Geometry Multiple Choice Regents Exam Questions

1   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

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

3   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) $y = 3$

4   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) $\overline{BC}, \overline{AB}, \overline{AC}$

5   In the diagram below, lines n and m are cut by transversals p and q.
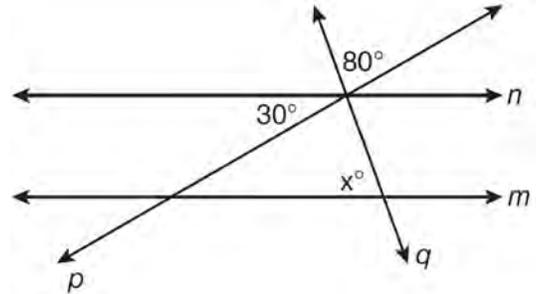
What value of x would make lines n and m parallel?
1)   110
2)   80
3)   70
4)   50

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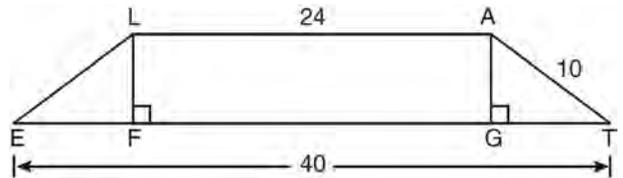
What is the length of $\overline{LF}$?
1)   6
2)   8
3)   3
4)   4

1

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

(Not drawn to scale)
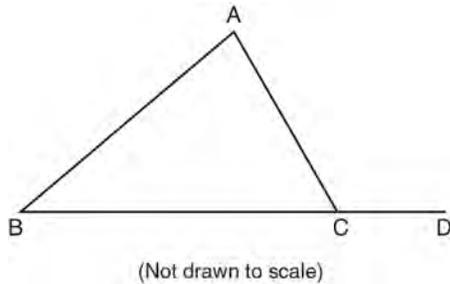
If $m\angle A = x^2 - 6x$, $m\angle B = 2x - 3$, and $m\angle ACD = 9x + 27$, what is the value of x?
1) 10
2) 2
3) 3
4) 15

8 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

9 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) $\angle ABC \cong \angle EDF$

10 In the diagram below of $\triangle ABC$, $\overline{AB} \cong \overline{AC}$, $m\angle A = 3x$, and $m\angle B = x + 20$.
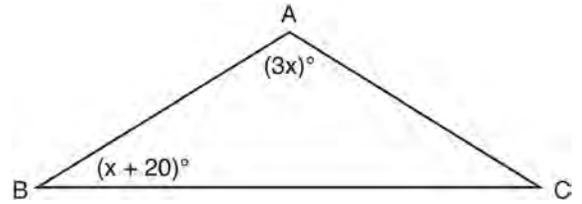
What is the value of x?
1) 10
2) 28
3) 32
4) 40

11 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 $\overline{N'O'}$

12 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

2

13 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) $3x + 4y = 14$

14 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

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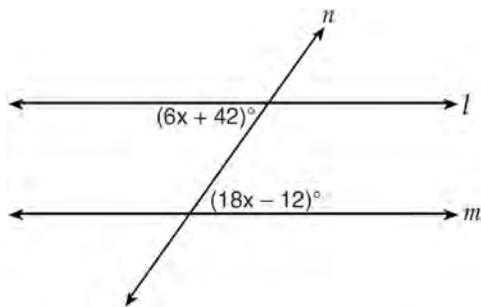

Which value of x would prove $l \parallel m$?
1) 2.5
2) 4.5
3) 6.25
4) 8.75

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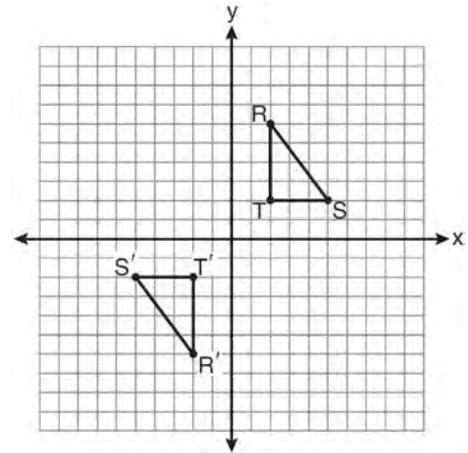

Which transformation does this graph represent?
1) glide reflection
2) line reflection
3) rotation
4) translation

17 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.
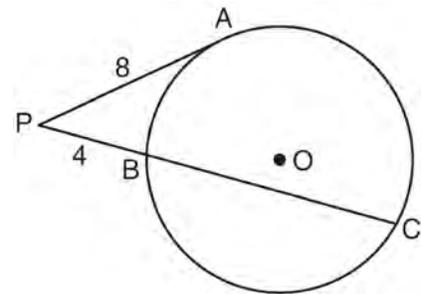
If $PA = 8$ and $PB = 4$, what is the length of $\overline{BC}$?
1) 20
2) 16
3) 15
4) 12

3

18 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

19 In the diagram below of rhombus $ABCD$, $m\angle C = 100$.
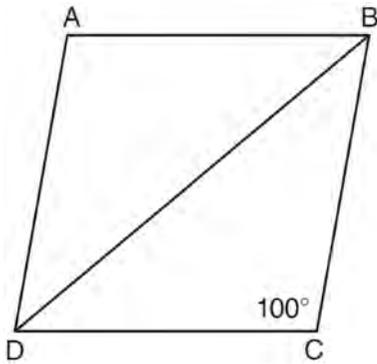
What is $m\angle DBC$?
1) 40
2) 45
3) 50
4) 80

20 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) $AB + CD = AD$

21 What is an equation of circle O shown in the graph below?
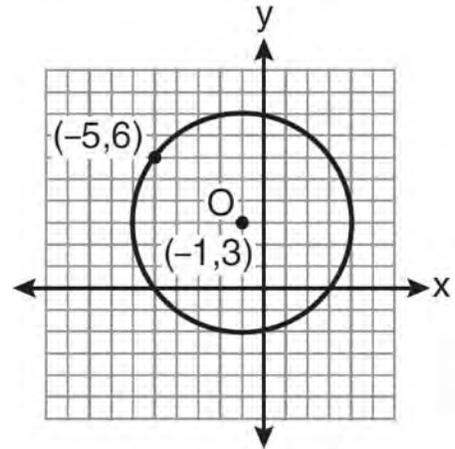
1) $(x + 1)^2 + (y - 3)^2 = 25$
2) $(x - 1)^2 + (y + 3)^2 = 25$
3) $(x - 5)^2 + (y + 6)^2 = 25$
4) $(x + 5)^2 + (y - 6)^2 = 25$

22 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 $BE = 4$.
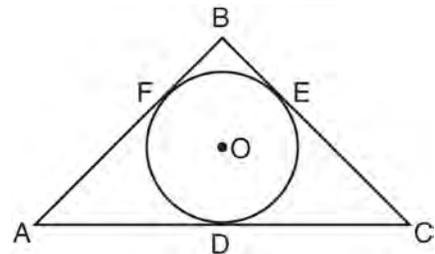
What is the perimeter of $\triangle ABC$?
1) 15
2) 25
3) 30
4) 60

4

23 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.

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

25 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.
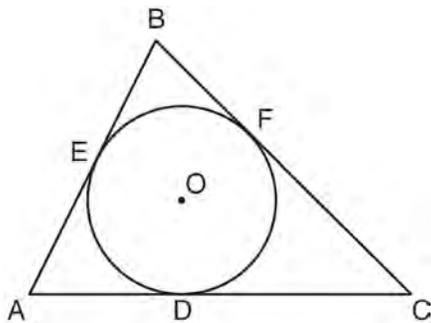
If $AB = 20$, $AE = 12$, and $CF = 15$, what is the length of $\overline{AC}$?
1) 8
2) 15
3) 23
4) 27

26 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°

27 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

28 In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$, $AC = 16$, and $CD = 7$.
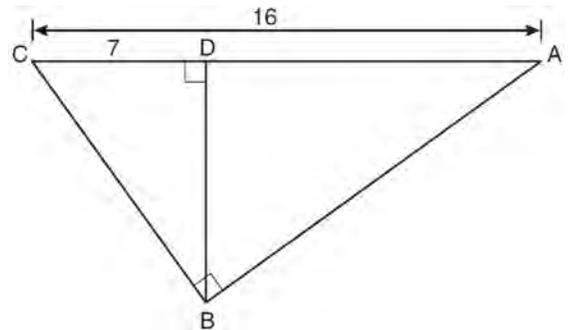
What is the length of $\overline{BD}$?
1) $3\sqrt{7}$
2) $4\sqrt{7}$
3) $7\sqrt{3}$
4) 12

29 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) $\overline{T'P'}$

30 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) $3x + y = 0$

31 The vertices of the triangle in the diagram below are $A(7,9)$, $B(3,3)$, and $C(11,3)$.
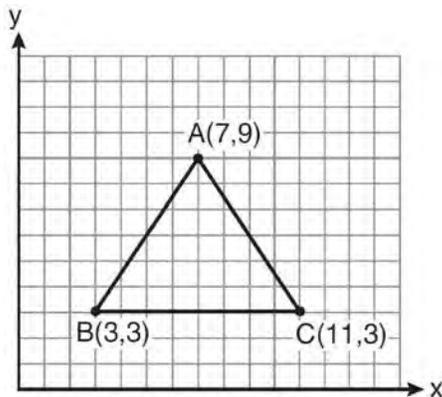
What are the coordinates of the centroid of $\triangle ABC$?

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

32 In the diagram below, $\triangle A'B'C'$ is a transformation of $\triangle ABC$, and $\triangle A''B''C''$ is a transformation of $\triangle A'B'C'$.
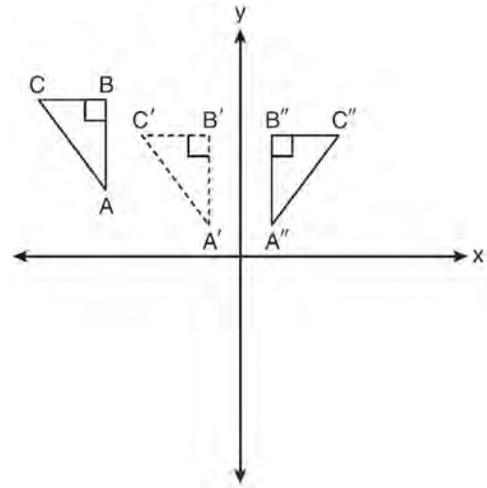
The composite transformation of $\triangle ABC$ to $\triangle A''B''C''$ is an example of a

1) reflection followed by a rotation
2) reflection followed by a translation
3) translation followed by a rotation
4) translation followed by a reflection

33 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) $y = \frac{1}{2}x + 1$

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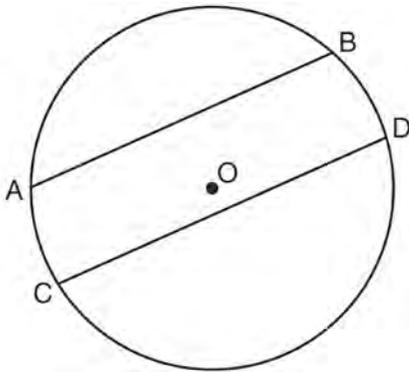

Which statement must be true?

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

35 What is an equation of circle O shown in the graph below?
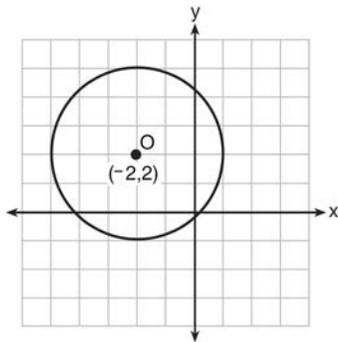
1) $(x+2)^2 + (y-2)^2 = 9$
2) $(x+2)^2 + (y-2)^2 = 3$
3) $(x-2)^2 + (y+2)^2 = 9$
4) $(x-2)^2 + (y+2)^2 = 3$

36 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.
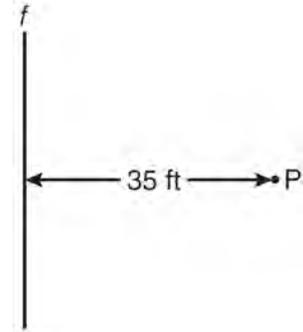
How many locations are possible for the bird bath?

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

37 In the diagram below, $\triangle LMO$ is isosceles with $LO = MO$.
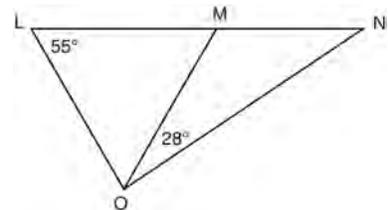
If m$\angle L = 55$ and m$\angle NOM = 28$, what is m$\angle N$?

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

38 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 $(6, 4)$

39 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

40 In $\triangle AED$ with $\overline{ABCD}$ shown in the diagram below, $\overline{EB}$ and $\overline{EC}$ are drawn.
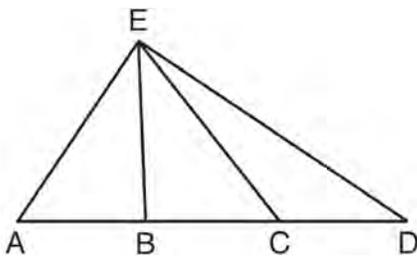
If $\overline{AB} \cong \overline{CD}$, which statement could always be proven?
1) $\overline{AC} \cong \overline{DB}$
2) $\overline{AE} \cong \overline{ED}$
3) $\overline{AB} \cong \overline{BC}$
4) $\overline{EC} \cong \overline{EA}$

41 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

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

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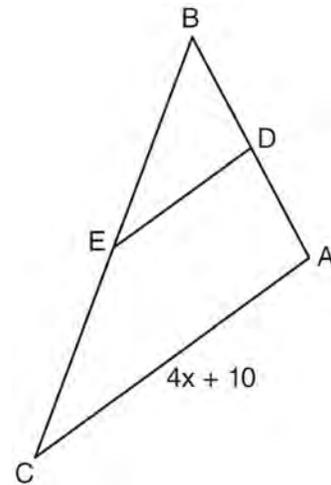

If $AC = 4x + 10$, which expression represents DE?
1) $x + 2.5$
2) $2x + 5$
3) $2x + 10$
4) $8x + 20$

44 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) $(x-4)^2 + y^2 = 36$

45 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) $(-5,2)$

46 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) $m\angle D = m\angle F$

47 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 $\mathcal{R}$.

48 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.
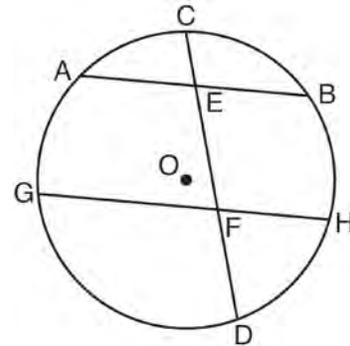
Which statement must always be true?

1) $\overparen{AC} \cong \overparen{CB}$

2) $\overparen{DH} \cong \overparen{BH}$

3) $\overparen{AB} \cong \overparen{GH}$

4) $\overparen{AG} \cong \overparen{BH}$

49 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

50 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

9

51 What is the slope of a line perpendicular to the line whose equation is $20x - 2y = 6$?
1) -10
2) $-\dfrac{1}{10}$
3) 10
4) $\dfrac{1}{10}$

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

53 In the diagram below, $\overline{EF}$ is the median of trapezoid $ABCD$.
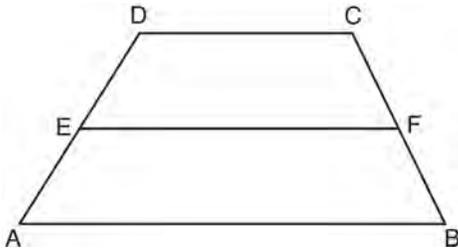
If $AB = 5x - 9$, $DC = x + 3$, and $EF = 2x + 2$, what is the value of x?
1) 5
2) 2
3) 7
4) 8

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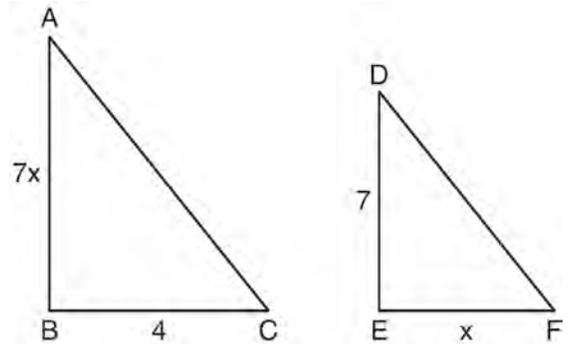

What is the length of $\overline{AB}$?
1) 28
2) 2
3) 14
4) 4

55 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) $\left(5, -2\right)$

56 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) $\overline{JK} \cong \overline{ON}$

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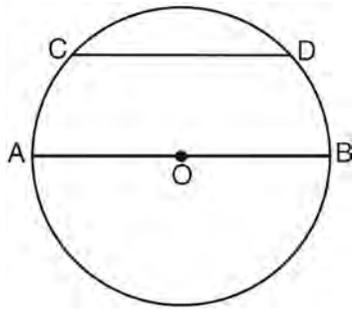

If $m\overarc{CD} = 70$, what is $m\overarc{AC}$?
1) 110
2) 70
3) 55
4) 35

58 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 $m\angle ACD = 5x + 5$.
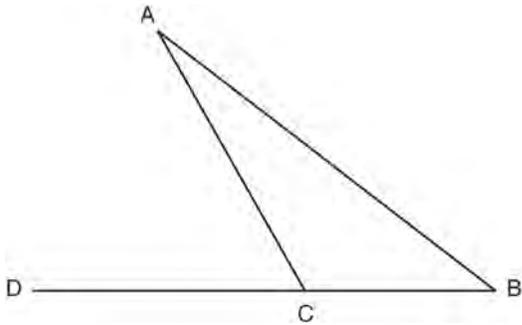
What is $m\angle B$?
1) 5
2) 20
3) 25
4) 55

59 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

60 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) $(-4b, -3a)$

61 In the diagram below, $\triangle ABC \cong \triangle XYZ$.
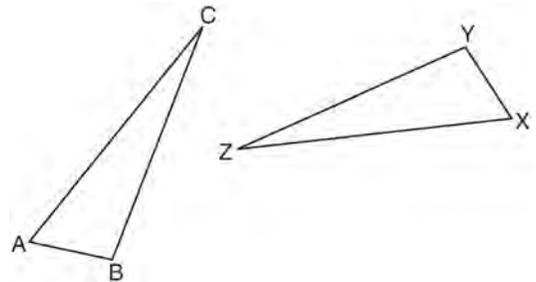
Which statement must be true?
1) $\angle C \cong \angle Y$
2) $\angle A \cong \angle X$
3) $\overline{AC} \cong \overline{YZ}$
4) $\overline{CB} \cong \overline{XZ}$

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

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

64 In the diagram below of $\triangle BCD$, side $\overline{DB}$ is extended to point A.
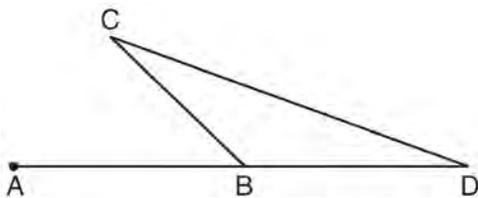
Which statement must be true?
1) $m\angle C > m\angle D$
2) $m\angle ABC < m\angle D$
3) $m\angle ABC > m\angle C$
4) $m\angle ABC > m\angle C + m\angle D$

65 What is the measure of each interior angle of a regular hexagon?
1) 60°
2) 120°
3) 135°
4) 270°

66 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

67 In the diagram below, $\overleftrightarrow{AB}$ is perpendicular to plane $AEFG$.
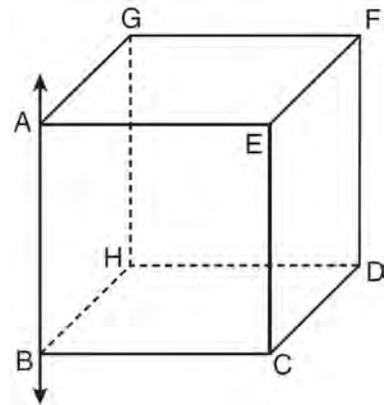
Which plane must be perpendicular to plane $AEFG$?
1) $ABCE$
2) $BCDH$
3) $CDFE$
4) $HDFG$

12

68 In parallelogram *ABCD* shown below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E*.
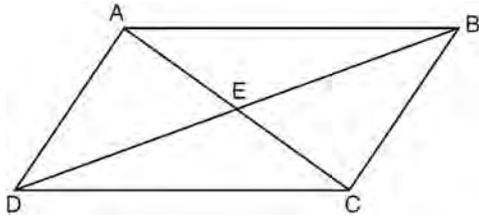
Which statement must be true?
1) $\overline{AC} \cong \overline{DB}$
2) $\angle ABD \cong \angle CBD$
3) $\triangle AED \cong \triangle CEB$
4) $\triangle DCE \cong \triangle BCE$

69 The graph below shows $\overline{JT}$ and its image, $\overline{J'T'}$, after a transformation.
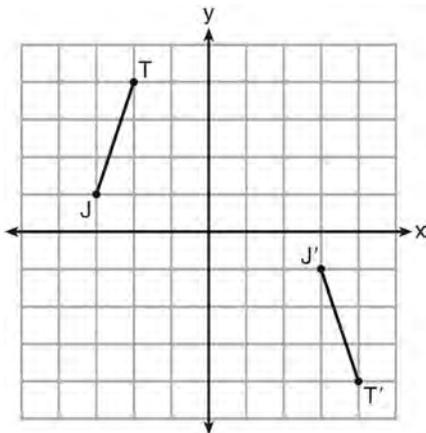
Which transformation would map $\overline{JT}$ onto $\overline{J'T'}$?
1) translation
2) glide reflection
3) rotation centered at the origin
4) reflection through the origin

70 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) $-\dfrac{1}{2}$
4) $\dfrac{1}{2}$

71 Plane $\mathcal{A}$ is parallel to plane $\mathcal{B}$. Plane $\mathcal{C}$ 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

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

73 An equation of the line that passes through $(2,-1)$ and is parallel to the line $2y + 3x = 8$ is
1) $y = \dfrac{3}{2}x - 4$
2) $y = \dfrac{3}{2}x + 4$
3) $y = -\dfrac{3}{2}x - 2$
4) $y = -\dfrac{3}{2}x + 2$

13

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

1)

2)

3)

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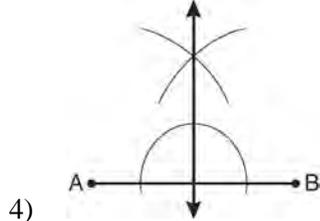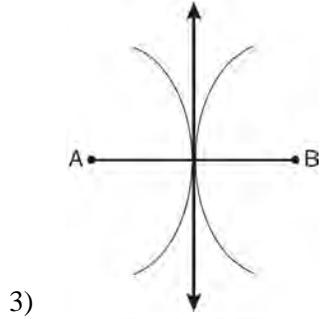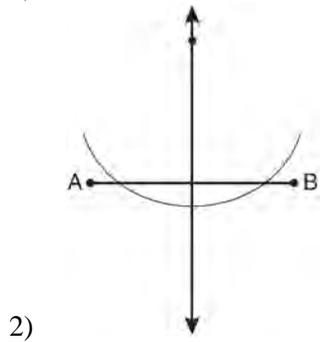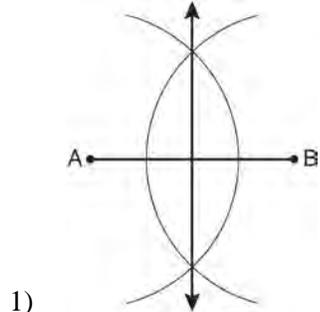
75 When a quadrilateral is reflected over the line $y = x$, which geometric relationship is *not* preserved?
1) congruence
2) orientation
3) parallelism
4) perpendicularity

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

77 Line segment AB is shown in the diagram below.
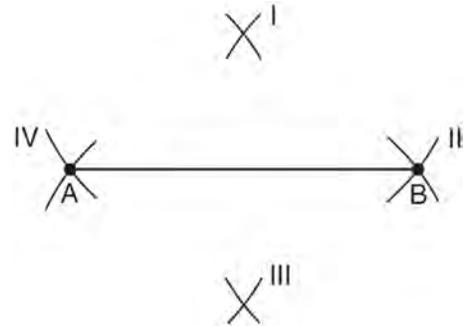
Which two sets of construction marks, labeled I, II, III, and IV, are part of the construction of the perpendicular bisector of line segment AB?
1) I and II
2) I and III
3) II and III
4) II and IV

78 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*.
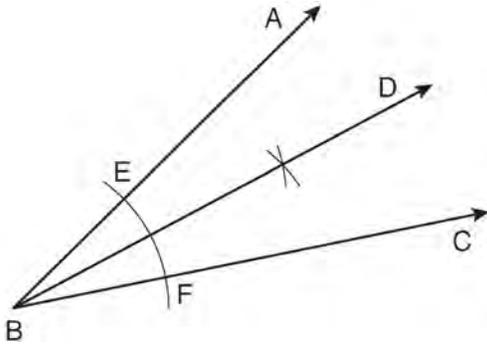

Which statement is *false*?

1) m∠*ABD* = m∠*DBC*

2) $\frac{1}{2}$ (m∠*ABC*) = m∠*ABD*

3) 2(m∠*DBC*) = m∠*ABC*

4) 2(m∠*ABC*) = m∠*CBD*

79 In the diagram of **Δ***KLM* below, m∠*L* = 70, m∠*M* = 50, and $\overline{MK}$ is extended through *N*.
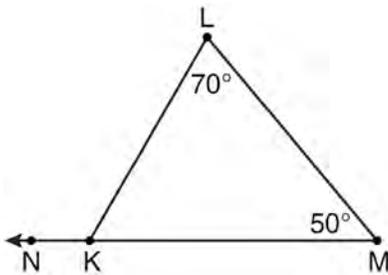
What is the measure of ∠*LKN*?

1) 60°

2) 120°

3) 180°

4) 300°

80 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)

81 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) $2,160\pi$

82 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°

83 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

15

84 What is an equation of the circle shown in the graph below?
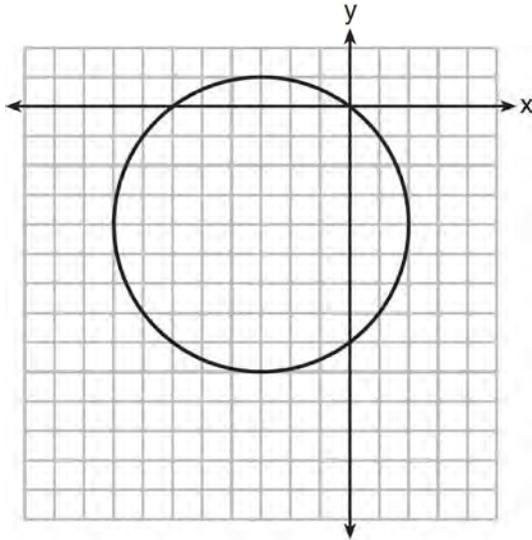
1) $(x-3)^2 + (y-4)^2 = 25$

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

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

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

85 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.

86 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) $(x-2)^2 + (y+8)^2 = 81$

87 Given that $ABCD$ is a parallelogram, a student wrote the proof below to show that a pair of its opposite angles are congruent.
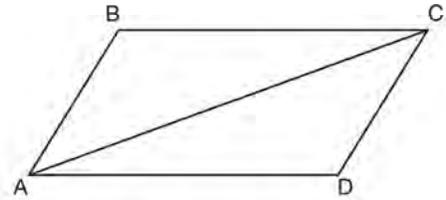
Statement	Reason
1. ABCD is a parallelogram.	1. Given
2. $\overline{BC} \cong \overline{AD}$ $\overline{AB} \cong \overline{DC}$	2. Opposite sides of a parallelogram are congruent.
3. $\overline{AC} \cong \overline{CA}$	3. Reflexive Postulate of Congruency
4. $\triangle ABC \cong \triangle CDA$	4. Side-Side-Side
5. $\angle B \cong \angle D$	5. _____

What is the reason justifying that $\angle B \cong \angle D$?
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.

88 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

89 In $\triangle ABC$ and $\triangle DEF$, $\dfrac{AC}{DF} = \dfrac{CB}{FE}$. Which

additional information would prove
$\triangle ABC \sim \triangle DEF$?
1) $AC = DF$
2) $CB = FE$
3) $\angle ACB \cong \angle DFE$
4) $\angle BAC \cong \angle EDF$

90 In the diagram of $\triangle ABC$ shown below, $\overline{DE} \parallel \overline{BC}$.
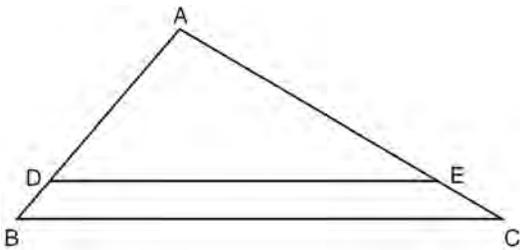
If $AB = 10$, $AD = 8$, and $AE = 12$, what is the
length of $\overline{EC}$?
1) 6
2) 2
3) 3
4) 15

91 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) $RS < TS < RT$

92 In the diagram below of circle O, diameter $\overline{AOB}$ is
perpendicular to chord $\overline{CD}$ at point E, $OA = 6$, and
$OE = 2$.
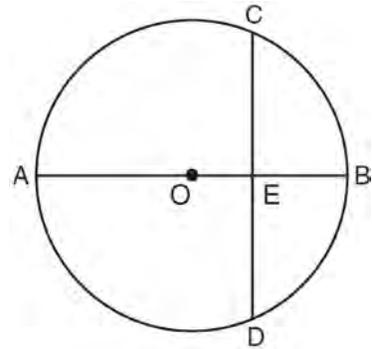
What is the length of $\overline{CE}$?
1) $4\sqrt{3}$
2) $2\sqrt{3}$
3) $8\sqrt{2}$
4) $4\sqrt{2}$

93 In the diagram below of $\triangle ABC$, $\overline{AE} \cong \overline{BE}$,
$\overline{AF} \cong \overline{CF}$, and $\overline{CD} \cong \overline{BD}$.
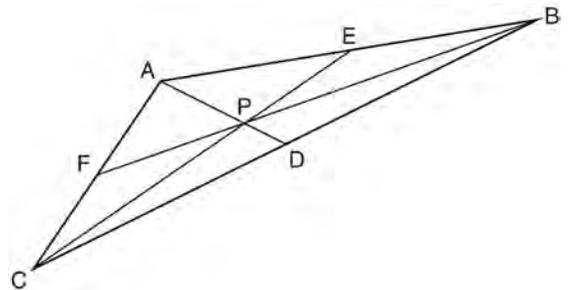
Point P must be the
1) centroid
2) circumcenter
3) Incenter
4) orthocenter

94 In the diagram below, $\triangle ABC \sim \triangle RST$.
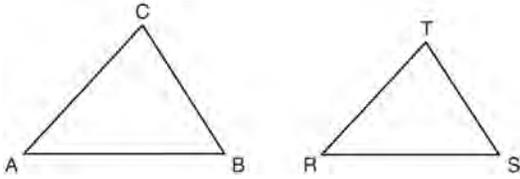
Which statement is *not* true?
1) $\angle A \cong \angle R$
2) $\dfrac{AB}{RS} = \dfrac{BC}{ST}$
3) $\dfrac{AB}{BC} = \dfrac{ST}{RS}$
4) $\dfrac{AB + BC + AC}{RS + ST + RT} = \dfrac{AB}{RS}$

95 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.
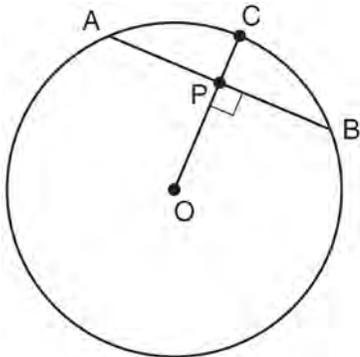
What is the length of $\overline{OP}$, in centimeters?
1) 8
2) 2
3) 3
4) 4

96 In the diagram below, line p intersects line m and line n.
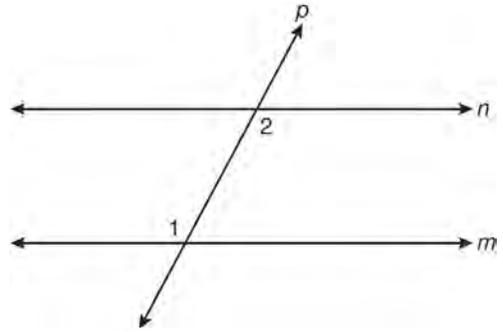
If $m\angle 1 = 7x$ and $m\angle 2 = 5x + 30$, lines m and n are parallel when x equals
1) 12.5
2) 15
3) 87.5
4) 105

97 As shown in the diagram below, $\overline{AC}$ bisects $\angle BAD$ and $\angle B \cong \angle D$.
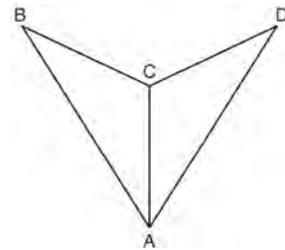
Which method could be used to prove $\triangle ABC \cong \triangle ADC$?
1) SSS
2) AAA
3) SAS
4) AAS

18

98 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) $(-1,3)$

99 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$\angle EMS = 59$.
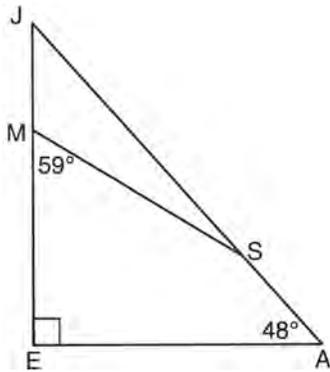

What is m$\angle JSM$?
1) 163
2) 121
3) 42
4) 17

100 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 $\triangle A'B'C'$

101 What is an equation of the line that is perpendicular to the line whose equation is $y = \dfrac{3}{5}x - 2$ and that passes through the point $(3,-6)$?
1) $y = \dfrac{5}{3}x - 11$
2) $y = -\dfrac{5}{3}x + 11$
3) $y = -\dfrac{5}{3}x - 1$
4) $y = \dfrac{5}{3}x + 1$

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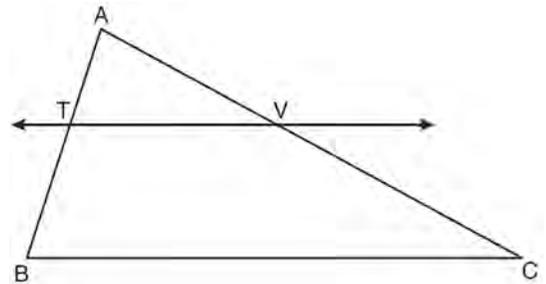

What is the length of $\overline{VC}$?
1) $3\dfrac{1}{2}$
2) $7\dfrac{1}{7}$
3) 14
4) 24

103 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.

104 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.
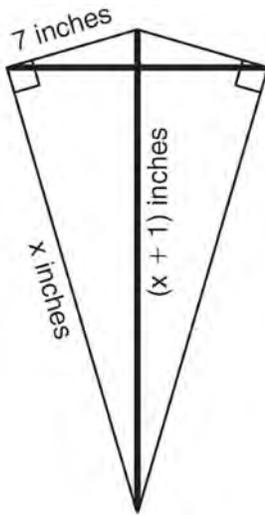
What is the measure, in inches, of the vertical support bar?
1) 23
2) 24
3) 25
4) 26

105 As shown in the diagram below, lines m and n are cut by transversal p.
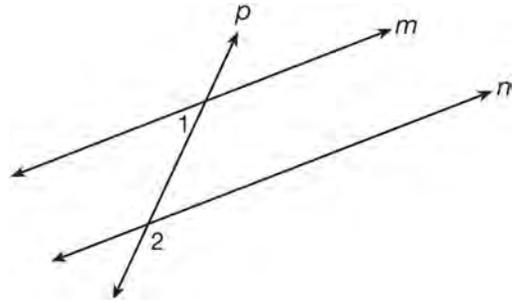
If $m\angle 1 = 4x + 14$ and $m\angle 2 = 8x + 10$, lines m and n are parallel when x equals
1) 1
2) 6
3) 13
4) 17

106 In $\triangle ABC$ shown below, P is the centroid and $BF = 18$.
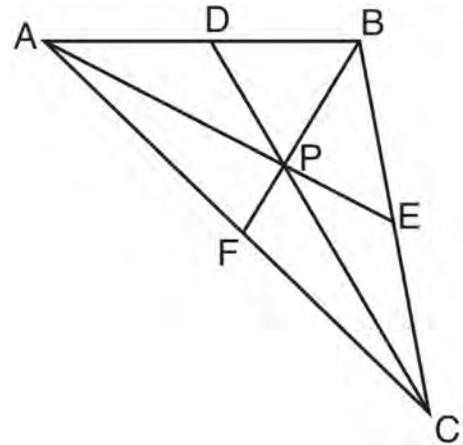
What is the length of $\overline{BP}$?
1) 6
2) 9
3) 3
4) 12

107 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) $2\sqrt{41}$

108 In the diagram below, $MATH$ is a rhombus with diagonals $\overline{AH}$ and $\overline{MT}$.
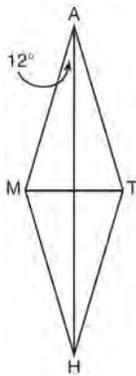
If m$\angle HAM = 12$, what is m$\angle AMT$?

1) 12
2) 78
3) 84
4) 156

109 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) $\sqrt{233}$

110 In the diagram below, quadrilateral $JUMP$ is inscribed in a circle..
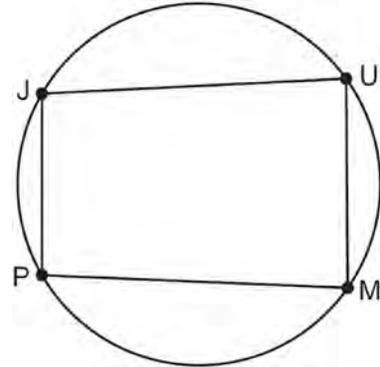
Opposite angles J and M must be

1) right
2) complementary
3) congruent
4) supplementary

111 In the diagram of quadrilateral $ABCD$, $\overline{AB} \parallel \overline{CD}$, $\angle ABC \cong \angle CDA$, and diagonal $\overline{AC}$ is drawn.
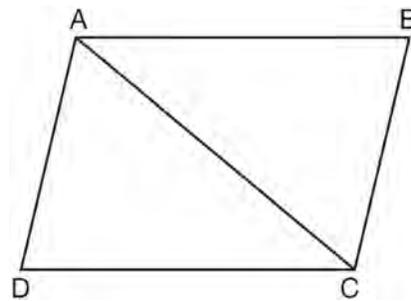
Which method can be used to prove $\triangle ABC$ is congruent to $\triangle CDA$?

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

112 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

113 The point $(3, -2)$ is rotated 90º 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) $(-8, -12)$

114 The diagram below shows a pair of congruent triangles, with $\angle ADB \cong \angle CDB$ and $\angle ABD \cong \angle CBD$.
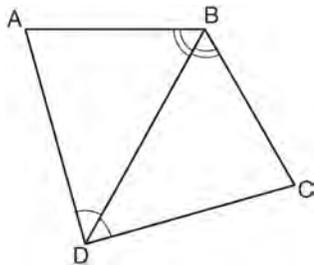
Which statement must be true?
1) $\angle ADB \cong \angle CBD$
2) $\angle ABC \cong \angle ADC$
3) $\overline{AB} \cong \overline{CD}$
4) $\overline{AD} \cong \overline{CD}$

115 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) $\sqrt{50}$

116 As shown in the diagram below, $\overleftrightarrow{EF}$ intersects planes $\mathcal{P}$, $\mathcal{Q}$, and $\mathcal{R}$.
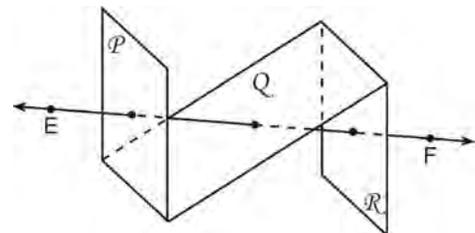
If $\overleftrightarrow{EF}$ is perpendicular to planes $\mathcal{P}$ and $\mathcal{R}$, which statement must be true?
1) Plane $\mathcal{P}$ is perpendicular to plane $\mathcal{Q}$.
2) Plane $\mathcal{R}$ is perpendicular to plane $\mathcal{P}$.
3) Plane $\mathcal{P}$ is parallel to plane $\mathcal{Q}$.
4) Plane $\mathcal{R}$ is parallel to plane $\mathcal{P}$.

117 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

118 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 $\angle BCE \cong \angle DAE$.
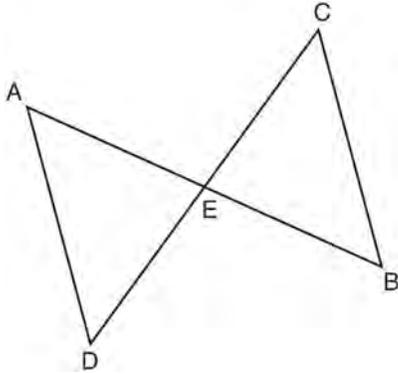
Triangle DAE can be proved congruent to triangle BCE by
1) ASA
2) SAS
3) SSS
4) HL

119 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

120 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

121 Triangle ABC is graphed on the set of axes below.
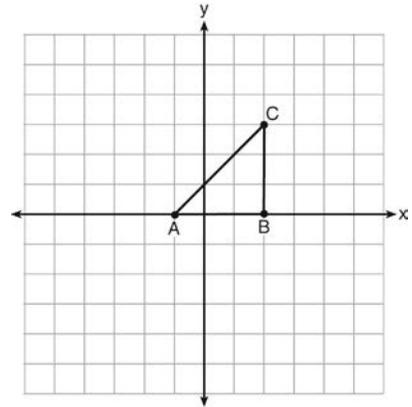
Which transformation produces an image that is similar to, but *not* congruent to, $\triangle ABC$?
1) $T_{2,3}$
2) D_2
3) $r_{y=x}$
4) R_{90}

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

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

23

124 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) $y = -2x - 5$

125 In the diagram below of right triangle ABC, $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$, $CB = 6$, and $AD = 5$.
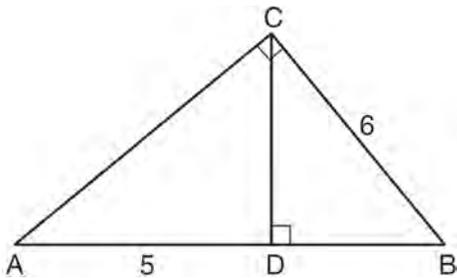
What is the length of $\overline{BD}$?
1) 5
2) 9
3) 3
4) 4

126 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°.

127 As shown in the diagram of $\triangle ACD$ below, B is a point on $\overline{AC}$ and $\overline{DB}$ is drawn.
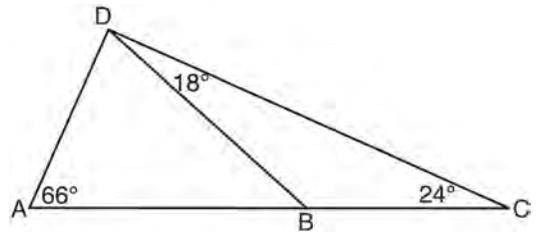
If $m\angle A = 66$, $m\angle CDB = 18$, and $m\angle C = 24$, what is the longest side of $\triangle ABD$?

1) $\overline{AB}$

2) $\overline{DC}$

3) $\overline{AD}$

4) $\overline{BD}$

128 A packing carton in the shape of a triangular prism is shown in the diagram below.
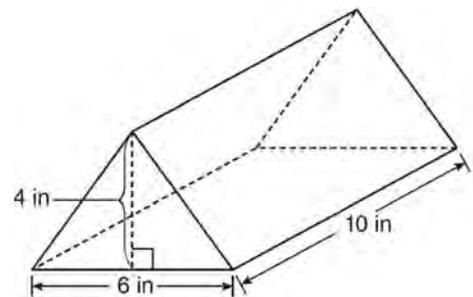
What is the volume, in cubic inches, of this carton?
1) 20
2) 60
3) 120
4) 240

24

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

1)

2)

3)

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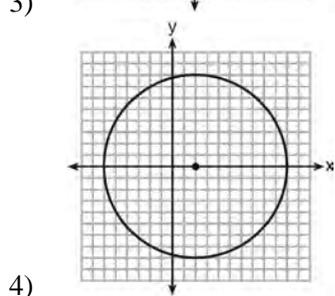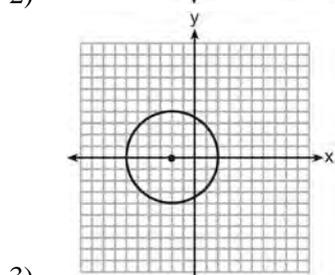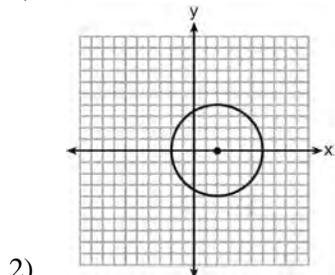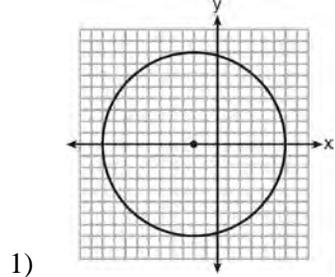
130 If the vertex angles of two isosceles triangles are congruent, then the triangles must be
1) acute
2) congruent
3) right
4) similar

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

132 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) $2\sqrt{26}$

133 In the diagram below, point P is the centroid of $\triangle ABC$.
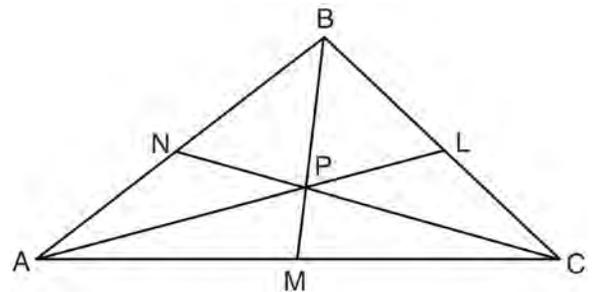
If $PM = 2x + 5$ and $BP = 7x + 4$, what is the length of $\overline{PM}$?
1) 9
2) 2
3) 18
4) 27

25

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

1)

2)

3)

4)
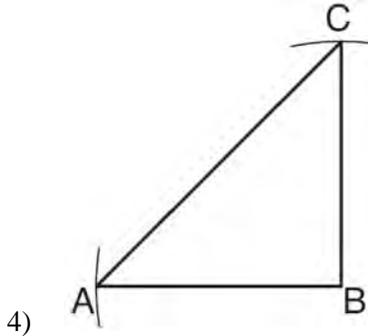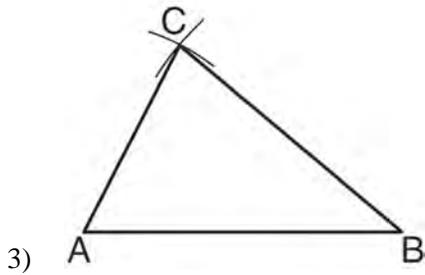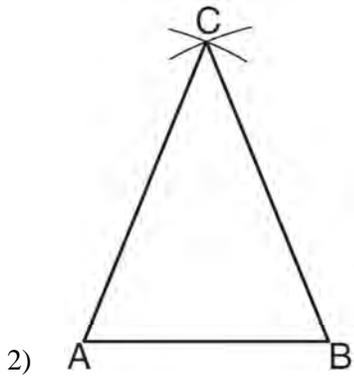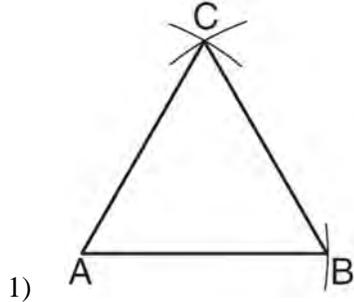
135 In the diagram below, $\overline{DE}$ joins the midpoints of two sides of $\triangle ABC$.
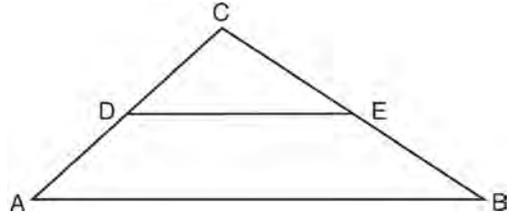
Which statement is *not* true?

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 $\triangle CAB$

136 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

137 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

138 In the diagram below, parallelogram $ABCD$ has diagonals $\overline{AC}$ and $\overline{BD}$ that intersect at point E.
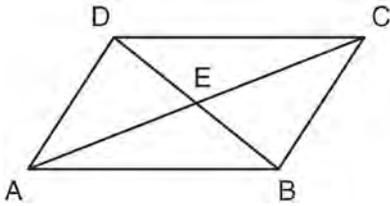
Which expression is *not* always true?
1) $\angle DAE \cong \angle BCE$
2) $\angle DEC \cong \angle BEA$
3) $\overline{AC} \cong \overline{DB}$
4) $\overline{DE} \cong \overline{EB}$

139 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.
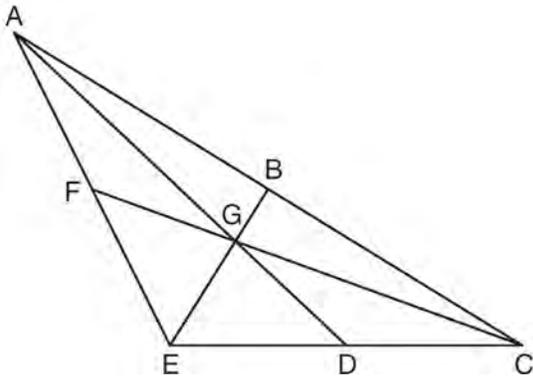
What is the length, in centimeters, of $\overline{GC}$?
1) 24
2) 12
3) 6
4) 4

140 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

141 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) $(-3, 2)$

142 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

143 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) $\{15, 36, 39\}$

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

1)

2)

3)

4)
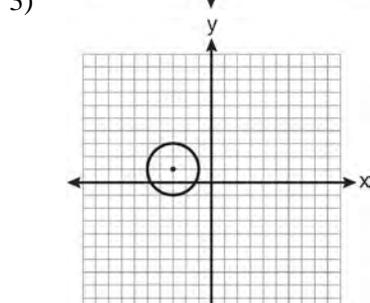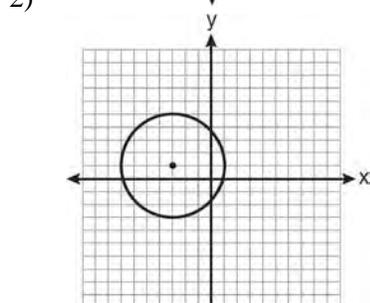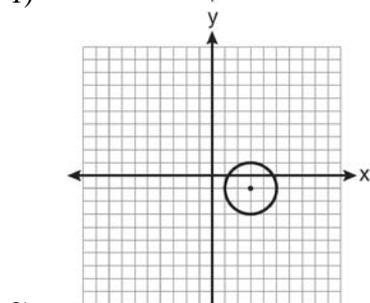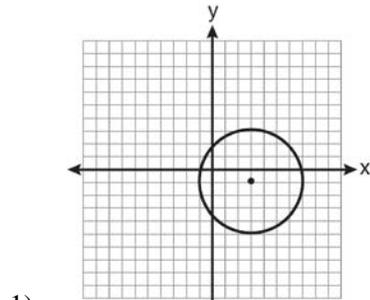
145 The diagram below shows the construction of $\overleftrightarrow{AB}$ through point P parallel to $\overleftrightarrow{CD}$.
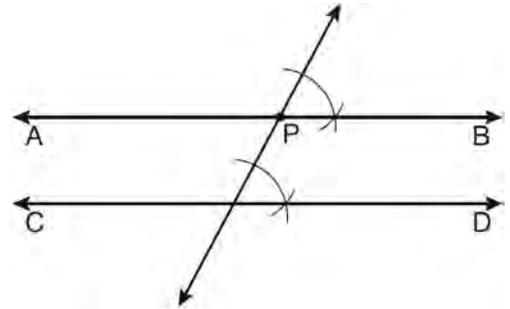
Which theorem justifies this method of construction?
1) If two lines in a plane are perpendicular to a transversal at different points, then the lines are parallel.
2) If two lines in a plane are cut by a transversal to form congruent corresponding angles, then the lines are parallel.
3) If two lines 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.

146 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 $\mathcal{D}$.

147 In the diagram below of isosceles trapezoid $ABCD$, $AB = CD = 25$, $AD = 26$, and $BC = 12$.
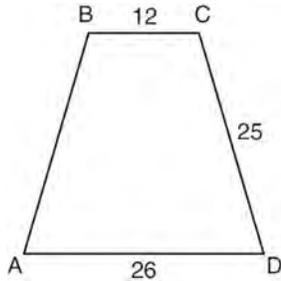
What is the length of an altitude of the trapezoid?
1) 7
2) 14
3) 19
4) 24

148 In the diagram below of $\triangle PAO$, $\overline{AP}$ is tangent to circle O at point A, $OB = 7$, and $BP = 18$.
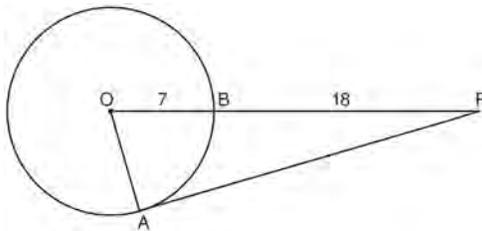
What is the length of $\overline{AP}$?
1) 10
2) 12
3) 17
4) 24

149 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) $(-15, -8)$

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

151 In the diagram below of circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E.
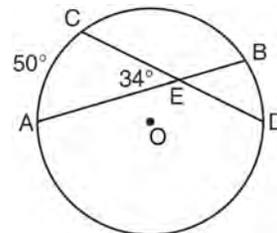
If $m\angle AEC = 34$ and $m\overset{\frown}{AC} = 50$, what is $m\overset{\frown}{DB}$?
1) 16
2) 18
3) 68
4) 118

29

152 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

153 The sum of the interior angles of a polygon of n sides is
1) 360
2) $\dfrac{360}{n}$
3) $(n-2) \cdot 180$
4) $\dfrac{(n-2) \cdot 180}{n}$

154 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 $\overline{AC}$.
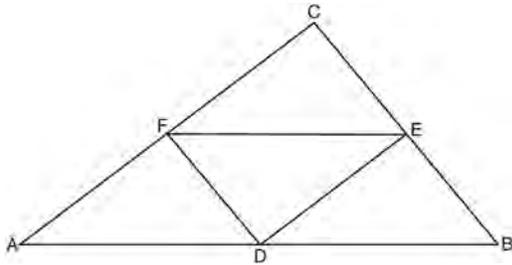
If $AB = 20$, $BC = 12$, and $AC = 16$, what is the perimeter of trapezoid $ABEF$?
1) 24
2) 36
3) 40
4) 44

155 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

156 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.

157 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

158 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.

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

160 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) $3 < AC < 7$

161 In circle O shown below, diameter $\overline{DB}$ is perpendicular to chord $\overline{AC}$ at E.
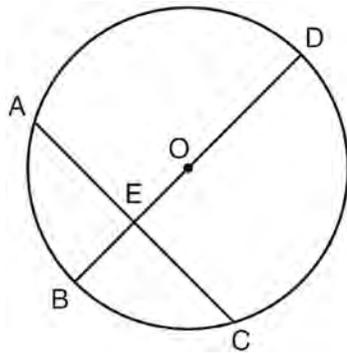
If $DB = 34$, $AC = 30$, and $DE > BE$, what is the length of $\overline{BE}$?
1) 8
2) 9
3) 16
4) 25

162 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

163 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.
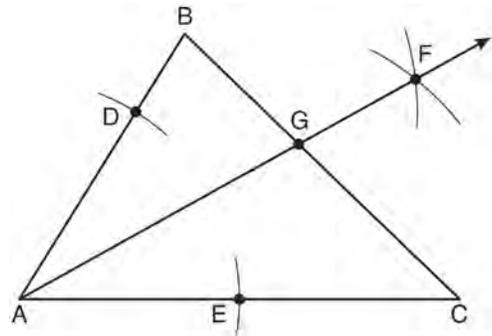
Which statement must be true?
1) $\overrightarrow{AF}$ bisects side $\overline{BC}$
2) $\overrightarrow{AF}$ bisects $\angle BAC$
3) $\overrightarrow{AF} \perp \overline{BC}$
4) $\triangle ABG \sim \triangle ACG$

31

164 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

165 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.

166 The diagram below represents a rectangular solid.
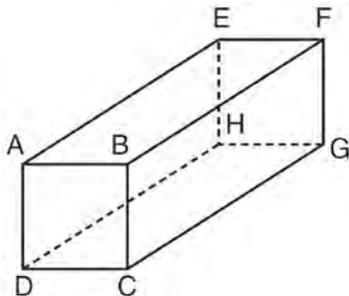
Which statement must be true?
1) $\overline{EH}$ and $\overline{BC}$ are coplanar
2) $\overline{FG}$ and $\overline{AB}$ are coplanar
3) $\overline{EH}$ and $\overline{AD}$ are skew
4) $\overline{FG}$ and $\overline{CG}$ are skew

167 The diagram below shows a rectangular prism.
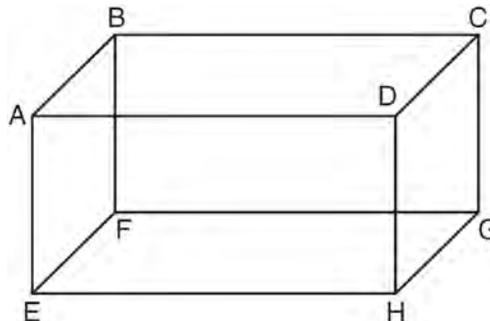
Which pair of edges are segments of lines that are
coplanar?
1) $\overline{AB}$ and $\overline{DH}$
2) $\overline{AE}$ and $\overline{DC}$
3) $\overline{BC}$ and $\overline{EH}$
4) $\overline{CG}$ and $\overline{EF}$

168 As shown in the diagram below, $\overline{FJ}$ is contained in
plane R, $\overline{BC}$ and $\overline{DE}$ are contained in plane S, and
$\overline{FJ}$, $\overline{BC}$, and $\overline{DE}$ intersect at A.
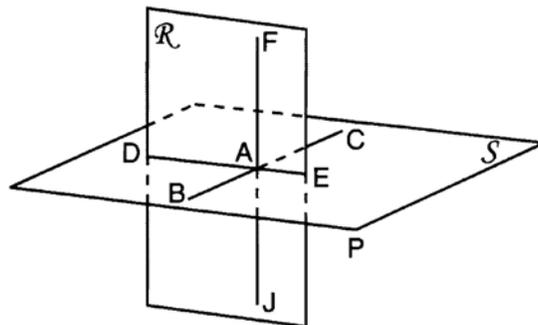
Which fact is sufficient to show that planes R and
S are perpendicular?
1) $\overline{FA} \perp \overline{DE}$
2) $\overline{AD} \perp \overline{AF}$
3) $\overline{BC} \perp \overline{FJ}$
4) $\overline{DE} \perp \overline{BC}$

Geometry Multiple Choice Regents Exam Questions

169 Based on the construction below, which conclusion is *not* always true?
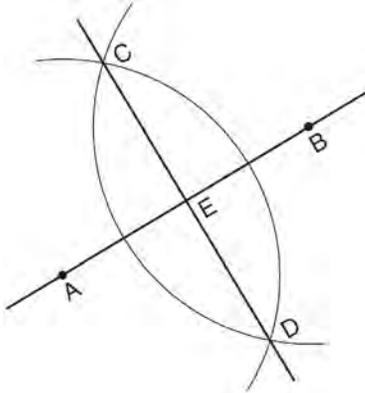
1) $\overline{AB} \perp \overline{CD}$
2) $AB = CD$
3) $AE = EB$
4) $CE = DE$

170 Circle O with $\angle AOC$ and $\angle ABC$ is shown in the diagram below.
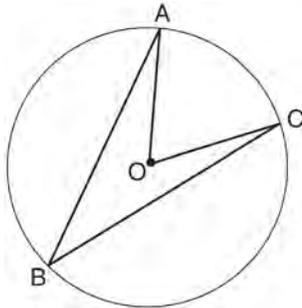
What is the ratio of m$\angle AOC$ to m$\angle ABC$?
1) $1:1$
2) $2:1$
3) $3:1$
4) $1:2$

171 The solution of the system of equations $y = x^2 - 2$ and $y = x$ is
1) $(1,1)$ and $(-2,-2)$
2) $(2,2)$ and $(-1,-1)$
3) $(1,1)$ and $(2,2)$
4) $(-2,-2)$ and $(-1,-1)$

172 In circle O, diameter $\overline{AB}$ intersects chord $\overline{CD}$ at E. If $CE = ED$, then $\angle CEA$ is which type of angle?
1) straight
2) obtuse
3) acute
4) right

173 What is the equation for circle O shown in the graph below?
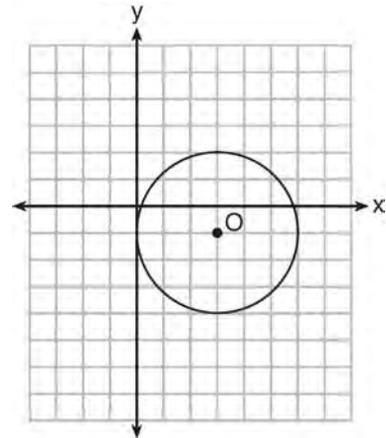
1) $(x - 3)^2 + (y + 1)^2 = 6$
2) $(x + 3)^2 + (y - 1)^2 = 6$
3) $(x - 3)^2 + (y + 1)^2 = 9$
4) $(x + 3)^2 + (y - 1)^2 = 9$

174 In the diagram below, $\overleftrightarrow{RCBT}$ and $\triangle ABC$ are shown with m$\angle A = 60$ and m$\angle ABT = 125$.
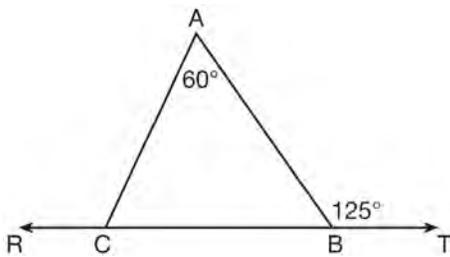
What is m$\angle ACR$?
1) 125
2) 115
3) 65
4) 55

175 A rectangular prism has a base with a length of 25, a width of 9, and a height of 12. A second prism has a square base with a side of 15. If the volumes of the two prisms are equal, what is the height of the second prism?
1) 6
2) 8
3) 12
4) 15

176 Triangle ABC is similar to triangle DEF. The lengths of the sides of $\triangle ABC$ are 5, 8, and 11. What is the length of the shortest side of $\triangle DEF$ if its perimeter is 60?
1) 10
2) 12.5
3) 20
4) 27.5

177 In the diagram below, diameter $\overline{AB}$ bisects chord $\overline{CD}$ at point E in circle F.
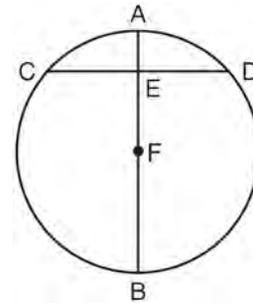
If $AE = 2$ and $FB = 17$, then the length of $\overline{CE}$ is
1) 7
2) 8
3) 15
4) 16

178 As shown below, the medians of $\triangle ABC$ intersect at D.
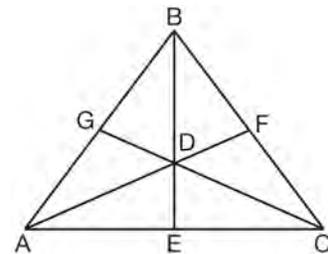
If the length of $\overline{BE}$ is 12, what is the length of $\overline{BD}$?
1) 8
2) 9
3) 3
4) 4

34

179 If $\triangle ABC$ and its image, $\triangle A'B'C'$, are graphed on a set of axes, $\triangle ABC \cong \triangle A'B'C'$ under each transformation *except*

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

180 If $\triangle ABC \cong \triangle JKL \cong \triangle RST$, then $\overline{BC}$ must be congruent to

1) $\overline{JL}$
2) $\overline{JK}$
3) $\overline{ST}$
4) $\overline{RS}$

181 In $\triangle ABC$, D is the midpoint of $\overline{AB}$ and E is the midpoint of $\overline{BC}$. If $AC = 3x - 15$ and $DE = 6$, what is the value of x?
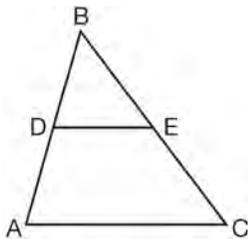
1) 6
2) 7
3) 9
4) 12

182 Point A is on line m. How many distinct planes will be perpendicular to line m and pass through point A?

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

183 Which equation represents the circle whose center is $(-5, 3)$ and that passes through the point $(-1, 3)$?

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

184 Given: $\triangle ABD$, $\overline{BC}$ is the perpendicular bisector of $\overline{AD}$
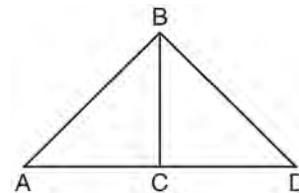
Which statement can *not* always be proven?

1) $\overline{AC} \cong \overline{DC}$
2) $\overline{BC} \cong \overline{CD}$
3) $\angle ACB \cong \angle DCB$
4) $\triangle ABC \cong \triangle DBC$

35

185 Triangle ABC has vertices $A(0,0)$, $B(6,8)$, and $C(8,4)$. Which equation represents the perpendicular bisector of $\overline{BC}$?

1) $y = 2x - 6$
2) $y = -2x + 4$
3) $y = \frac{1}{2}x + \frac{5}{2}$
4) $y = -\frac{1}{2}x + \frac{19}{2}$

186 What is the equation of a line passing through the point $(6, 1)$ and parallel to the line whose equation is $3x = 2y + 4$?

1) $y = -\frac{2}{3}x + 5$
2) $y = -\frac{2}{3}x - 3$
3) $y = \frac{3}{2}x - 8$
4) $y = \frac{3}{2}x - 5$

187 Triangle ABC has the coordinates $A(1,2)$, $B(5,2)$, and $C(5,5)$. Triangle ABC is rotated $180°$ about the origin to form triangle $A'B'C'$. Triangle $A'B'C'$ is

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

188 A circle with the equation $(x + 6)^2 + (y - 7)^2 = 64$ does *not* include points in Quadrant

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

189 In the diagram of $\triangle UVW$ below, A is the midpoint of $\overline{UV}$, B is the midpoint of $\overline{UW}$, C is the midpoint of $\overline{VW}$, and $\overline{AB}$ and $\overline{AC}$ are drawn.
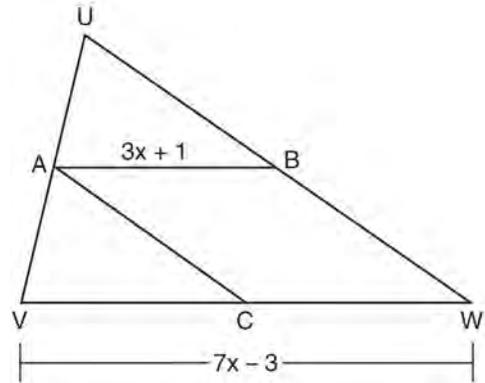
If $VW = 7x - 3$ and $AB = 3x + 1$, what is the length of $\overline{VC}$?

1) 5
2) 13
3) 16
4) 32

190 What are the coordinates of A', the image of $A(-3, 4)$, after a rotation of $180°$ about the origin?

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

191 When the system of equations $y + 2 = (x - 4)^2$ and $2x + y - 6 = 0$ is solved graphically, the solution is

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

192 A rectangular right prism is shown in the diagram below.
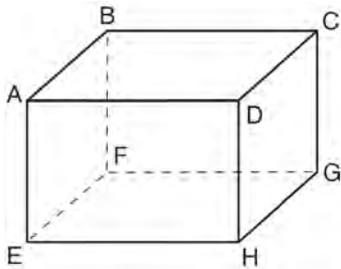
Which pair of edges are *not* coplanar?
1) $\overline{BF}$ and $\overline{CG}$
2) $\overline{BF}$ and $\overline{DH}$
3) $\overline{EF}$ and $\overline{CD}$
4) $\overline{EF}$ and $\overline{BC}$

193 The sides of a triangle are 8, 12, and 15. The longest side of a similar triangle is 18. What is the ratio of the perimeter of the smaller triangle to the perimeter of the larger triangle?
1) 2:3
2) 4:9
3) 5:6
4) 25:36

194 Which equation represents a line that is parallel to the line whose equation is $3x - 2y = 7$?

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

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

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

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

195 In trapezoid $RSTV$ with bases $\overline{RS}$ and $\overline{VT}$, diagonals $\overline{RT}$ and $\overline{SV}$ intersect at Q.
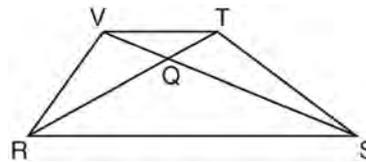
If trapezoid $RSTV$ is *not* isosceles, which triangle is equal in area to $\triangle RSV$?
1) $\triangle RQV$
2) $\triangle RST$
3) $\triangle RVT$
4) $\triangle SVT$

196 In the diagram below, four pairs of triangles are shown. Congruent corresponding parts are labeled in each pair.
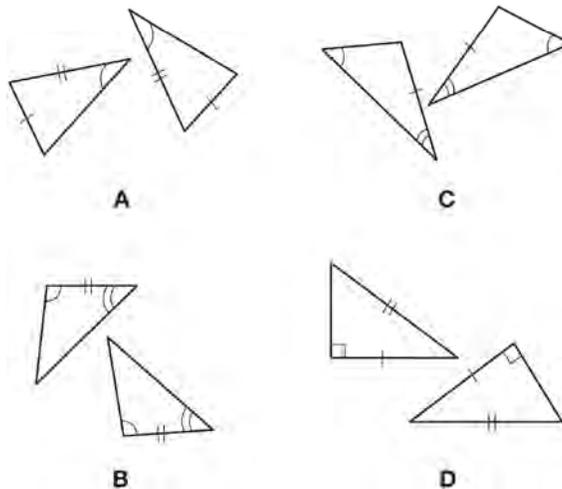
Using only the information given in the diagrams, which pair of triangles can *not* be proven congruent?
1) A
2) B
3) C
4) D

37

197 The equations $x^2 + y^2 = 25$ and $y = 5$ are graphed on a set of axes. What is the solution of this system?
1) $(0,0)$
2) $(5,0)$
3) $(0,5)$
4) $(5,5)$

198 If the vertices of $\triangle ABC$ are $A(-2,4)$, $B(-2,8)$, and $C(-5,6)$, then $\triangle ABC$ is classified as
1) right
2) scalene
3) isosceles
4) equilateral

199 Triangle ABC shown below is a right triangle with altitude $\overline{AD}$ drawn to the hypotenuse $\overline{BC}$.
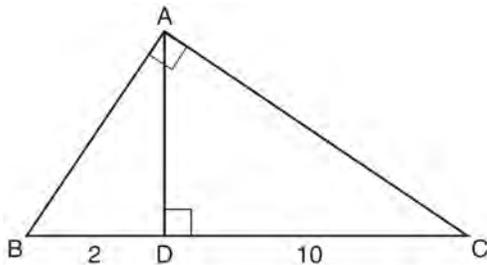
If $BD = 2$ and $DC = 10$, what is the length of $\overline{AB}$?
1) $2\sqrt{2}$
2) $2\sqrt{5}$
3) $2\sqrt{6}$
4) $2\sqrt{30}$

200 In the diagram below, $\triangle XYV \cong \triangle TSV$.
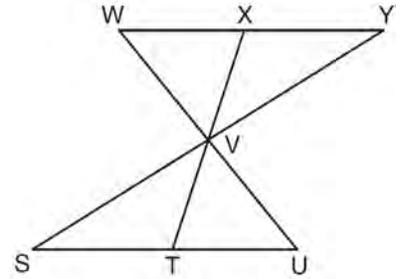
Which statement can *not* be proven?
1) $\angle XVY \cong \angle TVS$
2) $\angle VYX \cong \angle VUT$
3) $\overline{XY} \cong \overline{TS}$
4) $\overline{YV} \cong \overline{SV}$

201 Points $A(5,3)$ and $B(7,6)$ lie on $\overleftrightarrow{AB}$. Points $C(6,4)$ and $D(9,0)$ lie on $\overleftrightarrow{CD}$. Which statement is true?
1) $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$
2) $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$
3) $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are the same line.
4) $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect, but are not perpendicular.

202 Square $ABCD$ has vertices $A(-2,-3)$, $B(4,-1)$, $C(2,5)$, and $D(-4,3)$. What is the length of a side of the square?
1) $2\sqrt{5}$
2) $2\sqrt{10}$
3) $4\sqrt{5}$
4) $10\sqrt{2}$

38

203 As shown in the diagram below, $\overline{CD}$ is a median of $\triangle ABC$.
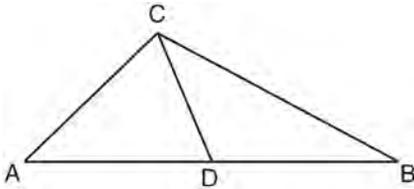

Which statement is *always* true?
1) $\overline{AD} \cong \overline{DB}$
2) $\overline{AC} \cong \overline{AD}$
3) $\angle ACD \cong \angle CDB$
4) $\angle BCD \cong \angle ACD$

204 Line ℓ passes through the point $(5, 3)$ and is parallel to line k whose equation is $5x + y = 6$. An equation of line ℓ is
1) $y = \frac{1}{5}x + 2$
2) $y = -5x + 28$
3) $y = \frac{1}{5}x - 2$
4) $y = -5x - 28$

205 What is the perimeter of a square whose diagonal is $3\sqrt{2}$?
1) 18
2) 12
3) 9
4) 6

206 As shown in the diagram below, when right triangle *DAB* is reflected over the *x*-axis, its image is triangle *DCB*.
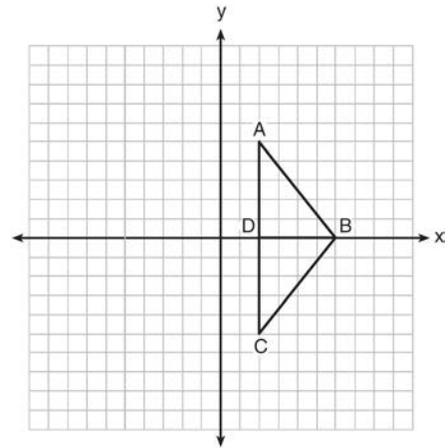
Which statement justifies why $\overline{AB} \cong \overline{CB}$?
1) Distance is preserved under reflection.
2) Orientation is preserved under reflection.
3) Points on the line of reflection remain invariant.
4) Right angles remain congruent under reflection.

207 In a coordinate plane, the locus of points 5 units from the *x*-axis is the
1) lines $x = 5$ and $x = -5$
2) lines $y = 5$ and $y = -5$
3) line $x = 5$, only
4) line $y = 5$, only

208 The diagram below shows the construction of line *m*, parallel to line ℓ, through point *P*.
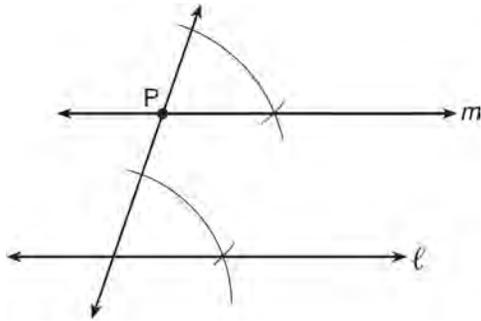
Which theorem was used to justify this construction?
1) If two lines are cut by a transversal and the alternate interior angles are congruent, the lines are parallel.
2) If two lines are cut by a transversal and the interior angles on the same side are supplementary, the lines are parallel.
3) If two lines are perpendicular to the same line, they are parallel.
4) If two lines are cut by a transversal and the corresponding angles are congruent, they are parallel.

209 What is the converse of "If an angle measures 90 degrees, then it is a right angle"?
1) If an angle is a right angle, then it measures 90 degrees.
2) An angle is a right angle if it measures 90 degrees.
3) If an angle is not a right angle, then it does not measure 90 degrees.
4) If an angle does not measure 90 degrees, then it is not a right angle.

210 What is the slope of the line perpendicular to the line represented by the equation $2x + 4y = 12$?
1) -2
2) 2
3) $-\dfrac{1}{2}$
4) $\dfrac{1}{2}$

211 Trapezoid *QRST* is graphed on the set of axes below.
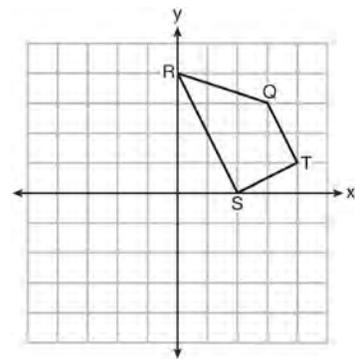
Under which transformation will there be *no* invariant points?
1) $r_{y=0}$
2) $r_{x=0}$
3) $r_{(0,0)}$
4) $r_{y=x}$

212 If $\triangle MNP \cong \triangle VWX$ and $\overline{PM}$ is the shortest side of $\triangle MNP$, what is the shortest side of $\triangle VWX$?
1) $\overline{XV}$
2) $\overline{WX}$
3) $\overline{VW}$
4) $\overline{NP}$

213 As shown in the diagram below, $\overline{FD}$ and $\overline{CB}$ intersect at point A and $\overline{ET}$ is perpendicular to both $\overline{FD}$ and $\overline{CB}$ at A.
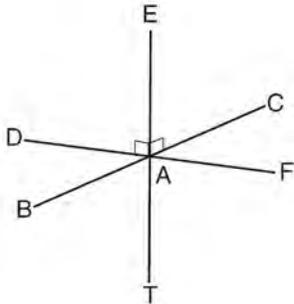
Which statement is *not* true?

1) $\overline{ET}$ is perpendicular to plane BAD.
2) $\overline{ET}$ is perpendicular to plane FAB.
3) $\overline{ET}$ is perpendicular to plane CAD.
4) $\overline{ET}$ is perpendicular to plane BAT.

214 In circle R shown below, diameter $\overline{DE}$ is perpendicular to chord $\overline{ST}$ at point L.
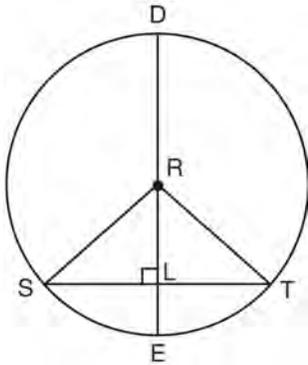
Which statement is *not* always true?

1) $\overline{SL} \cong \overline{TL}$
2) $RS = DR$
3) $\overline{RL} \cong \overline{LE}$
4) $(DL)(LE) = (SL)(LT)$

215 The diagram below shows $\triangle ABD$, with $\overrightarrow{ABC}$, $\overline{BE} \perp \overline{AD}$, and $\angle EBD \cong \angle CBD$.
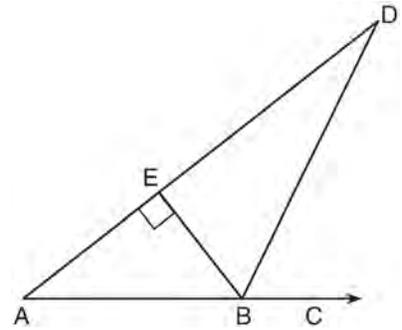
If $m\angle ABE = 52$, what is $m\angle D$?

1) 26
2) 38
3) 52
4) 64

216 As shown in the diagram of rectangle $ABCD$ below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E.
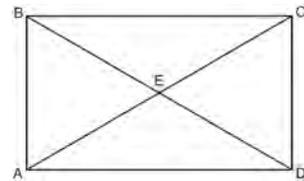
If $AE = x + 2$ and $BD = 4x - 16$, then the length of $\overline{AC}$ is

1) 6
2) 10
3) 12
4) 24

41

217 How many points in the coordinate plane are 3 units from the origin and also equidistant from both the *x*-axis and the *y*-axis?
1) 1
2) 2
3) 8
4) 4

218 The measure of an interior angle of a regular polygon is 120°. How many sides does the polygon have?
1) 5
2) 6
3) 3
4) 4

219 Triangle *ABC* is shown in the diagram below.
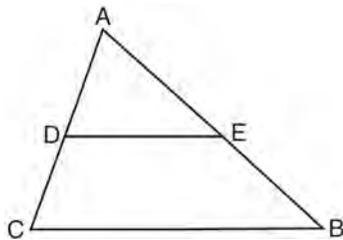
If $\overline{DE}$ joins the midpoints of $\overline{ADC}$ and $\overline{AEB}$, which statement is *not* true?

1) $DE = \frac{1}{2}CB$

2) $\overline{DE} \parallel \overline{CB}$

3) $\frac{AD}{DC} = \frac{DE}{CB}$

4) $\triangle ABC \sim \triangle AED$

220 In the diagram of $\triangle ABC$ below, $\overline{AB}$ is extended to point *D*.
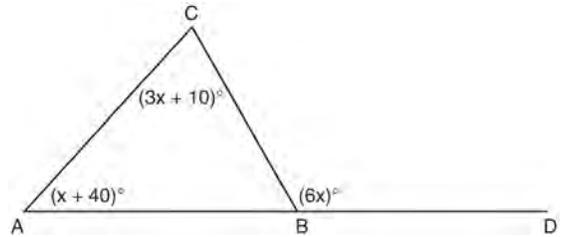
If m$\angle CAB = x + 40$, m$\angle ACB = 3x + 10$, m$\angle CBD = 6x$, what is m$\angle CAB$?
1) 13
2) 25
3) 53
4) 65

221 Which set of equations represents two circles that have the same center?
1) $x^2 + (y + 4)^2 = 16$ and $(x + 4)^2 + y^2 = 16$
2) $(x + 3)^2 + (y - 3)^2 = 16$ and $(x - 3)^2 + (y + 3)^2 = 25$
3) $(x - 7)^2 + (y - 2)^2 = 16$ and $(x + 7)^2 + (y + 2)^2 = 25$
4) $(x - 2)^2 + (y - 5)^2 = 16$ and $(x - 2)^2 + (y - 5)^2 = 25$

222 In $\triangle ABC$, $\angle A \cong \angle B$ and $\angle C$ is an obtuse angle. Which statement is true?
1) $\overline{AC} \cong \overline{AB}$ and $\overline{BC}$ is the longest side.
2) $\overline{AC} \cong \overline{BC}$ and $\overline{AB}$ is the longest side.
3) $\overline{AC} \cong \overline{AB}$ and $\overline{BC}$ is the shortest side.
4) $\overline{AC} \cong \overline{BC}$ and $\overline{AB}$ is the shortest side.

223 The equation of a line is $y = \frac{2}{3}x + 5$. What is an equation of the line that is perpendicular to the given line and that passes through the point $(4, 2)$?

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

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

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

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

224 The lateral area of a right circular cone is equal to 120π cm^2. If the base of the cone has a diameter of 24 cm, what is the length of the slant height, in centimeters?
1) 2.5
2) 5
3) 10
4) 15.7

225 Line segment AB is a diameter of circle O whose center has coordinates $(6, 8)$. What are the coordinates of point B if the coordinates of point A are $(4, 2)$?
1) $(1, 3)$
2) $(5, 5)$
3) $(8, 14)$
4) $(10, 10)$

226 If line ℓ is perpendicular to distinct planes $\mathcal{P}$ and $\mathcal{Q}$, then planes $\mathcal{P}$ and $\mathcal{Q}$
1) are parallel
2) contain line ℓ
3) are perpendicular
4) intersect, but are *not* perpendicular

227 In the diagram below of quadrilateral $ABCD$, E and F are points on $\overline{AB}$ and $\overline{CD}$, respectively, $\overline{BE} \cong \overline{DF}$, and $\overline{AE} \cong \overline{CF}$.
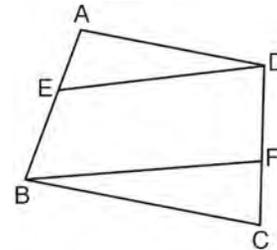
Which conclusion can be proven?
1) $\overline{ED} \cong \overline{FB}$
2) $\overline{AB} \cong \overline{CD}$
3) $\angle A \cong \angle C$
4) $\angle AED \cong \angle CFB$

228 In the diagram below of right triangle ABC, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$.
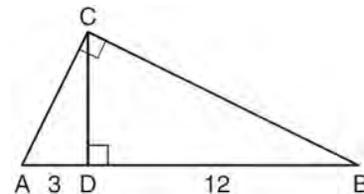
If $AD = 3$ and $DB = 12$, what is the length of altitude $\overline{CD}$?
1) 6
2) $6\sqrt{5}$
3) 3
4) $3\sqrt{5}$

229 Which diagram shows the construction of a 45° angle?

1)

2)

3)

4)
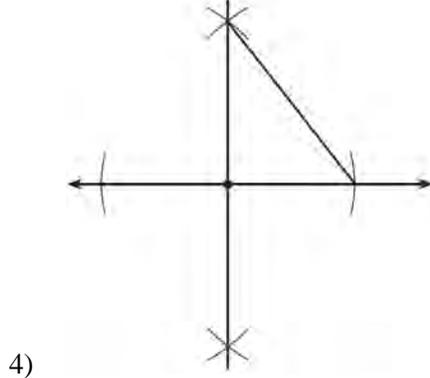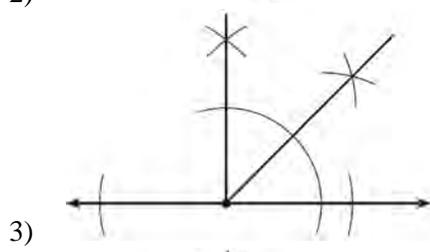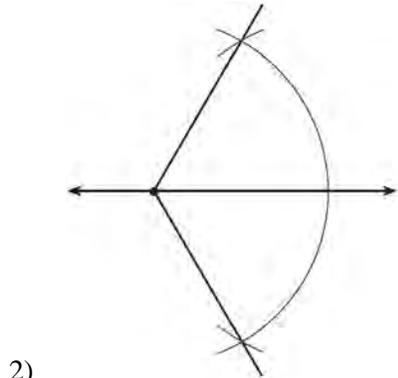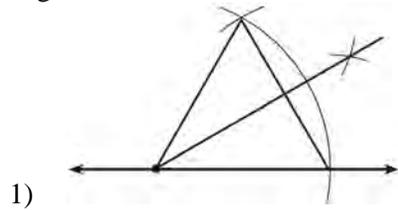
230 Which equation represents circle O shown in the graph below?
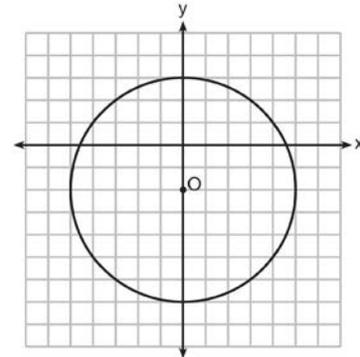
1) $x^2 + (y - 2)^2 = 10$
2) $x^2 + (y + 2)^2 = 10$
3) $x^2 + (y - 2)^2 = 25$
4) $x^2 + (y + 2)^2 = 25$

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

232 Which set of numbers could *not* represent the lengths of the sides of a right triangle?
1) $\{1, 3, \sqrt{10}\}$
2) $\{2, 3, 4\}$
3) $\{3, 4, 5\}$
4) $\{8, 15, 17\}$

233 Two prisms have equal heights and equal volumes. The base of one is a pentagon and the base of the other is a square. If the area of the pentagonal base is 36 square inches, how many inches are in the length of each side of the square base?
1) 6
2) 9
3) 24
4) 36

234 Chords $\overline{AB}$ and $\overline{CD}$ intersect at point E in a circle with center at O. If $AE = 8$, $AB = 20$, and $DE = 16$, what is the length of $\overline{CE}$?
1) 6
2) 9
3) 10
4) 12

235 In the diagram below, $\overline{AC}$ and $\overline{BC}$ are tangent to circle O at A and B, respectively, from external point C.
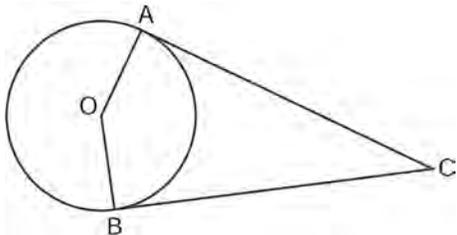
If m$\angle ACB = 38$, what is m$\angle AOB$?
1) 71
2) 104
3) 142
4) 161

236 As shown in the diagram below, a landscaper uses a cylindrical lawn roller on a lawn. The roller has a radius of 9 inches and a width of 42 inches.

To the *nearest square inch*, the area the roller covers in one complete rotation is
1) 2,374
2) 2,375
3) 10,682
4) 10,688

237 In the diagram of $\triangle ABC$ below, medians $\overline{AD}$ and $\overline{BE}$ intersect at point F.
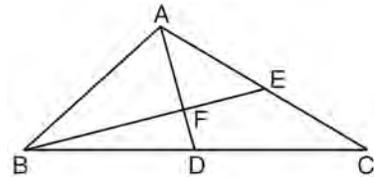
If $AF = 6$, what is the length of $\overline{FD}$?
1) 6
2) 2
3) 3
4) 9

45

238 How many points are 5 units from a line and also equidistant from two points on the line?
1) 1
2) 2
3) 3
4) 0

239 Lines m and n are in plane $\mathcal{A}$. What is the converse of the statement "If lines m and n are parallel, then lines m and n do not intersect"?
1) If lines m and n are not parallel, then lines m and n intersect.
2) If lines m and n are not parallel, then lines m and n do not intersect
3) If lines m and n intersect, then lines m and n are not parallel.
4) If lines m and n do not intersect, then lines m and n are parallel.

240 In the diagram of circle O below, chord $\overline{CD}$ is parallel to diameter $\overline{AOB}$ and $\text{m}\overset{\frown}{CD} = 110$.
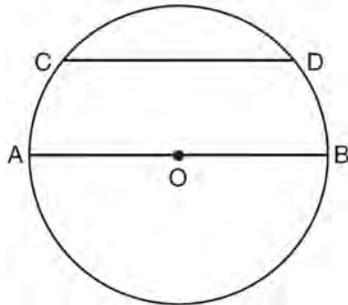
What is $\text{m}\overset{\frown}{DB}$?
1) 35
2) 55
3) 70
4) 110

241 A student wrote the following equations:
$$3y + 6 = 2x$$
$$2y - 3x = 6$$
The lines represented by these equations are
1) parallel
2) the same line
3) perpendicular
4) intersecting, but *not* perpendicular

242 In right triangle ABC shown in the diagram below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$, $CD = 12$, and $AD = 3$.
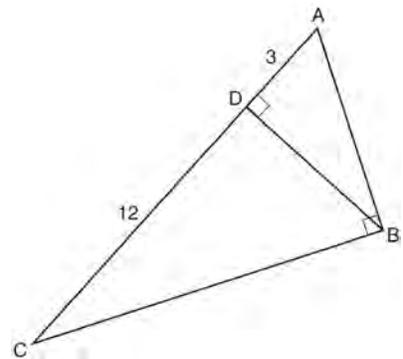
What is the length of $\overline{AB}$?
1) $5\sqrt{3}$
2) 6
3) $3\sqrt{5}$
4) 9

243 The coordinates of point P are $(7, 1)$. What are the coordinates of the image of P after $R_{90°}$ about the origin?
1) $(1, 7)$
2) $(-7, -1)$
3) $(1, -7)$
4) $(-1, 7)$

244 In the diagram below, $\overline{AC}$ and $\overline{AD}$ are tangent to circle B at points C and D, respectively, and $\overline{BC}$, $\overline{BD}$, and $\overline{BA}$ are drawn.
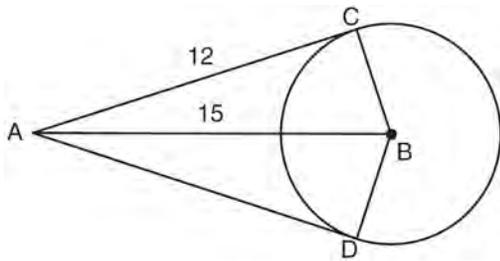
If $AC = 12$ and $AB = 15$, what is the length of $\overline{BD}$?
1) 5.5
2) 9
3) 12
4) 18

245 Which quadrilateral does *not* always have congruent diagonals?
1) isosceles trapezoid
2) rectangle
3) rhombus
4) square

246 What is an equation of the circle with center $(-5, 4)$ and a radius of 7?
1) $(x - 5)^2 + (y + 4)^2 = 14$
2) $(x - 5)^2 + (y + 4)^2 = 49$
3) $(x + 5)^2 + (y - 4)^2 = 14$
4) $(x + 5)^2 + (y - 4)^2 = 49$

247 Given the statement: One is a prime number. What is the negation and the truth value of the negation?
1) One is not a prime number; true
2) One is not a prime number; false
3) One is a composite number; true
4) One is a composite number; false

248 What is the equation of circle O shown in the diagram below?
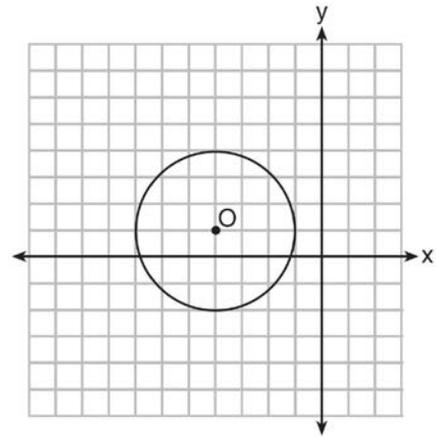
1) $(x + 4)^2 + (y - 1)^2 = 3$
2) $(x - 4)^2 + (y + 1)^2 = 3$
3) $(x + 4)^2 + (y - 1)^2 = 9$
4) $(x - 4)^2 + (y + 1)^2 = 9$

249 What is the measure of the largest exterior angle that any regular polygon can have?
1) 60°
2) 90°
3) 120°
4) 360°

250 Plane $\mathcal{A}$ and plane $\mathcal{B}$ are two distinct planes that are both perpendicular to line ℓ. Which statement about planes $\mathcal{A}$ and $\mathcal{B}$ is true?
1) Planes $\mathcal{A}$ and $\mathcal{B}$ have a common edge, which forms a line.
2) Planes $\mathcal{A}$ and $\mathcal{B}$ are perpendicular to each other.
3) Planes $\mathcal{A}$ and $\mathcal{B}$ intersect each other at exactly one point.
4) Planes $\mathcal{A}$ and $\mathcal{B}$ are parallel to each other.

251 If distinct planes $\mathcal{R}$ and $\mathcal{S}$ are both perpendicular to line ℓ, which statement must always be true?
1) Plane $\mathcal{R}$ is parallel to plane $\mathcal{S}$.
2) Plane $\mathcal{R}$ is perpendicular to plane $\mathcal{S}$.
3) Planes $\mathcal{R}$ and $\mathcal{S}$ and line ℓ are all parallel.
4) The intersection of planes $\mathcal{R}$ and $\mathcal{S}$ is perpendicular to line ℓ.

252 Which equation represents circle A shown in the diagram below?
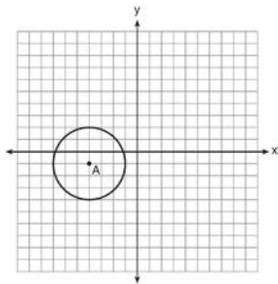
1) $(x-4)^2 + (y-1)^2 = 3$
2) $(x+4)^2 + (y+1)^2 = 3$
3) $(x-4)^2 + (y-1)^2 = 9$
4) $(x+4)^2 + (y+1)^2 = 9$

253 The bases of a right triangular prism are $\triangle ABC$ and $\triangle DEF$. Angles A and D are right angles, $AB = 6$, $AC = 8$, and $AD = 12$. What is the length of edge $\overline{BE}$?
1) 10
2) 12
3) 14
4) 16

254 In the diagram below of circle O, $\overline{PAC}$ and $\overline{PBD}$ are secants.
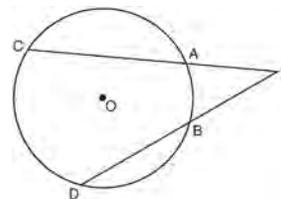
If $m\overarc{CD} = 70$ and $m\overarc{AB} = 20$, what is the degree measure of $\angle P$?
1) 25
2) 35
3) 45
4) 50

255 What is the difference between the sum of the measures of the interior angles of a regular pentagon and the sum of the measures of the exterior angles of a regular pentagon?
1) 36
2) 72
3) 108
4) 180

48

256 Consider the relationship between the two statements below.

$$\text{If } \sqrt{16+9} \neq 4+3, \text{ then } 5 \neq 4+3$$

$$\text{If } \sqrt{16+9} = 4+3, \text{ then } 5 = 4+3$$

These statements are
1) inverses
2) converses
3) contrapositives
4) biconditionals

257 As shown in the diagram below, a right pyramid has a square base, $ABCD$, and $\overline{EF}$ is the slant height.
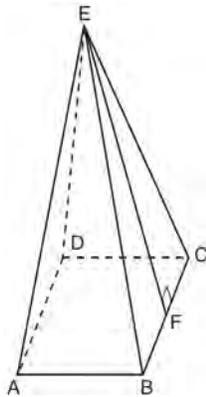
Which statement is *not* true?
1) $\overline{EA} \cong \overline{EC}$
2) $\overline{EB} \cong \overline{EF}$
3) $\triangle AEB \cong \triangle BEC$
4) $\triangle CED$ is isosceles

258 Lines p and q are intersected by line r, as shown below.
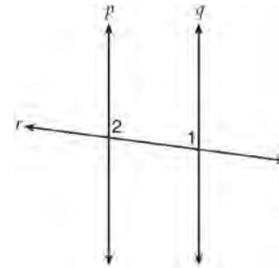
If $m\angle 1 = 7x - 36$ and $m\angle 2 = 5x + 12$, for which value of x would $p \parallel q$?
1) 17
2) 24
3) 83
4) 97

259 Transversal $\overleftrightarrow{EF}$ intersects $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$, as shown in the diagram below.
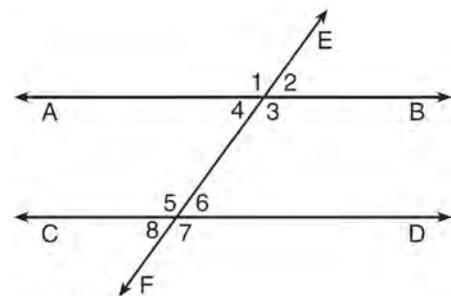
Which statement could always be used to prove $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$?
1) $\angle 2 \cong \angle 4$
2) $\angle 7 \cong \angle 8$
3) $\angle 3$ and $\angle 6$ are supplementary
4) $\angle 1$ and $\angle 5$ are supplementary

260 In the diagram of trapezoid $ABCD$ below, $\overline{AB} \parallel \overline{DC}$, $\overline{AD} \cong \overline{BC}$, $m\angle A = 4x + 20$, and $m\angle C = 3x - 15$.
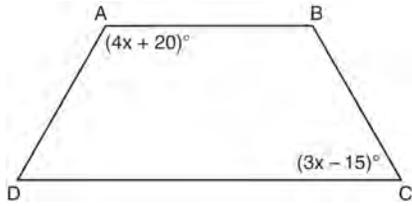
What is $m\angle D$?
1) 25
2) 35
3) 60
4) 90

261 In the diagram below, under which transformation is $\triangle A'B'C'$ the image of $\triangle ABC$?
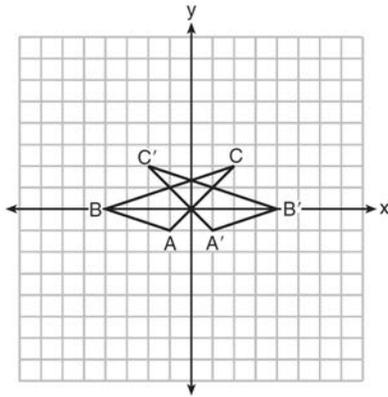
1) D_2
2) $r_{x\text{-axis}}$
3) $r_{y\text{-axis}}$
4) $(x, y) \rightarrow (x - 2, y)$

262 Which graph represents a circle whose equation is $x^2 + (y - 1)^2 = 9$?

1)

2)

3)

4)

50
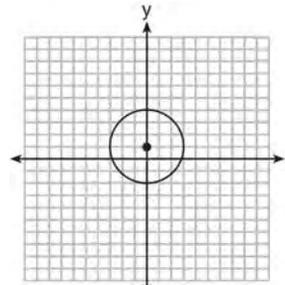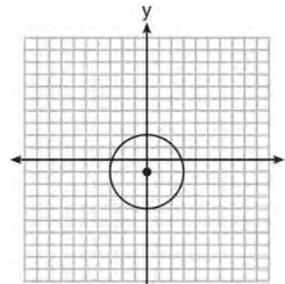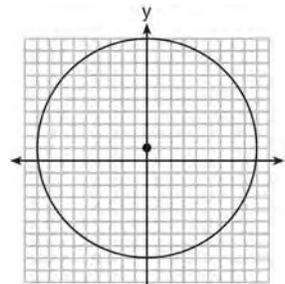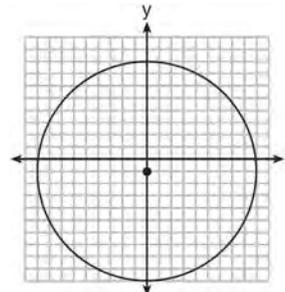
263 In $\triangle ABC$, $m\angle A = 3x + 1$, $m\angle B = 4x - 17$, and
$m\angle C = 5x - 20$. Which type of triangle is $\triangle ABC$?
1) right
2) scalene
3) isosceles
4) equilateral

264 For which measures of the sides of $\triangle ABC$ is angle
B the largest angle of the triangle?
1) $AB = 2$, $BC = 6$, $AC = 7$
2) $AB = 6$, $BC = 12$, $AC = 8$
3) $AB = 16$, $BC = 9$, $AC = 10$
4) $AB = 18$, $BC = 14$, $AC = 5$

265 In $\triangle ABC$, $m\angle A = 60$, $m\angle B = 80$, and $m\angle C = 40$.
Which inequality is true?
1) $AB > BC$
2) $AC > BC$
3) $AC < BA$
4) $BC < BA$

266 The midpoint of $\overline{AB}$ is $M(4, 2)$. If the coordinates
of A are $(6, -4)$, what are the coordinates of B?
1) $(1, -3)$
2) $(2, 8)$
3) $(5, -1)$
4) $(14, 0)$

267 The diagram below shows the construction of an
equilateral triangle.
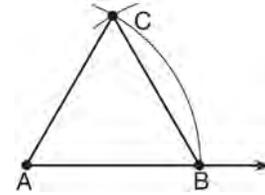
Which statement justifies this construction?
1) $\angle A + \angle B + \angle C = 180$
2) $m\angle A = m\angle B = m\angle C$
3) $AB = AC = BC$
4) $AB + BC > AC$

268 How many common tangent lines can be drawn to
the circles shown below?
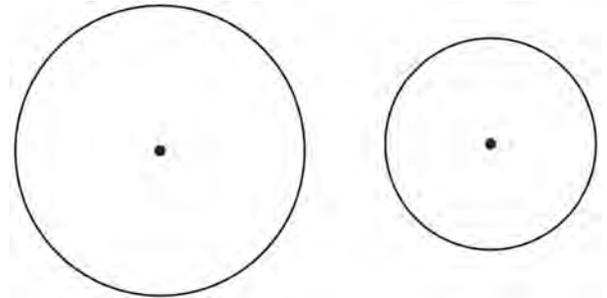
1) 1
2) 2
3) 3
4) 4

269 Which graph represents a circle whose equation is $x^2 + (y-2)^2 = 4$?

1)

2)

3)

4)
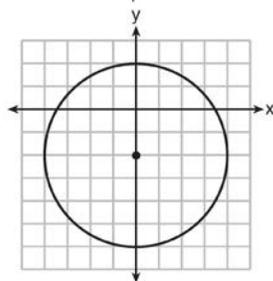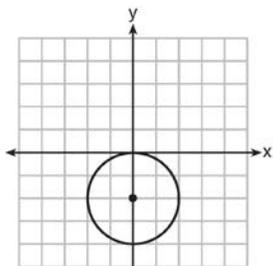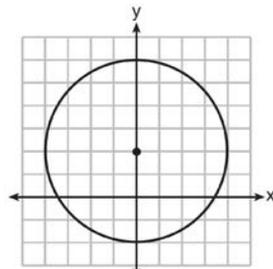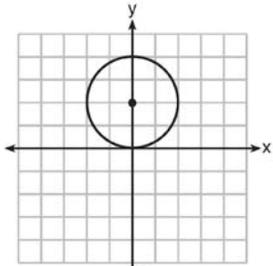
270 The volume of a sphere is approximately 44.6022 cubic centimeters. What is the radius of the sphere, to the *nearest tenth of a centimeter*?
1) 2.2
2) 3.3
3) 4.4
4) 4.7

271 In $\triangle ABC$ shown below, L is the midpoint of $\overline{BC}$, M is the midpoint of $\overline{AB}$, and N is the midpoint of $\overline{AC}$.
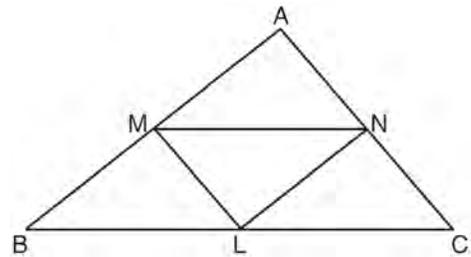
If $MN = 8$, $ML = 5$, and $NL = 6$, the perimeter of trapezoid $BMNC$ is
1) 35
2) 31
3) 28
4) 26

272 What are the coordinates of the center of a circle if the endpoints of its diameter are $A(8, -4)$ and $B(-3, 2)$?
1) $(2.5, 1)$
2) $(2.5, -1)$
3) $(5.5, -3)$
4) $(5.5, 3)$

273 What is the equation of the circle with its center at $(-1, 2)$ and that passes through the point $(1, 2)$?
1) $(x+1)^2 + (y-2)^2 = 4$
2) $(x-1)^2 + (y+2)^2 = 4$
3) $(x+1)^2 + (y-2)^2 = 2$
4) $(x-1)^2 + (y+2)^2 = 2$

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

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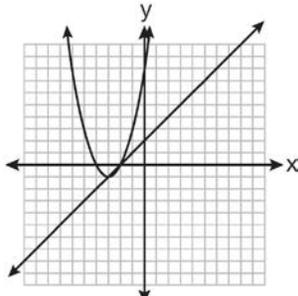
1)
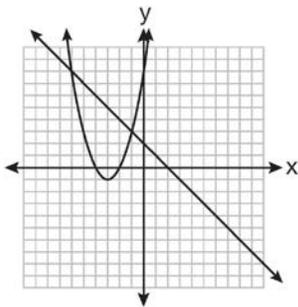
2)
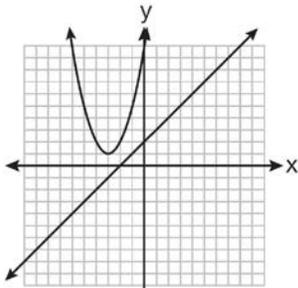
3)
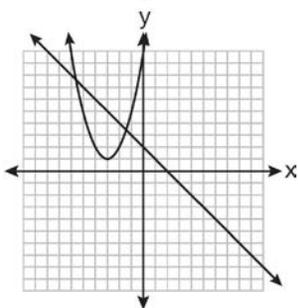
4)

275 In circle O shown in the diagram below, chords $\overline{AB}$ and $\overline{CD}$ are parallel.
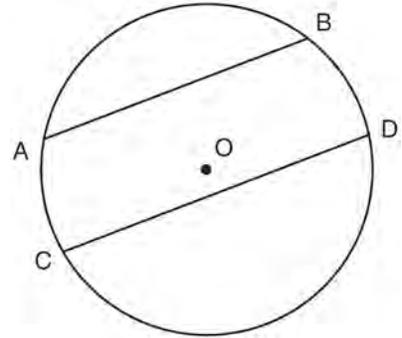
If $m\overset{\frown}{AB} = 104$ and $m\overset{\frown}{CD} = 168$, what is $m\overset{\frown}{BD}$?
1) 38
2) 44
3) 88
4) 96

276 In a park, two straight paths intersect. The city wants to install lampposts that are both equidistant from each path and also 15 feet from the intersection of the paths. How many lampposts are needed?
1) 1
2) 2
3) 3
4) 4

277 The equation of a circle is $(x - 2)^2 + (y + 5)^2 = 32$. What are the coordinates of the center of this circle and the length of its radius?
1) $(-2, 5)$ and 16
2) $(2, -5)$ and 16
3) $(-2, 5)$ and $4\sqrt{2}$
4) $(2, -5)$ and $4\sqrt{2}$

Geometry Multiple Choice Regents Exam Questions

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

279 In the diagram below of parallelogram $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$, m$\angle 1 = 45$ and m$\angle DCB = 120$.
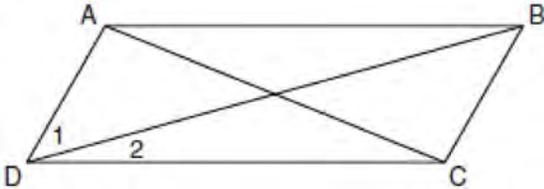
What is the measure of $\angle 2$?

1) 15°
2) 30°
3) 45°
4) 60°

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

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

281 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

282 In the diagram below of regular pentagon $ABCDE$, $\overline{EB}$ is drawn.
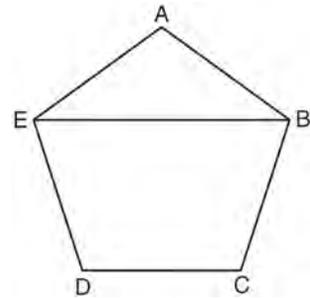
What is the measure of $\angle AEB$?

1) 36°
2) 54°
3) 72°
4) 108°

283 The lateral faces of a regular pyramid are composed of

1) squares
2) rectangles
3) congruent right triangles
4) congruent isosceles triangles

284 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 $\triangle ABC$.
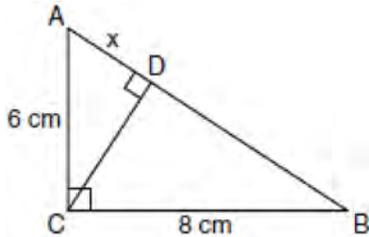
What is the length of $\overline{AD}$ to the *nearest tenth of a centimeter*?
1) 3.6
2) 6.0
3) 6.4
4) 4.0

285 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

286 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.

287 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 $2x$.
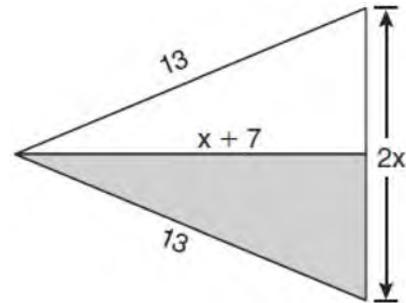
What is the length of the base?
1) 5
2) 10
3) 12
4) 24

288 In the diagram below of $\triangle ABC$, medians $\overline{AD}$, $\overline{BE}$, and $\overline{CF}$ intersect at G.
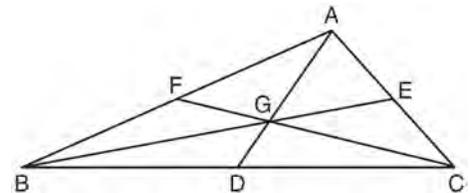
If $CF = 24$, what is the length of $\overline{FG}$?
1) 8
2) 10
3) 12
4) 16

289 Given $\triangle ABC$ with base $\overline{AFEDC}$, median $\overline{BF}$, altitude $\overline{BD}$, and $\overline{BE}$ bisects $\angle ABC$, which conclusion is valid?
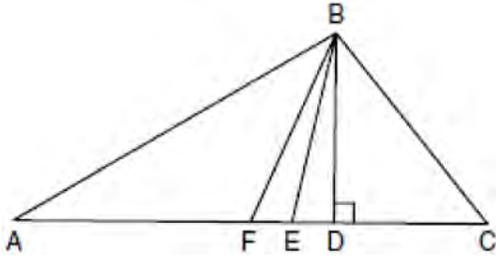
1) $\angle FAB \cong \angle ABF$
2) $\angle ABF \cong \angle CBD$
3) $\overline{CE} \cong \overline{EA}$
4) $\overline{CF} \cong \overline{FA}$

290 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 $\sqrt{13}$

291 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) $y = -2x - 9$

292 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.
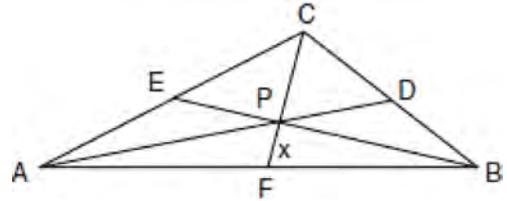
If $PF = x$, which equation can be used to find x?
1) $x + x = 6$
2) $2x + x = 6$
3) $3x + 2x = 6$
4) $x + \frac{2}{3}x = 6$

293 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) $(7, -4)$

294 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) $BC < AC < AB$

295 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.

296 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

297 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

298 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

299 Which expression best describes the transformation shown in the diagram below?
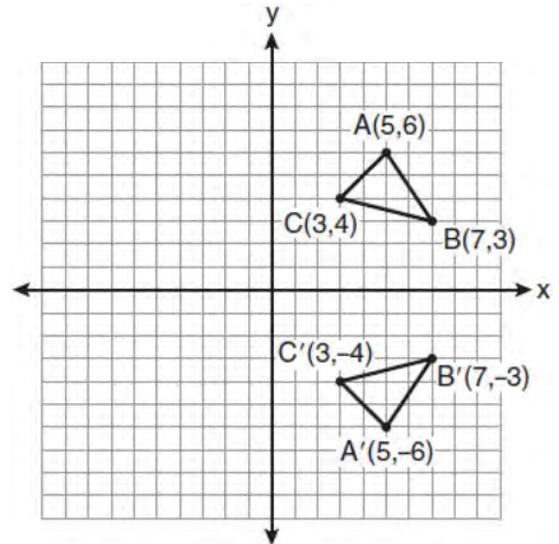
1) same orientation; reflection
2) opposite orientation; reflection
3) same orientation; translation
4) opposite orientation; translation

300 In the diagram below of $\triangle ACT$, $\overleftrightarrow{BE} \parallel \overline{AT}$.
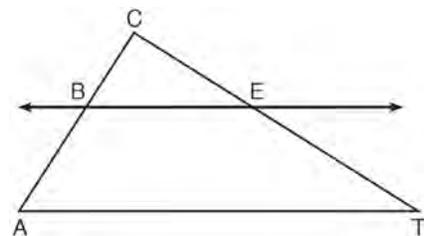
If $CB = 3$, $CA = 10$, and $CE = 6$, what is the length of $\overline{ET}$?
1) 5
2) 14
3) 20
4) 26

57

301 The equation of a circle is $(x-2)^2 + (y+4)^2 = 4$. Which diagram is the graph of the circle?
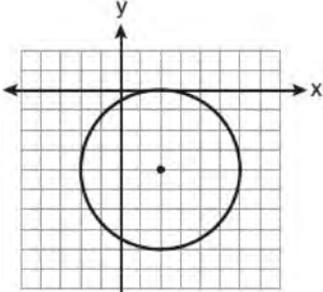
1)
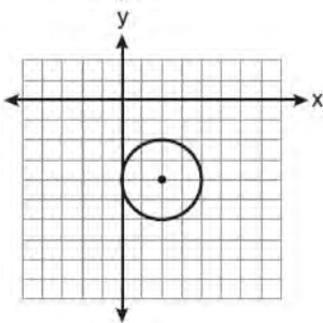
2)
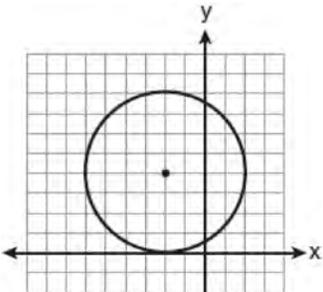
3)
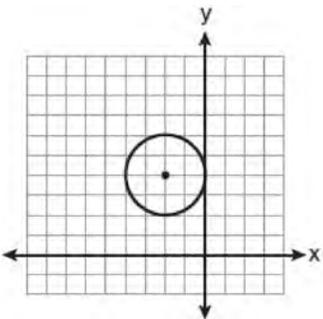
4)

302 The pentagon in the diagram below is formed by five rays.
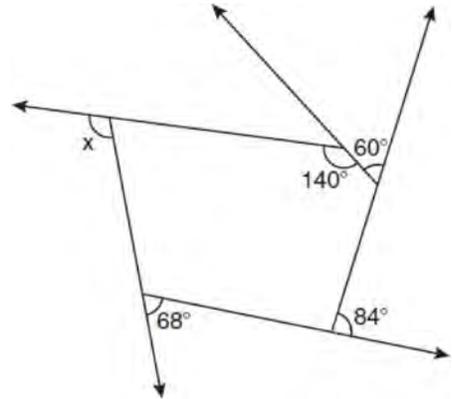
What is the degree measure of angle x?
1) 72
2) 96
3) 108
4) 112

303 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) $(1,-1)$

304 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.

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

306 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

307 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) $\{26, 8, 15\}$

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

309 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

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

311 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) $3y = -2x + 12$

312 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

313 Square *LMNO* is shown in the diagram below.
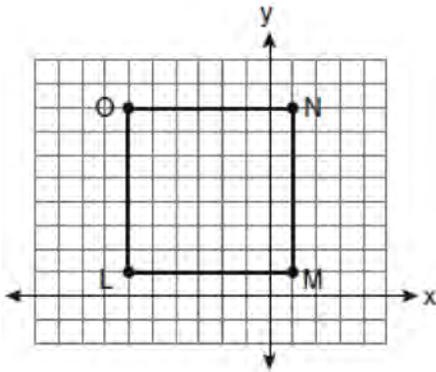
What are the coordinates of the midpoint of diagonal $\overline{LN}$?

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

314 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*.

315 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°

316 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) $m\angle P > m\angle R > m\angle Q$

317 In the diagram below of circle *O*, chords $\overline{AB}$ and $\overline{CD}$ intersect at *E*.
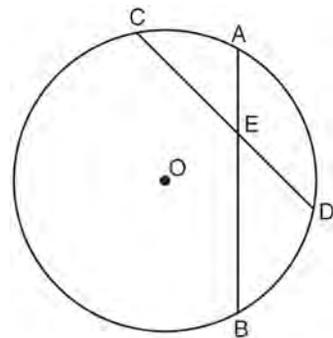
If $CE = 10$, $ED = 6$, and $AE = 4$, what is the length of $\overline{EB}$?
1) 15
2) 12
3) 6.7
4) 2.4

318 In the diagram below of circle O, chords $\overline{AD}$ and $\overline{BC}$ intersect at E.
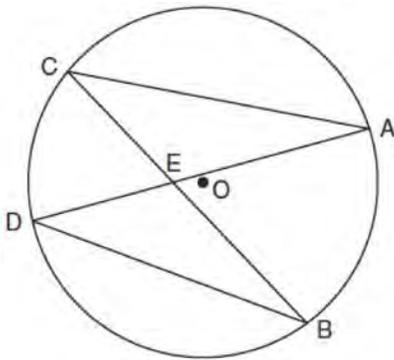
Which relationship must be true?
1) $\triangle CAE \cong \triangle DBE$
2) $\triangle AEC \sim \triangle BED$
3) $\angle ACB \cong \angle CBD$
4) $\overparen{CA} \cong \overparen{DB}$

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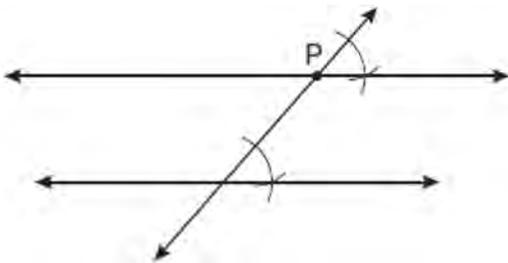
1) A line perpendicular to one of two parallel lines is perpendicular to the other.
2) Two lines are perpendicular if they intersect to form congruent adjacent angles.
3) When two lines are intersected by a transversal and alternate interior angles are congruent, the lines are parallel.
4) When two lines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

320 Given: $y = \dfrac{1}{4}x - 3$

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

In which quadrant will the graphs of the given equations intersect?
1) I
2) II
3) III
4) IV

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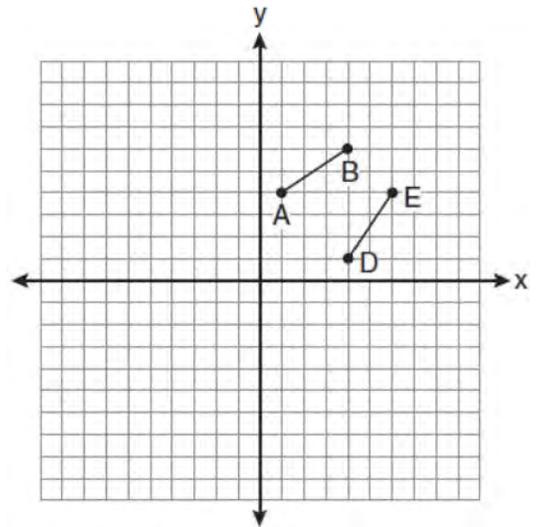
Which transformation will move $\overline{AB}$ onto $\overline{DE}$ such that point D is the image of point A and point E is the image of point B?
1) $T_{3,-3}$
2) $D_{\frac{1}{2}}$
3) $R_{90°}$
4) $r_{y=x}$

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

323 The rectangle *ABCD* shown in the diagram below will be reflected across the *x*-axis.
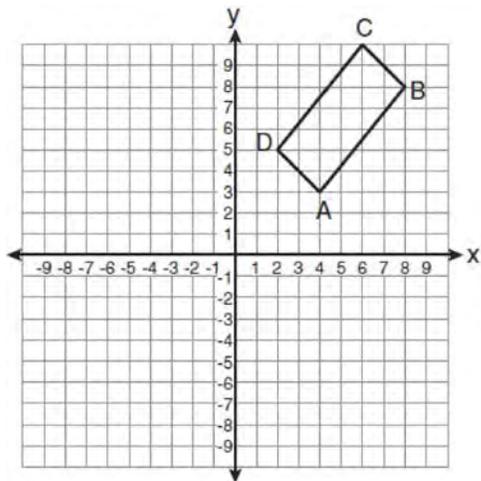
What will *not* be preserved?
1) slope of $\overline{AB}$
2) parallelism of $\overline{AB}$ and $\overline{CD}$
3) length of $\overline{AB}$
4) measure of $\angle A$

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

325 In the diagram below, under which transformation will $\triangle A'B'C'$ be the image of $\triangle ABC$?
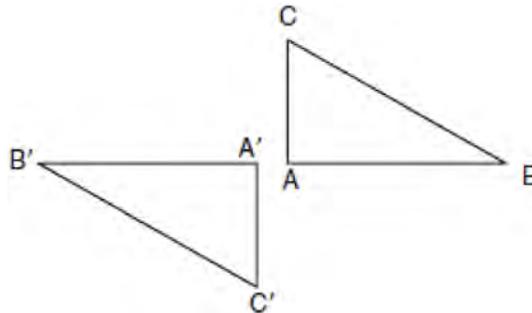
1) rotation
2) dilation
3) translation
4) glide reflection

326 How many common tangent lines can be drawn to the two externally tangent circles shown below?
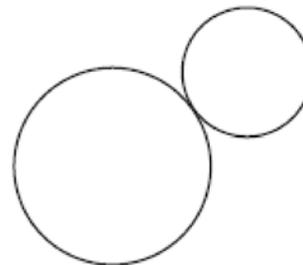
1) 1
2) 2
3) 3
4) 4

327 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

328 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

329 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 $\mathcal{P}$

330 In the diagram below of circle O, chords $\overline{AE}$ and $\overline{DC}$ intersect at point B, such that $m\overarc{AC} = 36$ and $m\overarc{DE} = 20$.
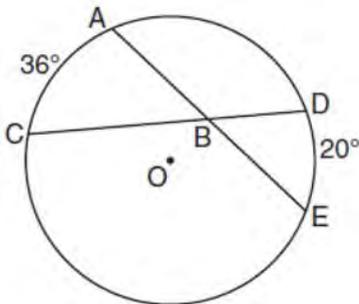
What is m∠ABC?
1) 56
2) 36
3) 28
4) 8

331 In the diagram below, circle A and circle B are shown.
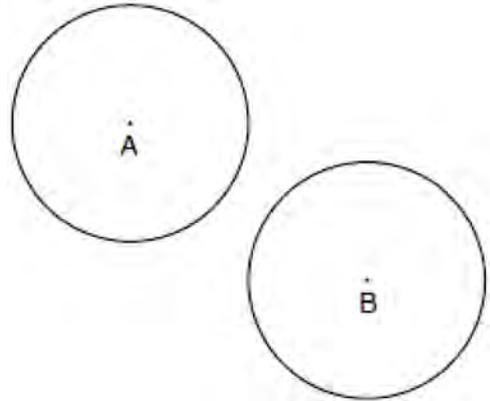
What is the total number of lines of tangency that are common to circle A and circle B?
1) 1
2) 2
3) 3
4) 4

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

333 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

334 Lines k_1 and k_2 intersect at point E. Line m is perpendicular to lines k_1 and k_2 at point E.
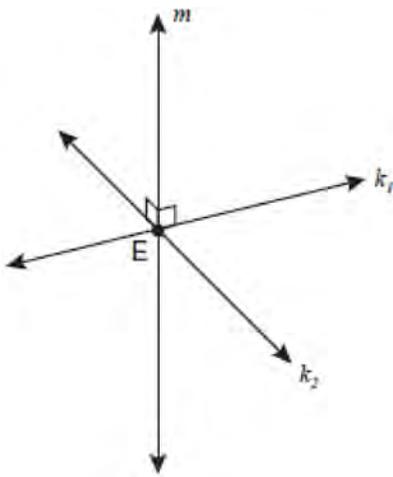
Which statement is always true?
1) Lines k_1 and k_2 are perpendicular.
2) Line m is parallel to the plane determined by lines k_1 and k_2.
3) Line m is perpendicular to the plane determined by lines k_1 and k_2.
4) Line m is coplanar with lines k_1 and k_2.

335 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) $y - 2x = 3$

336 In triangles ABC and DEF, $AB = 4$, $AC = 5$, $DE = 8$, $DF = 10$, and $\angle A \cong \angle D$. Which method could be used to prove $\triangle ABC \sim \triangle DEF$?
1) AA
2) SAS
3) SSS
4) ASA

337 In the diagram below of $\triangle ABC$, D is a point on $\overline{AB}$, $AC = 7$, $AD = 6$, and $BC = 18$.
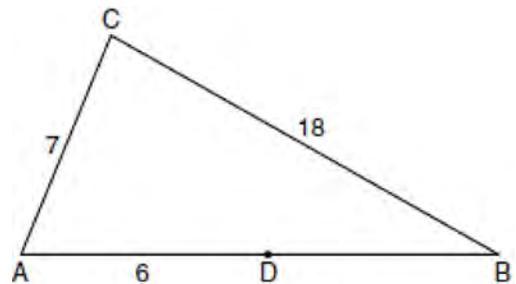
(Not drawn to scale)

The length of $\overline{DB}$ could be
1) 5
2) 12
3) 19
4) 25

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

8 inches

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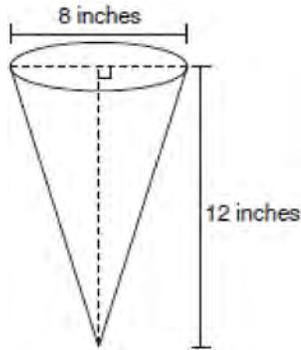
What is the volume of the cone to the *nearest cubic inch*?
1) 201
2) 481
3) 603
4) 804

339 Secants $\overline{JKL}$ and $\overline{JMN}$ are drawn to circle O from an external point, J. If $JK = 8$, $LK = 4$, and $JM = 6$, what is the length of $\overline{JN}$?
1) 16
2) 12
3) 10
4) 8

340 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 $(5, 0)$

341 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 $PR = x + 18$.

P

Q

R

O

S
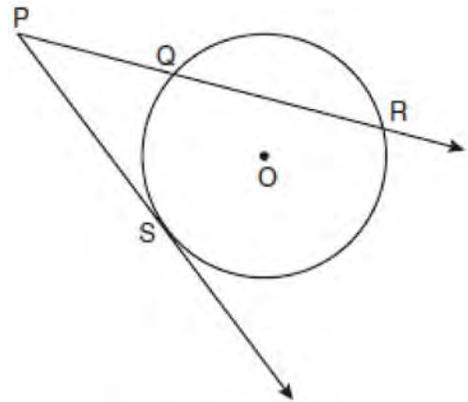
(Not drawn to scale)

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

342 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

343 Which diagram shows the construction of an equilateral triangle?
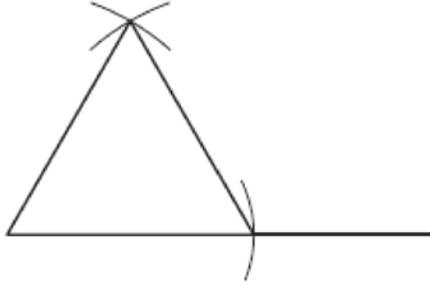
1)
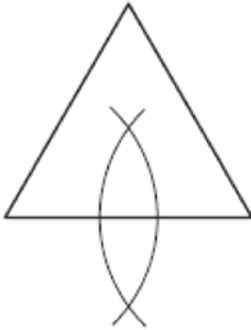
2)
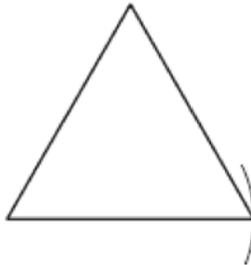
3)
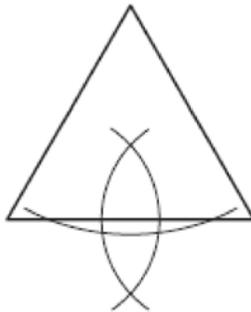
4)

344 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) $x^2 + 6x + 8$

345 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

346 In the diagram of trapezoid $ABCD$ below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E and $\triangle ABC \cong \triangle DCB$.
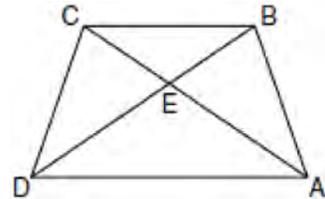
Which statement is true based on the given information?
1) $\overline{AC} \cong \overline{BC}$
2) $\overline{CD} \cong \overline{AD}$
3) $\angle CDE \cong \angle BAD$
4) $\angle CDB \cong \angle BAC$

347 In the diagram of $\triangle ABC$ and $\triangle DEF$ below, $\overline{AB} \cong \overline{DE}$, $\angle A \cong \angle D$, and $\angle B \cong \angle E$.
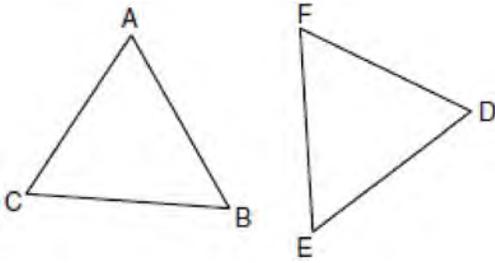
Which method can be used to prove $\triangle ABC \cong \triangle DEF$?

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

348 Which equation represents circle K shown in the graph below?
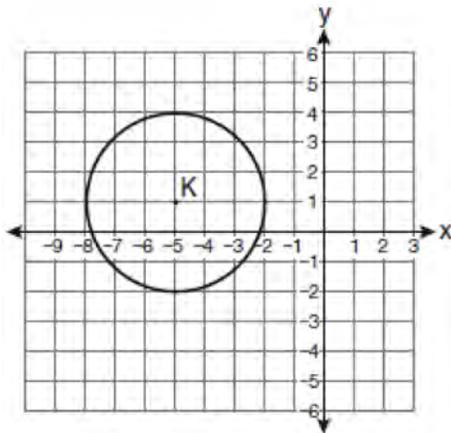
1) $(x+5)^2 + (y-1)^2 = 3$
2) $(x+5)^2 + (y-1)^2 = 9$
3) $(x-5)^2 + (y+1)^2 = 3$
4) $(x-5)^2 + (y+1)^2 = 9$

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

350 What is the slope of a line perpendicular to the line whose equation is $2y = -6x + 8$?

1) -3
2) $\dfrac{1}{6}$
3) $\dfrac{1}{3}$
4) -6

351 What is an equation for the circle shown in the graph below?
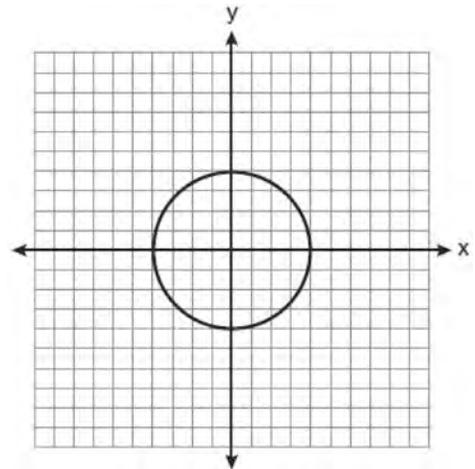
1) $x^2 + y^2 = 2$
2) $x^2 + y^2 = 4$
3) $x^2 + y^2 = 8$
4) $x^2 + y^2 = 16$

352 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.
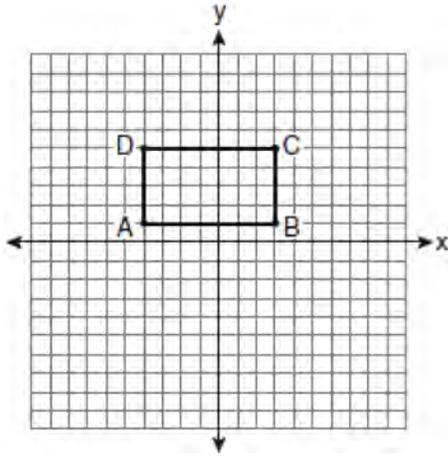
What will be the area of the rectangle after these transformations?
1) exactly 28 square units
2) less than 28 square units
3) greater than 28 square units
4) It cannot be determined from the information given.

353 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

354 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

355 In the diagram below of circle *C*, $m\widehat{QT} = 140$, and $m\angle P = 40$.
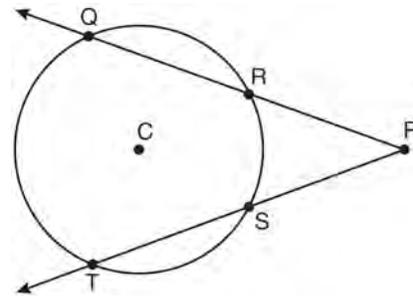
What is $m\widehat{RS}$?
1) 50
2) 60
3) 90
4) 110

356 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) $2y + 10x = 8$

357 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) $(4,3)$

358 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) $m\angle ABC = 60$

359 In the diagram below, line k is perpendicular to plane $\mathcal{P}$ at point T.
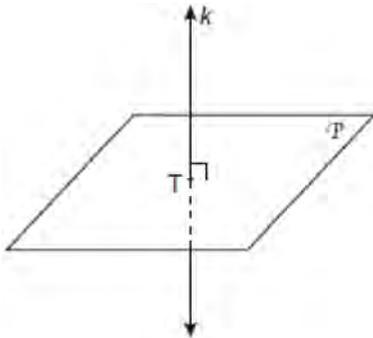
Which statement is true?
1) Any point in plane $\mathcal{P}$ also will be on line k.
2) Only one line in plane $\mathcal{P}$ will intersect line k.
3) All planes that intersect plane $\mathcal{P}$ will pass through T.
4) Any plane containing line k is perpendicular to plane $\mathcal{P}$.

360 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.
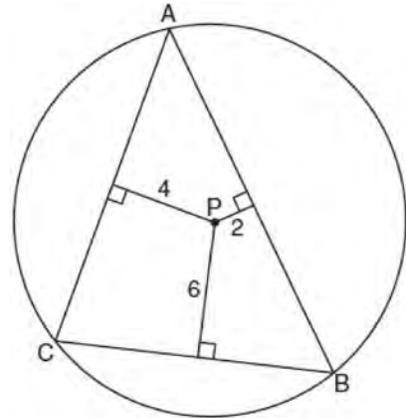
Which statement about the sides of the triangle is true?
1) $AB > AC > BC$
2) $AB < AC$ and $AC > BC$
3) $AC > AB > BC$
4) $AC = AB$ and $AB > BC$

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

69

362 In the diagram below, tangent $\overline{AB}$ and secant $\overline{ACD}$ are drawn to circle O from an external point A, $AB = 8$, and $AC = 4$.
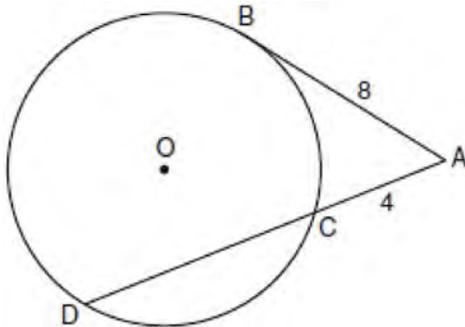
What is the length of $\overline{CD}$?
1) 16
2) 13
3) 12
4) 10

363 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.

364 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

365 The diagram below shows the construction of the center of the circle circumscribed about $\triangle ABC$.
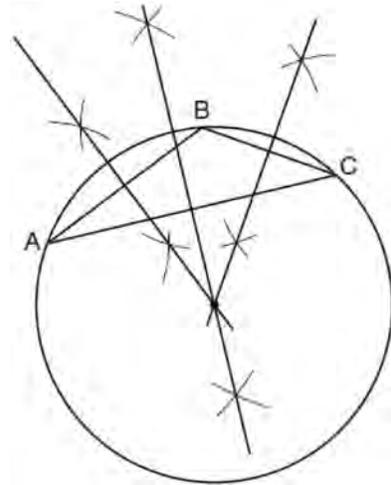
This construction represents how to find the intersection of
1) the angle bisectors of $\triangle ABC$
2) the medians to the sides of $\triangle ABC$
3) the altitudes to the sides of $\triangle ABC$
4) the perpendicular bisectors of the sides of $\triangle ABC$

366 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 $2:1$.

70

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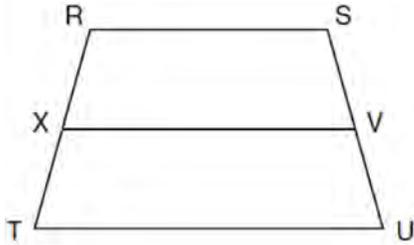
If $RS = 30$ and $XV = 44$, what is the length of $\overline{TU}$?
1)   37
2)   58
3)   74
4)   118

368   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 $\overline{BD}$

369   What is the slope of a line perpendicular to the line whose equation is $y = 3x + 4$?

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

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

3)   3
4) -3

370   Which expression represents the volume, in cubic centimeters, of the cylinder represented in the diagram below?
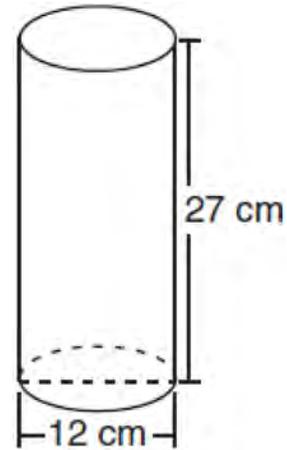
1) 162π
2) 324π
3) 972π
4) $3,888\pi$

371   In the diagram of $\triangle ABC$ below, $\overline{AB} \cong \overline{AC}$. The measure of $\angle B$ is $40°$.
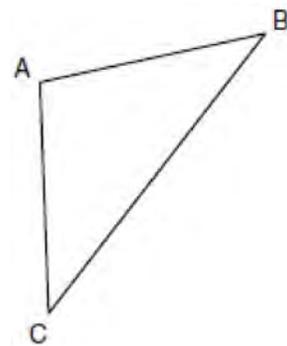
What is the measure of $\angle A$?
1)   40°
2)   50°
3)   70°
4)   100°

71

372 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) $m\angle RQT > m\angle PQR$

373 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.
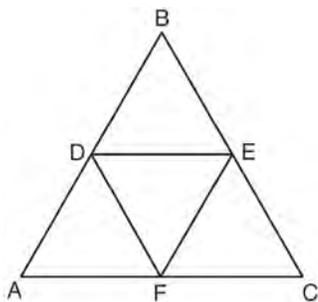
What is the length, in centimeters, of $\overline{EF}$?
1) 6
2) 12
3) 18
4) 4

374 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) $y = -\frac{1}{2}x - \frac{25}{2}$

375 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°

376 The diagram below shows the construction of the bisector of $\angle ABC$.
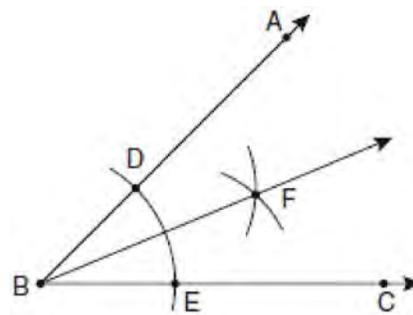
Which statement is *not* true?
1) $m\angle EBF = \frac{1}{2}m\angle ABC$
2) $m\angle DBF = \frac{1}{2}m\angle ABC$
3) $m\angle EBF = m\angle ABC$
4) $m\angle DBF = m\angle EBF$

377 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) $y = -2x + 17$

72

378 In the diagram below, $\triangle ABC$ is shown with $\overline{AC}$ extended through point D.
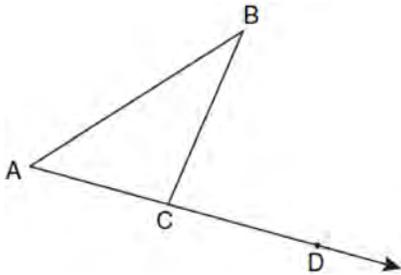
If $m\angle BCD = 6x + 2$, $m\angle BAC = 3x + 15$, and $m\angle ABC = 2x - 1$, what is the value of x?
1) 12
2) $14\frac{10}{11}$
3) 16
4) $18\frac{1}{9}$

379 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

380 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

381 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

382 In the diagram below, $\overline{SQ}$ and $\overline{PR}$ intersect at T, $\overline{PQ}$ is drawn, and $\overline{PS} \parallel \overline{QR}$.
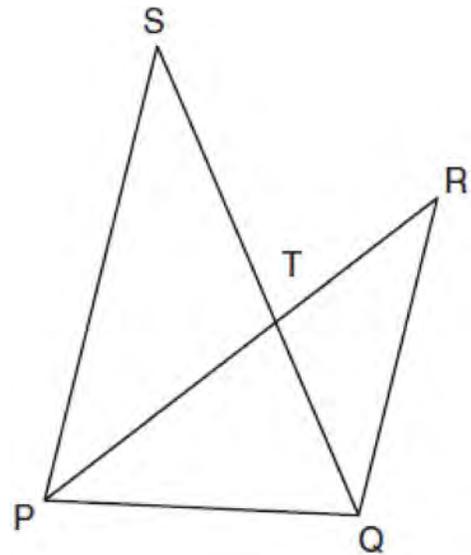
What technique can be used to prove that $\triangle PST \sim \triangle RQT$?
1) SAS
2) SSS
3) ASA
4) AA

73

383 The diagram below shows the construction of a line through point P perpendicular to line m.
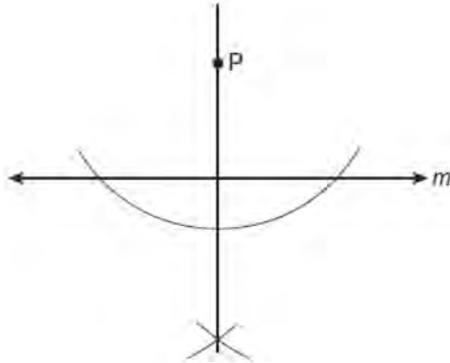
Which statement is demonstrated by this construction?
1) If a line is parallel to a line that is perpendicular to a third line, then the line is also perpendicular to the third line.
2) The set of points equidistant from the endpoints of a line segment is the perpendicular bisector of the segment.
3) 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.

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

385 In the diagram below of $\triangle ADB$, $m\angle BDA = 90$, $AD = 5\sqrt{2}$, and $AB = 2\sqrt{15}$.
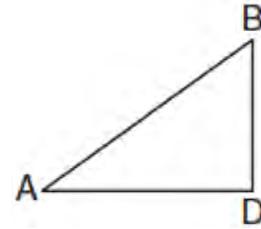
What is the length of $\overline{BD}$?
1) $\sqrt{10}$
2) $\sqrt{20}$
3) $\sqrt{50}$
4) $\sqrt{110}$

386 The diagram below illustrates the construction of $\overleftrightarrow{PS}$ parallel to $\overleftrightarrow{RQ}$ through point P.
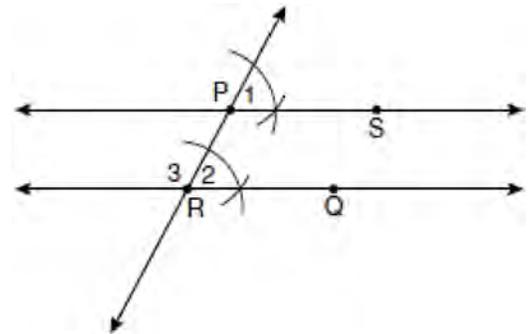
Which statement justifies this construction?
1) $m\angle 1 = m\angle 2$
2) $m\angle 1 = m\angle 3$
3) $\overline{PR} \cong \overline{RQ}$
4) $\overline{PS} \cong \overline{RQ}$

387 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

388 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) $r_{y=x}$

389 Which transformation can map the letter S onto itself?
1) glide reflection
2) translation
3) line reflection
4) rotation

390 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) $m\angle C < m\angle B$

391 In the diagram of circle O below, chord $\overline{CD}$ is parallel to diameter $\overline{AOB}$ and $m\widehat{AC} = 30$.
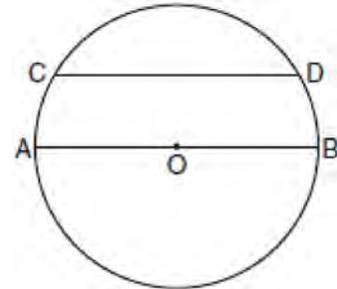
What is $m\widehat{CD}$?
1) 150
2) 120
3) 100
4) 60

392 In the diagram below, tangent $\overline{PA}$ and secant $\overline{PBC}$ are drawn to circle O from external point P.
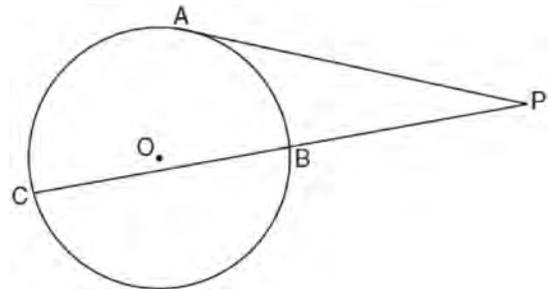
If $PB = 4$ and $BC = 5$, what is the length of $\overline{PA}$?
1) 20
2) 9
3) 8
4) 6

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

1)

2)

3)

4)
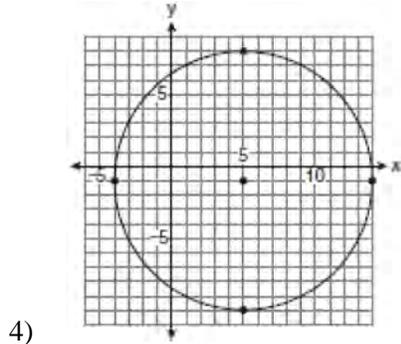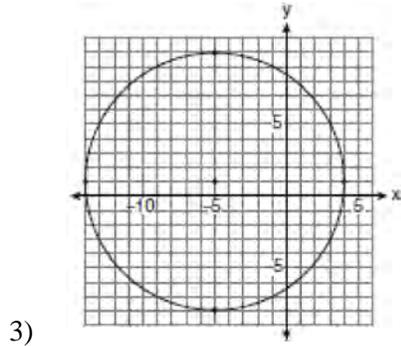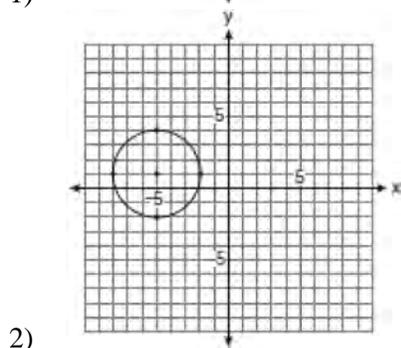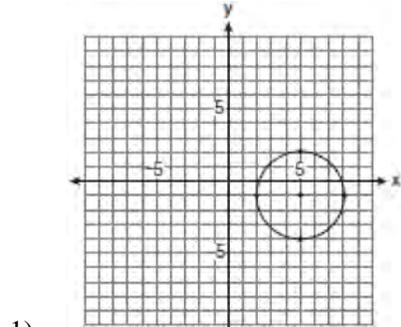
394 The figure in the diagram below is a triangular prism.
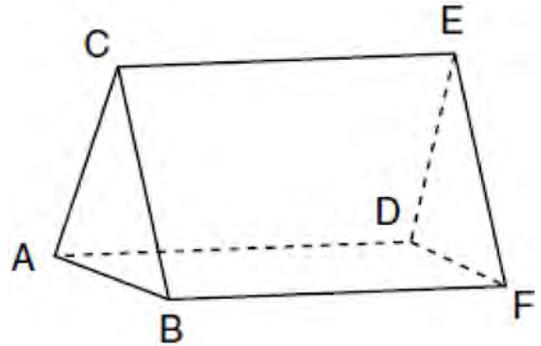
Which statement must be true?
1) $\overline{DE} \cong \overline{AB}$
2) $\overline{AD} \cong \overline{BC}$
3) $\overline{AD} \parallel \overline{CE}$
4) $\overline{DE} \parallel \overline{BC}$

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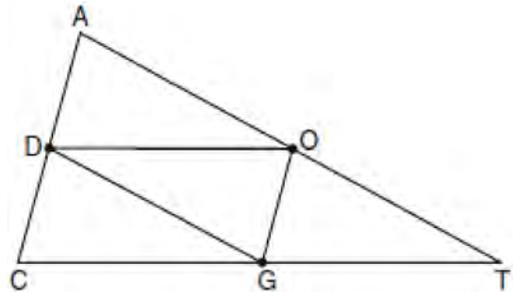
If $AC = 10$, $AT = 18$, and $CT = 22$, what is the perimeter of parallelogram $CDOG$?
1) 21
2) 25
3) 32
4) 40

396 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.

397 Based on the diagram below, which statement is true?
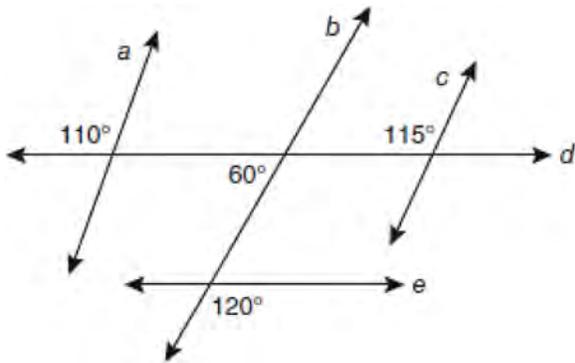
1) $a \parallel b$
2) $a \parallel c$
3) $b \parallel c$
4) $d \parallel e$

398 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°

399 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 $(3, 1)$

400 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) $\sqrt{145}$

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

402 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

403 In the diagram below of circle O, chords $\overline{AD}$ and $\overline{BC}$ intersect at E, $m\widehat{AC} = 87$, and $m\widehat{BD} = 35$.
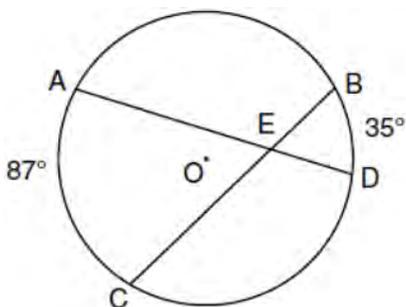
What is the degree measure of $\angle CEA$?
1) 87
2) 61
3) 43.5
4) 26

406 In the diagram below of circle O, chord $\overline{AB} \| $ chord $\overline{CD}$, and chord $\overline{CD} \| $ chord $\overline{EF}$.
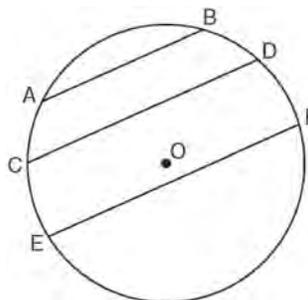
Which statement must be true?
1) $\widehat{CE} \cong \widehat{DF}$
2) $\widehat{AC} \cong \widehat{DF}$
3) $\widehat{AC} \cong \widehat{CE}$
4) $\widehat{EF} \cong \widehat{CD}$

404 A support beam between the floor and ceiling of a house forms a 90° 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) 45°
2) 60°
3) 90°
4) 180°

407 In the diagram below of $\triangle AGE$ and $\triangle OLD$, $\angle GAE \cong \angle LOD$, and $\overline{AE} \cong \overline{OD}$.
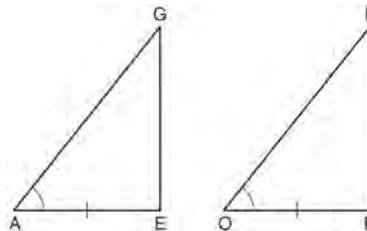
To prove that $\triangle AGE$ and $\triangle OLD$ are congruent by SAS, what other information is needed?
1) $\overline{GE} \cong \overline{LD}$
2) $\overline{AG} \cong \overline{OL}$
3) $\angle AGE \cong \angle OLD$
4) $\angle AEG \cong \angle ODL$

405 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 = $\sqrt{C}$

408 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

409 Based on the construction below, which statement must be true?
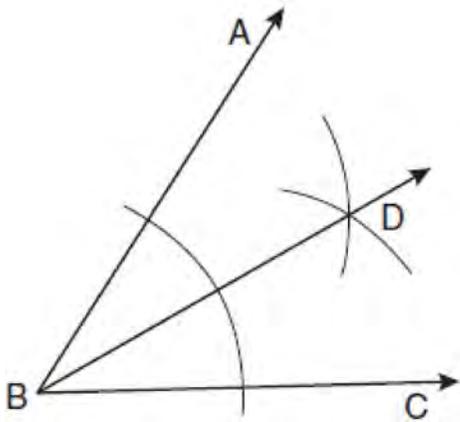
1) $m\angle ABD = \frac{1}{2} m\angle CBD$
2) $m\angle ABD = m\angle CBD$
3) $m\angle ABD = m\angle ABC$
4) $m\angle CBD = \frac{1}{2} m\angle ABD$

410 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) $(4x+4, 2y)$

411 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.
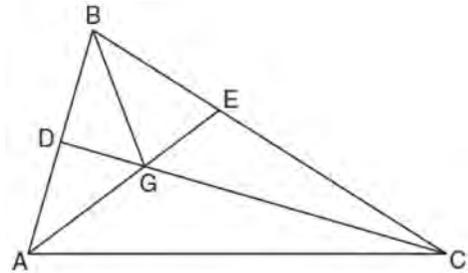
Which statement must be true?
1) $DG = EG$
2) $AG = BG$
3) $\angle AEB \cong \angle AEC$
4) $\angle DBG \cong \angle EBG$

412 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) $2\sqrt{5}$

413 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

79

414 In the diagram below of parallelogram $STUV$, $SV = x + 3$, $VU = 2x - 1$, and $TU = 4x - 3$.
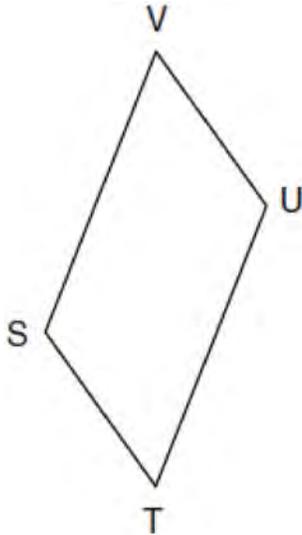
What is the length of $\overline{SV}$?
1) 5
2) 2
3) 7
4) 4

415 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.

416 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

417 In the diagram of circle O below, chords $\overline{AB}$ and $\overline{CD}$ are parallel, and $\overline{BD}$ is a diameter of the circle.
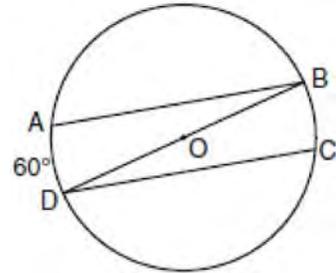
If $m\widehat{AD} = 60$, what is $m\angle CDB$?
1) 20
2) 30
3) 60
4) 120

418 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 $DB = 6$.
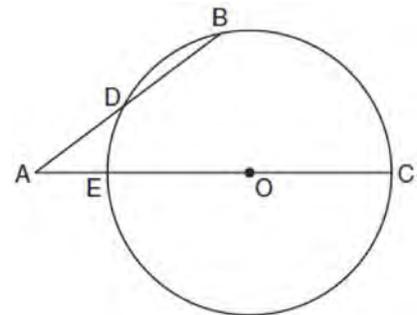
(Not drawn to scale)

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

419 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

420 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.

421 The diagram below shows a right pentagonal prism.
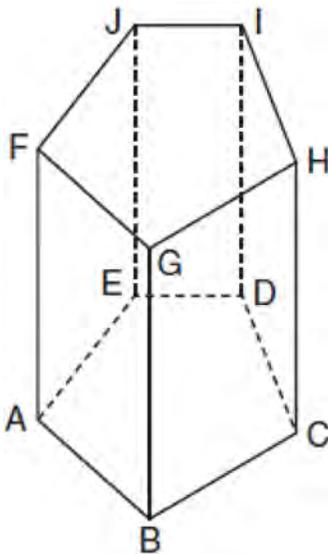
Which statement is always true?
1) $\overline{BC} \parallel \overline{ED}$
2) $\overline{FG} \parallel \overline{CD}$
3) $\overline{FJ} \parallel \overline{IH}$
4) $\overline{GB} \parallel \overline{HC}$

422 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 $EB = 4$.
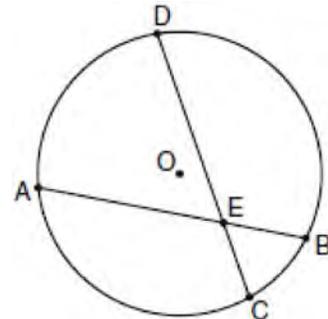
What is the value of x?
1) 1
2) 3.6
3) 5
4) 10.25

423 In the diagram below, which transformation was used to map $\triangle ABC$ to $\triangle A'B'C'$?
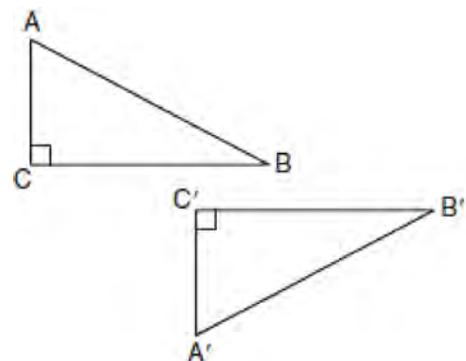
1) dilation
2) rotation
3) reflection
4) glide reflection

81

424 Which geometric principle is used in the construction shown below?
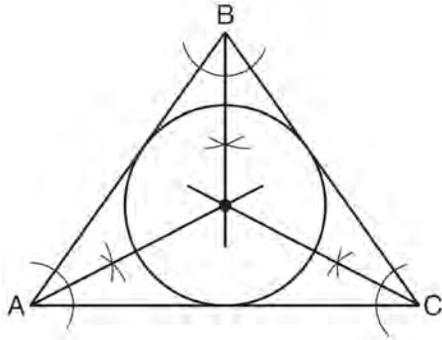
1) The intersection of the angle bisectors of a triangle is the center of the inscribed circle.
2) The intersection of the angle bisectors of a triangle is the center of the circumscribed circle.
3) The intersection of the perpendicular bisectors of the sides of a triangle is the center of the inscribed circle.
4) The intersection of the perpendicular bisectors of the sides of a triangle is the center of the circumscribed circle.

425 What is the perimeter of a rhombus whose diagonals are 16 and 30?
1) 92
2) 68
3) 60
4) 17

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

427 The diagram below shows the construction of the perpendicular bisector of $\overline{AB}$.
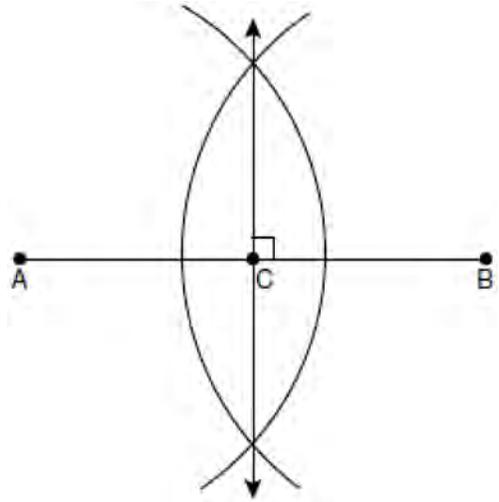
Which statement is *not* true?
1) $AC = CB$
2) $CB = \frac{1}{2}AB$
3) $AC = 2AB$
4) $AC + CB = AB$

428 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) $\angle C, \angle A, \angle B$

429 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.
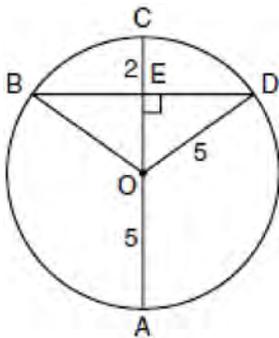
What is the length of $\overline{BD}$?
1) 12
2) 10
3) 8
4) 4

430 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 $B''(22, -4)$

431 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) $(2, -4)$

432 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.

433 $\triangle ABC$ 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) $\dfrac{m\angle A}{m\angle D}$
2) $\dfrac{m\angle B}{m\angle F}$
3) $\dfrac{\text{area of } \triangle ABC}{\text{area of } \triangle DEF}$
4) $\dfrac{\text{perimeter of } \triangle ABC}{\text{perimeter of } \triangle DEF}$

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

435 In the diagram below, $\triangle ABC \cong \triangle XYZ$.
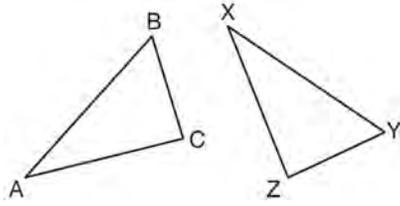
Which two statements identify corresponding congruent parts for these triangles?

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 $\angle A \cong \angle X$

436 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 $\angle RPT \cong \angle RSQ$.
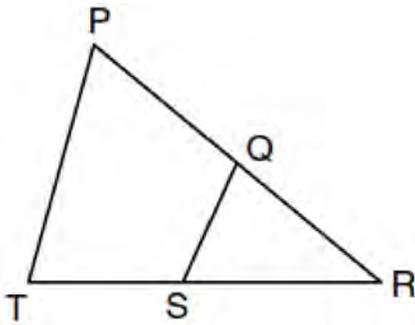
Which reason justifies the conclusion that $\triangle PRT \sim \triangle SRQ$?

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

437 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)
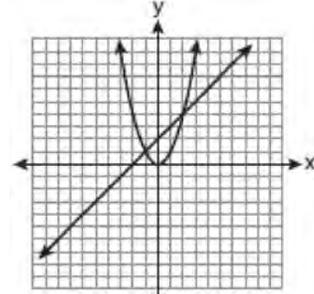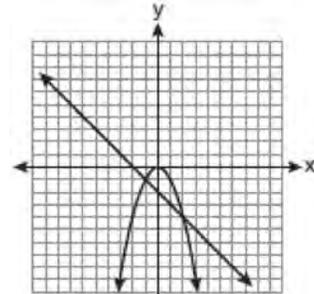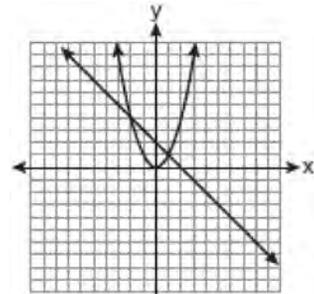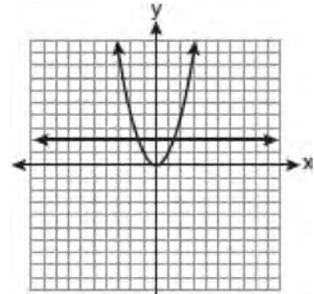
438 What is the slope of a line that is perpendicular to the line whose equation is $3x + 4y = 12$?

1) $\dfrac{3}{4}$

2) $-\dfrac{3}{4}$

3) $\dfrac{4}{3}$

4) $-\dfrac{4}{3}$

439 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

440 In the diagram below of right triangle ACB, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$.
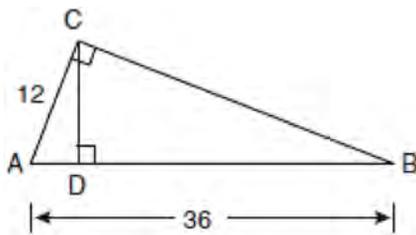
If $AB = 36$ and $AC = 12$, what is the length of $\overline{AD}$?
1) 32
2) 6
3) 3
4) 4

441 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.
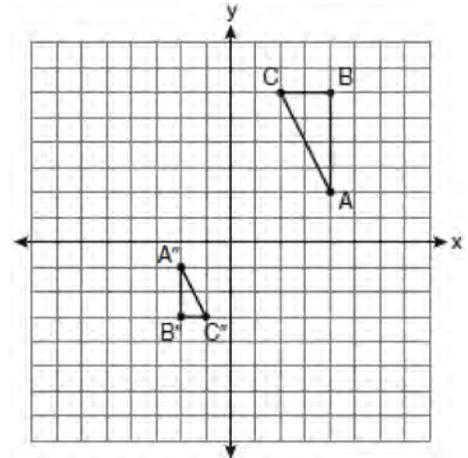
Which composition of transformations was used?
1) $R_{180°} \circ D_2$
2) $R_{90°} \circ D_2$
3) $D_{\frac{1}{2}} \circ R_{180°}$
4) $D_{\frac{1}{2}} \circ R_{90°}$

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

85

443 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.

444 Which illustration shows the correct construction of an angle bisector?

1)

2)

3)

4)
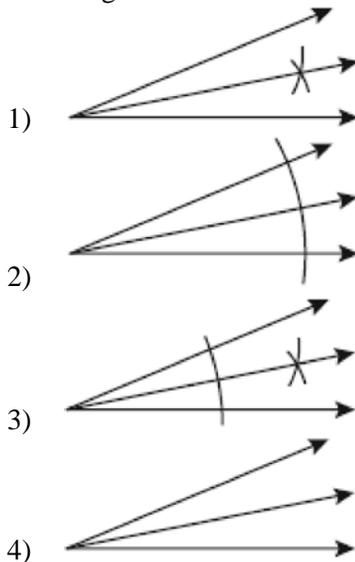
445 Which transformation of the line $x = 3$ results in an image that is perpendicular to the given line?
1) $r_{x\text{-axis}}$
2) $r_{y\text{-axis}}$
3) $r_{y = x}$
4) $r_{x = 1}$

446 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

447 In the diagram of $\triangle ABC$ and $\triangle EDC$ below, $\overline{AE}$ and $\overline{BD}$ intersect at C, and $\angle CAB \cong \angle CED$.
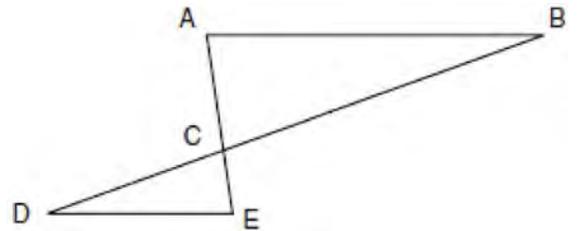
Which method can be used to show that $\triangle ABC$ must be similar to $\triangle EDC$?
1) SAS
2) AA
3) SSS
4) HL

448 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

Geometry 2 Point Regents Exam Questions

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

450 Using a compass and straightedge, construct a line perpendicular to $\overline{AB}$ through point P. [Leave all construction marks.]
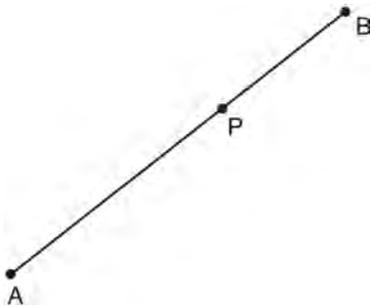
451 The coordinates of two vertices of square $ABCD$ are $A(2,1)$ and $B(4,4)$. Determine the slope of side $\overline{BC}$.

452 The endpoints of $\overline{AB}$ are $A(3,-4)$ and $B(7,2)$.

Determine and state the length of $\overline{AB}$ in simplest radical form.

453 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.

454 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 $m\angle C$.
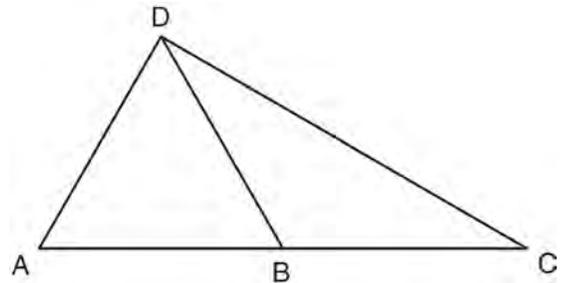
455 The cylindrical tank shown in the diagram below is to be painted. The tank is open at the top, and the bottom does *not* need to be painted. Only the outside needs to be painted. Each can of paint covers 600 square feet. How many cans of paint must be purchased to complete the job?
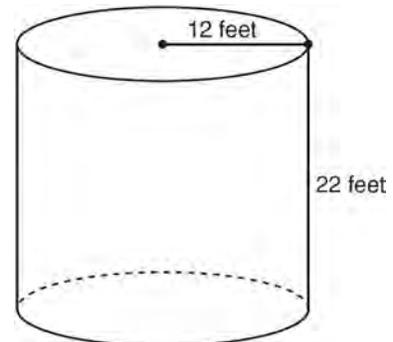
456 The diagram below shows isosceles trapezoid $ABCD$ with $\overline{AB} \parallel \overline{DC}$ and $\overline{AD} \cong \overline{BC}$. If $m\angle BAD = 2x$ and $m\angle BCD = 3x + 5$, find $m\angle BAD$.
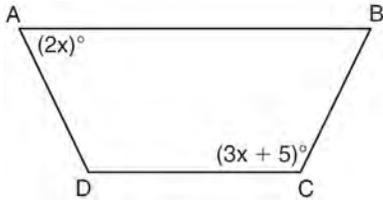
457 Write an equation of the line that is the perpendicular bisector of the line segment having endpoints $(3, -1)$ and $(3, 5)$. [The use of the grid below is optional]
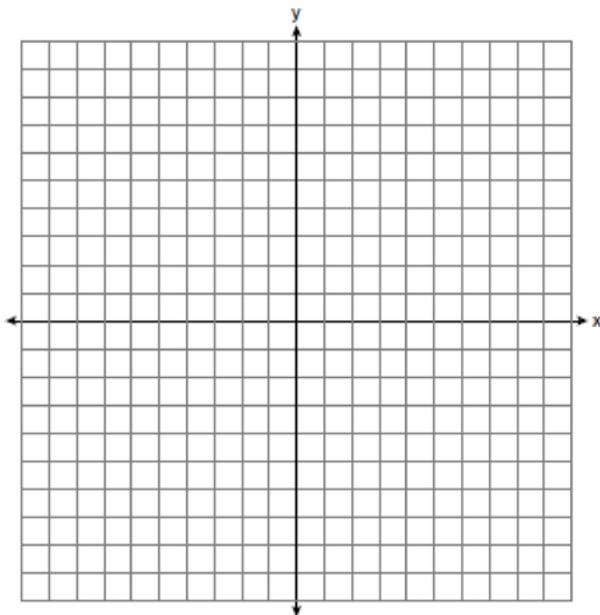
458 Find, in degrees, the measures of both an interior angle and an exterior angle of a regular pentagon.

459 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 $\overline{TD}$.
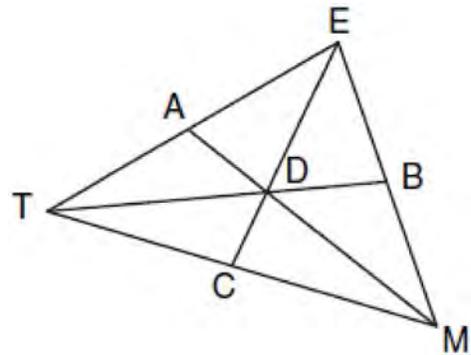
460 Write an equation of the circle graphed in the diagram below.
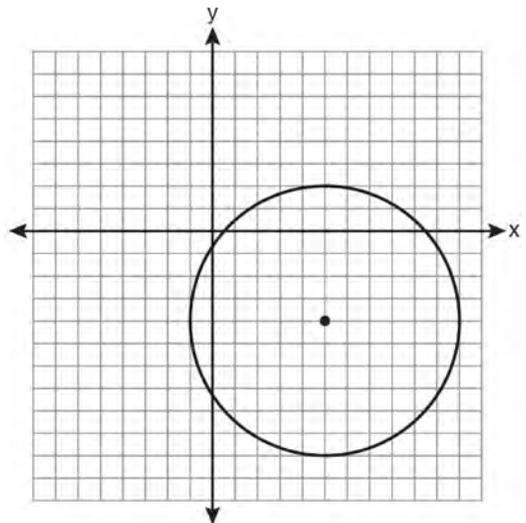
461 In circle O, diameter $\overline{RS}$ has endpoints $R(3a, 2b - 1)$ and $S(a - 6, 4b + 5)$. Find the coordinates of point O, in terms of a and b. Express your answer in simplest form.

462 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.

464 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 $\triangle ABC$.

463 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 $r_{x\text{-axis}}$. [The use of the grid is optional.]
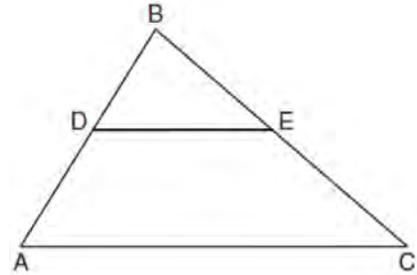
465 Two lines, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CRD}$, are parallel and 10 inches apart. Sketch the locus of all points that are equidistant from $\overleftrightarrow{AB}$ and $\overleftrightarrow{CRD}$ and 7 inches from point R. Label with an **X** each point that satisfies both conditions.
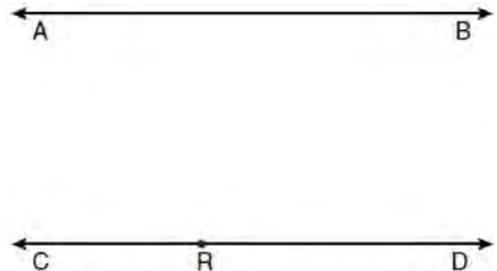
466 The base of a pyramid is a rectangle with a width of 6 cm and a length of 8 cm. Find, in centimeters, the height of the pyramid if the volume is 288 cm^3.

467 In the diagram of △*ABC* below, *AB* = 10, *BC* = 14, and *AC* = 16. Find the perimeter of the triangle formed by connecting the midpoints of the sides of △*ABC*.
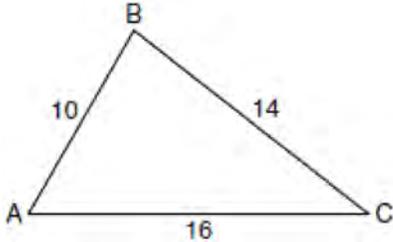
468 The endpoints of $\overline{PQ}$ are $P(-3, 1)$ and $Q(4, 25)$. Find the length of $\overline{PQ}$.

469 In the diagram below of △*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 $\overline{EB}$.
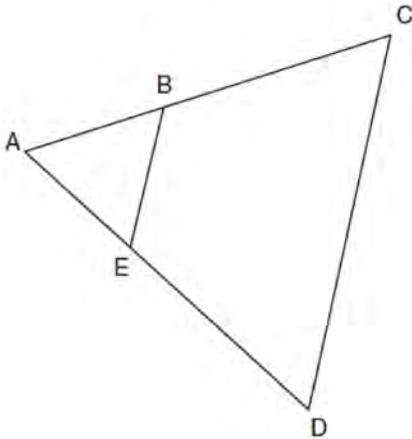
470 Triangle *TAP* has coordinates $T(-1, 4)$, $A(2, 4)$, and $P(2, 0)$. On the set of axes below, graph and label △*T′A′P′*, the image of △*TAP* after the translation $(x, y) \rightarrow (x - 5, y - 1)$.
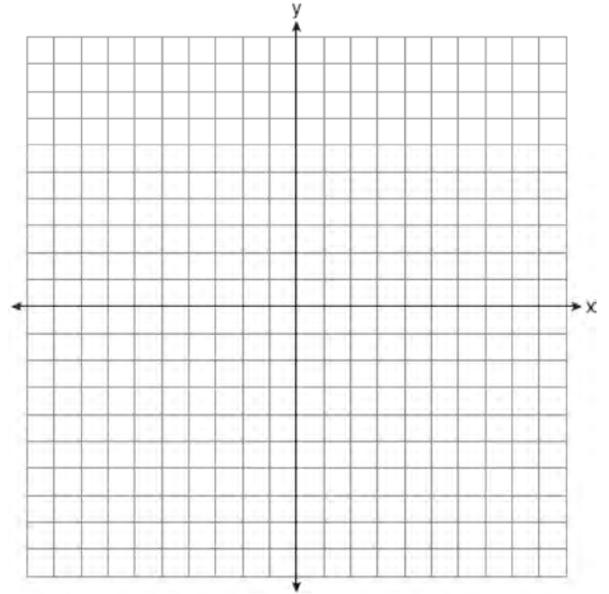
471 In the diagram below of circle *O*, diameter $\overline{AB}$ is perpendicular to chord $\overline{CD}$ at *E*. If *AO* = 10 and *BE* = 4, find the length of $\overline{CE}$.

90
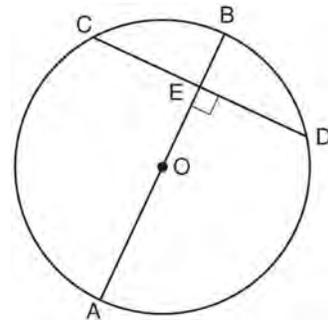
472 In the diagram below, trapezoid *ABCD*, with bases $\overline{AB}$ and $\overline{DC}$, is inscribed in circle *O*, with diameter $\overline{DC}$. If m$\widehat{AB}$=80, find m$\widehat{BC}$.
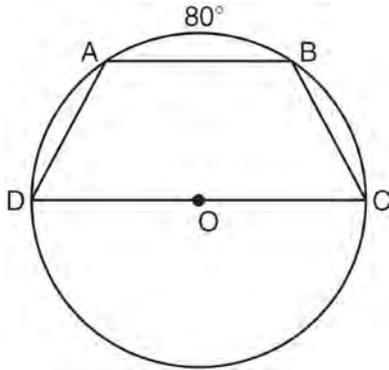
473 On the ray drawn below, using a compass and straightedge, construct an equilateral triangle with a vertex at *R*. The length of a side of the triangle must be equal to a length of the diagonal of rectangle *ABCD*.

474 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.

475 In the diagram below of Δ*HQP*, side $\overline{HP}$ is extended through *P* to *T*, m∠*QPT* = 6*x* + 20, m∠*HQP* = *x* + 40, and m∠*PHQ* = 4*x* − 5. Find m∠*QPT*.

(Not drawn to scale)

91
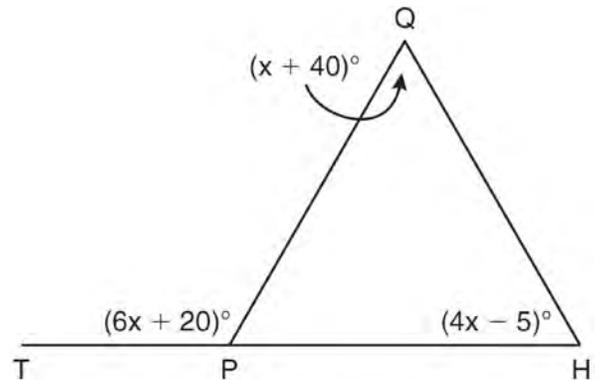
476 Triangle *ABC* has vertices *A*(6, 6), *B*(9, 0), and
C(3, −3). State and label the coordinates of
△*A'B'C'*, the image of △*ABC* after a dilation of
$D_{\frac{1}{3}}$.

477 Write the negation of the statement "2 is a prime
number," and determine the truth value of the
negation.

478 In the diagram below, $\ell \parallel m$ and $\overline{QR} \perp \overline{ST}$ at *R*.
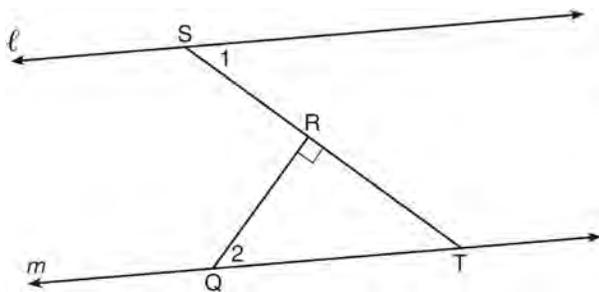
If m∠1 = 63, find m∠2.

479 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.
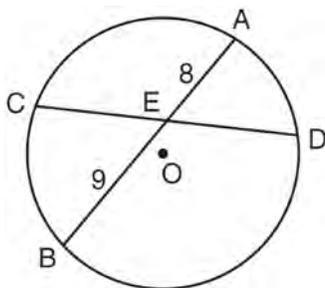
480 On the diagram of △*ABC* shown below, use a
compass and straightedge to construct the
perpendicular bisector of $\overline{AC}$. [Leave all
construction marks.]
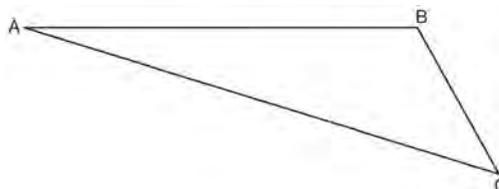
481 A pentagon is drawn on the set of axes below. If
the pentagon is reflected over the *y*-axis, determine
if this transformation is an isometry. Justify your
answer. [The use of the set of axes is optional.]
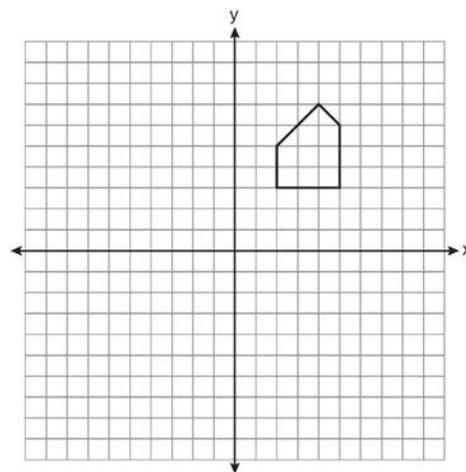
482 A tree, *T*, is 6 meters from a row of corn, *c*, as represented in the diagram below. A farmer wants to place a scarecrow 2 meters from the row of corn and also 5 meters from the tree. Sketch both loci. Indicate, with an **X**, all possible locations for the scarecrow.

485 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.]

486 Using a compass and straightedge, construct the bisector of $\angle CBA$. [Leave all construction marks.]
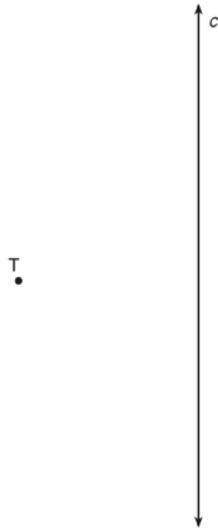
483 Determine whether the two lines represented by the equations $y = 2x + 3$ and $2y + x = 6$ are parallel, perpendicular, or neither. Justify your response.

484 A circle has the equation $(x - 3)^2 + (y + 4)^2 = 10$. Find the coordinates of the center of the circle and the length of the circle's radius.
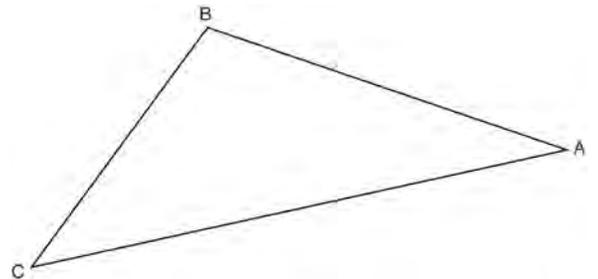
487 On the set of axes below, graph the locus of points that are 4 units from the line $x = 3$ and the locus of points that are 5 units from the point $(0, 2)$. Label with an **X** all points that satisfy both conditions.

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

489 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.]
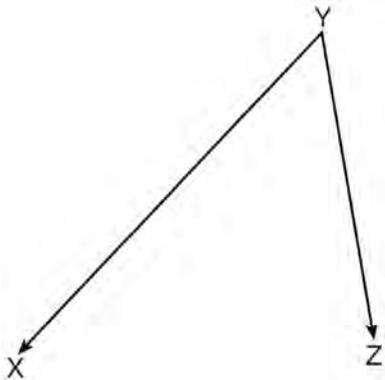
490 In the diagram below of circle C, $\overline{QR}$ is a diameter, and $Q(1, 8)$ and $C(3.5, 2)$ are points on a coordinate plane. Find and state the coordinates of point R.

94
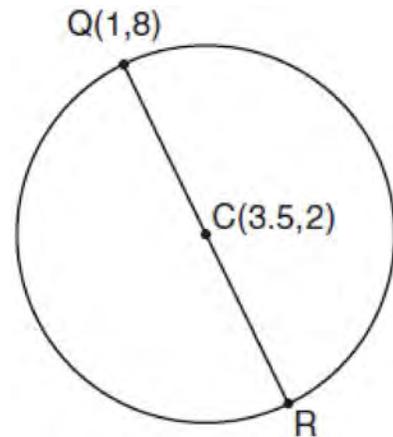
491 Write an equation of the line that passes through the point $(6, -5)$ and is parallel to the line whose equation is $2x - 3y = 11$.

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

493 A regular pyramid with a square base is shown in the diagram below.
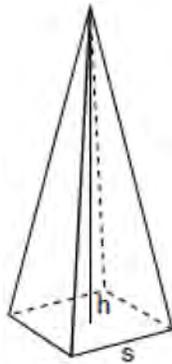
A side, s, of the base of the pyramid is 12 meters, and the height, h, is 42 meters. What is the volume of the pyramid in cubic meters?

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

495 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.
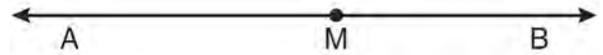
496 In the diagram below of right triangle ACB, altitude $\overline{CD}$ intersects $\overline{AB}$ at D. If $AD = 3$ and $DB = 4$, find the length of $\overline{CD}$ in simplest radical form.
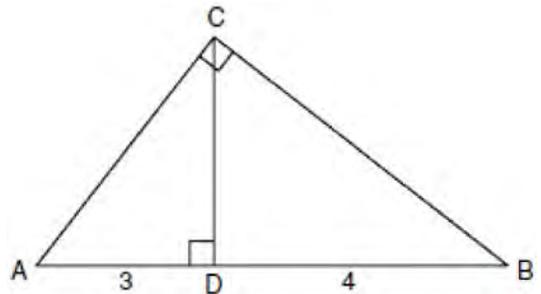
497 Using a compass and straightedge, construct the angle bisector of ∠ABC shown below. [Leave all construction marks.]
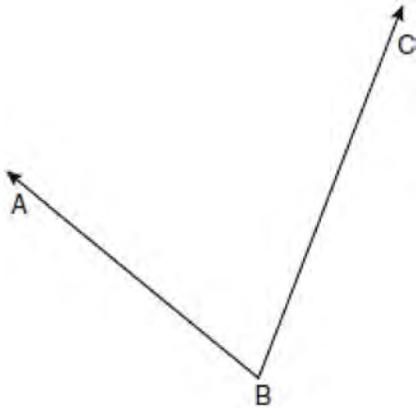
498 Using a compass and straightedge, and $\overline{AB}$ below, construct an equilateral triangle with all sides congruent to $\overline{AB}$. [Leave all construction marks.]

499 Triangle ABC has vertices at $A(3,0)$, $B(9,-5)$, and $C(7,-8)$. Find the length of $\overline{AC}$ in simplest radical form.

500 Determine, in degrees, the measure of each interior angle of a regular octagon.

501 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.
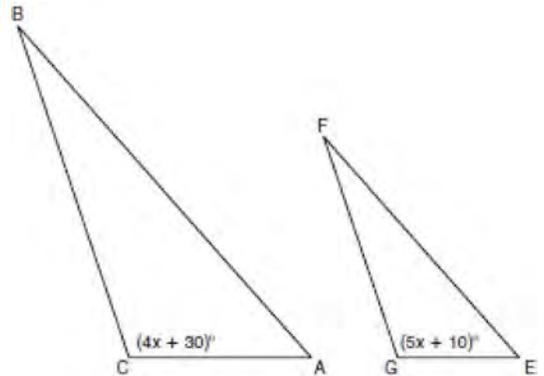
502 In the diagram below of $\triangle ABC$, D is a point on $\overline{AB}$, E is a point on $\overline{BC}$, $\overline{AC} \parallel \overline{DE}$, $CE = 25$ inches, $AD = 18$ inches, and $DB = 12$ inches. Find, to the nearest tenth of an inch, the length of $\overline{EB}$.
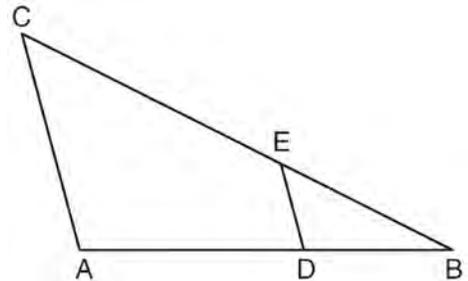
503 State whether the lines represented by the equations $y = \frac{1}{2}x - 1$ and $y + 4 = -\frac{1}{2}(x - 2)$ are parallel, perpendicular, or neither. Explain your answer.

504 On the diagram below, use a compass and straightedge to construct the bisector of $\angle ABC$. [Leave all construction marks.]
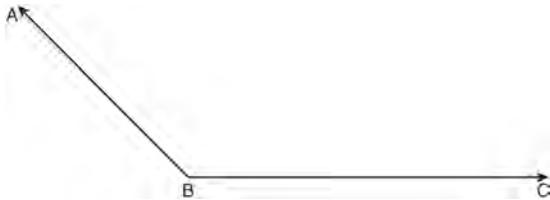
505 On the set of axes below, graph the locus of points 4 units from $(0, 1)$ and the locus of points 3 units from the origin. Label with an **X** *any* points that satisfy *both* conditions.
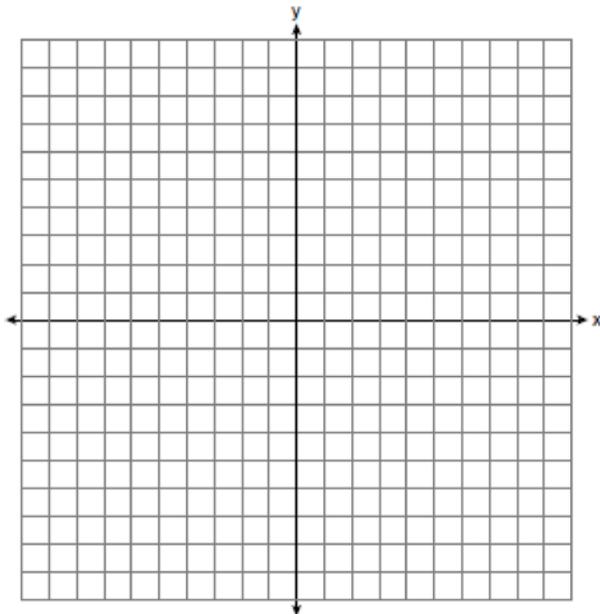
506 The Parkside Packing Company needs a rectangular shipping box. The box must have a length of 11 inches and a width of 8 inches. Find, to the *nearest tenth of an inch*, the minimum height of the box such that the volume is *at least* 800 cubic inches.

507 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.
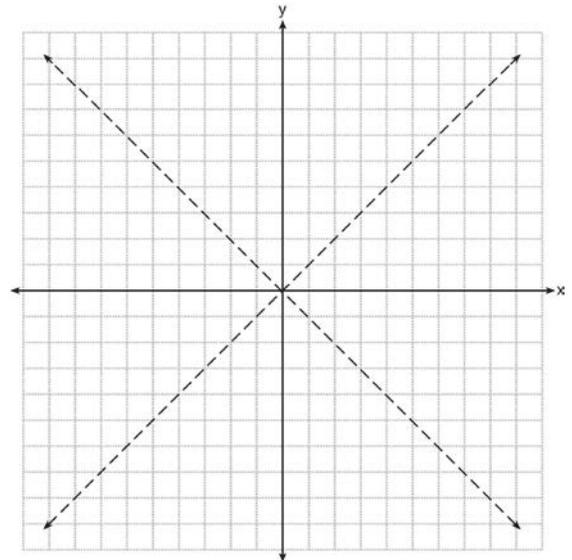
508 The volume of a cylinder is 12,566.4 cm³. The height of the cylinder is 8 cm. Find the radius of the cylinder to the *nearest tenth of a centimeter*.

509 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.

510   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 $\overline{AB} \parallel \overline{A'B'}$.

514   Write an equation for circle O shown on the graph below.
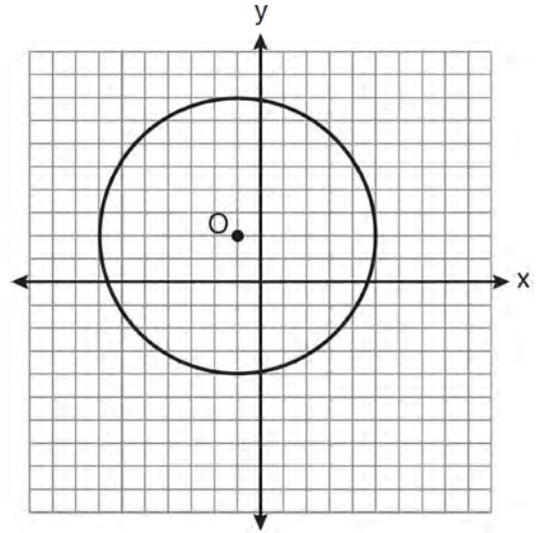
515   Tim is going to paint a wooden sphere that has a diameter of 12 inches. Find the surface area of the sphere, to the *nearest square inch*.

511   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.

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

512   Find, in simplest radical form, the length of the line segment with endpoints whose coordinates are $(-1,4)$ and $(3,-2)$.

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

513   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.

518   Write an equation of a circle whose center is $(-3,2)$ and whose diameter is 10.

519 After the transformation $r_{y=x}$, the image of $\triangle ABC$ is $\triangle A'B'C'$. If $AB = 2x + 13$ and $A'B' = 9x - 8$, find the value of x.

520 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 $\triangle XYZ$.
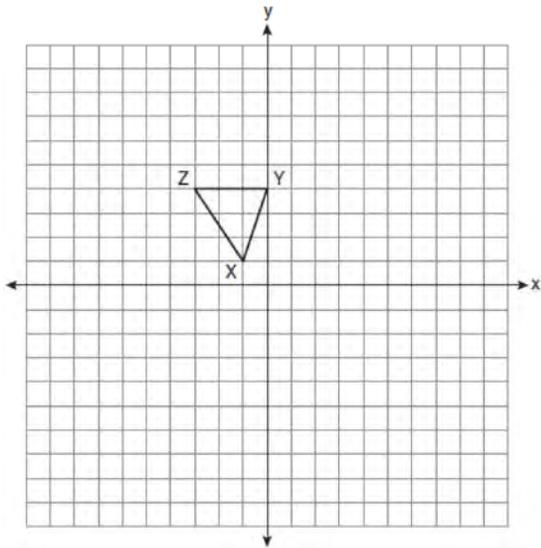
521 Using a compass and straightedge, construct a line that passes through point *P* and is perpendicular to line *m*. [Leave all construction marks.]
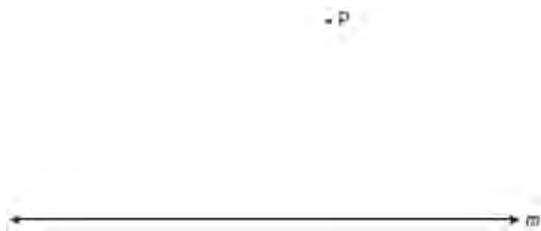
522 Find an equation of the line passing through the point $(5, 4)$ and parallel to the line whose equation is $2x + y = 3$.

523 Using a compass and straightedge, construct a line perpendicular to line ℓ through point *P*. [Leave all construction marks.]
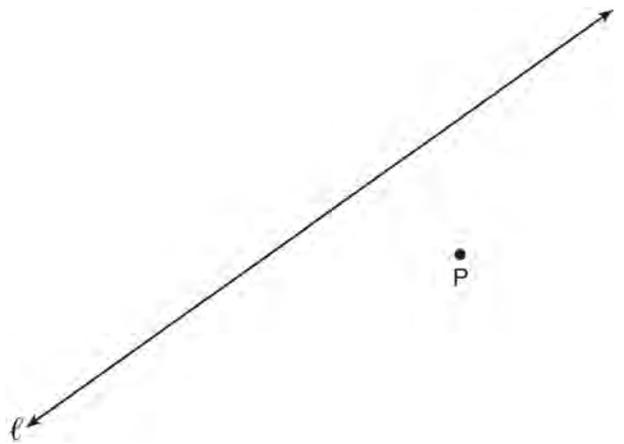
524 In the diagram below of $\triangle ABC$ with side $\overline{AC}$ extended through *D*, m$\angle A = 37$ and m$\angle BCD = 117$. Which side of $\triangle ABC$ is the longest side? Justify your answer.
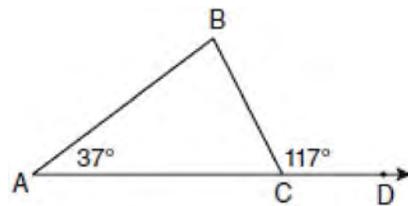
(Not drawn to scale)

525 On the set of axes below, graph the locus of points 4 units from the *x*-axis and equidistant from the points whose coordinates are $(-2, 0)$ and $(8, 0)$.

Mark with an **X** all points that satisfy *both* conditions.
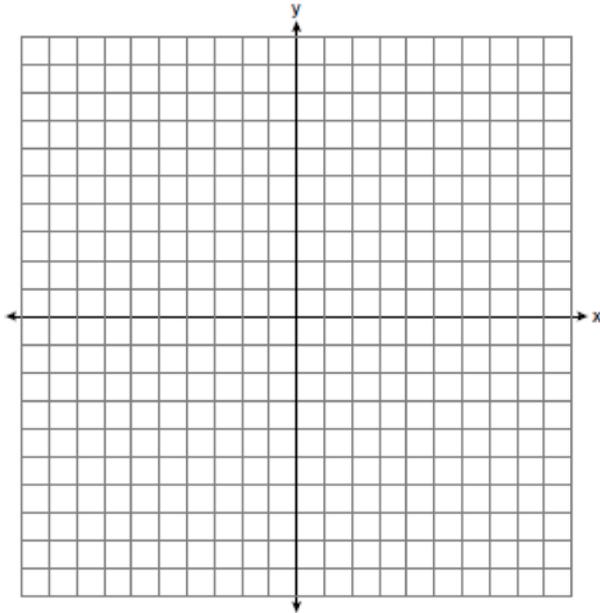
526 A right circular cylinder has a height of 7 inches and the base has a diameter of 6 inches. Determine the lateral area, in square inches, of the cylinder in terms of π.

527 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.

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

A •———————————————• B

529 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.]

100
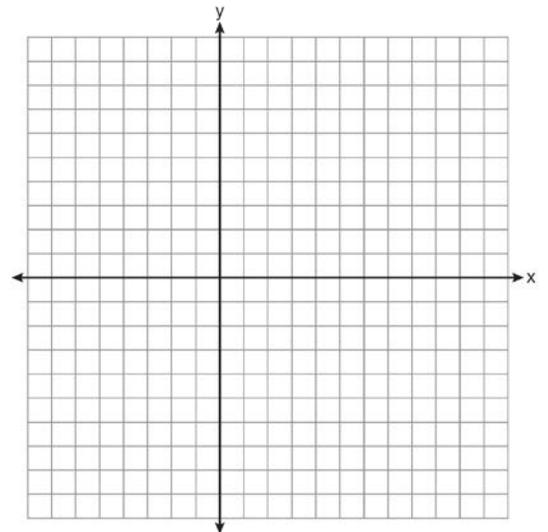
530 In the diagram below, two parallel lines intersect circle O at points A, B, C, and D, with $m\overset{\frown}{AB} = x + 20$ and $m\overset{\frown}{DC} = 2x - 20$. Find $m\overset{\frown}{AB}$.

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

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

531 Two intersecting lines are shown in the diagram below. Sketch the locus of points that are equidistant from the two lines. Sketch the locus of points that are a given distance, d, from the point of intersection of the given lines. State the number of points that satisfy both conditions.
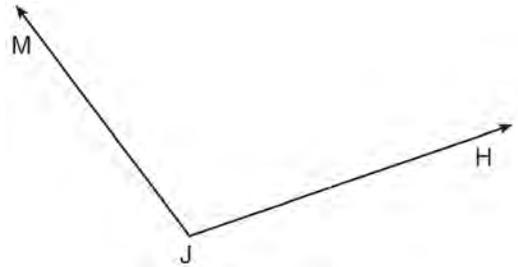
534 Using a compass and straightedge, construct the bisector of the angle shown below. [*Leave all construction marks*.]
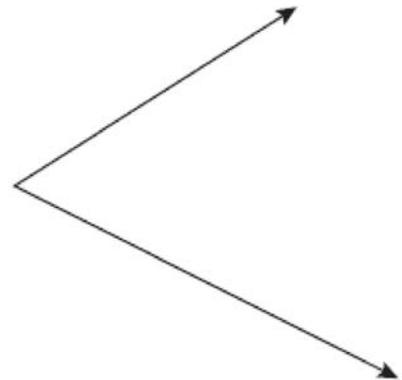
535 In the diagram below, circles A and B are tangent at point C and $\overline{AB}$ is drawn. Sketch all common tangent lines.
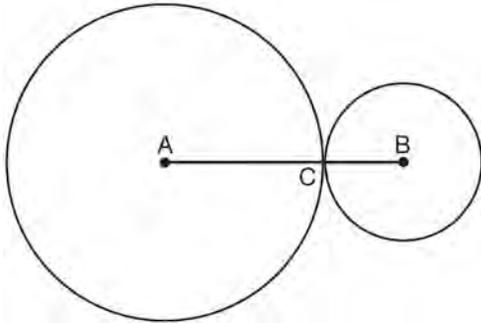
538 Using a compass and straightedge, construct the perpendicular bisector of $\overline{AB}$. [Leave all construction marks.]
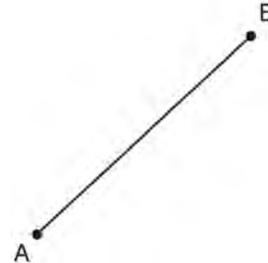
536 The diagram below shows $\triangle ABC$, with $\overline{AEB}$, $\overline{ADC}$, and $\angle ACB \cong \angle AED$. Prove that $\triangle ABC$ is similar to $\triangle ADE$.
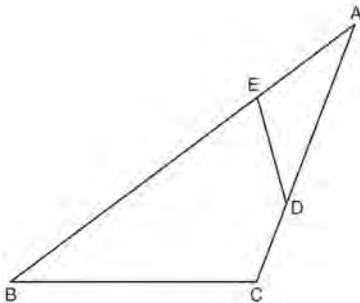
539 A sphere has a diameter of 18 meters. Find the volume of the sphere, in cubic meters, in terms of π.

540 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.

537 The diameter of a sphere is 5 inches. Determine and state the surface area of the sphere, to the *nearest hundredth of a square inch*.

541 In $\triangle ABC$, the measure of angle A is fifteen less than twice the measure of angle B. The measure of angle C equals the sum of the measures of angle A and angle B. Determine the measure of angle B.

102

542 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.]
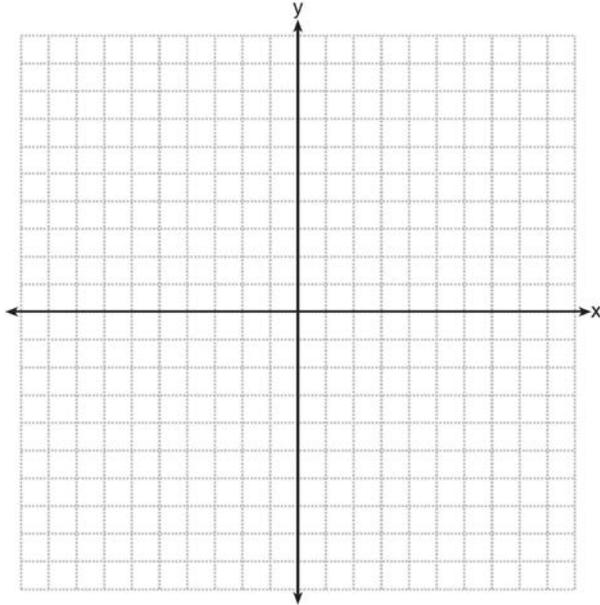
543 A right prism has a square base with an area of 12 square meters. The volume of the prism is 84 cubic meters. Determine and state the height of the prism, in meters.

544 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.

A •————————————————• B

Geometry 4 Point Regents Exam Questions

545 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.]

547 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.

546 Solve the following system of equations graphically.

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

$$x + y = 1$$
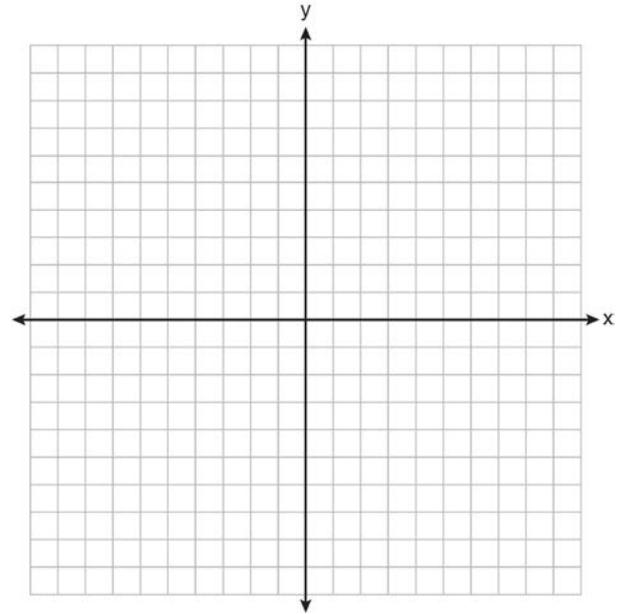
548 In circle O shown below, chords $\overline{AB}$ and $\overline{CD}$ and radius $\overline{OA}$ are drawn, such that $\overline{AB} \cong \overline{CD}$, $\overline{OE} \perp \overline{AB}$, $\overline{OF} \perp \overline{CD}$, $OF = 16$, $CF = y + 10$, and $CD = 4y - 20$.
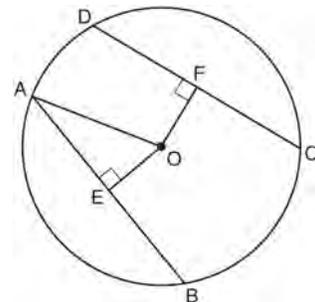
Determine the length of $\overline{DF}$. Determine the length of $\overline{OA}$.

549 Given: $\triangle ABC$, $\overline{BD}$ bisects $\angle ABC$, $\overline{BD} \perp \overline{AC}$
Prove: $\overline{AB} \cong \overline{CB}$

551 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.]

550 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''.
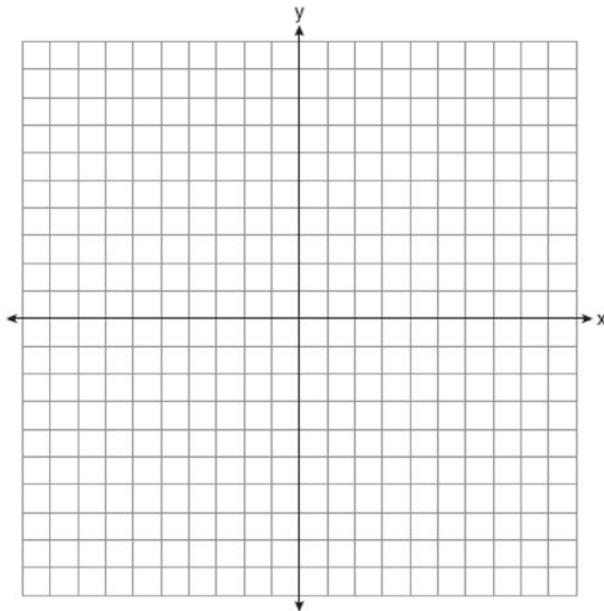
552 In the diagram below, circles X and Y have two tangents drawn to them from external point T. The points of tangency are C, A, S, and E. The ratio of TA to AC is $1:3$. If $TS = 24$, find the length of $\overline{SE}$.
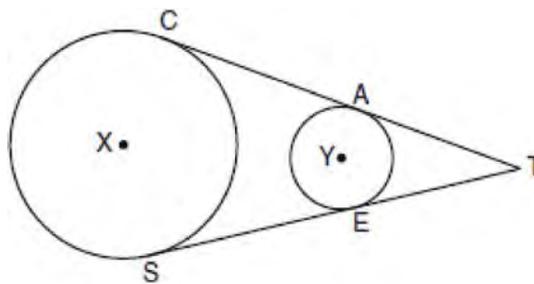
(Not drawn to scale)

553 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.]

555 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]
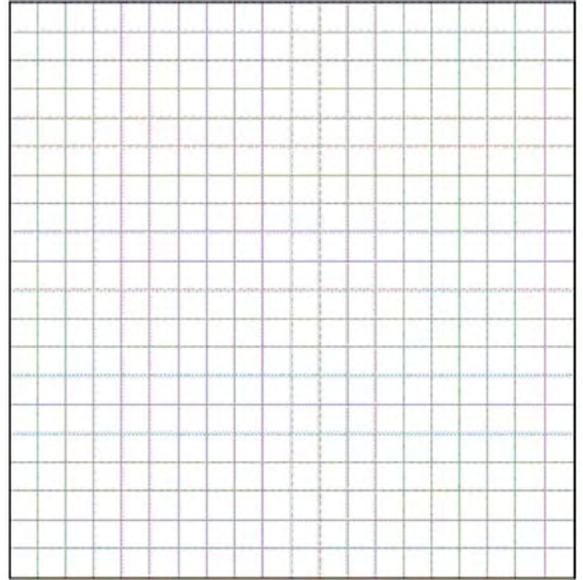
556 On the grid below, graph the points that are equidistant from both the *x* and *y* axes and the points that are 5 units from the origin. Label with an **X** all points that satisfy *both* conditions.

554 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.
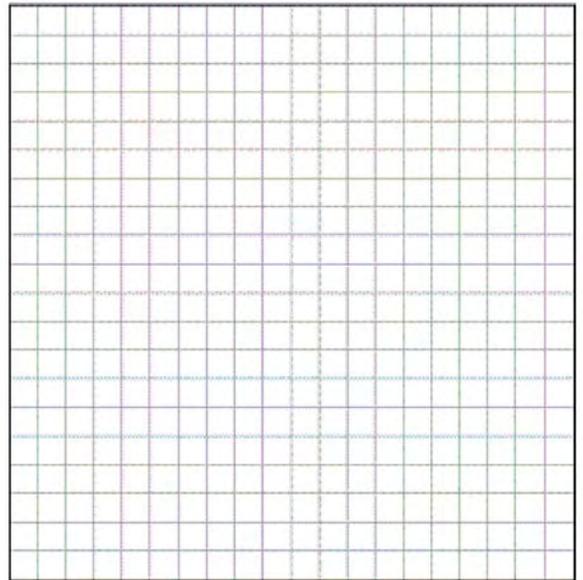
557 On the set of coordinate axes below, graph the locus of points that are equidistant from the lines $y = 6$ and $y = 2$ and also graph the locus of points that are 3 units from the y-axis. State the coordinates of *all* points that satisfy *both* conditions.
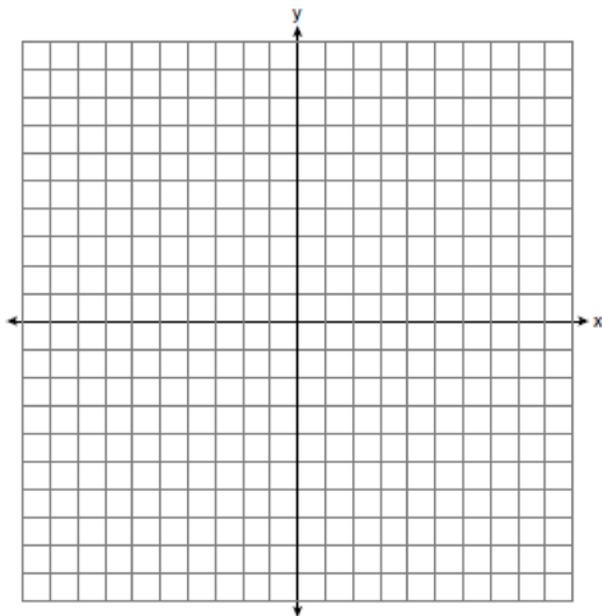
558 In the diagram below, $\triangle RST$ is a $3 - 4 - 5$ right triangle. The altitude, h, to the hypotenuse has been drawn. Determine the length of h.
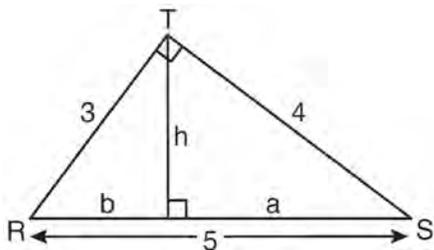
559 A city is planning to build a new park. The park must be equidistant from school A at $(3, 3)$ and school B at $(3, -5)$. The park also must be exactly 5 miles from the center of town, which is located at the origin on the coordinate graph. Each unit on the graph represents 1 mile. On the set of axes below, sketch the compound loci and label with an **X** all possible locations for the new park.
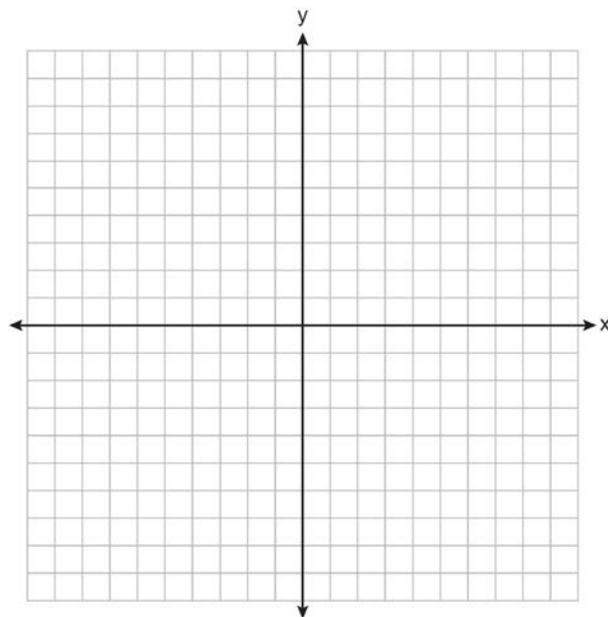
560 If $\triangle RST \sim \triangle ABC$, $m\angle A = x^2 - 8x$, $m\angle C = 4x - 5$, and $m\angle R = 5x + 30$, find $m\angle C$. [Only an algebraic solution can receive full credit.]

561 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 $\overline{AC}$.
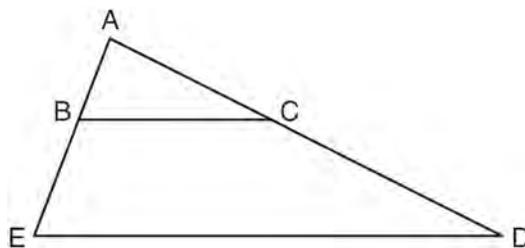
562 In right triangle ABC below, $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$. If $CD = 6$ and the ratio of AD to AB is 1:5, determine and state the length of $\overline{BD}$. [Only an algebraic solution can receive full credit.]
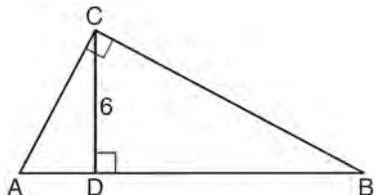
563 The coordinates of the vertices of $\triangle ABC$ are $A(-6, 5)$, $B(-4, 8)$, and $C(1, 6)$. State and label the coordinates of the vertices of $\triangle A''B''C''$, the image of $\triangle ABC$ after the composition of transformations $T_{(-4, 5)} \circ r_{y\text{-axis}}$. [The use of the set of axes below is optional.]
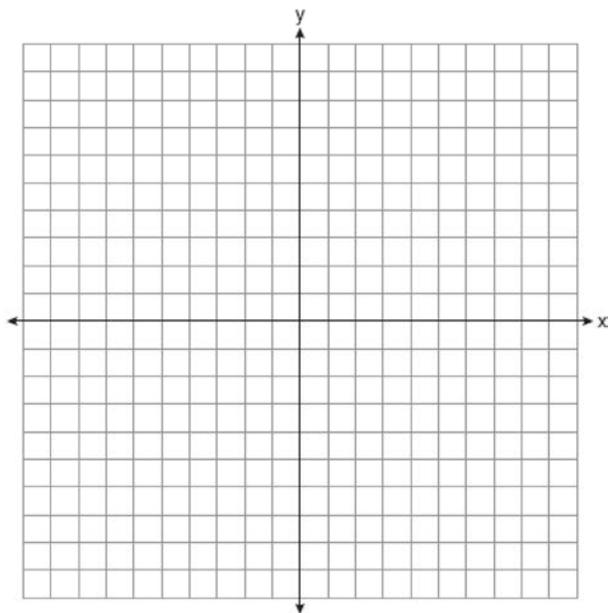
564 Quadrilateral $MATH$ has coordinates $M(-6, -3)$, $A(-1, -3)$, $T(-2, -1)$, and $H(-4, -1)$. The image of quadrilateral $MATH$ after the composition $r_{x\text{-axis}} \circ T_{7, 5}$ is quadrilateral $M''A''T''H''$. State and label the coordinates of $M''A''T''H''$. [The use of the set of axes below is optional.]
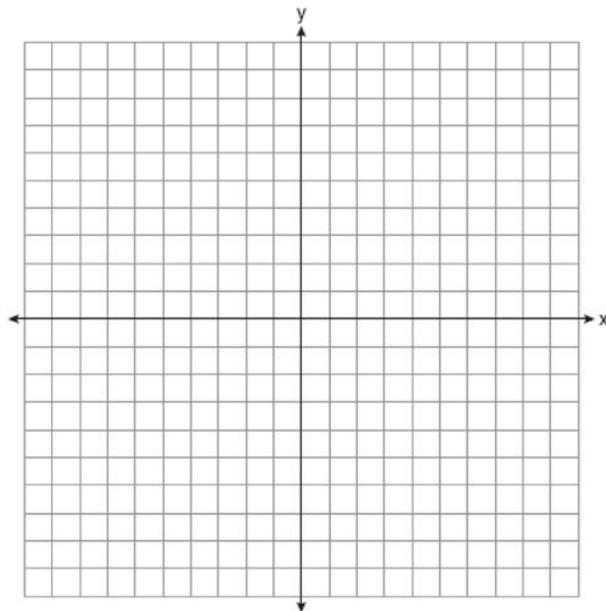
565 Given: Quadrilateral $ABCD$ with $\overline{AB} \cong \overline{CD}$, $\overline{AD} \cong \overline{BC}$, and diagonal $\overline{BD}$ is drawn
Prove: $\angle BDC \cong \angle ABD$

566 In $\triangle ABC$, $m\angle A = x^2 + 12$, $m\angle B = 11x + 5$, and $m\angle C = 13x - 17$. Determine the longest side of $\triangle ABC$.

567 A paint can is in the shape of a right circular cylinder. The volume of the paint can is 600π 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.

568 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.
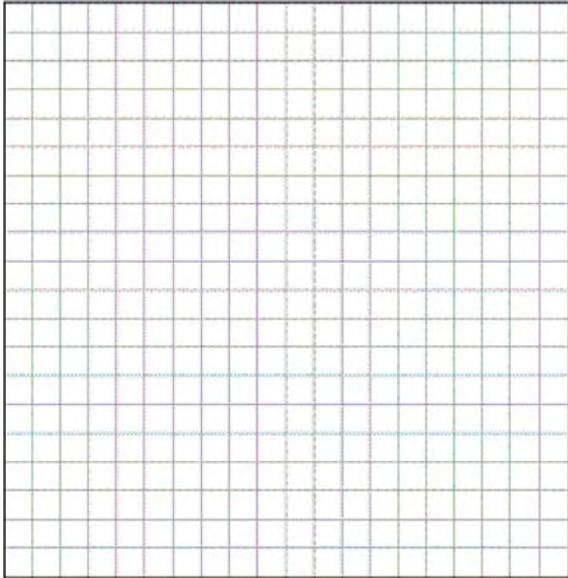
569 Trapezoid *TRAP*, with median $\overline{MQ}$, is shown in the diagram below. Solve algebraically for x and y.
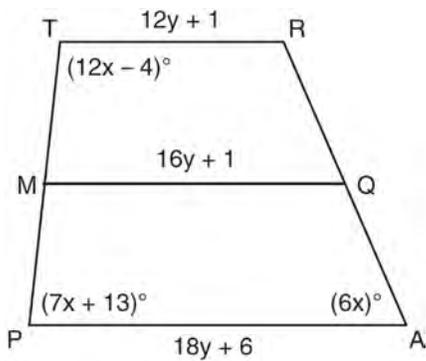
570 Find an equation of the line passing through the point $(6,5)$ and perpendicular to the line whose equation is $2y + 3x = 6$.

571 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.
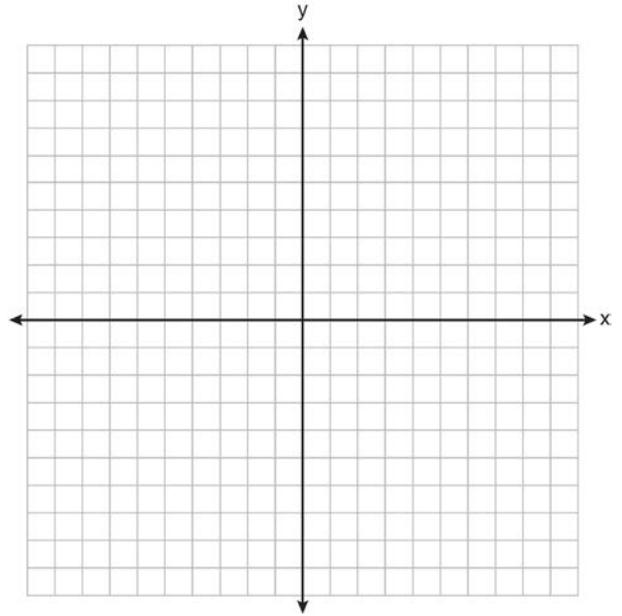
572 In the diagram below, $\overline{BFCE}$, $\overline{AB} \perp \overline{BE}$, $\overline{DE} \perp \overline{BE}$, and $\angle BFD \cong \angle ECA$. Prove that $\triangle ABC \sim \triangle DEF$.
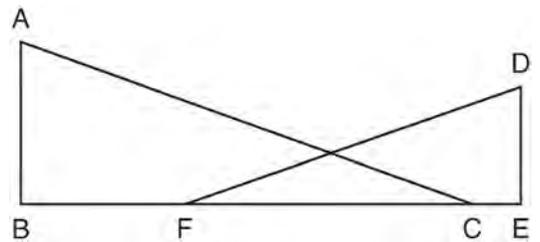
573 In the diagram below, tangent $\overline{ML}$ and secant $\overline{MNK}$ are drawn to circle O. The ratio $m\widehat{LN} : m\widehat{NK} : m\widehat{KL}$ is $3:4:5$. Find $m\angle LMK$.
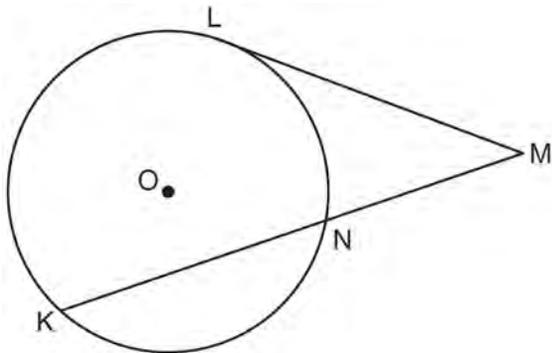
574 The coordinates of the vertices of parallelogram $SWAN$ are $S(2,-2)$, $W(-2,-4)$, $A(-4,6)$, and $N(0,8)$. State and label the coordinates of parallelogram $S''W''A''N''$, the image of $SWAN$ after the transformation $T_{4,-2} \circ D_{\frac{1}{2}}$. [The use of the set of axes below is optional.]
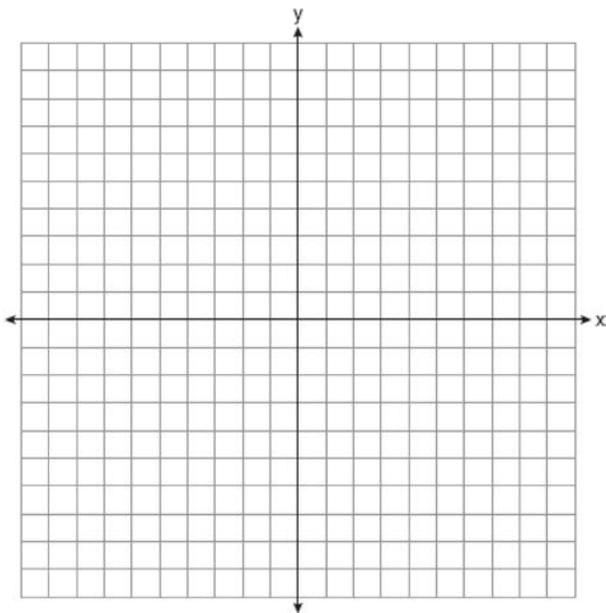
575 In the diagram below of circle O, chords $\overline{RT}$ and $\overline{QS}$ intersect at M. Secant $\overline{PTR}$ and tangent $\overline{PS}$ are drawn to circle O. The length of $\overline{RM}$ is two more than the length of $\overline{TM}$, $QM = 2$, $SM = 12$, and $PT = 8$.
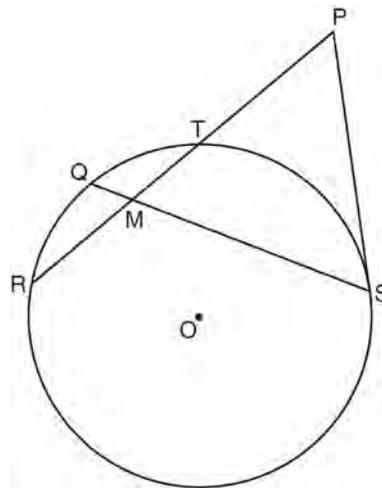
Find the length of $\overline{RT}$. Find the length of $\overline{PS}$.

576 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 $T_{-3,1} \circ D_2$.
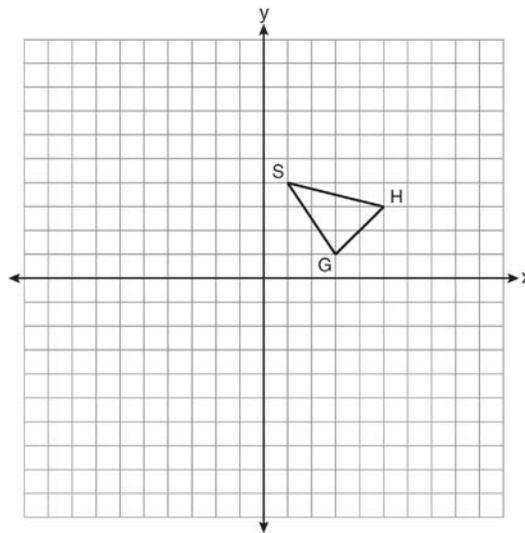
577 The coordinates of the vertices of parallelogram $ABCD$ are $A(-2, 2)$, $B(3, 5)$, $C(4, 2)$, and $D(-1, -1)$. State the coordinates of the vertices of parallelogram $A''B''C''D''$ that result from the transformation $r_{y-\text{axis}} \circ T_{2, -3}$. [The use of the set of axes below is optional.]

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

579 A right circular cylinder with a height of 5 cm has a base with a diameter of 6 cm. Find the lateral area of the cylinder to the *nearest hundredth of a square centimeter*. Find the volume of the cylinder to the *nearest hundredth of a cubic centimeter*.

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

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

$$2y + 4 = -x$$

581 In the diagram of $\triangle BCD$ shown below, $\overline{BA}$ is drawn from vertex B to point A on $\overline{DC}$, such that $\overline{BC} \cong \overline{BA}$.
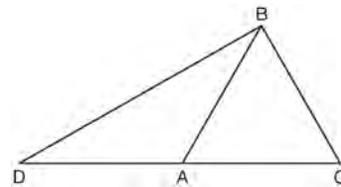
In $\triangle DAB$, $m\angle D = x$, $m\angle DAB = 5x - 30$, and $m\angle DBA = 3x - 60$. In $\triangle ABC$, $AB = 6y - 8$ and $BC = 4y - 2$. [Only algebraic solutions can receive full credit.] Find $m\angle D$. Find $m\angle BAC$. Find the length of $\overline{BC}$. Find the length of $\overline{DC}$.

582 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.]

584 Given: $JKLM$ is a parallelogram.
   $\overline{JM} \cong \overline{LN}$
   $\angle LMN \cong \angle LNM$
Prove: $JKLM$ is a rhombus.
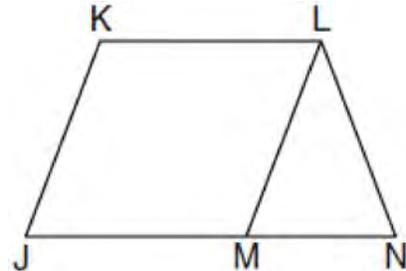
585 Triangle ABC has vertices $A(5,1)$, $B(1,4)$ and $C(1,1)$. State and label the coordinates of the vertices of $\triangle A''B''C''$, the image of $\triangle ABC$, following the composite transformation $T_{1,-1} \circ D_2$. [The use of the set of axes below is optional.]
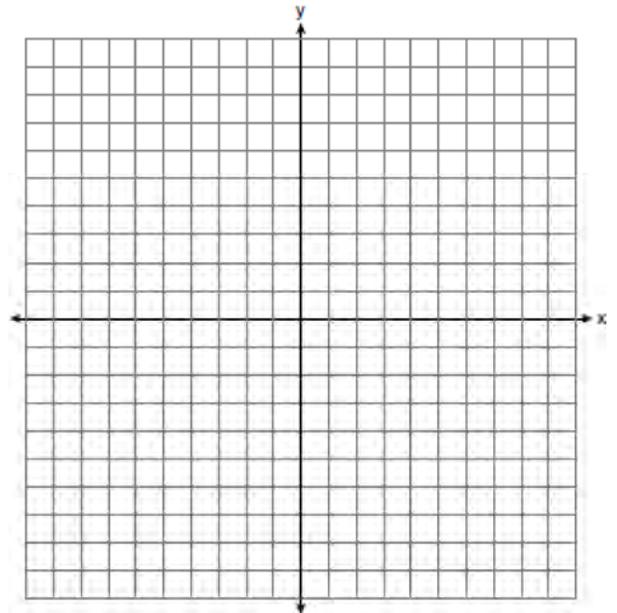
583 In the diagram below of quadrilateral $ABCD$ with diagonal $\overline{BD}$, $m\angle A = 93$, $m\angle ADB = 43$, $m\angle C = 3x + 5$, $m\angle BDC = x + 19$, and $m\angle DBC = 2x + 6$. Determine if $\overline{AB}$ is parallel to $\overline{DC}$. Explain your reasoning.

586 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.]
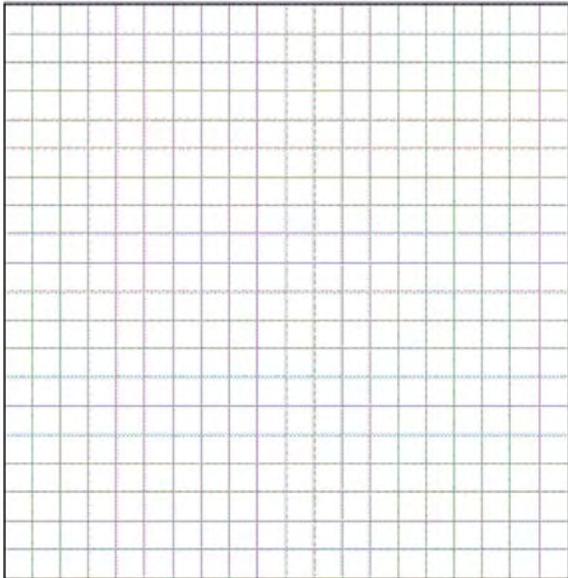
587 On the set of axes below, graph and label $\triangle DEF$ with vertices at $D(-4, -4)$, $E(-2, 2)$, and $F(8, -2)$. If G is the midpoint of $\overline{EF}$ and H is the midpoint of $\overline{DF}$, state the coordinates of G and H and label each point on your graph. Explain why $\overline{GH} \parallel \overline{DE}$.
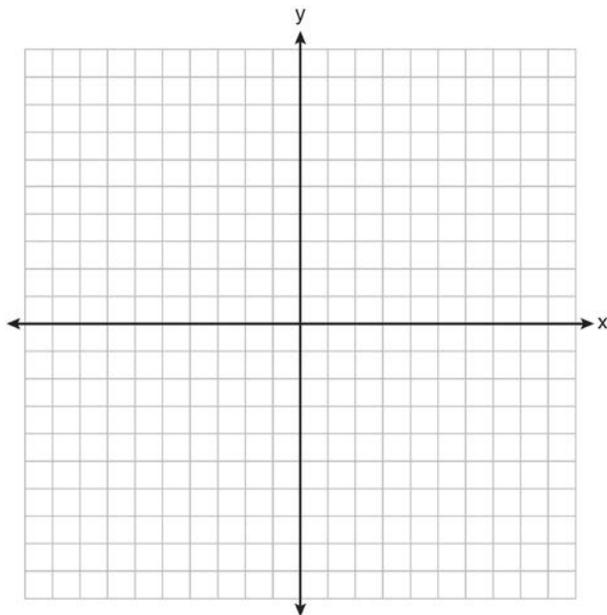
588 In the diagram below of $\triangle GJK$, H is a point on $\overline{GJ}$, $\overline{HJ} \cong \overline{JK}$, m$\angle G = 28$, and m$\angle GJK = 70$. Determine whether $\triangle GHK$ is an isosceles triangle and justify your answer.
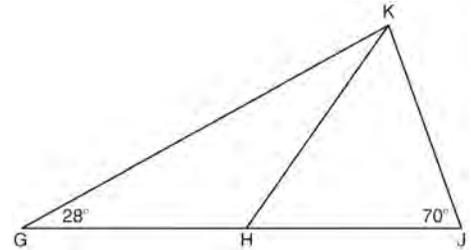
589 In $\triangle KLM$, m$\angle K = 36$ and $KM = 5$. The transformation D_2 is performed on $\triangle KLM$ to form $\triangle K'L'M'$. Find m$\angle K'$. Justify your answer. Find the length of $\overline{K'M'}$. Justify your answer.

590 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.]
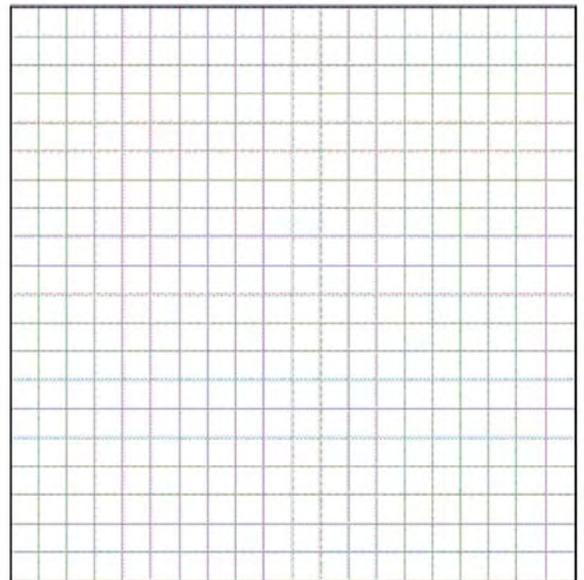
591 On the set of axes below, graph the locus of points that are four units from the point $(2, 1)$. On the same set of axes, graph the locus of points that are two units from the line $x = 4$. State the coordinates of all points that satisfy both conditions.
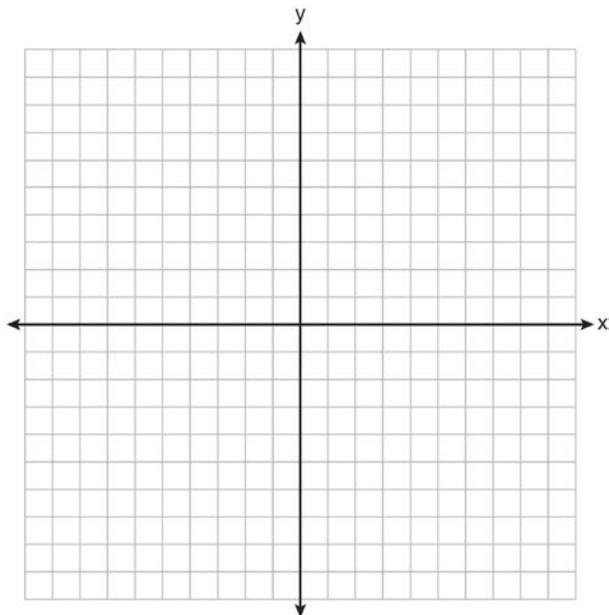
592 In the diagram below of circle O, chords $\overline{DF}$, $\overline{DE}$, $\overline{FG}$, and $\overline{EG}$ are drawn such that $m\overset{\frown}{DF} : m\overset{\frown}{FE} : m\overset{\frown}{EG} : m\overset{\frown}{GD} = 5:2:1:7$. Identify one pair of inscribed angles that are congruent to each other and give their measure.
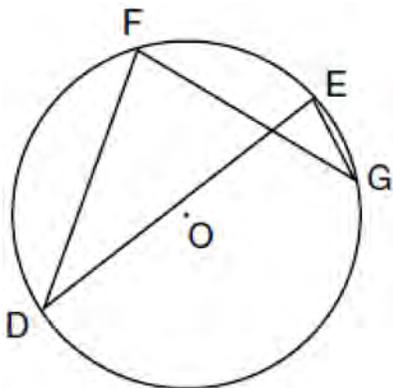
Geometry 6 Point Regents Exam Questions

593 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 $m\overset{\frown}{AC}:m\overset{\frown}{CB} = 3:1$.
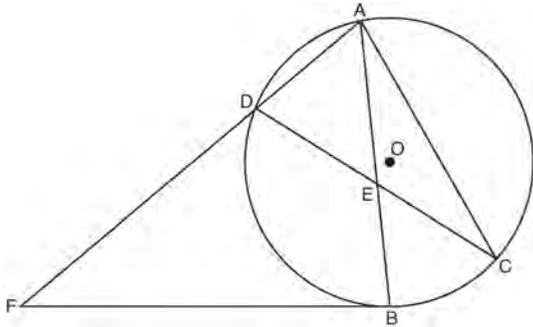
Determine $m\angle CEB$. Determine $m\angle F$. Determine $m\angle DAC$.

594 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 $m\angle TAS$.
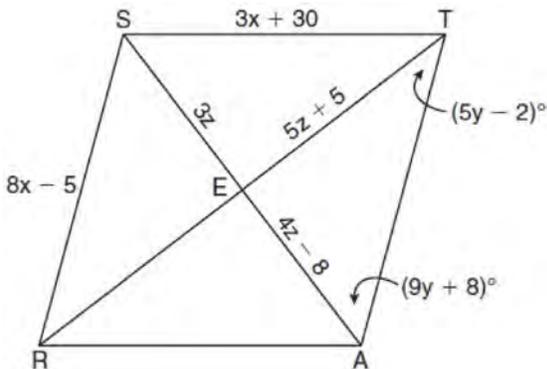
595 In the diagram below of quadrilateral $ABCD$, $\overline{AD} \cong \overline{BC}$ and $\angle DAE \cong \angle BCE$. Line segments AC, DB, and FG intersect at E.
Prove: $\triangle AEF \cong \triangle CEG$
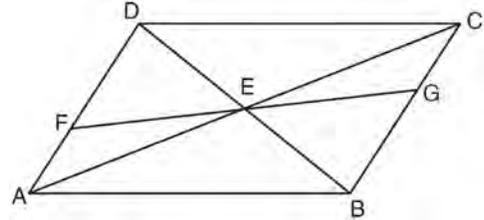
596 Given: Quadrilateral $ABCD$, diagonal $\overline{AFEC}$, $\overline{AE} \cong \overline{FC}$, $\overline{BF} \perp \overline{AC}$, $\overline{DE} \perp \overline{AC}$, $\angle 1 \cong \angle 2$
Prove: $ABCD$ is a parallelogram.
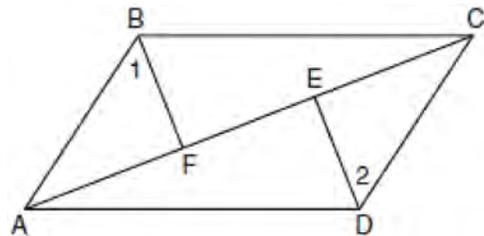
597 In the diagram of $\triangle MAH$ below, $\overline{MH} \cong \overline{AH}$ and medians $\overline{AB}$ and $\overline{MT}$ are drawn.
Prove: $\angle MBA \cong \angle ATM$
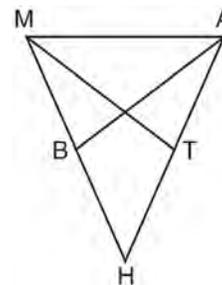
598 In the diagram below, quadrilateral *ABCD* is inscribed in circle *O*, $\overline{AB} \parallel \overline{DC}$, and diagonals $\overline{AC}$ and $\overline{BD}$ are drawn. Prove that $\triangle ACD \cong \triangle BDC$.
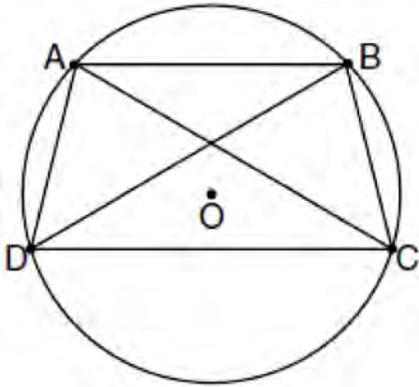
599 Given: Quadrilateral *ABCD* has vertices $A(-5, 6)$, $B(6, 6)$, $C(8, -3)$, and $D(-3, -3)$.

Prove: Quadrilateral *ABCD* is a parallelogram but is neither a rhombus nor a rectangle. [The use of the grid below is optional.]
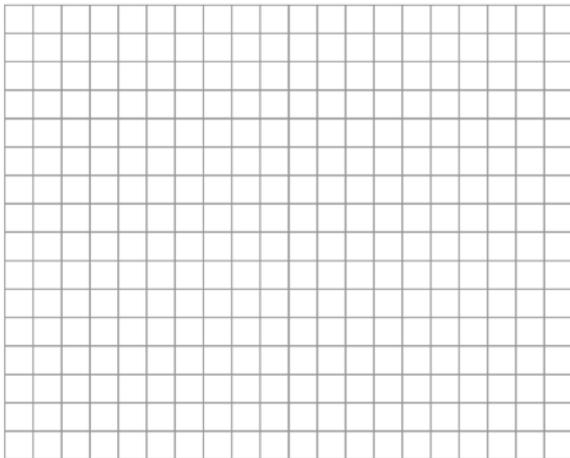
600 The diagram below shows rectangle *ABCD* with points *E* and *F* on side $\overline{AB}$. Segments *CE* and *DF* intersect at *G*, and $\angle ADG \cong \angle BCG$. Prove: $\overline{AE} \cong \overline{BF}$
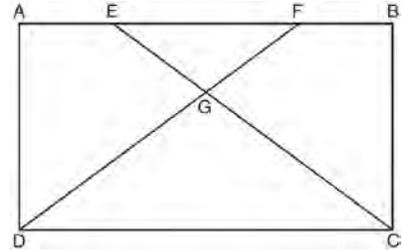
601 In the diagram below, $\overline{PA}$ and $\overline{PB}$ are tangent to circle *O*, $\overline{OA}$ and $\overline{OB}$ are radii, and $\overline{OP}$ intersects the circle at *C*. Prove: $\angle AOP \cong \angle BOP$
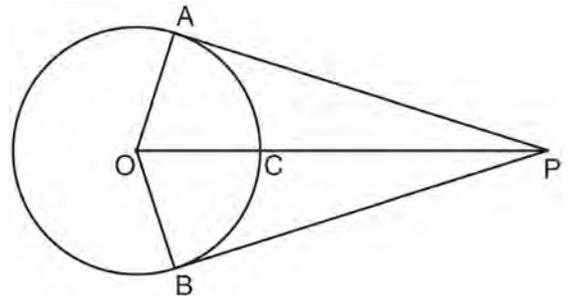
602 Given: $\triangle ABC$ and $\triangle EDC$, *C* is the midpoint of $\overline{BD}$ and $\overline{AE}$

Prove: $\overline{AB} \parallel \overline{DE}$

116
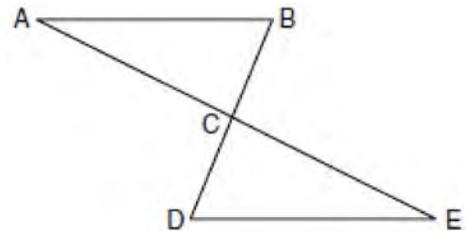
603 On the set of axes below, solve the following system of equations graphically for all values of x and y.

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

$$4x + 2y = 14$$
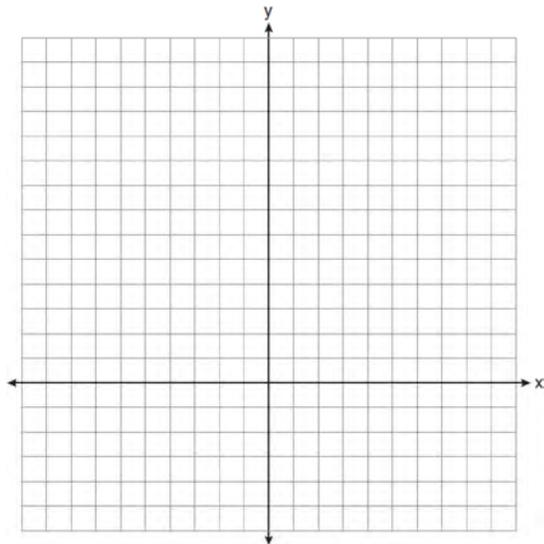
604 Given: $\triangle ABC$ with vertices $A(-6, -2)$, $B(2, 8)$, and $C(6, -2)$. $\overline{AB}$ has midpoint D, $\overline{BC}$ has midpoint E, and $\overline{AC}$ has midpoint F.

Prove: $ADEF$ is a parallelogram
$ADEF$ is *not* a rhombus

[The use of the grid is optional.]
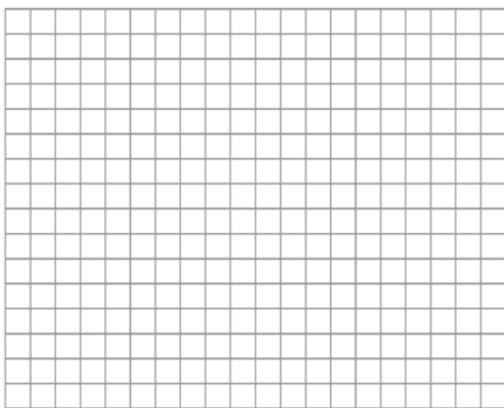
605 In the diagram of circle O below, diameter $\overline{RS}$, chord $\overline{AS}$, tangent $\overrightarrow{TS}$, and secant $\overline{TAR}$ are drawn.
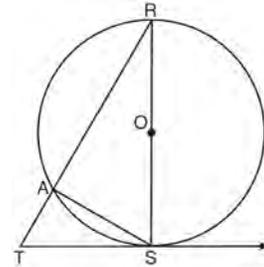
Complete the following proof to show
$(RS)^2 = RA \cdot RT$

Statements	Reasons
1. circle O, diameter $\overline{RS}$, chord $\overline{AS}$, tangent $\overrightarrow{TS}$, and secant $\overline{TAR}$	1. Given
2. $\overline{RS} \perp \overrightarrow{TS}$	2. _____
3. $\angle RST$ is a right angle	3. $\perp$ lines form right angles
4. $\angle RAS$ is a right angle	4. _____
5. $\angle RST \cong \angle RAS$	5. _____
6. $\angle R \cong \angle R$	6. Reflexive property
7. $\triangle RST \sim \triangle RAS$	7. _____
8. $\frac{RS}{RA} = \frac{RT}{RS}$	8. _____
9. $(RS)^2 = RA \cdot RT$	9. _____

606 Quadrilateral *MATH* has coordinates $M(1, 1)$, $A(-2, 5)$, $T(3, 5)$, and $H(6, 1)$. Prove that quadrilateral *MATH* is a rhombus and prove that it is *not* a square. [The use of the grid is optional.]
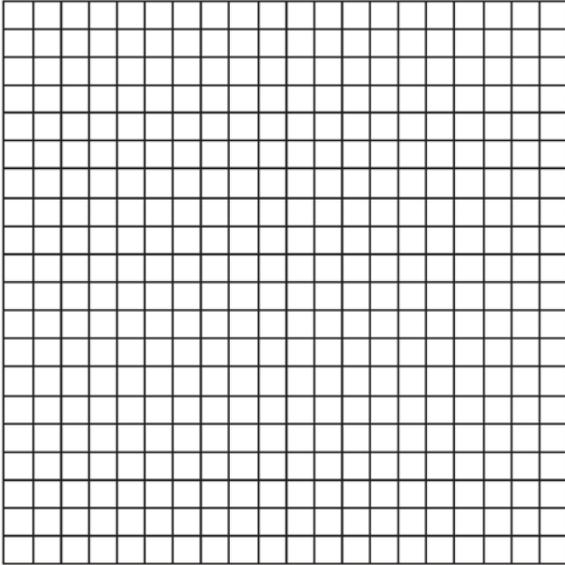
607 Quadrilateral *ABCD* with vertices $A(-7, 4)$, $B(-3, 6)$, $C(3, 0)$, and $D(1, -8)$ is graphed on the set of axes below. Quadrilateral *MNPQ* is formed by joining *M*, *N*, *P*, and *Q*, the midpoints of $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, and $\overline{AD}$, respectively. Prove that quadrilateral *MNPQ* is a parallelogram. Prove that quadrilateral *MNPQ* is *not* a rhombus.
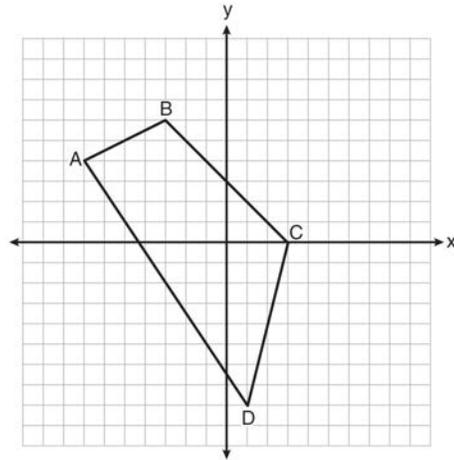
608 On the set of axes below, solve the system of equations graphically and state the coordinates of all points in the solution.

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

$$2y + 16 = 4x$$
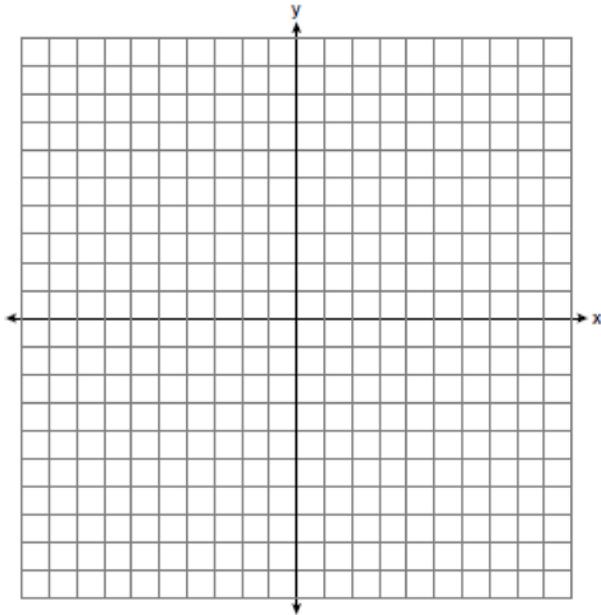
Geometry Multiple Choice Regents Exam Questions
Answer Section

1 ANS: 4   PTS: 2   REF: 061114ge   STA: G.G.73
   TOP: Equations of Circles
2 ANS: 3
   $(n - 2)180 = (5 - 2)180 = 540$

   PTS: 2   REF: 011223ge   STA: G.G.36   TOP: Interior and Exterior Angles of Polygons
3 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
4 ANS: 4
   $m\angle A = 80$

   PTS: 2   REF: 011115ge   STA: G.G.34   TOP: Angle Side Relationship
5 ANS: 3
   $7x = 5x + 30$

   $2x = 30$

   $x = 15$

   PTS: 2   REF: 081109ge   STA: G.G.35   TOP: Parallel Lines and Transversals
6 ANS: 1

   $\dfrac{40 - 24}{2} = 8.$ $\sqrt{10^2 - 8^2} = 6.$
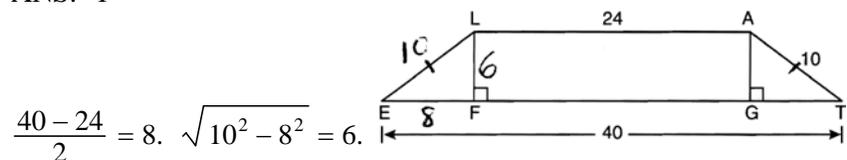
   PTS: 2   REF: 061204ge   STA: G.G.40   TOP: Trapezoids
7 ANS: 4
   $x^2 - 6x + 2x - 3 = 9x + 27$

   $x^2 - 4x - 3 = 9x + 27$

   $x^2 - 13x - 30 = 0$

   $(x - 15)(x + 2) = 0$

   $x = 15, -2$

   PTS: 2   REF: 061225ge   STA: G.G.32   TOP: Exterior Angle Theorem
8 ANS: 3
   $\sqrt{5^2 + 12^2} = 13$

   PTS: 2   REF: 061116ge   STA: G.G.39   TOP: Special Parallelograms

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

$3x + x + 20 + x + 20 = 180$

$$5x = 40$$

$$x = 28$$

    PTS: 2   REF: 081222ge   STA: G.G.31   TOP: Isosceles Triangle Theorem
11 ANS: 1   PTS: 2   REF: 011102ge   STA: G.G.55
    TOP: Properties of Transformations
12 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
13 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
14 ANS: 3   PTS: 2   REF: 011202ge   STA: G.G.21
    TOP: Centroid, Orthocenter, Incenter and Circumcenter
15 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
16 ANS: 3   PTS: 2   REF: 061122ge   STA: G.G.56
    TOP: Identifying Transformations
17 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

18 ANS: 2   PTS: 2   REF: 081226ge   STA: G.G.69
TOP: Triangles in the Coordinate Plane

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

20 ANS: 2

$$AC = BD$$

$$AC - BC = BD - BC$$

$$AB = CD$$

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

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

22 ANS: 3
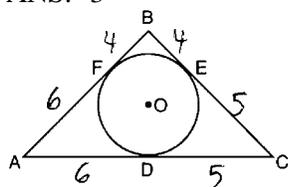
PTS: 2   REF: 011101ge   STA: G.G.53   TOP: Segments Intercepted by Circle
KEY: two tangents

23 ANS: 3   PTS: 2   REF: 061228ge   STA: G.G.39
TOP: Special Parallelograms

24 ANS: 3

$$y = mx + b$$

$$-1 = 2(2) + b$$

$$-5 = b$$

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

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

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

27 ANS: 2   PTS: 2   REF: 011206ge   STA: G.G.32
TOP: Exterior Angle Theorem

28 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

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

30 ANS: 3

The slope of $9x - 3y = 27$ is $m = \dfrac{-A}{B} = \dfrac{-9}{-3} = 3$, which is the opposite reciprocal of $-\dfrac{1}{3}$.

     PTS: 2   REF: 081225ge   STA: G.G.62   TOP: Parallel and Perpendicular Lines

31 ANS: 3   PTS: 2   REF: 011110ge   STA: G.G.21
     KEY: Centroid, Orthocenter, Incenter and Circumcenter

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

33 ANS: 2

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

$2 = -2(2) + b$

$6 = b$

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

34 ANS: 1

Parallel lines intercept congruent arcs.

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

35 ANS: 1   PTS: 2   REF: 011220ge   STA: G.G.72
     TOP: Equations of Circles

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

37 ANS: 1
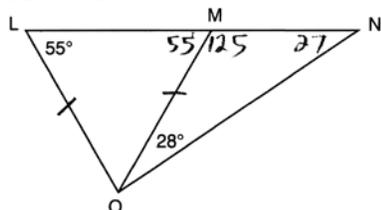
     PTS: 2   REF: 061211ge   STA: G.G.31   TOP: Isosceles Triangle Theorem

38 ANS: 3
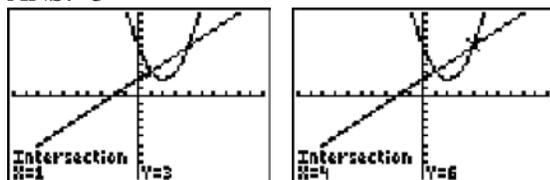
     PTS: 2   REF: 081118ge   STA: G.G.70   TOP: Quadratic-Linear Systems

39 ANS: 4   PTS: 2   REF: 081224ge   STA: G.G.21
     TOP: Centroid, Orthocenter, Incenter and Circumcenter

40 ANS: 1

$$AB = CD$$

$$AB + BC = CD + BC$$

$$AC = BD$$

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

41 ANS: 2   PTS: 2   REF: 081202ge   STA: G.G.55
    TOP: Properties of Transformations

42 ANS: 1   PTS: 2   REF: 061125ge   STA: G.G.39
    TOP: Special Parallelograms

43 ANS: 2

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

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

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

45 ANS: 1

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

$$-4 + x = 2 \qquad 3 + y = 10$$

$$x = 6 \qquad y = 7$$

PTS: 2   REF: 081115ge   STA: G.G.66   TOP: Midpoint

46 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

47 ANS: 4   PTS: 2   REF: 061213ge   STA: G.G.5
    TOP: Planes

48 ANS: 4

Parallel lines intercept congruent arcs.

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

49 ANS: 3   PTS: 2   REF: 081128ge   STA: G.G.39
    TOP: Special Parallelograms

50 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

51 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

52 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

53 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

54 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

55 ANS: 2

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

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

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

57 ANS: 3

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

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

58 ANS: 3

$x + 2x + 15 = 5x + 15 \quad 2(5) + 15 = 25$

$$3x + 15 = 5x + 5$$
$$10 = 2x$$
$$5 = x$$

PTS: 2   REF: 011127ge   STA: G.G.32   TOP: Exterior Angle Theorem

59 ANS: 4   PTS: 2   REF: 011108ge   STA: G.G.27
   TOP: Angle Proofs

60 ANS: 1   PTS: 2   REF: 081113ge   STA: G.G.54
   TOP: Reflections   KEY: basic

61 ANS: 2   PTS: 2   REF: 081102ge   STA: G.G.29
   TOP: Triangle Congruency

62 ANS: 4   PTS: 2   REF: 081110ge   STA: G.G.71
   TOP: Equations of Circles

63 ANS: 4

$y = mx + b$

$3 = \dfrac{3}{2}(-2) + b$

$3 = -3 + b$

$6 = b$

   PTS: 2   REF: 011114ge   STA: G.G.65   TOP: Parallel and Perpendicular Lines

64 ANS: 3   PTS: 2   REF: 081111ge   STA: G.G.32
   TOP: Exterior Angle Theorem

65 ANS: 2

$(n - 2)180 = (6 - 2)180 = 720.\ \dfrac{720}{6} = 120.$

   PTS: 2   REF: 081125ge   STA: G.G.37   TOP: Interior and Exterior Angles of Polygons

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

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

68 ANS: 3
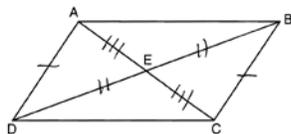
. Opposite sides of a parallelogram are congruent and the diagonals of a parallelogram bisect each other.

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

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

70 ANS: 2

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

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

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

72 ANS: 1

$$m = \left(\frac{8+0}{2}, \frac{2+6}{2} \right) = (4,4) \quad m = \frac{6-2}{0-8} = \frac{4}{-8} = -\frac{1}{2} \quad m_\perp = 2 \quad y = mx + b$$
$$4 = 2(4) + b$$
$$-4 = b$$

PTS: 2 REF: 081126ge STA: G.G.68 TOP: Perpendicular Bisector

73 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

74 ANS: 1 PTS: 2 REF: 011120ge STA: G.G.18
TOP: Constructions

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

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

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

78 ANS: 4 PTS: 2 REF: 081106ge STA: G.G.17
TOP: Constructions

79 ANS: 2 PTS: 2 REF: 061107ge STA: G.G.32
TOP: Exterior Angle Theorem

80 ANS: 4

$$-5 = \frac{-3+x}{2}. \quad 2 = \frac{6+y}{2}$$
$$-10 = -3 + x \quad 4 = 6 + y$$
$$-7 = x \quad -2 = y$$

PTS: 2 REF: 081203ge STA: G.G.66 TOP: Midpoint

81 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 and Lateral Area

82 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

83 ANS: 3

$$180(n - 2) = n\left(180 - \frac{180(n - 2)}{n}\right)$$

$$180n - 360 = 180n - 180n + 360$$

$$180n = 720$$

$$n = 4$$

PTS: 2   REF: 081223ge   STA: G.G.36   TOP: Interior and Exterior Angles of Polygons

84 ANS: 2   PTS: 2   REF: 081212ge   STA: G.G.72
TOP: Equations of Circles

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

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

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

88 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

89 ANS: 3   PTS: 2   REF: 011209ge   STA: G.G.44
TOP: Similarity Proofs

90 ANS: 3

$$\frac{8}{2} = \frac{12}{x}.$$
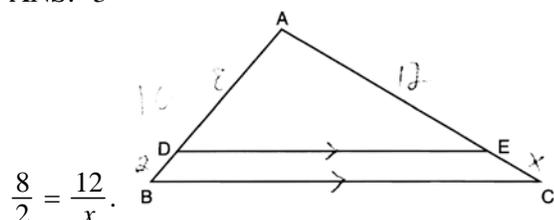
$$8x = 24$$

$$x = 3$$

PTS: 2   REF: 061216ge   STA: G.G.46   TOP: Side Splitter Theorem

91 ANS: 4   PTS: 2   REF: 011222ge   STA: G.G.34
TOP: Angle Side Relationship

92 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

93 ANS: 1   PTS: 2   REF: 061214ge   STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

94 ANS: 3   PTS: 2   REF: 061224ge   STA: G.G.45
TOP: Similarity   KEY: basic

95 ANS: 3
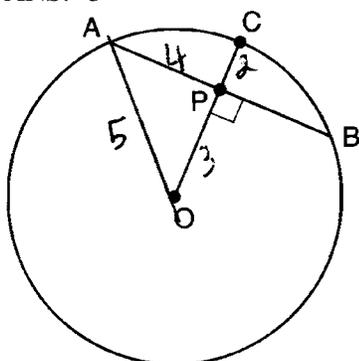
PTS: 2   REF: 011112ge   STA: G.G.49   TOP: Chords

96 ANS: 2

$7x = 5x + 30$

$2x = 30$

$x = 15$

PTS: 2   REF: 061106ge   STA: G.G.35   TOP: Parallel Lines and Transversals

97 ANS: 4
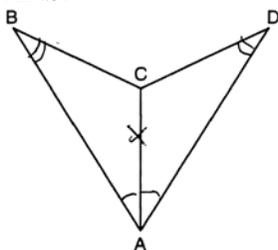
PTS: 2   REF: 081114ge   STA: G.G.28   TOP: Triangle Congruency

98 ANS: 1

The diagonals of a parallelogram intersect at their midpoints. $M_{\overline{AC}}\left(\dfrac{1+3}{2}, \dfrac{5+(-1)}{2} \right) = (2,2)$

PTS: 2   REF: 061209ge   STA: G.G.69   TOP: Quadrilaterals in the Coordinate Plane

99 ANS: 4   PTS: 2   REF: 081206ge   STA: G.G.30
    TOP: Interior and Exterior Angles of Triangles

100 ANS: 2   PTS: 2   REF: 061126ge   STA: G.G.59
    TOP: Properties of Transformations

101 ANS: 3   PTS: 2   REF: 011217ge   STA: G.G.64
    TOP: Parallel and Perpendicular Lines

102 ANS: 3

$$\frac{5}{7} = \frac{10}{x}$$

$5x = 70$

$x = 14$

PTS: 2   REF: 081103ge   STA: G.G.46   TOP: Side Splitter Theorem

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

104 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

105 ANS: 3

$$4x + 14 + 8x + 10 = 180$$

$$12x = 156$$

$$x = 13$$

PTS: 2   REF: 081213ge   STA: G.G.35   TOP: Parallel Lines and Transversals

106 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

107 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

108 ANS: 2
The diagonals of a rhombus are perpendicular. $180 - (90 + 12) = 78$

PTS: 2   REF: 011204ge   STA: G.G.39   TOP: Special Parallelograms

109 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

110 ANS: 4   PTS: 2   REF: 011124ge   STA: G.G.51
TOP: Arcs Determined by Angles   KEY: inscribed

111 ANS: 1   PTS: 2   REF: 011122ge   STA: G.G.28
  TOP: Triangle Congruency
112 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
113 ANS: 3
  $(3, -2) \to (2, 3) \to (8, 12)$

  PTS: 2   REF: 011126ge   STA: G.G.54   TOP: Compositions of Transformations
  KEY: basic
114 ANS: 4   PTS: 2   REF: 011216ge   STA: G.G.29
  TOP: Triangle Congruency
115 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
116 ANS: 4   PTS: 2   REF: 061203ge   STA: G.G.9
  TOP: Planes
117 ANS: 3   PTS: 2   REF: 081204ge   STA: G.G.59
  TOP: Properties of Transformations
118 ANS: 1
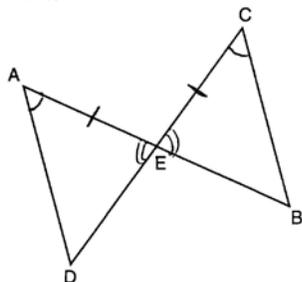
  PTS: 2   REF: 081210ge   STA: G.G.28   TOP: Triangle Congruency
119 ANS: 1   PTS: 2   REF: 011213ge   STA: G.G.24
  TOP: Negations
120 ANS: 2   PTS: 2   REF: 081117ge   STA: G.G.23
  TOP: Locus
121 ANS: 2   PTS: 2   REF: 061201ge   STA: G.G.59
  TOP: Properties of Transformations

122 ANS: 4

$$m_\perp = -\frac{1}{3}. \quad y = mx + b$$

$$6 = -\frac{1}{3}(-9) + b$$

$$6 = 3 + b$$

$$3 = b$$

PTS: 2 REF: 061215ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

123 ANS: 1 PTS: 2 REF: 061223ge STA: G.G.73
TOP: Equations of Circles

124 ANS: 3

The slope of $2y = x + 2$ is $\frac{1}{2}$, which is the opposite reciprocal of -2. $\quad 3 = -2(4) + b$

$$11 = b$$

PTS: 2 REF: 081228ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

125 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

126 ANS: 4

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

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

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

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

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

127 ANS: 1
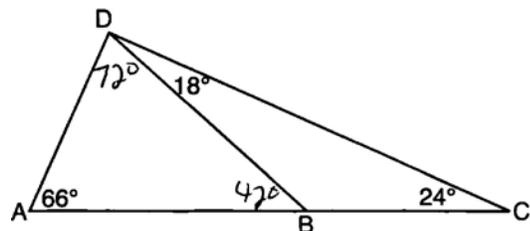
PTS: 2 REF: 081219ge STA: G.G.34 TOP: Angle Side Relationship

13

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

129 ANS: 3   PTS: 2   REF: 061220ge   STA: G.G.74
TOP: Graphing Circles

130 ANS: 4   PTS: 2   REF: 061124ge   STA: G.G.31
TOP: Isosceles Triangle Theorem

131 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

132 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

133 ANS: 1

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

$7x + 4 = 4x + 10$

$3x = 6$

$x = 2$

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

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

135 ANS: 3   PTS: 2   REF: 081227ge   STA: G.G.42
TOP: Midsegments

136 ANS: 1   PTS: 2   REF: 011128ge   STA: G.G.2
TOP: Planes

137 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

138 ANS: 3   PTS: 2   REF: 061111ge   STA: G.G.38
TOP: Parallelograms

139 ANS: 1   PTS: 2   REF: 061104ge   STA: G.G.43
TOP: Centroid

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

141 ANS: 2   PTS: 2   REF: 081108ge   STA: G.G.54
    TOP: Reflections   KEY: basic
142 ANS: 1   PTS: 2   REF: 061113ge   STA: G.G.63
    TOP: Parallel and Perpendicular Lines
143 ANS: 3
    $8^2 + 24^2 \neq 25^2$

    PTS: 2   REF: 011111ge   STA: G.G.48   TOP: Pythagorean Theorem
144 ANS: 2   PTS: 2   REF: 011125ge   STA: G.G.74
    TOP: Graphing Circles
145 ANS: 2   PTS: 2   REF: 061208ge   STA: G.G.19
    TOP: Constructions
146 ANS: 2   PTS: 2   REF: 011109ge   STA: G.G.9
    TOP: Planes
147 ANS: 4
    $$\sqrt{25^2 - \left(\frac{26-12}{2}\right)^2} = 24$$

    PTS: 2   REF: 011219ge   STA: G.G.40   TOP: Trapezoids
148 ANS: 4
    $$\sqrt{25^2 - 7^2} = 24$$

    PTS: 2   REF: 081105ge   STA: G.G.50   TOP: Tangents
    KEY: point of tangency
149 ANS: 3
    $-5 + 3 = -2$ $2 + -4 = -2$

    PTS: 2   REF: 011107ge   STA: G.G.54   TOP: Translations
150 ANS: 3   PTS: 2   REF: 081209ge   STA: G.G.71
    TOP: Equations of Circles
151 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
152 ANS: 2   PTS: 2   REF: 061115ge   STA: G.G.69
    TOP: Triangles in the Coordinate Plane
153 ANS: 3   PTS: 2   REF: 061218ge   STA: G.G.36
    TOP: Interior and Exterior Angles of Polygons

154 ANS: 4
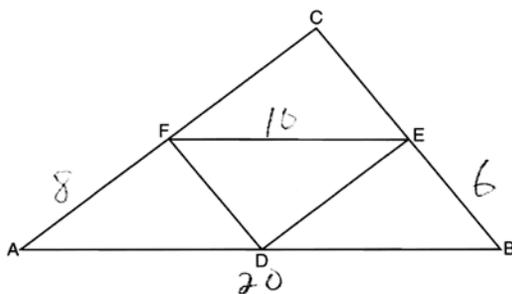
$20 + 8 + 10 + 6 = 44.$

PTS: 2   REF: 061211ge   STA: G.G.42   TOP: Midsegments
155 ANS: 4   PTS: 2   REF: 081101ge   STA: G.G.25
TOP: Compound Statements   KEY: conjunction
156 ANS: 4   PTS: 2   REF: 061118ge   STA: G.G.1
TOP: Planes
157 ANS: 1   PTS: 2   REF: 081121ge   STA: G.G.39
TOP: Special Parallelograms
158 ANS: 3   PTS: 2   REF: 081218ge   STA: G.G.1
TOP: Planes
159 ANS: 2

$V = \dfrac{4}{3}\,\pi r^3 = \dfrac{4}{3}\,\pi \cdot 3^3 = 36\pi$

PTS: 2   REF: 061112ge   STA: G.G.16   TOP: Volume and Surface Area
160 ANS: 2
$5 - 3 = 2, 5 + 3 = 8$

PTS: 2   REF: 011228ge   STA: G.G.33   TOP: Triangle Inequality Theorem
161 ANS: 2
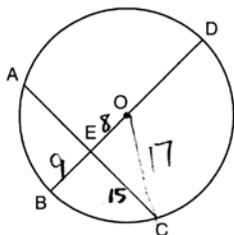
$\sqrt{17^2 - 15^2} = 8. \ \ 17 - 8 = 9$

PTS: 2   REF: 061221ge   STA: G.G.49   TOP: Chords
162 ANS: 1   PTS: 2   REF: 011218ge   STA: G.G.3
TOP: Planes
163 ANS: 2   PTS: 2   REF: 081205ge   STA: G.G.17
TOP: Constructions
164 ANS: 2   PTS: 2   REF: 011203ge   STA: G.G.73
TOP: Equations of Circles
165 ANS: 4   PTS: 2   REF: 011118ge   STA: G.G.25
TOP: Compound Statements   KEY: general

166 ANS: 1   PTS: 2   REF: 011221ge   STA: G.G.10
    TOP: Solids
167 ANS: 3   PTS: 2   REF: 011105ge   STA: G.G.10
    TOP: Solids
168 ANS: 3

As originally administered, this question read, "Which fact is *not* sufficient to show that planes $\mathcal{R}$ and $\mathcal{S}$ are perpendicular?" The State Education Department stated that since a correct solution was not provided for Question 11, all students shall be awarded credit for this question.

PTS: 2   REF: 081211ge   STA: G.G.5   TOP: Planes

Geometry Multiple Choice Regents Exam Questions
Answer Section

169 ANS: 2   PTS: 2   REF: 061305ge   STA: G.G.18
     TOP: Constructions

170 ANS: 2   PTS: 2   REF: 061322ge   STA: G.G.51
     TOP: Arcs Determined by Angles   KEY: inscribed

171 ANS: 2

$$x^2 - 2 = x$$
$$x^2 - x - 2 = 0$$
$$(x-2)(x+1) = 0$$
$$x = 2, -1$$

     PTS: 2   REF: 011409ge   STA: G.G.70   TOP: Quadratic-Linear Systems

172 ANS: 4   PTS: 2   REF: 081308ge   STA: G.G.49
     TOP: Chords

173 ANS: 3   PTS: 2   REF: 061309ge   STA: G.G.72
     TOP: Equations of Circles

174 ANS: 2

$m\angle ABC = 55$, so $m\angle ACR = 60 + 55 = 115$

     PTS: 2   REF: 011414ge   STA: G.G.32   TOP: Exterior Angle Theorem

175 ANS: 3

$$25 \times 9 \times 12 = 15^2 h$$
$$2700 = 15^2 h$$
$$12 = h$$

     PTS: 2   REF: 061323ge   STA: G.G.11   TOP: Volume

176 ANS: 2

Perimeter of ΔDEF is $5 + 8 + 11 = 24$. $\dfrac{5}{24} = \dfrac{x}{60}$

$$24x = 300$$
$$x = 12.5$$

     PTS: 2   REF: 011307ge   STA: G.G.45   TOP: Similarity
     KEY: perimeter and area

177 ANS: 2

$$\sqrt{17^2 - 15^2} = \sqrt{289 - 225} = \sqrt{64} = 8$$

     PTS: 2   REF: 011424ge   STA: G.G.49   TOP: Chords

178 ANS: 1
$2x + x = 12.$ $\overline{BD} = 2(4) = 8$
$\quad 3x = 12$
$\quad\ \ x = 4$

   PTS: 2   REF: 011408ge   STA: G.G.43   TOP: Centroid
179 ANS: 1   PTS: 2   REF: 011405ge   STA: G.G.59
   TOP: Properties of Transformations
180 ANS: 3   PTS: 2   REF: 081309ge   STA: G.G.29
   TOP: Triangle Congruency
181 ANS: 3
$3x - 15 = 2(6)$
$\quad\ 3x = 27$
$\quad\ \ x = 9$

   PTS: 2   REF: 061311ge   STA: G.G.42   TOP: Midsegments
182 ANS: 1   PTS: 2   REF: 061310ge   STA: G.G.2
   TOP: Planes
183 ANS: 3   PTS: 2   REF: 061306ge   STA: G.G.71
   TOP: Equations of Circles
184 ANS: 2   PTS: 2   REF: 081301ge   STA: G.G.24
   TOP: Statements
185 ANS: 3
   midpoint: $\left(\dfrac{6+8}{2}, \dfrac{8+4}{2} \right) = (7,6).$ slope: $\dfrac{8-4}{6-8} = \dfrac{4}{-2} = -2; m_\perp = \dfrac{1}{2}.$ $6 = \dfrac{1}{2}(7) + b$
   $$\dfrac{12}{2} = \dfrac{7}{2} + b$$
   $$\dfrac{5}{12} = b$$

   PTS: 2   REF: 081327ge   STA: G.G.68   TOP: Perpendicular Bisector
186 ANS: 3
   $2y = 3x - 4.$ $1 = \dfrac{3}{2}(6) + b$
   $y = \dfrac{3}{2}x - 2$ $1 = 9 + b$
   $\qquad\qquad -8 = b$

   PTS: 2   REF: 061316ge   STA: G.G.65   TOP: Parallel and Perpendicular Lines
187 ANS: 4
   Distance is preserved after a rotation.

   PTS: 2   REF: 081304ge   STA: G.G.55   TOP: Properties of Transformations
188 ANS: 4   PTS: 2   REF: 011426ge   STA: G.G.73
   TOP: Equations of Circles

189 ANS: 3   PTS: 2   REF: 081320ge   STA: G.G.42
    TOP: Midsegments
190 ANS: 4
    $(x, y) \rightarrow (-x, -y)$

    PTS: 2   REF: 061304ge   STA: G.G.54   TOP: Rotations
191 ANS: 2
    $(x - 4)^2 - 2 = -2x + 6.$ $y = -2(4) + 6 = -2$

    $x^2 - 8x + 16 - 2 = -2x + 6$ $y = -2(2) + 6 = 2$

    $x^2 - 6x + 8 = 0$

    $(x - 4)(x - 2) = 0$

    $x = 4, 2$

    PTS: 2   REF: 081319ge   STA: G.G.70   TOP: Quadratic-Linear Systems
192 ANS: 4   PTS: 2   REF: 011406ge   STA: G.G.10
    TOP: Solids
193 ANS: 3
    $\dfrac{15}{18} = \dfrac{5}{6}$

    PTS: 2   REF: 081317ge   STA: G.G.45   TOP: Similarity
    KEY: perimeter and area
194 ANS: 3
    $m = \dfrac{-A}{B} = \dfrac{-3}{-2} = \dfrac{3}{2}$

    PTS: 2   REF: 011324ge   STA: G.G.63   TOP: Parallel and Perpendicular Lines
195 ANS: 2

    Isosceles or not, $\triangle RSV$ and $\triangle RST$ have a common base, and since $\overline{RS}$ and $\overline{VT}$ are bases, congruent altitudes.

    PTS: 2   REF: 061301ge   STA: G.G.40   TOP: Trapezoids
196 ANS: 1   PTS: 2   REF: 011412ge   STA: G.G.28
    TOP: Triangle Congruency
197 ANS: 3
    $x^2 + 5^2 = 25$

    $x = 0$

    PTS: 2   REF: 011312ge   STA: G.G.70   TOP: Quadratic-Linear Systems
198 ANS: 3
    $AB = 8 - 4 = 4. \; BC = \sqrt{(-2 - (-5))^2 + (8 - 6)^2} = \sqrt{13}. \; AC = \sqrt{(-2 - (-5))^2 + (4 - 6)^2} = \sqrt{13}$

    PTS: 2   REF: 011328ge   STA: G.G.69   TOP: Triangles in the Coordinate Plane

199 ANS: 3

$$x^2 = 2(2 + 10)$$

$$x^2 = 24$$

$$x = \sqrt{24} = \sqrt{4}\sqrt{6} = 2\sqrt{6}$$

PTS: 2   REF: 081326ge   STA: G.G.47   TOP: Similarity
KEY: leg

200 ANS: 2
(1) is true because of vertical angles. (3) and (4) are true because CPCTC.

PTS: 2   REF: 061302ge   STA: G.G.29   TOP: Triangle Congruency

201 ANS: 4

$$m\overleftrightarrow{AB} = \frac{6-3}{7-5} = \frac{3}{2}. \quad m\overleftrightarrow{CD} = \frac{4-0}{6-9} = \frac{4}{-3}$$

PTS: 2   REF: 061318ge   STA: G.G.63   TOP: Parallel and Perpendicular Lines

202 ANS: 2

$$\sqrt{(-2-4)^2 + (-3-(-1))^2} = \sqrt{40} = \sqrt{4}\sqrt{10} = 2\sqrt{10}$$

PTS: 2   REF: 011313ge   STA: G.G.69   TOP: Quadrilaterals in the Coordinate Plane

203 ANS: 1   PTS: 2   REF: 011303ge   STA: G.G.24
TOP: Statements

204 ANS: 2

$$m = \frac{-A}{B} = \frac{-5}{1} = -5 \quad y = mx + b$$
$$3 = -5(5) + b$$
$$28 = b$$

PTS: 2   REF: 011410ge   STA: G.G.65   TOP: Parallel and Perpendicular Lines

205 ANS: 2

$$s^2 + s^2 = (3\sqrt{2})^2$$
$$2s^2 = 18$$
$$s^2 = 9$$
$$s = 3$$

PTS: 2   REF: 011420ge   STA: G.G.39   TOP: Special Parallelograms

206 ANS: 1   PTS: 2   REF: 061307ge   STA: G.G.55
TOP: Properties of Transformations

207 ANS: 2   PTS: 2   REF: 081316ge   STA: G.G.23
TOP: Locus

208 ANS: 4   PTS: 2   REF: 081313ge   STA: G.G.19
TOP: Constructions

209 ANS: 1   PTS: 2   REF: 061314ge   STA: G.G.26
TOP: Converse and Biconditional

210 ANS: 2

The slope of $2x + 4y = 12$ is $m = \dfrac{-A}{B} = \dfrac{-2}{4} = -\dfrac{1}{2}$. $m_\perp = 2$.

PTS: 2   REF: 011310ge   STA: G.G.62   TOP: Parallel and Perpendicular Lines
211 ANS: 3   PTS: 2   REF: 011427ge   STA: G.G.56
TOP: Identifying Transformations
212 ANS: 1   PTS: 2   REF: 011301ge   STA: G.G.29
TOP: Triangle Congruency
213 ANS: 4   PTS: 2   REF: 011315ge   STA: G.G.1
TOP: Planes
214 ANS: 3   PTS: 2   REF: 011322ge   STA: G.G.49
TOP: Chords
215 ANS: 1

$\dfrac{180 - 52}{2} = 64$. $180 - (90 + 64) = 26$

PTS: 2   REF: 011314ge   STA: G.G.30   TOP: Interior and Exterior Angles of Triangles
216 ANS: 4

$2x - 8 = x + 2$. $AE = 10 + 2 = 12$. $AC = 2(AE) = 2(12) = 24$

$x = 10$

PTS: 2   REF: 011327ge   STA: G.G.39   TOP: Special Parallelograms
217 ANS: 4   PTS: 2   REF: 011407ge   STA: G.G.23
TOP: Locus
218 ANS: 2

$\dfrac{(n - 2)180}{n} = 120$.

$180n - 360 = 120n$

$60n = 360$

$n = 6$

PTS: 2   REF: 011326ge   STA: G.G.37   TOP: Interior and Exterior Angles of Polygons
219 ANS: 3   PTS: 2   REF: 011311ge   STA: G.G.42
TOP: Midsegments
220 ANS: 4

$6x = x + 40 + 3x + 10$. $m\angle CAB = 25 + 40 = 65$

$6x = 4x + 50$

$2x = 50$

$x = 25$

PTS: 2   REF: 081310ge   STA: G.G.32   TOP: Exterior Angle Theorem
221 ANS: 4   PTS: 2   REF: 061319ge   STA: G.G.73
TOP: Equations of Circles

222 ANS: 2   PTS: 2   REF: 081306ge   STA: G.G.34
    TOP: Angle Side Relationship

223 ANS: 4

$m = \dfrac{2}{3}$. $2 = -\dfrac{3}{2}(4) + b$

$m_\perp = -\dfrac{3}{2}$ $2 = -6 + b$

$8 = b$

PTS: 2   REF: 011319ge   STA: G.G.64   TOP: Parallel and Perpendicular Lines

224 ANS: 3

$120\pi = \pi(12)(l)$

$10 = l$

PTS: 2   REF: 081314ge   STA: G.G.15   TOP: Volume and Lateral Area

225 ANS: 3

$6 = \dfrac{4+x}{2}$. $8 = \dfrac{2+y}{2}$.

$4 + x = 12$ $2 + y = 16$

$x = 8$ $y = 14$

PTS: 2   REF: 011305ge   STA: G.G.66   TOP: Midpoint

226 ANS: 1   PTS: 2   REF: 081323ge   STA: G.G.9
    TOP: Planes

227 ANS: 2   PTS: 2   REF: 011411ge   STA: G.G.27
    TOP: Quadrilateral Proofs

228 ANS: 1

$x^2 = 3 \times 12$

$x = 6$

PTS: 2   REF: 011308ge   STA: G.G.47   TOP: Similarity
KEY: altitude

229 ANS: 3   PTS: 2   REF: 011402ge   STA: G.G.17
    TOP: Constructions

230 ANS: 4   PTS: 2   REF: 011415ge   STA: G.G.72
    TOP: Equations of Circles

231 ANS: 4   PTS: 2   REF: 011403ge   STA: G.G.73
    TOP: Equations of Circles

232 ANS: 2

$2^2 + 3^2 \neq 4^2$

PTS: 2   REF: 011316ge   STA: G.G.48   TOP: Pythagorean Theorem

233 ANS: 1

If two prisms have equal heights and volume, the area of their bases is equal.

PTS: 2   REF: 081321ge   STA: G.G.11   TOP: Volume

234 ANS: 1

$8 \times 12 = 16x$

$6 = x$

PTS: 2   REF: 081328ge   STA: G.G.53   TOP: Segments Intercepted by Circle
KEY: two chords

235 ANS: 3

$180 - 38 = 142$

PTS: 2   REF: 011419ge   STA: G.G.50   TOP: Tangents
KEY: two tangents

236 ANS: 2

$18\pi \cdot 42 \approx 2375$

PTS: 2   REF: 011418ge   STA: G.G.14   TOP: Volume and Lateral Area

237 ANS: 3

The centroid divides each median into segments whose lengths are in the ratio 2 : 1.

PTS: 2   REF: 081307ge   STA: G.G.43   TOP: Centroid

238 ANS: 2   PTS: 2   REF: 011317ge   STA: G.G.22
TOP: Locus

239 ANS: 4   PTS: 2   REF: 081318ge   STA: G.G.26
TOP: Converse and Biconditional

240 ANS: 1

Parallel chords intercept congruent arcs. $m\overgroup{AC} = m\overgroup{BD}$. $\dfrac{180 - 110}{2} = 35$.

PTS: 2   REF: 081302ge   STA: G.G.52   TOP: Chords

241 ANS: 4

$3y + 6 = 2x \qquad 2y - 3x = 6$

$3y = 2x - 6 \qquad 2y = 3x + 6$

$y = \dfrac{2}{3}x - 2 \qquad y = \dfrac{3}{2}x + 3$

$m = \dfrac{2}{3} \qquad\qquad m = \dfrac{3}{2}$

PTS: 2   REF: 081315ge   STA: G.G.63   TOP: Parallel and Perpendicular Lines

242 ANS: 3

$x^2 = 3 \times 12$. $\sqrt{6^2 + 3^2} = \sqrt{45} = \sqrt{9}\sqrt{5} = 3\sqrt{5}$

$x = 6$

PTS: 2   REF: 061327ge   STA: G.G.47   TOP: Similarity
KEY: altitude

243 ANS: 4   PTS: 2   REF: 011421ge   STA: G.G.54
TOP: Rotations

244 ANS: 2

$\sqrt{15^2 - 12^2} = 9$

PTS: 2   REF: 081325ge   STA: G.G.50   TOP: Tangents
KEY: point of tangency
245 ANS: 3   PTS: 2   REF: 011425ge   STA: G.G.39
TOP: Special Parallelograms
246 ANS: 4   PTS: 2   REF: 081305ge   STA: G.G.71
TOP: Equations of Circles
247 ANS: 1   PTS: 2   REF: 081303ge   STA: G.G.24
TOP: Negations
248 ANS: 3   PTS: 2   REF: 081312ge   STA: G.G.72
TOP: Equations of Circles
249 ANS: 3

The regular polygon with the smallest interior angle is an equilateral triangle, with 60º. 180° − 60° = 120°

PTS: 2   REF: 011417ge   STA: G.G.37   TOP: Interior and Exterior Angles of Polygons
250 ANS: 4   PTS: 2   REF: 011306ge   STA: G.G.9
TOP: Planes
251 ANS: 1   PTS: 2   REF: 011404ge   STA: G.G.9
TOP: Planes
252 ANS: 4   PTS: 2   REF: 011323ge   STA: G.G.72
TOP: Equations of Circles
253 ANS: 2   PTS: 2   REF: 081311ge   STA: G.G.10
TOP: Solids
254 ANS: 1

$\dfrac{70 - 20}{2} = 25$

PTS: 2   REF: 011325ge   STA: G.G.51   TOP: Arcs Determined by Angles
KEY: outside circle
255 ANS: 4

$(n - 2)180 - n\left(\dfrac{(n - 2)180}{n}\right) = 180n - 360 - 180n + 180n - 360 = 180n - 720.$

$180(5) - 720 = 180$

PTS: 2   REF: 081322ge   STA: G.G.37   TOP: Interior and Exterior Angles of Polygons
256 ANS: 1   PTS: 2   REF: 011320ge   STA: G.G.26
TOP: Conditional Statements
257 ANS: 2   PTS: 2   REF: 061315ge   STA: G.G.13
TOP: Solids

258 ANS: 1

$$7x - 36 + 5x + 12 = 180$$

$$12x - 24 = 180$$

$$12x = 204$$

$$x = 17$$

PTS: 2   REF: 011422ge   STA: G.G.35   TOP: Parallel Lines and Transversals

259 ANS: 3   PTS: 2   REF: 061320ge   STA: G.G.35
     TOP: Parallel Lines and Transversals

260 ANS: 3

$$2(4x + 20) + 2(3x - 15) = 360. \quad \angle D = 3(25) - 15 = 60$$

$$8x + 40 + 6x - 30 = 360$$

$$14x + 10 = 360$$

$$14x = 350$$

$$x = 25$$

PTS: 2   REF: 011321ge   STA: G.G.40   TOP: Trapezoids

261 ANS: 3   PTS: 2   REF: 011304ge   STA: G.G.56
     TOP: Identifying Transformations

262 ANS: 1   PTS: 2   REF: 061325ge   STA: G.G.74
     TOP: Graphing Circles

263 ANS: 3

$$3x + 1 + 4x - 17 + 5x - 20 = 180. \quad 3(18) + 1 = 55$$

$$12x - 36 = 180 \quad 4(18) - 17 = 55$$

$$12x = 216 \quad 5(18) - 20 = 70$$

$$x = 18$$

PTS: 2   REF: 061308ge   STA: G.G.30   TOP: Interior and Exterior Angles of Triangles

264 ANS: 1   PTS: 2   REF: 011416ge   STA: G.G.34
     TOP: Angle Side Relationship

265 ANS: 2   PTS: 2   REF: 061321ge   STA: G.G.34
     TOP: Angle Side Relationship

266 ANS: 2

$$\frac{6 + x}{2} = 4. \quad \frac{-4 + y}{2} = 2$$

$$x = 2 \qquad y = 8$$

PTS: 2   REF: 011401ge   STA: G.G.66   TOP: Midpoint

267 ANS: 3   PTS: 2   REF: 011309ge   STA: G.G.20
     TOP: Constructions

268 ANS: 4   PTS: 2   REF: 011428ge   STA: G.G.50
     TOP: Tangents   KEY: common tangency

269 ANS: 1   PTS: 2   REF: 081324ge   STA: G.G.74
    TOP: Graphing Circles

270 ANS: 1

$$V = \frac{4}{3} \pi r^3$$

$$44.6022 = \frac{4}{3} \pi r^3$$

$$10.648 \approx r^3$$

$$2.2 \approx r$$

    PTS: 2   REF: 061317ge   STA: G.G.16   TOP: Volume and Surface Area

271 ANS: 1
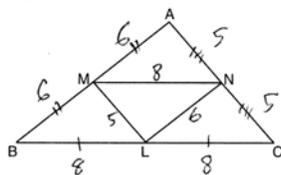
    PTS: 2   REF: 011413ge   STA: G.G.42   TOP: Midsegments

272 ANS: 2

$$M_x = \frac{8 + (-3)}{2} = 2.5. \quad M_Y = \frac{-4 + 2}{2} = -1.$$

    PTS: 2   REF: 061312ge   STA: G.G.66   TOP: Midpoint

273 ANS: 1   PTS: 2   REF: 011423ge   STA: G.G.71
    TOP: Equations of Circles

274 ANS: 2   PTS: 2   REF: 061313ge   STA: G.G.70
    TOP: Quadratic-Linear Systems

275 ANS: 2

Parallel chords intercept congruent arcs. $\dfrac{360 - (104 + 168)}{2} = 44$

    PTS: 2   REF: 011302ge   STA: G.G.52   TOP: Chords

276 ANS: 4   PTS: 2   REF: 061303ge   STA: G.G.22
    TOP: Locus

277 ANS: 4   PTS: 2   REF: 011318ge   STA: G.G.73
    TOP: Equations of Circles

Geometry Multiple Choice Regents Exam Questions
Answer Section

278 ANS: 2

$M_x = \dfrac{2 + (-4)}{2} = -1.$ $M_Y = \dfrac{-3 + 6}{2} = \dfrac{3}{2}.$

PTS: 2   REF: fall0813ge   STA: G.G.66   TOP: Midpoint
KEY: general

279 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

280 ANS: 1   PTS: 2   REF: 080918ge   STA: G.G.41
TOP: Special Quadrilaterals

281 ANS: 1

$x + 2x + 2 + 3x + 4 = 180$

$\qquad\qquad 6x + 6 = 180$

$\qquad\qquad\quad x = 29$

PTS: 2   REF: 011002ge   STA: G.G.30   TOP: Interior and Exterior Angles of Triangles

282 ANS: 1

$\angle A = \dfrac{(n-2)180}{n} = \dfrac{(5-2)180}{5} = 108$ $\angle AEB = \dfrac{180 - 108}{2} = 36$

PTS: 2   REF: 081022ge   STA: G.G.37   TOP: Interior and Exterior Angles of Polygons

283 ANS: 4   PTS: 2   REF: 060904ge   STA: G.G.13
TOP: Solids

284 ANS: 1

$\overline{AB} = 10$ since $\triangle ABC$ is a 6-8-10 triangle. $6^2 = 10x$

$\qquad\qquad\qquad\qquad\qquad 3.6 = x$

PTS: 2   REF: 060915ge   STA: G.G.47   TOP: Similarity
KEY: leg

285 ANS: 1   PTS: 2   REF: 060918ge   STA: G.G.2
TOP: Planes

286 ANS: 2   PTS: 2   REF: 061007ge   STA: G.G.35
TOP: Parallel Lines and Transversals

287 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

288 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

289 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

290 ANS: 4   PTS: 2   REF: 060922ge   STA: G.G.73

TOP: Equations of Circles

291 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

292 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

293 ANS: 3   PTS: 2   REF: 060905ge   STA: G.G.54

TOP: Reflections   KEY: basic

294 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

295 ANS: 3   PTS: 2   REF: 080924ge   STA: G.G.24
TOP: Negations
296 ANS: 1   PTS: 2   REF: 061013ge   STA: G.G.50
TOP: Tangents   KEY: point of tangency
297 ANS: 4   PTS: 2   REF: 081005ge   STA: G.G.18
TOP: Constructions
298 ANS: 4
$180 - (50 + 30) = 100$

PTS: 2   REF: 081006ge   STA: G.G.45   TOP: Similarity
KEY: basic
299 ANS: 2   PTS: 2   REF: 011003ge   STA: G.G.55
TOP: Properties of Transformations
300 ANS: 2
$$\frac{3}{7} = \frac{6}{x}$$
$$3x = 42$$
$$x = 14$$

PTS: 2   REF: 081027ge   STA: G.G.46   TOP: Side Splitter Theorem
301 ANS: 2   PTS: 2   REF: 011020ge   STA: G.G.74
TOP: Graphing Circles
302 ANS: 3
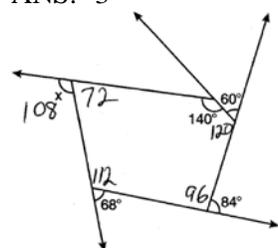
. The sum of the interior angles of a pentagon is $(5 - 2)180 = 540$.

PTS: 2   REF: 011023ge   STA: G.G.36   TOP: Interior and Exterior Angles of Polygons
303 ANS: 1
$(x, y) \rightarrow (x + 3, y + 1)$

PTS: 2   REF: fall0803ge   STA: G.G.54   TOP: Translations
304 ANS: 4   PTS: 2   REF: fall0802ge   STA: G.G.24
TOP: Negations
305 ANS: 3   PTS: 2   REF: 011010ge   STA: G.G.71
TOP: Equations of Circles
306 ANS: 4   PTS: 2   REF: 060912ge   STA: G.G.23
TOP: Locus
307 ANS: 2
$6 + 17 > 22$

PTS: 2   REF: 080916ge   STA: G.G.33   TOP: Triangle Inequality Theorem

308 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

309 ANS: 2

$y + \dfrac{1}{2}x = 4 \quad 3x + 6y = 12$

$y = -\dfrac{1}{2}x + 4$

$\quad\quad\quad 6y = -3x + 12$

$m = -\dfrac{1}{2}$

$\quad\quad\quad y = -\dfrac{3}{6}x + 2$

$\quad\quad\quad y = -\dfrac{1}{2}x + 2$

PTS: 2   REF: 081014ge   STA: G.G.63   TOP: Parallel and Perpendicular Lines

310 ANS: 1

$M_x = \dfrac{-2 + 6}{2} = 2$. $M_y = \dfrac{3 + 3}{2} = 3$. 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

311 ANS: 2

The slope of $2x + 3y = 12$ is $-\dfrac{A}{B} = -\dfrac{2}{3}$. The slope of a perpendicular line is $\dfrac{3}{2}$. Rewritten in slope intercept form,

(2) becomes $y = \dfrac{3}{2}x + 3$.

PTS: 2   REF: 060926ge   STA: G.G.63   TOP: Parallel and Perpendicular Lines

312 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

313 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

314 ANS: 4   PTS: 2   REF: 011012ge   STA: G.G.1
TOP: Planes

315 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

316 ANS: 1   PTS: 2   REF: 061010ge   STA: G.G.34

TOP: Angle Side Relationship

317 ANS: 1
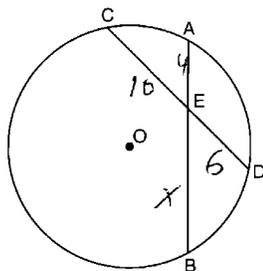
$4x = 6 \cdot 10$

$x = 15$

PTS: 2   REF: 081017ge   STA: G.G.53   TOP: Segments Intercepted by Circle

KEY: two chords

318 ANS: 2
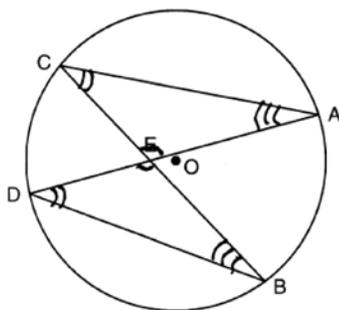
PTS: 2   REF: 061026GE   STA: G.G.51   TOP: Arcs Determined by Angles

KEY: inscribed

319 ANS: 4   PTS: 2   REF: 011009ge   STA: G.G.19

TOP: Constructions

320 ANS: 3
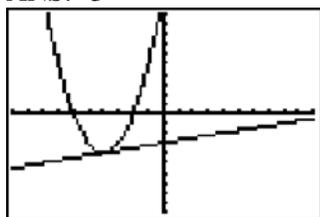
PTS: 2   REF: 061011ge   STA: G.G.70   TOP: Quadratic-Linear Systems

321 ANS: 4   PTS: 2   REF: 061018ge   STA: G.G.56

TOP: Identifying Transformations

5

322 ANS: 2   PTS: 2   REF: 080927ge   STA: G.G.4
  TOP: Planes
323 ANS: 1   PTS: 2   REF: 061005ge   STA: G.G.55
  TOP: Properties of Transformations
324 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
325 ANS: 1   PTS: 2   REF: 060903ge   STA: G.G.56
  TOP: Identifying Transformations
326 ANS: 3   PTS: 2   REF: 080928ge   STA: G.G.50
  TOP: Tangents   KEY: common tangency
327 ANS: 4

$SA = 4\pi r^2$ $V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot 6^3 = 288\pi$

$144\pi = 4\pi r^2$

$36 = r^2$

$6 = r$

  PTS: 2   REF: 081020ge   STA: G.G.16   TOP: Surface Area
328 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 and Lateral Area
329 ANS: 3   PTS: 2   REF: 061017ge   STA: G.G.1
  TOP: Planes
330 ANS: 3

$\frac{36 + 20}{2} = 28$

  PTS: 2   REF: 061019ge   STA: G.G.51   TOP: Arcs Determined by Angles
  KEY: inside circle
331 ANS: 4   PTS: 2   REF: fall0824ge   STA: G.G.50
  TOP: Tangents   KEY: common tangency

332 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

333 ANS: 2 PTS: 2 REF: 011011ge STA: G.G.22
TOP: Locus

334 ANS: 3 PTS: 2 REF: fall0816ge STA: G.G.1
TOP: Planes

335 ANS: 3

The slope of $y = x + 2$ is 1. The slope of $y - x = -1$ is $\frac{-A}{B} = \frac{-(-1)}{1} = 1$.

PTS: 2 REF: 080909ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

336 ANS: 2 PTS: 2 REF: 061324ge STA: G.G.44
TOP: Similarity Proofs

337 ANS: 2
$7 + 18 > 6 + 12$

PTS: 2 REF: fall0819ge STA: G.G.33 TOP: Triangle Inequality Theorem

338 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

339 ANS: 1
$12(8) = x(6)$

$96 = 6x$

$16 = x$

PTS: 2 REF: 061328ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two secants

340 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

341 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

342 ANS: 1   PTS: 2   REF: 081008ge   STA: G.G.3
TOP: Planes

343 ANS: 1   PTS: 2   REF: 061012ge   STA: G.G.20
TOP: Constructions

344 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

345 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 and Lateral Area

346 ANS: 4   PTS: 2   REF: 080905ge   STA: G.G.29
TOP: Triangle Congruency

347 ANS: 3
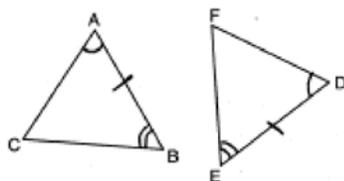
PTS: 2   REF: 060902ge   STA: G.G.28   TOP: Triangle Congruency

348 ANS: 2   PTS: 2   REF: 080921ge   STA: G.G.72
TOP: Equations of Circles

349 ANS: 2   PTS: 2   REF: 060910ge   STA: G.G.71
TOP: Equations of Circles

350 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

351 ANS: 4

The radius is 4. $r^2 = 16$.

PTS: 2   REF: 061014ge   STA: G.G.72   TOP: Equations of Circles

352 ANS: 1

Translations and reflections do not affect distance.

PTS: 2   REF: 080908ge   STA: G.G.61
TOP: Analytical Representations of Transformations

353 ANS: 1   PTS: 2   REF: 081009ge   STA: G.G.73
TOP: Equations of Circles

354 ANS: 3

$\dfrac{36 - 20}{2} = 8$. $\sqrt{17^2 - 8^2} = 15$
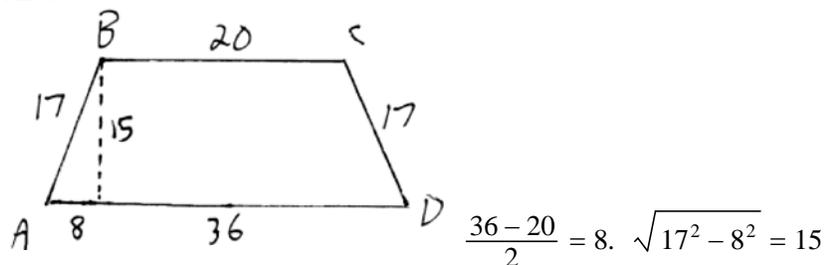
PTS: 2   REF: 061016ge   STA: G.G.40   TOP: Trapezoids

355 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

356 ANS: 3

$m = \dfrac{-A}{B} = \dfrac{5}{2}$. $m = \dfrac{-A}{B} = \dfrac{10}{4} = \dfrac{5}{2}$

PTS: 2   REF: 011014ge   STA: G.G.63   TOP: Parallel and Perpendicular Lines

357 ANS: 2

$M_x = \dfrac{-2 + 6}{2} = 2$. $M_y = \dfrac{-4 + 2}{2} = -1$

PTS: 2   REF: 080910ge   STA: G.G.66   TOP: Midpoint
KEY: general

358 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

359 ANS: 4   PTS: 2   REF: 080914ge   STA: G.G.7
TOP: Planes

9

360 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
361 ANS: 2　　　　　　PTS: 2　　　　　REF: 081015ge　　STA: G.G.56
TOP: Identifying Transformations
362 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
363 ANS: 4　　　　　　PTS: 2　　　　　REF: 060913ge　　STA: G.G.26
TOP: Conditional Statements
364 ANS: 4　　　　　　PTS: 2　　　　　REF: 061008ge　　STA: G.G.40
TOP: Trapezoids
365 ANS: 4　　　　　　PTS: 2　　　　　REF: 080925ge　　STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter
366 ANS: 4
Corresponding angles of similar triangles are congruent.

PTS: 2　　　　　　REF: fall0826ge　　STA: G.G.45　　　TOP: Similarity
KEY: perimeter and area
367 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
368 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
369 ANS: 2　　　　　　PTS: 2　　　　　REF: 061022ge　　STA: G.G.62
TOP: Parallel and Perpendicular Lines
370 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 and Lateral Area
371 ANS: 4
$180 - (40 + 40) = 100$

PTS: 2　　　　　　REF: 080903ge　　STA: G.G.31　　　TOP: Isosceles Triangle Theorem

372 ANS: 4
(4) is not true if $\angle PQR$ is obtuse.

PTS: 2   REF: 060924ge   STA: G.G.32   TOP: Exterior Angle Theorem
373 ANS: 1
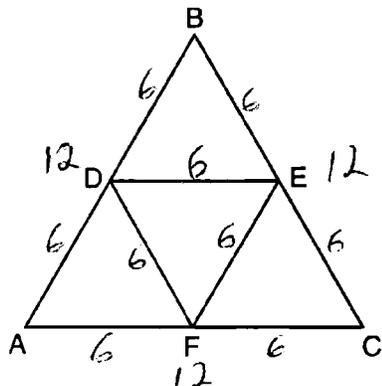
PTS: 2   REF: 081003ge   STA: G.G.42   TOP: Midsegments
374 ANS: 2

The slope of a line in standard form is $-\dfrac{A}{B}$, so the slope of this line is $\dfrac{-2}{-1} = 2$. 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
375 ANS: 1   PTS: 2   REF: 081012ge   STA: G.G.50
TOP: Tangents   KEY: two tangents
376 ANS: 3   PTS: 2   REF: 080902ge   STA: G.G.17
TOP: Constructions
377 ANS: 4

The slope of a line in standard form is $-\dfrac{A}{B}$, so the slope of this line is $\dfrac{-4}{2} = -2$. 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

378 ANS: 1

$$3x + 15 + 2x - 1 = 6x + 2$$
$$5x + 14 = 6x + 2$$
$$x = 12$$
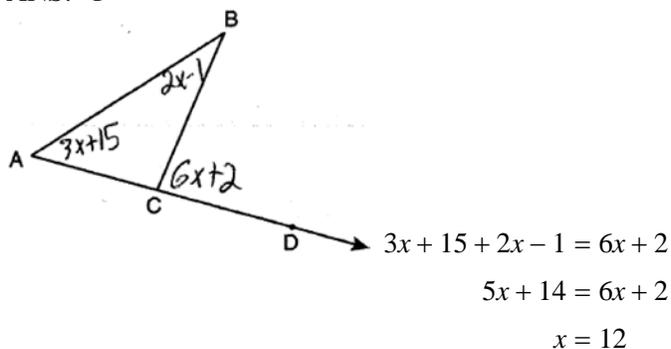
PTS: 2   REF: 011021ge   STA: G.G.32   TOP: Exterior Angle Theorem

379 ANS: 4   PTS: 2   REF: fall0818ge   STA: G.G.61
TOP: Analytical Representations of Transformations

380 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

381 ANS: 3   PTS: 2   REF: 080913ge   STA: G.G.28
TOP: Triangle Congruency

382 ANS: 4   PTS: 2   REF: 011019ge   STA: G.G.44
TOP: Similarity Proofs

383 ANS: 2   PTS: 2   REF: 061020ge   STA: G.G.19
TOP: Constructions

384 ANS: 2   PTS: 2   REF: 011006ge   STA: G.G.56
TOP: Identifying Transformations

385 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

386 ANS: 1   PTS: 2   REF: fall0807ge   STA: G.G.19
TOP: Constructions

387 ANS: 3   PTS: 2   REF: fall0825ge   STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

388 ANS: 2
A dilation affects distance, not angle measure.

PTS: 2   REF: 080906ge   STA: G.G.60   TOP: Identifying Transformations
389 ANS: 4   PTS: 2   REF: 061015ge   STA: G.G.56
TOP: Identifying Transformations
390 ANS: 3   PTS: 2   REF: 061004ge   STA: G.G.31
TOP: Isosceles Triangle Theorem
391 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
392 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
393 ANS: 1   PTS: 2   REF: 060920ge   STA: G.G.74
TOP: Graphing Circles
394 ANS: 3
The lateral edges of a prism are parallel.

PTS: 2   REF: fall0808ge   STA: G.G.10   TOP: Solids
395 ANS: 3
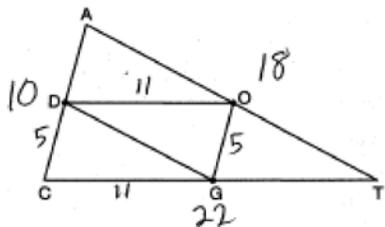
PTS: 2   REF: 080920ge   STA: G.G.42   TOP: Midsegments
396 ANS: 1   PTS: 2   REF: 061009ge   STA: G.G.26
TOP: Converse and Biconditional
397 ANS: 4
The marked 60º angle and the angle above it are on the same straight line and supplementary. This unmarked
supplementary angle is 120º. Because the unmarked 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

398 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

399 ANS: 4
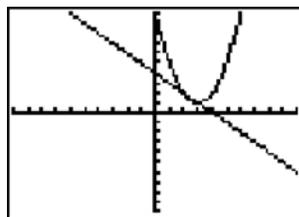
$y + x = 4$. $x^2 - 6x + 10 = -x + 4$. $y + x = 4$. $y + 2 = 4$

$y = -x + 4$ $x^2 - 5x + 6 = 0$ $y + 3 = 4$ $y = 2$

$(x - 3)(x - 2) = 0$ $y = 1$

$x = 3 \text{ or } 2$

PTS: 2   REF: 080912ge   STA: G.G.70   TOP: Quadratic-Linear Systems

400 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

401 ANS: 2

Because the triangles are similar, $\dfrac{m\angle A}{m\angle D} = 1$

PTS: 2   REF: 011022ge   STA: G.G.45   TOP: Similarity
KEY: perimeter and area

402 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

403 ANS: 2

$\dfrac{87 + 35}{2} = \dfrac{122}{2} = 61$

PTS: 2   REF: 011015ge   STA: G.G.51   TOP: Arcs Determined by Angles
KEY: inside circle

404 ANS: 3   PTS: 2   REF: 081002ge   STA: G.G.9
TOP: Planes
405 ANS: 3   PTS: 2   REF: fall0814ge   STA: G.G.73
TOP: Equations of Circles
406 ANS: 1
Parallel lines intercept congruent arcs.

PTS: 2   REF: 061001ge   STA: G.G.52   TOP: Chords
407 ANS: 2
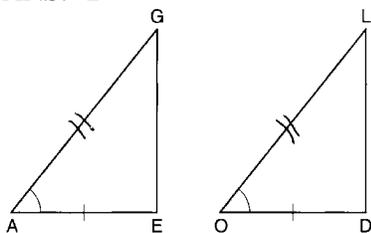
PTS: 2   REF: 081007ge   STA: G.G.28   TOP: Triangle Congruency
408 ANS: 1   PTS: 2   REF: 080911ge   STA: G.G.73
TOP: Equations of Circles
409 ANS: 2   PTS: 2   REF: 011004ge   STA: G.G.17
TOP: Constructions
410 ANS: 2

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

PTS: 2   REF: 081019ge   STA: G.G.66   TOP: Midpoint
KEY: general
411 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
412 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
413 ANS: 3   PTS: 2   REF: 060928ge   STA: G.G.8
TOP: Planes
414 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

415 ANS: 2   PTS: 2   REF: fall0806ge   STA: G.G.9
    TOP: Planes

416 ANS: 4

$3y + 1 = 6x + 4.$ $2y + 1 = x - 9$

    $3y = 6x + 3$ $2y = x - 10$

     $y = 2x + 1$ $y = \dfrac{1}{2}x - 5$

    PTS: 2   REF: fall0822ge   STA: G.G.63   TOP: Parallel and Perpendicular Lines

417 ANS: 2

Parallel chords intercept congruent arcs. $\text{m}\widehat{AD} = \text{m}\widehat{BC} = 60.$ $\text{m}\angle CDB = \dfrac{1}{2}\,\text{m}\widehat{BC} = 30.$

    PTS: 2   REF: 060906ge   STA: G.G.52   TOP: Chords

418 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

419 ANS: 1   PTS: 2   REF: 011024ge   STA: G.G.3
    TOP: Planes

420 ANS: 3   PTS: 2   REF: 081026ge   STA: G.G.26
    TOP: Contrapositive

421 ANS: 4   PTS: 2   REF: 061003ge   STA: G.G.10
    TOP: Solids

422 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

423 ANS: 4   PTS: 2   REF: 080915ge   STA: G.G.56
    TOP: Identifying Transformations

424 ANS: 1   PTS: 2   REF: 081028ge   STA: G.G.21
    TOP: Centroid, Orthocenter, Incenter and Circumcenter

425 ANS: 2

$\sqrt{8^2 + 15^2} = 17$

    PTS: 2   REF: 061326ge   STA: G.G.39   TOP: Special Parallelograms

426 ANS: 4

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

PTS: 2   REF: fall0827ge   STA: G.G.37   TOP: Interior and Exterior Angles of Polygons

427 ANS: 3   PTS: 2   REF: fall0804ge   STA: G.G.18
TOP: Constructions

428 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

429 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

430 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

431 ANS: 1
$A'(2,4)$

PTS: 2   REF: 011023ge   STA: G.G.54   TOP: Compositions of Transformations
KEY: basic

432 ANS: 2   PTS: 2   REF: 061002ge   STA: G.G.24
TOP: Negations

433 ANS: 4   PTS: 2   REF: 081023ge   STA: G.G.45
TOP: Similarity   KEY: perimeter and area

434 ANS: 2
The slope of a line in standard form is $-\dfrac{A}{B}$ so the slope of this line is $-\dfrac{5}{3}$ 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

435 ANS: 4
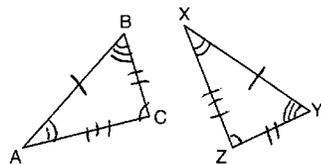
PTS: 2   REF: 081001ge   STA: G.G.29   TOP: Triangle Congruency

436 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

437 ANS: 3
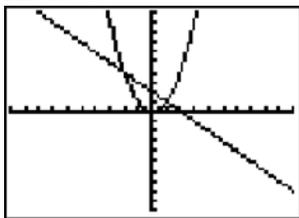
PTS: 2   REF: fall0805ge   STA: G.G.70   TOP: Quadratic-Linear Systems

438 ANS: 3

$$m = \frac{-A}{B} = -\frac{3}{4}$$

PTS: 2   REF: 011025ge   STA: G.G.62   TOP: Parallel and Perpendicular Lines

439 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

440 ANS: 4

Let $\overline{AD} = x$. $36x = 12^2$

$\qquad\qquad x = 4$

PTS: 2   REF: 080922ge   STA: G.G.47   TOP: Similarity
KEY: leg

441 ANS: 3   PTS: 2   REF: 060908ge   STA: G.G.60
TOP: Identifying Transformations

442 ANS: 3   PTS: 2   REF: 011007ge   STA: G.G.31
TOP: Isosceles Triangle Theorem

443 ANS: 3   PTS: 2   REF: 011028ge   STA: G.G.26
TOP: Conditional Statements

444 ANS: 3   PTS: 2   REF: 060925ge   STA: G.G.17
TOP: Constructions

445 ANS: 3   PTS: 2   REF: 081021ge   STA: G.G.57
TOP: Properties of Transformations

446 ANS: 1
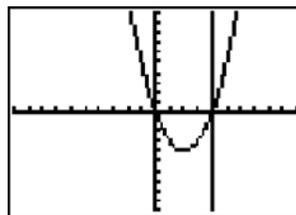
$y = x^2 - 4x = (4)^2 - 4(4) = 0$. $(4, 0)$ is the only intersection.

PTS: 2   REF: 060923ge   STA: G.G.70   TOP: Quadratic-Linear Systems

447   ANS: 2
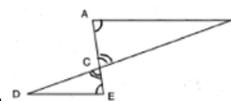
$\angle ACB$ and $\angle ECD$ are congruent vertical angles and $\angle CAB \cong \angle CED$.

PTS: 2   REF: 060917ge   STA: G.G.44   TOP: Similarity Proofs

448   ANS: 4

$\triangle ABC \sim \triangle DBE.$ $\dfrac{\overline{AB}}{\overline{DB}} = \dfrac{\overline{AC}}{\overline{DE}}$

$$\dfrac{9}{2} = \dfrac{x}{3}$$

$$x = 13.5$$

PTS: 2   REF: 060927ge   STA: G.G.46   TOP: Side Splitter Theorem

Geometry 2 Point Regents Exam Questions

Answer Section

449 ANS:

67. $\dfrac{180-46}{2}=67$

PTS: 2 REF: 011029ge STA: G.G.31 TOP: Isosceles Triangle Theorem

450 ANS:
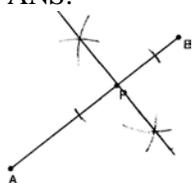
PTS: 2 REF: 081233ge STA: G.G.19 TOP: Constructions

451 ANS:

$m\overline{_{AB}}=\dfrac{4-1}{4-2}=\dfrac{3}{2}.\ m\overline{_{BC}}=-\dfrac{2}{3}$

PTS: 4 REF: 061334ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

452 ANS:

$\sqrt{(3-7)^2+(-4-2)^2}=\sqrt{16+36}=\sqrt{52}=\sqrt{4}\,\sqrt{13}=2\sqrt{13}$.

PTS: 2 REF: 011431ge STA: G.G.67 TOP: Distance

453 ANS:

The medians of a triangle are not concurrent. False.

PTS: 2 REF: 061129ge STA: G.G.24 TOP: Negations

454 ANS:

30.
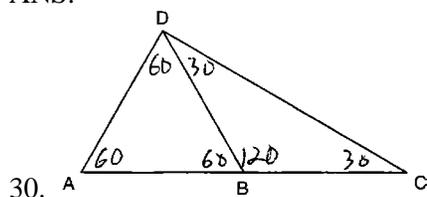
PTS: 2   REF: 011129ge   STA: G.G.31   TOP: Isosceles Triangle Theorem

455 ANS:

$L = 2\pi rh = 2\pi \cdot 12 \cdot 22 \approx 1659.$ $\dfrac{1659}{600} \approx 2.8.$ 3 cans are needed.

PTS: 2   REF: 061233ge   STA: G.G.14   TOP: Volume and Lateral Area

456 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

457 ANS:
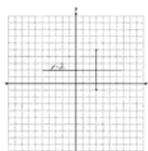
$M = \left(\dfrac{3+3}{2}, \dfrac{-1+5}{2} \right) = (3,2).$ $y = 2.$

PTS: 2   REF: 011334ge   STA: G.G.68   TOP: Perpendicular Bisector

458 ANS:

$(5-2)180 = 540.$ $\dfrac{540}{5} = 108$ interior. $180 - 108 = 72$ exterior

PTS: 2   REF: 011131ge   STA: G.G.37   TOP: Interior and Exterior Angles of Polygons

459 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

460 ANS:

$(x-5)^2 + (y+4)^2 = 36$

PTS: 2   REF: 081132ge   STA: G.G.72   TOP: Equations of Circles

461 ANS:

$(2a - 3, 3b + 2)$. $\left(\dfrac{3a + a - 6}{2}, \dfrac{2b - 1 + 4b + 5}{2} \right) = \left(\dfrac{4a - 6}{2}, \dfrac{6b + 4}{2} \right) = (2a - 3, 3b + 2)$

PTS: 2   REF: 061134ge   STA: G.G.66   TOP: Midpoint

462 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

463 ANS:
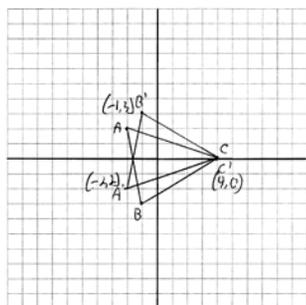
PTS: 2   REF: 011130ge   STA: G.G.54   TOP: Reflections
KEY: grids

464 ANS:

37. Since $\overline{DE}$ is a midsegment, $AC = 14$. $10 + 13 + 14 = 37$

PTS: 2   REF: 061030ge   STA: G.G.42   TOP: Midsegments

465 ANS:
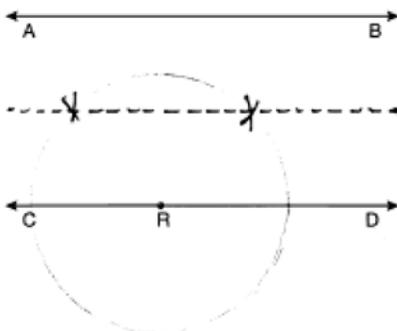
PTS: 2   REF: 061033ge   STA: G.G.22   TOP: Locus

3

466 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

467 ANS:

20. The sides of the triangle formed by connecting the midpoints are half the sides of the original triangle.
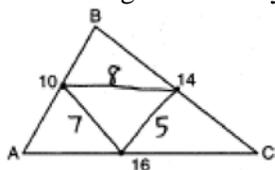
$5 + 7 + 8 = 20.$

PTS: 2   REF: 060929ge   STA: G.G.42   TOP: Midsegments

468 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

469 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

470 ANS:
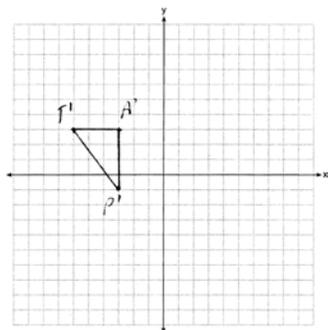
$T'(-6,3), A'(-3,3), P'(-3,-1)$

PTS: 2   REF: 061229ge   STA: G.G.54   TOP: Translations

471 ANS:

$EO = 6.$ $CE = \sqrt{10^2 - 6^2} = 8$

PTS: 2　　　REF: 011234ge　　STA: G.G.49　　TOP: Chords

472 ANS:

$\dfrac{180 - 80}{2} = 50$

PTS: 2　　　REF: 081129ge　　STA: G.G.52　　TOP: Chords

473 ANS:
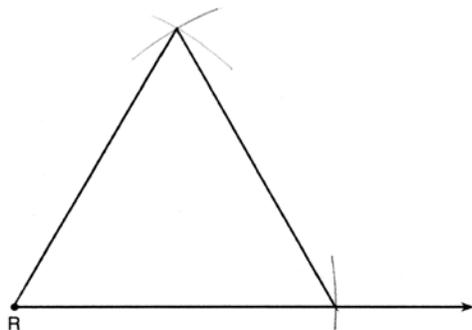

PTS: 2　　　REF: 061332ge　　STA: G.G.20　　TOP: Constructions

474 ANS:
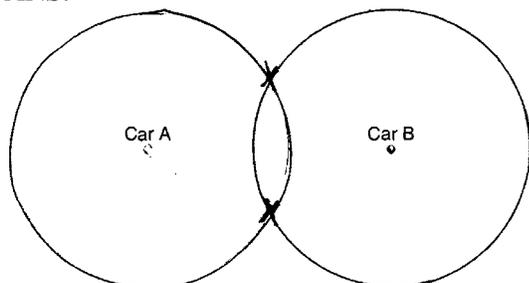
PTS: 2　　　REF: 081033ge　　STA: G.G.22　　TOP: Locus

475 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

476 ANS:

$A'(2,2), B'(3,0), C(1,-1)$

PTS: 2　　　REF: 081329ge　　STA: G.G.58　　TOP: Dilations

477 ANS:
2 is not a prime number, false.

PTS: 2   REF: 081229ge   STA: G.G.24   TOP: Negations

478 ANS:
$180 - (90 + 63) = 27$

PTS: 2   REF: 061230ge   STA: G.G.35   TOP: Parallel Lines and Transversals

479 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

480 ANS:
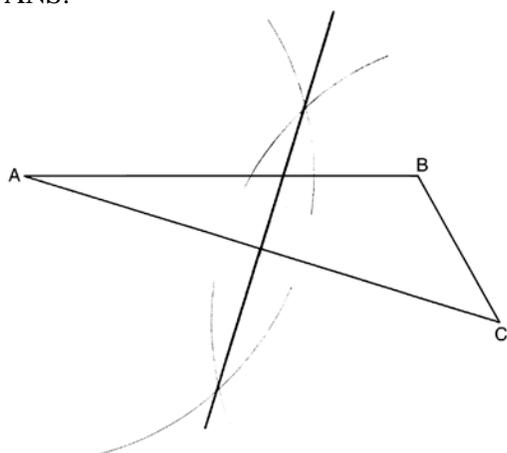
PTS: 2   REF: 081130ge   STA: G.G.18   TOP: Constructions

481 ANS:
Yes. A reflection is an isometry.

PTS: 2   REF: 061132ge   STA: G.G.55   TOP: Properties of Transformations

482 ANS:
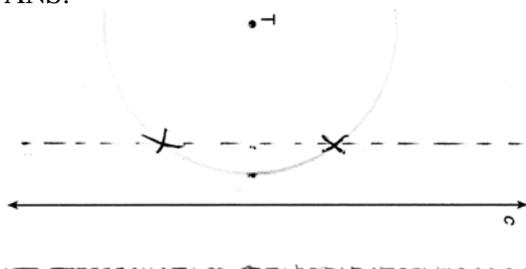
PTS: 2   REF: 011434ge   STA: G.G.22   TOP: Locus

483 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

484 ANS:

center: $(3, -4)$; radius: $\sqrt{10}$

PTS: 2   REF: 081333ge   STA: G.G.73   TOP: Equations of Circles

485 ANS:
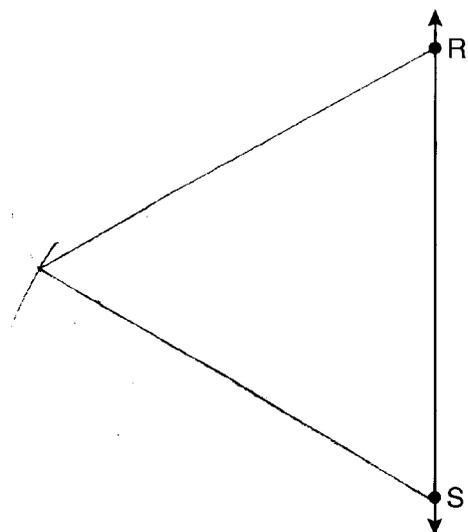
PTS: 2   REF: 061130ge   STA: G.G.20   TOP: Constructions

486 ANS:
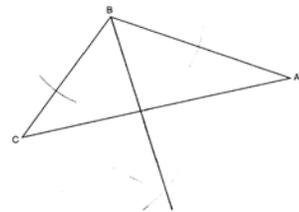
PTS: 2   REF: 061232ge   STA: G.G.17   TOP: Constructions

487 ANS:
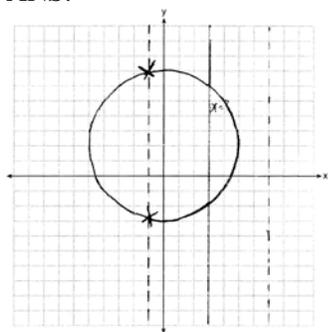
PTS: 2   REF: 061234ge   STA: G.G.23   TOP: Locus

488 ANS:
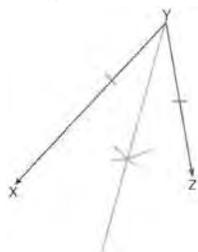
PTS: 2   REF: 011233ge   STA: G.G.17   TOP: Constructions

489 ANS:

$R'(-3,-2)$, $S'(-4,4)$, and $T'(2,2)$.

PTS: 2   REF: 011232ge   STA: G.G.54   TOP: Rotations

490 ANS:

$(6,-4)$. $C_x = \dfrac{Q_x + R_x}{2}$. $C_y = \dfrac{Q_y + R_y}{2}$.

$$3.5 = \frac{1 + R_x}{2} \qquad 2 = \frac{8 + R_y}{2}$$

$$7 = 1 + R_x \qquad 4 = 8 + R_y$$

$$6 = R_x \qquad -4 = R_y$$

PTS: 2   REF: 011031ge   STA: G.G.66   TOP: Midpoint

KEY: graph

491 ANS:

$y = \dfrac{2}{3}x - 9$. The slope of $2x - 3y = 11$ is $-\dfrac{A}{B} = \dfrac{-2}{-3} = \dfrac{2}{3}$. $-5 = \left(\dfrac{2}{3} \right)(6) + b$

$$-5 = 4 + b$$
$$b = -9$$

PTS: 2   REF: 080931ge   STA: G.G.65   TOP: Parallel and Perpendicular Lines

492 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

493 ANS:

2016. $V = \frac{1}{3} Bh = \frac{1}{3} s^2 h = \frac{1}{3} 12^2 \cdot 42 = 2016$

PTS: 2   REF: 080930ge   STA: G.G.13   TOP: Volume

494 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

495 ANS:
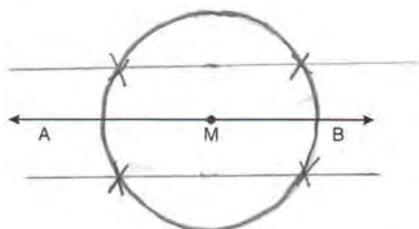
PTS: 2   REF: 011230ge   STA: G.G.22   TOP: Locus

496 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

497 ANS:
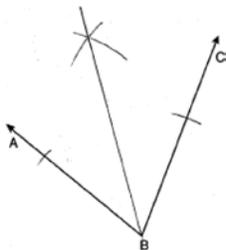
PTS: 2   REF: 080932ge   STA: G.G.17   TOP: Constructions

498 ANS:
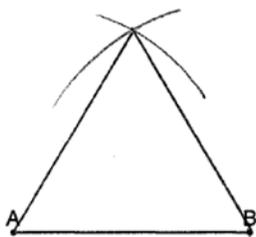
PTS: 2   REF: 011032ge   STA: G.G.20   TOP: Constructions

499 ANS:

$$\sqrt{(7-3)^2 + (-8-0)^2} = \sqrt{16+64} = \sqrt{80} = 4\sqrt{5}$$

PTS: 2   REF: 061331ge   STA: G.G.69   TOP: Triangles in the Coordinate Plane

500 ANS:

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

PTS: 2   REF: 061330ge   STA: G.G.37   TOP: Interior and Exterior Angles of Polygons

501 ANS:

20. $5x + 10 = 4x + 30$

$\qquad x = 20$

PTS: 2   REF: 060934ge   STA: G.G.45   TOP: Similarity
KEY: basic

502 ANS:

16.7. $\dfrac{x}{25} = \dfrac{12}{18}$

$\qquad 18x = 300$

$\qquad x \approx 16.7$

PTS: 2   REF: 061133ge   STA: G.G.46   TOP: Side Splitter Theorem

503 ANS:

Neither. The slope of $y = \dfrac{1}{2}x - 1$ is $\dfrac{1}{2}$. The slope of $y + 4 = -\dfrac{1}{2}(x-2)$ is $-\dfrac{1}{2}$. The slopes are neither the same nor opposite reciprocals.

PTS: 2   REF: 011433ge   STA: G.G.63   TOP: Parallel and Perpendicular Lines

504 ANS:
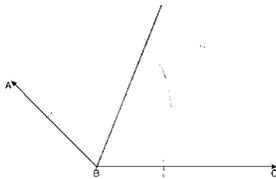
PTS: 2   REF: 011133ge   STA: G.G.17   TOP: Constructions

505 ANS:
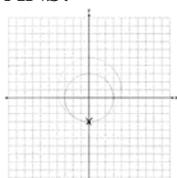
    PTS: 2   REF: 011331ge   STA: G.G.23   TOP: Locus

506 ANS:

    9.1. $(11)(8)h = 800$

           $h \approx 9.1$

    PTS: 2   REF: 061131ge   STA: G.G.12   TOP: Volume

507 ANS:
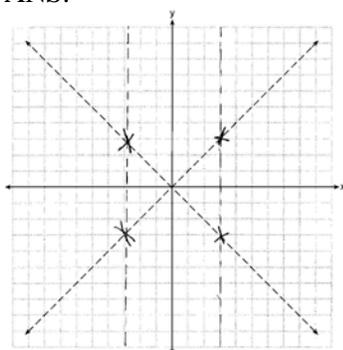
    PTS: 2   REF: 081234ge   STA: G.G.23   TOP: Locus

508 ANS:

    22.4. $V = \pi r^2 h$

      $12566.4 = \pi r^2 \cdot 8$

          $r^2 = \dfrac{12566.4}{8\pi}$

          $r \approx 22.4$

   PTS: 2   REF: fall0833ge   STA: G.G.14   TOP: Volume and Lateral Area

509 ANS:

    $V = \pi r^2 h = \pi(5)^2 \cdot 7 = 175\pi$

    PTS: 2   REF: 081231ge   STA: G.G.14   TOP: Volume and Lateral Area

510 ANS:
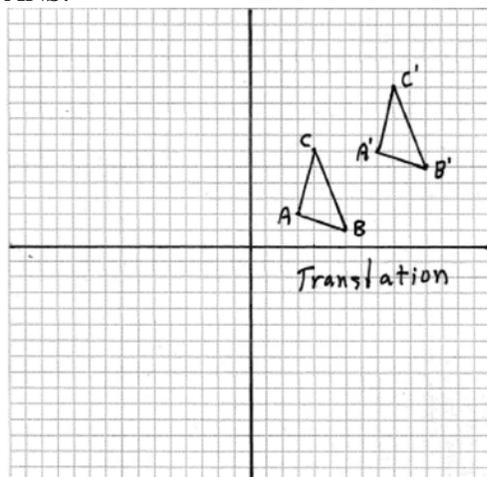
PTS: 2　　　　　REF: fall0830ge　　　STA: G.G.55　　　TOP: Properties of Transformations

511 ANS:

375π　$L = \pi r l = \pi(15)(25) = 375\pi$

PTS: 2　　　　　REF: 081030ge　　　STA: G.G.15　　　TOP: Lateral Area

512 ANS:

$\sqrt{(-1-3)^2 + (4-(-2))^2} = \sqrt{16+36} = \sqrt{52} = \sqrt{4}\sqrt{13} = 2\sqrt{13}$

PTS: 2　　　　　REF: 081331ge　　　STA: G.G.67　　　TOP: Distance

513 ANS:

The slope of $x + 2y = 4$ is $m = \dfrac{-A}{B} = \dfrac{-1}{2}$. The slope of $4y - 2x = 12$ is $\dfrac{-A}{B} = \dfrac{2}{4} = \dfrac{1}{2}$. 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

514 ANS:

$(x+1)^2 + (y-2)^2 = 36$

PTS: 2　　　　　REF: 081034ge　　　STA: G.G.72　　　TOP: Equations of Circles

515 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: Volume and Surface Area

516 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

517 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

518 ANS:

If $r = 5$, then $r^2 = 25$. $(x + 3)^2 + (y - 2)^2 = 25$

PTS: 2 REF: 011332ge STA: G.G.71 TOP: Equations of Circles

519 ANS:

Distance is preserved after the reflection. $2x + 13 = 9x - 8$

$$21 = 7x$$

$$3 = x$$

PTS: 2 REF: 011329ge STA: G.G.55 TOP: Properties of Transformations

520 ANS:
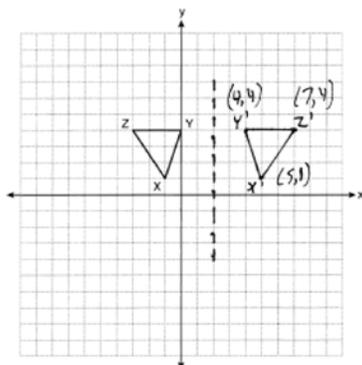
PTS: 2 REF: 061032ge STA: G.G.54 TOP: Reflections
KEY: grids

521 ANS:
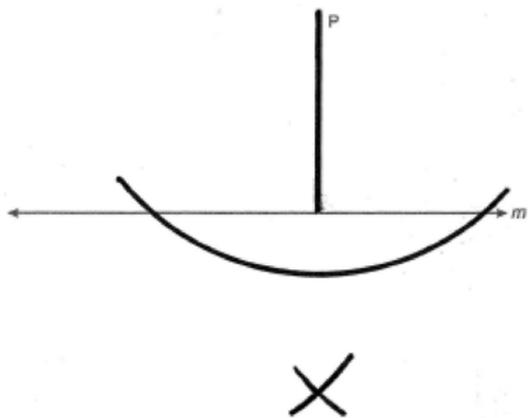
PTS: 2 REF: 060930ge STA: G.G.19 TOP: Constructions

522 ANS:

$y = -2x + 14$. The slope of $2x + y = 3$ is $\dfrac{-A}{B} = \dfrac{-2}{1} = -2$. $y = mx + b$.

$$4 = (-2)(5) + b$$
$$b = 14$$

PTS: 2 REF: 060931ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

523 ANS:
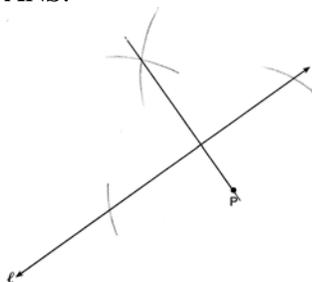
PTS: 2 REF: 011333ge STA: G.G.19 TOP: Constructions

524 ANS:

$\overline{AC}$. m$\angle BCA = 63$ and m$\angle ABC = 80$. $\overline{AC}$ is the longest side as it is opposite the largest angle.

PTS: 2 REF: 080934ge STA: G.G.34 TOP: Angle Side Relationship

525 ANS:
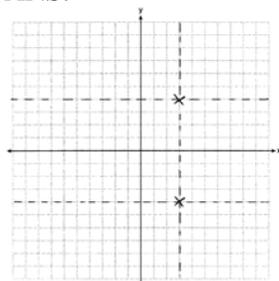
PTS: 2 REF: 061333ge STA: G.G.23 TOP: Locus

526 ANS:

$L = 2\pi rh = 2\pi \cdot 3 \cdot 7 = 42\pi$

PTS: 2 REF: 061329ge STA: G.G.14 TOP: Volume and Lateral Area

527 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

528 ANS:
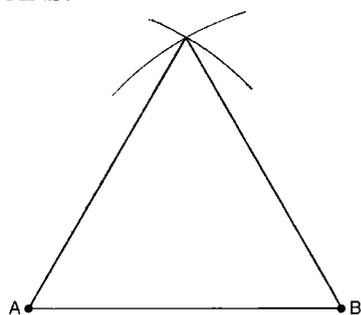
PTS: 2 REF: 081032ge STA: G.G.20 TOP: Constructions

529 ANS:
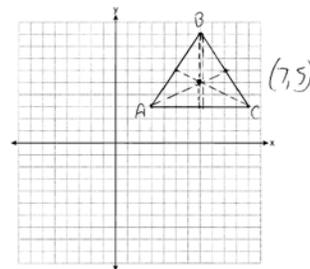
$(7,5)$ $m_{\overline{AB}} = \left(\dfrac{3+7}{2}, \dfrac{3+9}{2} \right) = (5,6)$ $m_{\overline{BC}} = \left(\dfrac{7+11}{2}, \dfrac{9+3}{2} \right) = (9,6)$

PTS: 2 REF: 081134ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

530 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

531 ANS:
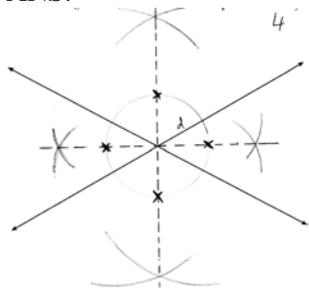
PTS: 2   REF: 081334ge   STA: G.G.22   TOP: Locus

532 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

533 ANS:
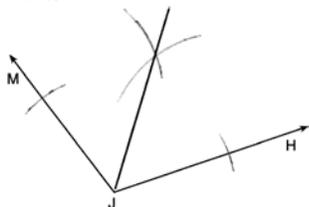

PTS: 2   REF: 081330ge   STA: G.G.17   TOP: Constructions

534 ANS:
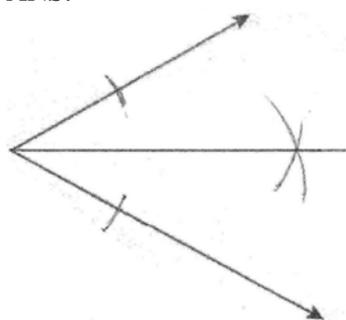
PTS: 2   REF: fall0832ge   STA: G.G.17   TOP: Constructions

535 ANS:
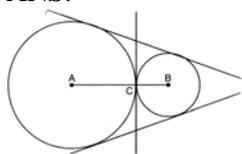
PTS: 2   REF: 011330ge   STA: G.G.50   TOP: Tangents
KEY: common tangency

536 ANS:
∠*ACB* ≅ ∠*AED* is given. ∠*A* ≅ ∠*A* because of the reflexive property. Therefore △*ABC* ~ △*ADE* because of AA.

PTS: 2   REF: 081133ge   STA: G.G.44   TOP: Similarity Proofs

537 ANS:
$SA = 4\pi r^2 = 4\pi \cdot 2.5^2 = 25\pi \approx 78.54$

PTS: 2   REF: 011429ge   STA: G.G.16   TOP: Volume and Surface Area

538 ANS:
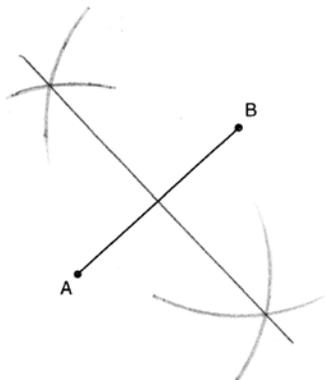
PTS: 2   REF: 011430ge   STA: G.G.18   TOP: Constructions

539 ANS:
$V = \dfrac{4}{3}\pi \cdot 9^3 = 972\pi$

PTS: 2   REF: 081131ge   STA: G.G.16   TOP: Volume and Surface Area

540 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

541 ANS:
$A = 2B - 15$. $2B - 15 + B + 2B - 15 + B = 180$

$C = A + B$ $6B - 30 = 180$

$C = 2B - 15 + B$ $6B = 210$

                            $B = 35$

PTS: 2   REF: 081332ge   STA: G.G.30   TOP: Interior and Exterior Angles of Triangles

17

542 ANS:
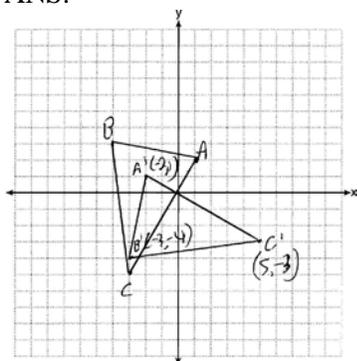
$A'(-2, 1)$, $B'(-3, -4)$, and $C'(5, -3)$

PTS: 2   REF: 081230ge   STA: G.G.54   TOP: Rotations

543 ANS:

$Bh = V$

$12h = 84$

$h = 7$

PTS: 2   REF: 011432ge   STA: G.G.12   TOP: Volume

544 ANS:
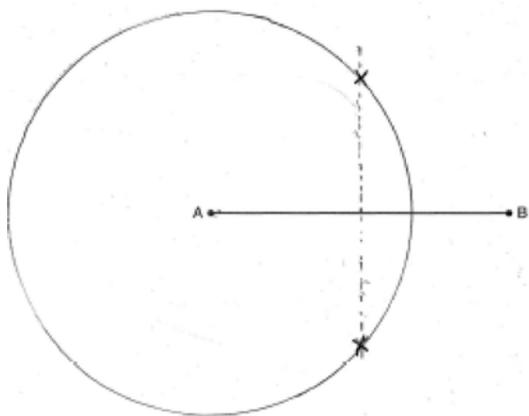
PTS: 2   REF: 060932ge   STA: G.G.22   TOP: Locus

Geometry 4 Point Regents Exam Questions
Answer Section

545 ANS:

2 $\dfrac{x+2}{x} = \dfrac{x+6}{4}$

$x^2 + 6x = 4x + 8$

$x^2 + 2x - 8 = 0$

$(x+4)(x-2) = 0$

$x = 2$

PTS: 4   REF: 081137ge   STA: G.G.45   TOP: Similarity
KEY: basic

546 ANS:
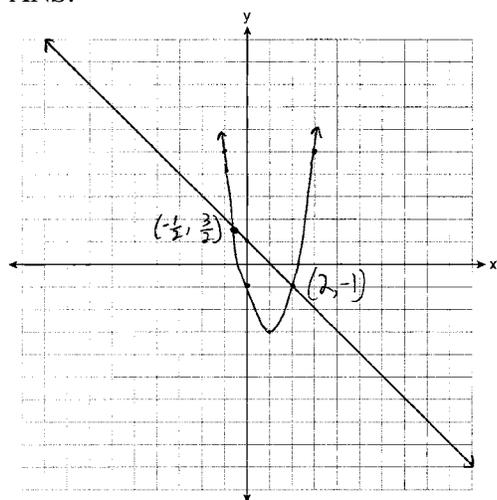
PTS: 4   REF: 061137ge   STA: G.G.70   TOP: Quadratic-Linear Systems

547 ANS:
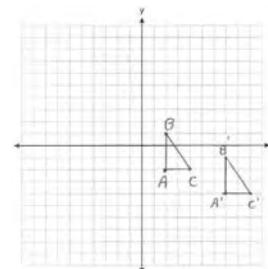
$A'(7,-4), B'(7,-1). C'(9,-4)$. The areas are equal because translations preserve distance.

PTS: 4   REF: 011235ge   STA: G.G.55   TOP: Properties of Transformations

548 ANS:

$2(y + 10) = 4y - 20.$ $\overline{DF} = y + 10 = 20 + 10 = 30.$ $\overline{OA} = \overline{OD} = \sqrt{16^2 + 30^2} = 34$

$\quad 2y + 20 = 4y - 20$

$\quad\quad\quad 40 = 2y$

$\quad\quad\quad 20 = y$

PTS: 4   REF: 061336ge   STA: G.G.49   TOP: Chords

549 ANS:

$\triangle ABC$, $\overline{BD}$ bisects $\angle ABC$, $\overline{BD} \perp \overline{AC}$ (Given). $\angle CBD \cong \angle ABD$ (Definition of angle bisector). $\overline{BD} \cong \overline{BD}$ (Reflexive property). $\angle CDB$ and $\angle ADB$ are right angles (Definition of perpendicular). $\angle CDB \cong \angle ADB$ (All right angles are congruent). $\triangle CDB \cong \triangle ADB$ (SAS). $\overline{AB} \cong \overline{CB}$ (CPCTC).

PTS: 4   REF: 081335ge   STA: G.G.27   TOP: Triangle Proofs

550 ANS:
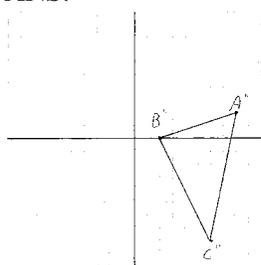
$A''(8, 2),\ B''(2, 0),\ C''(6, -8)$

PTS: 4   REF: 081036ge   STA: G.G.58   TOP: Compositions of Transformations

551 ANS:
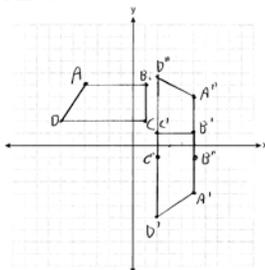
$A'(5, -4),\ B'(5, 1),\ C'(2, 1),\ D'(2, -6);\ A''(5, 4),\ B''(5, -1),\ C''(2, -1),\ D''(2, 6)$

PTS: 4   REF: 061236ge   STA: G.G.58   TOP: Compositions of Transformations
KEY: grids

552 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

553 ANS:
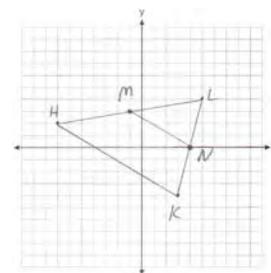
$M\left(\dfrac{-7+5}{2}, \dfrac{2+4}{2}\right) = M(-1,3).$ $N\left(\dfrac{3+5}{2}, \dfrac{-4+4}{2}\right) = N(4,0).$ $\overline{MN}$ is a midsegment.

PTS: 4 REF: 011237ge STA: G.G.42 TOP: Midsegments

554 ANS:

11. $\qquad x^2 + 6x = x + 14.$ $\quad 6(2) - 1 = 11$

$\quad x^2 + 5x - 14 = 0$

$\quad (x + 7)(x - 2) = 0$

$\qquad\qquad x = 2$

PTS: 2 REF: 081235ge STA: G.G.38 TOP: Parallelograms

555 ANS:

$y = \dfrac{4}{3}x - 6.$ $\quad M_x = \dfrac{-1+7}{2} = 3$ $\quad$ The perpendicular bisector goes through $(3, -2)$ and has a slope of $\dfrac{4}{3}$.

$\qquad\qquad M_y = \dfrac{1+(-5)}{2} = -2$

$\qquad\qquad m = \dfrac{1-(-5)}{-1-7} = -\dfrac{3}{4}$
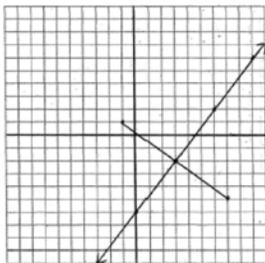
$y - y_M = m(x - x_M).$

$y - 1 = \dfrac{4}{3}(x - 2)$

PTS: 4 REF: 080935ge STA: G.G.68 TOP: Perpendicular Bisector

556 ANS:
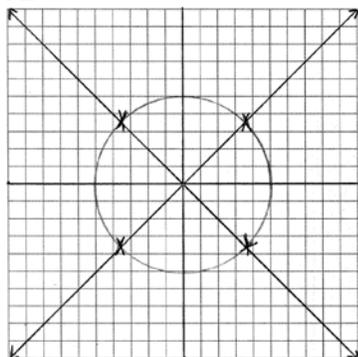
PTS: 4 REF: 011037ge STA: G.G.23 TOP: Locus

557 ANS:
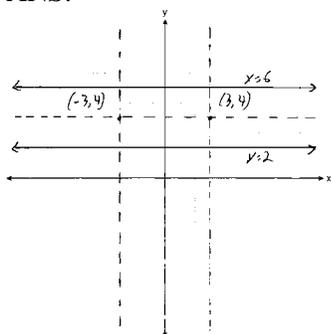
PTS: 4 REF: 061135ge STA: G.G.23 TOP: Locus

558 ANS:

2.4. $5a = 4^2$ $5b = 3^2$ $h^2 = ab$

$a = 3.2$ $b = 1.8$ $h^2 = 3.2 \cdot 1.8$

$h = \sqrt{5.76} = 2.4$

PTS: 4 REF: 081037ge STA: G.G.47 TOP: Similarity
KEY: altitude

559 ANS:
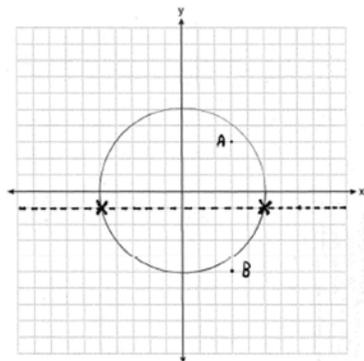
PTS: 4 REF: fall0837ge STA: G.G.23 TOP: Locus

560 ANS:

$$x^2 - 8x = 5x + 30. \quad m\angle C = 4(15) - 5 = 55$$
$$x^2 - 13x - 30 = 0$$
$$(x - 15)(x + 2) = 0$$
$$x = 15$$

PTS: 4   REF: 061337ge   STA: G.G.45   TOP: Similarity
KEY: basic

561 ANS:

32. $\dfrac{16}{20} = \dfrac{x-3}{x+5}$. $\overline{AC} = x - 3 = 35 - 3 = 32$
$$16x + 80 = 20x - 60$$
$$140 = 4x$$
$$35 = x$$

PTS: 4   REF: 011137ge   STA: G.G.46   TOP: Side Splitter Theorem

562 ANS:

$$4x \cdot x = 6^2$$
$$4x^2 = 36$$
$$x^2 = 9$$
$$x = 3$$
$$\overline{BD} = 4(3) = 12$$

PTS: 4   REF: 011437ge   STA: G.G.47   TOP: Similarity
KEY: leg

563 ANS:
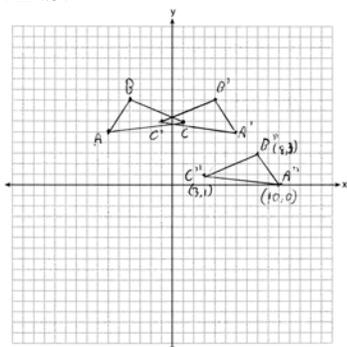
PTS: 3   REF: 011436ge   STA: G.G.58   TOP: Compositions of Transformations
KEY: grids

5

564 ANS:
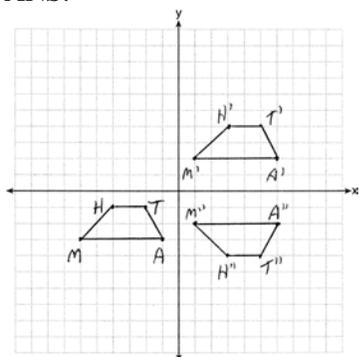

$M''(1,-2), A''(6,-2), T''(5,-4), H''(3,-4)$

PTS: 4　　　　REF: 081336ge　　　STA: G.G.58　　　TOP: Compositions of Transformations
KEY: grids

565 ANS:

$\overline{BD} \cong \overline{DB}$ (Reflexive Property); $\triangle ABD \cong \triangle CDB$ (SSS); $\angle BDC \cong \angle ABD$ (CPCTC).
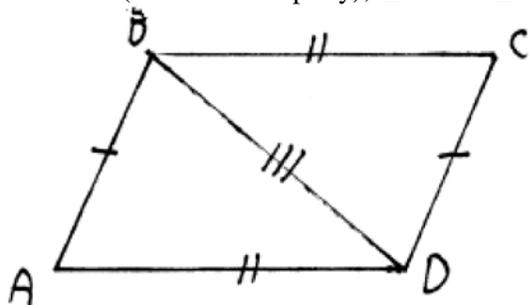
PTS: 4　　　　REF: 061035ge　　　STA: G.G.27　　　TOP: Quadrilateral Proofs

566 ANS:

$x^2 + 12 + 11x + 5 + 13x - 17 = 180$.　$m\angle A = 6^2 + 12 = 48$　. $\angle B$ is the largest angle, so $\overline{AC}$ in the longest side.

$$x^2 + 24x - 180 = 0 \qquad m\angle B = 11(6) + 5 = 71$$
$$(x + 30)(x - 6) = 0 \qquad m\angle C = 13(6) - 7 = 61$$
$$x = 6$$

PTS: 4　　　　REF: 011337ge　　　STA: G.G.34　　　TOP: Angle Side Relationship

567 ANS:

$$V = \pi r^2 h \quad . \ L = 2\pi rh = 2\pi \cdot 5\sqrt{2} \cdot 12 \approx 533.1$$
$$600\pi = \pi r^2 \cdot 12$$
$$50 = r^2$$
$$\sqrt{25}\sqrt{2} = r$$
$$5\sqrt{2} = r$$

PTS: 4　　　　REF: 011236ge　　　STA: G.G.14　　　TOP: Volume and Lateral Area

568 ANS:
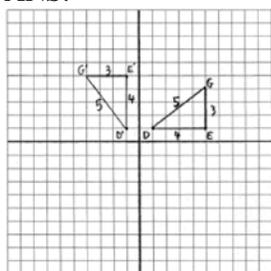
$D'(-1, 1), E'(-1, 5), G'(-4, 5)$

PTS: 4 REF: 080937ge STA: G.G.55 TOP: Properties of Transformations

569 ANS:

$12x - 4 + 180 - 6x + 6x + 7x + 13 = 360.$ $16y + 1 = \dfrac{12y + 1 + 18y + 6}{2}$

$19x + 189 = 360$ $32y + 2 = 30y + 7$

$19x = 171$ $2y = 5$

$x = 9$ $y = \dfrac{5}{2}$

PTS: 4 REF: 081337ge STA: G.G.40 TOP: Trapezoids

570 ANS:

$y = \dfrac{2}{3}x + 1.$ $2y + 3x = 6$. $y = mx + b$

$2y = -3x + 6$ $5 = \dfrac{2}{3}(6) + b$

$y = -\dfrac{3}{2}x + 3$ $5 = 4 + b$

$m = -\dfrac{3}{2}$ $1 = b$

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

PTS: 4 REF: 061036ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

571 ANS:
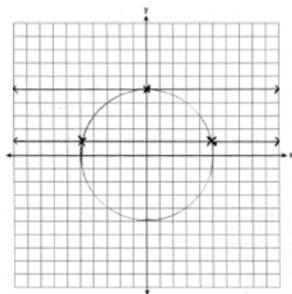
PTS: 4 REF: 080936ge STA: G.G.23 TOP: Locus

7

572 ANS:
∠*B* and ∠*E* are right angles because of the definition of perpendicular lines. ∠*B* ≅ ∠*E* because all right angles are congruent. ∠*BFD* and ∠*DFE* are supplementary and ∠*ECA* and ∠*ACB* are supplementary because of the definition of supplementary angles. ∠*DFE* ≅ ∠*ACB* because angles supplementary to congruent angles are congruent. Δ*ABC* ~ Δ*DEF* because of AA.

PTS: 4 　　 REF: 011136ge 　　 STA: G.G.44 　　 TOP: Similarity Proofs

573 ANS:

30. $3x + 4x + 5x = 360$. $\mathrm{m}\widehat{LN} : \mathrm{m}\widehat{NK} : \mathrm{m}\widehat{KL} = 90 : 120 : 150$. $\dfrac{150 - 90}{2} = 30$

$x = 20$

PTS: 4 　　 REF: 061136ge 　　 STA: G.G.51 　　 TOP: Arcs Determined by Angles
KEY: outside circle

574 ANS:
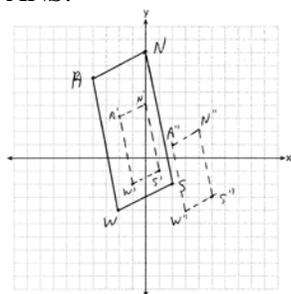
$S''(5, -3)$, $W''(3, -4)$, $A''(2, 1)$, and $N''(4, 2)$

PTS: 4 　　 REF: 061335ge 　　 STA: G.G.58 　　 TOP: Compositions of Transformations
KEY: grids

575 ANS:
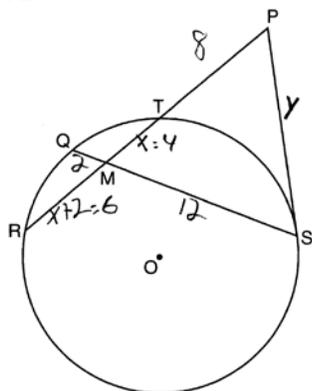
$x(x + 2) = 12 \cdot 2$. 　 $\overline{RT} = 6 + 4 = 10$. 　 $y \cdot y = 18 \cdot 8$

$x^2 + 2x - 24 = 0$ 　　　　　　　　　 $y^2 = 144$

$(x + 6)(x - 4) = 0$ 　　　　　　　　　 $y = 12$

$x = 4$

PTS: 4 　　 REF: 061237ge 　　 STA: G.G.53 　　 TOP: Segments Intercepted by Circle
KEY: tangent and secant

576 ANS:
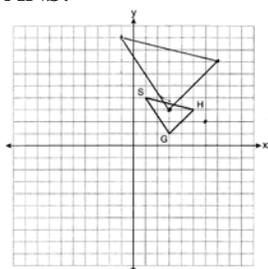
$G''(3,3), H''(7,7), S''(-1,9)$

PTS: 4   REF: 081136ge   STA: G.G.58   TOP: Compositions of Transformations

577 ANS:
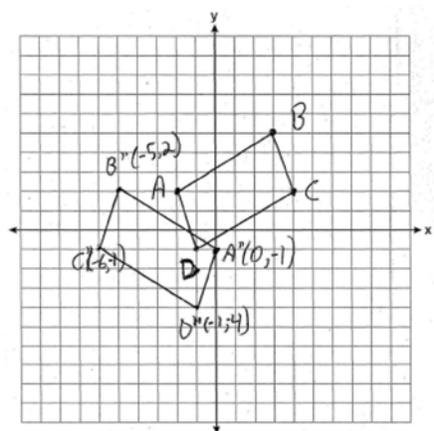
PTS: 4   REF: 060937ge   STA: G.G.54   TOP: Compositions of Transformations
KEY: grids

578 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

579 ANS:

$L = 2\pi rh = 2\pi \cdot 3 \cdot 5 \approx 94.25$. $V = \pi r^2 h = \pi(3)^2(5) \approx 141.37$

PTS: 4   REF: 011335ge   STA: G.G.14   TOP: Volume and Lateral Area

580 ANS:
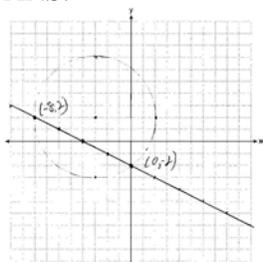
PTS: 4   REF: 081237ge   STA: G.G.70   TOP: Quadratic-Linear Systems

9

581 ANS:

$x + 3x - 60 + 5x - 30 = 180$ $\qquad$ $5(30) - 30 = 120$ $\qquad$ $6y - 8 = 4y - 2$ $\quad$ $\overline{DC} = 10 + 10 = 20$

$\qquad\qquad 9x - 90 = 180$ $\qquad$ m$\angle BAC = 180 - 120 = 60$ $\qquad$ $2y = 6$

$\qquad\qquad\qquad 9x = 270$ $\qquad\qquad\qquad\qquad\qquad\qquad\qquad y = 3$

$\qquad\qquad\qquad x = 30 = $ m$\angle D$ $\qquad\qquad\qquad\qquad\qquad 4(3) - 2 = 10 = \overline{BC}$
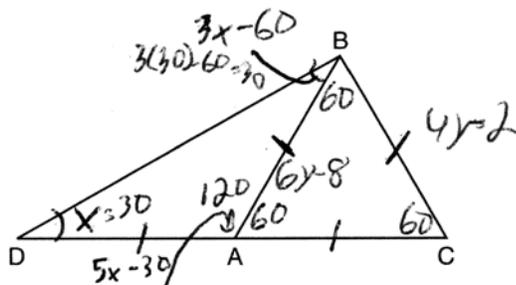
PTS: 3 $\qquad$ REF: 011435ge $\qquad$ STA: G.G.31 $\qquad$ TOP: Isosceles Triangle Theorem

582 ANS:
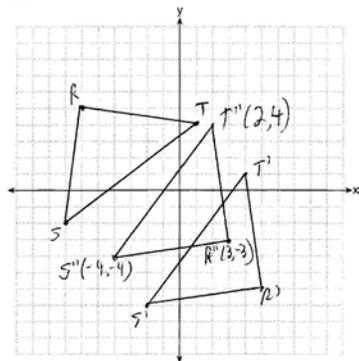
PTS: 4 $\qquad$ REF: 081236ge $\qquad$ STA: G.G.58 $\qquad$ TOP: Compositions of Transformations
KEY: grids

583 ANS:

Yes, m$\angle ABD = $ m$\angle BDC = 44$ $\quad$ $180 - (93 + 43) = 44$ $\quad$ $x + 19 + 2x + 6 + 3x + 5 = 180$. Because alternate interior

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad 6x + 30 = 180$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\quad 6x = 150$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad x = 25$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\quad x + 19 = 44$

angles $\angle ABD$ and $\angle CDB$ are congruent, $\overline{AB}$ is parallel to $\overline{DC}$.

PTS: 4 $\qquad$ REF: 081035ge $\qquad$ STA: G.G.35 $\qquad$ TOP: Parallel Lines and Transversals

584 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 $\qquad$ REF: 011036ge $\qquad$ STA: G.G.27 $\qquad$ TOP: Quadrilateral Proofs

585 ANS:
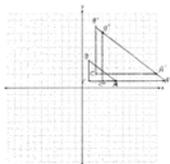
$A''(11,1)$, $B''(3,7)$, $C''(3,1)$

PTS: 4　　REF: 011336ge　　STA: G.G.58　　TOP: Compositions of Transformations

586 ANS:

Midpoint: $\left(\dfrac{-4+4}{2}, \dfrac{2+(-4)}{2}\right) = (0,-1)$. 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

587 ANS:
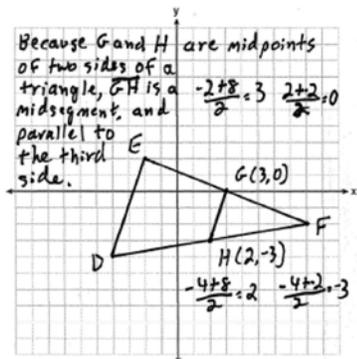
PTS: 4　　REF: fall0835ge　　STA: G.G.42　　TOP: Midsegments

588 ANS:
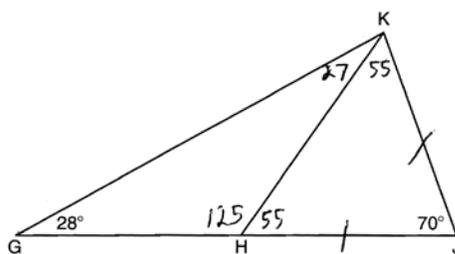
No, $\angle KGH$ is not congruent to $\angle GKH$.

PTS: 2　　REF: 081135ge　　STA: G.G.31　　TOP: Isosceles Triangle Theorem

589 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

590 ANS:
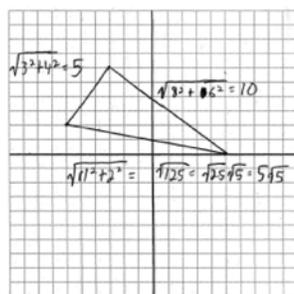
$15 + 5\sqrt{5}$.

PTS: 4   REF: 060936ge   STA: G.G.69   TOP: Triangles in the Coordinate Plane

591 ANS:
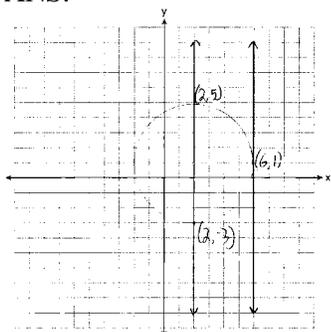
PTS: 4   REF: 011135ge   STA: G.G.23   TOP: Locus

592 ANS:

$\angle D$, $\angle G$ and 24° or $\angle E$, $\angle F$ and 84°. $m\widehat{FE} = \dfrac{2}{15} \times 360 = 48$. Since the chords forming $\angle D$ and $\angle G$ are intercepted by $\widehat{FE}$, their measure is 24°. $m\widehat{GD} = \dfrac{7}{15} \times 360 = 168$. Since the chords forming $\angle E$ and $\angle F$ are intercepted by $\widehat{GD}$, their measure is 84°.

PTS: 4   REF: fall0836ge   STA: G.G.51   TOP: Arcs Determined by Angles
KEY: inscribed

Geometry 6 Point Regents Exam Questions
Answer Section

593 ANS:

52, 40, 80. $360 - (56 + 112) = 192.$ $\dfrac{192 - 112}{2} = 40.$ $\dfrac{112 + 48}{2} = 80$

$\dfrac{1}{4} \times 192 = 48$

$\dfrac{56 + 48}{2} = 52$

PTS: 6 REF: 081238ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: mixed

594 ANS:
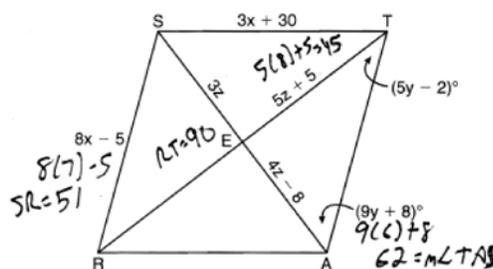
$8x - 5 = 3x + 30.$ $4z - 8 = 3z.$ $9y + 8 + 5y - 2 = 90.$

$5x = 35$ $z = 8$ $14y + 6 = 90$

$x = 7$ $14y = 84$

$y = 6$

PTS: 6 REF: 061038ge STA: G.G.39 TOP: Special Parallelograms

595 ANS:

Quadrilateral $ABCD$, $\overline{AD} \cong \overline{BC}$ and $\angle DAE \cong \angle BCE$ are given. $\overline{AD} \| \overline{BC}$ 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

596 ANS:
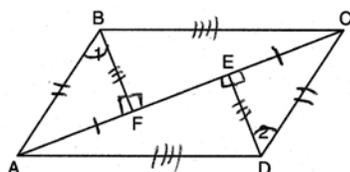
$\overline{FE} \cong \overline{FE}$ (Reflexive Property); $\overline{AE} - \overline{FE} \cong \overline{FC} - \overline{EF}$ (Line Segment Subtraction Theorem); $\overline{AF} \cong \overline{CE}$ (Substitution); $\angle BFA \cong \angle DEC$ (All right angles are congruent); $\Delta BFA \cong \Delta DEC$ (AAS); $\overline{AB} \cong \overline{CD}$ and $\overline{BF} \cong \overline{DE}$ (CPCTC); $\angle BFC \cong \angle DEA$ (All right angles are congruent); $\Delta BFC \cong \Delta DEA$ (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.27　　　TOP: Quadrilateral Proofs

597 ANS:

ΔMAH, $\overline{MH} \cong \overline{AH}$ and medians $\overline{AB}$ and $\overline{MT}$ are given. $\overline{MA} \cong \overline{AM}$ (reflexive property). ΔMAH is an isosceles triangle (definition of isosceles triangle). $\angle AMB \cong \angle MAT$ (isosceles triangle theorem). *B* is the midpoint of $\overline{MH}$ and *T* is the midpoint of $\overline{AH}$ (definition of median). $m\overline{MB} = \frac{1}{2} m\overline{MH}$ and $m\overline{AT} = \frac{1}{2} m\overline{AH}$ (definition of midpoint). $\overline{MB} \cong \overline{AT}$ (multiplication postulate). $\Delta MBA \cong \Delta ATM$ (SAS). $\angle MBA \cong \angle ATM$ (CPCTC).

PTS: 6　　　REF: 061338ge　　　STA: G.G.27　　　TOP: Triangle Proofs

598 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. $\angle DAC \cong \angle DBC$ because inscribed angles that intercept the same arc are congruent. Therefore, $\Delta ACD \cong \Delta BDC$ because of AAS.

PTS: 6　　　REF: fall0838ge　　　STA: G.G.27　　　TOP: Circle Proofs

599 ANS:
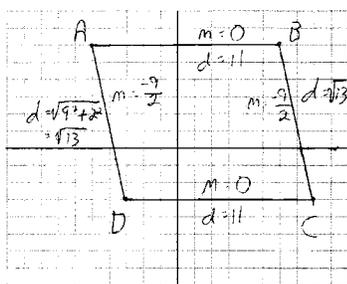
$\overline{AB} \parallel \overline{CD}$ and $\overline{AD} \parallel \overline{CB}$ because their slopes are equal. *ABCD* is a parallelogram because opposite side are parallel. $\overline{AB} \neq \overline{BC}$. *ABCD* is not a rhombus because all sides are not equal. $\overline{AB} \sim \perp \overline{BC}$ 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

600 ANS:

Rectangle *ABCD* with points *E* and *F* on side $\overline{AB}$, segments *CE* and *DF* intersect at *G*, and ∠*ADG* ≅ ∠*BCE* are given. $\overline{AD} \cong \overline{BC}$ because opposite sides of a rectangle are congruent. ∠*A* and ∠*B* are right angles and congruent because all angles of a rectangle are right and congruent. Δ*ADF* ≅ Δ*BCE* by ASA. $\overline{AF} \cong \overline{BE}$ per CPCTC. $\overline{EF} \cong \overline{FE}$ under the Reflexive Property. $\overline{AF} - \overline{EF} \cong \overline{BE} - \overline{FE}$ using the Subtraction Property of Segments. $\overline{AE} \cong \overline{BF}$ because of the Definition of Segments.

PTS: 6   REF: 011338ge   STA: G.G.27   TOP: Quadrilateral Proofs

601 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. ∠*PAO* and ∠*PBO* are right angles because of the definition of perpendicular. ∠*PAO* ≅ ∠*PBO* because all right angles are congruent. Δ*AOP* ≅ Δ*BOP* because of HL. ∠*AOP* ≅ ∠*BOP* because of CPCTC.

PTS: 6   REF: 061138ge   STA: G.G.27   TOP: Circle Proofs

602 ANS:

$\overline{AC} \cong \overline{EC}$ and $\overline{DC} \cong \overline{BC}$ because of the definition of midpoint. ∠*ACB* ≅ ∠*ECD* because of vertical angles. Δ*ABC* ≅ Δ*EDC* because of SAS. ∠*CDE* ≅ ∠*CBA* because of CPCTC. $\overline{BD}$ is a transversal intersecting $\overline{AB}$ and
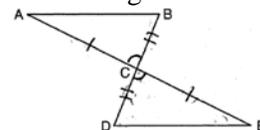
$\overline{ED}$. Therefore $\overline{AB} \parallel \overline{DE}$ because ∠*CDE* and ∠*CBA* are congruent alternate interior angles.

PTS: 6   REF: 060938ge   STA: G.G.27   TOP: Triangle Proofs

603 ANS:
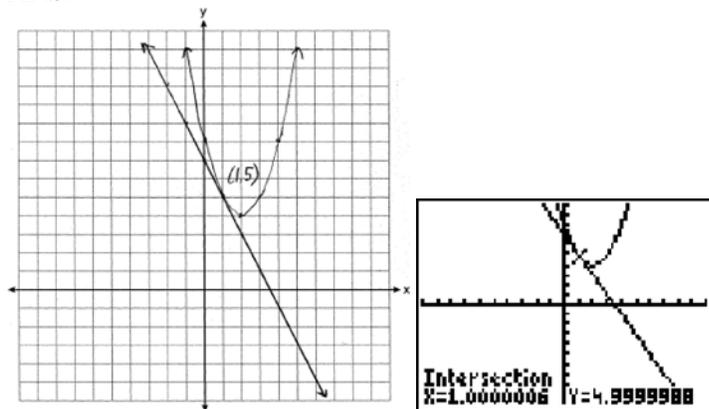
PTS: 6   REF: 011038ge   STA: G.G.70   TOP: Quadratic-Linear Systems

604 ANS:

$m_{\overline{AB}} = \left(\dfrac{-6+2}{2}, \dfrac{-2+8}{2} \right) = D(2,3)$ $m_{\overline{BC}} = \left(\dfrac{2+6}{2}, \dfrac{8+-2}{2} \right) = E(4,3)$ $F(0,-2)$. 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: $m_{\overline{AD}} = \dfrac{3--2}{-2--6} = \dfrac{5}{4}$ $\overline{AF} \| \overline{DE}$ because all horizontal lines have the same slope. $ADEF$

$$m_{\overline{FE}} = \dfrac{3--2}{4-0} = \dfrac{5}{4}$$

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

605 ANS:

2. The diameter of a circle is $\perp$ to a tangent at the point of tangency. 4. An angle inscribed in a semicircle is a right angle. 5. All right angles are congruent. 7. AA. 8. Corresponding sides of congruent triangles are in proportion. 9. The product of the means equals the product of the extremes.

PTS: 6   REF: 011438ge   STA: G.G.27   TOP: Circle Proofs

606 ANS:
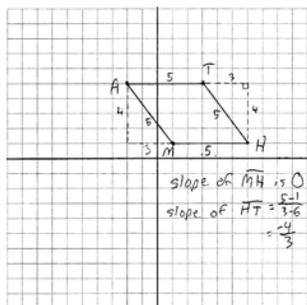
The length of each side of quadrilateral is 5. Since each side is congruent, quadrilateral

$MATH$ is a rhombus. The slope of $\overline{MH}$ is 0 and the slope of $\overline{HT}$ is $-\dfrac{4}{3}$. 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

607 ANS:

$M\left(\dfrac{-7+-3}{2},\dfrac{4+6}{2}\right)=M(-5,5)$. $m_{\overline{MN}}=\dfrac{5-3}{-5-0}=\dfrac{2}{-5}$. Since both opposite sides have equal slopes and are

$N\left(\dfrac{-3+3}{2},\dfrac{6+0}{2}\right)=N(0,3)$ $m_{\overline{PQ}}=\dfrac{-4--2}{2--3}=\dfrac{-2}{5}$

$P\left(\dfrac{3+1}{2},\dfrac{0+-8}{2}\right)=P(2,-4)$ $m_{\overline{NA}}=\dfrac{3--4}{0-2}=\dfrac{7}{-2}$

$Q\left(\dfrac{-7+1}{2},\dfrac{4+-8}{2}\right)=Q(-3,-2)$ $m_{\overline{QM}}=\dfrac{-2-5}{-3--5}=\dfrac{-7}{2}$

parallel, *MNPQ* is a parallelogram. $\overline{MN}=\sqrt{(-5-0)^2+(5-3)^2}=\sqrt{29}$. $\overline{MN}$ is not congruent to $\overline{NP}$, so *MNPQ*

$$\overline{NA}=\sqrt{(0-2)^2+(3--4)^2}=\sqrt{53}$$
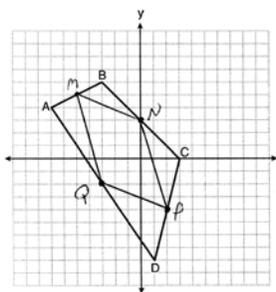
is not a rhombus since not all sides are congruent.

PTS: 6   REF: 081338ge   STA: G.G.69   TOP: Quadrilaterals in the Coordinate Plane

608 ANS:
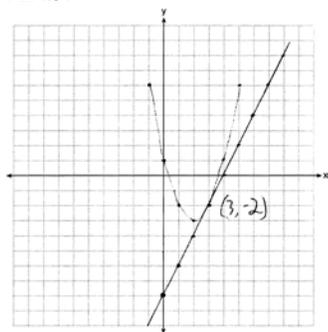
PTS: 6   REF: 061238ge   STA: G.G.70   TOP: Quadratic-Linear Systems