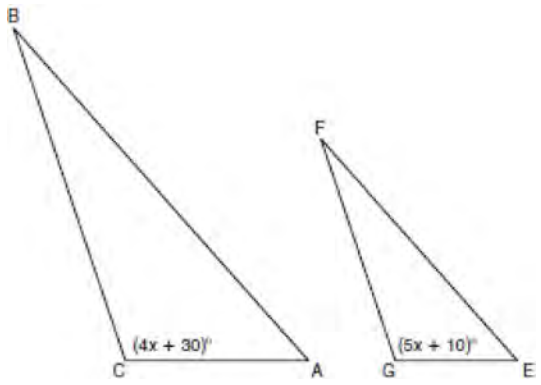
Geometry 2 Point Regents Exam Questions

337 Given: Two is an even integer or three is an even integer.
Determine the truth value of this disjunction.
Justify your answer.

338 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.

339 The volume of a cylinder is 12,566.4 cm^3. The height of the cylinder is 8 cm. Find the radius of the cylinder to the *nearest tenth of a centimeter*.

340 In the diagram below, $\triangle ABC \sim \triangle EFG$, $m\angle C = 4x + 30$, and $m\angle G = 5x + 10$. Determine the value of x.

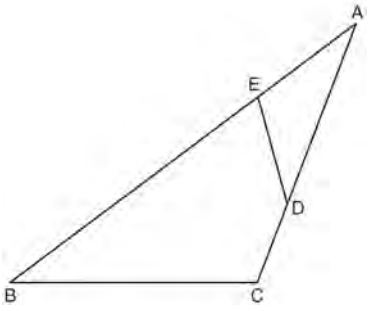


341 Find the slope of a line perpendicular to the line whose equation is $2y - 6x = 4$.

342 Find, in degrees, the measures of both an interior angle and an exterior angle of a regular pentagon.

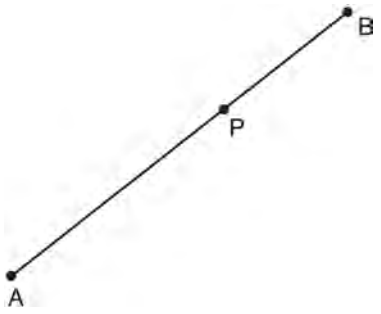
343 In $\triangle RST$, $m\angle RST = 46$ and $\overline{RS} \cong \overline{ST}$. Find $m\angle STR$.

344 The diagram below shows $\triangle ABC$, with $\overline{AEB}$, $\overline{ADC}$, and $\angle ACB \cong \angle AED$. Prove that $\triangle ABC$ is similar to $\triangle ADE$.

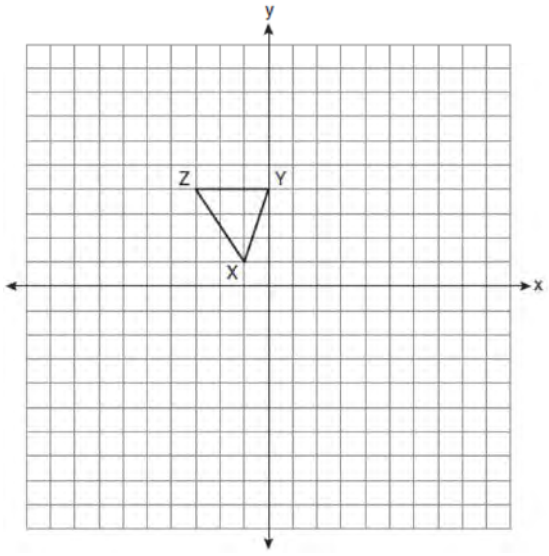


345 Two lines are represented by the equations $x + 2y = 4$ and $4y - 2x = 12$. Determine whether these lines are parallel, perpendicular, or neither. Justify your answer.

346 Using a compass and straightedge, construct a line perpendicular to $\overline{AB}$ through point P. [Leave all construction marks.]

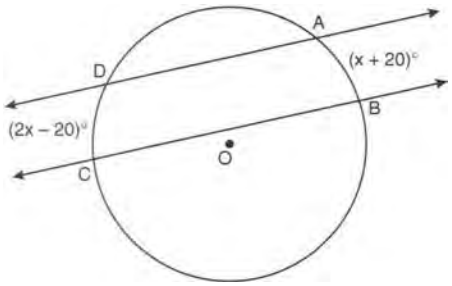


347 Triangle XYZ, shown in the diagram below, is reflected over the line $x = 2$. State the coordinates of $\triangle X'Y'Z'$, the image of $\triangle XYZ$.



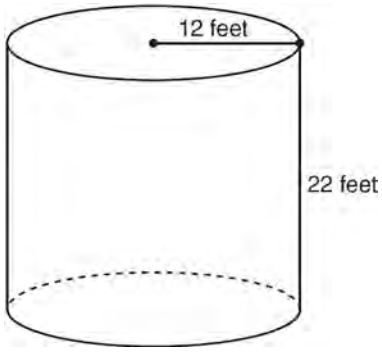
348 In the diagram below, point M is located on $\overleftrightarrow{AB}$. Sketch the locus of points that are 1 unit from $\overleftrightarrow{AB}$ and the locus of points 2 units from point M. Label with an **X** all points that satisfy both conditions.

349 In the diagram below, two parallel lines intersect circle O at points A, B, C, and D, with $m\overset{\frown}{AB} = x + 20$ and $m\overset{\frown}{DC} = 2x - 20$. Find $m\overset{\frown}{AB}$.



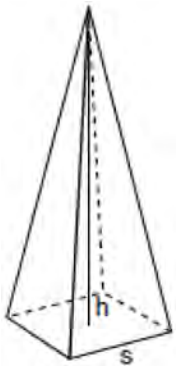
350 In circle O, diameter $\overline{RS}$ has endpoints $R(3a, 2b - 1)$ and $S(a - 6, 4b + 5)$. Find the coordinates of point O, in terms of a and b. Express your answer in simplest form.

351 The cylindrical tank shown in the diagram below is to be painted. The tank is open at the top, and the bottom does *not* need to be painted. Only the outside needs to be painted. Each can of paint covers 600 square feet. How many cans of paint must be purchased to complete the job?



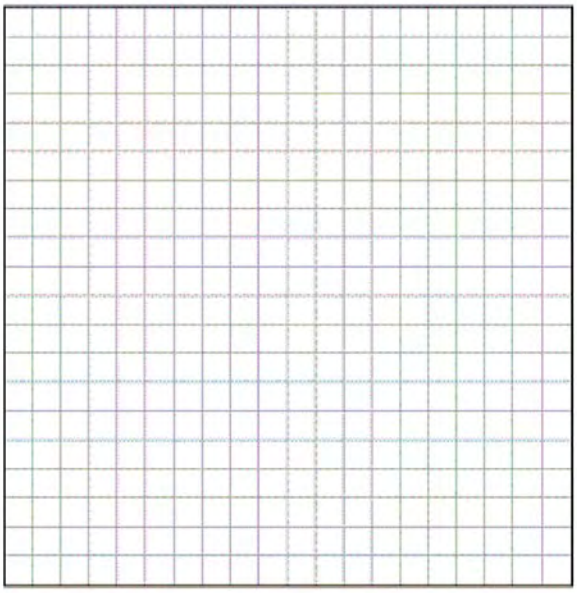
352 The coordinates of the endpoints of $\overline{FG}$ are $(-4,3)$ and $(2,5)$. Find the length of $\overline{FG}$ in simplest radical form.

353 A regular pyramid with a square base is shown in the diagram below.

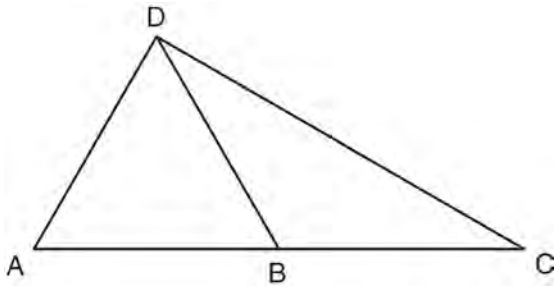


A side, *s*, of the base of the pyramid is 12 meters, and the height, *h*, is 42 meters. What is the volume of the pyramid in cubic meters?

354 Triangle ABC has vertices $A(-2,2)$, $B(-1,-3)$, and $C(4,0)$. Find the coordinates of the vertices of $\triangle A'B'C'$, the image of $\triangle ABC$ after the transformation $r_{\text{x-axis}}$. [The use of the grid is optional.]

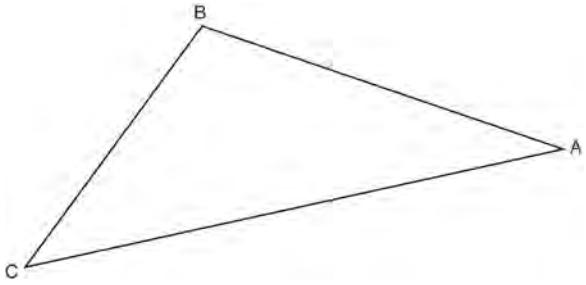


355 In the diagram below of $\triangle ACD$, B is a point on $\overline{AC}$ such that $\triangle ADB$ is an equilateral triangle, and $\triangle DBC$ is an isosceles triangle with $\overline{DB} \cong \overline{BC}$. Find $m\angle C$.

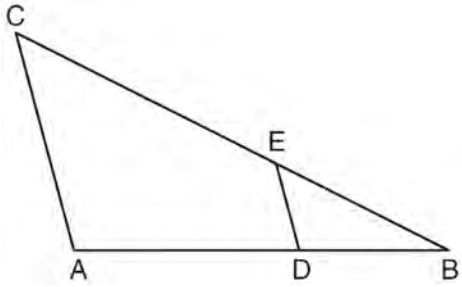


356 Determine whether the two lines represented by the equations $y = 2x + 3$ and $2y + x = 6$ are parallel, perpendicular, or neither. Justify your response.

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

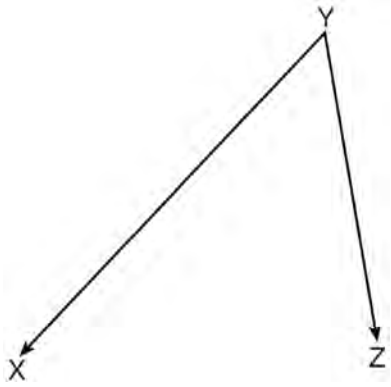


358 In the diagram below of $\triangle ABC$, D is a point on $\overline{AB}$, E is a point on $\overline{BC}$, $\overline{AC} \parallel \overline{DE}$, $CE = 25$ inches, $AD = 18$ inches, and $DB = 12$ inches. Find, to the *nearest tenth of an inch*, the length of $\overline{EB}$.

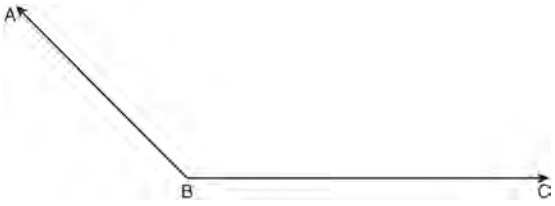


359 A sphere has a diameter of 18 meters. Find the volume of the sphere, in cubic meters, in terms of π.

360 On the diagram below, use a compass and straightedge to construct the bisector of $\angle XYZ$. [Leave all construction marks.]

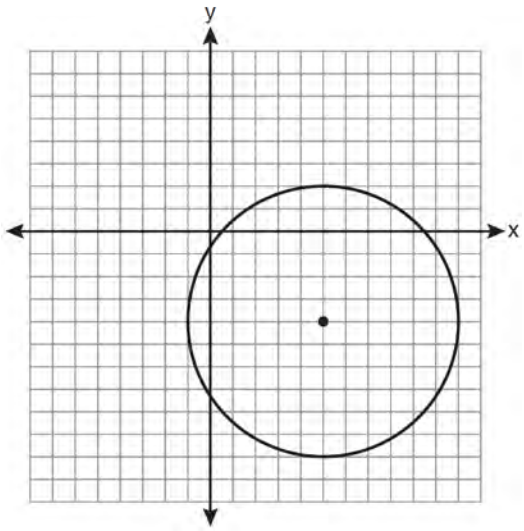


361 On the diagram below, use a compass and straightedge to construct the bisector of $\angle ABC$. [Leave all construction marks.]

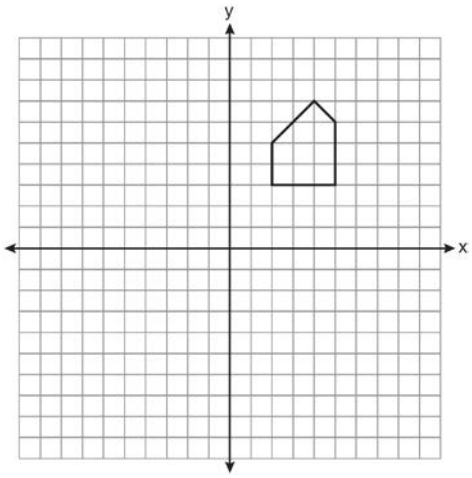


362 The degree measures of the angles of $\triangle ABC$ are represented by x, $3x$, and $5x - 54$. Find the value of x.

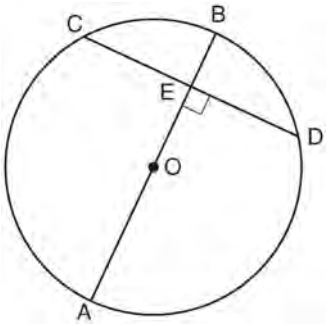
363 Write an equation of the circle graphed in the diagram below.



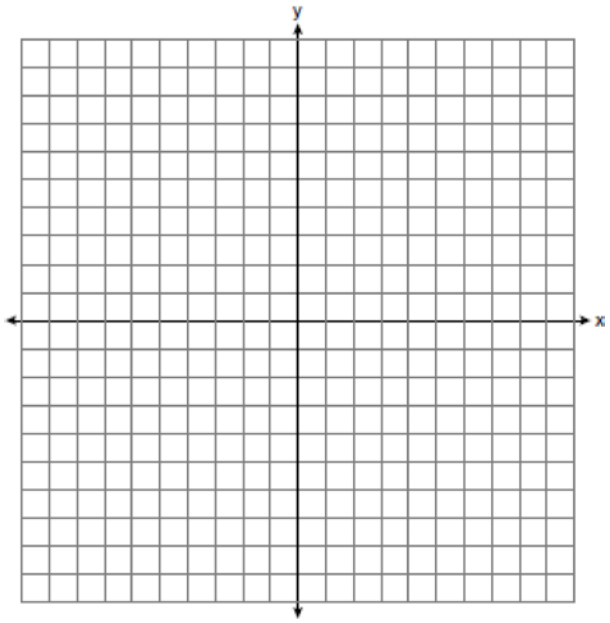
364 A pentagon is drawn on the set of axes below. If the pentagon is reflected over the *y*-axis, determine if this transformation is an isometry. Justify your answer. [The use of the set of axes is optional.]



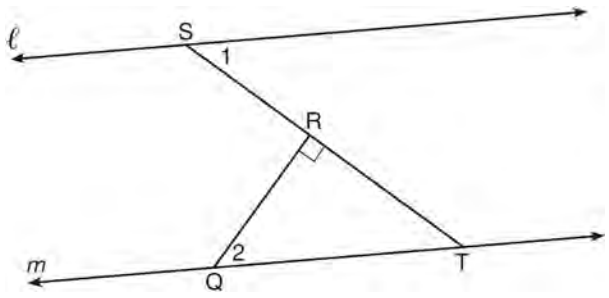
365 In the diagram below of circle *O*, diameter $\overline{AB}$ is perpendicular to chord $\overline{CD}$ at *E*. If $AO = 10$ and $BE = 4$, find the length of $\overline{CE}$.



366 On the set of axes below, graph the locus of points that are 4 units from the line $x = 3$ and the locus of points that are 5 units from the point $(0,2)$. Label with an **X** all points that satisfy both conditions.

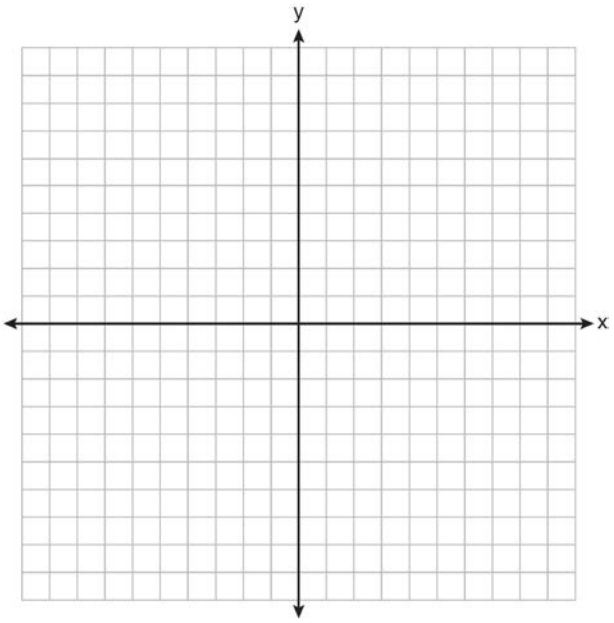


367 In the diagram below, $\ell \parallel m$ and $\overline{QR} \perp \overline{ST}$ at R.

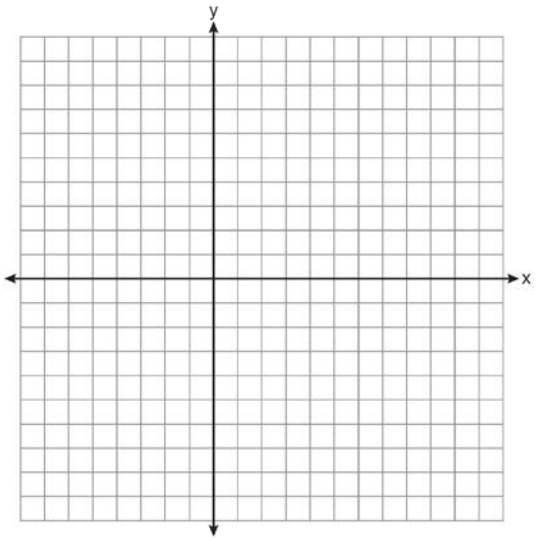


If m∠1 = 63, find m∠2.

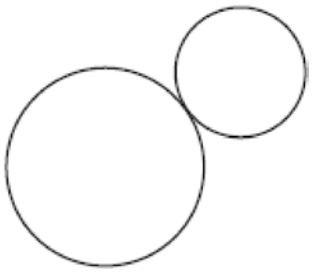
368 The coordinates of the vertices of $\triangle RST$ are $R(-2,3)$, $S(4,4)$, and $T(2,-2)$. Triangle $R'S'T'$ is the image of $\triangle RST$ after a rotation of 90° about the origin. State the coordinates of the vertices of $\triangle R'S'T'$. [The use of the set of axes below is optional.]



369 Triangle ABC has vertices $A(3,3)$, $B(7,9)$, and $C(11,3)$. Determine the point of intersection of the medians, and state its coordinates. [The use of the set of axes below is optional.]

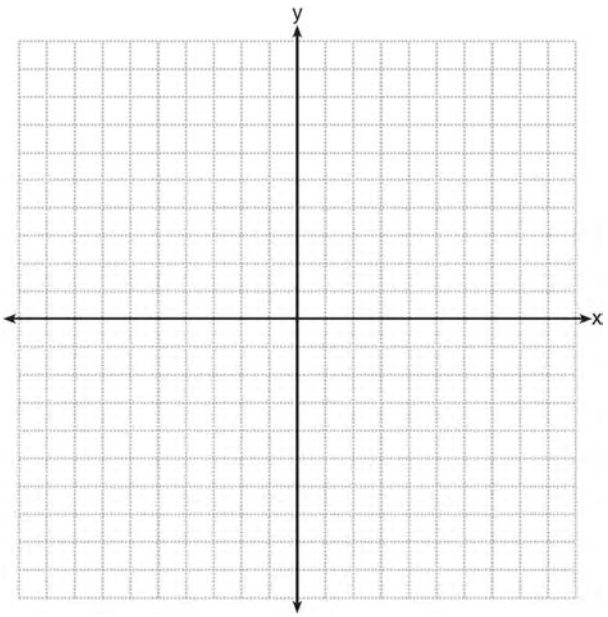


370 How many common tangent lines can be drawn to the two externally tangent circles shown below?

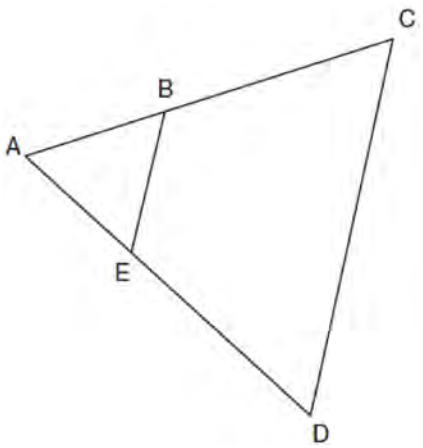


1) 1
2) 2
3) 3
4) 4

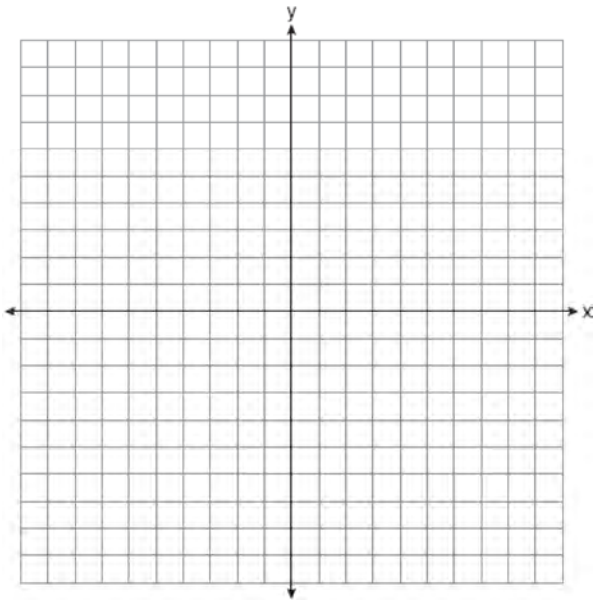
371 The coordinates of the vertices of $\triangle ABC$ are $A(1,2)$, $B(-4,3)$, and $C(-3,-5)$. State the coordinates of $\triangle A'B'C'$, the image of $\triangle ABC$ after a rotation of 90° about the origin. [The use of the set of axes below is optional.]



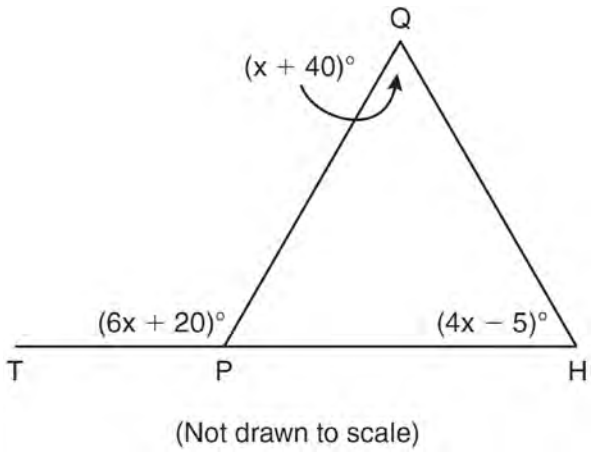
372 In the diagram below of $\triangle ACD$, E is a point on $\overline{AD}$ and B is a point on $\overline{AC}$, such that $\overline{EB} \parallel \overline{DC}$. If $AE = 3$, $ED = 6$, and $DC = 15$, find the length of $\overline{EB}$.



373 Triangle TAP has coordinates $T(-1,4)$, $A(2,4)$, and $P(2,0)$. On the set of axes below, graph and label $\triangle T'A'P'$, the image of $\triangle TAP$ after the translation $(x,y) \rightarrow (x-5, y-1)$.



374 In the diagram below of $\triangle HQP$, side $\overline{HP}$ is extended through P to T, $m\angle QPT = 6x + 20$, $m\angle HQP = x + 40$, and $m\angle PHQ = 4x - 5$. Find $m\angle QPT$.



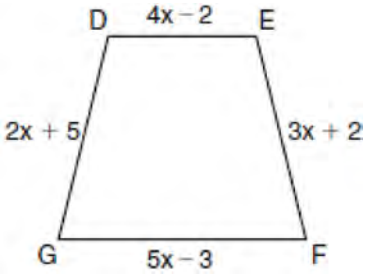
375 Write a statement that is logically equivalent to the statement "If two sides of a triangle are congruent, the angles opposite those sides are congruent." Identify the new statement as the converse, inverse, or contrapositive of the original statement.

376 Given the true statement, "The medians of a triangle are concurrent," write the negation of the statement and give the truth value for the negation.

377 Using a compass and straightedge, on the diagram below of $\overleftrightarrow{RS}$, construct an equilateral triangle with $\overline{RS}$ as one side. [Leave all construction marks.]

378 The endpoints of $\overline{PQ}$ are $P(-3,1)$ and $Q(4,25)$. Find the length of $\overline{PQ}$.

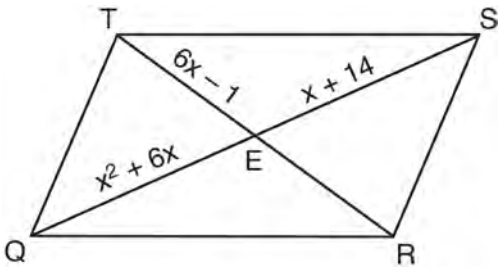
379 In the diagram below of isosceles trapezoid $DEFG$, $\overline{DE} \parallel \overline{GF}$, $DE = 4x - 2$, $EF = 3x + 2$, $FG = 5x - 3$, and $GD = 2x + 5$. Find the value of x.



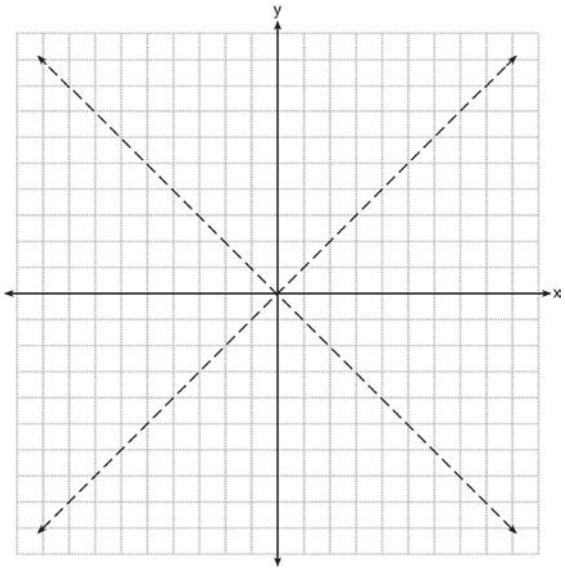
380 Using a compass and straightedge, construct a line that passes through point P and is perpendicular to line m. [Leave all construction marks.]

381 Tim is going to paint a wooden sphere that has a diameter of 12 inches. Find the surface area of the sphere, to the *nearest square inch*.

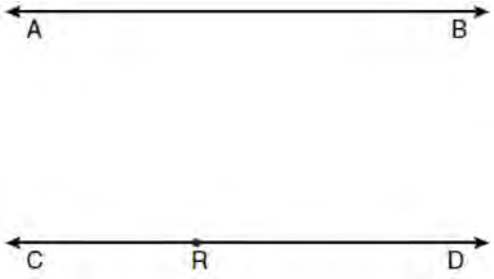
382 As shown in the diagram below, the diagonals of parallelogram *QRST* intersect at *E*. If $QE = x^2 + 6x$, $SE = x + 14$, and $TE = 6x - 1$, determine *TE* algebraically.



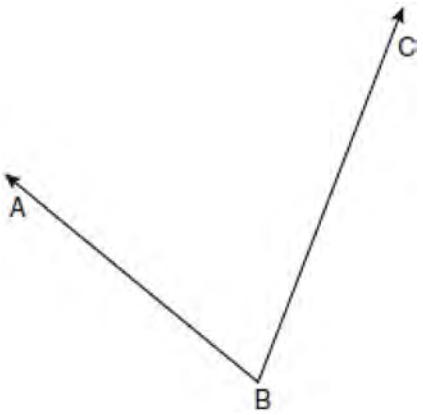
383 The graph below shows the locus of points equidistant from the *x*-axis and *y*-axis. On the same set of axes, graph the locus of points 3 units from the line $x = 0$. Label with an **X** *all* points that satisfy both conditions.



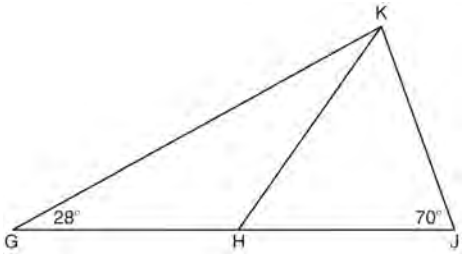
384 Two lines, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CRD}$, are parallel and 10 inches apart. Sketch the locus of all points that are equidistant from $\overleftrightarrow{AB}$ and $\overleftrightarrow{CRD}$ and 7 inches from point *R*. Label with an **X** each point that satisfies both conditions.



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

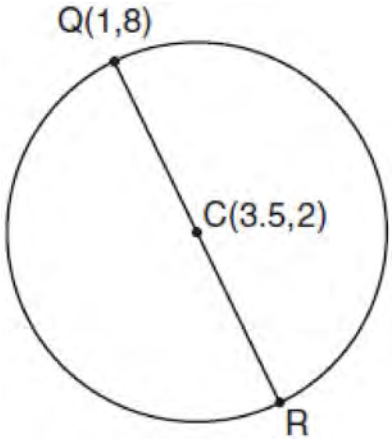


386 In the diagram below of $\triangle GJK$, H is a point on $\overline{GJ}$, $\overline{HJ} \cong \overline{JK}$, $m\angle G = 28$, and $m\angle GJK = 70$. Determine whether $\triangle GHK$ is an isosceles triangle and justify your answer.

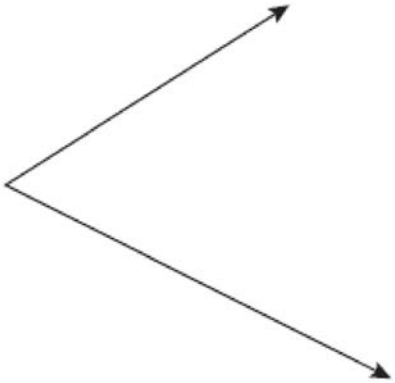


387 A right circular cone has a base with a radius of 15 cm, a vertical height of 20 cm, and a slant height of 25 cm. Find, in terms of' π, the number of square centimeters in the lateral area of the cone.

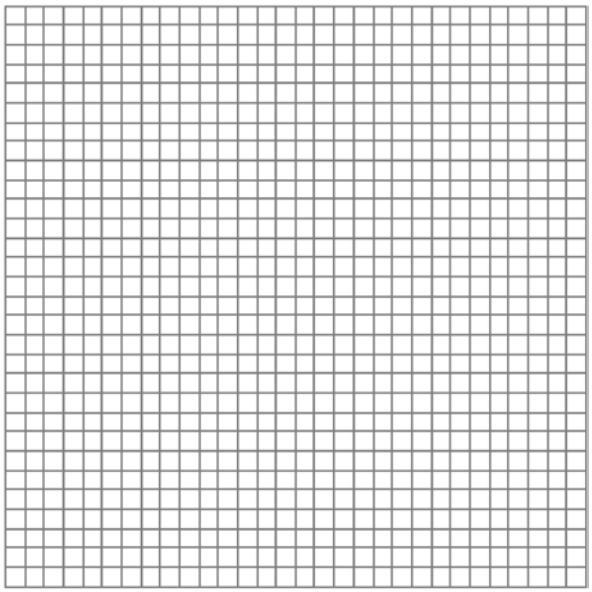
388 In the diagram below of circle C, $\overline{QR}$ is a diameter, and $Q(1,8)$ and $C(3.5,2)$ are points on a coordinate plane. Find and state the coordinates of point R.



389 Using a compass and straightedge, construct the bisector of the angle shown below. [*Leave all construction marks*.]

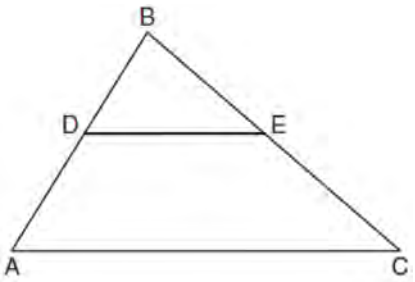


390 The vertices of $\triangle ABC$ are $A(3,2)$, $B(6,1)$, and $C(4,6)$. Identify and graph a transformation of $\triangle ABC$ such that its image, $\triangle A'B'C'$, results in $\overline{AB} \parallel \overline{A'B'}$.

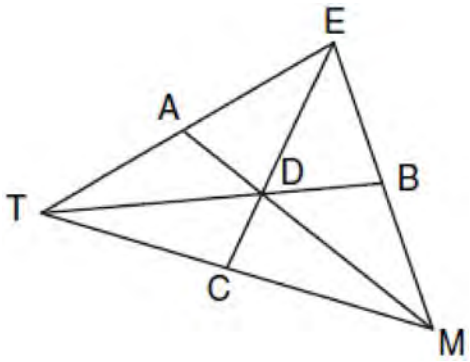


391 The Parkside Packing Company needs a rectangular shipping box. The box must have a length of 11 inches and a width of 8 inches. Find, to the *nearest tenth of an inch*, the minimum height of the box such that the volume is *at least* 800 cubic inches.

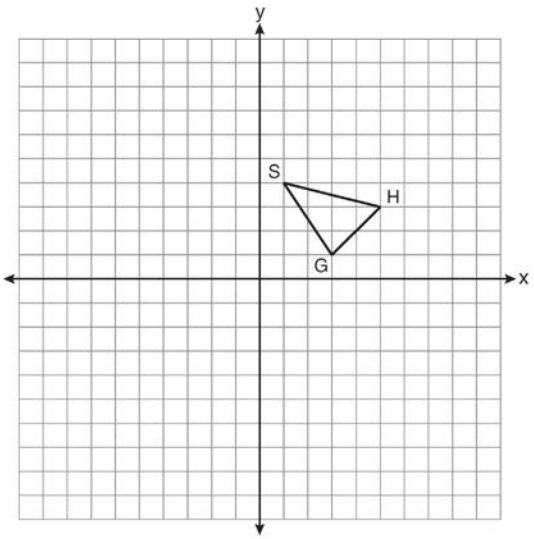
392 In the diagram below of $\triangle ABC$, $\overline{DE}$ is a midsegment of $\triangle ABC$, $DE = 7$, $AB = 10$, and $BC = 13$. Find the perimeter of $\triangle ABC$.



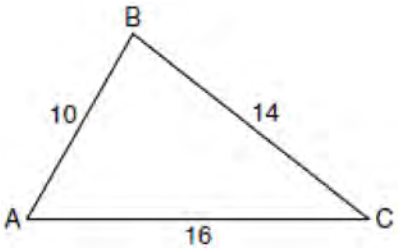
393 In the diagram below of $\triangle TEM$, medians $\overline{TB}$, $\overline{EC}$, and $\overline{MA}$ intersect at D, and $TB = 9$. Find the length of $\overline{TD}$.



394 As shown on the set of axes below, $\triangle GHS$ has vertices $G(3,1)$, $H(5,3)$, and $S(1,4)$. Graph and state the coordinates of $\triangle G''H''S''$, the image of $\triangle GHS$ after the transformation $T_{-3,1} \circ D_2$.

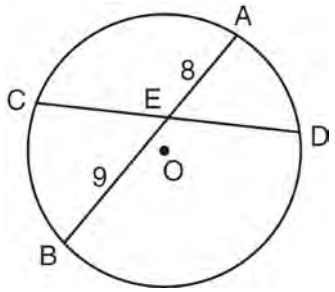


395 In the diagram of $\triangle ABC$ below, $AB = 10$, $BC = 14$, and $AC = 16$. Find the perimeter of the triangle formed by connecting the midpoints of the sides of $\triangle ABC$.



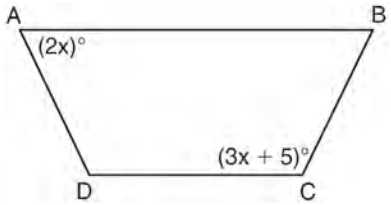
396 In right $\triangle DEF$, $m\angle D = 90$ and $m\angle F$ is 12 degrees less than twice $m\angle E$. Find $m\angle E$.

397 In the diagram below of circle O, chord $\overline{AB}$ bisects chord $\overline{CD}$ at E. If $AE = 8$ and $BE = 9$, find the length of $\overline{CE}$ in simplest radical form.

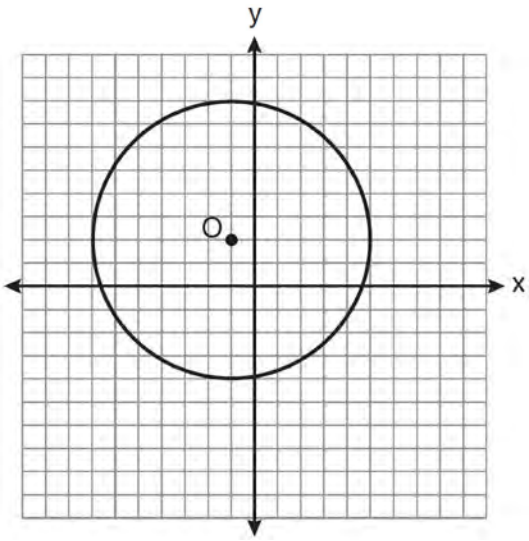


398 Find an equation of the line passing through the point $(5,4)$ and parallel to the line whose equation is $2x + y = 3$.

399 The diagram below shows isosceles trapezoid $ABCD$ with $\overline{AB} \parallel \overline{DC}$ and $\overline{AD} \cong \overline{BC}$. If $m\angle BAD = 2x$ and $m\angle BCD = 3x + 5$, find $m\angle BAD$.

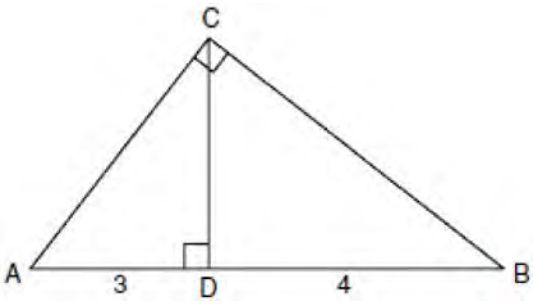


400 Write an equation for circle O shown on the graph below.



401 On the line segment below, use a compass and straightedge to construct equilateral triangle ABC. [Leave all construction marks.]

402 In the diagram below of right triangle *ACB*, altitude $\overline{CD}$ intersects $\overline{AB}$ at *D*. If $AD = 3$ and $DB = 4$, find the length of $\overline{CD}$ in simplest radical form.



403 The base of a pyramid is a rectangle with a width of 6 cm and a length of 8 cm. Find, in centimeters, the height of the pyramid if the volume is $288\ \text{cm}^3$.

404 A cylinder has a height of 7 cm and a base with a diameter of 10 cm. Determine the volume, in cubic centimeters, of the cylinder in terms of π.

405 Write an equation of the line that passes through the point $(6,-5)$ and is parallel to the line whose equation is $2x - 3y = 11$.

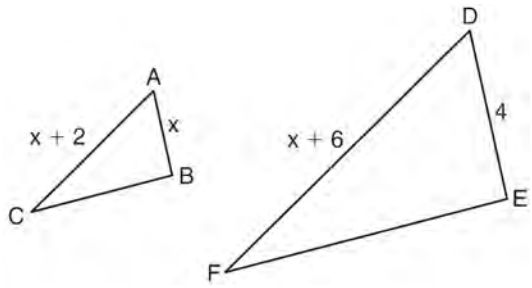
406 In the diagram below, car *A* is parked 7 miles from car *B*. Sketch the points that are 4 miles from car *A* and sketch the points that are 4 miles from car *B*. Label with an **X** all points that satisfy both conditions.

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

408 The length of $\overline{AB}$ is 3 inches. On the diagram below, sketch the points that are equidistant from *A* and *B* and sketch the points that are 2 inches from A. Label with an **X** all points that satisfy both conditions.

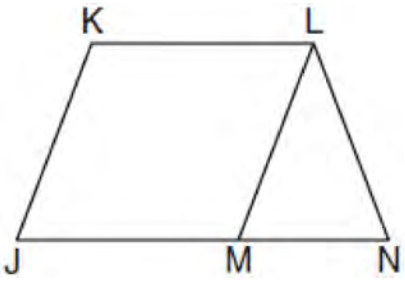
Geometry 4 Point Regents Exam Questions

409 In the diagram below, $\triangle ABC \sim \triangle DEF$, $DE = 4$, $AB = x$, $AC = x + 2$, and $DF = x + 6$. Determine the length of $\overline{AB}$. [Only an algebraic solution can receive full credit.]

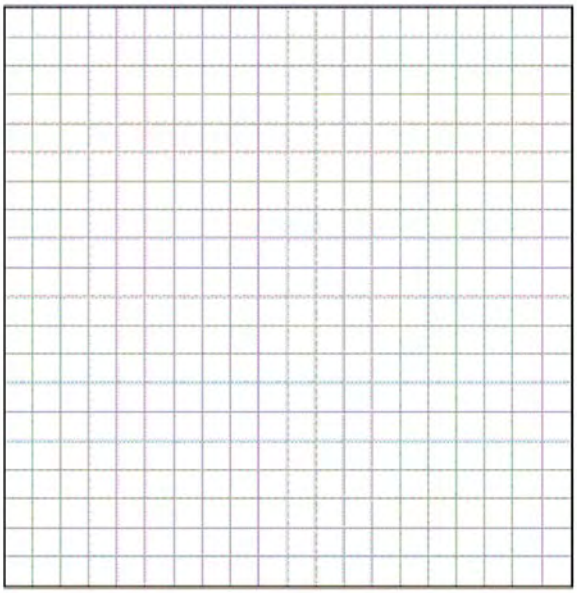


410 Find an equation of the line passing through the point $(6,5)$ and perpendicular to the line whose equation is $2y + 3x = 6$.

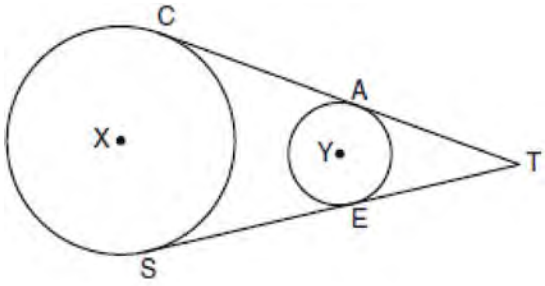
411 Given: $JKLM$ is a parallelogram.
$\overline{JM} \cong \overline{LN}$
$\angle LMN \cong \angle LNM$
Prove: $JKLM$ is a rhombus.



412 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.

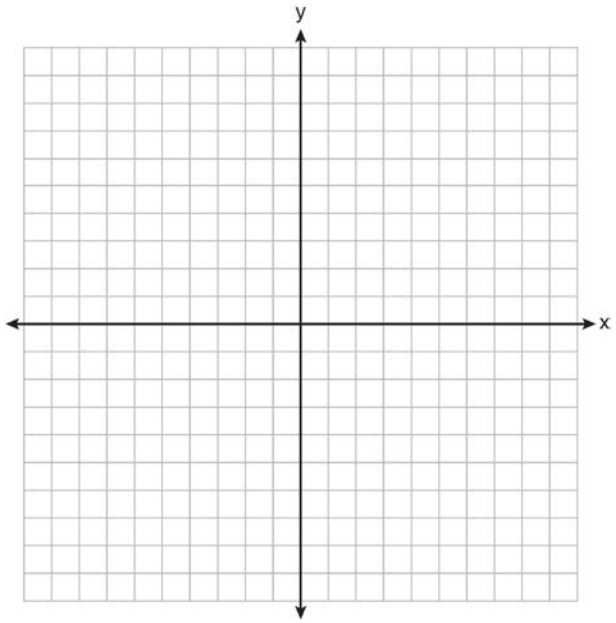


413 In the diagram below, circles X and Y have two tangents drawn to them from external point T. The points of tangency are C, A, S, and E. The ratio of $\overline{TA}$ to $\overline{AC}$ is $1:3$. If $TS = 24$, find the length of $\overline{SE}$.



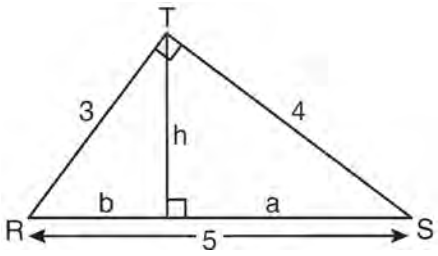
(Not drawn to scale)

414 Triangle ABC has coordinates $A(2,-2)$, $B(2,1)$, and $C(4,-2)$. Triangle $A'B'C'$ is the image of $\triangle ABC$ under $T_{5,-2}$. On the set of axes below, graph and label $\triangle ABC$ and its image, $\triangle A'B'C'$. Determine the relationship between the area of $\triangle ABC$ and the area of $\triangle A'B'C'$. Justify your response.

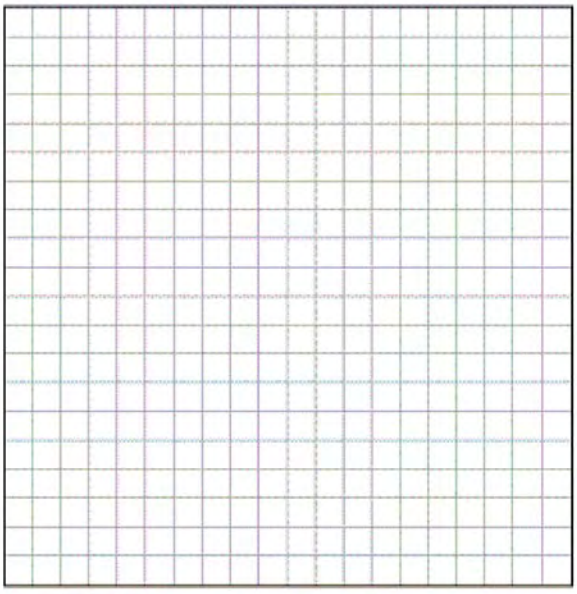


415 In $\triangle KLM$, $m\angle K = 36$ and $KM = 5$. The transformation D_2 is performed on $\triangle KLM$ to form $\triangle K'L'M'$. Find $m\angle K'$. Justify your answer. Find the length of $\overline{K'M'}$. Justify your answer.

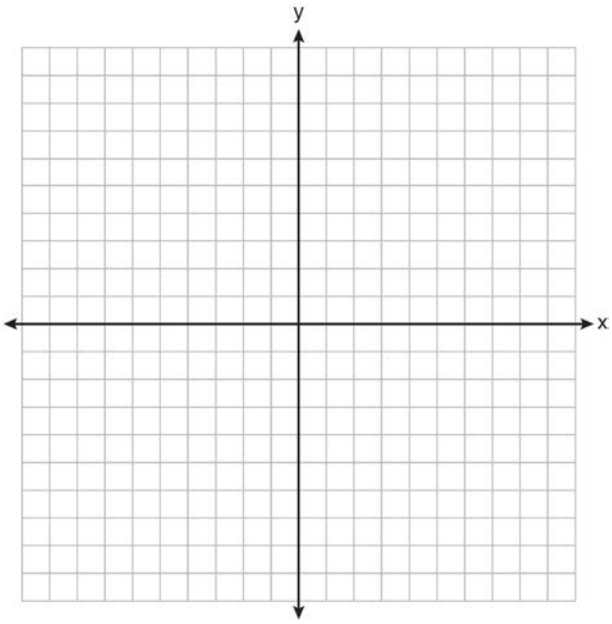
416 In the diagram below, $\triangle RST$ is a $3-4-5$ right triangle. The altitude, h, to the hypotenuse has been drawn. Determine the length of h.



417 Triangle ABC has coordinates $A(-6,2)$, $B(-3,6)$, and $C(5,0)$. Find the perimeter of the triangle. Express your answer in simplest radical form. [The use of the grid below is optional.]

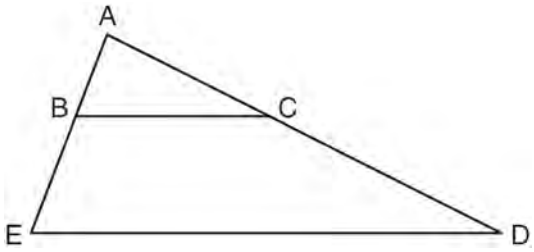


418 On the set of axes below, sketch the points that are 5 units from the origin and sketch the points that are 2 units from the line $y = 3$. Label with an **X** all points that satisfy both conditions.

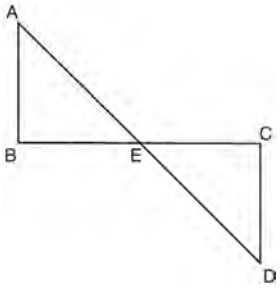


419 A paint can is in the shape of a right circular cylinder. The volume of the paint can is 600□ cubic inches and its altitude is 12 inches. Find the radius, in inches, of the base of the paint can. Express the answer in simplest radical form. Find, to the *nearest tenth of a square inch*, the lateral area of the paint can.

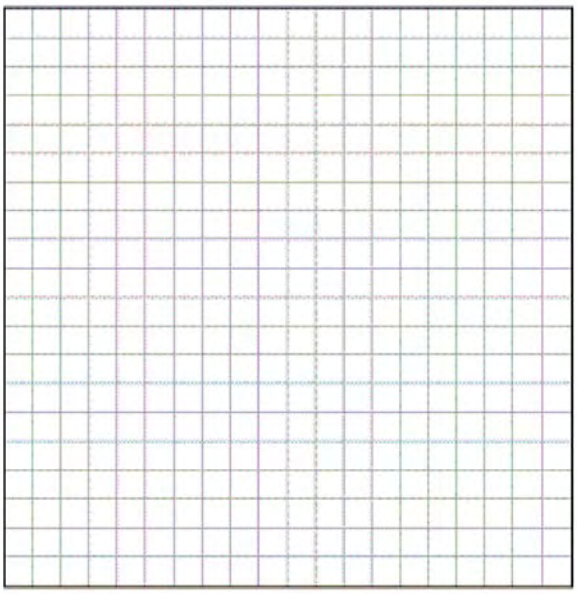
420 In the diagram below of $\triangle ADE$, B is a point on $\overline{AE}$ and C is a point on $\overline{AD}$ such that $\overline{BC} \parallel \overline{ED}$, $AC = x - 3$, $BE = 20$, $AB = 16$, and $AD = 2x + 2$. Find the length of $\overline{AC}$.



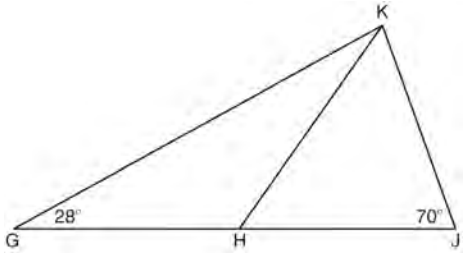
421 Given: $\overline{AD}$ bisects $\overline{BC}$ at E.
$\overline{AB} \perp \overline{BC}$
$\overline{DC} \perp \overline{BC}$
Prove: $\overline{AB} \cong \overline{DC}$



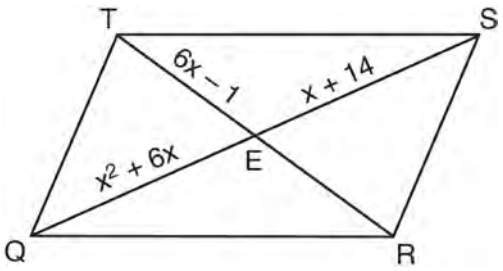
422 Write an equation of the circle whose diameter $\overline{AB}$ has endpoints $A(-4,2)$ and $B(4,-4)$. [The use of the grid below is optional.]



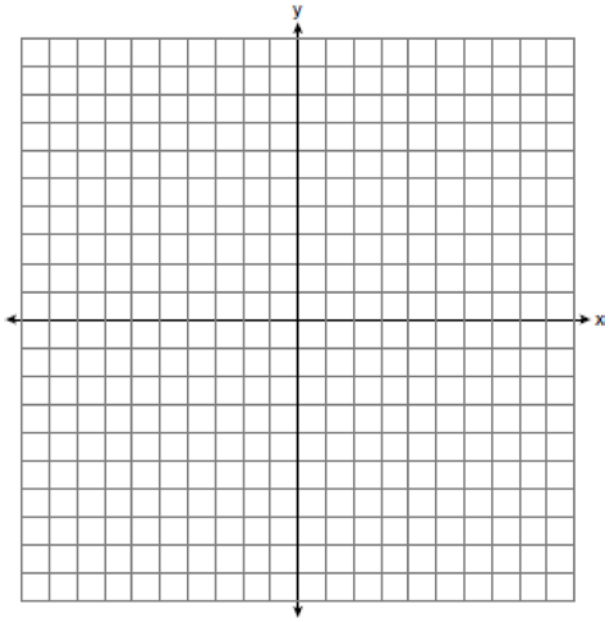
423 In the diagram below of $\triangle GJK$, H is a point on $\overline{GJ}$, $\overline{HJ} \cong \overline{JK}$, $m\angle G = 28$, and $m\angle GJK = 70$. Determine whether $\triangle GHK$ is an isosceles triangle and justify your answer.



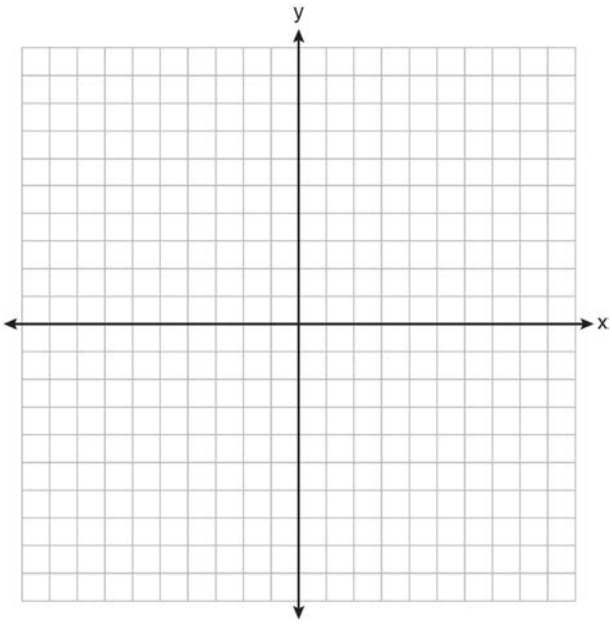
424 As shown in the diagram below, the diagonals of parallelogram *QRST* intersect at *E*. If $QE = x^2 + 6x$, $SE = x + 14$, and $TE = 6x - 1$, determine *TE* algebraically.



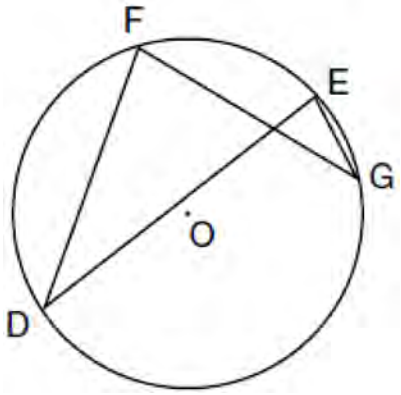
425 On the set of coordinate axes below, graph the locus of points that are equidistant from the lines $y = 6$ and $y = 2$ and also graph the locus of points that are 3 units from the *y*-axis. State the coordinates of *all* points that satisfy *both* conditions.



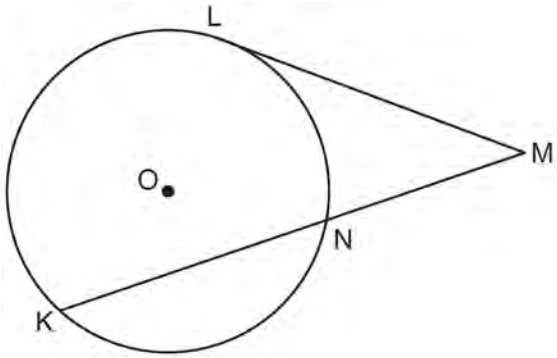
426 The coordinates of the vertices of parallelogram *ABCD* are $A(-2,2)$, $B(3,5)$, $C(4,2)$, and $D(-1,-1)$. State the coordinates of the vertices of parallelogram $A''B''C''D''$ that result from the transformation $r_{y-\text{axis}} \circ T_{2,-3}$. [The use of the set of axes below is optional.]



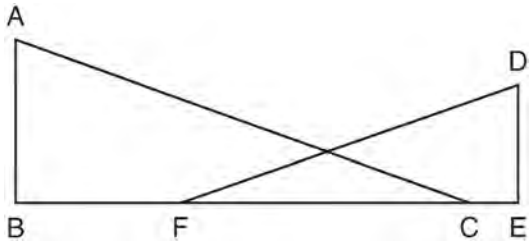
427 In the diagram below of circle *O*, chords $\overline{DF}$, $\overline{DE}$, $\overline{FG}$, and $\overline{EG}$ are drawn such that $m\overset{\frown}{DF} : m\overset{\frown}{FE} : m\overset{\frown}{EG} : m\overset{\frown}{GD} = 5:2:1:7$. Identify one pair of inscribed angles that are congruent to each other and give their measure.



428 In the diagram below, tangent $\overline{ML}$ and secant $\overline{MNK}$ are drawn to circle O. The ratio $m\overset{\frown}{LN} : m\overset{\frown}{NK} : m\overset{\frown}{KL}$ is $3:4:5$. Find $m\angle LMK$.

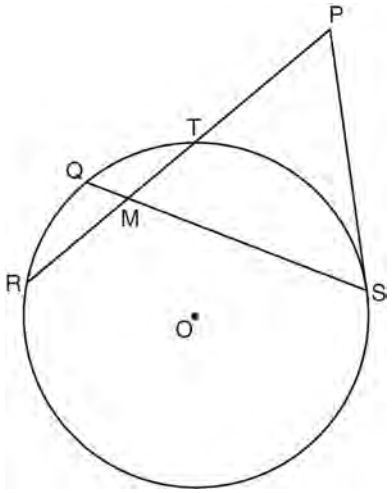


429 In the diagram below, $\overline{BFCE}$, $\overline{AB} \perp \overline{BE}$, $\overline{DE} \perp \overline{BE}$, and $\angle BFD \cong \angle ECA$. Prove that $\triangle ABC \sim \triangle DEF$.



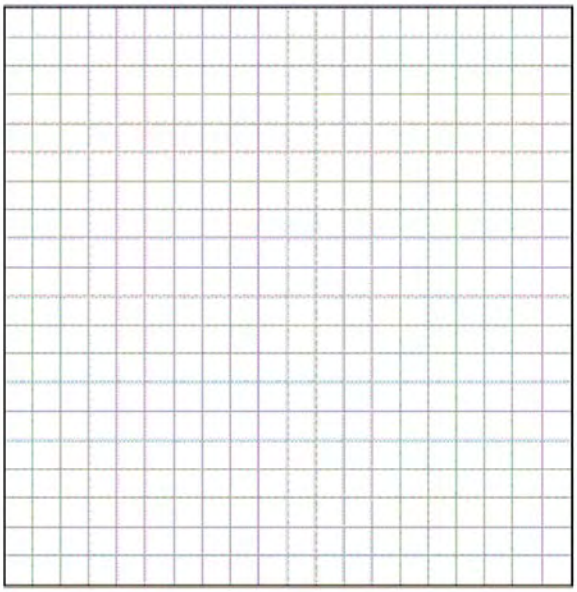
430 Given: Quadrilateral $ABCD$ with $\overline{AB} \cong \overline{CD}$, $\overline{AD} \cong \overline{BC}$, and diagonal $\overline{BD}$ is drawn
Prove: $\angle BDC \cong \angle ABD$

431 In the diagram below of circle O, chords $\overline{RT}$ and $\overline{QS}$ intersect at M. Secant $\overline{PTR}$ and tangent $\overline{PS}$ are drawn to circle O. The length of $\overline{RM}$ is two more than the length of $\overline{TM}$, $QM = 2$, $SM = 12$, and $PT = 8$.

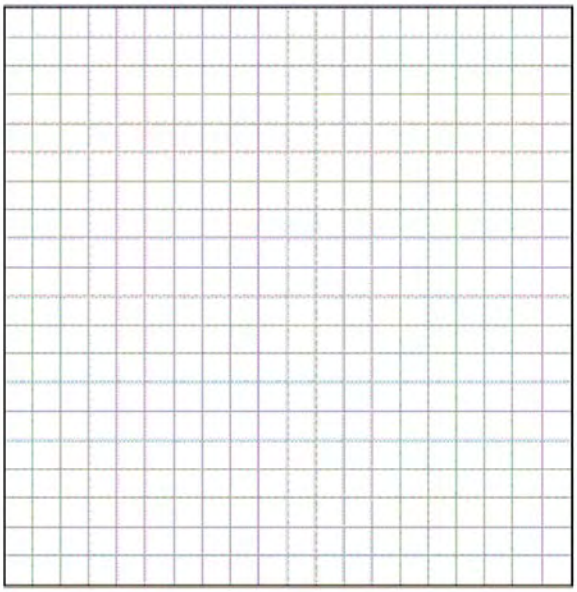


Find the length of $\overline{RT}$. Find the length of $\overline{PS}$.

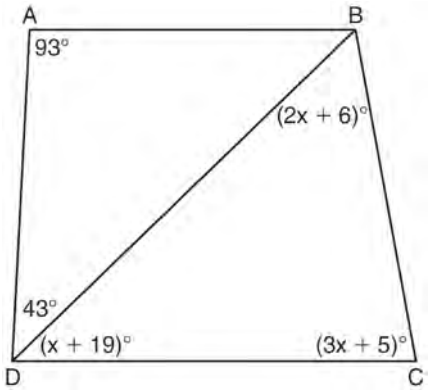
432 Triangle DEG has the coordinates $D(1,1)$, $E(5,1)$, and $G(5,4)$. Triangle DEG is rotated 90° about the origin to form $\triangle D'E'G'$. On the grid below, graph and label $\triangle DEG$ and $\triangle D'E'G'$. State the coordinates of the vertices D', E', and G'. Justify that this transformation preserves distance.



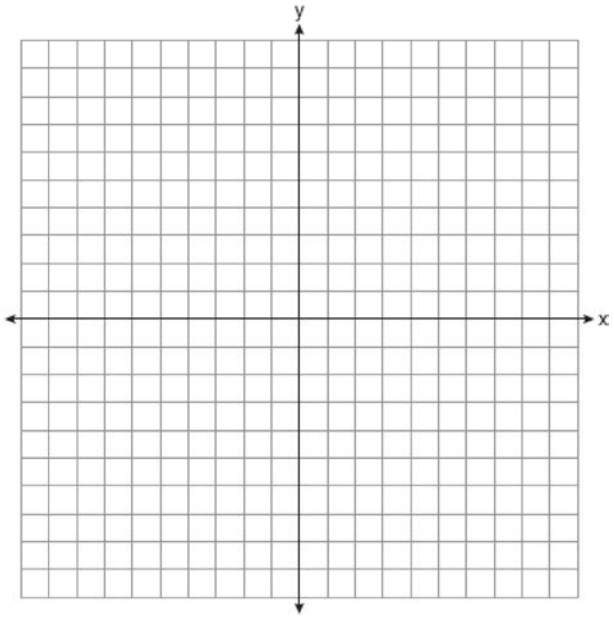
433 Write an equation of the perpendicular bisector of the line segment whose endpoints are $(-1,1)$ and $(7,-5)$. [The use of the grid below is optional]



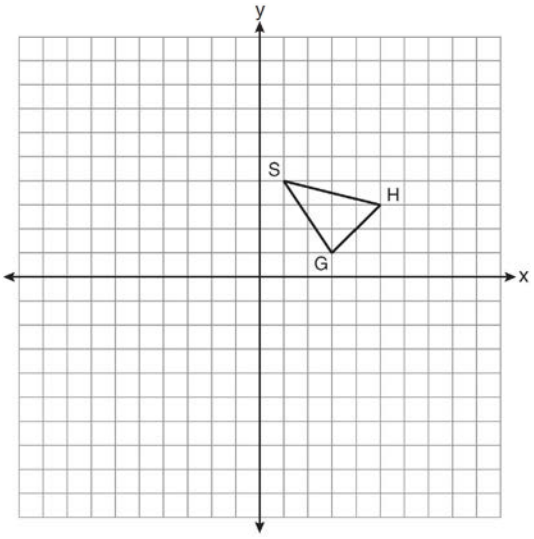
434 In the diagram below of quadrilateral $ABCD$ with diagonal $\overline{BD}$, $m\angle A = 93$, $m\angle ADB = 43$, $m\angle C = 3x + 5$, $m\angle BDC = x + 19$, and $m\angle DBC = 2x + 6$. Determine if $\overline{AB}$ is parallel to $\overline{DC}$. Explain your reasoning.



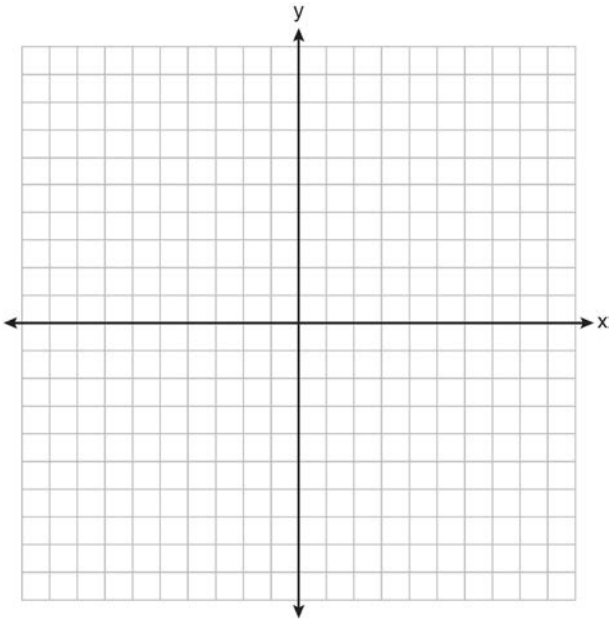
435 The coordinates of trapezoid $ABCD$ are $A(-4,5)$, $B(1,5)$, $C(1,2)$, and $D(-6,2)$. Trapezoid $A''B''C''D''$ is the image after the composition $r_{x-\text{axis}} \circ r_{y=x}$ is performed on trapezoid $ABCD$. State the coordinates of trapezoid $A''B''C''D''$. [The use of the set of axes below is optional.]



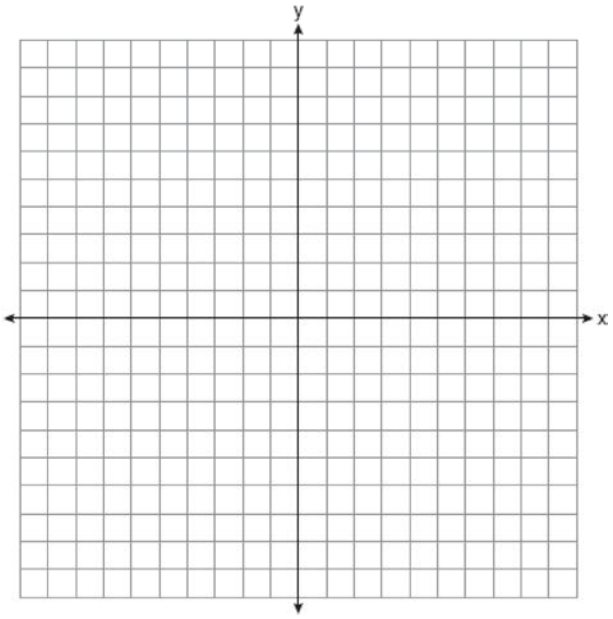
436 As shown on the set of axes below, $\triangle GHS$ has vertices $G(3,1)$, $H(5,3)$, and $S(1,4)$. Graph and state the coordinates of $\triangle G''H''S''$, the image of $\triangle GHS$ after the transformation $T_{-3,1} \circ D_2$.



437 A city is planning to build a new park. The park must be equidistant from school A at $(3,3)$ and school B at $(3,-5)$. The park also must be exactly 5 miles from the center of town, which is located at the origin on the coordinate graph. Each unit on the graph represents 1 mile. On the set of axes below, sketch the compound loci and label with an **X** all possible locations for the new park.



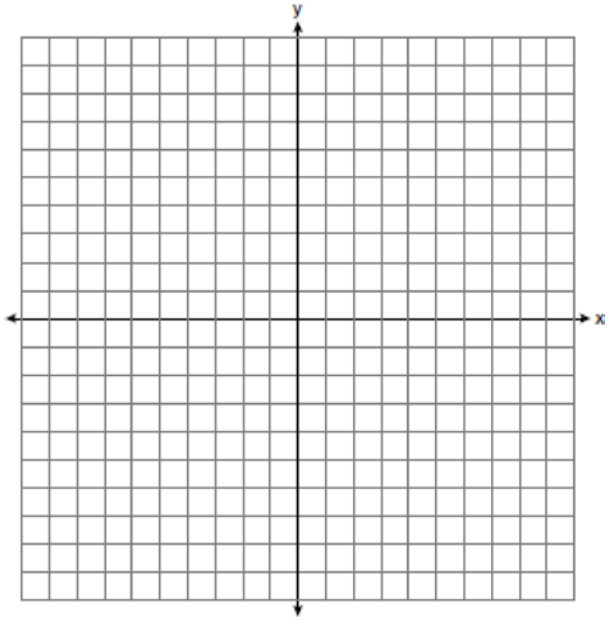
438 The vertices of $\triangle RST$ are $R(-6,5)$, $S(-7,-2)$, and $T(1,4)$. The image of $\triangle RST$ after the composition $T_{-2,3} \circ r_{y=x}$ is $\triangle R''S''T''$. State the coordinates of $\triangle R''S''T''$. [The use of the set of axes below is optional.]



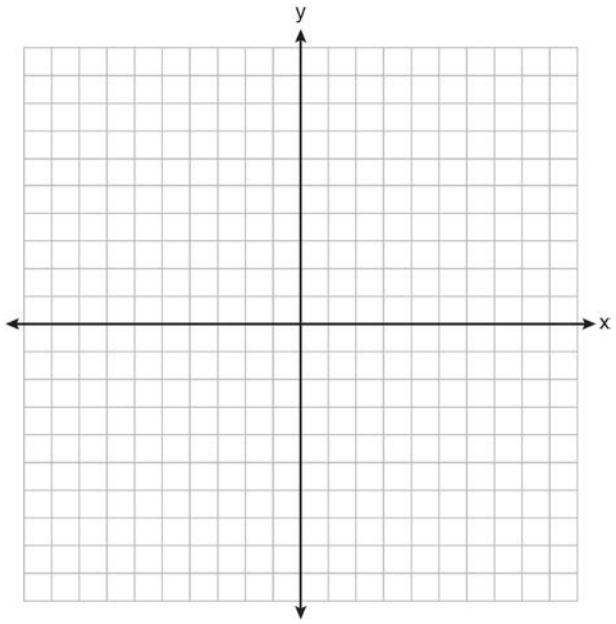
439 Solve the following system of equations graphically.

$$2x^2 - 4x = y + 1$$

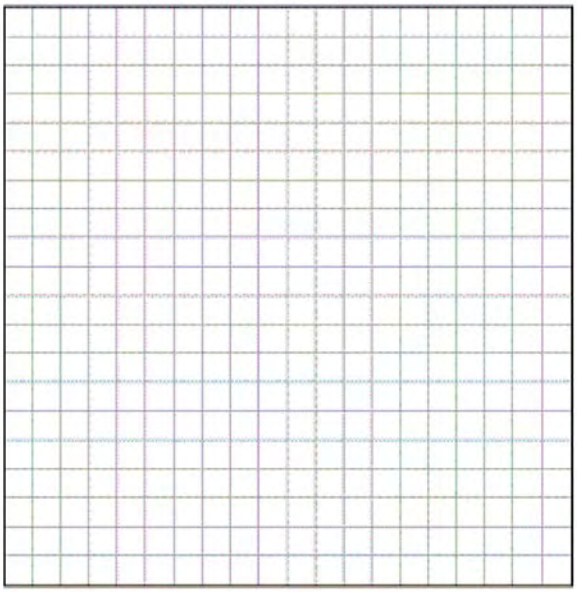
$$x + y = 1$$



440 On the set of axes below, graph and label $\triangle DEF$ with vertices at $D(-4,-4)$, $E(-2,2)$, and $F(8,-2)$. If G is the midpoint of $\overline{EF}$ and H is the midpoint of $\overline{DF}$, state the coordinates of G and H and label each point on your graph. Explain why $\overline{GH} \parallel \overline{DE}$.



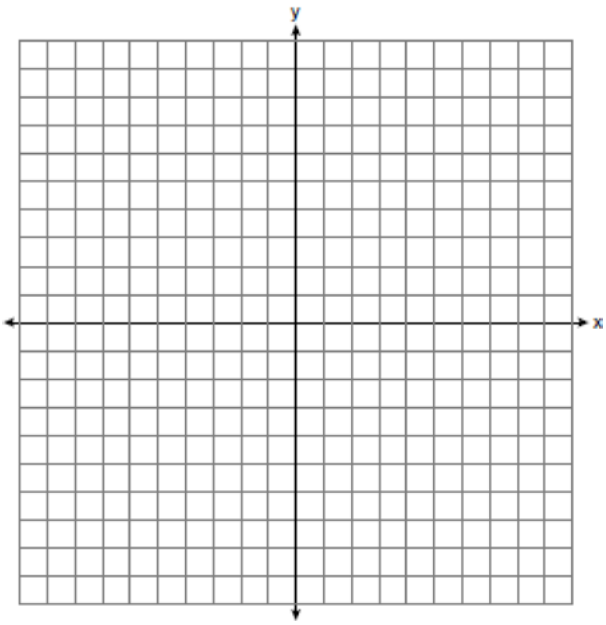
441 The coordinates of the vertices of $\triangle ABC$ $A(1,3)$, $B(-2,2)$ and $C(0,-2)$. On the grid below, graph and label $\triangle A''B''C''$, the result of the composite transformation $D_2 \circ T_{3,-2}$. State the coordinates of A'', B'', and C''.



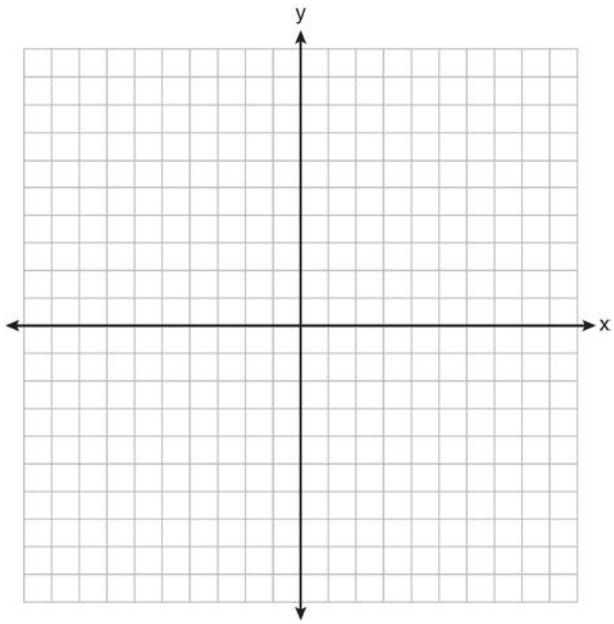
442 On the set of axes below, solve the following system of equations graphically and state the coordinates of *all* points in the solution.

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

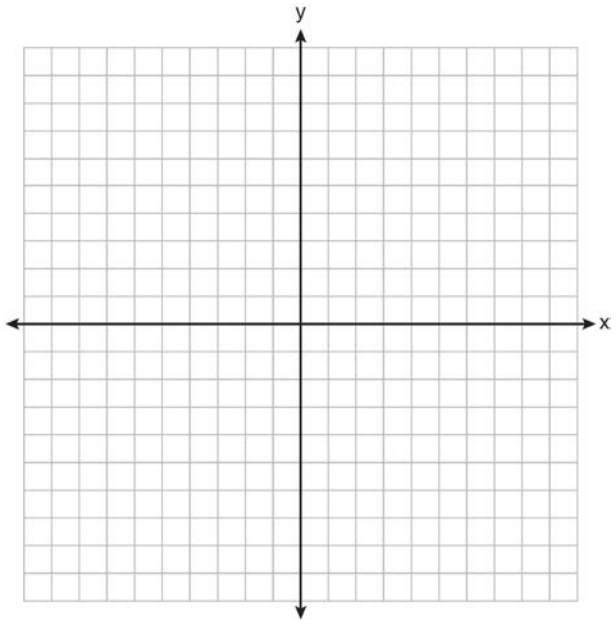
$$2y+4=-x$$



443 On the set of axes below, graph the locus of points that are four units from the point $(2,1)$. On the same set of axes, graph the locus of points that are two units from the line $x = 4$. State the coordinates of all points that satisfy both conditions.

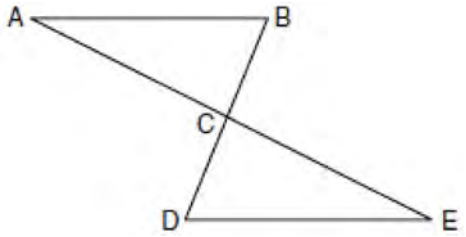


444 Triangle HKL has vertices $H(-7,2)$, $K(3,-4)$, and $L(5,4)$. The midpoint of $\overline{HL}$ is M and the midpoint of $\overline{LK}$ is N. Determine and state the coordinates of points M and N. Justify the statement: $\overline{MN}$ is parallel to $\overline{HK}$. [The use of the set of axes below is optional.]

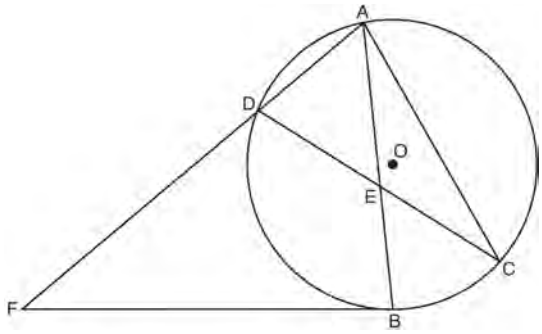


Geometry 6 Point Regents Exam Questions

445 Given: $\triangle ABC$ and $\triangle EDC$, C is the midpoint of $\overline{BD}$ and $\overline{AE}$
Prove: $\overline{AB} \parallel \overline{DE}$

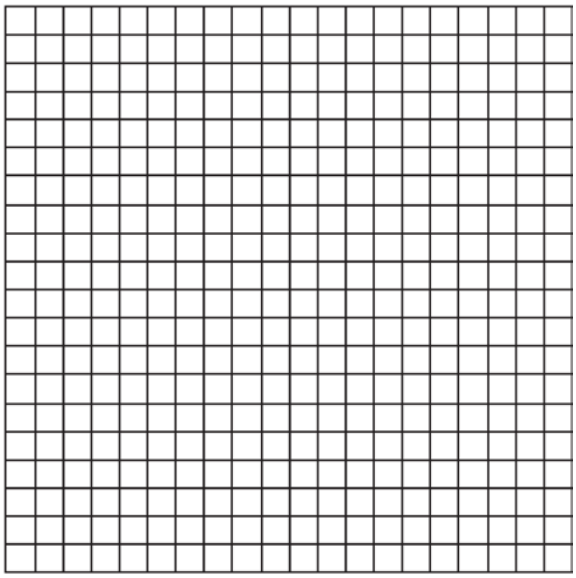


446 Chords $\overline{AB}$ and $\overline{CD}$ intersect at E in circle O, as shown in the diagram below. Secant $\overline{FDA}$ and tangent $\overline{FB}$ are drawn to circle O from external point F and chord $\overline{AC}$ is drawn. The $m\overset{\frown}{DA} = 56$, $m\overset{\frown}{DB} = 112$, and the ratio of $m\overset{\frown}{AC} : m\overset{\frown}{CB} = 3:1$.

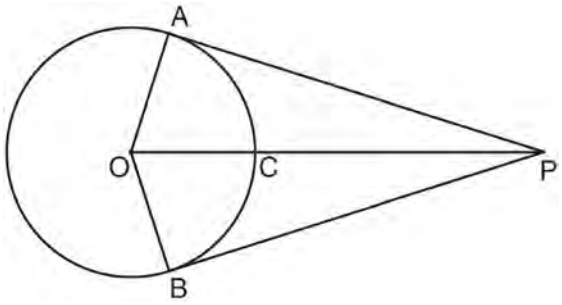


Determine $m\angle CEB$. Determine $m\angle F$. Determine $m\angle DAC$.

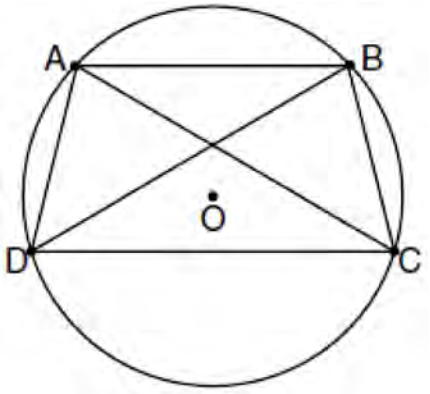
447 Quadrilateral $MATH$ has coordinates $M(1,1)$, $A(-2,5)$, $T(3,5)$, and $H(6,1)$. Prove that quadrilateral $MATH$ is *not* a square. [The use of the grid is optional.]



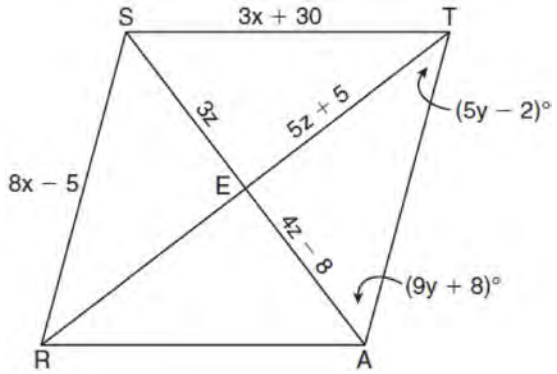
448 In the diagram below, $\overline{PA}$ and $\overline{PB}$ are tangent to circle O, $\overline{OA}$ and $\overline{OB}$ are radii, and $\overline{OP}$ intersects the circle at C. Prove: $\angle AOP \cong \angle BOP$



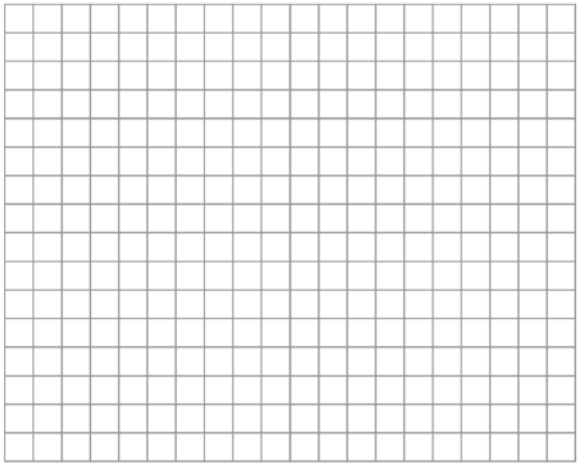
449 In the diagram below, quadrilateral *ABCD* is inscribed in circle *O*, $\overline{AB} \parallel \overline{DC}$, and diagonals $\overline{AC}$ and $\overline{BD}$ are drawn. Prove that $\triangle ACD \cong \triangle BDC$.



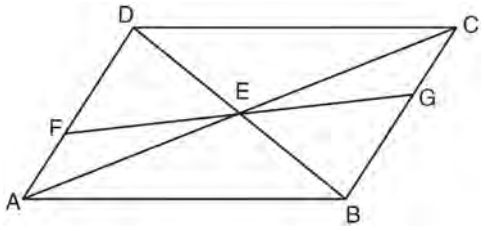
450 In the diagram below, quadrilateral *STAR* is a rhombus with diagonals $\overline{SA}$ and $\overline{TR}$ intersecting at *E*. $ST = 3x + 30$, $SR = 8x - 5$, $SE = 3z$, $TE = 5z + 5$, $AE = 4z - 8$, $m\angle RTA = 5y - 2$, and $m\angle TAS = 9y + 8$. Find *SR*, *RT*, and $m\angle TAS$.



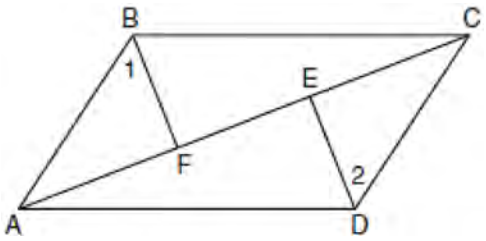
451 Given: Quadrilateral *ABCD* has vertices *A*(−5, 6), *B*(6, 6), *C*(8, −3), and *D*(−3, −3).
Prove: Quadrilateral *ABCD* is a parallelogram but is neither a rhombus nor a rectangle. [The use of the grid below is optional.]



452 In the diagram below of quadrilateral *ABCD*, $\overline{AD} \cong \overline{BC}$ and $\angle DAE \cong \angle BCE$. Line segments *AC*, *DB*, and *FG* intersect at *E*.
Prove: $\triangle AEF \cong \triangle CEG$



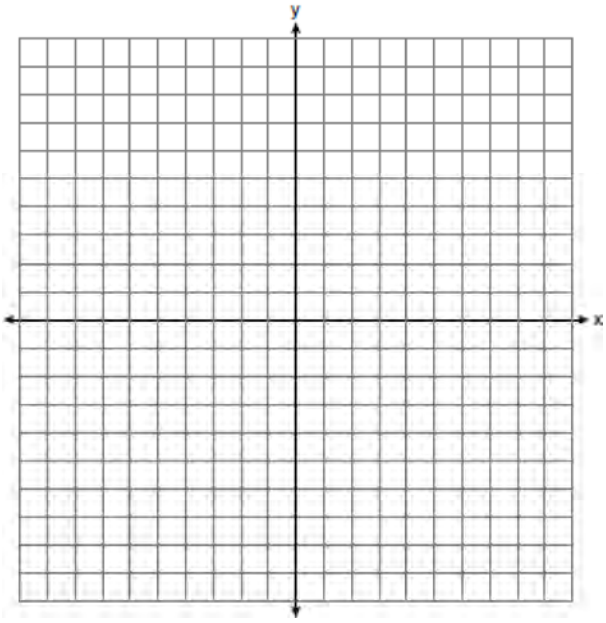
453 Given: Quadrilateral $ABCD$, diagonal $\overline{AFEC}$, $\overline{AE} \cong \overline{FC}$, $\overline{BF} \perp \overline{AC}$, $\overline{DE} \perp \overline{AC}$, $\angle 1 \cong \angle 2$
Prove: $ABCD$ is a parallelogram.



454 On the set of axes below, solve the system of equations graphically and state the coordinates of all points in the solution.

$$y = (x-2)^2 - 3$$

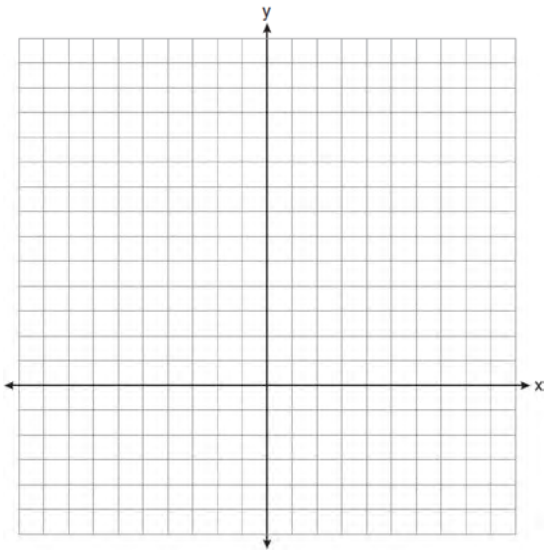
$$2y + 16 = 4x$$



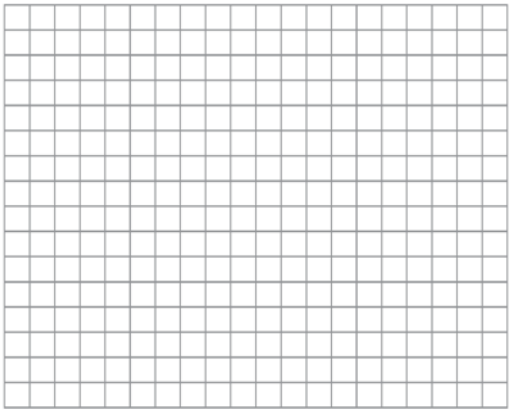
455 On the set of axes below, solve the following system of equations graphically for all values of x and y.

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

$$4x + 2y = 14$$

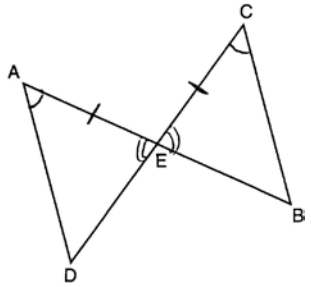


456 Given: $\triangle ABC$ with vertices $A(-6,-2)$, $B(2,8)$, and $C(6,-2)$. $\overline{AB}$ has midpoint D, $\overline{BC}$ has midpoint E, and $\overline{AC}$ has midpoint F.
Prove: $ADEF$ is a parallelogram
$ADEF$ is *not* a rhombus
[The use of the grid is optional.]



Geometry Multiple Choice Regents Exam Questions
Answer Section

1 ANS: 1



PTS: 2 REF: 081210ge STA: G.G.28 TOP: Triangle Congruency

2 ANS: 2 PTS: 2 REF: 011203ge STA: G.G.73
TOP: Equations of Circles

3 ANS: 1 PTS: 2 REF: 011207ge STA: G.G.20
TOP: Constructions

4 ANS: 2

The slope of $x + 2y = 3$ is $m = \frac{-A}{B} = \frac{-1}{2}$. $m_{\perp} = 2$.

PTS: 2 REF: 081122ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

5 ANS: 2 PTS: 2 REF: 081108ge STA: G.G.54
TOP: Reflections KEY: basic

6 ANS: 3 PTS: 2 REF: 081204ge STA: G.G.59
TOP: Properties of Transformations

7 ANS: 2 PTS: 2 REF: 081117ge STA: G.G.23
TOP: Locus

8 ANS: 1

$d = \sqrt{(4-1)^2 + (7-11)^2} = \sqrt{9+16} = \sqrt{25} = 5$

PTS: 2 REF: 011205ge STA: G.G.67 TOP: Distance
KEY: general

9 ANS: 4

$6^2 = x(x+5)$

$36 = x^2 + 5x$

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

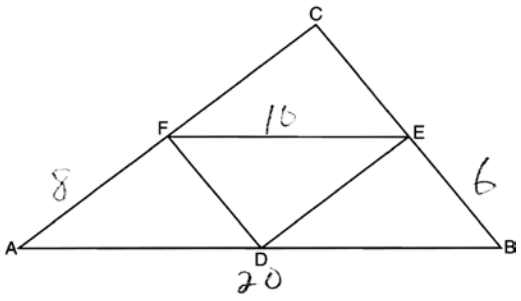
$0 = (x+9)(x-4)$

$x = 4$

PTS: 2 REF: 011123ge STA: G.G.47 TOP: Similarity
KEY: leg

10 ANS: 2 PTS: 2 REF: 081120ge STA: G.G.8
TOP: Planes

11 ANS: 4



$20 + 8 + 10 + 6 = 44$.

PTS: 2 REF: 061211ge STA: G.G.42 TOP: Midsegments

12 ANS: 3 PTS: 2 REF: 011116ge STA: G.G.71
TOP: Equations of Circles

13 ANS: 4 PTS: 2 REF: 011212ge STA: G.G.71
TOP: Equations of Circles

14 ANS: 4 PTS: 2 REF: 011208ge STA: G.G.53
TOP: Segments Intercepted by Circle KEY: two tangents

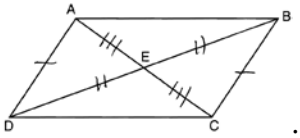
15 ANS: 3 PTS: 2 REF: 081123ge STA: G.G.12
TOP: Volume

16 ANS: 4 PTS: 2 REF: 061103ge STA: G.G.60
TOP: Identifying Transformations

17 ANS: 1 PTS: 2 REF: 011213ge STA: G.G.24
TOP: Negations

18 ANS: 2 PTS: 2 REF: 011211ge STA: G.G.55
TOP: Properties of Transformations

19 ANS: 3



. Opposite sides of a parallelogram are congruent and the diagonals of a parallelogram bisect each other.

PTS: 2 REF: 061222ge STA: G.G.28 TOP: Triangle Congruency

20 ANS: 3

$y = mx + b$

$-1 = 2(2) + b$

$-5 = b$

PTS: 2 REF: 011224ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

21 ANS: 3 PTS: 2 REF: 061102ge STA: G.G.29
TOP: Triangle Congruency

22 ANS: 3

$x^2 + 7^2 = (x+1)^2 \qquad x + 1 = 25$

$x^2 + 49 = x^2 + 2x + 1$

$48 = 2x$

$24 = x$

PTS: 2 REF: 081127ge STA: G.G.48 TOP: Pythagorean Theorem

23 ANS: 4

$\frac{5}{2+3+5} \times 180 = 90$

PTS: 2 REF: 081119ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

24 ANS: 2 PTS: 2 REF: 061101ge STA: G.G.18
TOP: Constructions

25 ANS: 2

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot \left(\frac{6}{2}\right)^3 \approx 36\pi$

PTS: 2 REF: 081215ge STA: G.G.16 TOP: Volume and Surface Area

26 ANS: 2

$M_x = \frac{7 + (-3)}{2} = 2. \quad M_Y = \frac{-1 + 3}{2} = 1.$

PTS: 2 REF: 011106ge STA: G.G.66 TOP: Midpoint

27 ANS: 1 PTS: 2 REF: 061110ge STA: G.G.72
TOP: Equations of Circles

28 ANS: 4 PTS: 2 REF: 081101ge STA: G.G.25
TOP: Compound Statements KEY: conjunction

29 ANS: 3 PTS: 2 REF: 011202ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

30 ANS: 2

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

$2 = -2(2) + b$

$6 = b$

PTS: 2 REF: 081112ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

31 ANS: 4 PTS: 2 REF: 081216ge STA: G.G.45
TOP: Similarity KEY: basic

32 ANS: 2

$\frac{4x + 10}{2} = 2x + 5$

PTS: 2 REF: 011103ge STA: G.G.42 TOP: Midsegments

33 ANS: 1

$x^2 = 7(16-7)$

$x^2 = 63$

$x = \sqrt{9}\sqrt{7}$

$x = 3\sqrt{7}$

PTS: 2 REF: 061128ge STA: G.G.47 TOP: Similarity
KEY: altitude

34 ANS: 2 PTS: 2 REF: 061121ge STA: G.G.22
TOP: Locus

35 ANS: 3 PTS: 2 REF: 081104ge STA: G.G.55
TOP: Properties of Transformations

36 ANS: 2

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot \left(\frac{15}{2}\right)^3 \approx 1767.1$

PTS: 2 REF: 061207ge STA: G.G.16 TOP: Volume and Surface Area

37 ANS: 2

$AC = BD$

$AC - BC = BD - BC$

$AB = CD$

PTS: 2 REF: 061206ge STA: G.G.27 TOP: Line Proofs

38 ANS: 2 PTS: 2 REF: 061202ge STA: G.G.24
TOP: Negations

39 ANS: 3

$\frac{180-70}{2} = 55$

PTS: 2 REF: 061205ge STA: G.G.52 TOP: Chords

40 ANS: 4
Parallel lines intercept congruent arcs.

PTS: 2 REF: 081201ge STA: G.G.52 TOP: Chords

41 ANS: 2 PTS: 2 REF: 081205ge STA: G.G.17
TOP: Constructions

42 ANS: 4

$x + 6y = 12$ $\qquad 3(x - 2) = -y - 4$

$6y = -x + 12$ $\qquad -3(x - 2) = y + 4$

$y = -\frac{1}{6}x + 2$ $\qquad m = -3$

$m = -\frac{1}{6}$

PTS: 2 REF: 011119ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

43 ANS: 1 PTS: 2 REF: 011122ge STA: G.G.28
TOP: Triangle Congruency

44 ANS: 1 PTS: 2 REF: 081116ge STA: G.G.7
TOP: Planes

45 ANS: 3 PTS: 2 REF: 061210ge STA: G.G.71
TOP: Equations of Circles

46 ANS: 1

$7x + 4 = 2(2x + 5)$. $PM = 2(2) + 5 = 9$

$7x + 4 = 4x + 10$

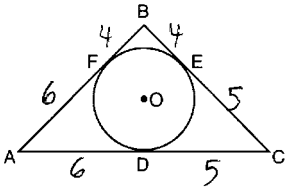
$3x = 6$

$x = 2$

PTS: 2 REF: 011226ge STA: G.G.43 TOP: Centroid

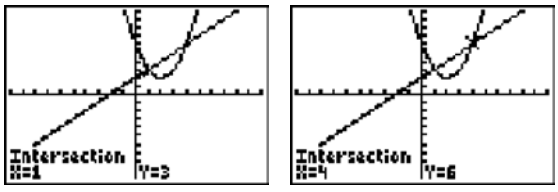
47 ANS: 1 PTS: 2 REF: 061113ge STA: G.G.63
TOP: Parallel and Perpendicular Lines

48 ANS: 3



PTS: 2 REF: 011101ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two tangents

49 ANS: 3



PTS: 2 REF: 081118ge STA: G.G.70 TOP: Quadratic-Linear Systems

50 ANS: 3 PTS: 2 REF: 011104ge STA: G.G.38
TOP: Parallelograms

51 ANS: 1 PTS: 2 REF: 061108ge STA: G.G.9
TOP: Planes

52 ANS: 2

$m = \frac{-A}{B} = \frac{-20}{-2} = 10.\ m_{\perp} = -\frac{1}{10}$

PTS: 2 REF: 061219ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

53 ANS: 4

$m = \frac{-A}{B} = \frac{-3}{2}.\quad y = mx + b$

$-1 = \left(\frac{-3}{2}\right)(2) + b$

$-1 = -3 + b$

$2 = b$

PTS: 2 REF: 061226ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

54 ANS: 1

Parallel lines intercept congruent arcs.

PTS: 2 REF: 061105ge STA: G.G.52 TOP: Chords

55 ANS: 1

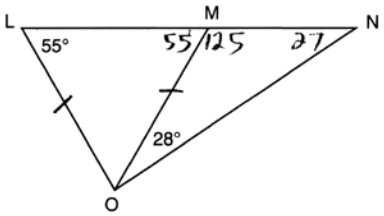
$AB = CD$

$AB + BC = CD + BC$

$AC = BD$

PTS: 2 REF: 081207ge STA: G.G.27 TOP: Line Proofs

56 ANS: 1



PTS: 2 REF: 061211ge STA: G.G.31 TOP: Isosceles Triangle Theorem

57 ANS: 2 PTS: 2 REF: 011215ge STA: G.G.12
TOP: Volume

58 ANS: 2 PTS: 2 REF: 081214ge STA: G.G.50
TOP: Tangents KEY: point of tangency

59 ANS: 3

$-5 + 3 = -2 \qquad 2 + -4 = -2$

PTS: 2 REF: 011107ge STA: G.G.54 TOP: Translations

60 ANS: 1 PTS: 2 REF: 011112ge STA: G.G.39
TOP: Special Parallelograms

61 ANS: 2 PTS: 2 REF: 061227ge STA: G.G.56
TOP: Identifying Transformations

62 ANS: 3 PTS: 2 REF: 081208ge STA: G.G.27
TOP: Quadrilateral Proofs

63 ANS: 4 PTS: 2 REF: 061213ge STA: G.G.5
TOP: Planes

64 ANS: 3

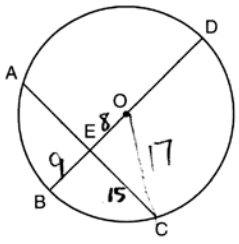
$4x + 14 + 8x + 10 = 180$

$12x = 156$

$x = 13$

PTS: 2 REF: 081213ge STA: G.G.35 TOP: Parallel Lines and Transversals

65 ANS: 2



$\sqrt{17^2 - 15^2} = 8.\ \ 17 - 8 = 9$

PTS: 2 REF: 061221ge STA: G.G.49 TOP: Chords

66 ANS: 2 PTS: 2 REF: 011109ge STA: G.G.9
TOP: Planes

67 ANS: 2

$5 - 3 = 2, 5 + 3 = 8$

PTS: 2 REF: 011228ge STA: G.G.33 TOP: Triangle Inequality Theorem

68 ANS: 2 PTS: 2 REF: 081202ge STA: G.G.55
TOP: Properties of Transformations

69 ANS: 4

$\overline{AB}$ is a vertical line, so its perpendicular bisector is a horizontal line through the midpoint of $\overline{AB}$, which is $(0, 3)$.

PTS: 2 REF: 011225ge STA: G.G.68 TOP: Perpendicular Bisector

70 ANS: 2 PTS: 2 REF: 061201ge STA: G.G.59
TOP: Properties of Transformations

71 ANS: 1 PTS: 2 REF: 011220ge STA: G.G.72
TOP: Equations of Circles

72 ANS: 3

$7x = 5x + 30$

$2x = 30$

$x = 15$

PTS: 2 REF: 081109ge STA: G.G.35 TOP: Parallel Lines and Transversals

73 ANS: 3 PTS: 2 REF: 011110ge STA: G.G.21
KEY: Centroid, Orthocenter, Incenter and Circumcenter

74 ANS: 2

$d = \sqrt{(-1-7)^2 + (9-4)^2} = \sqrt{64+25} = \sqrt{89}$

PTS: 2 REF: 061109ge STA: G.G.67 TOP: Distance
KEY: general

75 ANS: 3 PTS: 2 REF: 061220ge STA: G.G.74
TOP: Graphing Circles

76 ANS: 1

$3x + 5 + 4x - 15 + 2x + 10 = 180$. $m\angle D = 3(20) + 5 = 65$. $m\angle E = 4(20) - 15 = 65$.

$9x = 180$

$x = 20$

PTS: 2 REF: 061119ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

77 ANS: 3

$180(n-2) = n\left(180 - \dfrac{180(n-2)}{n}\right)$

$180n - 360 = 180n - 180n + 360$

$180n = 720$

$n = 4$

PTS: 2 REF: 081223ge STA: G.G.36 TOP: Interior and Exterior Angles of Polygons

78 ANS: 2

$V = \pi r^2 h = \pi \cdot 6^2 \cdot 15 = 540\pi$

PTS: 2 REF: 011117ge STA: G.G.14 TOP: Volume

79 ANS: 4

$m_{\perp} = -\dfrac{1}{3}$. $y = mx + b$

$6 = -\dfrac{1}{3}(-9) + b$

$6 = 3 + b$

$3 = b$

PTS: 2 REF: 061215ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

80 ANS: 4 PTS: 2 REF: 061124ge STA: G.G.31
TOP: Isosceles Triangle Theorem

81 ANS: 2

$7x = 5x + 30$

$2x = 30$

$x = 15$

PTS: 2 REF: 061106ge STA: G.G.35 TOP: Parallel Lines and Transversals

82 ANS: 4

$m\angle A = 80$

PTS: 2 REF: 011115ge STA: G.G.34 TOP: Angle Side Relationship

83 ANS: 2 PTS: 2 REF: 061107ge STA: G.G.32
TOP: Exterior Angle Theorem

84 ANS: 2

$6x + 42 = 18x - 12$

$54 = 12x$

$x = \frac{54}{12} = 4.5$

PTS: 2 REF: 011201ge STA: G.G.35 TOP: Parallel Lines and Transversals

85 ANS: 4

$-5 = \frac{-3 + x}{2}$. $2 = \frac{6 + y}{2}$

$-10 = -3 + x$ $4 = 6 + y$

$-7 = x$ $-2 = y$

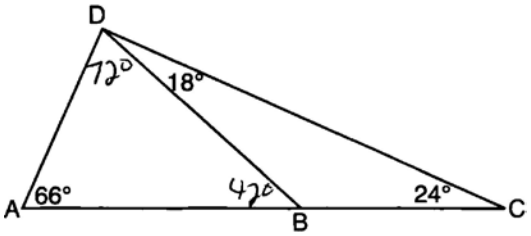
PTS: 2 REF: 081203ge STA: G.G.66 TOP: Midpoint

86 ANS: 2 PTS: 2 REF: 081226ge STA: G.G.69
TOP: Triangles in the Coordinate Plane

87 ANS: 4 PTS: 2 REF: 061203ge STA: G.G.9
TOP: Planes

88 ANS: 3 PTS: 2 REF: 081209ge STA: G.G.71
TOP: Equations of Circles

89 ANS: 1



PTS: 2 REF: 081219ge STA: G.G.34 TOP: Angle Side Relationship

90 ANS: 4

$y = mx + b$

$3 = \frac{3}{2}(-2) + b$

$3 = -3 + b$

$6 = b$

PTS: 2 REF: 011114ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

91 ANS: 1 PTS: 2 REF: 081121ge STA: G.G.39
TOP: Special Parallelograms

92 ANS: 1

The diagonals of a parallelogram intersect at their midpoints. $M_{\overline{AC}}\left(\frac{1+3}{2}, \frac{5+(-1)}{2}\right) = (2,2)$

PTS: 2 REF: 061209ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

93 ANS: 4

$d = \sqrt{(-5-3)^2 + (4-(-6))^2} = \sqrt{64+100} = \sqrt{164} = \sqrt{4}\sqrt{41} = 2\sqrt{41}$

PTS: 2 REF: 011121ge STA: G.G.67 TOP: Distance
KEY: general

94 ANS: 1

$m = \left(\frac{8+0}{2}, \frac{2+6}{2}\right) = (4,4)$ $m = \frac{6-2}{0-8} = \frac{4}{-8} = -\frac{1}{2}$ $m_{\perp} = 2$ $y = mx + b$

$4 = 2(4) + b$

$-4 = b$

PTS: 2 REF: 081126ge STA: G.G.68 TOP: Perpendicular Bisector

95 ANS: 3

$(3,-2) \rightarrow (2,3) \rightarrow (8,12)$

PTS: 2 REF: 011126ge STA: G.G.54 TOP: Compositions of Transformations
KEY: basic

96 ANS: 4 PTS: 2 REF: 081211ge STA: G.G.5
TOP: Planes

97 ANS: 1 PTS: 2 REF: 011218ge STA: G.G.3
TOP: Planes

98 ANS: 4

$\sqrt{25^2 - 7^2} = 24$

PTS: 2 REF: 081105ge STA: G.G.50 TOP: Tangents
KEY: point of tangency

99 ANS: 2

The slope of a line in standard form is $\frac{-A}{B}$, so the slope of this line is $\frac{-4}{3}$. A parallel line would also have a slope of $\frac{-4}{3}$. Since the answers are in standard form, use the point-slope formula. $y-2=-\frac{4}{3}(x+5)$

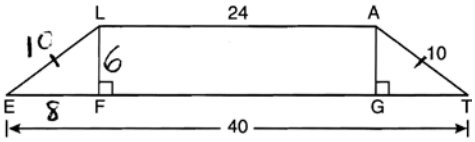
$3y-6=-4x-20$

$4x+3y=-14$

PTS: 2 REF: 061123ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

100 ANS: 1

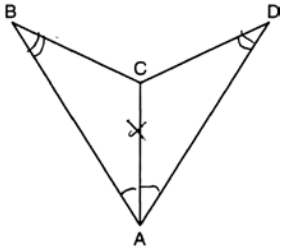
$\frac{40-24}{2}=8.\ \sqrt{10^2-8^2}=6.$



PTS: 2 REF: 061204ge STA: G.G.40 TOP: Trapezoids

101 ANS: 1 PTS: 2 REF: 061125ge STA: G.G.39
TOP: Special Parallelograms

102 ANS: 4



PTS: 2 REF: 081114ge STA: G.G.28 TOP: Triangle Congruency

103 ANS: 4

The slope of $3x+5y=4$ is $m=\frac{-A}{B}=\frac{-3}{5}.\ m_{\perp}=\frac{5}{3}.$

PTS: 2 REF: 061127ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

104 ANS: 4 PTS: 2 REF: 011124ge STA: G.G.51
TOP: Arcs Determined by Angles KEY: inscribed

105 ANS: 2 PTS: 2 REF: 011206ge STA: G.G.32
TOP: Exterior Angle Theorem

106 ANS: 1

$m=\frac{3}{2}\quad y=mx+b$

$2=\frac{3}{2}(1)+b$

$\frac{1}{2}=b$

PTS: 2 REF: 081217ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

107 ANS: 3

$x + 2x + 15 = 5x + 15$ $2(5) + 15 = 25$

$3x + 15 = 5x + 5$

$10 = 2x$

$5 = x$

PTS: 2 REF: 011127ge STA: G.G.32 TOP: Exterior Angle Theorem

108 ANS: 4 PTS: 2 REF: 011222ge STA: G.G.34
TOP: Angle Side Relationship

109 ANS: 1 PTS: 2 REF: 081113ge STA: G.G.54
TOP: Reflections KEY: basic

110 ANS: 1 PTS: 2 REF: 011128ge STA: G.G.2
TOP: Planes

111 ANS: 2 PTS: 2 REF: 061115ge STA: G.G.69
TOP: Triangles in the Coordinate Plane

112 ANS: 3

$8^2 + 24^2 \neq 25^2$

PTS: 2 REF: 011111ge STA: G.G.48 TOP: Pythagorean Theorem

113 ANS: 4 PTS: 2 REF: 061114ge STA: G.G.73
TOP: Equations of Circles

114 ANS: 3

The slope of $2y = x + 2$ is $\frac{1}{2}$, which is the opposite reciprocal of -2. $3 = -2(4) + b$

$11 = b$

PTS: 2 REF: 081228ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

115 ANS: 4

$\sqrt{25^2 - \left(\frac{26 - 12}{2}\right)^2} = 24$

PTS: 2 REF: 011219ge STA: G.G.40 TOP: Trapezoids

116 ANS: 3

$(n - 2)180 = (5 - 2)180 = 540$

PTS: 2 REF: 011223ge STA: G.G.36 TOP: Interior and Exterior Angles of Polygons

117 ANS: 1 PTS: 2 REF: 011221ge STA: G.G.10
TOP: Solids

118 ANS: 3 PTS: 2 REF: 081128ge STA: G.G.39
TOP: Special Parallelograms

119 ANS: 1

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

$-4+x=2$ $3+y=10$

$x=6$ $y=7$

PTS: 2 REF: 081115ge STA: G.G.66 TOP: Midpoint

120 ANS: 4 PTS: 2 REF: 011216ge STA: G.G.29
TOP: Triangle Congruency

121 ANS: 4 PTS: 2 REF: 011118ge STA: G.G.25
TOP: Compound Statements KEY: general

122 ANS: 3 PTS: 2 REF: 081218ge STA: G.G.1
TOP: Planes

123 ANS: 3 PTS: 2 REF: 081111ge STA: G.G.32
TOP: Exterior Angle Theorem

124 ANS: 3 PTS: 2 REF: 081227ge STA: G.G.42
TOP: Midsegments

125 ANS: 2

$(n-2)180 = (6-2)180 = 720.$ $\frac{720}{6} = 120.$

PTS: 2 REF: 081125ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

126 ANS: 3 PTS: 2 REF: 011217ge STA: G.G.64
TOP: Parallel and Perpendicular Lines

127 ANS: 4 PTS: 2 REF: 081206ge STA: G.G.30
TOP: Interior and Exterior Angles of Triangles

128 ANS: 2 PTS: 2 REF: 061208ge STA: G.G.19
TOP: Constructions

129 ANS: 3 PTS: 2 REF: 061228ge STA: G.G.39
TOP: Special Parallelograms

130 ANS: 3

$\frac{3}{8+3+4} \times 180 = 36$

PTS: 2 REF: 011210ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

131 ANS: 1

The length of the midsegment of a trapezoid is the average of the lengths of its bases. $\frac{x+3+5x-9}{2} = 2x+2.$

$6x-6 = 4x+4$

$2x = 10$

$x = 5$

PTS: 2 REF: 081221ge STA: G.G.40 TOP: Trapezoids

132 ANS: 3

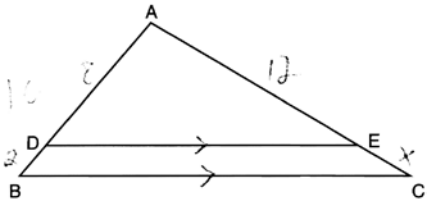
$d = \sqrt{(-1-4)^2 + (0-(-3))^2} = \sqrt{25+9} = \sqrt{34}$

PTS: 2 REF: 061217ge STA: G.G.67 TOP: Distance
KEY: general

133 ANS: 2 PTS: 2 REF: 011125ge STA: G.G.74
TOP: Graphing Circles

134 ANS: 3 PTS: 2 REF: 061122ge STA: G.G.56
TOP: Identifying Transformations

135 ANS: 3



$\frac{8}{2} = \frac{12}{x}$.

$8x = 24$

$x = 3$

PTS: 2 REF: 061216ge STA: G.G.46 TOP: Side Splitter Theorem

136 ANS: 4 PTS: 2 REF: 081110ge STA: G.G.71
TOP: Equations of Circles

137 ANS: 3 PTS: 2 REF: 061218ge STA: G.G.36
TOP: Interior and Exterior Angles of Polygons

138 ANS: 4
The centroid divides each median into segments whose lengths are in the ratio 2 : 1.

PTS: 2 REF: 081220ge STA: G.G.43 TOP: Centroid

139 ANS: 4

$4(x+4) = 8^2$

$4x + 16 = 64$

$4x = 48$

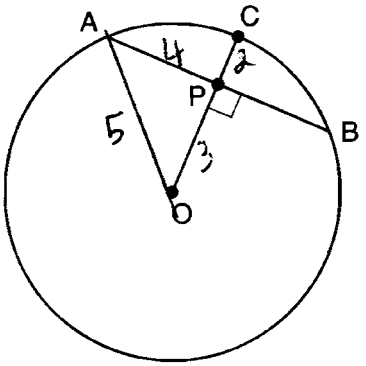
$x = 12$

PTS: 2 REF: 061117ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

140 ANS: 4 PTS: 2 REF: 081106ge STA: G.G.17
TOP: Constructions

141 ANS: 1 PTS: 2 REF: 061223ge STA: G.G.73
TOP: Equations of Circles

142 ANS: 3



PTS: 2 REF: 011112ge STA: G.G.49 TOP: Chords

143 ANS: 3

The slope of $9x - 3y = 27$ is $m = \frac{-A}{B} = \frac{-9}{-3} = 3$, which is the opposite reciprocal of $-\frac{1}{3}$.

PTS: 2 REF: 081225ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

144 ANS: 1 PTS: 2 REF: 061104ge STA: G.G.43
TOP: Centroid

145 ANS: 2

$$\frac{50+x}{2} = 34$$

$$50 + x = 68$$

$$x = 18$$

PTS: 2 REF: 011214ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inside circle

146 ANS: 1 PTS: 2 REF: 011120ge STA: G.G.18
TOP: Constructions

147 ANS: 2 PTS: 2 REF: 081102ge STA: G.G.29
TOP: Triangle Congruency

148 ANS: 4

$$\sqrt{6^2 - 2^2} = \sqrt{32} = \sqrt{16}\sqrt{2} = 4\sqrt{2}$$

PTS: 2 REF: 081124ge STA: G.G.49 TOP: Chords

149 ANS: 3 PTS: 2 REF: 011209ge STA: G.G.44
TOP: Similarity Proofs

150 ANS: 4

$x^2 - 6x + 2x - 3 = 9x + 27$

$x^2 - 4x - 3 = 9x + 27$

$x^2 - 13x - 30 = 0$

$(x - 15)(x + 2) = 0$

$x = 15, -2$

PTS: 2 REF: 061225ge STA: G.G.32 TOP: Exterior Angle Theorem

151 ANS: 3

$\sqrt{5^2 + 12^2} = 13$

PTS: 2 REF: 061116ge STA: G.G.39 TOP: Special Parallelograms

152 ANS: 2 PTS: 2 REF: 061126ge STA: G.G.59
TOP: Properties of Transformations

153 ANS: 3 PTS: 2 REF: 061111ge STA: G.G.38
TOP: Parallelograms

154 ANS: 3

$d = \sqrt{(1-9)^2 + (-4-2)^2} = \sqrt{64+36} = \sqrt{100} = 10$

PTS: 2 REF: 081107ge STA: G.G.67 TOP: Distance
KEY: general

155 ANS: 1 PTS: 2 REF: 011102ge STA: G.G.55
TOP: Properties of Transformations

156 ANS: 2 PTS: 2 REF: 081212ge STA: G.G.72
TOP: Equations of Circles

157 ANS: 4 PTS: 2 REF: 061118ge STA: G.G.1
TOP: Planes

158 ANS: 4 PTS: 2 REF: 011108ge STA: G.G.27
TOP: Angle Proofs

159 ANS: 3

$\frac{5}{7} = \frac{10}{x}$

$5x = 70$

$x = 14$

PTS: 2 REF: 081103ge STA: G.G.46 TOP: Side Splitter Theorem

160 ANS: 1 PTS: 2 REF: 061214ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

161 ANS: 3

$\frac{7x}{4} = \frac{7}{x}$. $7(2) = 14$

$7x^2 = 28$

$x = 2$

PTS: 2 REF: 061120ge STA: G.G.45 TOP: Similarity
KEY: basic

162 ANS: 4 PTS: 2 REF: 081224ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

163 ANS: 2

$3x + x + 20 + x + 20 = 180$

$5x = 40$

$x = 28$

PTS: 2 REF: 081222ge STA: G.G.31 TOP: Isosceles Triangle Theorem

164 ANS: 2

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot 3^3 = 36\pi$

PTS: 2 REF: 061112ge STA: G.G.16 TOP: Volume and Surface Area

165 ANS: 4

$x \cdot 4x = 6^2$. $PQ = 4x + x = 5x = 5(3) = 15$

$4x^2 = 36$

$x = 3$

PTS: 2 REF: 011227ge STA: G.G.47 TOP: Similarity
KEY: leg

Geometry Multiple Choice Regents Exam Questions
Answer Section

166 ANS: 1

$x + 2x + 2 + 3x + 4 = 180$

$6x + 6 = 180$

$x = 29$

PTS: 2 REF: 011002ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

167 ANS: 2

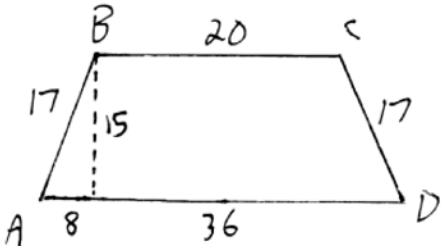
The slope of a line in standard form is $-\frac{A}{B}$, so the slope of this line is $\frac{-2}{-1} = 2$. A parallel line would also have a slope of 2. Since the answers are in slope intercept form, find the y-intercept: $y = mx + b$

$-11 = 2(-3) + b$

$-5 = b$

PTS: 2 REF: fall0812ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

168 ANS: 3



$\frac{36-20}{2} = 8$. $\sqrt{17^2 - 8^2} = 15$

PTS: 2 REF: 061016ge STA: G.G.40 TOP: Trapezoids

169 ANS: 2 PTS: 2 REF: 011011ge STA: G.G.22
TOP: Locus

170 ANS: 3 PTS: 2 REF: 060925ge STA: G.G.17
TOP: Constructions

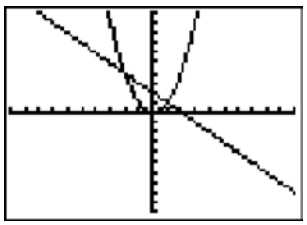
171 ANS: 4

$d = \sqrt{(-6-2)^2 + (4-(-5))^2} = \sqrt{64+81} = \sqrt{145}$

PTS: 2 REF: 081013ge STA: G.G.67 TOP: Distance
KEY: general

172 ANS: 2 PTS: 2 REF: 081015ge STA: G.G.55
TOP: Properties of Transformations

173 ANS: 3



PTS: 2 REF: fall0805ge STA: G.G.70 TOP: Quadratic-Linear Systems

174 ANS: 4

$\triangle ABC \sim \triangle DBE$. $\frac{\overline{AB}}{\overline{DB}} = \frac{\overline{AC}}{\overline{DE}}$

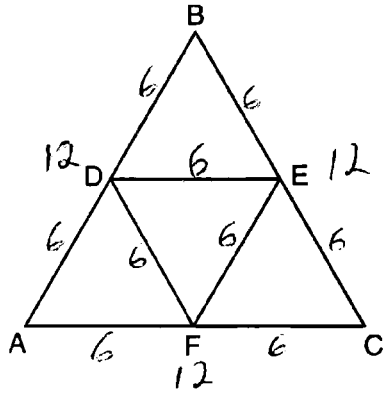
$\frac{9}{2} = \frac{x}{3}$

$x = 13.5$

PTS: 2 REF: 060927ge STA: G.G.46 TOP: Side Splitter Theorem

175 ANS: 3 PTS: 2 REF: 060908ge STA: G.G.60
TOP: Identifying Transformations

176 ANS: 1



PTS: 2 REF: 081003ge STA: G.G.42 TOP: Midsegments

177 ANS: 2 PTS: 2 REF: 061022ge STA: G.G.62
TOP: Parallel and Perpendicular Lines

178 ANS: 2

$M_x = \frac{2+(-4)}{2} = -1$. $M_Y = \frac{-3+6}{2} = \frac{3}{2}$.

PTS: 2 REF: fall0813ge STA: G.G.66 TOP: Midpoint
KEY: general

179 ANS: 4 PTS: 2 REF: 061003ge STA: G.G.10
TOP: Solids

180 ANS: 2 PTS: 2 REF: 011006ge STA: G.G.56
TOP: Identifying Transformations

181 ANS: 3

$2y = -6x + 8$ Perpendicular lines have slope the opposite and reciprocal of each other.

$y = -3x + 4$

$m = -3$

$m_{\perp} = \frac{1}{3}$

PTS: 2 REF: 081024ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

182 ANS: 3 PTS: 2 REF: 080913ge STA: G.G.28
TOP: Triangle Congruency

183 ANS: 4

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

PTS: 2 REF: fall0827ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

184 ANS: 1

Opposite sides of a parallelogram are congruent. $4x - 3 = x + 3.$ $SV = (2) + 3 = 5.$

$3x = 6$

$x = 2$

PTS: 2 REF: 011013ge STA: G.G.38 TOP: Parallelograms

185 ANS: 2

$(d+4)4 = 12(6)$

$4d + 16 = 72$

$d = 14$

$r = 7$

PTS: 2 REF: 061023ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two secants

186 ANS: 3 PTS: 2 REF: 060905ge STA: G.G.54
TOP: Reflections KEY: basic

187 ANS: 1

$M_x = \frac{-2+6}{2} = 2.$ $M_y = \frac{3+3}{2} = 3.$ The center is $(2,3).$ $d = \sqrt{(-2-6)^2 + (3-3)^2} = \sqrt{64+0} = 8.$ If the diameter is 8, the radius is 4 and $r^2 = 16.$

PTS: 2 REF: fall0820ge STA: G.G.71 TOP: Equations of Circles

188 ANS: 4

Let $\overline{AD} = x.$ $36x = 12^2$

$x = 4$

PTS: 2 REF: 080922ge STA: G.G.47 TOP: Similarity
KEY: leg

189 ANS: 2 PTS: 2 REF: 080927ge STA: G.G.4
TOP: Planes

190 ANS: 1 PTS: 2 REF: 060918ge STA: G.G.2
TOP: Planes

191 ANS: 4 PTS: 2 REF: 060922ge STA: G.G.73
TOP: Equations of Circles

192 ANS: 3

$V = \pi r^2 h = \pi \cdot 6^2 \cdot 27 = 972\pi$

PTS: 2 REF: 011027ge STA: G.G.14 TOP: Volume

193 ANS: 2

The slope of $2x + 3y = 12$ is $-\frac{A}{B} = -\frac{2}{3}$. The slope of a perpendicular line is $\frac{3}{2}$. Rewritten in slope intercept form, (2) becomes $y = \frac{3}{2}x + 3$.

PTS: 2 REF: 060926ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

194 ANS: 4

The marked 60º angle and the angle above it are on the same straight line and supplementary. This unmarked supplementary angle is 120º. Because the unmarked 120º angle and the marked 120º angle are alternate exterior angles and congruent, $d \parallel e$.

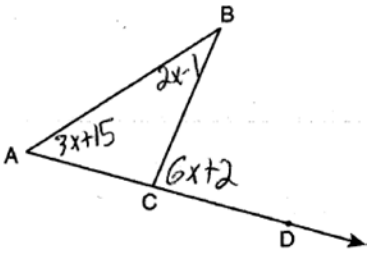
PTS: 2 REF: 080901ge STA: G.G.35 TOP: Parallel Lines and Transversals

195 ANS: 4 PTS: 2 REF: 061008ge STA: G.G.40
TOP: Trapezoids

196 ANS: 3 PTS: 2 REF: 011028ge STA: G.G.26
TOP: Conditional Statements

197 ANS: 2 PTS: 2 REF: 011004ge STA: G.G.17
TOP: Constructions

198 ANS: 1



$3x + 15 + 2x - 1 = 6x + 2$

$5x + 14 = 6x + 2$

$x = 12$

PTS: 2 REF: 011021ge STA: G.G.32 TOP: Exterior Angle Theorem

199 ANS: 1

The closer a chord is to the center of a circle, the longer the chord.

PTS: 2 REF: 011005ge STA: G.G.49 TOP: Chords

200 ANS: 1

The centroid divides each median into segments whose lengths are in the ratio 2 : 1.

$$\overline{GC} = 2\overline{FG}$$
$$\overline{GC} + \overline{FG} = 24$$
$$2\overline{FG} + \overline{FG} = 24$$
$$3\overline{FG} = 24$$
$$\overline{FG} = 8$$

PTS: 2 REF: 081018ge STA: G.G.43 TOP: Centroid

201 ANS: 1

$d = \sqrt{(-4-2)^2 + (5-(-5))^2} = \sqrt{36+100} = \sqrt{136} = \sqrt{4} \cdot \sqrt{34} = 2\sqrt{34}.$

PTS: 2 REF: 080919ge STA: G.G.67 TOP: Distance
KEY: general

202 ANS: 1 PTS: 2 REF: 081009ge STA: G.G.73
TOP: Equations of Circles

203 ANS: 2 PTS: 2 REF: 080921ge STA: G.G.72
TOP: Equations of Circles

204 ANS: 4

$L = 2\pi rh = 2\pi \cdot 5 \cdot 11 \approx 345.6$

PTS: 2 REF: 061006ge STA: G.G.14 TOP: Volume

205 ANS: 1

If $\angle A$ is at minimum (50°) and $\angle B$ is at minimum (90°), $\angle C$ is at maximum of 40° (180° - (50° + 90°)). If $\angle A$ is at maximum (60°) and $\angle B$ is at maximum (100°), $\angle C$ is at minimum of 20° (180° - (60° + 100°)).

PTS: 2 REF: 060901ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

206 ANS: 2

Parallel chords intercept congruent arcs. $\text{m}\overset{\frown}{AD} = \text{m}\overset{\frown}{BC} = 60$. $\text{m}\angle CDB = \frac{1}{2}\text{m}\overset{\frown}{BC} = 30$.

PTS: 2 REF: 060906ge STA: G.G.52 TOP: Chords

207 ANS: 3 PTS: 2 REF: 060928ge STA: G.G.8
TOP: Planes

208 ANS: 4

$d = \sqrt{(-3-1)^2 + (2-0)^2} = \sqrt{16+4} = \sqrt{20} = \sqrt{4} \cdot \sqrt{5} = 2\sqrt{5}$

PTS: 2 REF: 011017ge STA: G.G.67 TOP: Distance
KEY: general

209 ANS: 2

$$\frac{140 - \overline{RS}}{2} = 40$$

$$140 - \overline{RS} = 80$$

$$\overline{RS} = 60$$

PTS: 2 REF: 081025ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: outside circle

210 ANS: 1

After the translation, the coordinates are $A'(-1,5)$ and $B'(3,4)$. After the dilation, the coordinates are $A''(-2,10)$ and $B''(6,8)$.

PTS: 2 REF: fall0823ge STA: G.G.58 TOP: Compositions of Transformations

211 ANS: 4

(4) is not true if $\angle PQR$ is obtuse.

PTS: 2 REF: 060924ge STA: G.G.32 TOP: Exterior Angle Theorem

212 ANS: 1

$$-2\left(-\frac{1}{2}y = 6x + 10\right)$$

$$y = -12x - 20$$

PTS: 2 REF: 061027ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

213 ANS: 3

$$m = \frac{-A}{B} = -\frac{3}{4}$$

PTS: 2 REF: 011025ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

214 ANS: 4

$$\text{SA} = 4\pi r^2 \quad V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot 6^3 = 288\pi$$

$$144\pi = 4\pi r^2$$

$$36 = r^2$$

$$6 = r$$

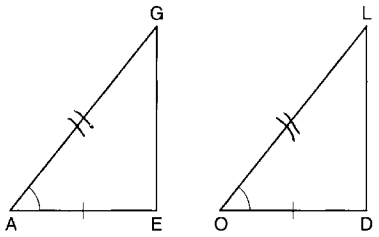
PTS: 2 REF: 081020ge STA: G.G.16 TOP: Surface Area

215 ANS: 2

Adjacent sides of a rectangle are perpendicular and have opposite and reciprocal slopes.

PTS: 2 REF: 061028ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

216 ANS: 2



PTS: 2 REF: 081007ge STA: G.G.28 TOP: Triangle Congruency

217 ANS: 3

Because $\overline{OC}$ is a radius, its length is 5. Since $CE = 2$ $OE = 3$. $\triangle EDO$ is a 3-4-5 triangle. If $ED = 4$, $BD = 8$.

PTS: 2 REF: fall0811ge STA: G.G.49 TOP: Chords

218 ANS: 2

The slope of a line in standard form is $-\frac{A}{B}$ so the slope of this line is $-\frac{5}{3}$ Perpendicular lines have slope that are the opposite and reciprocal of each other.

PTS: 2 REF: fall0828ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

219 ANS: 3 PTS: 2 REF: 011010ge STA: G.G.71
TOP: Equations of Circles

220 ANS: 4 PTS: 2 REF: 080915ge STA: G.G.56
TOP: Identifying Transformations

221 ANS: 2

$4(4x - 3) = 3(2x + 8)$

$16x - 12 = 6x + 24$

$10x = 36$

$x = 3.6$

PTS: 2 REF: 080923ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two chords

222 ANS: 3

$m = \frac{-A}{B} = \frac{5}{2}$. $m = \frac{-A}{B} = \frac{10}{4} = \frac{5}{2}$

PTS: 2 REF: 011014ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

223 ANS: 1

$\angle A = \frac{(n-2)180}{n} = \frac{(5-2)180}{5} = 108$ $\angle AEB = \frac{180-108}{2} = 36$

PTS: 2 REF: 081022ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

224 ANS: 4

The slope of $y = -\frac{2}{3}x - 5$ is $-\frac{2}{3}$. Perpendicular lines have slope that are opposite reciprocals.

PTS: 2 REF: 080917ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

225 ANS: 2

The centroid divides each median into segments whose lengths are in the ratio 2 : 1.

PTS: 2 REF: 060914ge STA: G.G.43 TOP: Centroid

226 ANS: 1

$A'(2,4)$

PTS: 2 REF: 011023ge STA: G.G.54 TOP: Compositions of Transformations
KEY: basic

227 ANS: 1

$V = \pi r^2 h$

$1000 = \pi r^2 \cdot 8$

$r^2 = \frac{1000}{8\pi}$

$r \approx 6.3$

PTS: 2 REF: 080926ge STA: G.G.14 TOP: Volume

228 ANS: 2

$6 + 17 > 22$

PTS: 2 REF: 080916ge STA: G.G.33 TOP: Triangle Inequality Theorem

229 ANS: 3 PTS: 2 REF: fall0816ge STA: G.G.1
TOP: Planes

230 ANS: 4 PTS: 2 REF: fall0802ge STA: G.G.24
TOP: Negations

231 ANS: 1 PTS: 2 REF: 060903ge STA: G.G.56
TOP: Identifying Transformations

232 ANS: 4

Median $\overline{BF}$ bisects $\overline{AC}$ so that $\overline{CF} \cong \overline{FA}$.

PTS: 2 REF: fall0810ge STA: G.G.24 TOP: Statements

233 ANS: 4 PTS: 2 REF: fall0824ge STA: G.G.50
TOP: Tangents KEY: common tangency

234 ANS: 3 PTS: 2 REF: 080928ge STA: G.G.50
TOP: Tangents KEY: common tangency

235 ANS: 3 PTS: 2 REF: fall0825ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

236 ANS: 2 PTS: 2 REF: 061007ge STA: G.G.35
TOP: Parallel Lines and Transversals

237 ANS: 2

$y + \frac{1}{2}x = 4 \quad 3x + 6y = 12$

$6y = -3x + 12$

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

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

$m = -\frac{1}{2}$

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

PTS: 2 REF: 081014ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

238 ANS: 1 PTS: 2 REF: 081008ge STA: G.G.3
TOP: Planes

239 ANS: 1 PTS: 2 REF: 060920ge STA: G.G.74
TOP: Graphing Circles

240 ANS: 4 PTS: 2 REF: 081005ge STA: G.G.18
TOP: Constructions

241 ANS: 4

The slope of $y = -3x + 2$ is -3. The perpendicular slope is $\frac{1}{3}$. $-1 = \frac{1}{3}(3) + b$

$-1 = 1 + b$

$b = -2$

PTS: 2 REF: 011018ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

242 ANS: 4 PTS: 2 REF: 061015ge STA: G.G.56
TOP: Identifying Transformations

243 ANS: 1 PTS: 2 REF: 061009ge STA: G.G.26
TOP: Converse and Biconditional

244 ANS: 3 PTS: 2 REF: fall0804ge STA: G.G.18
TOP: Constructions

245 ANS: 2 PTS: 2 REF: fall0806ge STA: G.G.9
TOP: Planes

246 ANS: 1 PTS: 2 REF: fall0807ge STA: G.G.19
TOP: Constructions

247 ANS: 2

Parallel chords intercept congruent arcs. $m\overset{\frown}{AC} = m\overset{\frown}{BD} = 30$. $180 - 30 - 30 = 120$.

PTS: 2 REF: 080904ge STA: G.G.52 TOP: Chords

248 ANS: 1 PTS: 2 REF: 061013ge STA: G.G.50
TOP: Tangents KEY: point of tangency

249 ANS: 2

$\frac{87 + 35}{2} = \frac{122}{2} = 61$

PTS: 2 REF: 011015ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inside circle

250 ANS: 3

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

$x^2 + 6x + 9 - 4 = 2x + 5$

$x^2 + 4x = 0$

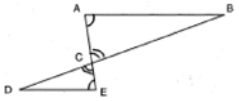
$x(x+4) = 0$

$x = 0, -4$

PTS: 2 REF: 081004ge STA: G.G.70 TOP: Quadratic-Linear Systems

251 ANS: 4 PTS: 2 REF: 080925ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

252 ANS: 2

$\angle ACB$ and $\angle ECD$ are congruent vertical angles and $\angle CAB \cong \angle CED$. 

PTS: 2 REF: 060917ge STA: G.G.44 TOP: Similarity Proofs

253 ANS: 4

$M_x = \dfrac{-6+1}{2} = -\dfrac{5}{2}$. $M_y = \dfrac{1+8}{2} = \dfrac{9}{2}$.

PTS: 2 REF: 060919ge STA: G.G.66 TOP: Midpoint
KEY: graph

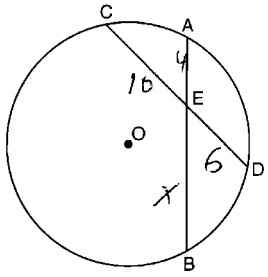
254 ANS: 1 PTS: 2 REF: 080918ge STA: G.G.41
TOP: Special Quadrilaterals

255 ANS: 3

The slope of $y = x + 2$ is 1. The slope of $y - x = -1$ is $\dfrac{-A}{B} = \dfrac{-(-1)}{1} = 1$.

PTS: 2 REF: 080909ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

256 ANS: 1



$4x = 6 \cdot 10$

$x = 15$

PTS: 2 REF: 081017ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two chords

257 ANS: 3
The lateral edges of a prism are parallel.

PTS: 2 REF: fall0808ge STA: G.G.10 TOP: Solids

258 ANS: 3

$4(x+4) = 8^2$

$4x + 16 = 64$

$x = 12$

PTS: 2 REF: 060916ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

259 ANS: 4
$\overline{BG}$ is also an angle bisector since it intersects the concurrence of $\overline{CD}$ and $\overline{AE}$

PTS: 2 REF: 061025ge STA: G.G.21
KEY: Centroid, Orthocenter, Incenter and Circumcenter

260 ANS: 2 PTS: 2 REF: 061020ge STA: G.G.19
TOP: Constructions

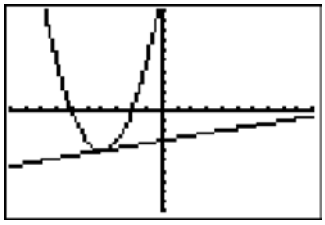
261 ANS: 2
Longest side of a triangle is opposite the largest angle. Shortest side is opposite the smallest angle.

PTS: 2 REF: 060911ge STA: G.G.34 TOP: Angle Side Relationship

262 ANS: 1
Since $\overline{AC} \cong \overline{BC}$, $m\angle A = m\angle B$ under the Isosceles Triangle Theorem.

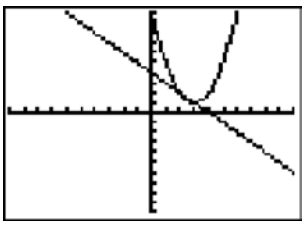
PTS: 2 REF: fall0809ge STA: G.G.69 TOP: Triangles in the Coordinate Plane

263 ANS: 3



PTS: 2 REF: 061011ge STA: G.G.70 TOP: Quadratic-Linear Systems

264 ANS: 4



$y + x = 4$. $x^2 - 6x + 10 = -x + 4$. $y + x = 4$. $y + 2 = 4$

$y = -x + 4$ $x^2 - 5x + 6 = 0$ $y + 3 = 4$ $y = 2$

$(x - 3)(x - 2) = 0$ $y = 1$

$x = 3$ or 2

PTS: 2 REF: 080912ge STA: G.G.70 TOP: Quadratic-Linear Systems

265 ANS: 3 PTS: 2 REF: 011007ge STA: G.G.31
TOP: Isosceles Triangle Theorem

266 ANS: 1 PTS: 2 REF: 061005ge STA: G.G.55
TOP: Properties of Transformations

267 ANS: 4
$180 - (40 + 40) = 100$

PTS: 2 REF: 080903ge STA: G.G.31 TOP: Isosceles Triangle Theorem

268 ANS: 4 PTS: 2 REF: 060904ge STA: G.G.13
TOP: Solids

269 ANS: 2

$x^2 = 3(x + 18)$

$x^2 - 3x - 54 = 0$

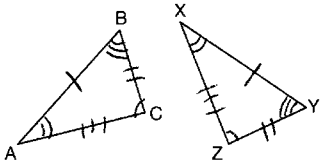
$(x - 9)(x + 6) = 0$

$x = 9$

PTS: 2 REF: fall0817ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

270 ANS: 1 PTS: 2 REF: 061010ge STA: G.G.34
TOP: Angle Side Relationship

271 ANS: 4



PTS: 2 REF: 081001ge STA: G.G.29 TOP: Triangle Congruency

272 ANS: 4 PTS: 2 REF: 061018ge STA: G.G.56
TOP: Identifying Transformations

273 ANS: 2
The diagonals of a rhombus are perpendicular. $180 - (90 + 12) = 78$

PTS: 2 REF: 011204ge STA: G.G.39 TOP: Special Parallelograms
274 ANS: 1
$V = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \cdot 4^2 \cdot 12 \approx 201$

PTS: 2 REF: 060921ge STA: G.G.15 TOP: Volume
275 ANS: 1
Parallel lines intercept congruent arcs.

PTS: 2 REF: 061001ge STA: G.G.52 TOP: Chords
276 ANS: 2
The length of the midsegment of a trapezoid is the average of the lengths of its bases. $\frac{x+30}{2} = 44.$

$$x + 30 = 88$$
$$x = 58$$

PTS: 2 REF: 011001ge STA: G.G.40 TOP: Trapezoids
277 ANS: 2
A dilation affects distance, not angle measure.

PTS: 2 REF: 080906ge STA: G.G.60 TOP: Identifying Transformations
278 ANS: 3 PTS: 2 REF: 011105ge STA: G.G.10
TOP: Solids
279 ANS: 2
The slope of $y = \frac{1}{2}x + 5$ is $\frac{1}{2}$. The slope of a perpendicular line is -2. $y = mx + b$.

$$5 = (-2)(-2) + b$$
$$b = 1$$

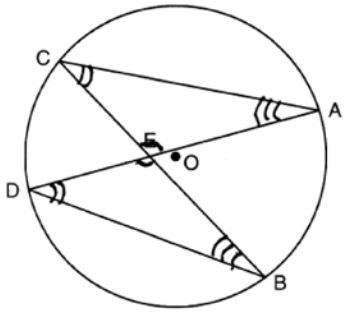
PTS: 2 REF: 060907ge STA: G.G.64 TOP: Parallel and Perpendicular Lines
280 ANS: 4
$d = \sqrt{(146 - (-4))^2 + (52 - 2)^2} = \sqrt{25{,}000} \approx 158.1$

PTS: 2 REF: 061021ge STA: G.G.67 TOP: Distance
KEY: general
281 ANS: 4
The radius is 4. $r^2 = 16.$

PTS: 2 REF: 061014ge STA: G.G.72 TOP: Equations of Circles

282 ANS: 1
$(x,y) \rightarrow (x+3,y+1)$

PTS: 2 REF: fall0803ge STA: G.G.54 TOP: Translations
283 ANS: 1 PTS: 2 REF: 061012ge STA: G.G.20
TOP: Constructions
284 ANS: 3 PTS: 2 REF: 081026ge STA: G.G.26
TOP: Contrapositive
285 ANS: 2 PTS: 2 REF: 061002ge STA: G.G.24
TOP: Negations
286 ANS: 2



PTS: 2 REF: 061026GE STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inscribed
287 ANS: 4 PTS: 2 REF: 011009ge STA: G.G.19
TOP: Constructions
288 ANS: 2

Because the triangles are similar, $\frac{\text{m}\angle A}{\text{m}\angle D} = 1$

PTS: 2 REF: 011022ge STA: G.G.45 TOP: Similarity
KEY: perimeter and area
289 ANS: 1

$a^2 + (5\sqrt{2})^2 = (2\sqrt{15})^2$

$a^2 + (25 \times 2) = 4 \times 15$

$a^2 + 50 = 60$

$a^2 = 10$

$a = \sqrt{10}$

PTS: 2 REF: 011016ge STA: G.G.48 TOP: Pythagorean Theorem
290 ANS: 4 PTS: 2 REF: 080905ge STA: G.G.29
TOP: Triangle Congruency

291 ANS: 1

$\overline{AB} = 10$ since $\triangle ABC$ is a 6-8-10 triangle. $6^2 = 10x$

$3.6 = x$

PTS: 2 REF: 060915ge STA: G.G.47 TOP: Similarity
KEY: leg

292 ANS: 4

sum of interior $\angle$s = sum of exterior $\angle$s

$$(n-2)180 = n\left(180 - \frac{(n-2)180}{n}\right)$$

$$180n - 360 = 180n - 180n + 360$$

$$180n = 720$$

$$n = 4$$

PTS: 2 REF: 081016ge STA: G.G.36 TOP: Interior and Exterior Angles of Polygons

293 ANS: 2 PTS: 2 REF: 060910ge STA: G.G.71
TOP: Equations of Circles

294 ANS: 1 PTS: 2 REF: 011024ge STA: G.G.3
TOP: Planes

295 ANS: 4 PTS: 2 REF: 080914ge STA: G.G.7
TOP: Planes

296 ANS: 3 PTS: 2 REF: 061017ge STA: G.G.1
TOP: Planes

297 ANS: 1

$\triangle PRT$ and $\triangle SRQ$ share $\angle R$ and it is given that $\angle RPT \cong \angle RSQ$.

PTS: 2 REF: fall0821ge STA: G.G.44 TOP: Similarity Proofs

298 ANS: 4

Longest side of a triangle is opposite the largest angle. Shortest side is opposite the smallest angle.

PTS: 2 REF: 081011ge STA: G.G.34 TOP: Angle Side Relationship

299 ANS: 4

The slope of a line in standard form is $-\frac{A}{B}$, so the slope of this line is $\frac{-4}{2} = -2$. A parallel line would also have a slope of –2. Since the answers are in slope intercept form, find the y-intercept: $y = mx + b$

$3 = -2(7) + b$

$17 = b$

PTS: 2 REF: 081010ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

300 ANS: 2

$$x^2 + (x+7)^2 = 13^2$$

$$x^2 + x^2 + 7x + 7x + 49 = 169$$

$$2x^2 + 14x - 120 = 0$$

$$x^2 + 7x - 60 = 0$$

$$(x+12)(x-5) = 0$$

$$x = 5$$

$$2x = 10$$

PTS: 2 REF: 061024ge STA: G.G.48 TOP: Pythagorean Theorem

301 ANS: 3 PTS: 2 REF: 080902ge STA: G.G.17
TOP: Constructions

302 ANS: 4 PTS: 2 REF: 011019ge STA: G.G.44
TOP: Similarity Proofs

303 ANS: 1 PTS: 2 REF: 080911ge STA: G.G.73
TOP: Equations of Circles

304 ANS: 4 PTS: 2 REF: 060912ge STA: G.G.23
TOP: Locus

305 ANS: 2

$M_x = \frac{-2+6}{2} = 2.$ $M_y = \frac{-4+2}{2} = -1$

PTS: 2 REF: 080910ge STA: G.G.66 TOP: Midpoint
KEY: general

306 ANS: 1

$\angle DCB$ and $\angle ADC$ are supplementary adjacent angles of a parallelogram. $180 - 120 = 60$. $\angle 2 = 60 - 45 = 15$.

PTS: 2 REF: 080907ge STA: G.G.38 TOP: Parallelograms

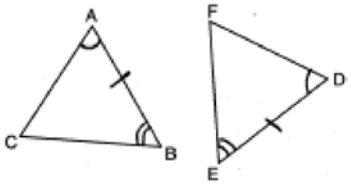
307 ANS: 2

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

PTS: 2 REF: 081019ge STA: G.G.66 TOP: Midpoint
KEY: general

308 ANS: 3 PTS: 2 REF: 081021ge STA: G.G.57
TOP: Properties of Transformations

309 ANS: 3



PTS: 2 REF: 060902ge STA: G.G.28 TOP: Triangle Congruency

310 ANS: 4 PTS: 2 REF: fall0818ge STA: G.G.61
TOP: Analytical Representations of Transformations

311 ANS: 3

$$\frac{36+20}{2} = 28$$

PTS: 2 REF: 061019ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inside circle

312 ANS: 1 PTS: 2 REF: 081012ge STA: G.G.50
TOP: Tangents KEY: two tangents

313 ANS: 2

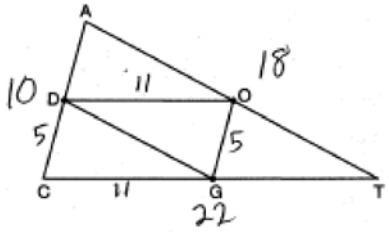
$$\frac{3}{7} = \frac{6}{x}$$

$$3x = 42$$

$$x = 14$$

PTS: 2 REF: 081027ge STA: G.G.46 TOP: Side Splitter Theorem

314 ANS: 3



PTS: 2 REF: 080920ge STA: G.G.42 TOP: Midsegments

315 ANS: 4

$$180 - (50 + 30) = 100$$

PTS: 2 REF: 081006ge STA: G.G.45 TOP: Similarity
KEY: basic

316 ANS: 3 PTS: 2 REF: 080924ge STA: G.G.24
TOP: Negations

317 ANS: 3
The diagonals of an isosceles trapezoid are congruent. $5x + 3 = 11x - 5$.

$$6x = 18$$

$$x = 3$$

PTS: 2 REF: fall0801ge STA: G.G.40 TOP: Trapezoids

318 ANS: 3 PTS: 2 REF: 061004ge STA: G.G.31
TOP: Isosceles Triangle Theorem

319 ANS: 1
Translations and reflections do not affect distance.

PTS: 2 REF: 080908ge STA: G.G.61
TOP: Analytical Representations of Transformations

320 ANS: 4 PTS: 2 REF: 081023ge STA: G.G.45
TOP: Similarity KEY: perimeter and area

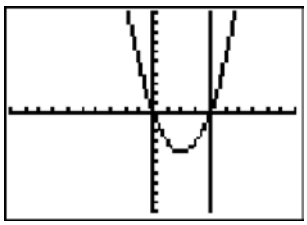
321 ANS: 3 PTS: 2 REF: fall0814ge STA: G.G.73
TOP: Equations of Circles

322 ANS: 3 PTS: 2 REF: 081002ge STA: G.G.9
TOP: Planes

323 ANS: 2
$7 + 18 > 6 + 12$

PTS: 2 REF: fall0819ge STA: G.G.33 TOP: Triangle Inequality Theorem

324 ANS: 1



$y = x^2 - 4x = (4)^2 - 4(4) = 0$. $(4,0)$ is the only intersection.

PTS: 2 REF: 060923ge STA: G.G.70 TOP: Quadratic-Linear Systems

325 ANS: 4
$x^2 = (4+5) \times 4$

$x^2 = 36$

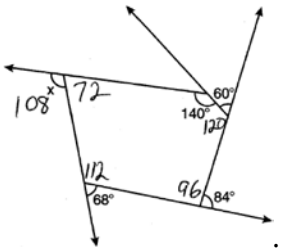
$x = 6$

PTS: 2 REF: 011008ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

326 ANS: 4 PTS: 2 REF: 011012ge STA: G.G.1
TOP: Planes

327 ANS: 2 PTS: 2 REF: 011020ge STA: G.G.74
TOP: Graphing Circles

328 ANS: 3



. The sum of the interior angles of a pentagon is $(5-2)180 = 540$.

PTS: 2 REF: 011023ge STA: G.G.36 TOP: Interior and Exterior Angles of Polygons

329 ANS: 4

$3y + 1 = 6x + 4$. $2y + 1 = x - 9$

$3y = 6x + 3$ $\quad 2y = x - 10$

$y = 2x + 1$ $\quad y = \frac{1}{2}x - 5$

PTS: 2 REF: fall0822ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

330 ANS: 1

$3x^2 + 18x + 24$

$3(x^2 + 6x + 8)$

$3(x + 4)(x + 2)$

PTS: 2 REF: fall0815ge STA: G.G.12 TOP: Volume

331 ANS: 4

Corresponding angles of similar triangles are congruent.

PTS: 2 REF: fall0826ge STA: G.G.45 TOP: Similarity
KEY: perimeter and area

332 ANS: 1 PTS: 2 REF: 081028ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

333 ANS: 2 PTS: 2 REF: 011003ge STA: G.G.55
TOP: Properties of Transformations

334 ANS: 3 PTS: 2 REF: 061224ge STA: G.G.45
TOP: Similarity KEY: basic

335 ANS: 1

In an equilateral triangle, each interior angle is 60° and each exterior angle is 120° (180° - 120°). The sum of the three interior angles is 180° and the sum of the three exterior angles is 360°.

PTS: 2 REF: 060909ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

336 ANS: 4 PTS: 2 REF: 060913ge STA: G.G.26
TOP: Conditional Statements

Geometry 2 Point Regents Exam Questions

Answer Section

337 ANS:
True. The first statement is true and the second statement is false. In a disjunction, if either statement is true, the disjunction is true.

PTS: 2 REF: 060933ge STA: G.G.25 TOP: Compound Statements
KEY: disjunction

338 ANS:
4. $l_1 w_1 h_1 = l_2 w_2 h_2$

$10 \times 2 \times h = 5 \times w_2 \times h$

$20 = 5w_2$

$w_2 = 4$

PTS: 2 REF: 011030ge STA: G.G.11 TOP: Volume

339 ANS:
22.4. $V = \pi r^2 h$

$12566.4 = \pi r^2 \cdot 8$

$r^2 = \frac{12566.4}{8\pi}$

$r \approx 22.4$

PTS: 2 REF: fall0833ge STA: G.G.14 TOP: Volume

340 ANS:
20. $5x + 10 = 4x + 30$

$x = 20$

PTS: 2 REF: 060934ge STA: G.G.45 TOP: Similarity
KEY: basic

341 ANS:
$m = \frac{-A}{B} = \frac{6}{2} = 3.\ m_{\perp} = -\frac{1}{3}.$

PTS: 2 REF: 011134ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

342 ANS:
$(5-2)180 = 540.\ \frac{540}{5} = 108$ interior. $180 - 108 = 72$ exterior

PTS: 2 REF: 011131ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

343 ANS:
67. $\frac{180-46}{2} = 67$

PTS: 2 REF: 011029ge STA: G.G.31 TOP: Isosceles Triangle Theorem

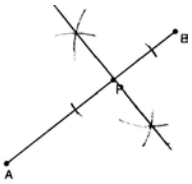
344 ANS:
$\angle ACB \cong \angle AED$ is given. $\angle A \cong \angle A$ because of the reflexive property. Therefore $\triangle ABC \sim \triangle ADE$ because of AA.

PTS: 2 REF: 081133ge STA: G.G.44 TOP: Similarity Proofs

345 ANS:
The slope of $x + 2y = 4$ is $m = \frac{-A}{B} = \frac{-1}{2}$. The slope of $4y - 2x = 12$ is $\frac{-A}{B} = \frac{2}{4} = \frac{1}{2}$. Since the slopes are neither equal nor opposite reciprocals, the lines are neither parallel nor perpendicular.

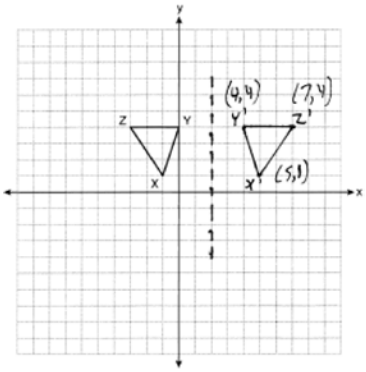
PTS: 2 REF: 061231ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

346 ANS:



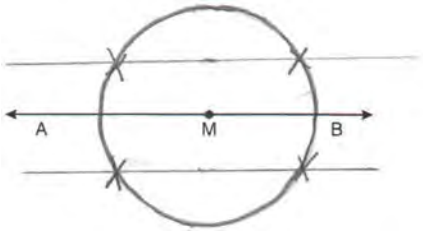
PTS: 2 REF: 081233ge STA: G.G.19 TOP: Constructions

347 ANS:



PTS: 2 REF: 061032ge STA: G.G.54 TOP: Reflections
KEY: grids

348 ANS:



PTS: 2 REF: 011230ge STA: G.G.22 TOP: Locus

349 ANS:

$2x - 20 = x + 20$. $\text{m}\overset{\frown}{AB} = x + 20 = 40 + 20 = 60$

$x = 40$

PTS: 2 REF: 011229ge STA: G.G.52 TOP: Chords

350 ANS:

$(2a - 3, 3b + 2)$. $\left(\frac{3a + a - 6}{2}, \frac{2b - 1 + 4b + 5}{2}\right) = \left(\frac{4a - 6}{2}, \frac{6b + 4}{2}\right) = (2a - 3, 3b + 2)$

PTS: 2 REF: 061134ge STA: G.G.66 TOP: Midpoint

351 ANS:

$L = 2\pi rh = 2\pi \cdot 12 \cdot 22 \approx 1659$. $\frac{1659}{600} \approx 2.8$. 3 cans are needed.

PTS: 2 REF: 061233ge STA: G.G.14 TOP: Lateral Area

352 ANS:

$\sqrt{(-4-2)^2 + (3-5)^2} = \sqrt{36+4} = \sqrt{40} = \sqrt{4}\sqrt{10} = 2\sqrt{10}$.

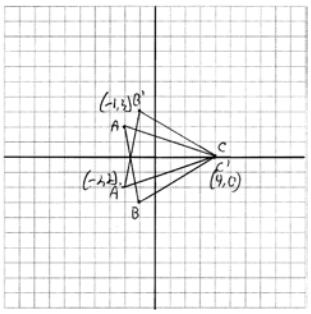
PTS: 2 REF: 081232ge STA: G.G.67 TOP: Distance

353 ANS:

2016. $V = \frac{1}{3}Bh = \frac{1}{3}s^2h = \frac{1}{3}12^2 \cdot 42 = 2016$

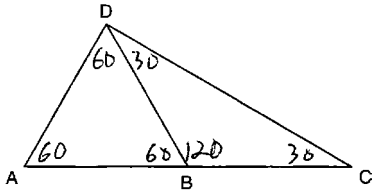
PTS: 2 REF: 080930ge STA: G.G.13 TOP: Volume

354 ANS:



PTS: 2 REF: 011130ge STA: G.G.54 TOP: Reflections
KEY: grids

355 ANS:



30.

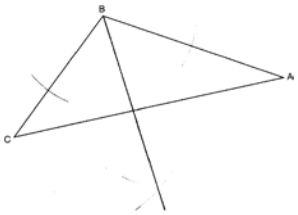
PTS: 2 REF: 011129ge STA: G.G.31 TOP: Isosceles Triangle Theorem

356 ANS:

The slope of $y = 2x + 3$ is 2. The slope of $2y + x = 6$ is $\frac{-A}{B} = \frac{-1}{2}$. Since the slopes are opposite reciprocals, the lines are perpendicular.

PTS: 2 REF: 011231ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

357 ANS:



PTS: 2 REF: 061232ge STA: G.G.17 TOP: Constructions

358 ANS:

16.7. $\frac{x}{25} = \frac{12}{18}$

$18x = 300$

$x \approx 16.7$

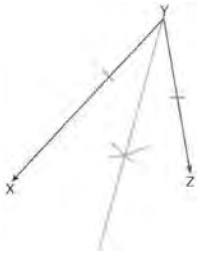
PTS: 2 REF: 061133ge STA: G.G.46 TOP: Side Splitter Theorem

359 ANS:

$V = \frac{4}{3}\pi \cdot 9^3 = 972\pi$

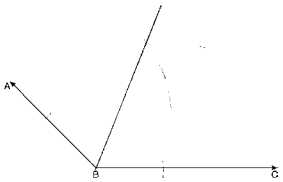
PTS: 2 REF: 081131ge STA: G.G.16 TOP: Surface Area

360 ANS:



PTS: 2 REF: 011233ge STA: G.G.17 TOP: Constructions

361 ANS:



PTS: 2 REF: 011133ge STA: G.G.17 TOP: Constructions

362 ANS:

26. $x + 3x + 5x - 54 = 180$

$9x = 234$

$x = 26$

PTS: 2 REF: 080933ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

363 ANS:

$(x-5)^2 + (y+4)^2 = 36$

PTS: 2 REF: 081132ge STA: G.G.72 TOP: Equations of Circles

364 ANS:

Yes. A reflection is an isometry.

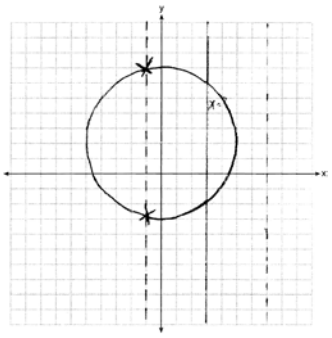
PTS: 2 REF: 061132ge STA: G.G.56 TOP: Identifying Transformations

365 ANS:

$EO = 6.\ CE = \sqrt{10^2 - 6^2} = 8$

PTS: 2 REF: 011234ge STA: G.G.49 TOP: Chords

366 ANS:



PTS: 2 REF: 061234ge STA: G.G.23 TOP: Locus

367 ANS:

$180 - (90 + 63) = 27$

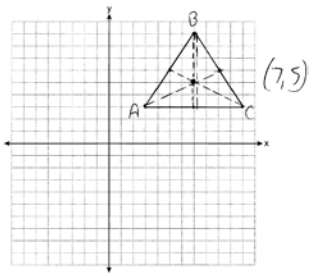
PTS: 2 REF: 061230ge STA: G.G.35 TOP: Parallel Lines and Transversals

368 ANS:

$R'(-3,-2)$, $S'(-4,4)$, and $T'(2,2)$.

PTS: 2 REF: 011232ge STA: G.G.54 TOP: Rotations

369 ANS:

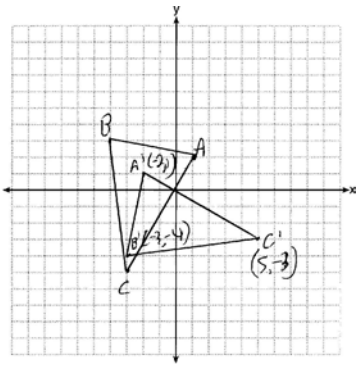


$(7,5)\ m_{\overline{AB}} = \left(\frac{3+7}{2}, \frac{3+9}{2}\right) = (5,6)\ m_{\overline{BC}} = \left(\frac{7+11}{2}, \frac{9+3}{2}\right) = (9,6)$

PTS: 2 REF: 081134ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

370 ANS: 3 PTS: 2 REF: 080928ge STA: G.G.50
TOP: Tangents KEY: common tangency

371 ANS:



$A'(-2,1)$, $B'(-3,-4)$, and $C'(5,-3)$

PTS: 2 REF: 081230ge STA: G.G.54 TOP: Rotations

372 ANS:

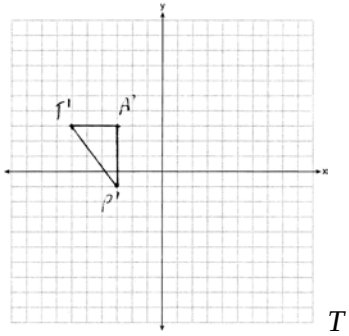
5. $\frac{3}{x} = \frac{6+3}{15}$

$9x = 45$

$x = 5$

PTS: 2 REF: 011033ge STA: G.G.46 TOP: Side Splitter Theorem

373 ANS:



$T'(-6,3)$, $A'(-3,3)$, $P'(-3,-1)$

PTS: 2 REF: 061229ge STA: G.G.54 TOP: Translations

374 ANS:

110. $6x + 20 = x + 40 + 4x - 5$

$6x + 20 = 5x + 35$

$x = 15$

$6((15) + 20 = 110$

PTS: 2 REF: 081031ge STA: G.G.32 TOP: Exterior Angle Theorem

375 ANS:

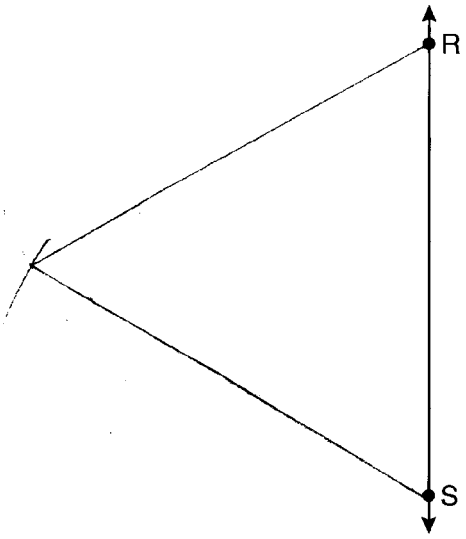
Contrapositive-If two angles of a triangle are not congruent, the sides opposite those angles are not congruent.

PTS: 2 REF: fall0834ge STA: G.G.26 TOP: Conditional Statements

376 ANS:
The medians of a triangle are not concurrent. False.

PTS: 2 REF: 061129ge STA: G.G.24 TOP: Negations

377 ANS:



PTS: 2 REF: 061130ge STA: G.G.20 TOP: Constructions

378 ANS:
25. $d = \sqrt{(-3-4)^2 + (1-25)^2} = \sqrt{49+576} = \sqrt{625} = 25.$

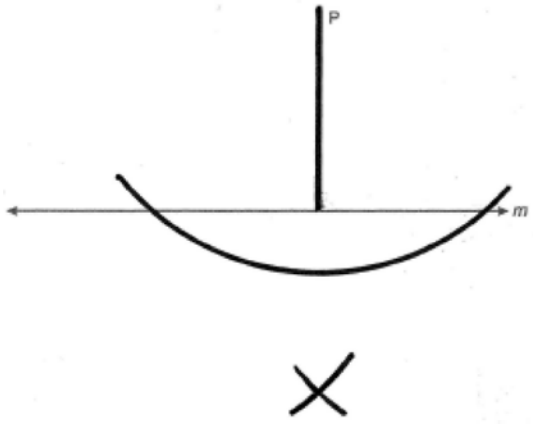
PTS: 2 REF: fall0831ge STA: G.G.67 TOP: Distance
KEY: general

379 ANS:
3. The non-parallel sides of an isosceles trapezoid are congruent. $2x + 5 = 3x + 2$

$x = 3$

PTS: 2 REF: 080929ge STA: G.G.40 TOP: Trapezoids

380 ANS:



PTS: 2 REF: 060930ge STA: G.G.19 TOP: Constructions

381 ANS:

452. $SA = 4\pi r^2 = 4\pi \cdot 6^2 = 144\pi \approx 452$

PTS: 2 REF: 061029ge STA: G.G.16 TOP: Surface Area

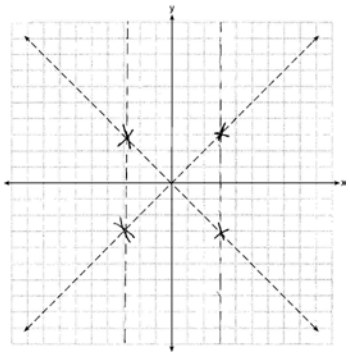
382 ANS:

11. $x^2 + 6x = x + 14$. $6(2) - 1 = 11$

$$x^2 + 5x - 14 = 0$$
$$(x + 7)(x - 2) = 0$$
$$x = 2$$

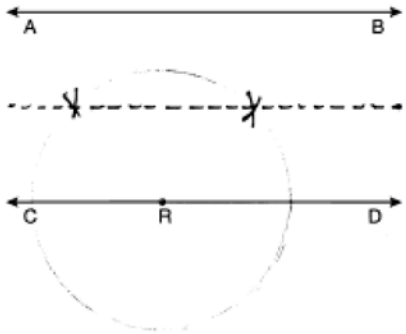
PTS: 2 REF: 081235ge STA: G.G.38 TOP: Parallelograms

383 ANS:



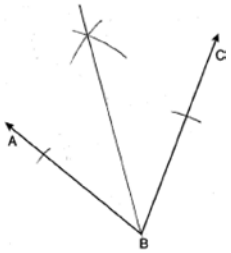
PTS: 2 REF: 081234ge STA: G.G.23 TOP: Locus

384 ANS:



PTS: 2 REF: 061033ge STA: G.G.22 TOP: Locus

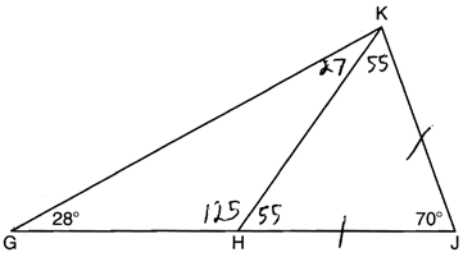
385 ANS:



PTS: 2 REF: 080932ge STA: G.G.17 TOP: Constructions

386 ANS:

No, $\angle KGH$ is not congruent to $\angle GKH$.



PTS: 2 REF: 081135ge STA: G.G.31 TOP: Isosceles Triangle Theorem

387 ANS:

375π $L = \pi r l = \pi(15)(25) = 375\pi$

PTS: 2 REF: 081030ge STA: G.G.15 TOP: Lateral Area

388 ANS:

(6,–4). $C_x = \dfrac{Q_x + R_x}{2}$. $C_y = \dfrac{Q_y + R_y}{2}$.

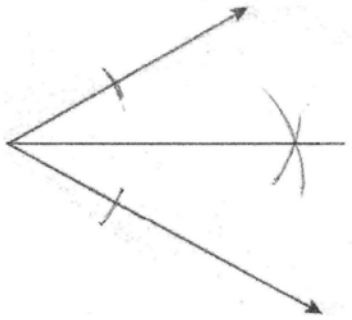
$3.5 = \dfrac{1 + R_x}{2}$ $\quad 2 = \dfrac{8 + R_y}{2}$

$7 = 1 + R_x$ $\quad 4 = 8 + R_y$

$6 = R_x$ $\quad -4 = R_y$

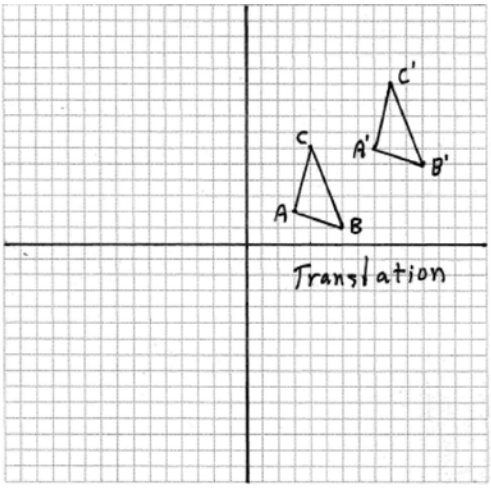
PTS: 2 REF: 011031ge STA: G.G.66 TOP: Midpoint
KEY: graph

389 ANS:



PTS: 2 REF: fall0832ge STA: G.G.17 TOP: Constructions

390 ANS:



PTS: 2 REF: fall0830ge STA: G.G.55 TOP: Properties of Transformations

391 ANS:

9.1. $(11)(8)h = 800$

$h \approx 9.1$

PTS: 2 REF: 061131ge STA: G.G.12 TOP: Volume

392 ANS:

37. Since $\overline{DE}$ is a midsegment, $AC = 14$. $10 + 13 + 14 = 37$

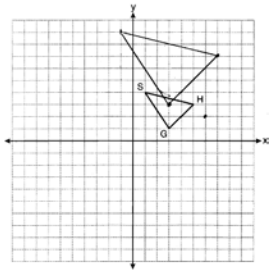
PTS: 2 REF: 061030ge STA: G.G.42 TOP: Midsegments

393 ANS:

6. The centroid divides each median into segments whose lengths are in the ratio 2 : 1. $\overline{TD} = 6$ and $\overline{DB} = 3$

PTS: 2 REF: 011034ge STA: G.G.43 TOP: Centroid

394 ANS:

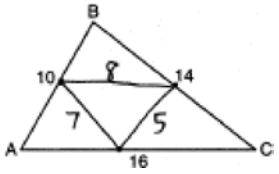


$G''(3,3), H''(7,7), S''(-1,9)$

PTS: 4 REF: 081136ge STA: G.G.58 TOP: Compositions of Transformations

395 ANS:

20. The sides of the triangle formed by connecting the midpoints are half the sides of the original triangle.

$5 + 7 + 8 = 20.$ 

PTS: 2 REF: 060929ge STA: G.G.42 TOP: Midsegments

396 ANS:

34. $2x - 12 + x + 90 = 180$

$3x + 78 = 90$

$3x = 102$

$x = 34$

PTS: 2 REF: 061031ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

397 ANS:

$x^2 = 9 \cdot 8$

$x = \sqrt{72}$

$x = \sqrt{36}\sqrt{2}$

$x = 6\sqrt{2}$

PTS: 2 REF: 011132ge STA: G.G.53 TOP: Segments Intercepted by Circle

KEY: two chords

398 ANS:

$y = -2x + 14$. The slope of $2x + y = 3$ is $\frac{-A}{B} = \frac{-2}{1} = -2$. $y = mx + b$.

$4 = (-2)(5) + b$

$b = 14$

PTS: 2 REF: 060931ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

399 ANS:

70. $3x + 5 + 3x + 5 + 2x + 2x = 180$

$10x + 10 = 360$

$10x = 350$

$x = 35$

$2x = 70$

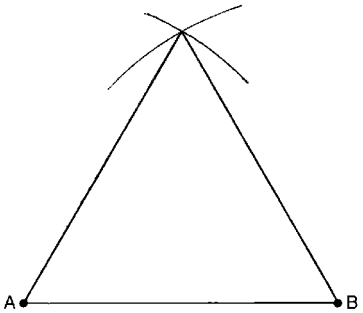
PTS: 2 REF: 081029ge STA: G.G.40 TOP: Trapezoids

400 ANS:

$(x+1)^2 + (y-2)^2 = 36$

PTS: 2 REF: 081034ge STA: G.G.72 TOP: Equations of Circles

401 ANS:



PTS: 2 REF: 081032ge STA: G.G.20 TOP: Constructions

402 ANS:

$2\sqrt{3}$. $x^2 = 3 \cdot 4$

$x = \sqrt{12} = 2\sqrt{3}$

PTS: 2 REF: fall0829ge STA: G.G.47 TOP: Similarity

KEY: altitude

403 ANS:

18. $V = \frac{1}{3}Bh = \frac{1}{3}lwh$

$288 = \frac{1}{3} \cdot 8 \cdot 6 \cdot h$

$288 = 16h$

$18 = h$

PTS: 2 REF: 061034ge STA: G.G.13 TOP: Volume

404 ANS:

$V = \pi r^2 h = \pi(5)^2 \cdot 7 = 175\pi$

PTS: 2 REF: 081231ge STA: G.G.14 TOP: Volume

405 ANS:

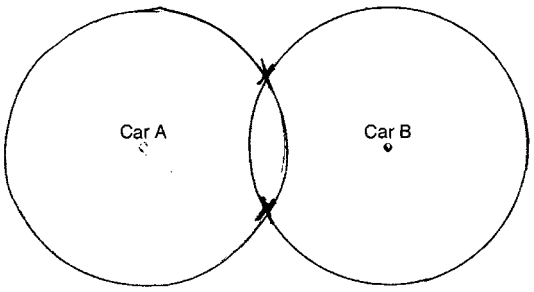
$y = \frac{2}{3}x - 9$. The slope of $2x - 3y = 11$ is $-\frac{A}{B} = \frac{-2}{-3} = \frac{2}{3}$. $-5 = \left(\frac{2}{3}\right)(6) + b$

$-5 = 4 + b$

$b = -9$

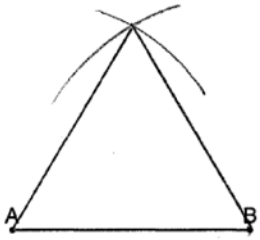
PTS: 2 REF: 080931ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

406 ANS:



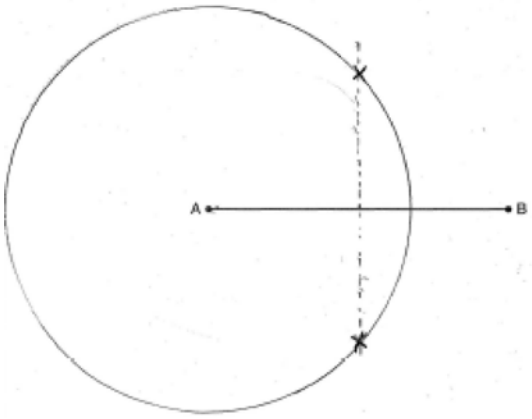
PTS: 2 REF: 081033ge STA: G.G.22 TOP: Locus

407 ANS:



PTS: 2 REF: 011032ge STA: G.G.20 TOP: Constructions

408 ANS:



PTS: 2 REF: 060932ge STA: G.G.22 TOP: Locus

Geometry 4 Point Regents Exam Questions
Answer Section

409 ANS:

2 $\frac{x+2}{x} = \frac{x+6}{4}$

$x^2 + 6x = 4x + 8$

$x^2 + 2x - 8 = 0$

$(x+4)(x-2) = 0$

$x = 2$

PTS: 4 REF: 081137ge STA: G.G.45 TOP: Similarity
KEY: basic

410 ANS:

$y = \frac{2}{3}x + 1$. $2y + 3x = 6$. $y = mx + b$

$2y = -3x + 6$ $5 = \frac{2}{3}(6) + b$

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

$m = -\frac{3}{2}$ $1 = b$

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

$m_{\perp} = \frac{2}{3}$

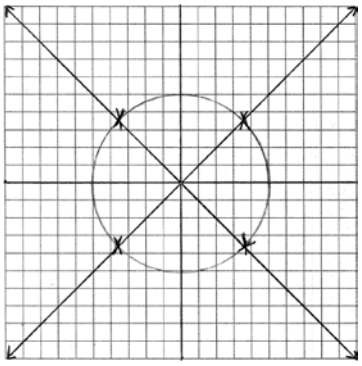
PTS: 4 REF: 061036ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

411 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: Special Quadrilaterals

412 ANS:



PTS: 4 REF: 011037ge STA: G.G.23 TOP: Locus

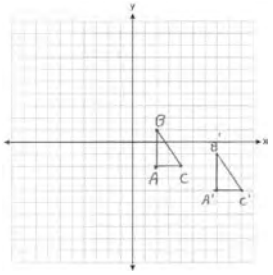
413 ANS:

18. If the ratio of *TA* to *AC* is 1:3, the ratio of *TE* to *ES* is also 1:3. $x + 3x = 24$. $3(6) = 18$.

$$x = 6$$

PTS: 4 REF: 060935ge STA: G.G.50 TOP: Tangents
KEY: common tangency

414 ANS:



$A'(7,-4), B'(7,-1). C'(9,-4)$. The areas are equal because translations preserve distance.

PTS: 4 REF: 011235ge STA: G.G.55 TOP: Properties of Transformations

415 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: Properties of Transformations

416 ANS:

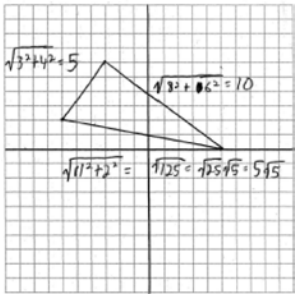
2.4. $5a = 4^2 \quad 5b = 3^2 \quad h^2 = ab$

$a = 3.2 \quad b = 1.8 \quad h^2 = 3.2 \cdot 1.8$

$h = \sqrt{5.76} = 2.4$

PTS: 4 REF: 081037ge STA: G.G.47 TOP: Similarity
KEY: altitude

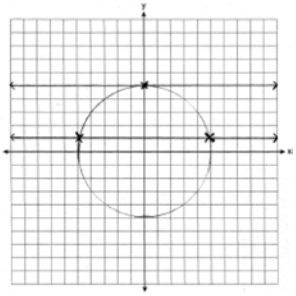
417 ANS:



$15 + 5\sqrt{5}$.

PTS: 4 REF: 060936ge STA: G.G.69 TOP: Triangles in the Coordinate Plane

418 ANS:



PTS: 4 REF: 080936ge STA: G.G.23 TOP: Locus

419 ANS:

$V = \pi r^2 h$. $L = 2\pi rh = 2\pi \cdot 5\sqrt{2} \cdot 12 \approx 533.1$

$600\pi = \pi r^2 \cdot 12$

$50 = r^2$

$\sqrt{25}\sqrt{2} = r$

$5\sqrt{2} = r$

PTS: 4 REF: 011236ge STA: G.G.14 TOP: Volume

420 ANS:

32. $\frac{16}{20} = \frac{x-3}{x+5}$. $\overline{AC} = x - 3 = 35 - 3 = 32$

$16x + 80 = 20x - 60$

$140 = 4x$

$35 = x$

PTS: 4 REF: 011137ge STA: G.G.46 TOP: Side Splitter Theorem

421 ANS:

$\angle B$ and $\angle C$ are right angles because perpendicular lines form right angles. $\angle B \cong \angle C$ because all right angles are congruent. $\angle AEB \cong \angle DEC$ because vertical angles are congruent. $\triangle ABE \cong \triangle DCE$ because of ASA. $\overline{AB} \cong \overline{DC}$ because CPCTC.

PTS: 4 REF: 061235ge STA: G.G.27 TOP: Triangle Proofs

422 ANS:

Midpoint: $\left(\frac{-4+4}{2}, \frac{2+(-4)}{2}\right) = (0,-1)$. Distance: $d = \sqrt{(-4-4)^2 + (2-(-4))^2} = \sqrt{100} = 10$

$r = 5$

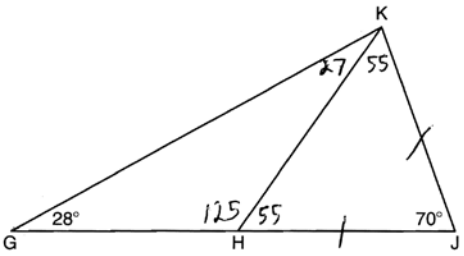
$r^2 = 25$

$x^2 + (y+1)^2 = 25$

PTS: 4 REF: 061037ge STA: G.G.71 TOP: Equations of Circles

423 ANS:

No, $\angle KGH$ is not congruent to $\angle GKH$.



PTS: 2 REF: 081135ge STA: G.G.31 TOP: Isosceles Triangle Theorem

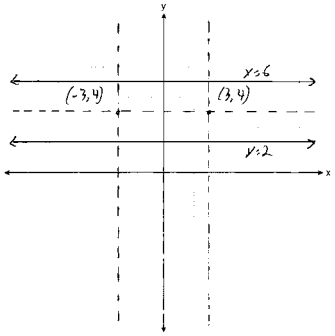
424 ANS:

11. $x^2 + 6x = x + 14$. $6(2) - 1 = 11$

$$x^2 + 5x - 14 = 0$$
$$(x + 7)(x - 2) = 0$$
$$x = 2$$

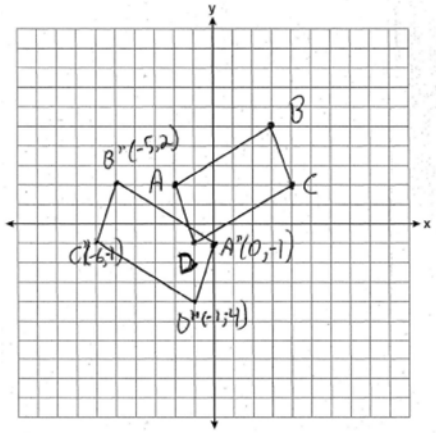
PTS: 2 REF: 081235ge STA: G.G.38 TOP: Parallelograms

425 ANS:



PTS: 4 REF: 061135ge STA: G.G.23 TOP: Locus

426 ANS:



PTS: 4 REF: 060937ge STA: G.G.54 TOP: Compositions of Transformations
KEY: grids

427 ANS:

$\angle D$, $\angle G$ and 24° or $\angle E$, $\angle F$ and 84°. $\text{m}\overset{\frown}{FE} = \frac{2}{15} \times 360 = 48$. Since the chords forming $\angle D$ and $\angle G$ are intercepted by $\overset{\frown}{FE}$, their measure is 24°. $\text{m}\overset{\frown}{GD} = \frac{7}{15} \times 360 = 168$. Since the chords forming $\angle E$ and $\angle F$ are intercepted by $\overset{\frown}{GD}$, their measure is 84°.

PTS: 4 REF: fall0836ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inscribed

428 ANS:

30. $3x + 4x + 5x = 360$. $\text{m}\overset{\frown}{LN} : \text{m}\overset{\frown}{NK} : \text{m}\overset{\frown}{KL} = 90 : 120 : 150$. $\frac{150 - 90}{2} = 30$

$x = 20$

PTS: 4 REF: 061136ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: outside circle

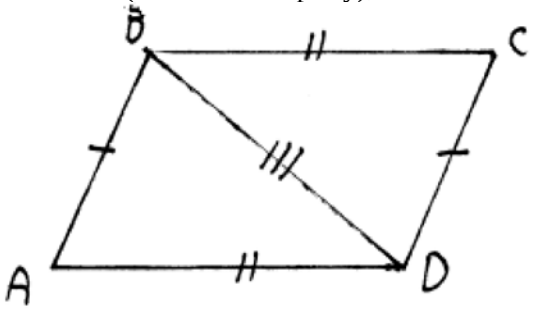
429 ANS:

$\angle B$ and $\angle E$ are right angles because of the definition of perpendicular lines. $\angle B \cong \angle E$ because all right angles are congruent. $\angle BFD$ and $\angle DFE$ are supplementary and $\angle ECA$ and $\angle ACB$ are supplementary because of the definition of supplementary angles. $\angle DFE \cong \angle ACB$ because angles supplementary to congruent angles are congruent. $\triangle ABC \sim \triangle DEF$ because of AA.

PTS: 4 REF: 011136ge STA: G.G.44 TOP: Similarity Proofs

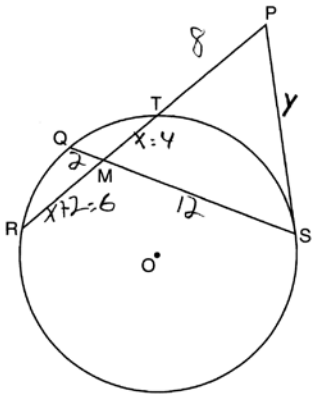
430 ANS:

$\overline{BD} \cong \overline{DB}$ (Reflexive Property); $\triangle ABD \cong \triangle CDB$ (SSS); $\angle BDC \cong \angle ABD$ (CPCTC).



PTS: 4 REF: 061035ge STA: G.G.27 TOP: Quadrilateral Proofs

431 ANS:



$x(x+2) = 12 \cdot 2$. $\overline{RT} = 6 + 4 = 10$. $y \cdot y = 18 \cdot 8$

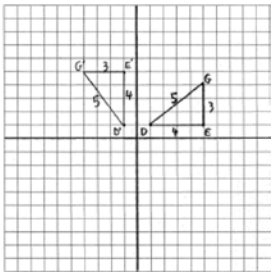
$x^2 + 2x - 24 = 0$ $\qquad$ $y^2 = 144$

$(x+6)(x-4) = 0$ $\qquad$ $y = 12$

$x = 4$

PTS: 4 REF: 061237ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

432 ANS:



$D'(-1,1)$, $E'(-1,5)$, $G'(-4,5)$

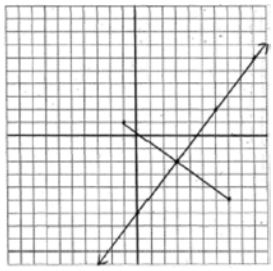
PTS: 4 REF: 080937ge STA: G.G.55 TOP: Properties of Transformations

433 ANS:

$y = \frac{4}{3}x - 6$. $M_x = \frac{-1+7}{2} = 3$ The perpendicular bisector goes through $(3,-2)$ and has a slope of $\frac{4}{3}$.

$$M_y = \frac{1+(-5)}{2} = -2$$

$$m = \frac{1-(-5)}{-1-7} = -\frac{3}{4}$$



$y - y_M = m(x - x_M)$.

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

PTS: 4 REF: 080935ge STA: G.G.68 TOP: Perpendicular Bisector

434 ANS:

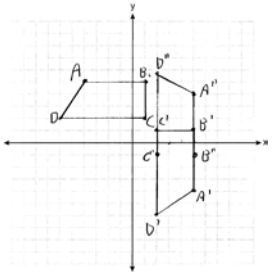
Yes, $m\angle ABD = m\angle BDC = 44$ $180 - (93+43) = 44$ $x + 19 + 2x + 6 + 3x + 5 = 180$. Because alternate interior

$$6x + 30 = 180$$
$$6x = 150$$
$$x = 25$$
$$x + 19 = 44$$

angles $\angle ABD$ and $\angle CDB$ are congruent, $\overline{AB}$ is parallel to $\overline{DC}$.

PTS: 4 REF: 081035ge STA: G.G.35 TOP: Parallel Lines and Transversals

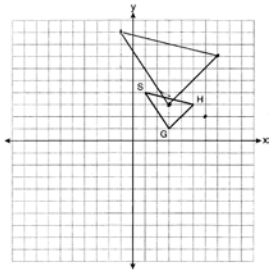
435 ANS:



$A'(5,-4), B'(5,1), C'(2,1), D'(2,-6); A''(5,4), B''(5,-1), C''(2,-1), D''(2,6)$

PTS: 4 REF: 061236ge STA: G.G.58 TOP: Compositions of Transformations
KEY: grids

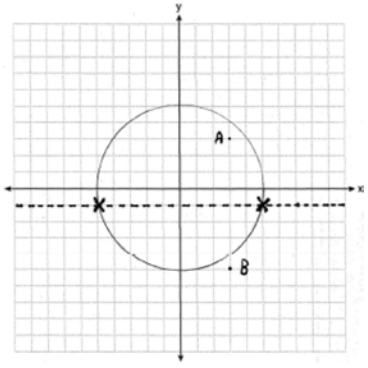
436 ANS:



$G''(3,3), H''(7,7), S''(-1,9)$

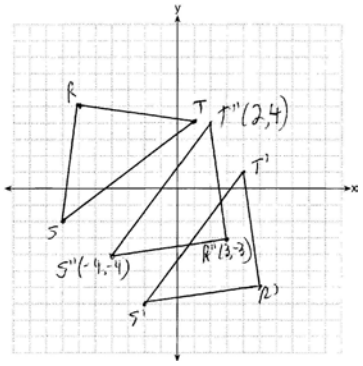
PTS: 4 REF: 081136ge STA: G.G.58 TOP: Compositions of Transformations

437 ANS:



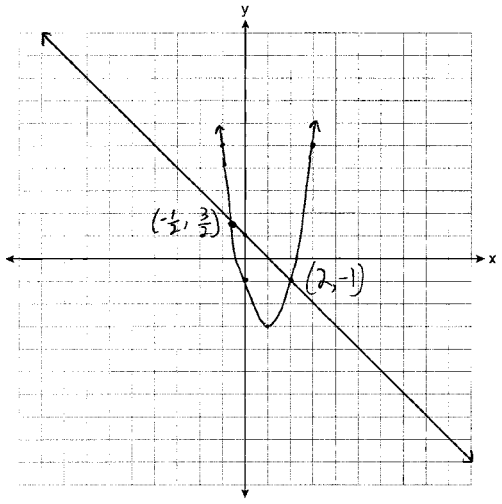
PTS: 4 REF: fall0837ge STA: G.G.23 TOP: Locus

438 ANS:



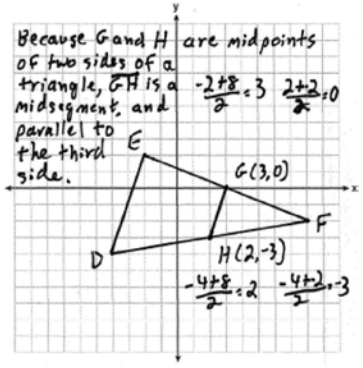
PTS: 4 REF: 081236ge STA: G.G.58 TOP: Compositions of Transformations
KEY: grids

439 ANS:



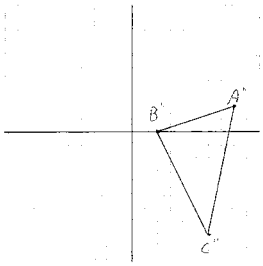
PTS: 4 REF: 061137ge STA: G.G.70 TOP: Quadratic-Linear Systems

440 ANS:



PTS: 4 REF: fall0835ge STA: G.G.42 TOP: Midsegments

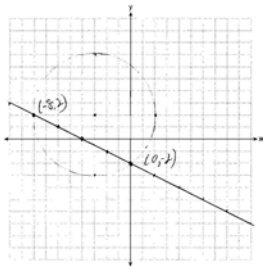
441 ANS:



$A''(8,2),\ B''(2,0),\ C''(6,-8)$

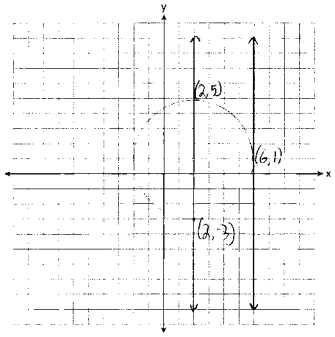
PTS: 4 REF: 081036ge STA: G.G.58 TOP: Compositions of Transformations

442 ANS:



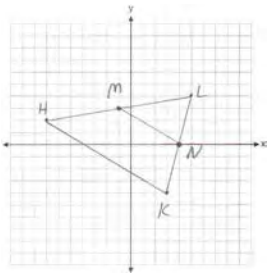
PTS: 4 REF: 081237ge STA: G.G.70 TOP: Quadratic-Linear Systems

443 ANS:



PTS: 4 REF: 011135ge STA: G.G.23 TOP: Locus

444 ANS:



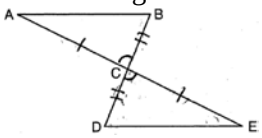
$M\left(\frac{-7+5}{2}, \frac{2+4}{2}\right) = M(-1,3)$. $N\left(\frac{3+5}{2}, \frac{-4+4}{2}\right) = N(4,0)$. $\overline{MN}$ is a midsegment.

PTS: 4 REF: 011237ge STA: G.G.42 TOP: Midsegments

Geometry 6 Point Regents Exam Questions
Answer Section

445 ANS:

$\overline{AC} \cong \overline{EC}$ and $\overline{DC} \cong \overline{BC}$ because of the definition of midpoint. $\angle ACB \cong \angle ECD$ because of vertical angles. $\triangle ABC \cong \triangle EDC$ because of SAS. $\angle CDE \cong \angle CBA$ because of CPCTC. $\overline{BD}$ is a transversal intersecting $\overline{AB}$ and $\overline{ED}$. Therefore $\overline{AB} \parallel \overline{DE}$ because $\angle CDE$ and $\angle CBA$ are congruent alternate interior angles.



PTS: 6 REF: 060938ge STA: G.G.27 TOP: Triangle Proofs

446 ANS:

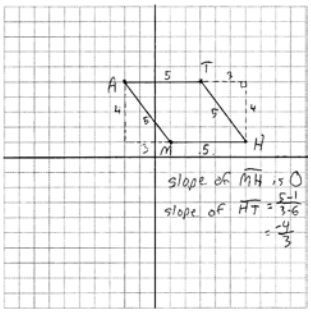
52, 40, 80. $360 - (56 + 112) = 192$. $\frac{192 - 112}{2} = 40$. $\frac{112 + 48}{2} = 80$

$\frac{1}{4} \times 192 = 48$

$\frac{56 + 48}{2} = 52$

PTS: 6 REF: 081238ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inscribed

447 ANS:



The length of each side of quadrilateral is 5. Since each side is congruent, quadrilateral *MATH* is a rhombus. The slope of $\overline{MH}$ is 0 and the slope of $\overline{HT}$ is $-\frac{4}{3}$. Since the slopes are not negative reciprocals, the sides are not perpendicular and do not form rights angles. Since adjacent sides are not perpendicular, quadrilateral *MATH* is not a square.

PTS: 6 REF: 011138ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

448 ANS:

$\overline{OA} \cong \overline{OB}$ because all radii are equal. $\overline{OP} \cong \overline{OP}$ because of the reflexive property. $\overline{OA} \perp \overline{PA}$ and $\overline{OB} \perp \overline{PB}$ because tangents to a circle are perpendicular to a radius at a point on a circle. $\angle PAO$ and $\angle PBO$ are right angles because of the definition of perpendicular. $\angle PAO \cong \angle PBO$ because all right angles are congruent. $\triangle AOP \cong \triangle BOP$ because of HL. $\angle AOP \cong \angle BOP$ because of CPCTC.

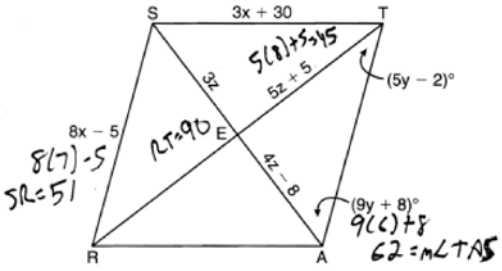
PTS: 6 REF: 061138ge STA: G.G.27 TOP: Circle Proofs

449 ANS:

Because $\overline{AB} \parallel \overline{DC}$, $\overset{\frown}{AD} \cong \overset{\frown}{BC}$ since parallel chords intersect congruent arcs. $\angle BDC \cong \angle ACD$ because inscribed angles that intercept congruent arcs are congruent. $\overline{AD} \cong \overline{BC}$ since congruent chords intersect congruent arcs. $\overline{DC} \cong \overline{CD}$ because of the reflexive property. Therefore, $\triangle ACD \cong \triangle BDC$ because of SAS.

PTS: 6 REF: fall0838ge STA: G.G.27 TOP: Circle Proofs

450 ANS:



$8x - 5 = 3x + 30$. $4z - 8 = 3z$. $9y + 8 + 5y - 2 = 90$.

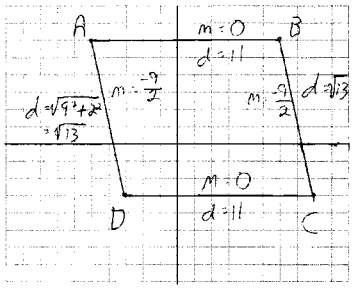
$5x = 35$ $z = 8$ $14y + 6 = 90$

$x = 7$ $14y = 84$

$y = 6$

PTS: 6 REF: 061038ge STA: G.G.39 TOP: Special Parallelograms

451 ANS:



$\overline{AB} \parallel \overline{CD}$ and $\overline{AD} \parallel \overline{CB}$ because their slopes are equal. *ABCD* is a parallelogram because opposite side are parallel. $\overline{AB} \neq \overline{BC}$. *ABCD* is not a rhombus because all sides are not equal. $\overline{AB} \sim \perp \overline{BC}$ because their slopes are not opposite reciprocals. *ABCD* is not a rectangle because $\angle ABC$ is not a right angle.

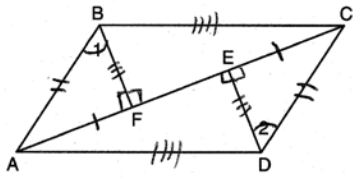
PTS: 4 REF: 081038ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

452 ANS:

Quadrilateral *ABCD*, $\overline{AD} \cong \overline{BC}$ and $\angle DAE \cong \angle BCE$ are given. $\overline{AD} \parallel \overline{BC}$ because if two lines are cut by a transversal so that a pair of alternate interior angles are congruent, the lines are parallel. *ABCD* is a parallelogram because if one pair of opposite sides of a quadrilateral are both congruent and parallel, the quadrilateral is a parallelogram. $\overline{AE} \cong \overline{CE}$ because the diagonals of a parallelogram bisect each other. $\angle FEA \cong \angle GEC$ as vertical angles. $\triangle AEF \cong \triangle CEG$ by ASA.

PTS: 6 REF: 011238ge STA: G.G.27 TOP: Quadrilateral Proofs

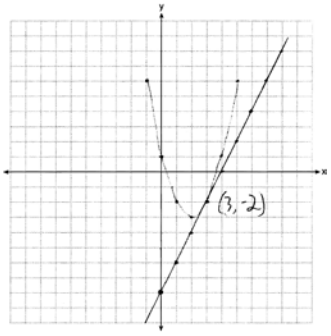
453 ANS:



$\overline{FE} \cong \overline{FE}$ (Reflexive Property); $\overline{AE} - \overline{FE} \cong \overline{FC} - \overline{EF}$ (Line Segment Subtraction Theorem); $\overline{AF} \cong \overline{CE}$ (Substitution); $\angle BFA \cong \angle DEC$ (All right angles are congruent); $\triangle BFA \cong \triangle DEC$ (AAS); $\overline{AB} \cong \overline{CD}$ and $\overline{BF} \cong \overline{DE}$ (CPCTC); $\angle BFC \cong \angle DEA$ (All right angles are congruent); $\triangle BFC \cong \triangle DEA$ (SAS); $\overline{AD} \cong \overline{CB}$ (CPCTC); $ABCD$ is a parallelogram (opposite sides of quadrilateral $ABCD$ are congruent)

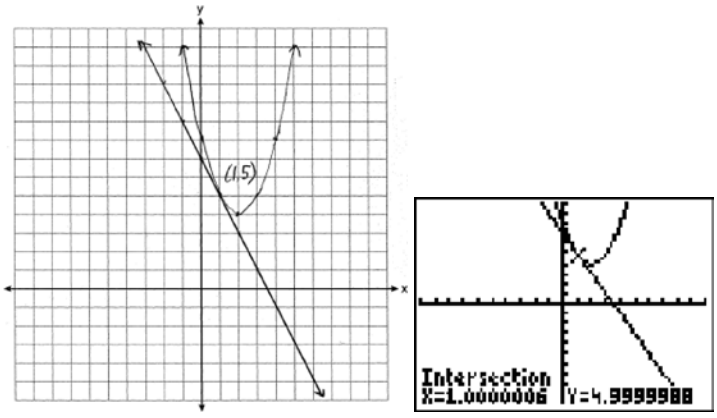
PTS: 6 REF: 080938ge STA: G.G.41 TOP: Special Quadrilaterals

454 ANS:



PTS: 6 REF: 061238ge STA: G.G.70 TOP: Quadratic-Linear Systems

455 ANS:



PTS: 6 REF: 011038ge STA: G.G.70 TOP: Quadratic-Linear Systems

456 ANS:

$m_{\overline{AB}} = \left(\frac{-6+2}{2}, \frac{-2+8}{2}\right) = D(2,3)$ $m_{\overline{BC}} = \left(\frac{2+6}{2}, \frac{8+-2}{2}\right) = E(4,3)$ $F(0,-2)$. To prove that *ADEF* is a parallelogram, show that both pairs of opposite sides of the parallelogram are parallel by showing the opposite sides have the same slope: $\mathrm{m}_{\overline{AD}} = \frac{3--2}{-2--6} = \frac{5}{4}$ $\overline{AF} \| \overline{DE}$ because all horizontal lines have the same slope. *ADEF*

$$\mathrm{m}_{FE} = \frac{3--2}{4-0} = \frac{5}{4}$$

is not a rhombus because not all sides are congruent. $AD = \sqrt{5^2 + 4^2} = \sqrt{41}$ $AF = 6$

PTS: 6 REF: 081138ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane