JMAP
REGENTS AT RANDOM

The NY Geometry Regents Exams
Fall 2008-January 2014

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Geometry Regents at Random

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

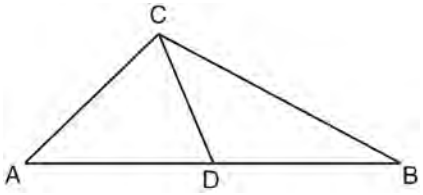
1) $y = -\frac{3}{2}x + 5$

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

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

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

2 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) $\angle BCD \cong \angle ACD$

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

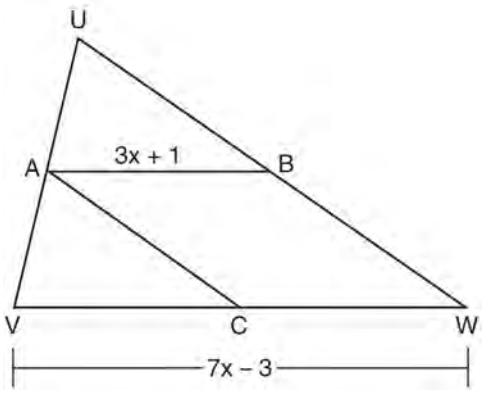
1) $y = 2x - 6$

2) $y = -2x + 4$

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

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

4 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

5 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

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

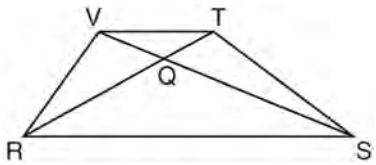
1) $(4,-3)$
2) $(-4,-3)$
3) $(3,4)$
4) $(3,-4)$

7 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

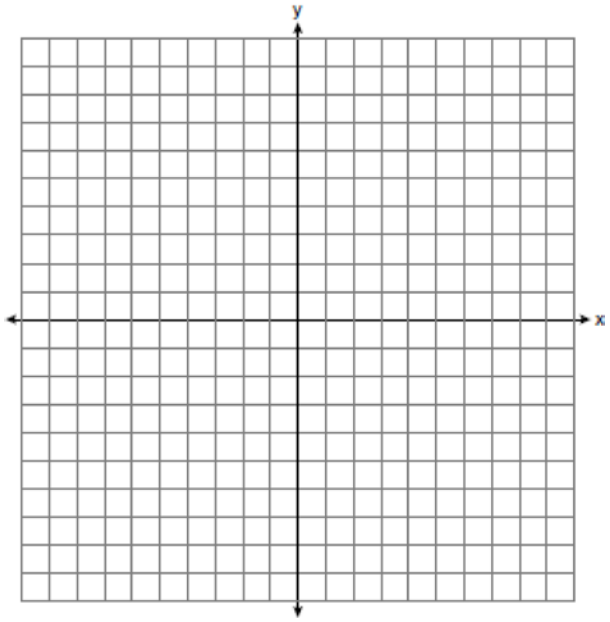
8 In trapezoid *RSTV* with bases $\overline{RS}$ and $\overline{VT}$, diagonals $\overline{RT}$ and $\overline{SV}$ intersect at *Q*.



If trapezoid *RSTV* is *not* isosceles, which triangle is equal in area to ΔRSV?

1) ΔRQV
2) ΔRST
3) ΔRVT
4) ΔSVT

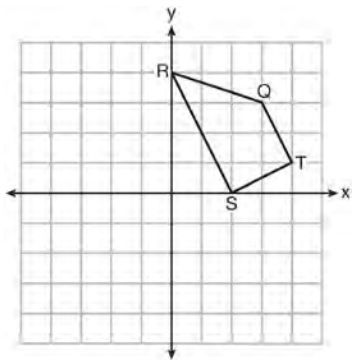
9 Write an equation of the line that is the perpendicular bisector of the line segment having endpoints $(3,-1)$ and $(3,5)$. [The use of the grid below is optional]



10 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.

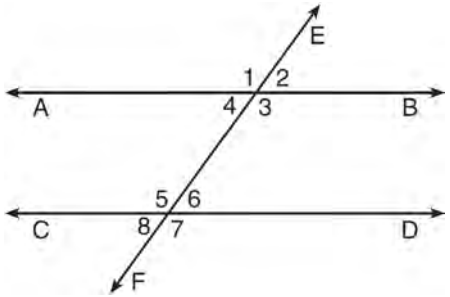
11 Trapezoid *QRST* is graphed on the set of axes below.



Under which transformation will there be *no* invariant points?

1) $r_{y=0}$
2) $r_{x=0}$
3) $r_{(0,0)}$
4) $r_{y=x}$

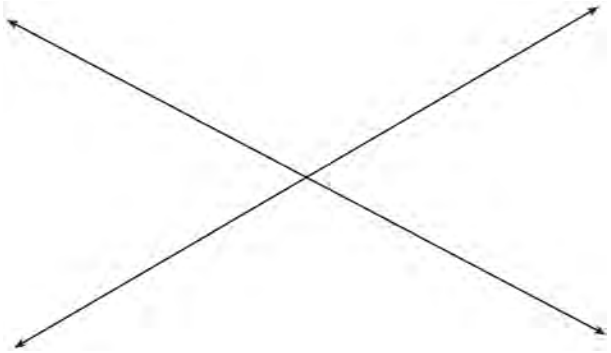
12 Transversal $\overleftrightarrow{EF}$ intersects $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$, as shown in the diagram below.



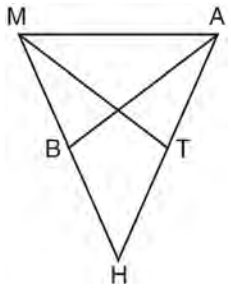
Which statement could always be used to prove $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$?

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

13 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.



14 In the diagram of ΔMAH below, $\overline{MH} \cong \overline{AH}$ and medians $\overline{AB}$ and $\overline{MT}$ are drawn.
Prove: $\angle MBA \cong \angle ATM$



15 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.

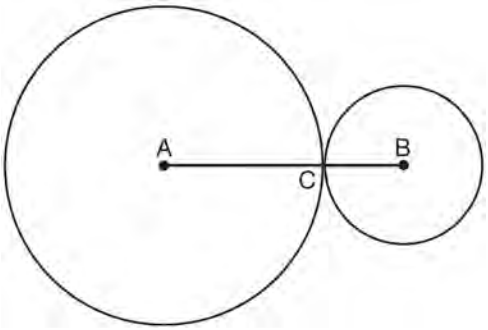
16 After the transformation $r_{y=x}$, the image of ΔABC is $\Delta A'B'C'$. If $AB = 2x + 13$ and $A'B' = 9x - 8$, find the value of x.

17 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.

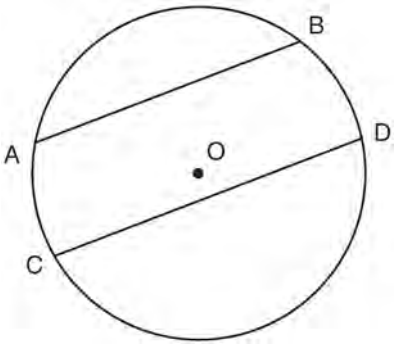
18 Lines m and n are in plane $\mathcal{A}$. What is the converse of the statement "If lines m and n are parallel, then lines m and n do not intersect"?
1) If lines m and n are not parallel, then lines m and n intersect.
2) If lines m and n are not parallel, then lines m and n do not intersect
3) If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

19 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) $(-1, 7)$

20 In the diagram below, circles A and B are tangent at point C and $\overline{AB}$ is drawn. Sketch all common tangent lines.

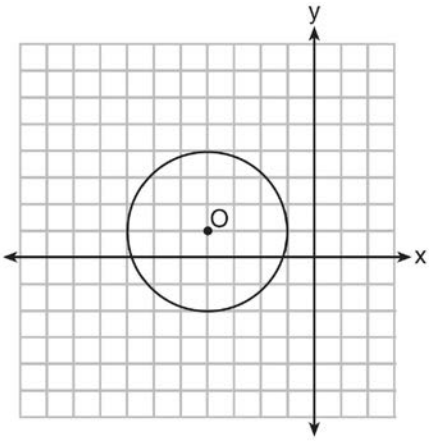


21 In circle O shown in the diagram below, chords $\overline{AB}$ and $\overline{CD}$ are parallel.



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

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

23 In ΔABC, 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.

24 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) $(5,5)$

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

26 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

27 Triangle ABC has vertices $A(6,6)$, $B(9,0)$, and $C(3,-3)$. State and label the coordinates of $\Delta A'B'C'$, the image of ΔABC after a dilation of $D\frac{1}{3}$.

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

29 Which set of equations represents two circles that have the same center?

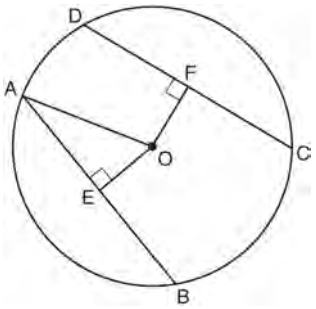
1) $x^2 + (y+4)^2 = 16$ and $(x+4)^2 + y^2 = 16$

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
$(x+7)^2 + (y+2)^2 = 25$

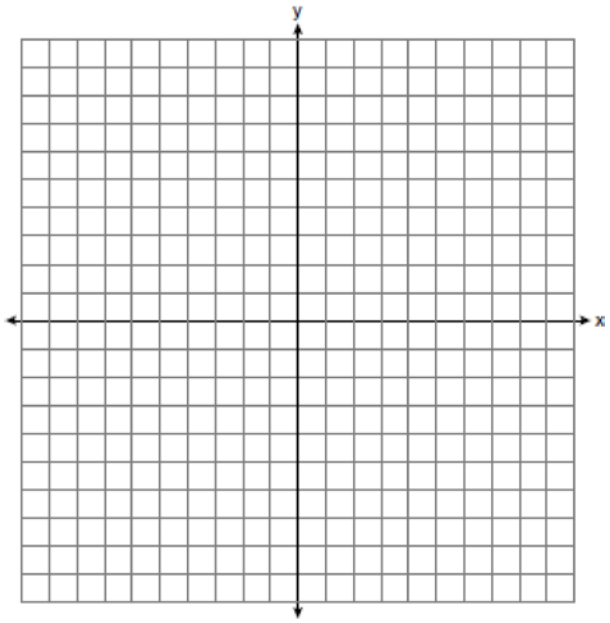
4) $(x-2)^2 + (y-5)^2 = 16$ and
$(x-2)^2 + (y-5)^2 = 25$

30 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 $CD = 4y - 20$.

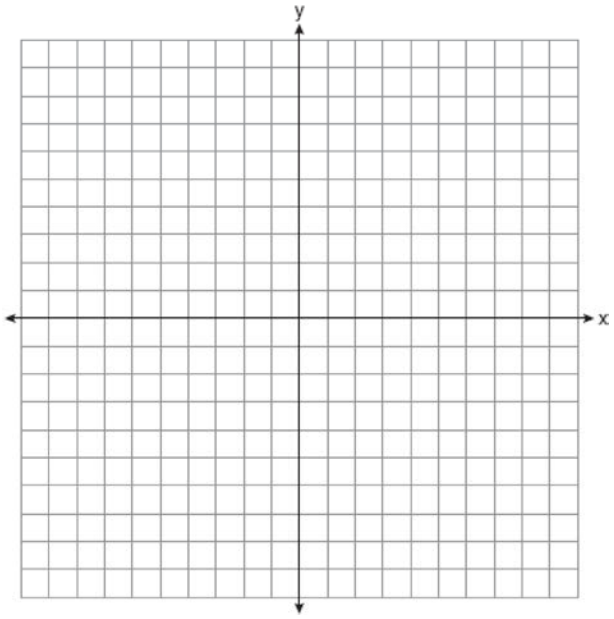


Determine the length of $\overline{DF}$. Determine the length of $\overline{OA}$.

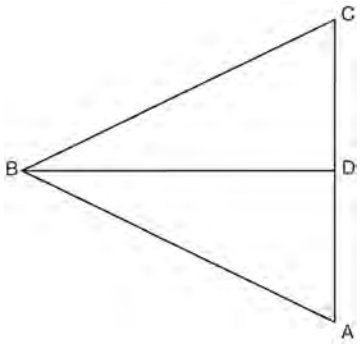
31 On the set of axes below, graph the locus of points 4 units from the x-axis and equidistant from the points whose coordinates are $(-2, 0)$ and $(8, 0)$. Mark with an **X** all points that satisfy *both* conditions.



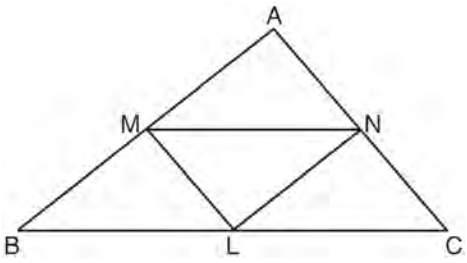
32 Quadrilateral *MATH* has coordinates $M(-6,-3)$, $A(-1,-3)$, $T(-2,-1)$, and $H(-4,-1)$. The image of quadrilateral *MATH* after the composition $r_{x\text{-axis}} \circ T_{7,5}$ is quadrilateral $M''A''T''H''$. State and label the coordinates of $M''A''T''H''$. [The use of the set of axes below is optional.]



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

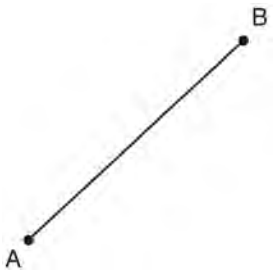


34 In ΔABC shown below, *L* is the midpoint of $\overline{BC}$, *M* is the midpoint of $\overline{AB}$, and *N* is the midpoint of $\overline{AC}$.



If $MN = 8$, $ML = 5$, and $NL = 6$, the perimeter of trapezoid *BMNC* is
1) 35
2) 31
3) 28
4) 26

35 Using a compass and straightedge, construct the perpendicular bisector of $\overline{AB}$. [Leave all construction marks.]

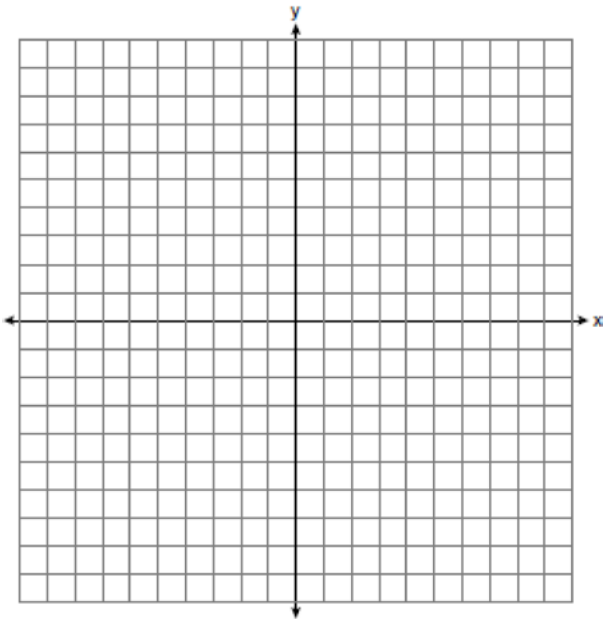


36 A right circular cylinder has a height of 7 inches and the base has a diameter of 6 inches. Determine the lateral area, in square inches, of the cylinder in terms of π.

37 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 $(4, 2)$?

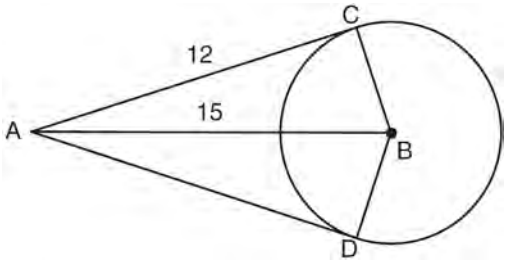
1) $(1, 3)$
2) $(5, 5)$
3) $(8, 14)$
4) $(10, 10)$

38 Triangle ABC has vertices $A(5, 1)$, $B(1, 4)$ and $C(1, 1)$. State and label the coordinates of the vertices of $\Delta A''B''C''$, the image of ΔABC, following the composite transformation $T_{1,-1} \circ D_2$. [The use of the set of axes below is optional.]



39 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.

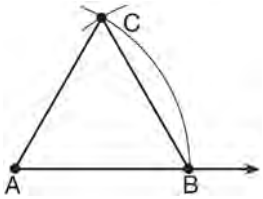
40 In the diagram below, $\overline{AC}$ and $\overline{AD}$ are tangent to circle B at points C and D, respectively, and $\overline{BC}$, $\overline{BD}$, and $\overline{BA}$ are drawn.



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

1) 5.5
2) 9
3) 12
4) 18

41 The diagram below shows the construction of an equilateral triangle.



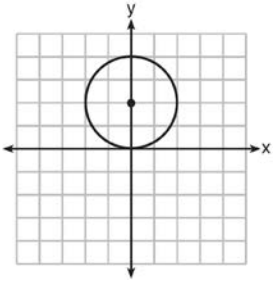
Which statement justifies this construction?

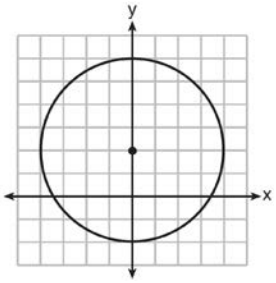
1) $\angle A + \angle B + \angle C = 180$
2) $m\angle A = m\angle B = m\angle C$
3) $AB = AC = BC$
4) $AB + BC > AC$

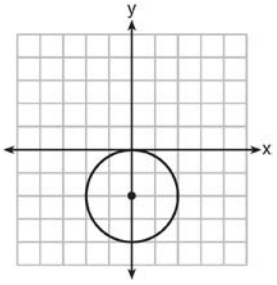
42 If $\Delta MNP \cong \Delta VWX$ and $\overline{PM}$ is the shortest side of ΔMNP, what is the shortest side of ΔVWX?

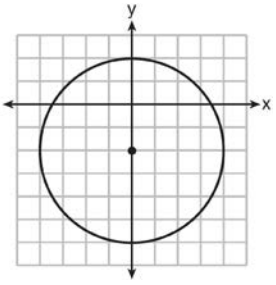
1) $\overline{XV}$
2) $\overline{WX}$
3) $\overline{VW}$
4) $\overline{NP}$

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

1) 

2) 

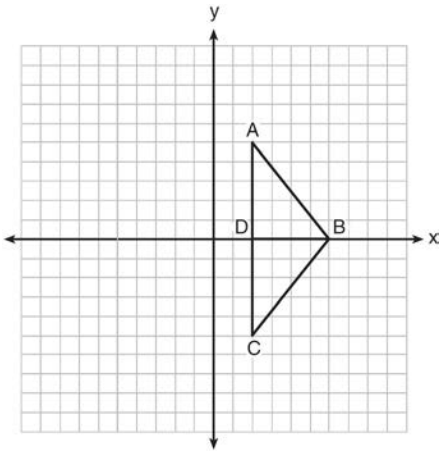
3) 

4) 

44 In ΔABC, $\angle A \cong \angle B$ 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.

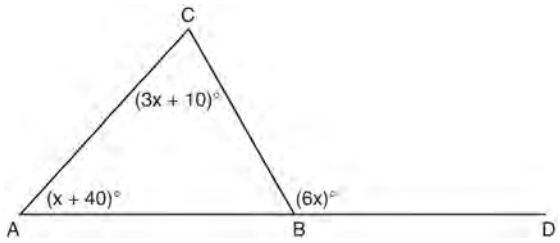
45 As shown in the diagram below, when right triangle *DAB* is reflected over the *x*-axis, its image is triangle *DCB*.



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.

46 In the diagram of ΔABC 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

47 A student wrote the following equations:

$$3y + 6 = 2x$$

$$2y - 3x = 6$$

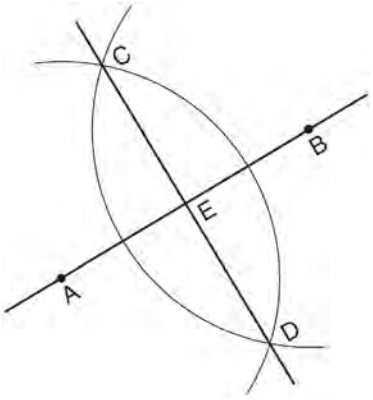
The lines represented by these equations are

1) parallel
2) the same line
3) perpendicular
4) intersecting, but *not* perpendicular

48 Triangle ABC is similar to triangle DEF. The lengths of the sides of ΔABC are 5, 8, and 11. What is the length of the shortest side of ΔDEF if its perimeter is 60?

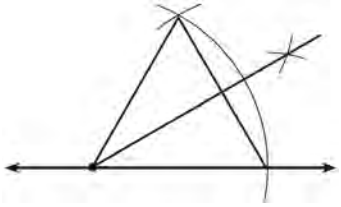
1) 10
2) 12.5
3) 20
4) 27.5

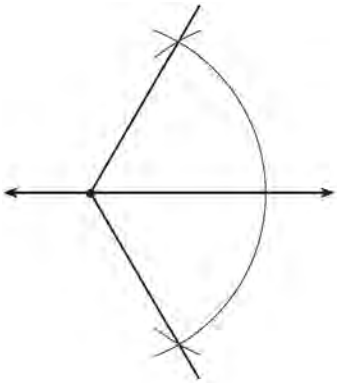
49 Based on the construction below, which conclusion is *not* always true?

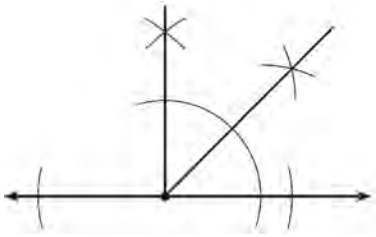


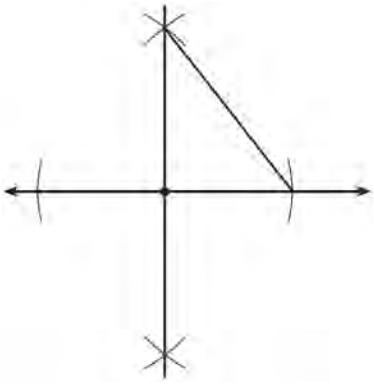
1) $\overline{AB} \perp \overline{CD}$
2) $AB = CD$
3) $AE = EB$
4) $CE = DE$

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

1) 

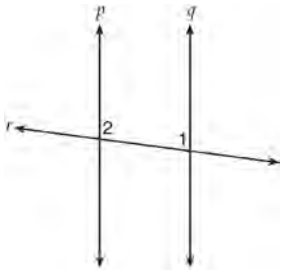
2) 

3) 

4) 

51 If $\Delta RST \sim \Delta ABC$, $m\angle A = x^2 - 8x$, $m\angle C = 4x - 5$, and $m\angle R = 5x + 30$, find $m\angle C$. [Only an algebraic solution can receive full credit.]

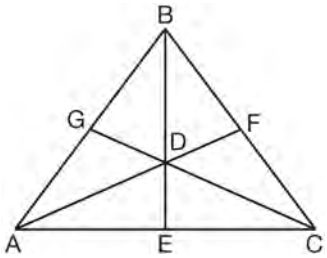
52 Lines p and q are intersected by line r, as shown below.



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

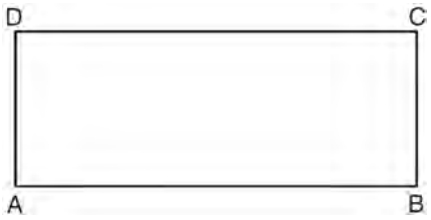
53 As shown below, the medians of ΔABC intersect at D.

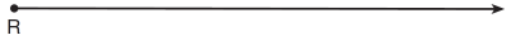


If the length of $\overline{BE}$ is 12, what is the length of $\overline{BD}$?

1) 8
2) 9
3) 3
4) 4

54 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*.





55 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.

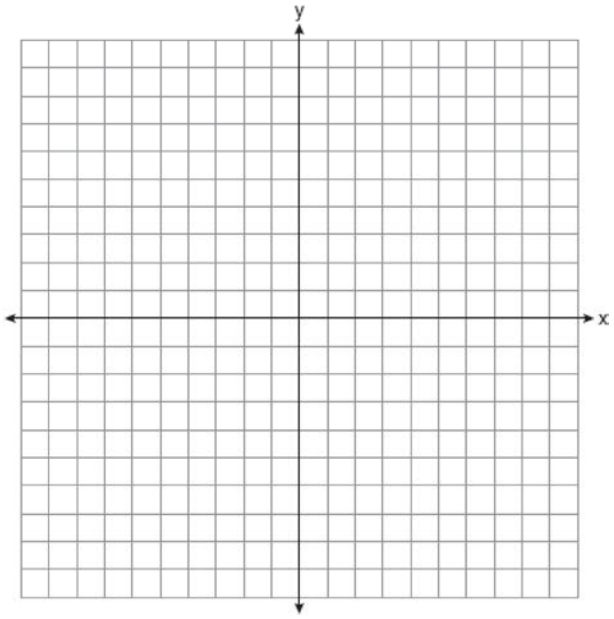
56 The equation of a circle is $(x - 2)^2 + (y + 5)^2 = 32$. What are the coordinates of the center of this circle and the length of its radius?

1) $(-2, 5)$ and 16
2) $(2, -5)$ and 16
3) $(-2, 5)$ and $4\sqrt{2}$
4) $(2, -5)$ and $4\sqrt{2}$

57 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?

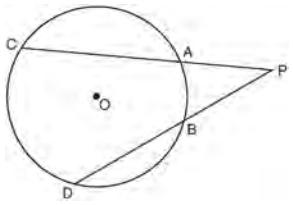
1) 2.5
2) 5
3) 10
4) 15.7

58 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.]



59 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

60 In the diagram below of circle O, $\overline{PAC}$ and $\overline{PBD}$ are secants.



If $m\overset{\frown}{CD} = 70$ and $m\overset{\frown}{AB} = 20$, what is the degree measure of $\angle P$?
1) 25
2) 35
3) 45
4) 50

61 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) $10\sqrt{2}$

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

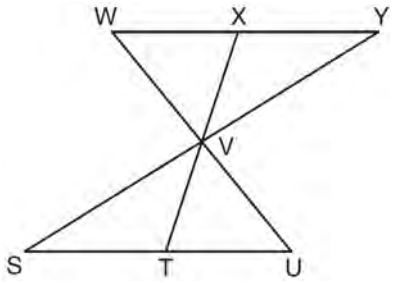
63 Which equation represents the circle whose center is $(-5, 3)$ and that passes through the point $(-1, 3)$?

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

64 What is the measure of the largest exterior angle that any regular polygon can have?

1) 60º
2) 90º
3) 120º
4) 360º

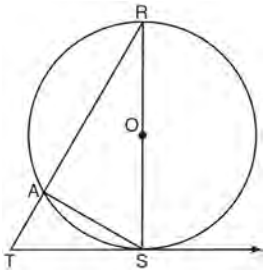
65 In the diagram below, $\Delta XYV \cong \Delta TSV$.



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) $\overline{YV} \cong \overline{SV}$

66 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. _____

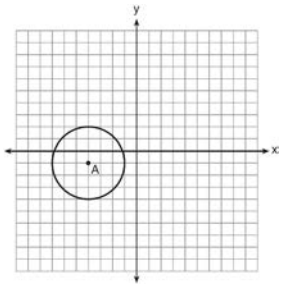
67 What is the converse of "If an angle measures 90 degrees, then it is a right angle"?

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.

68 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 $(-1, -1)$

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

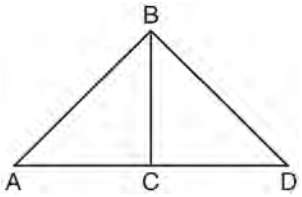
70 Which equation represents circle A shown in the diagram below?



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

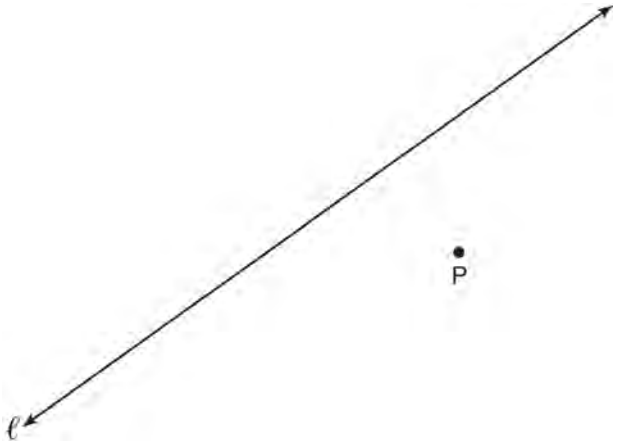
71 When the system of equations $y + 2 = (x-4)^2$ and $2x + y - 6 = 0$ is solved graphically, the solution is
1) $(-4, -2)$ and $(-2, 2)$
2) $(4, -2)$ and $(2, 2)$
3) $(-4, 2)$ and $(-6, 6)$
4) $(4, 2)$ and $(6, 6)$

72 Given: ΔABD, $\overline{BC}$ is the perpendicular bisector of $\overline{AD}$

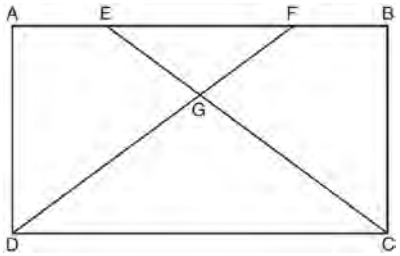


Which statement can *not* always be proven?
1) $\overline{AC} \cong \overline{DC}$
2) $\overline{BC} \cong \overline{CD}$
3) $\angle ACB \cong \angle DCB$
4) $\Delta ABC \cong \Delta DBC$

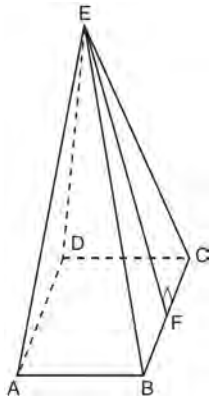
73 Using a compass and straightedge, construct a line perpendicular to line ℓ through point P. [Leave all construction marks.]



74 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: $\overline{AE} \cong \overline{BF}$



75 As shown in the diagram below, a right pyramid has a square base, *ABCD*, and $\overline{EF}$ is the slant height.



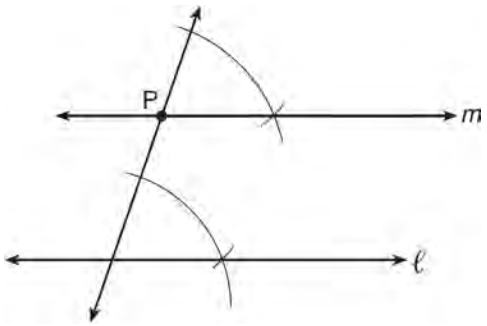
Which statement is *not* true?

1) $\overline{EA} \cong \overline{EC}$
2) $\overline{EB} \cong \overline{EF}$
3) $\Delta AEB \cong \Delta BEC$
4) ΔCED is isosceles

76 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

77 The diagram below shows the construction of line *m*, parallel to line ℓ, through point *P*.



Which theorem was used to justify this construction?

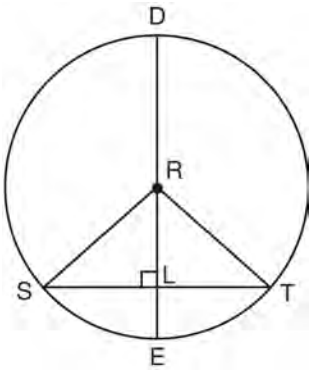
1) If two lines are cut by a transversal and the alternate interior angles are congruent, the lines are parallel.
2) If two lines are cut by a transversal and the interior angles on the same side are supplementary, the lines are parallel.
3) If two lines are perpendicular to the same line, they are parallel.
4) If two lines are cut by a transversal and the corresponding angles are congruent, they are parallel.

78 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*.

79 If $\Delta ABC \cong \Delta JKL \cong \Delta RST$, then $\overline{BC}$ must be congruent to
1) $\overline{JL}$
2) $\overline{JK}$
3) $\overline{ST}$
4) $\overline{RS}$

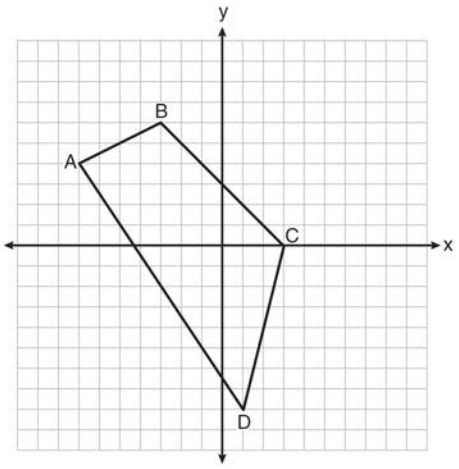
80 Two prisms have equal heights and equal volumes. The base of one is a pentagon and the base of the other is a square. If the area of the pentagonal base is 36 square inches, how many inches are in the length of each side of the square base?
1) 6
2) 9
3) 24
4) 36

81 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) $(DL)(LE) = (SL)(LT)$

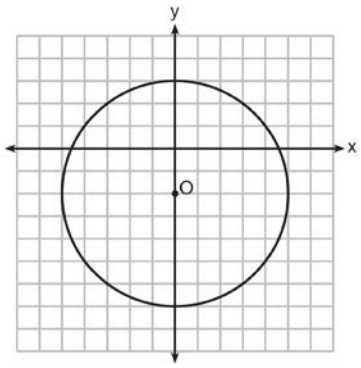
82 Quadrilateral $ABCD$ with vertices $A(-7,4)$, $B(-3,6)$, $C(3,0)$, and $D(1,-8)$ is graphed on the set of axes below. Quadrilateral $MNPQ$ is formed by joining M, N, P, and Q, the midpoints of $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, and $\overline{AD}$, respectively. Prove that quadrilateral $MNPQ$ is a parallelogram. Prove that quadrilateral $MNPQ$ is *not* a rhombus.



83 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

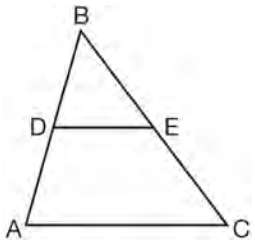
84 The measure of an interior angle of a regular polygon is 120°. How many sides does the polygon have?
1) 5
2) 6
3) 3
4) 4

85 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) $x^2 + (y+2)^2 = 25$

86 In ΔABC, 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?

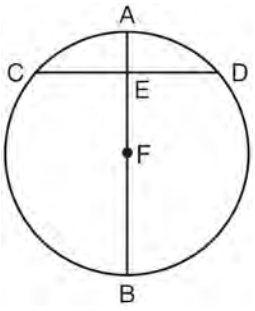


1) 6
2) 7
3) 9
4) 12

87 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

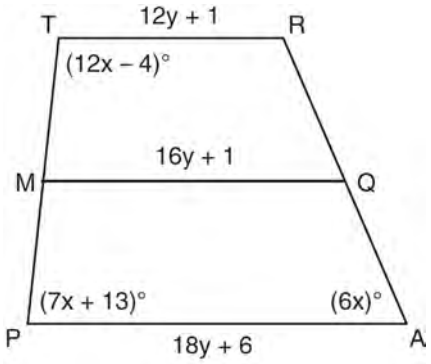
88 Line ℓ passes through the point $(5, 3)$ and is parallel to line k whose equation is $5x + y = 6$. An equation of line ℓ is
1) $y = \frac{1}{5}x + 2$
2) $y = -5x + 28$
3) $y = \frac{1}{5}x - 2$
4) $y = -5x - 28$

89 In the diagram below, diameter $\overline{AB}$ bisects chord $\overline{CD}$ at point E in circle F.

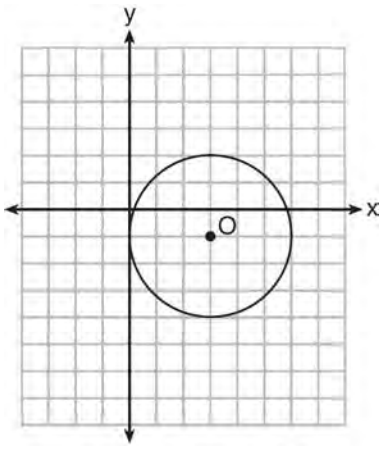


If $AE = 2$ and $FB = 17$, then the length of $\overline{CE}$ is
1) 7
2) 8
3) 15
4) 16

90 Trapezoid *TRAP*, with median $\overline{MQ}$, is shown in the diagram below. Solve algebraically for x and y.



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

92 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

93 For which measures of the sides of ΔABC 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) $AB = 18$, $BC = 14$, $AC = 5$

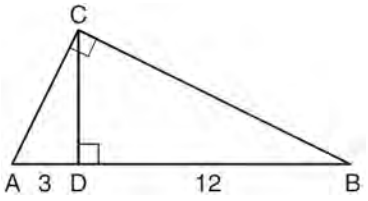
94 The midpoint of $\overline{AB}$ is $M(4,2)$. If the coordinates of *A* are $(6,-4)$, what are the coordinates of *B*?
1) $(1,-3)$
2) $(2,8)$
3) $(5,-1)$
4) $(14,0)$

95 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) $(x-1)^2+(y+2)^2=2$

96 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

97 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

98 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) $3\sqrt{5}$

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

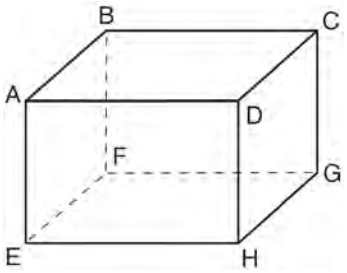
100 Consider the relationship between the two statements below.

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

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

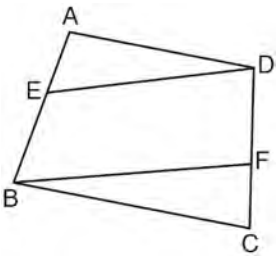
These statements are
1) inverses
2) converses
3) contrapositives
4) biconditionals

101 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 $\overline{BC}$

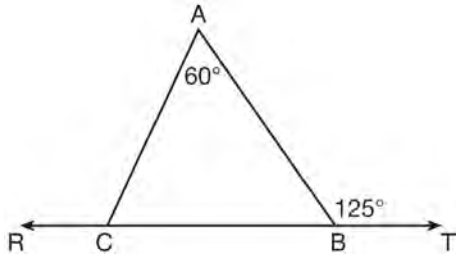
102 In the diagram below of quadrilateral $ABCD$, E and F are points on $\overline{AB}$ and $\overline{CD}$, respectively, $\overline{BE} \cong \overline{DF}$, and $\overline{AE} \cong \overline{CF}$.



Which conclusion can be proven?

1) $\overline{ED} \cong \overline{FB}$
2) $\overline{AB} \cong \overline{CD}$
3) $\angle A \cong \angle C$
4) $\angle AED \cong \angle CFB$

103 In the diagram below, $\overleftrightarrow{RCBT}$ and ΔABC are shown with $m\angle A = 60$ and $m\angle ABT = 125$.



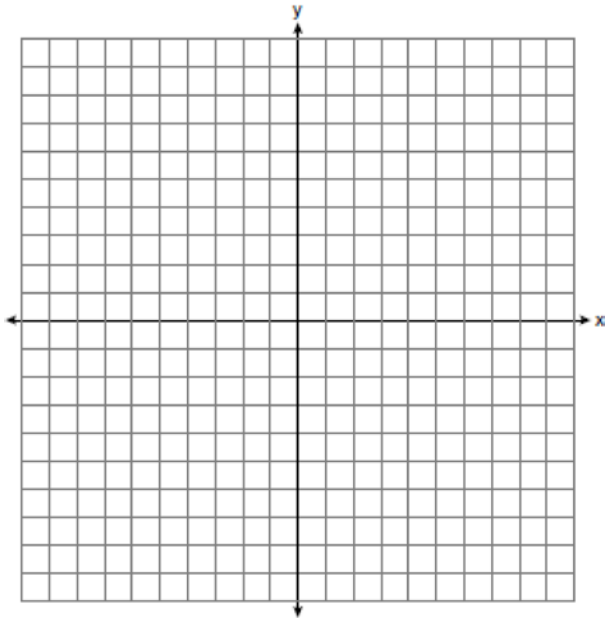
What is $m\angle ACR$?

1) 125
2) 115
3) 65
4) 55

104 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

105 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.



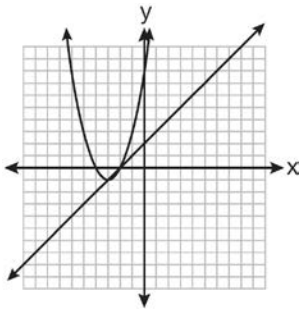
106 The bases of a right triangular prism are ΔABC and ΔDEF. Angles A and D are right angles, $AB = 6$, $AC = 8$, and $AD = 12$. What is the length of edge $\overline{BE}$?

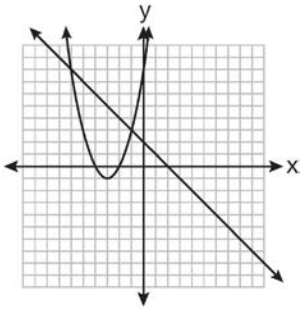
1) 10
2) 12
3) 14
4) 16

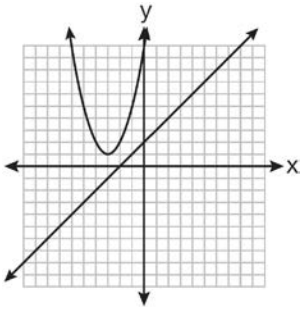
107 Which graph could be used to find the solution to the following system of equations?

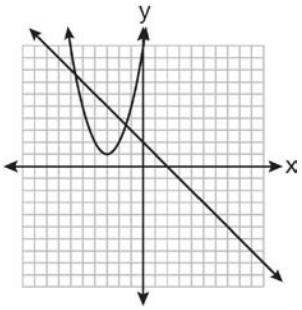
$$y = (x + 3)^2 - 1$$

$$x + y = 2$$

1) 

2) 

3) 

4) 

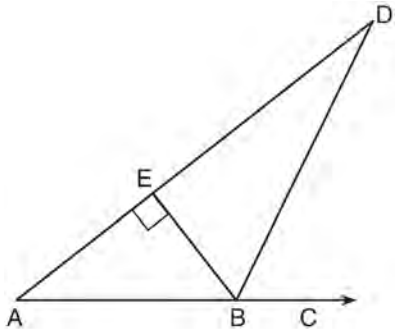
108 In a park, two straight paths intersect. The city wants to install lampposts that are both equidistant from each path and also 15 feet from the intersection of the paths. How many lampposts are needed?

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

109 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.

110 The diagram below shows ΔABD, with $\overleftrightarrow{ABC}$, $\overline{BE} \perp \overline{AD}$, and $\angle EBD \cong \angle CBD$.

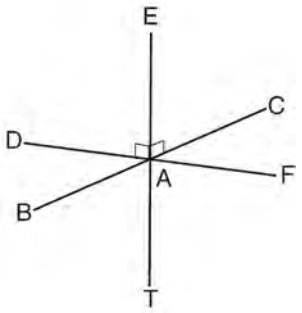


If m$\angle ABE$ = 52, what is m$\angle D$?
1) 26
2) 38
3) 52
4) 64

111 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

112 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

113 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*.

114 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

115 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 $(4, 2)$?

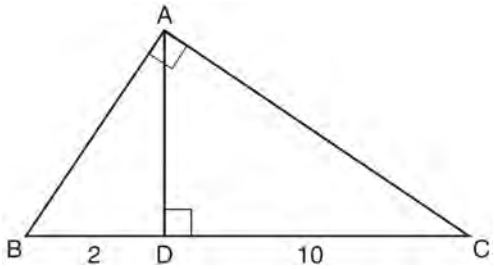
1) $y = \frac{2}{3}x - \frac{2}{3}$

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

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

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

116 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) $2\sqrt{2}$

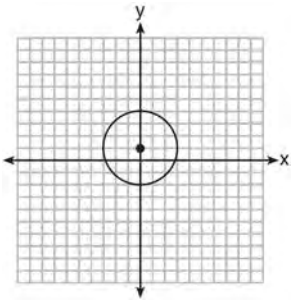
2) $2\sqrt{5}$

3) $2\sqrt{6}$

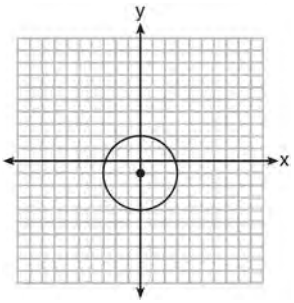
4) $2\sqrt{30}$

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

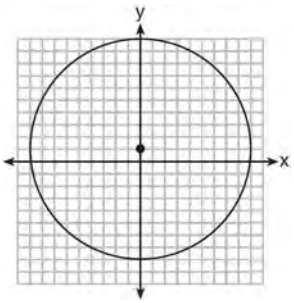
1)



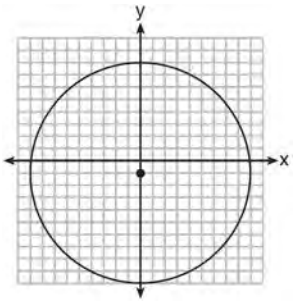
2)



3)



4)

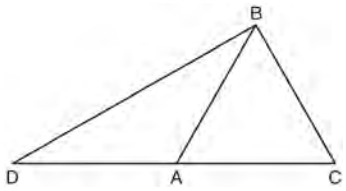


118 Write an equation of a circle whose center is $(-3, 2)$ and whose diameter is 10.

119 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.

120 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

121 In the diagram of ΔBCD shown below, $\overline{BA}$ is drawn from vertex B to point A on $\overline{DC}$, such that $\overline{BC} \cong \overline{BA}$.



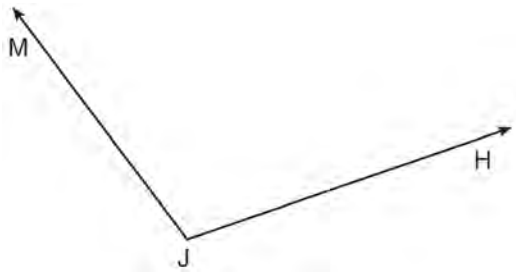
In ΔDAB, $m\angle D = x$, $m\angle DAB = 5x - 30$, and $m\angle DBA = 3x - 60$. In ΔABC, $AB = 6y - 8$ and $BC = 4y - 2$. [Only algebraic solutions can receive full credit.] Find $m\angle D$. Find $m\angle BAC$. Find the length of $\overline{BC}$. Find the length of $\overline{DC}$.

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

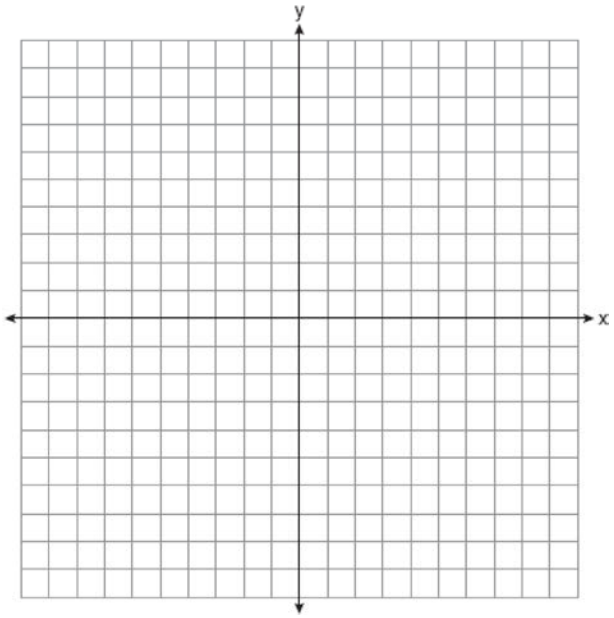
123 In ΔABC, $m\angle A = 3x + 1$, $m\angle B = 4x - 17$, and $m\angle C = 5x - 20$. Which type of triangle is ΔABC?
1) right
2) scalene
3) isosceles
4) equilateral

124 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 $\Delta ABC \sim \Delta DEF$?
1) AA
2) SAS
3) SSS
4) ASA

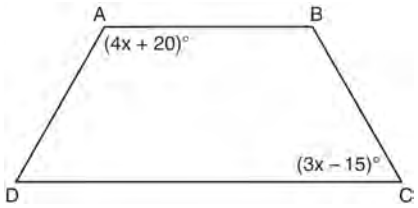
125 Using a compass and straightedge, construct the bisector of $\angle MJH$. [Leave all construction marks.]



126 The coordinates of the vertices of ΔABC are $A(-6,5)$, $B(-4,8)$, and $C(1,6)$. State and label the coordinates of the vertices of $\Delta A''B''C''$, the image of ΔABC after the composition of transformations $T_{(-4,5)} \circ r_{y\text{-axis}}$. [The use of the set of axes below is optional.]



127 In the diagram of trapezoid $ABCD$ below, $\overline{AB} \parallel \overline{DC}$, $\overline{AD} \cong \overline{BC}$, $m\angle A = 4x + 20$, and $m\angle C = 3x - 15$.



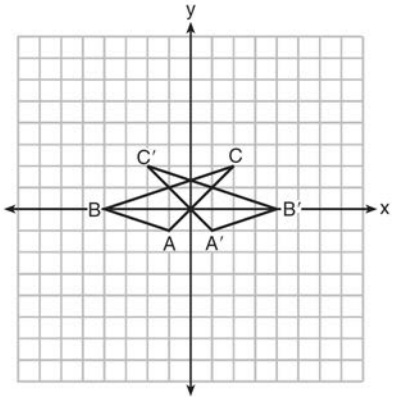
What is $m\angle D$?

1) 25
2) 35
3) 60
4) 90

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

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

129 In the diagram below, under which transformation is $\Delta A'B'C'$ the image of ΔABC?



1) D_2
2) $r_{x\text{-axis}}$
3) $r_{y\text{-axis}}$
4) $(x,y) \rightarrow (x-2,y)$

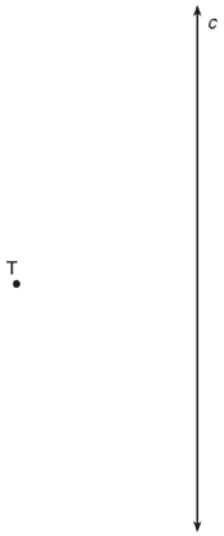
130 Which quadrilateral does *not* always have congruent diagonals?

1) isosceles trapezoid
2) rectangle
3) rhombus
4) square

131 Which set of numbers could *not* represent the lengths of the sides of a right triangle?

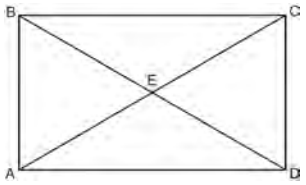
1) $\{1, 3, \sqrt{10}\}$
2) $\{2, 3, 4\}$
3) $\{3, 4, 5\}$
4) $\{8, 15, 17\}$

132 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.



133 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*.

134 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

135 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) $(5.5, 3)$

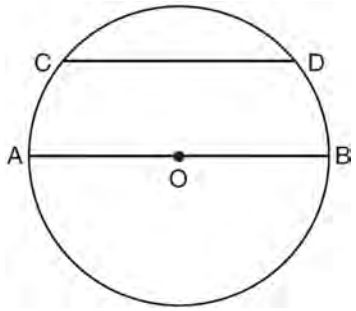
136 What is an equation of the circle with center $(-5, 4)$ and a radius of 7?

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) $(x+5)^2 + (y-4)^2 = 49$

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

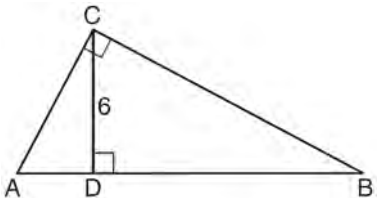
138 What is the perimeter of a rhombus whose diagonals are 16 and 30?
1) 92
2) 68
3) 60
4) 17

139 In the diagram of circle O below, chord $\overline{CD}$ is parallel to diameter $\overline{AOB}$ and $m\overset{\frown}{CD} = 110$.

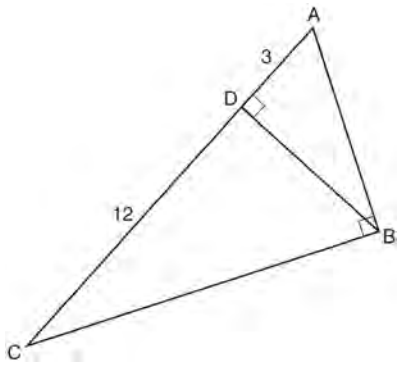


What is $m\overset{\frown}{DB}$?
1) 35
2) 55
3) 70
4) 110

140 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.]

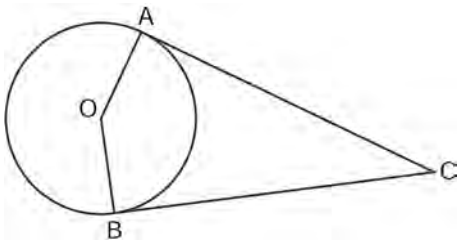


141 In right triangle ABC shown in the diagram below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$, $CD = 12$, and $AD = 3$.



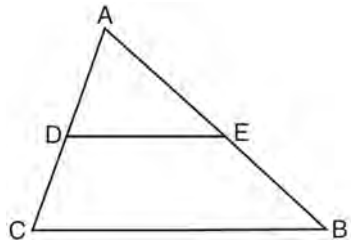
What is the length of $\overline{AB}$?
1) $5\sqrt{3}$
2) 6
3) $3\sqrt{5}$
4) 9

142 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

143 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) $\Delta ABC \sim \Delta AED$

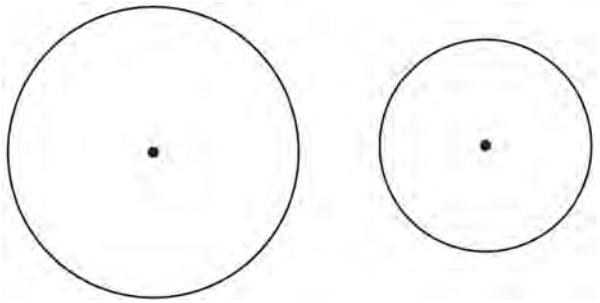
144 What is the equation of a line passing through the point $(6, 1)$ and parallel to the line whose equation is $3x = 2y + 4$?

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

145 What is the slope of the line perpendicular to the line represented by the equation $2x + 4y = 12$?

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

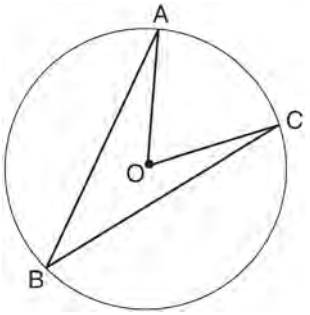
146 How many common tangent lines can be drawn to the circles shown below?



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

147 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.

148 Circle O with $\angle AOC$ and $\angle ABC$ is shown in the diagram below.

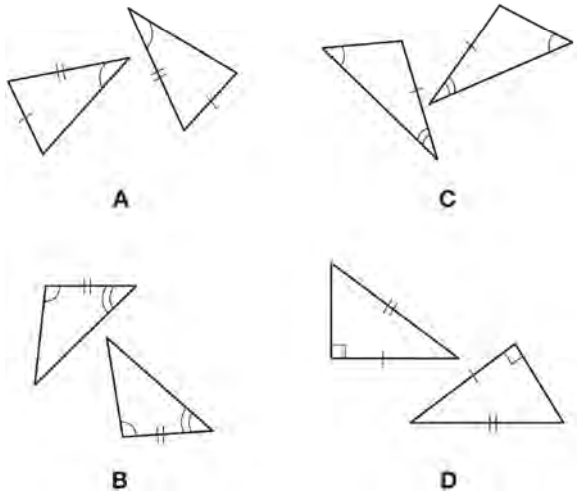


What is the ratio of m$\angle AOC$ to m$\angle ABC$?

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

149 The coordinates of two vertices of square $ABCD$ are $A(2,1)$ and $B(4,4)$. Determine the slope of side $\overline{BC}$.

150 In the diagram below, four pairs of triangles are shown. Congruent corresponding parts are labeled in each pair.



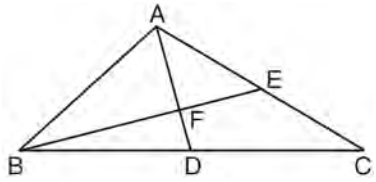
Using only the information given in the diagrams, which pair of triangles can *not* be proven congruent?

1) A
2) B
3) C
4) D

151 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

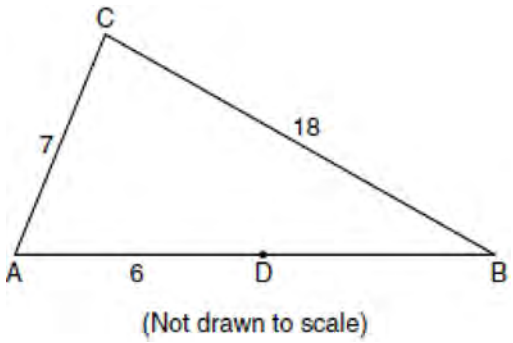
152 In the diagram of ΔABC below, medians $\overline{AD}$ and $\overline{BE}$ intersect at point F.



If $AF = 6$, what is the length of $\overline{FD}$?

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

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



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

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

Geometry Regents at Random

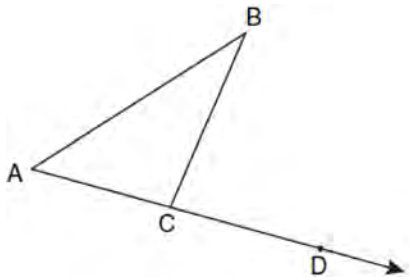
154 Triangle ABC has vertices $A(1,3)$, $B(0,1)$, and $C(4,0)$. Under a translation, A', the image point of A, is located at $(4,4)$. Under this same translation, point C' is located at
1) $(7,1)$
2) $(5,3)$
3) $(3,2)$
4) $(1,-1)$

155 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) $y - 2x = 3$

156 In ΔABC, 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

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

158 In the diagram below, ΔABC is shown with $\overline{AC}$ extended through point D.

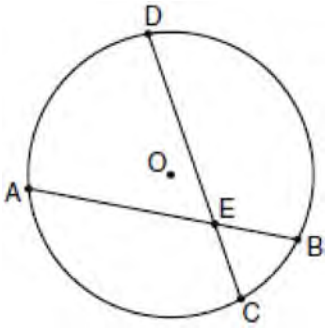


If $m\angle BCD = 6x + 2$, $m\angle BAC = 3x + 15$, and $m\angle ABC = 2x - 1$, what is the value of x?
1) 12
2) $14\frac{10}{11}$
3) 16
4) $18\frac{1}{9}$

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

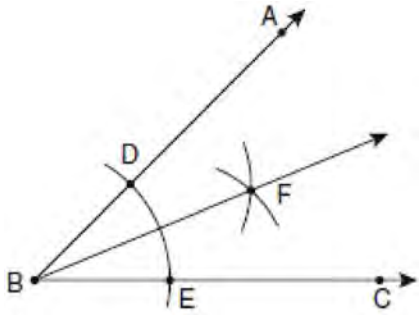
160 What is the distance between the points $(-3,2)$ and $(1,0)$?
1) $2\sqrt{2}$
2) $2\sqrt{3}$
3) $5\sqrt{2}$
4) $2\sqrt{5}$

161 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 $EB = 4$.



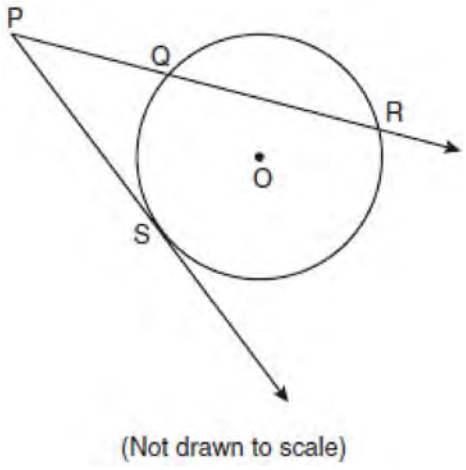
What is the value of x?
1) 1
2) 3.6
3) 5
4) 10.25

162 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) $m\angle DBF = m\angle EBF$

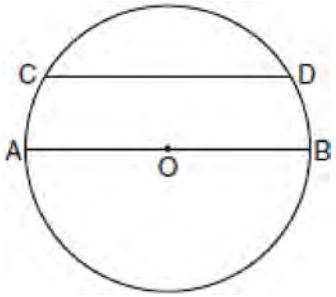
163 In the diagram below, $\overline{PS}$ is a tangent to circle O at point S, $\overline{PQR}$ is a secant, $PS = x$, $PQ = 3$, and $PR = x + 18$.



(Not drawn to scale)

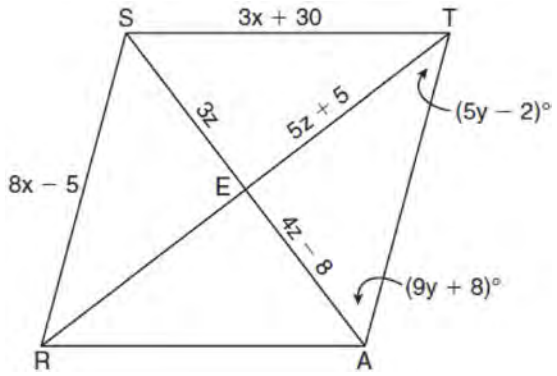
What is the length of $\overline{PS}$?
1) 6
2) 9
3) 3
4) 27

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

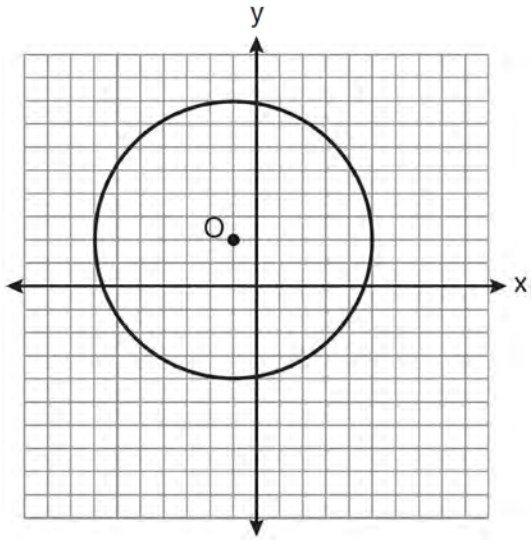


What is $m\overset{\frown}{CD}$?
1) 150
2) 120
3) 100
4) 60

165 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 $m\angle TAS$.



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



167 In ΔABC, $\overline{AB} \cong \overline{BC}$. 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) $\overline{AD} \cong \overline{DC}$

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

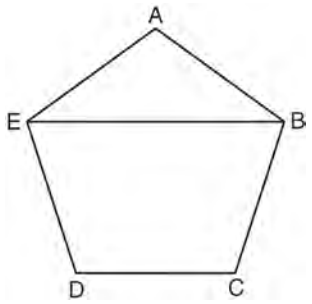
169 Point *A* is located at $(4, -7)$. The point is reflected in the *x*-axis. Its image is located at

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

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

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

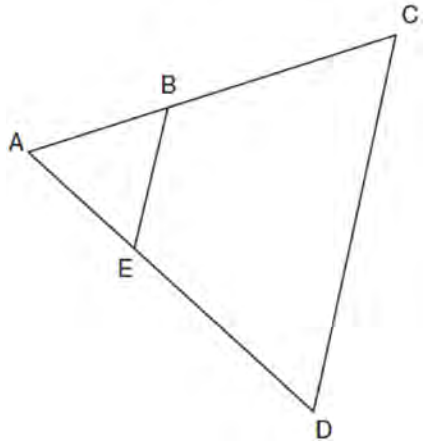
171 In the diagram below of regular pentagon *ABCDE*, $\overline{EB}$ is drawn.



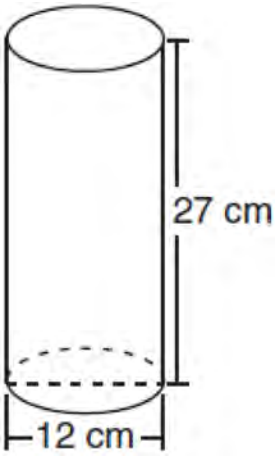
What is the measure of $\angle AEB$?

1) 36°
2) 54°
3) 72°
4) 108°

172 In the diagram below of ΔACD, 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 $\overline{EB}$.

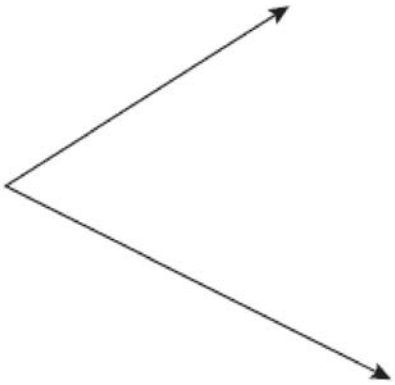


173 Which expression represents the volume, in cubic centimeters, of the cylinder represented in the diagram below?



1) 162π
2) 324π
3) 972π
4) $3,888\pi$

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



175 What is the slope of a line perpendicular to the line whose equation is $5x + 3y = 8$?

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

176 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

177 In ΔPQR, $PQ = 8$, $QR = 12$, and $RP = 13$. Which statement about the angles of ΔPQR 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) $m\angle P > m\angle R > m\angle Q$

178 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

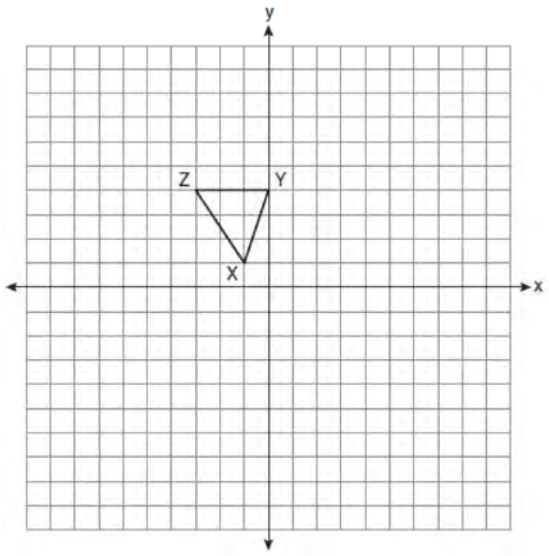
179 Lines *j* and *k* intersect at point *P*. Line *m* is drawn so that it is perpendicular to lines *j* and *k* at point *P*. Which statement is correct?

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*.

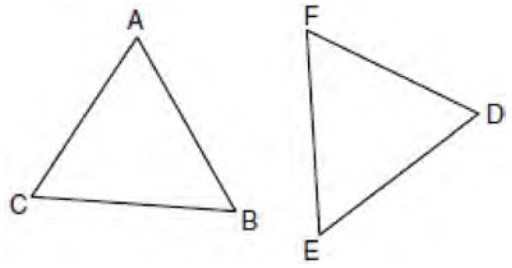
180 Which transformation is *not* always an isometry?

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

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



182 In the diagram of ΔABC and ΔDEF below, $\overline{AB} \cong \overline{DE}$, $\angle A \cong \angle D$, and $\angle B \cong \angle E$.



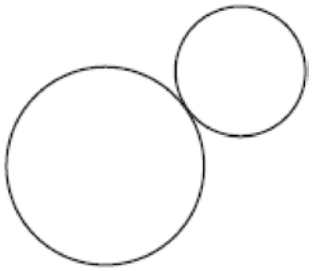
Which method can be used to prove $\Delta ABC \cong \Delta DEF$?
1) SSS
2) SAS
3) ASA
4) HL

183 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

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

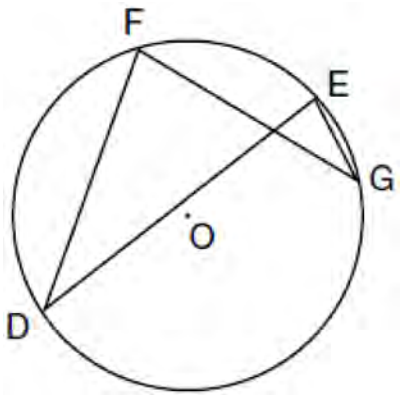
185 If the surface area of a sphere is represented by 144π, what is the volume in terms of π?
1) 36π
2) 48π
3) 216π
4) 288π

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

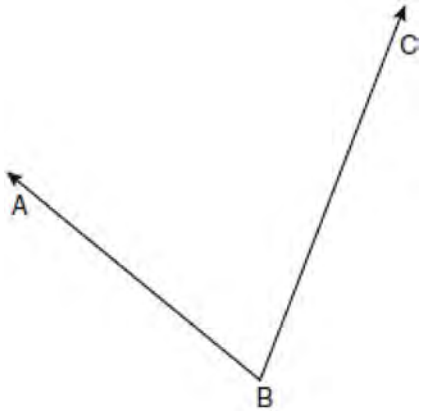


1) 1
2) 2
3) 3
4) 4

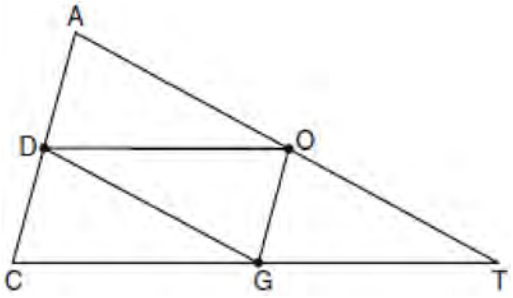
187 In the diagram below of circle O, chords $\overline{DF}$, $\overline{DE}$, $\overline{FG}$, and $\overline{EG}$ are drawn such that $m\overset{\frown}{DF} : m\overset{\frown}{FE} : m\overset{\frown}{EG} : m\overset{\frown}{GD} = 5:2:1:7$. Identify one pair of inscribed angles that are congruent to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



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



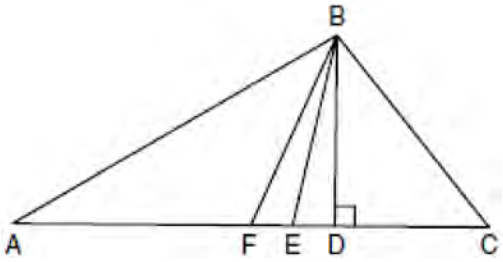
189 In the diagram below of ΔACT, D is the midpoint of $\overline{AC}$, O is the midpoint of $\overline{AT}$, and G is the midpoint of $\overline{CT}$.



If $AC = 10$, $AT = 18$, and $CT = 22$, what is the perimeter of parallelogram $CDOG$?

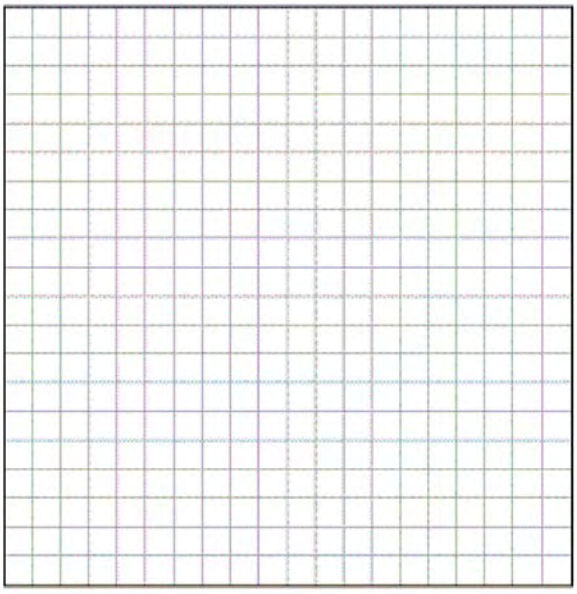
1) 21
2) 25
3) 32
4) 40

190 Given ΔABC 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) $\overline{CF} \cong \overline{FA}$

191 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]



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

193 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) $\sqrt{145}$

194 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) $(4, 3)$

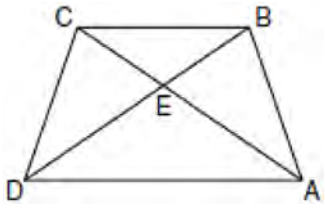
195 What is the measure of an interior angle of a regular octagon?

1) 45°
2) 60°
3) 120°
4) 135°

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

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

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



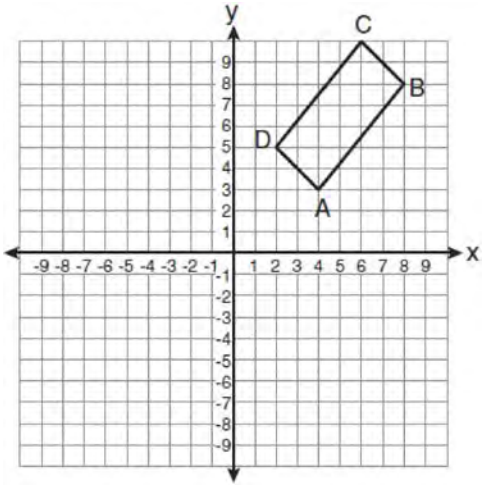
Which statement is true based on the given information?

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

198 Given $\Delta ABC \sim \Delta DEF$ 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) $\frac{\text{area of } \Delta ABC}{\text{area of } \Delta DEF} = \frac{9}{4}$
4) $\frac{\text{perimeter of } \Delta ABC}{\text{perimeter of } \Delta DEF} = \frac{3}{2}$

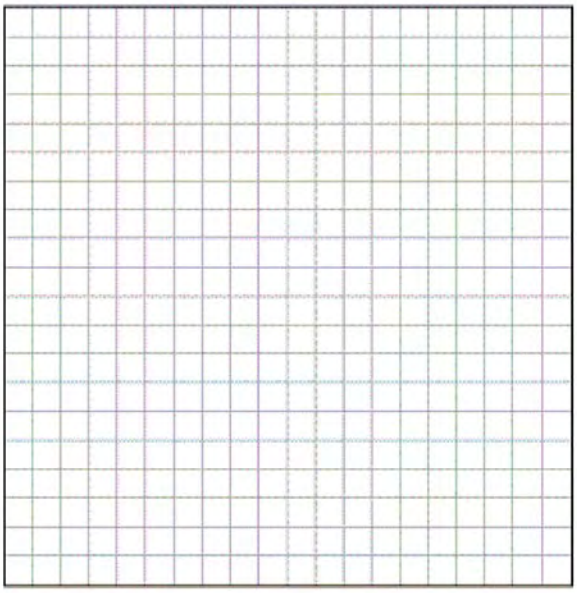
199 The rectangle *ABCD* shown in the diagram below will be reflected across the *x*-axis.



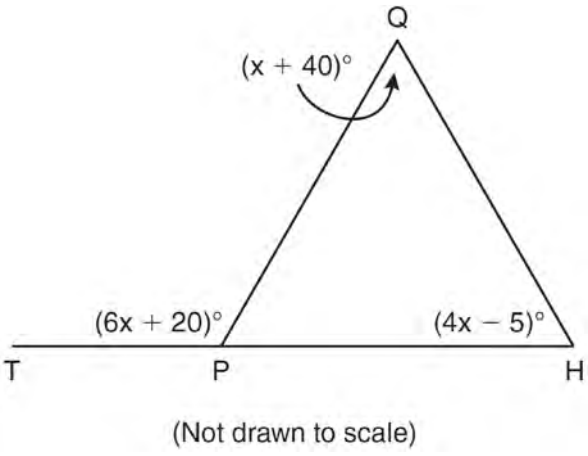
What will *not* be preserved?

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

200 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.]

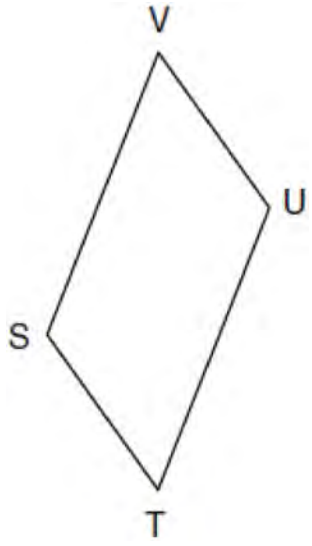


201 In the diagram below of ΔHQP, side $\overline{HP}$ is extended through P to T, $m\angle QPT = 6x + 20$, $m\angle HQP = x + 40$, and $m\angle PHQ = 4x - 5$. Find $m\angle QPT$.



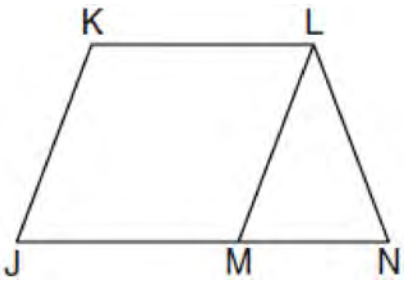
(Not drawn to scale)

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

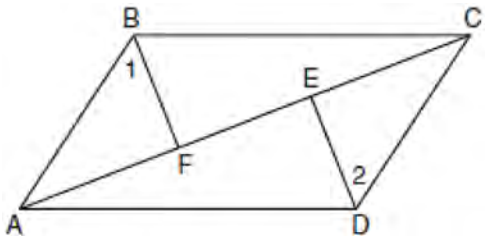


What is the length of $\overline{SV}$?
1) 5
2) 2
3) 7
4) 4

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

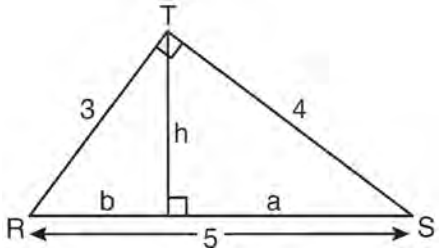


204 Given: Quadrilateral *ABCD*, diagonal $\overline{AFEC}$, $\overline{AE} \cong \overline{FC}$, $\overline{BF} \perp \overline{AC}$, $\overline{DE} \perp \overline{AC}$, $\angle 1 \cong \angle 2$
Prove: *ABCD* is a parallelogram.

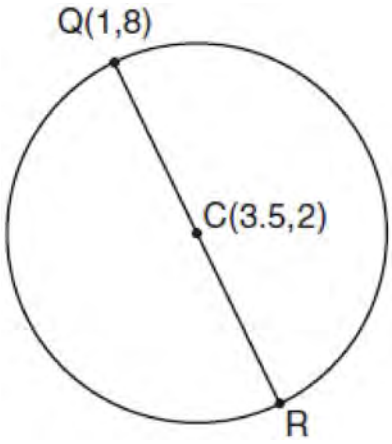


205 In isosceles triangle *ABC*, $AB = BC$. Which statement will always be true?
1) $m\angle B = m\angle A$
2) $m\angle A > m\angle B$
3) $m\angle A = m\angle C$
4) $m\angle C < m\angle B$

206 In the diagram below, ΔRST is a 3 – 4 – 5 right triangle. The altitude, *h*, to the hypotenuse has been drawn. Determine the length of *h*.



207 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.



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

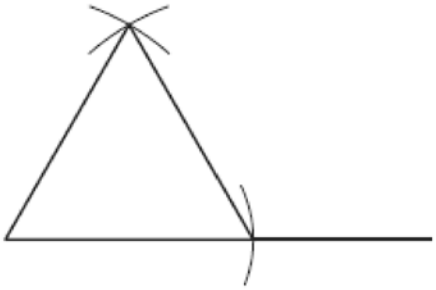
1) 180°
2) 120°
3) 90°
4) 60°

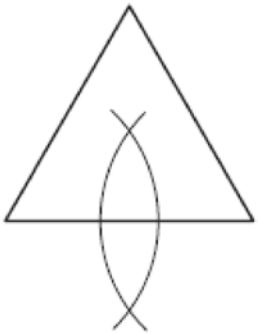
209 What is the solution of the following system of equations?

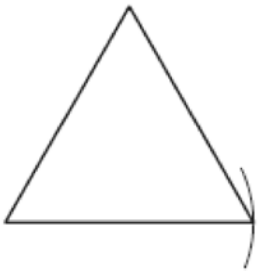
$$y = (x+3)^2 - 4$$
$$y = 2x + 5$$

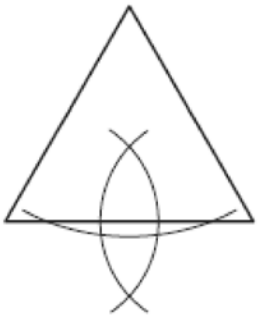
1) $(0,-4)$
2) $(-4,0)$
3) $(-4,-3)$ and $(0,5)$
4) $(-3,-4)$ and $(5,0)$

210 Which diagram shows the construction of an equilateral triangle?

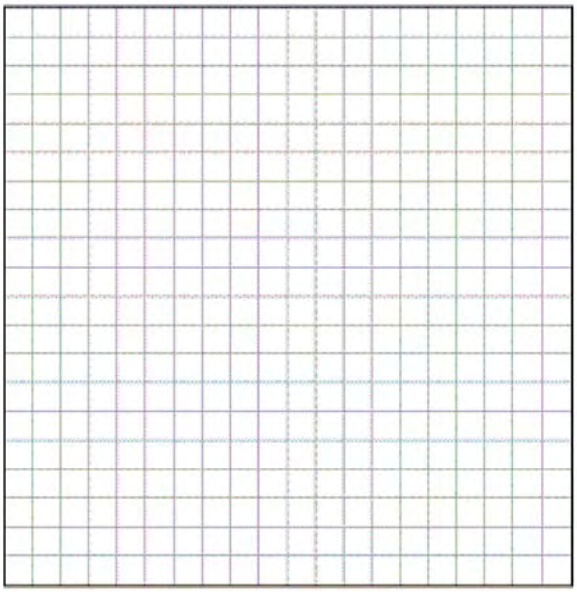
1)


2)


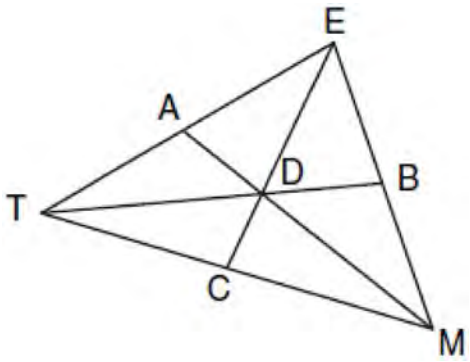
3)


4)


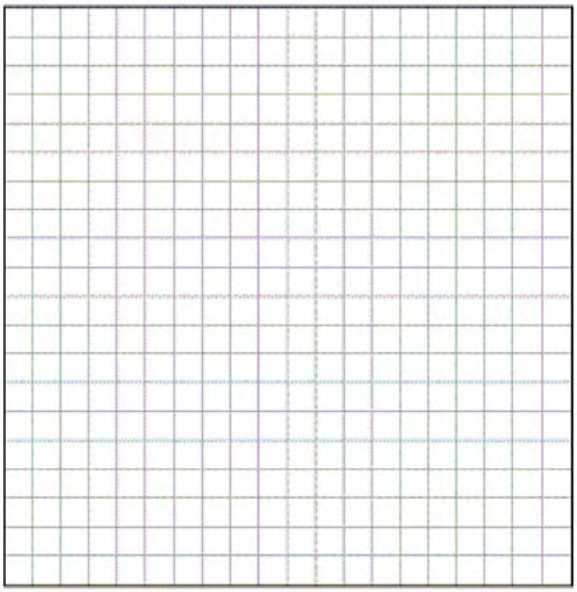
211 Triangle DEG has the coordinates $D(1,1)$, $E(5,1)$, and $G(5,4)$. Triangle DEG is rotated 90° about the origin to form $\Delta D'E'G'$. On the grid below, graph and label ΔDEG and $\Delta D'E'G'$. State the coordinates of the vertices D', E', and G'. Justify that this transformation preserves distance.



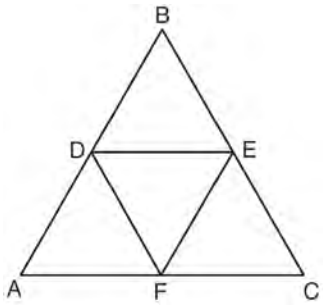
212 In the diagram below of ΔTEM, medians $\overline{TB}$, $\overline{EC}$, and $\overline{MA}$ intersect at D, and $TB = 9$. Find the length of $\overline{TD}$.



213 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.]



214 In the diagram below, the vertices of ΔDEF are the midpoints of the sides of equilateral triangle ABC, and the perimeter of ΔABC is 36 cm.



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

1) 6
2) 12
3) 18
4) 4

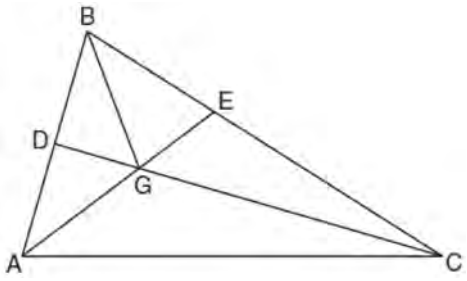
215 Side $\overline{PQ}$ of ΔPQR is extended through Q to point T. Which statement is *not* always true?

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

216 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

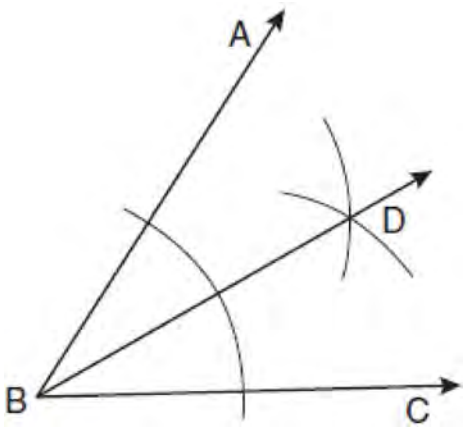
217 In the diagram below of ΔABC, $\overline{CD}$ is the bisector of $\angle BCA$, $\overline{AE}$ is the bisector of $\angle CAB$, and $\overline{BG}$ is drawn.



Which statement must be true?

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

218 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) $m\angle CBD = \frac{1}{2} m\angle ABD$

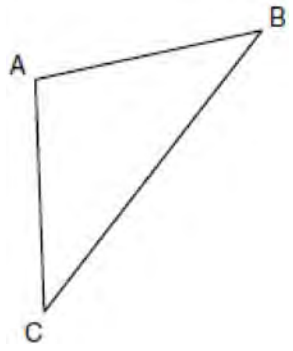
219 Which transformation produces a figure similar but not congruent to the original figure?

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

220 Juliann plans on drawing ΔABC, 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 $\angle C$?

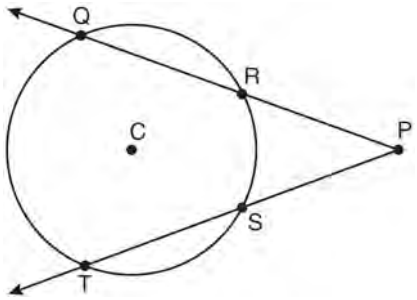
1) 20° to 40°
2) 30° to 50°
3) 80° to 90°
4) 120° to 130°

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



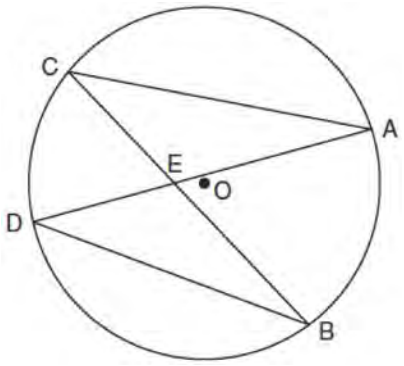
What is the measure of $\angle A$?
1) 40°
2) 50°
3) 70°
4) 100°

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



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

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



Which relationship must be true?
1) $\Delta CAE \cong \Delta DBE$
2) $\Delta AEC \sim \Delta BED$
3) $\angle ACB \cong \angle CBD$
4) $\overset{\frown}{CA} \cong \overset{\frown}{DB}$

224 A support beam between the floor and ceiling of a house forms a 90º angle with the floor. The builder wants to make sure that the floor and ceiling are parallel. Which angle should the support beam form with the ceiling?
1) 45º
2) 60º
3) 90º
4) 180º

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

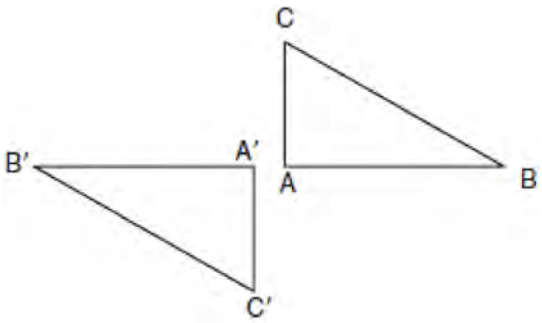
226 Which transformation of the line $x = 3$ results in an image that is perpendicular to the given line?

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

227 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

228 In the diagram below, under which transformation will $\Delta A'B'C'$ be the image of ΔABC?



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

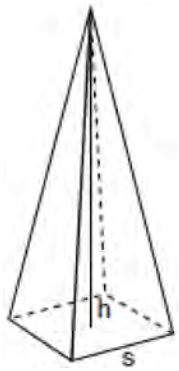
229 Given the system of equations: $y = x^2 - 4x$

$x = 4$

The number of points of intersection is

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

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

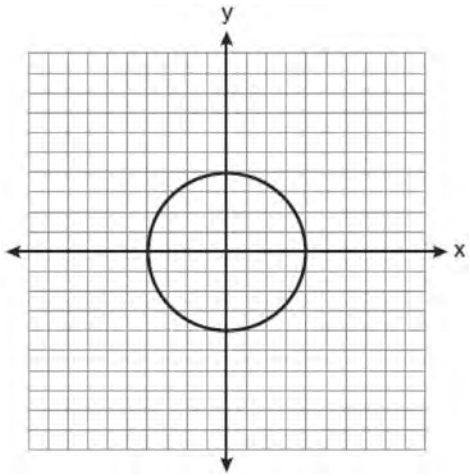


A side, *s*, of the base of the pyramid is 12 meters, and the height, *h*, is 42 meters. What is the volume of the pyramid in cubic meters?

231 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.

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



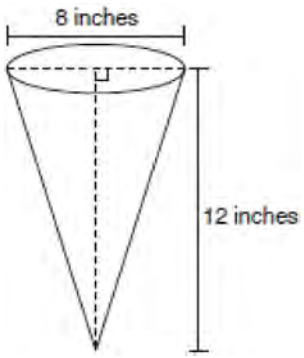
1) $x^2 + y^2 = 2$
2) $x^2 + y^2 = 4$
3) $x^2 + y^2 = 8$
4) $x^2 + y^2 = 16$

233 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

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

235 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.

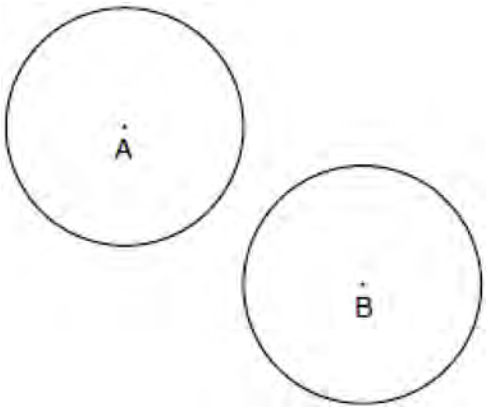
236 In the diagram below, a right circular cone has a diameter of 8 inches and a height of 12 inches.



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

237 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

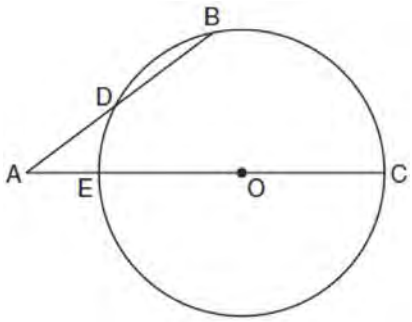
238 In the diagram below, circle A and circle B are shown.



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

239 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 $DB = 6$.

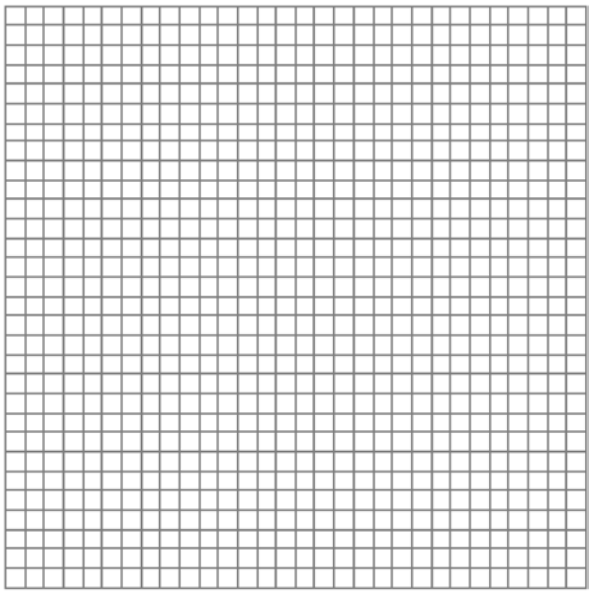


(Not drawn to scale)

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

1) 4.5
2) 7
3) 9
4) 14

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



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

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

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

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

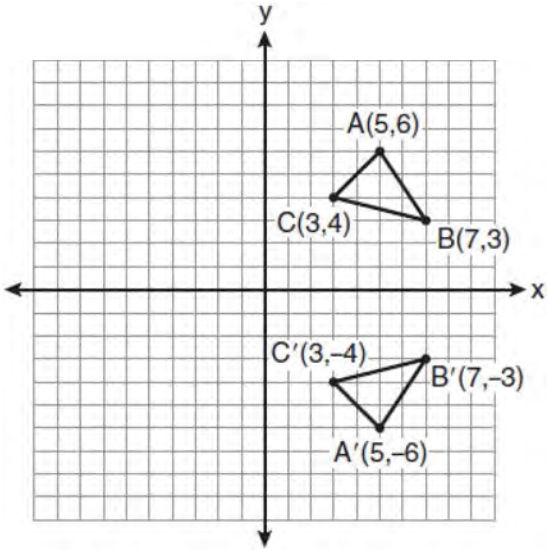
242 Which equation represents a line parallel to the line whose equation is $2y - 5x = 10$?

1) $5y - 2x = 25$
2) $5y + 2x = 10$
3) $4y - 10x = 12$
4) $2y + 10x = 8$

243 In ΔABC, $AB = 7$, $BC = 8$, and $AC = 9$. Which list has the angles of ΔABC 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) $\angle C, \angle A, \angle B$

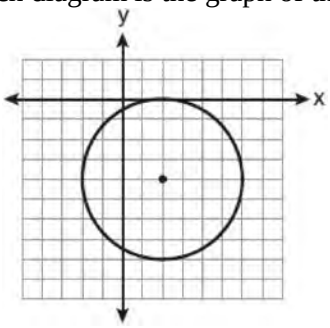
244 Which expression best describes the transformation shown in the diagram below?

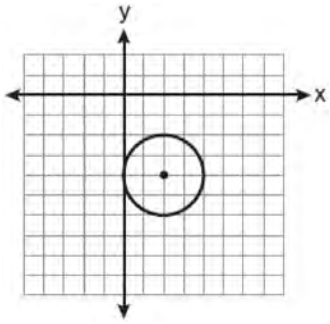


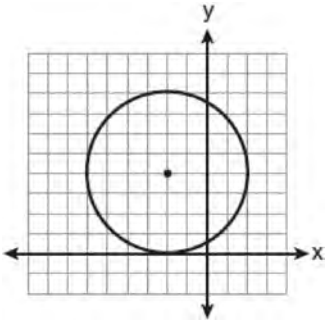
1) same orientation; reflection
2) opposite orientation; reflection
3) same orientation; translation
4) opposite orientation; translation

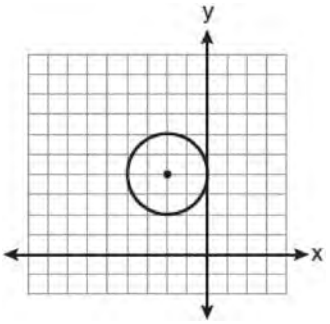
245 Tim has a rectangular prism with a length of 10 centimeters, a width of 2 centimeters, and an unknown height. He needs to build another rectangular prism with a length of 5 centimeters and the same height as the original prism. The volume of the two prisms will be the same. Find the width, in centimeters,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

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

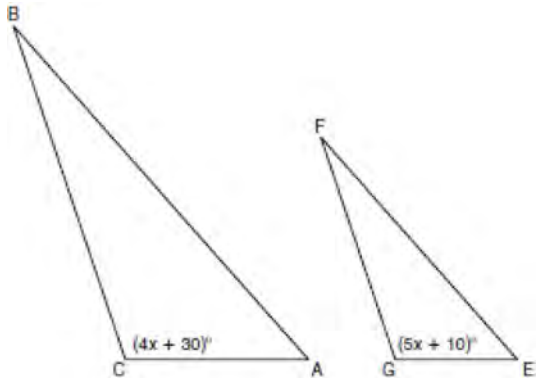
1)


2)


3)


4)


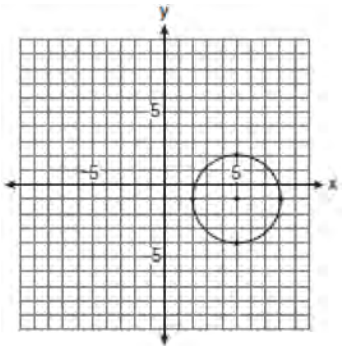
247 In the diagram below, $\Delta ABC \sim \Delta EFG$, $m\angle C = 4x + 30$, and $m\angle G = 5x + 10$. Determine the value of x.

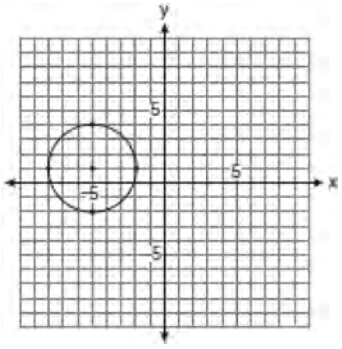


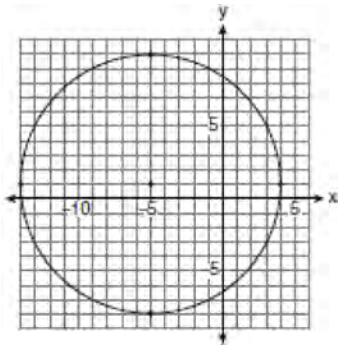
248 If two different lines are perpendicular to the same plane, they are
1) collinear
2) coplanar
3) congruent
4) consecutive

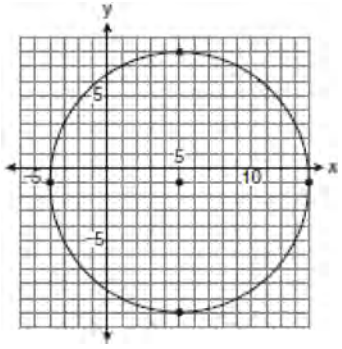
249 What is the inverse of the statement "If two triangles are not similar, their corresponding angles are not congruent"?
1) If two triangles are similar, their corresponding angles are not congruent.
2) If corresponding angles of two triangles are not congruent, the triangles are not similar.
3) If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

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

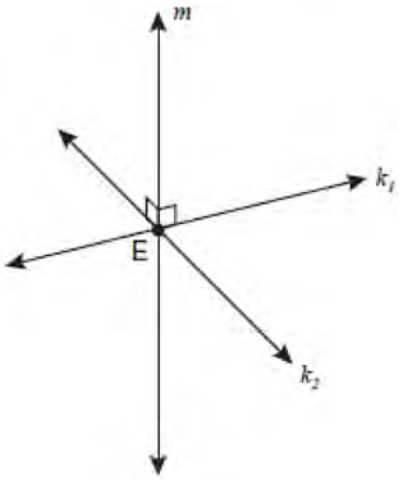
1)


2)


3)


4)


251 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?

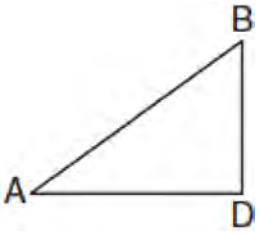
1) Lines k_1 and k_2 are perpendicular.
2) Line m is parallel to the plane determined by lines k_1 and k_2.
3) Line m is perpendicular to the plane determined by lines k_1 and k_2.
4) Line m is coplanar with lines k_1 and k_2.

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

253 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.

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



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

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

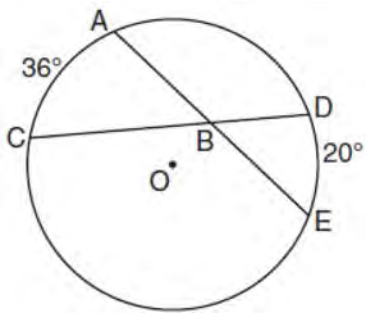
255 What is an equation of the line that passes through the point $(-2,5)$ and is perpendicular to the line whose equation is $y = \frac{1}{2}x + 5$?

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

256 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.

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

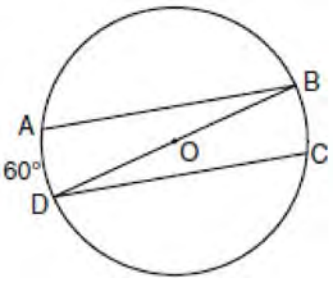


What is $m\angle ABC$?
1) 56
2) 36
3) 28
4) 8

258 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) $y = -2x + 17$

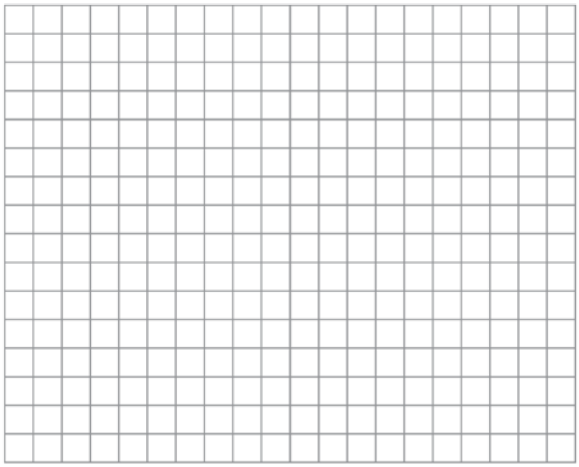
259 If a line segment has endpoints $A(3x + 5, 3y)$ and $B(x - 1, -y)$, what are the coordinates of the midpoint of $\overline{AB}$?
1) $(x + 3, 2y)$
2) $(2x + 2, y)$
3) $(2x + 3, y)$
4) $(4x + 4, 2y)$

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

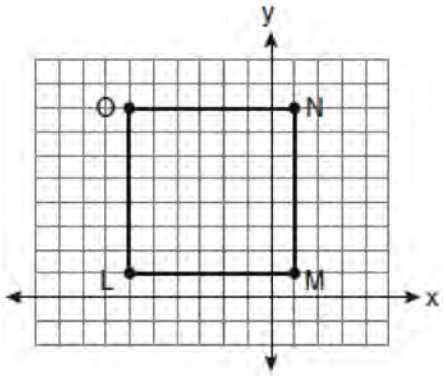


If $m\overset{\frown}{AD} = 60$, what is $m\angle CDB$?
1) 20
2) 30
3) 60
4) 120

261 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.]



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

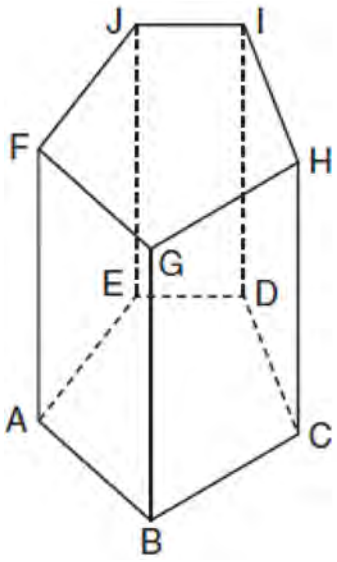
263 What is the slope of a line perpendicular to the line whose equation is $y = 3x + 4$?

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

264 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

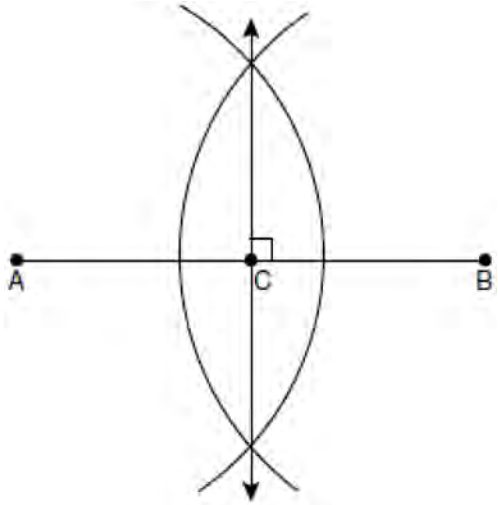
265 The diagram below shows a right pentagonal prism.



Which statement is always true?

1) $\overline{BC} \parallel \overline{ED}$
2) $\overline{FG} \parallel \overline{CD}$
3) $\overline{FJ} \parallel \overline{IH}$
4) $\overline{GB} \parallel \overline{HC}$

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



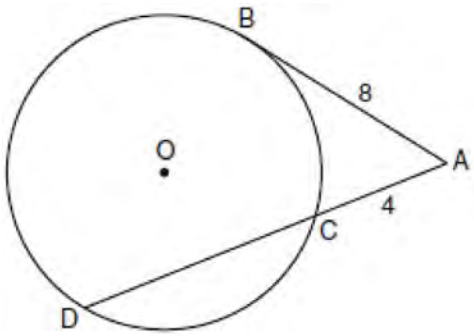
Which statement is *not* true?

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

267 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.

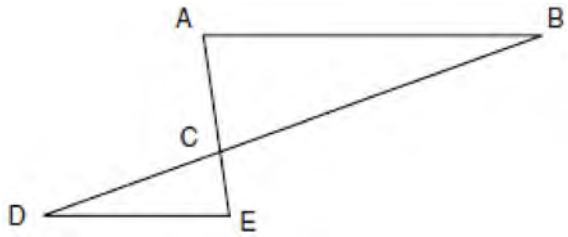
268 In the diagram below, tangent $\overline{AB}$ and secant $\overline{ACD}$ are drawn to circle O from an external point A, $AB = 8$, and $AC = 4$.



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

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

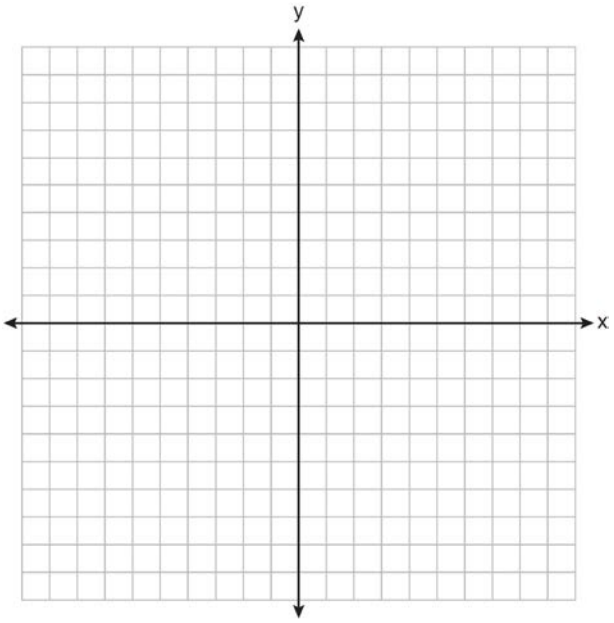
269 In the diagram of ΔABC and ΔEDC below, $\overline{AE}$ and $\overline{BD}$ intersect at C, and $\angle CAB \cong \angle CED$.



Which method can be used to show that ΔABC must be similar to ΔEDC?

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

270 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.



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

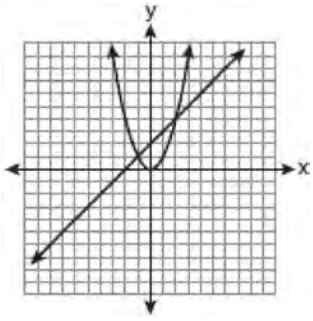
1) $m\angle A = m\angle B$
2) $m\angle A = m\angle C$
3) $m\angle ACB = 90$
4) $m\angle ABC = 60$

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

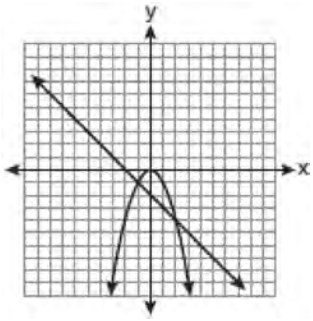
$$y = -x + 2$$

$$y = x^2$$

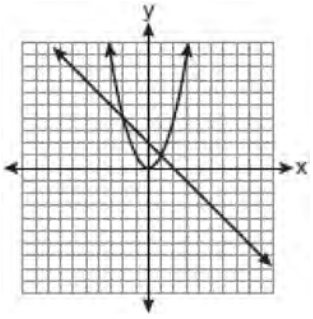
1)



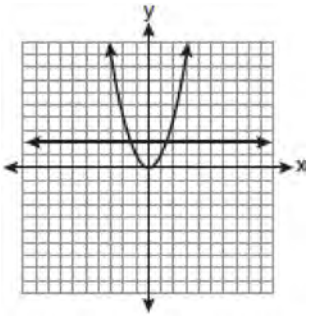
2)



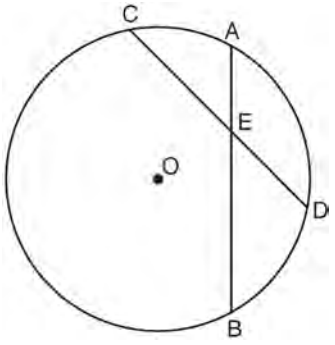
3)



4)



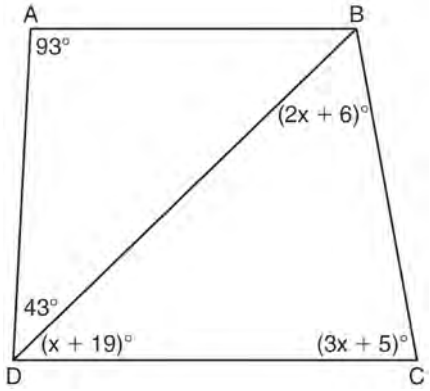
273 In the diagram below of circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E.



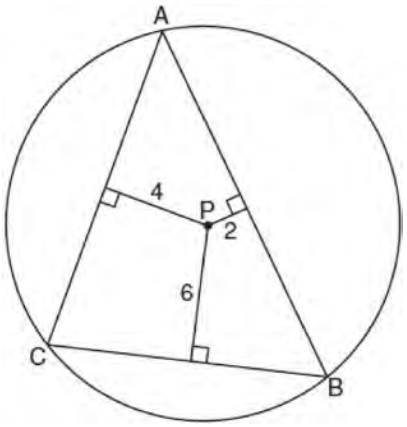
If $CE = 10$, $ED = 6$, and $AE = 4$, what is the length of $\overline{EB}$?

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

274 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.



275 In the diagram below, ΔABC 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 $AB > BC$

276 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?

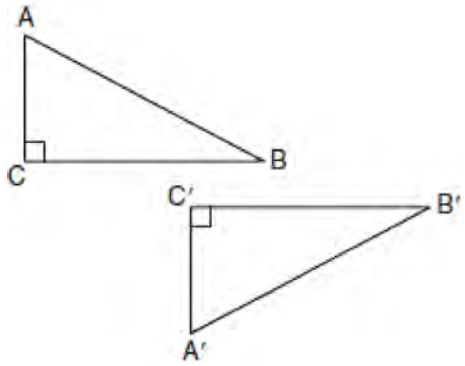
1) right
2) obtuse
3) scalene
4) isosceles

277 In ΔABC, $m\angle A = x$, $m\angle B = 2x + 2$, and $m\angle C = 3x + 4$. What is the value of x?

1) 29
2) 31
3) 59
4) 61

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

279 In the diagram below, which transformation was used to map ΔABC to $\Delta A'B'C'$?



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

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

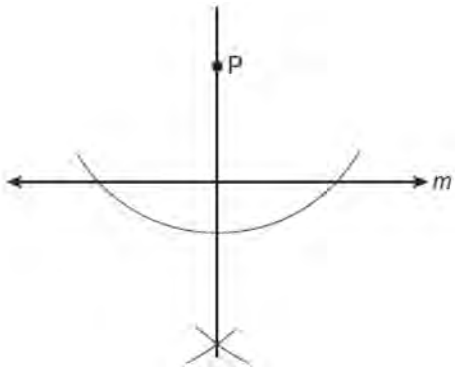
1) one
2) two
3) zero
4) infinite

281 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.

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

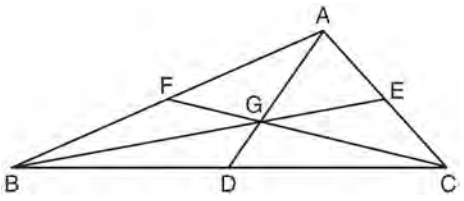
283 The diagram below shows the construction of a line through point P perpendicular to line m.



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.

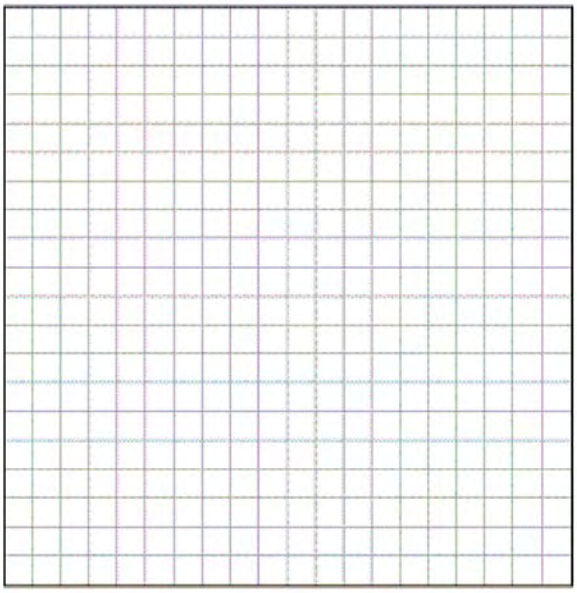
284 In the diagram below of ΔABC, medians $\overline{AD}$, $\overline{BE}$, and $\overline{CF}$ intersect at G.



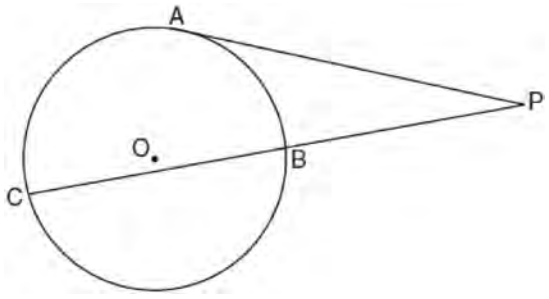
If $CF = 24$, what is the length of $\overline{FG}$?

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

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



286 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 $\overline{PA}$?

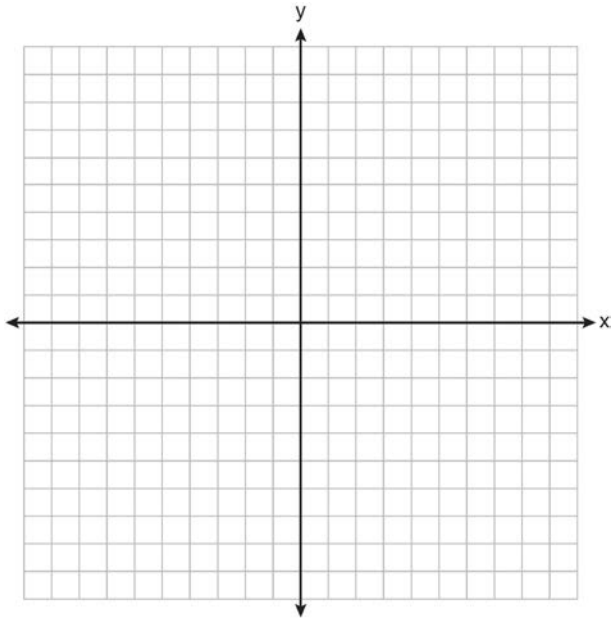
1) 20
2) 9
3) 8
4) 6

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

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

289 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.



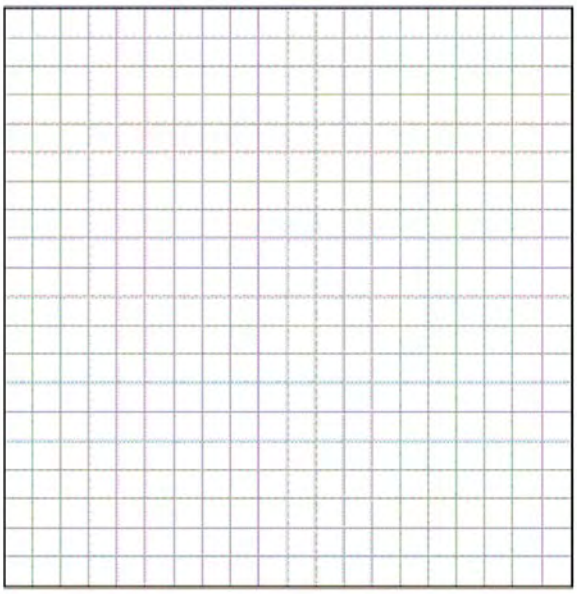
290 The diameter of a circle has endpoints at $(-2, 3)$ and $(6, 3)$. What is an equation of the circle?

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

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

292 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.



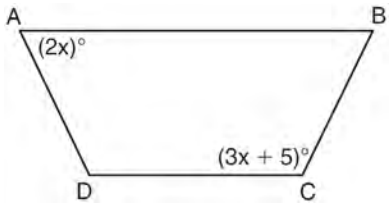
293 The diagonal $\overline{AC}$ is drawn in parallelogram $ABCD$. Which method can *not* be used to prove that $\Delta ABC \cong \Delta CDA$?
1) SSS
2) SAS
3) SSA
4) ASA

294 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

295 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 $\sqrt{13}$

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

297 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 $m\angle BAD$.

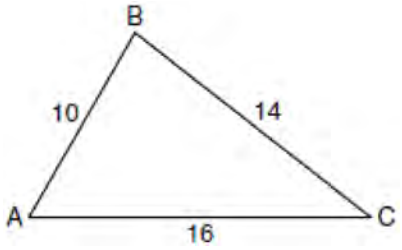


298 A right circular cylinder has an altitude of 11 feet and a radius of 5 feet. What is the lateral area, in square feet, of the cylinder, to the *nearest tenth*?
1) 172.7
2) 172.8
3) 345.4
4) 345.6

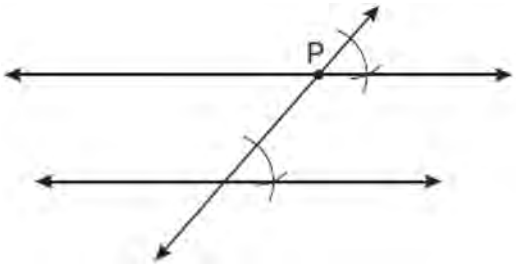
299 ΔABC is similar to ΔDEF. The ratio of the length of $\overline{AB}$ to the length of $\overline{DE}$ is 3:1. Which ratio is also equal to 3:1?
1) $\frac{m\angle A}{m\angle D}$
2) $\frac{m\angle B}{m\angle F}$
3) $\frac{\text{area of } \Delta ABC}{\text{area of } \Delta DEF}$
4) $\frac{\text{perimeter of } \Delta ABC}{\text{perimeter of } \Delta DEF}$

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

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



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

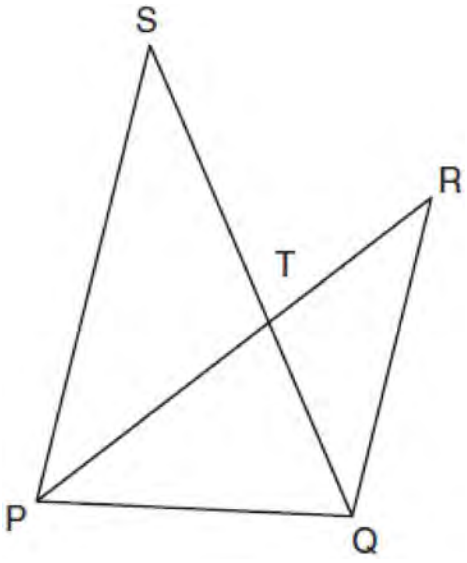


1) A line perpendicular to one of two parallel lines is perpendicular to the other.
2) Two lines are perpendicular if they intersect to form congruent adjacent angles.
3) When two lines are intersected by a transversal and alternate interior angles are congruent, the lines are parallel.
4) When two lines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

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

304 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 $\Delta PST \sim \Delta RQT$?

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

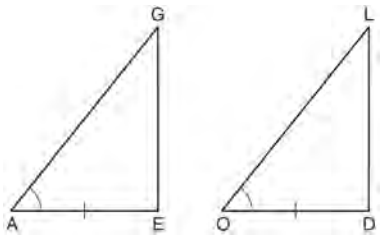
305 In ΔABC, $m\angle A = 95$, $m\angle B = 50$, and $m\angle C = 35$. Which expression correctly relates the lengths of the sides of this triangle?

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

306 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.

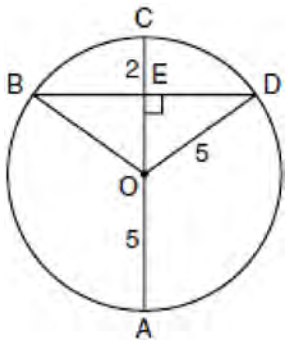
307 In the diagram below of ΔAGE and ΔOLD, $\angle GAE \cong \angle LOD$, and $\overline{AE} \cong \overline{OD}$.



To prove that ΔAGE and ΔOLD 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) $\angle AEG \cong \angle ODL$

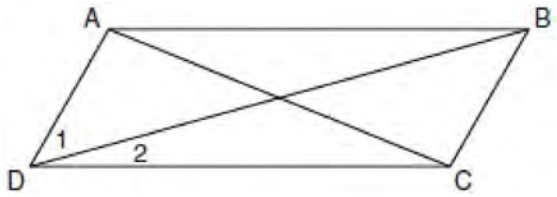
308 In the diagram below, circle O has a radius of 5, and $CE = 2$. Diameter $\overline{AC}$ is perpendicular to chord $\overline{BD}$ at E.



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

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

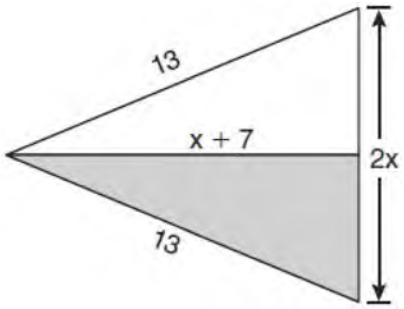
309 In the diagram below of parallelogram $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$, $m\angle 1 = 45$ and $m\angle DCB = 120$.



What is the measure of $\angle 2$?

1) 15°
2) 30°
3) 45°
4) 60°

310 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 $2x$.



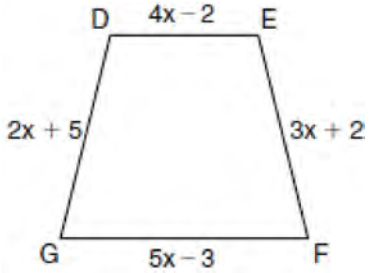
What is the length of the base?

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

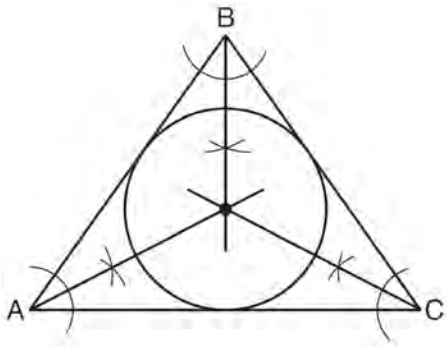
311 Which equation represents a line perpendicular to the line whose equation is $2x + 3y = 12$?

1) $6y = -4x + 12$
2) $2y = 3x + 6$
3) $2y = -3x + 6$
4) $3y = -2x + 12$

312 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.



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



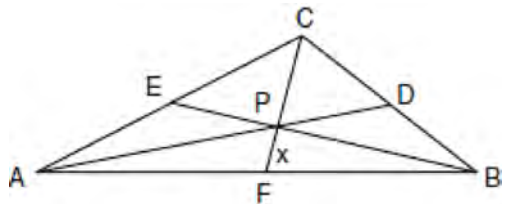
1) The intersection of the angle bisectors of a triangle is the center of the inscribed circle.
2) The intersection of the angle bisectors of a triangle is the center of the circumscribed circle.
3) The intersection of the perpendicular bisectors of the sides of a triangle is the center of the inscribed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

314 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 $\overline{BD}$

315 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.

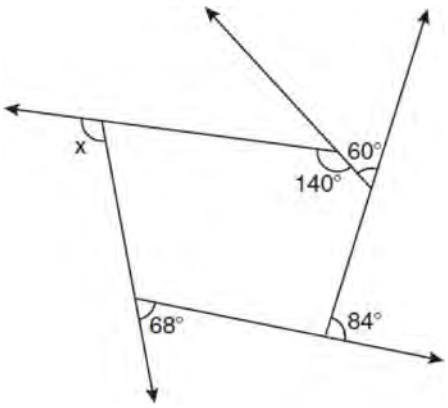
316 In the diagram of ΔABC below, Jose found centroid P by constructing the three medians. He measured $\overline{CF}$ and found it to be 6 inches.



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

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

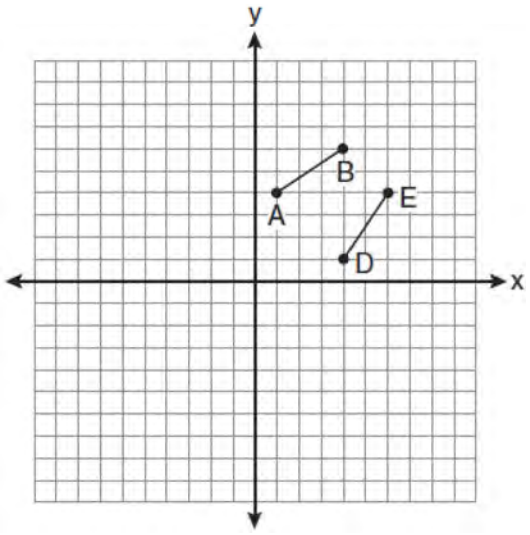
317 The pentagon in the diagram below is formed by five rays.



What is the degree measure of angle x?

1) 72
2) 96
3) 108
4) 112

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



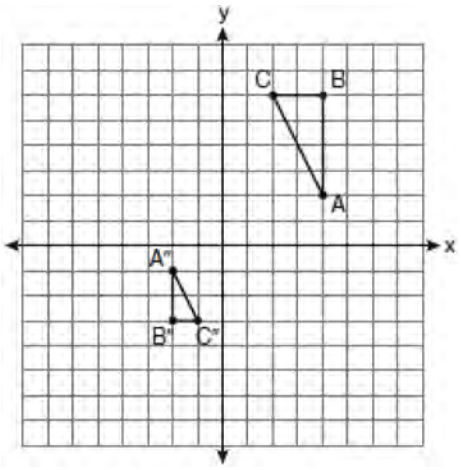
Which transformation will move $\overline{AB}$ onto $\overline{DE}$ such that point D is the image of point A and point E is the image of point B?

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

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

320 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) $D_{\frac{1}{2}} \circ R_{90°}$

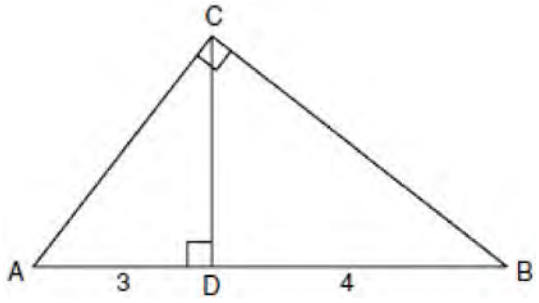
321 What is the contrapositive of the statement, "If I am tall, then I will bump my head"?

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.

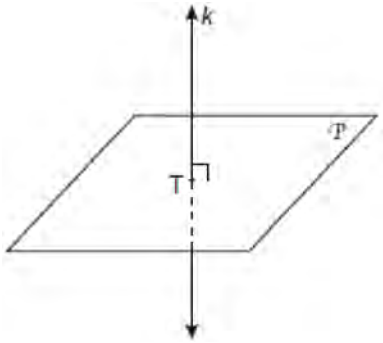
322 What is the negation of the statement "I am not going to eat ice cream"?

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.

323 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.



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

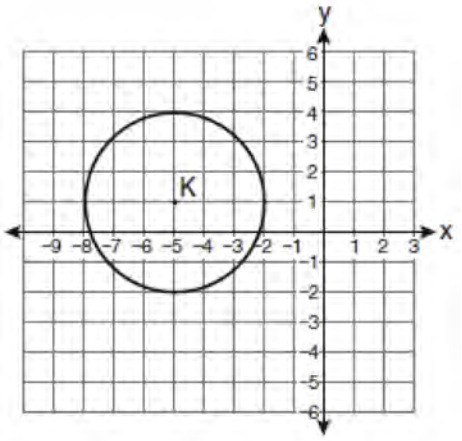


Which statement is true?

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 $\mathcal{P}$.

325 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

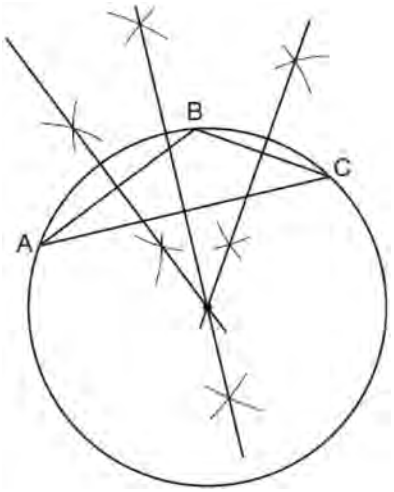
326 Which equation represents circle *K* shown in the graph below?



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

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

328 The diagram below shows the construction of the center of the circle circumscribed about ΔABC.

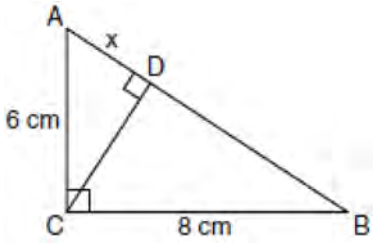


This construction represents how to find the intersection of
1) the angle bisectors of ΔABC
2) the medians to the sides of ΔABC
3) the altitudes to the sides of ΔABC
4) the perpendicular bisectors of the sides of ΔABC

329 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.

330 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.

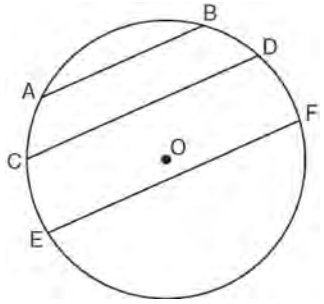
331 In the diagram below, the length of the legs $\overline{AC}$ and $\overline{BC}$ of right triangle ABC are 6 cm and 8 cm, respectively. Altitude $\overline{CD}$ is drawn to the hypotenuse of ΔABC.



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

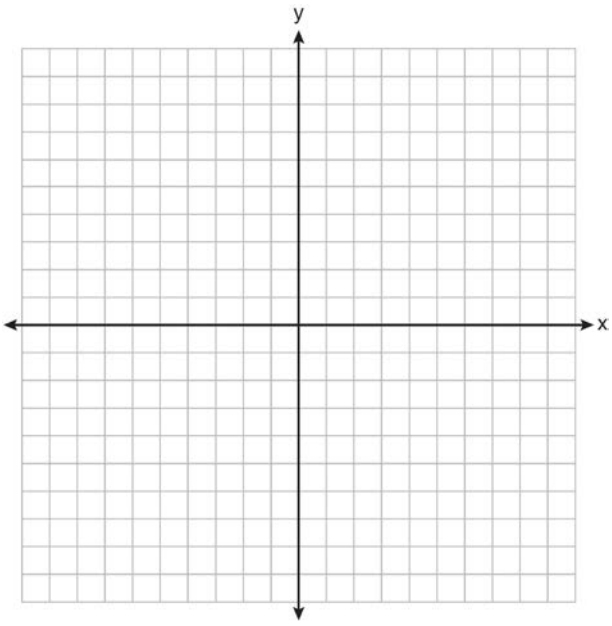
332 In the diagram below of circle O, chord $\overline{AB} \parallel$ chord $\overline{CD}$, and chord $\overline{CD} \parallel$ chord $\overline{EF}$.



Which statement must be true?

1) $\overset{\frown}{CE} \cong \overset{\frown}{DF}$
2) $\overset{\frown}{AC} \cong \overset{\frown}{DF}$
3) $\overset{\frown}{AC} \cong \overset{\frown}{CE}$
4) $\overset{\frown}{EF} \cong \overset{\frown}{CD}$

333 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.]



334 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

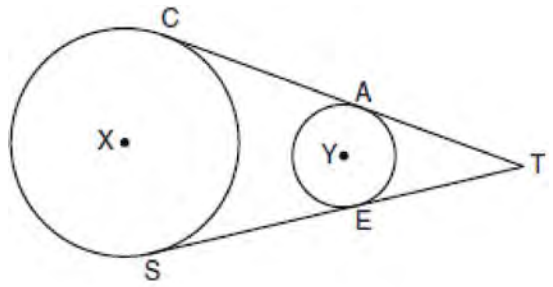
335 Write an equation of the line that passes through the point $(6,-5)$ and is parallel to the line whose equation is $2x - 3y = 11$.

336 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

337 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*.

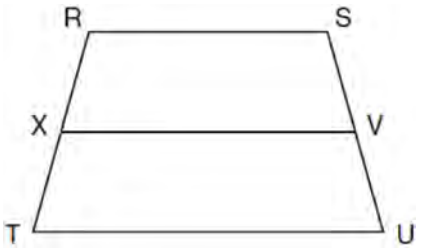
338 In the diagram below, circles X and Y have two tangents drawn to them from external point T. The points of tangency are C, A, S, and E. The ratio of TA to AC is 1:3. If $TS = 24$, find the length of $\overline{SE}$.



(Not drawn to scale)

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

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

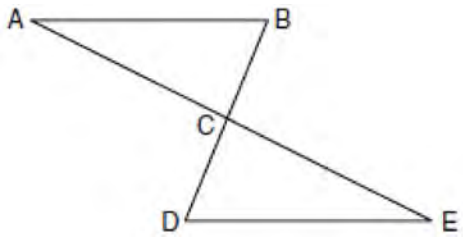


If $RS = 30$ and $XV = 44$, what is the length of $\overline{TU}$?

1) 37
2) 58
3) 74
4) 118

341 Given: ΔABC and ΔEDC, C is the midpoint of $\overline{BD}$ and $\overline{AE}$

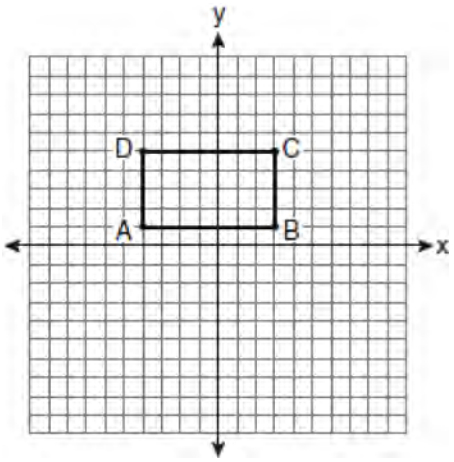
Prove: $\overline{AB} \parallel \overline{DE}$



342 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 = $\sqrt{C}$

343 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.

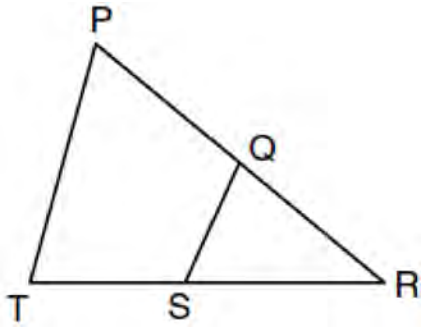
344 The lines represented by the equations $y + \frac{1}{2}x = 4$ and $3x + 6y = 12$ are

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

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

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

346 In the diagram below of ΔPRT, 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 $\Delta PRT \sim \Delta SRQ$?

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

347 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

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

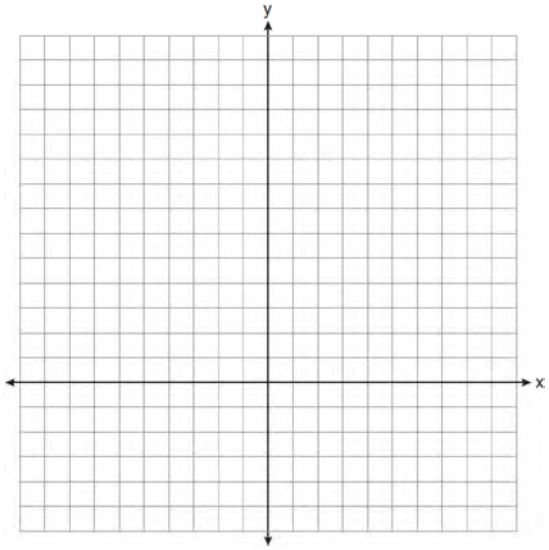
1) {5, 18, 13}
2) {6, 17, 22}
3) {16, 24, 7}
4) {26, 8, 15}

349 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

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

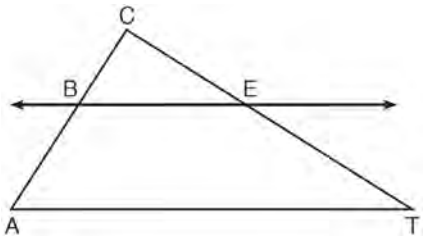
$$y = (x-2)^2 + 4$$

$$4x + 2y = 14$$



351 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°

352 In the diagram below of ΔACT, $\overleftrightarrow{BE} \parallel \overline{AT}$.

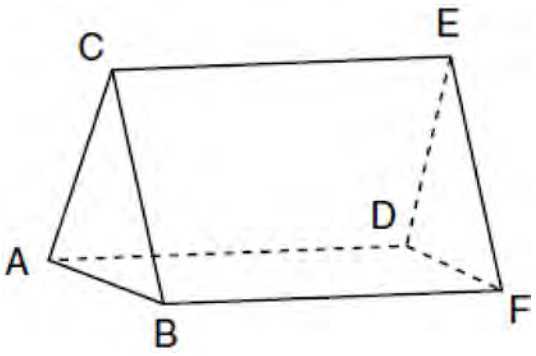


If $CB = 3$, $CA = 10$, and $CE = 6$, what is the length of $\overline{ET}$?
1) 5
2) 14
3) 20
4) 26

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

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

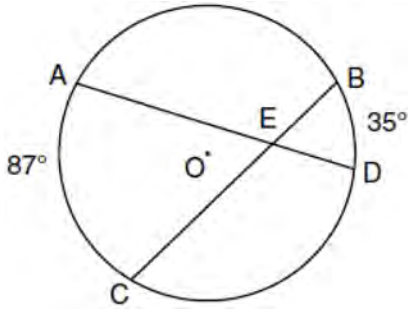
355 The figure in the diagram below is a triangular prism.



Which statement must be true?

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

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



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

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

357 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

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

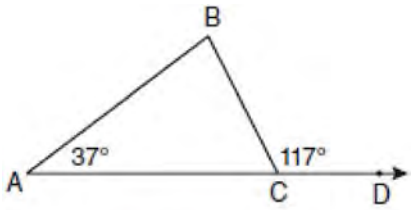
359 If the endpoints of $\overline{AB}$ are $A(-4, 5)$ and $B(2, -5)$, what is the length of $\overline{AB}$?

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

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

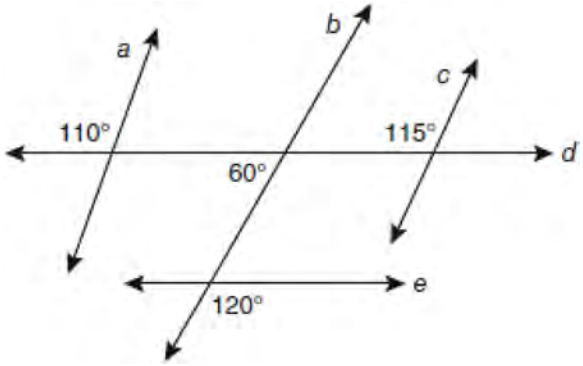
361 In the diagram below of ΔABC with side $\overline{AC}$ extended through D, $m\angle A = 37$ and $m\angle BCD = 117$. Which side of ΔABC is the longest side? Justify your answer.



(Not drawn to scale)

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

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

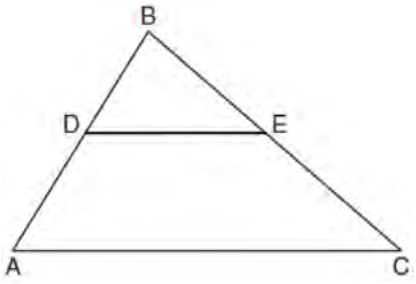


1) $a \parallel b$
2) $a \parallel c$
3) $b \parallel c$
4) $d \parallel e$

364 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.

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

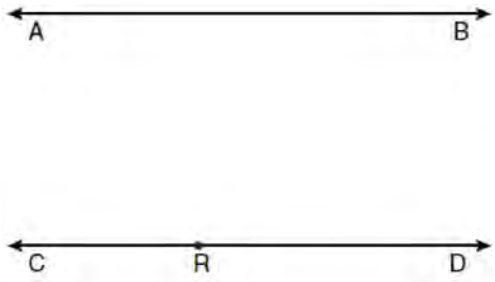


366 In isosceles trapezoid $ABCD$, $\overline{AB} \cong \overline{CD}$. If $BC = 20$, $AD = 36$, and $AB = 17$, what is the length of the altitude of the trapezoid?

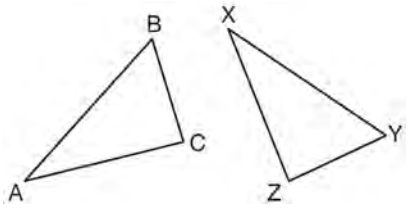
1) 10
2) 12
3) 15
4) 16

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

368 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.



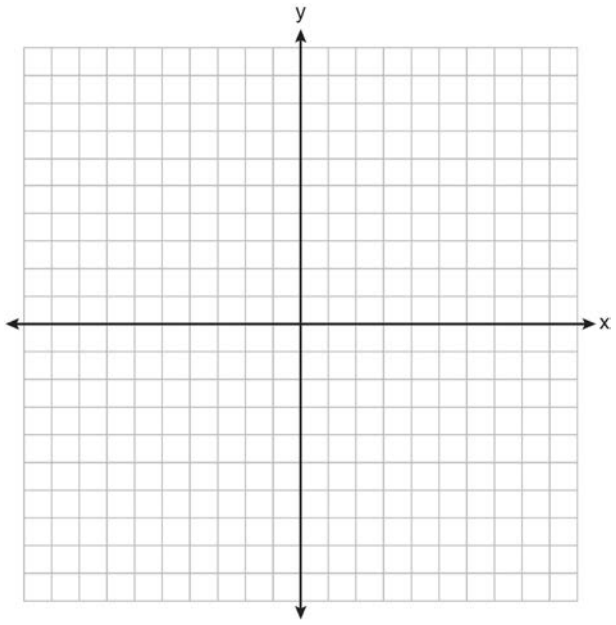
369 In the diagram below, $\Delta ABC \cong \Delta XYZ$.



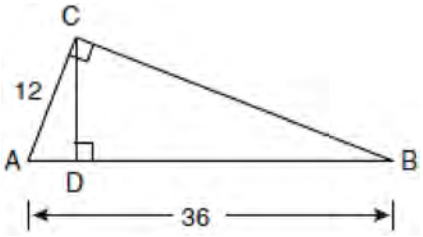
Which two statements identify corresponding congruent parts for these triangles?

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 $\angle A \cong \angle X$

370 On the set of axes below, graph and label ΔDEF 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 $\overline{GH} \parallel \overline{DE}$.



371 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 $\overline{AD}$?

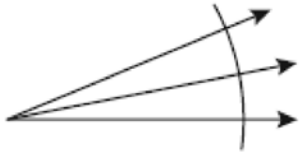
1) 32
2) 6
3) 3
4) 4

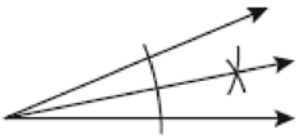
372 In ΔRST, $m\angle RST = 46$ and $\overline{RS} \cong \overline{ST}$. Find $m\angle STR$.

373 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 $\mathcal{P}$

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

1) 

2) 

3) 

4) 

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

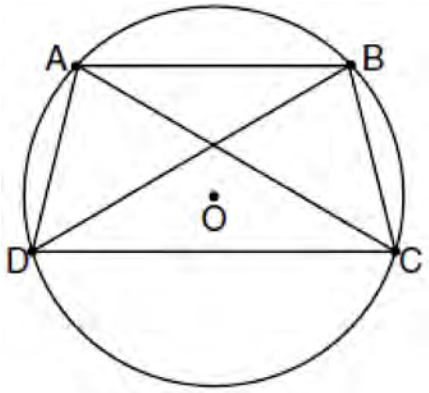
376 In which polygon does the sum of the measures of the interior angles equal the sum of the measures of the exterior angles?
1) triangle
2) hexagon
3) octagon
4) quadrilateral

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

$y + x = 4$

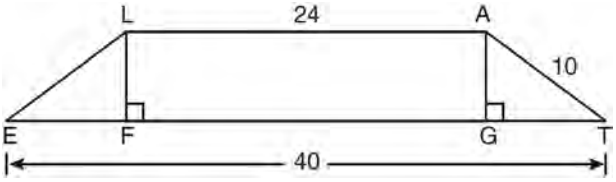
What is the solution to the given system of equations?
1) $(2, 3)$
2) $(3, 2)$
3) $(2, 2)$ and $(1,3)$
4) $(2, 2)$ and $(3, 1)$

378 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 $\Delta ACD \cong \Delta BDC$.



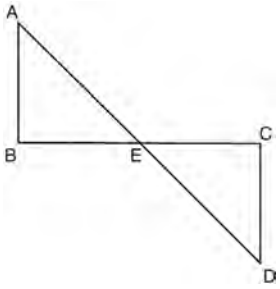
Geometry Regents at Random

379 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.



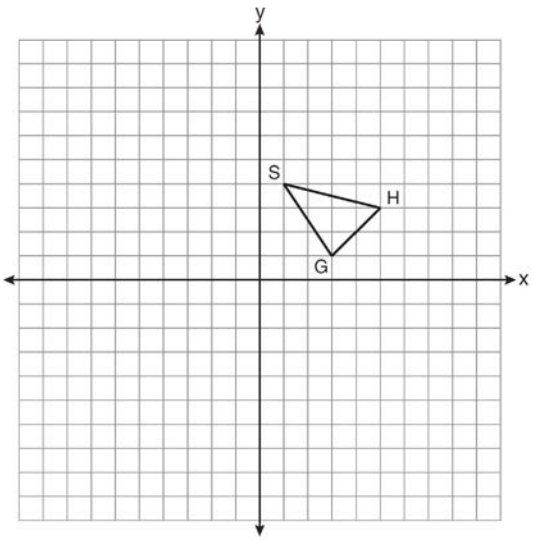
What is the length of $\overline{LF}$?
1) 6
2) 8
3) 3
4) 4

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

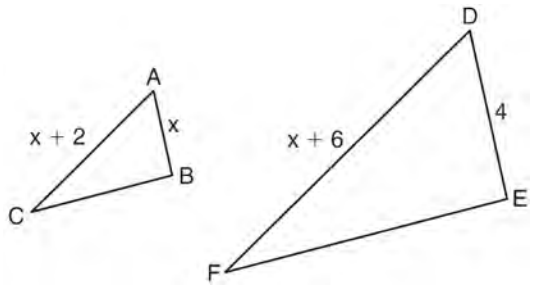


381 A cylinder has a height of 7 cm and a base with a diameter of 10 cm. Determine the volume, in cubic centimeters, of the cylinder in terms of π.

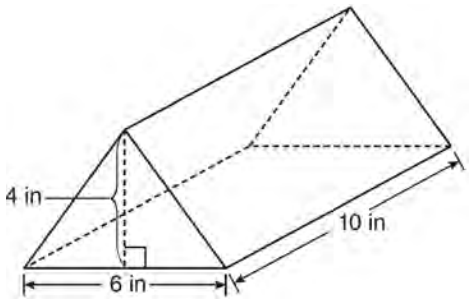
382 As shown on the set of axes below, ΔGHS has vertices $G(3, 1)$, $H(5, 3)$, and $S(1, 4)$. Graph and state the coordinates of $\Delta G''H''S''$, the image of ΔGHS after the transformation $T_{-3,1} \circ D_2$.



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

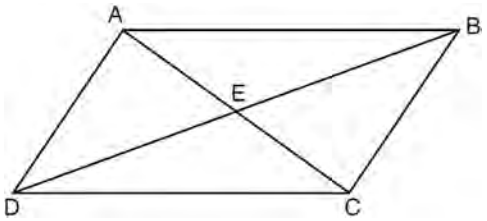


384 A packing carton in the shape of a triangular prism is shown in the diagram below.



What is the volume, in cubic inches, of this carton?
1) 20
2) 60
3) 120
4) 240

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



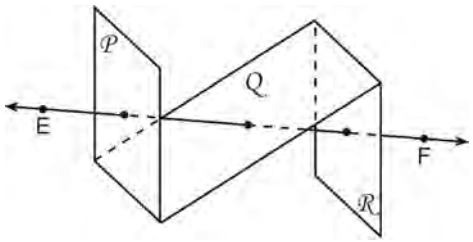
Which statement must be true?
1) $\overline{AC} \cong \overline{DB}$
2) $\angle ABD \cong \angle CBD$
3) $\Delta AED \cong \Delta CEB$
4) $\Delta DCE \cong \Delta BCE$

386 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.

387 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) $(-4b, -3a)$

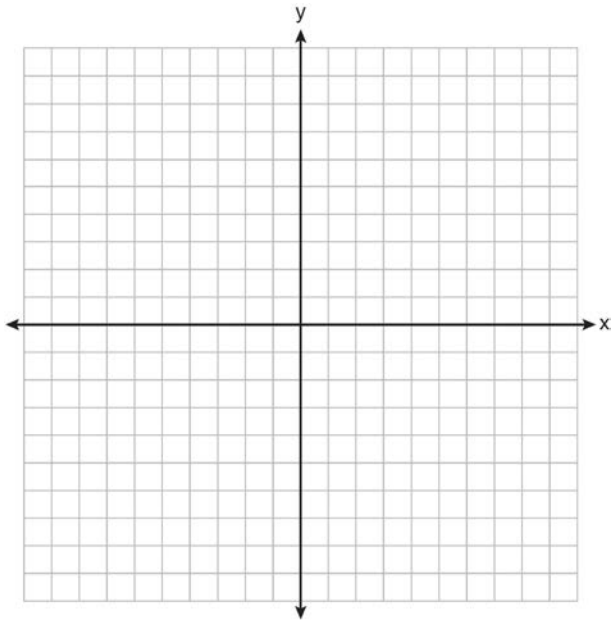
388 What is the equation of the line that passes through the point $(-9, 6)$ and is perpendicular to the line $y = 3x - 5$?
1) $y = 3x + 21$
2) $y = -\frac{1}{3}x - 3$
3) $y = 3x + 33$
4) $y = -\frac{1}{3}x + 3$

389 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 $\mathcal{P}$.

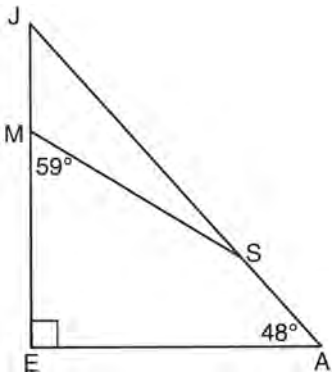
390 On the set of axes below, graph the locus of points that are four units from the point $(2, 1)$. On the same set of axes, graph the locus of points that are two units from the line $x = 4$. State the coordinates of all points that satisfy both conditions.



391 What is the equation of a line passing through $(2, -1)$ and parallel to the line represented by the equation $y = 2x + 1$?

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

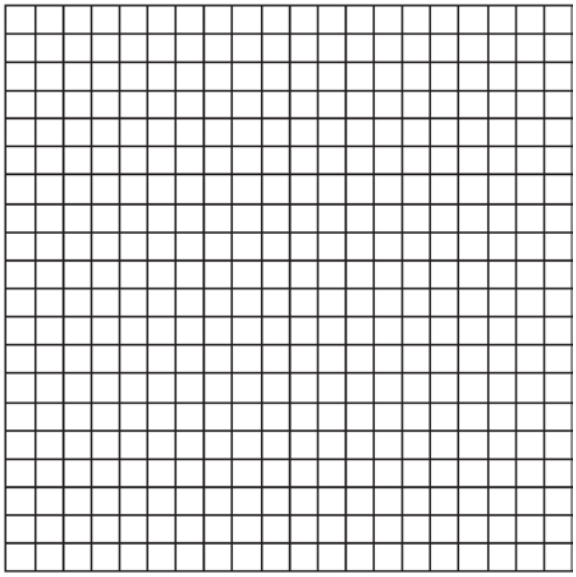
392 In the diagram of ΔJEA below, $m\angle JEA = 90$ and $m\angle EAJ = 48$. Line segment MS connects points M and S on the triangle, such that $m\angle EMS = 59$.



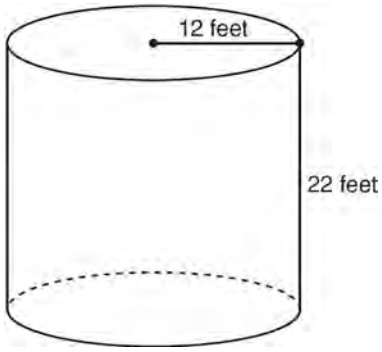
What is $m\angle JSM$?

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

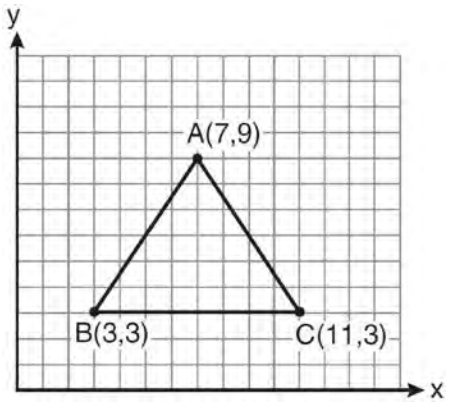
393 Quadrilateral $MATH$ has coordinates $M(1, 1)$, $A(-2, 5)$, $T(3, 5)$, and $H(6, 1)$. Prove that quadrilateral $MATH$ is a rhombus and prove that it is *not* a square. [The use of the grid is optional.]



394 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?



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



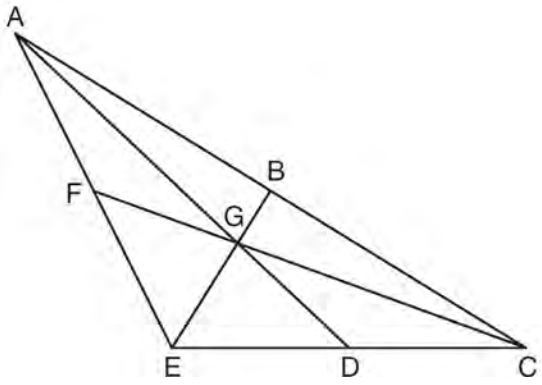
What are the coordinates of the centroid of ΔABC?

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

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

397 In the diagram below of ΔACE, 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

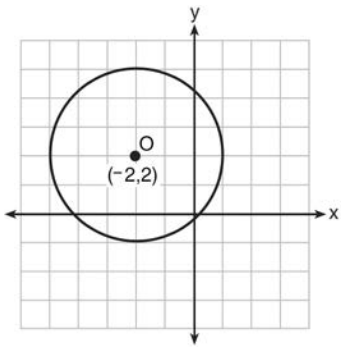
398 Which line is parallel to the line whose equation is $4x + 3y = 7$ and also passes through the point $(-5, 2)$?

1) $4x + 3y = -26$
2) $4x + 3y = -14$
3) $3x + 4y = -7$
4) $3x + 4y = 14$

399 Which equation represents the line parallel to the line whose equation is $4x + 2y = 14$ and passing through the point $(2, 2)$?

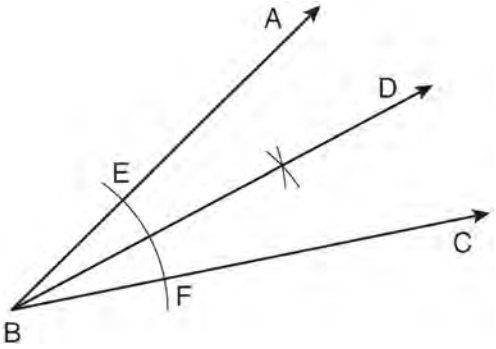
1) $y = -2x$
2) $y = -2x + 6$
3) $y = \frac{1}{2}x$
4) $y = \frac{1}{2}x + 1$

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

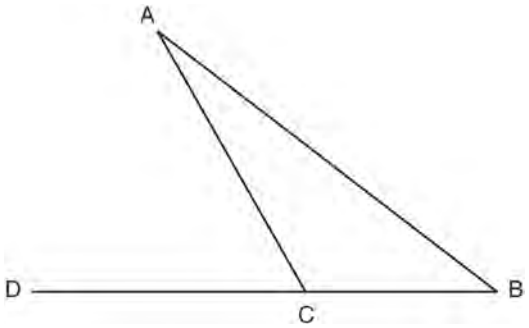
401 A straightedge and compass were used to create the construction below. Arc EF was drawn from point B, and arcs with equal radii were drawn from E and F.



Which statement is *false*?

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

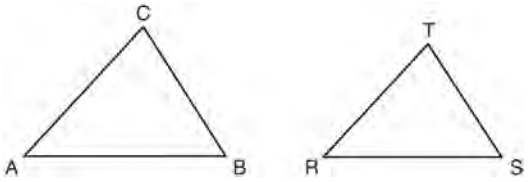
402 In the diagram below of ΔABC, side $\overline{BC}$ is extended to point D, $m\angle A = x$, $m\angle B = 2x + 15$, and $m\angle ACD = 5x + 5$.



What is $m\angle B$?

1) 5
2) 20
3) 25
4) 55

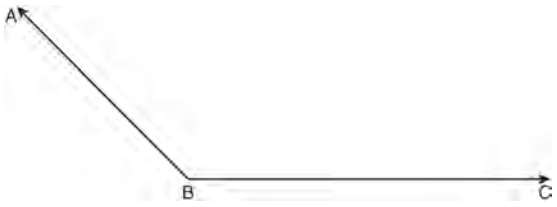
403 In the diagram below, $\Delta ABC \sim \Delta RST$.



Which statement is *not* true?

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

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



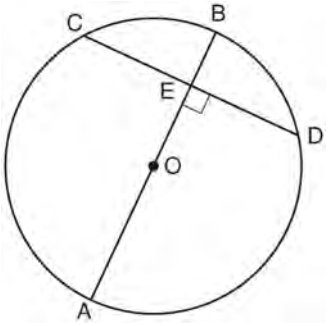
405 What is the equation of a circle whose center is 4 units above the origin in the coordinate plane and whose radius is 6?

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

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

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

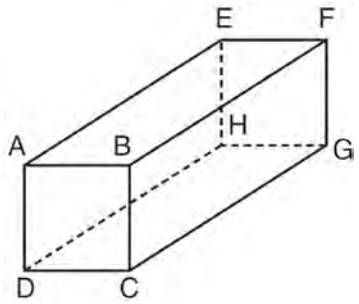
407 In the diagram below of circle O, diameter $\overline{AB}$ is perpendicular to chord $\overline{CD}$ at E. If $AO = 10$ and $BE = 4$, find the length of $\overline{CE}$.



408 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 $\mathcal{D}$.

409 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

410 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) $2\sqrt{26}$

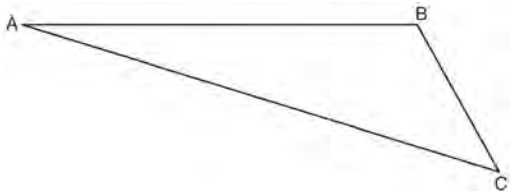
411 When a quadrilateral is reflected over the line $y = x$, which geometric relationship is *not* preserved?

1) congruence
2) orientation
3) parallelism
4) perpendicularity

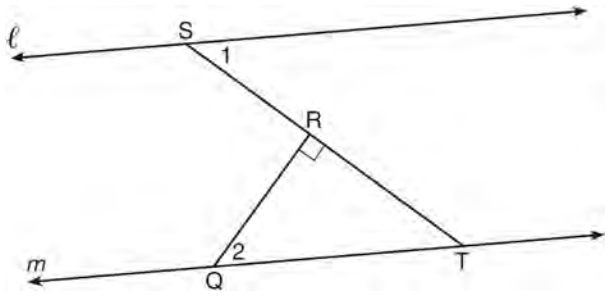
412 The angles of triangle *ABC* are in the ratio of 8:3:4. What is the measure of the *smallest* angle?

1) 12º
2) 24º
3) 36º
4) 72º

413 On the diagram of ΔABC shown below, use a compass and straightedge to construct the perpendicular bisector of $\overline{AC}$. [Leave all construction marks.]

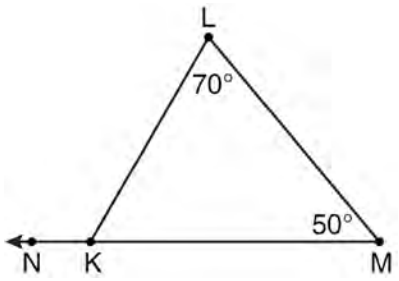


414 In the diagram below, $\ell \parallel m$ and $\overline{QR} \perp \overline{ST}$ at *R*.



If m∠1 = 63, find m∠2.

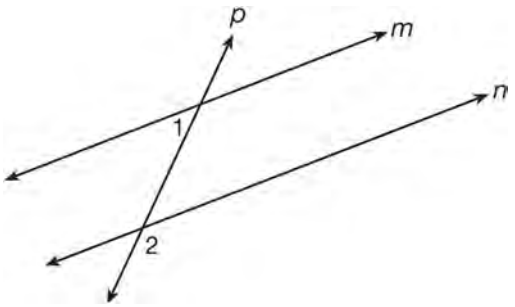
415 In the diagram of ΔKLM below, $m\angle L = 70$, $m\angle M = 50$, and $\overline{MK}$ is extended through N.



What is the measure of $\angle LKN$?

1) 60°
2) 120°
3) 180°
4) 300°

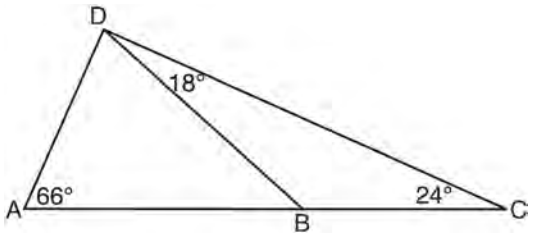
416 As shown in the diagram below, lines m and n are cut by transversal p.



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

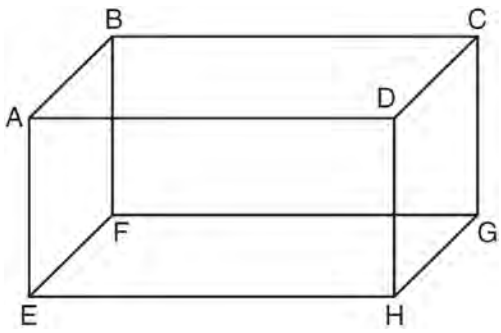
417 As shown in the diagram of ΔACD below, B is a point on $\overline{AC}$ and $\overline{DB}$ is drawn.



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

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

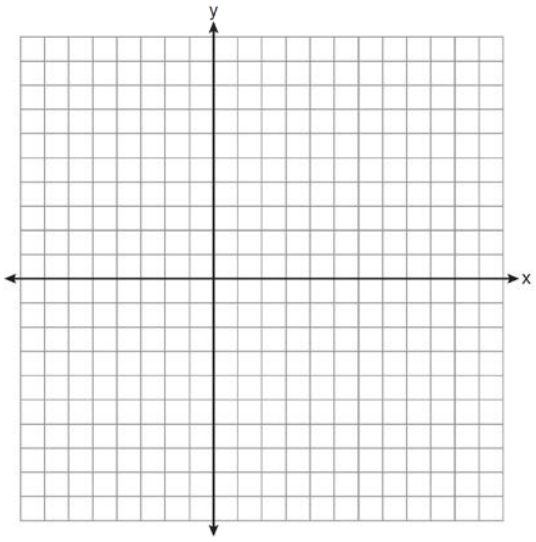
418 The diagram below shows a rectangular prism.



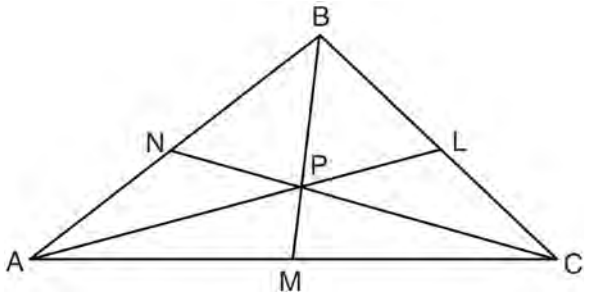
Which pair of edges are segments of lines that are coplanar?

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

419 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.]



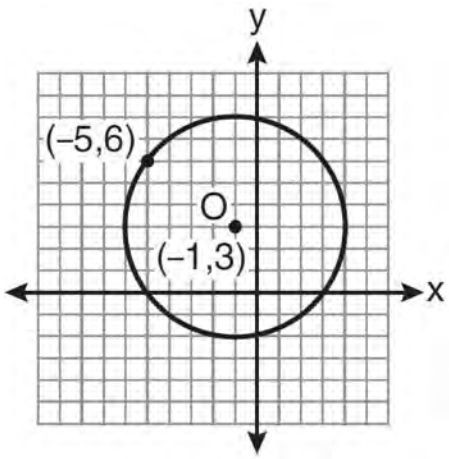
420 In the diagram below, point P is the centroid of ΔABC.



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

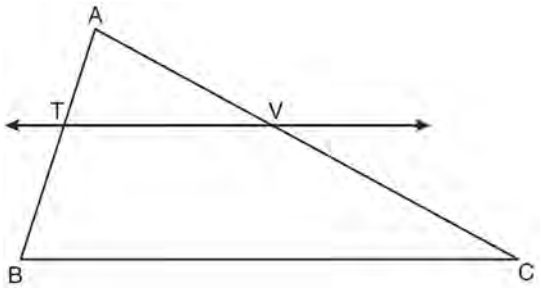
1) 9
2) 2
3) 18
4) 27

421 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) $(x+5)^2 + (y-6)^2 = 25$

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



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

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

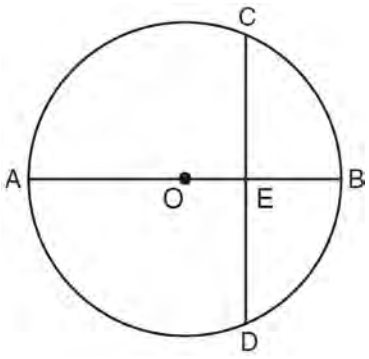
423 The equation of a circle with its center at $(-3, 5)$ and a radius of 4 is

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

424 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 $\overline{N'O'}$

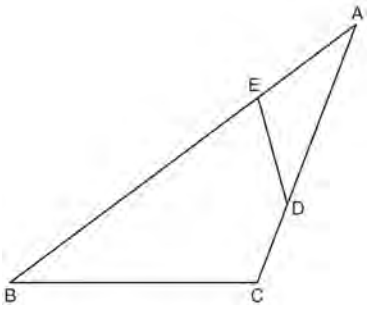
425 In the diagram below of circle O, diameter $\overline{AOB}$ is perpendicular to chord $\overline{CD}$ at point E, $OA = 6$, and $OE = 2$.



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

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

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



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

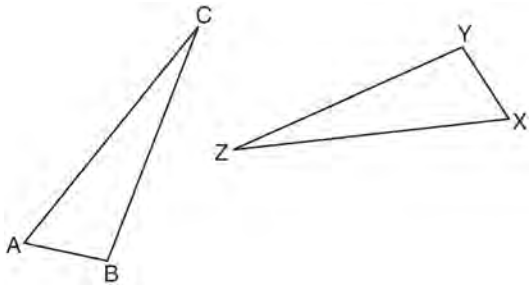
428 In $\triangle DEF$, $m\angle D = 3x + 5$, $m\angle E = 4x - 15$, and $m\angle F = 2x + 10$. Which statement is true?

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

429 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

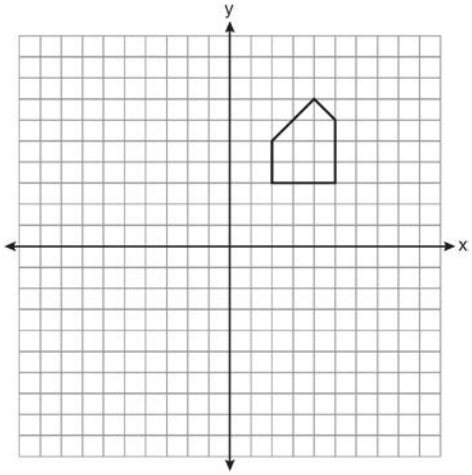
430 In the diagram below, $\Delta ABC \cong \Delta XYZ$.



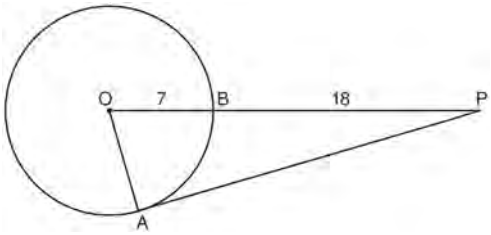
Which statement must be true?

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

431 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.]



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



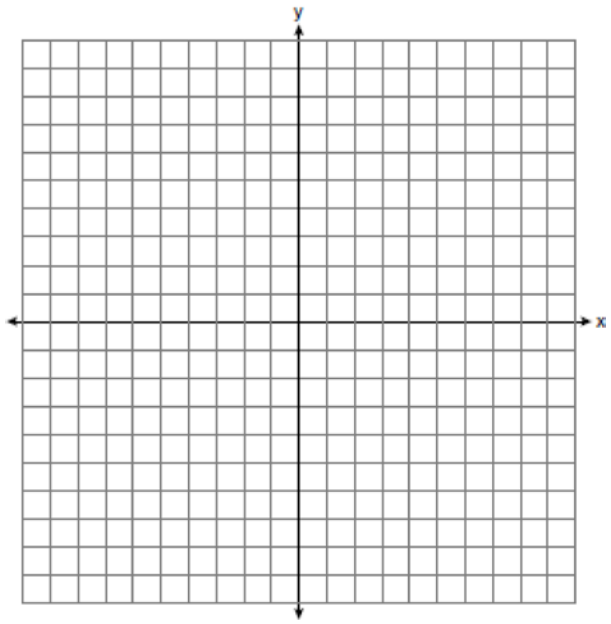
What is the length of $\overline{AP}$?

1) 10
2) 12
3) 17
4) 24

433 Solve the following system of equations graphically.

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

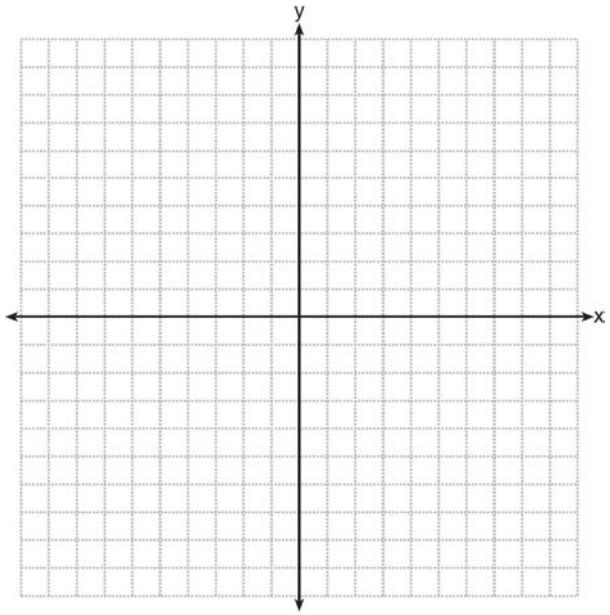
$$x + y = 1$$



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

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



436 For a triangle, which two points of concurrence could be located outside the triangle?

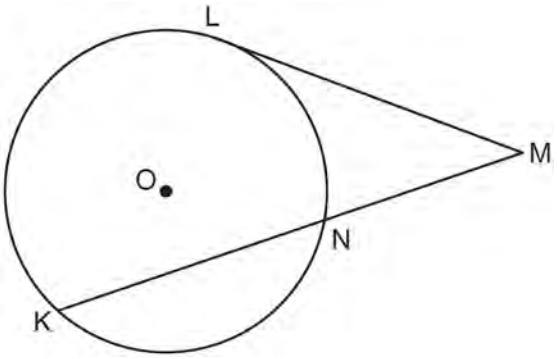
1) incenter and centroid
2) centroid and orthocenter
3) incenter and circumcenter
4) circumcenter and orthocenter

437 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.

438 In ΔFGH, $m\angle F = 42$ 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

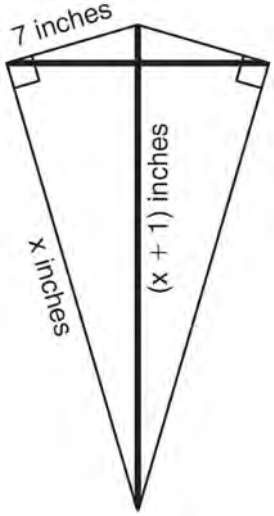
439 In the diagram below, tangent $\overline{ML}$ and secant $\overline{MNK}$ are drawn to circle O. The ratio $m\overset{\frown}{LN} : m\overset{\frown}{NK} : m\overset{\frown}{KL}$ is 3:4:5. Find $m\angle LMK$.



440 The number of degrees in the sum of the interior angles of a pentagon is

1) 72
2) 360
3) 540
4) 720

441 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.



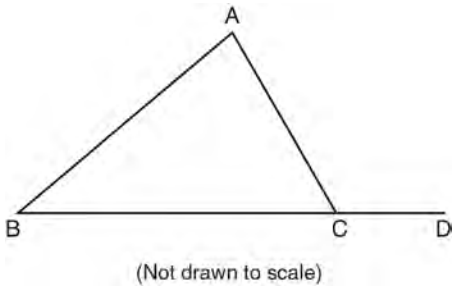
What is the measure, in inches, of the vertical support bar?
1) 23
2) 24
3) 25
4) 26

442 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

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

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

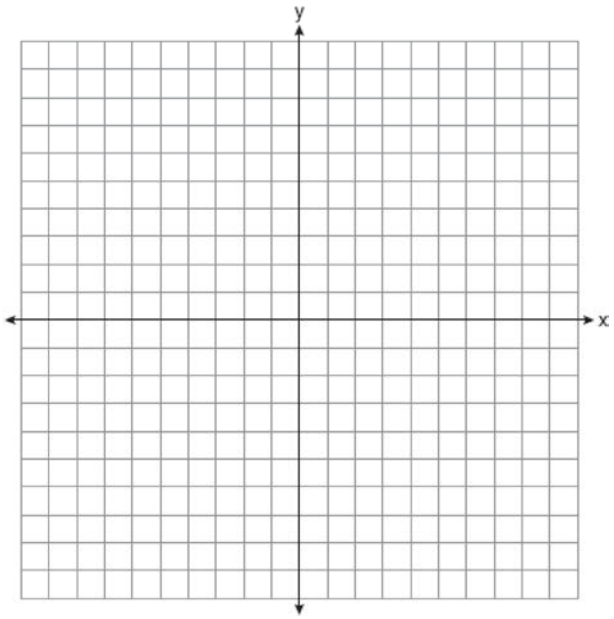
445 In the diagram below of ΔABC, $\overline{BC}$ is extended to D.



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

446 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) $\angle ABC \cong \angle EDF$

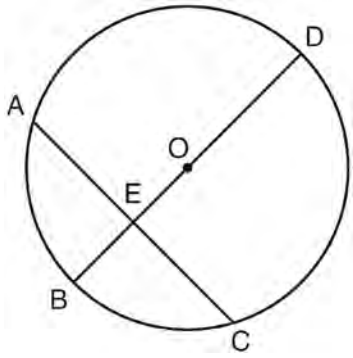
447 The coordinates of trapezoid *ABCD* are $A(-4, 5)$, $B(1, 5)$, $C(1, 2)$, and $D(-6, 2)$. Trapezoid $A''B''C''D''$ is the image after the composition $r_{x-\text{axis}} \circ r_{y=x}$ is performed on trapezoid *ABCD*. State the coordinates of trapezoid $A''B''C''D''$. [The use of the set of axes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



448 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*.

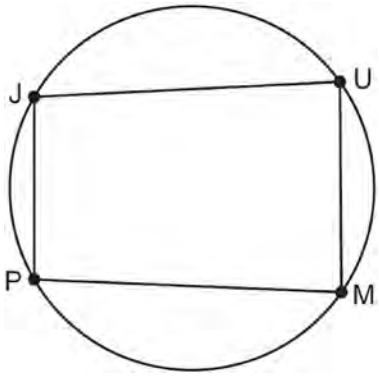
449 In circle *O* shown below, diameter $\overline{DB}$ is perpendicular to chord $\overline{AC}$ at *E*.



If $DB = 34$, $AC = 30$, and $DE > BE$, what is the length of $\overline{BE}$?

1) 8
2) 9
3) 16
4) 25

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



Opposite angles *J* and *M* must be

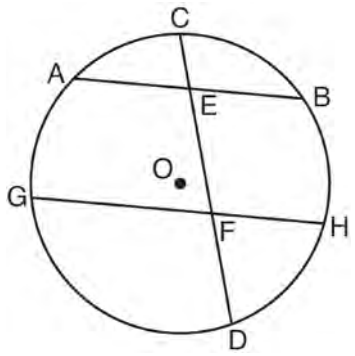
1) right
2) complementary
3) congruent
4) supplementary

451 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.

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

1) $(-12, 8)$
2) (12,-8)
3) $(8, 12)$
4) $(-8, -12)$

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



Which statement must always be true?

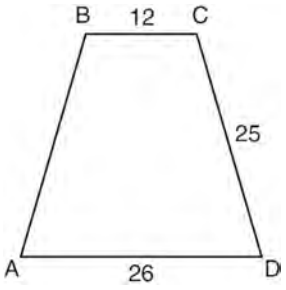
1) $\overset{\frown}{AC} \cong \overset{\frown}{CB}$
2) $\overset{\frown}{DH} \cong \overset{\frown}{BH}$
3) $\overset{\frown}{AB} \cong \overset{\frown}{GH}$
4) $\overset{\frown}{AG} \cong \overset{\frown}{BH}$

454 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) $\sqrt{233}$

455 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.

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



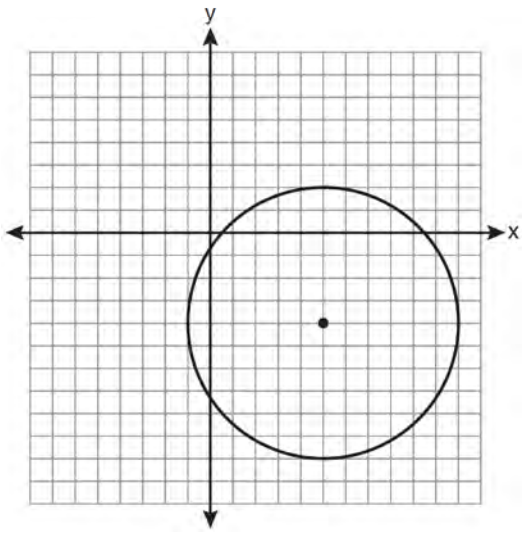
What is the length of an altitude of the trapezoid?

1) 7
2) 14
3) 19
4) 24

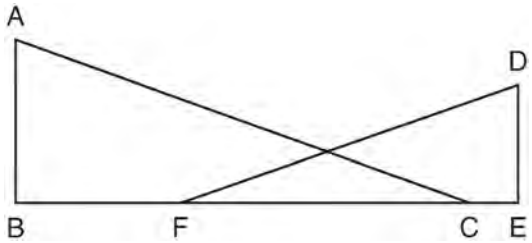
457 What is the slope of a line that is perpendicular to the line whose equation is $3x + 5y = 4$?

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

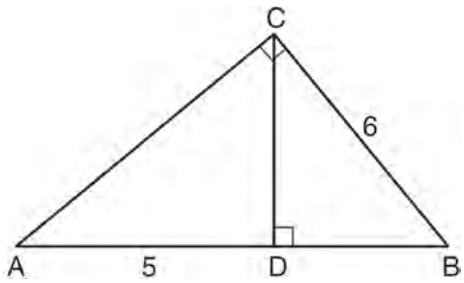
458 Write an equation of the circle graphed in the diagram below.



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



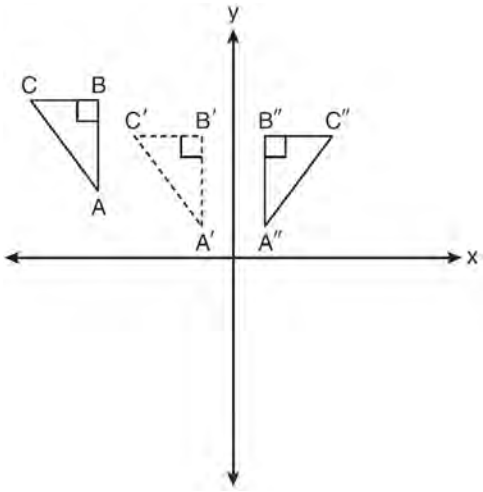
460 In the diagram below of right triangle ABC, $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$, $CB = 6$, and $AD = 5$.



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

1) 5
2) 9
3) 3
4) 4

461 In the diagram below, $\Delta A'B'C'$ is a transformation of ΔABC, and $\Delta A''B''C''$ is a transformation of $\Delta A'B'C'$.



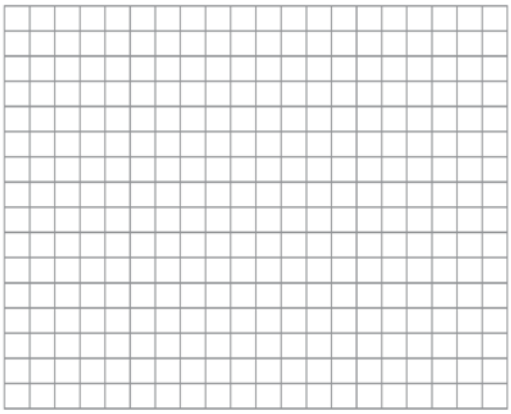
The composite transformation of ΔABC to $\Delta A''B''C''$ is an example of a

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

462 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) $(-5, 2)$

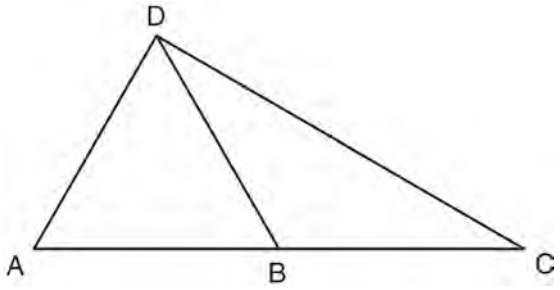
463 Given: ΔABC with vertices $A(-6, -2)$, $B(2, 8)$, and $C(6, -2)$. $\overline{AB}$ has midpoint D, $\overline{BC}$ has midpoint E, and $\overline{AC}$ has midpoint F.
Prove: $ADEF$ is a parallelogram
$ADEF$ is *not* a rhombus
[The use of the grid is optional.]



464 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

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



466 In ΔPQR, $\angle PRQ$ 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

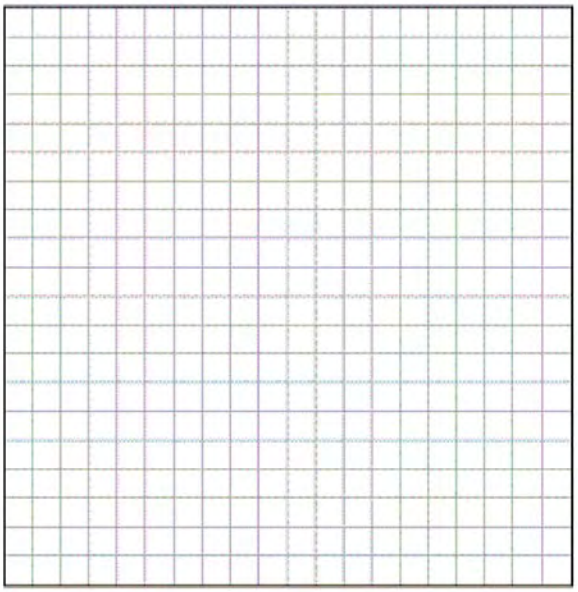
467 The angle formed by the radius of a circle and a tangent to that circle has a measure of

1) 45°
2) 90°
3) 135°
4) 180°

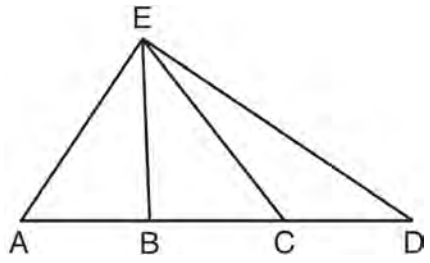
468 When a dilation is performed on a hexagon, which property of the hexagon will *not* be preserved in its image?

1) parallelism
2) orientation
3) length of sides
4) measure of angles

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



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



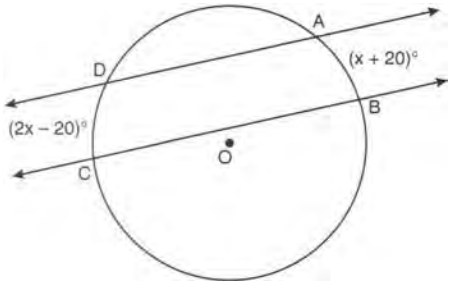
If $\overline{AB} \cong \overline{CD}$, which statement could always be proven?

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

471 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

472 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 $m\overset{\frown}{AB}$.



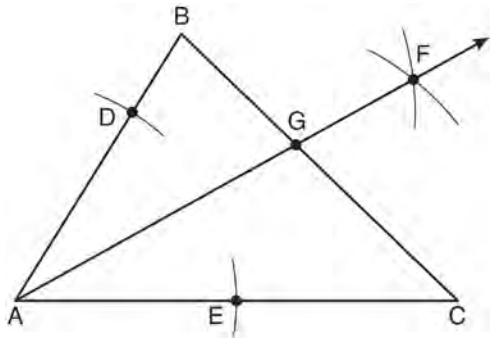
473 Triangle ABC has vertices $A(0, 0)$, $B(3, 2)$, and $C(0, 4)$. The triangle may be classified as

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

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

475 As shown in the diagram below of ΔABC, 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 ΔABC, is labeled.



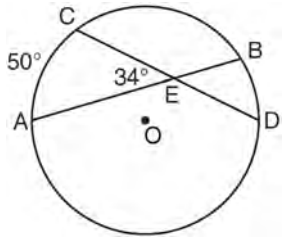
Which statement must be true?

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

476 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 $\mathcal{R}$.

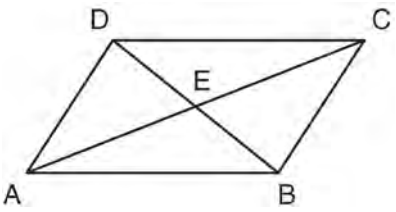
477 In the diagram below of circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E.



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

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



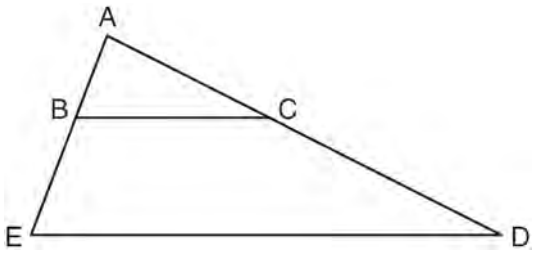
Which expression is *not* always true?

1) $\angle DAE \cong \angle BCE$
2) $\angle DEC \cong \angle BEA$
3) $\overline{AC} \cong \overline{DB}$
4) $\overline{DE} \cong \overline{EB}$

479 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.

480 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

481 In the diagram below of ΔADE, 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 $\overline{AC}$.



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

483 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

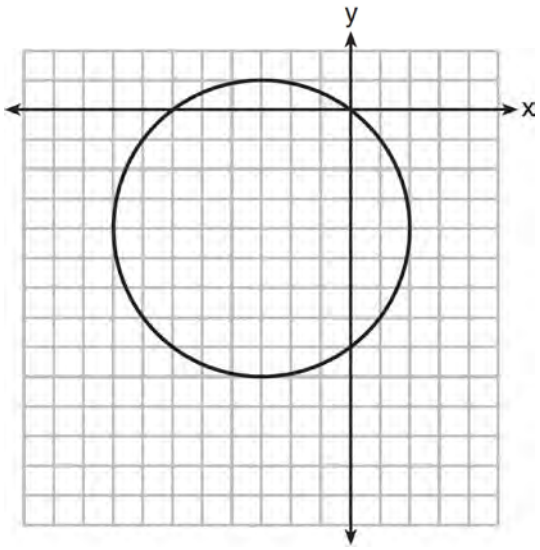
484 The two lines represented by the equations below are graphed on a coordinate plane.

$$x + 6y = 12$$

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

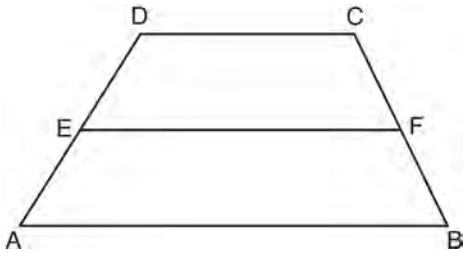
Which statement best describes the two lines?
1) The lines are parallel.
2) The lines are the same line.
3) The lines are perpendicular.
4) The lines intersect at an angle other than 90°.

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

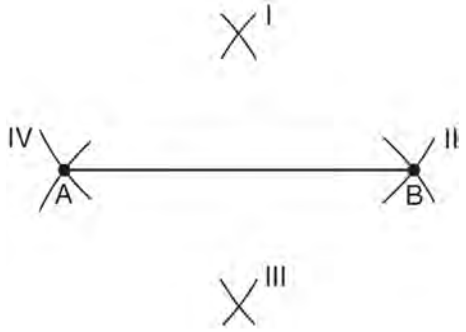
486 In the diagram below, $\overline{EF}$ is the median of trapezoid *ABCD*.



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

487 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

488 What is the slope of a line that is perpendicular to the line represented by the equation $x + 2y = 3$?

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

489 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) $2,160\pi$

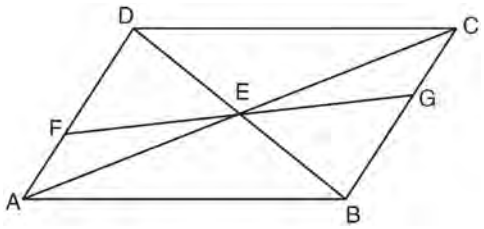
490 Point *P* lies on line *m*. Point *P* is also included in distinct planes $\mathcal{Q}$, $\mathcal{R}$, $\mathcal{S}$, and $\mathcal{T}$. At most, how many of these planes could be perpendicular to line *m*?

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

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

492 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: $\Delta AEF \cong \Delta CEG$



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

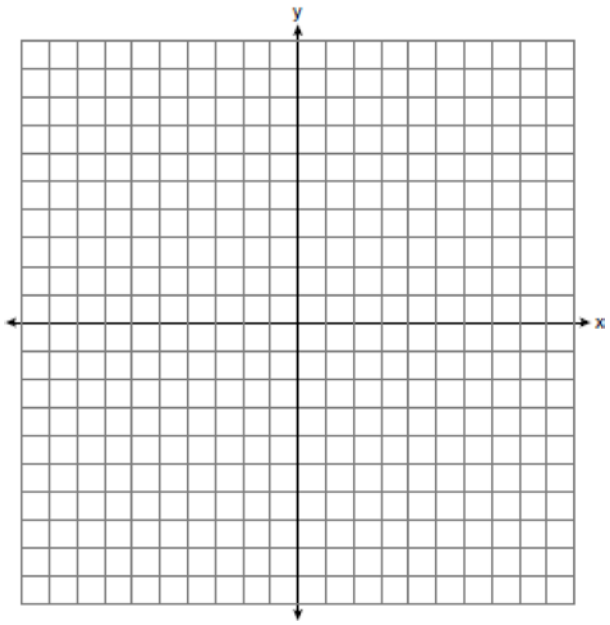
494 Which equation of a circle will have a graph that lies entirely in the first quadrant?
1) $(x-4)^2 + (y-5)^2 = 9$
2) $(x+4)^2 + (y+5)^2 = 9$
3) $(x+4)^2 + (y+5)^2 = 25$
4) $(x-5)^2 + (y-4)^2 = 25$

495 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.

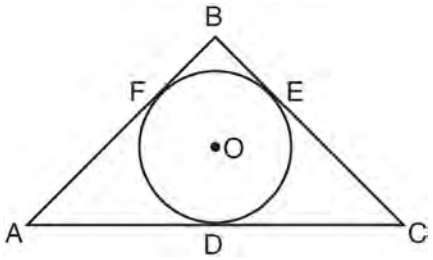
496 On the set of axes below, solve the system of equations graphically and state the coordinates of all points in the solution.

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

$$2y + 16 = 4x$$

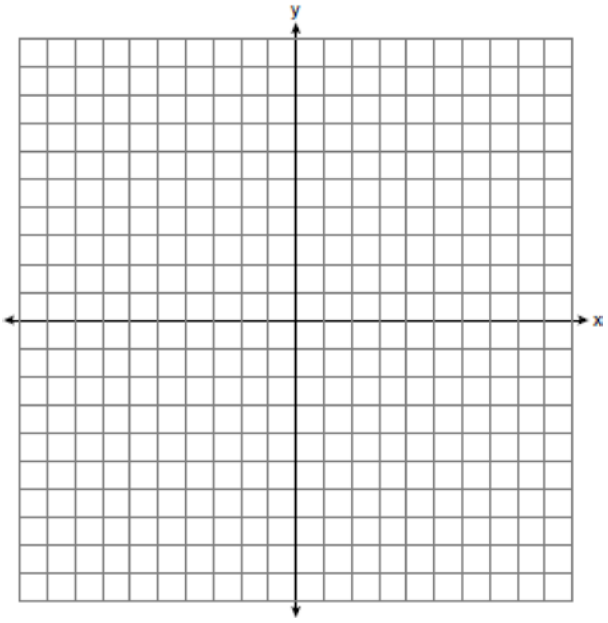


497 In the diagram below, $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$ are tangents to circle O at points F, E, and D, respectively, $AF = 6$, $CD = 5$, and $BE = 4$.

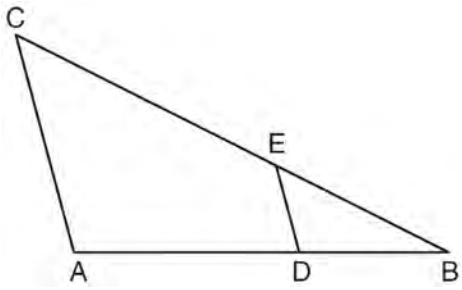


What is the perimeter of ΔABC?
1) 15
2) 25
3) 30
4) 60

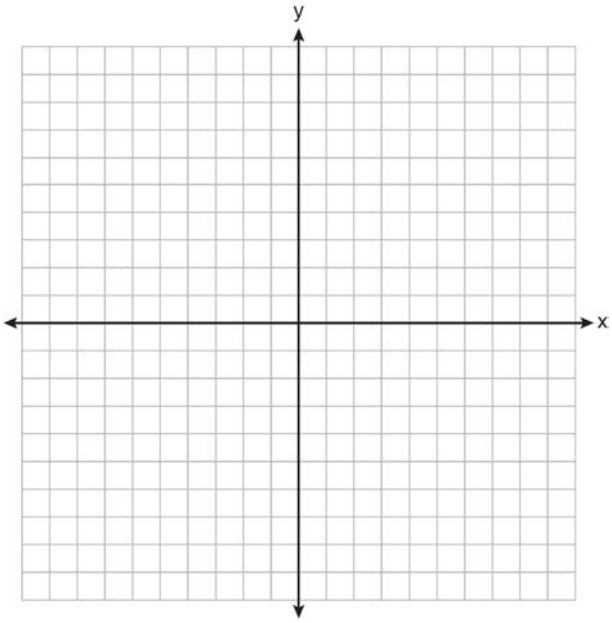
498 On the set of axes below, graph the locus of points that are 4 units from the line $x = 3$ and the locus of points that are 5 units from the point $(0, 2)$. Label with an **X** all points that satisfy both conditions.



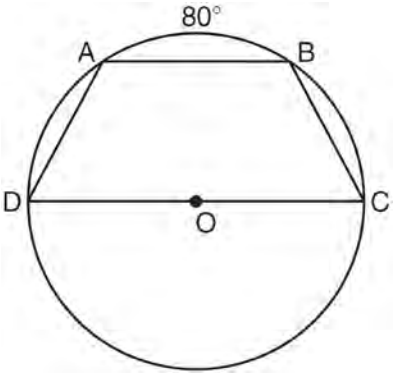
499 In the diagram below of ΔABC, D is a point on $\overline{AB}$, E is a point on $\overline{BC}$, $\overline{AC} \parallel \overline{DE}$, $CE = 25$ inches, $AD = 18$ inches, and $DB = 12$ inches. Find, to the *nearest tenth of an inch*, the length of $\overline{EB}$.



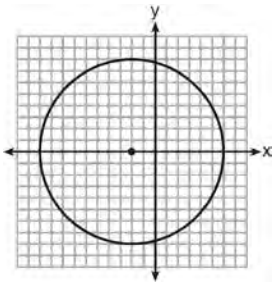
500 Triangle HKL has vertices $H(-7, 2)$, $K(3, -4)$, and $L(5, 4)$. The midpoint of $\overline{HL}$ is M and the midpoint of $\overline{LK}$ is N. Determine and state the coordinates of points M and N. Justify the statement: $\overline{MN}$ is parallel to $\overline{HK}$. [The use of the set of axes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

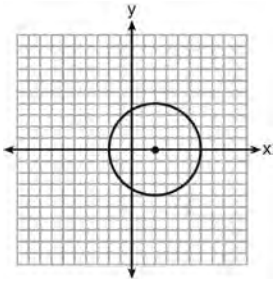


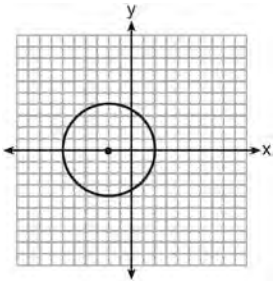
501 In the diagram below, trapezoid $ABCD$, with bases $\overline{AB}$ and $\overline{DC}$, is inscribed in circle O, with diameter $\overline{DC}$. If $m\overset{\frown}{AB}=80$, find $m\overset{\frown}{BC}$.

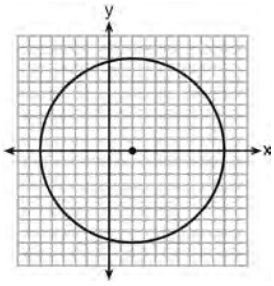


502 Which graph represents a circle whose equation is $(x+2)^2 + y^2 = 16$?

1) 

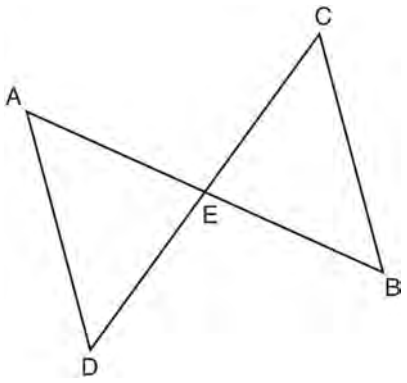
2) 

3) 

4) 

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

504 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

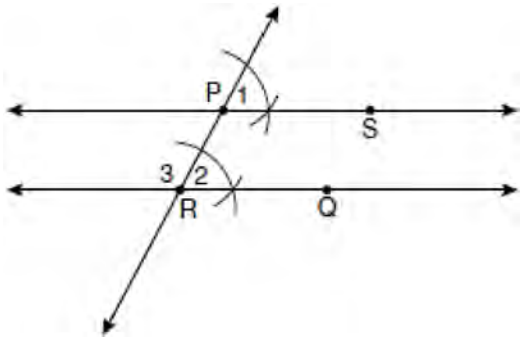
505 In a given triangle, the point of intersection of the three medians is the same as the point of intersection of the three altitudes. Which classification of the triangle is correct?
1) scalene triangle
2) isosceles triangle
3) equilateral triangle
4) right isosceles triangle

506 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) $\sqrt{50}$

507 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) $(-1,3)$

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



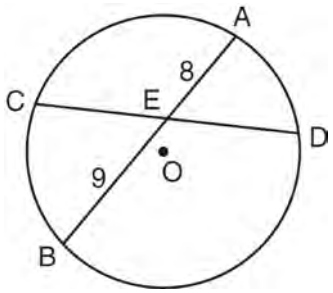
Which statement justifies this construction?

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

509 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

510 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.



511 In ΔABC, $AB = 5$ 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) $3 < AC < 7$

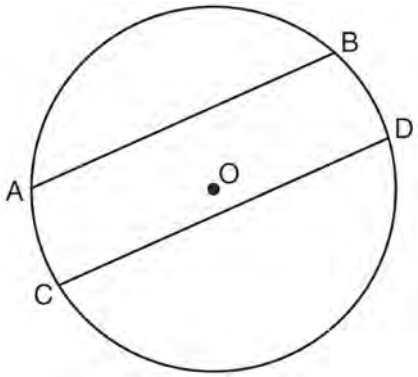
512 Which reason could be used to prove that a parallelogram is a rhombus?

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

513 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

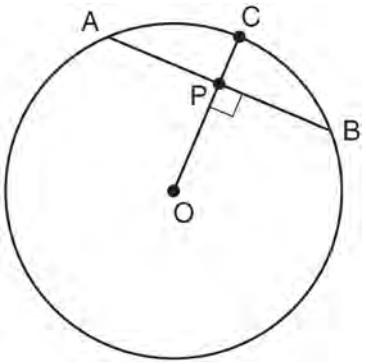
514 In the diagram below of circle O, chord $\overline{AB}$ is parallel to chord $\overline{CD}$.



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) $\overset{\frown}{ABD} \cong \overset{\frown}{CDB}$

515 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.

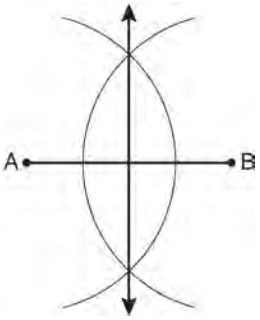


What is the length of $\overline{OP}$, in centimeters?

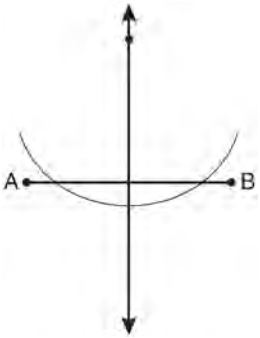
1) 8
2) 2
3) 3
4) 4

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

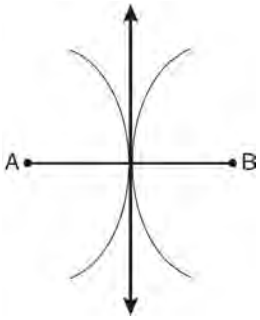
1)



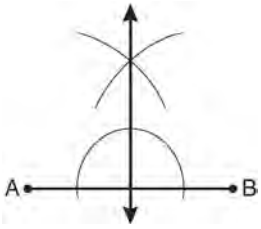
2)



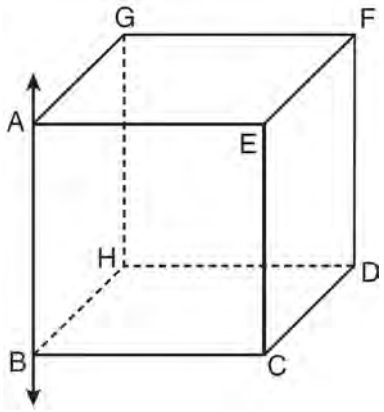
3)



4)



517 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*

518 Triangle *PQR* has angles in the ratio of 2:3:5. Which type of triangle is ΔPQR?

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

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

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

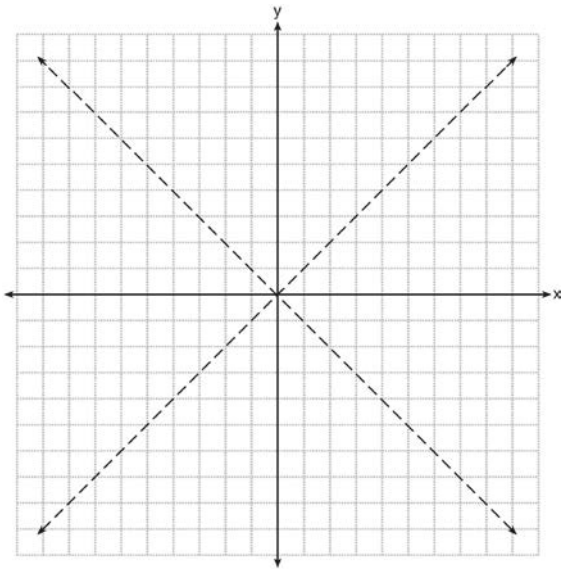
$$y = x + 2$$

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

520 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) $y = -2x - 5$

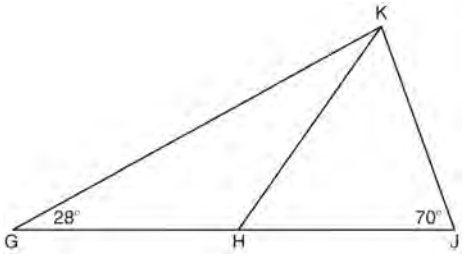
521 The graph below shows the locus of points equidistant from the *x*-axis and *y*-axis. On the same set of axes, graph the locus of points 3 units from the line $x = 0$. Label with an **X** *all* points that satisfy both conditions.



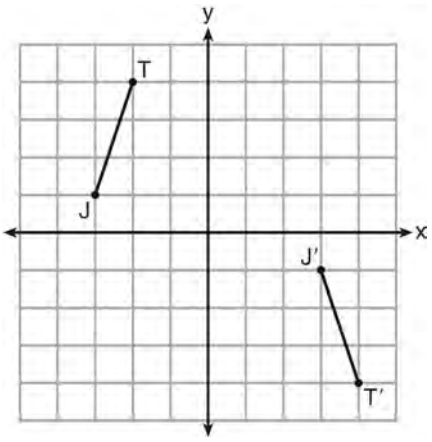
522 In the diagram below, point M is located on $\overleftrightarrow{AB}$.

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.

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



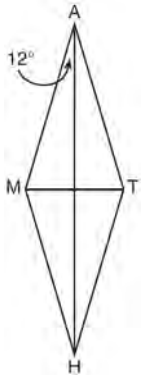
524 The graph below shows $\overline{JT}$ and its image, $\overline{J'T'}$, after a transformation.



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

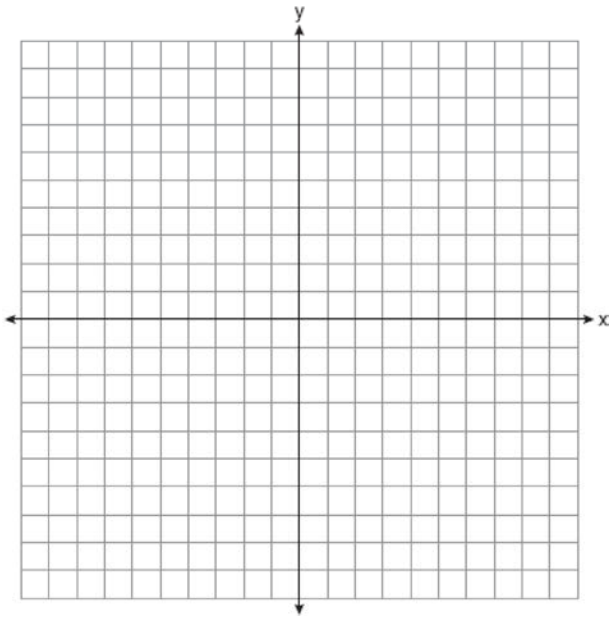
525 In the diagram below, $MATH$ is a rhombus with diagonals $\overline{AH}$ and $\overline{MT}$.



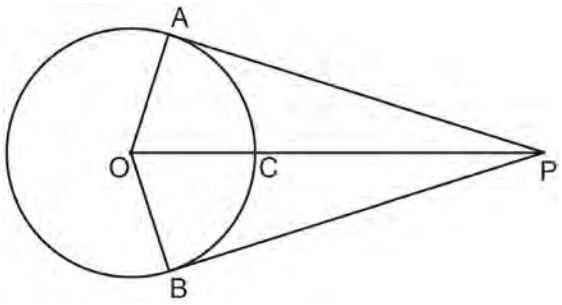
If $m\angle HAM = 12$, what is $m\angle AMT$?

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

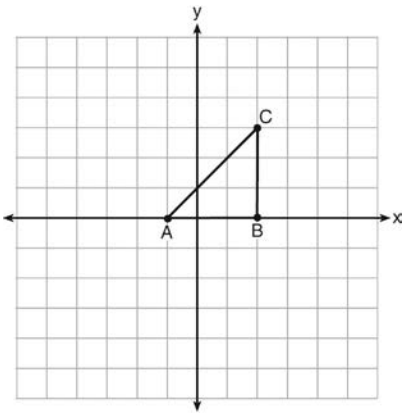
526 The vertices of ΔRST are $R(-6,5)$, $S(-7,-2)$, and $T(1,4)$. The image of ΔRST after the composition $T_{-2,3} \circ r_{y=x}$ is $\Delta R''S''T''$. State the coordinates of $\Delta R''S''T''$. [The use of the set of axes below is optional.]



527 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: $\angle AOP \cong \angle BOP$



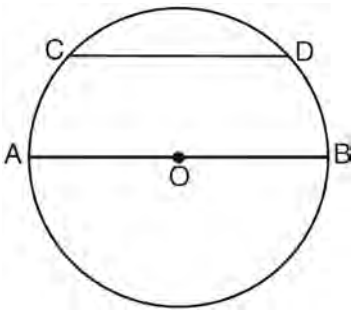
528 Triangle ABC is graphed on the set of axes below.



Which transformation produces an image that is similar to, but *not* congruent to, ΔABC?

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

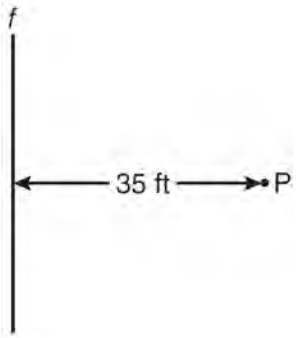
529 In the diagram below of circle O, diameter $\overline{AB}$ is parallel to chord $\overline{CD}$.



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

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

530 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.

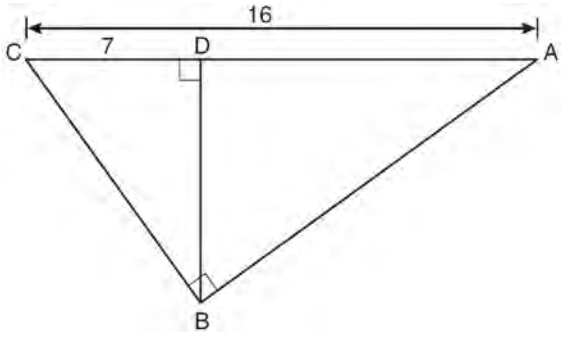


How many locations are possible for the bird bath?
1) 1
2) 2
3) 3
4) 0

531 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.

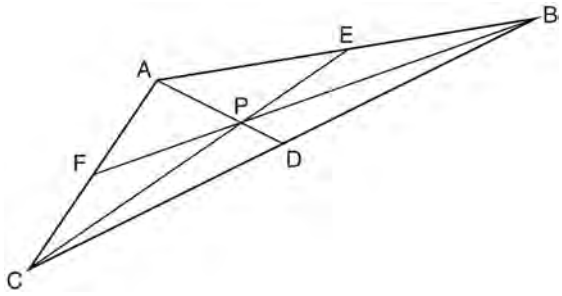
532 What is the measure of each interior angle of a regular hexagon?
1) 60°
2) 120°
3) 135°
4) 270°

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



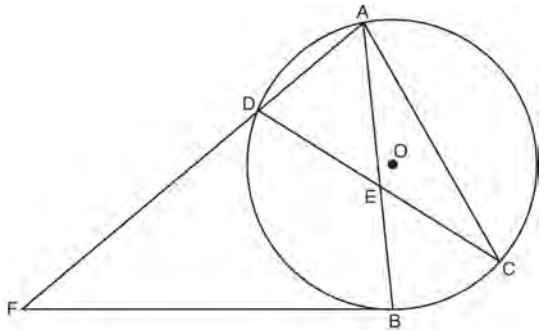
What is the length of $\overline{BD}$?
1) $3\sqrt{7}$
2) $4\sqrt{7}$
3) $7\sqrt{3}$
4) 12

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



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

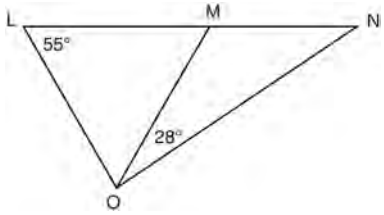
535 Chords $\overline{AB}$ and $\overline{CD}$ intersect at E in circle O, as shown in the diagram below. Secant $\overline{FDA}$ and tangent $\overline{FB}$ are drawn to circle O from external point F and chord $\overline{AC}$ is drawn. The $m\overset{\frown}{DA} = 56$, $m\overset{\frown}{DB} = 112$,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



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

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

537 In the diagram below, ΔLMO is isosceles with $LO = MO$.



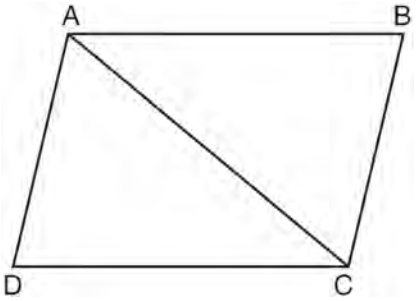
If $m\angle L = 55$ and $m\angle NOM = 28$, what is $m\angle N$?

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

538 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.

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



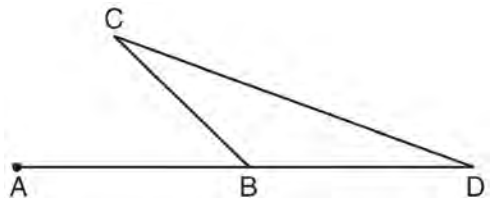
Which method can be used to prove ΔABC is congruent to ΔCDA?

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

540 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

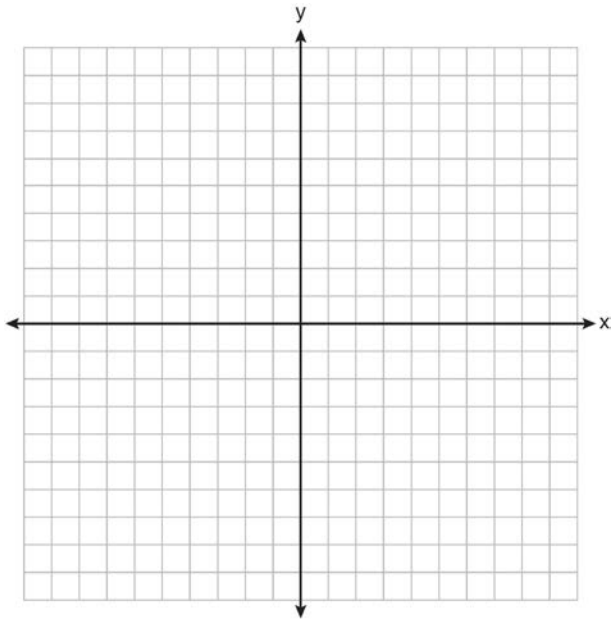
541 In the diagram below of ΔBCD, side $\overline{DB}$ is extended to point A.



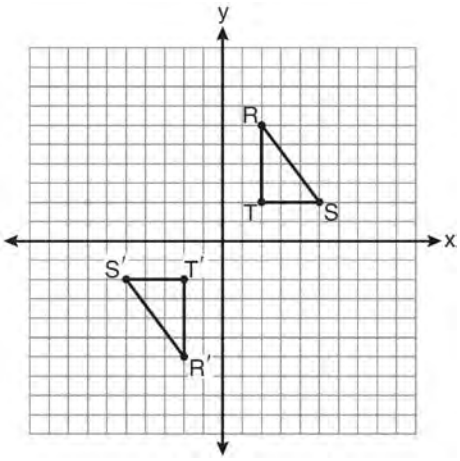
Which statement must be true?

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

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



543 As shown on the graph below, $\Delta R'S'T'$ is the image of ΔRST under a single transformation.



Which transformation does this graph represent?

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

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

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

546 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

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

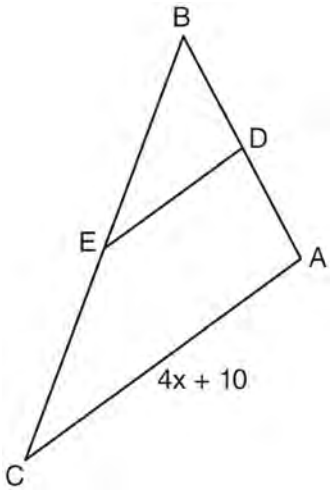
548 The slope of line ℓ is $-\frac{1}{3}$. What is an equation of a line that is perpendicular to line ℓ?
1) $y + 2 = \frac{1}{3}x$
2) $-2x + 6 = 6y$
3) $9x - 3y = 27$
4) $3x + y = 0$

549 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

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

551 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) $y = 3$

552 In the diagram below of ΔABC, D is the midpoint of $\overline{AB}$, and E is the midpoint of $\overline{BC}$.

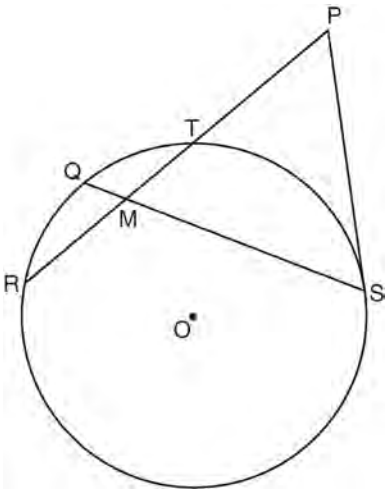


If $AC = 4x + 10$, which expression represents DE?
1) $x + 2.5$
2) $2x + 5$
3) $2x + 10$
4) $8x + 20$

553 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

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

555 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 $PT = 8$.

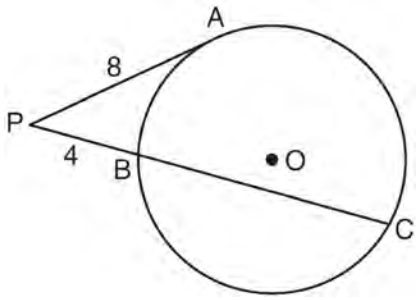


Find the length of $\overline{RT}$. Find the length of $\overline{PS}$.

556 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) $(-3, 2)$

557 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.

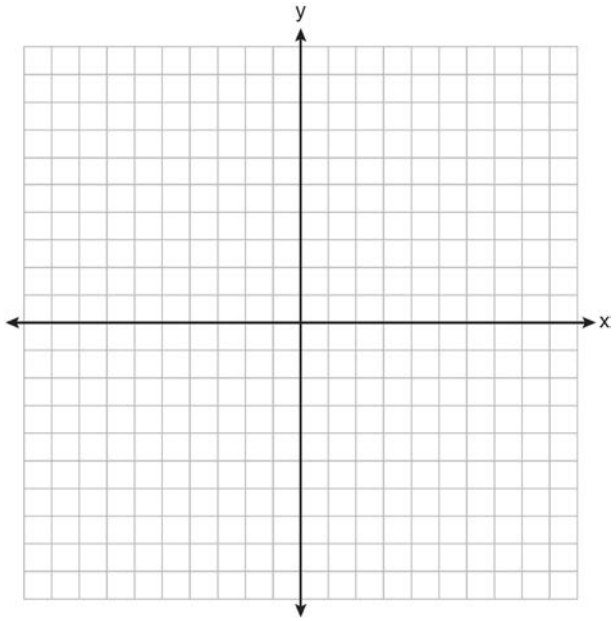
558 In the diagram below of circle O, $\overline{PA}$ is tangent to circle O at A, and $\overline{PBC}$ is a secant with points B and C on the circle.



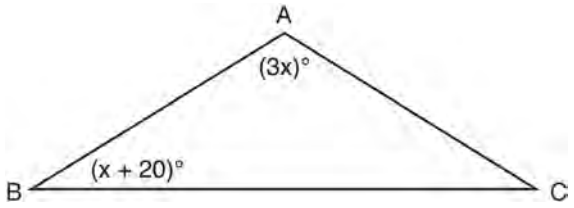
If $PA = 8$ and $PB = 4$, what is the length of $\overline{BC}$?
1) 20
2) 16
3) 15
4) 12

559 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) $(-7, -2)$

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



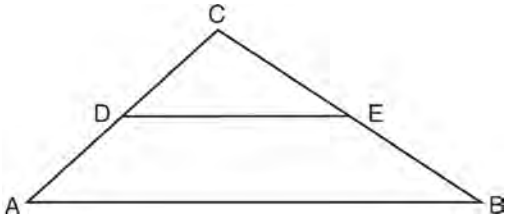
561 In the diagram below of ΔABC, $\overline{AB} \cong \overline{AC}$, $m\angle A = 3x$, and $m\angle B = x + 20$.



What is the value of x?

1) 10
2) 28
3) 32
4) 40

562 In the diagram below, $\overline{DE}$ joins the midpoints of two sides of ΔABC.



Which statement is *not* true?

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

563 The volume, in cubic centimeters, of a sphere whose diameter is 6 centimeters is

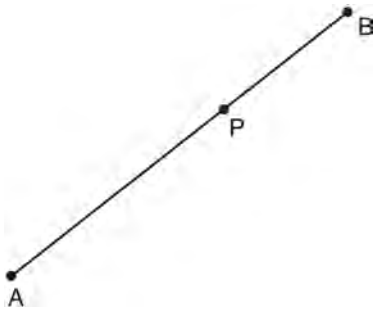
1) 12π
2) 36π
3) 48π
4) 288π

564 Which equation represents the perpendicular bisector of $\overline{AB}$ whose endpoints are $A(8,2)$ and $B(0,6)$?

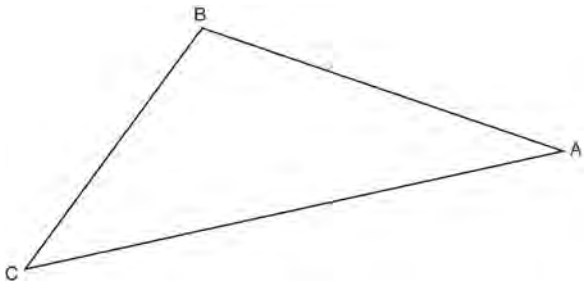
1) $y = 2x - 4$
2) $y = -\frac{1}{2}x + 2$
3) $y = -\frac{1}{2}x + 6$
4) $y = 2x - 12$

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

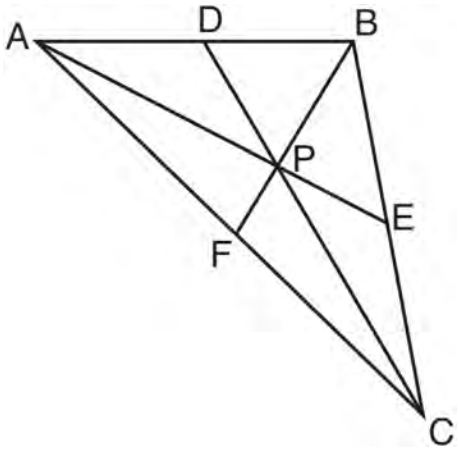
566 Using a compass and straightedge, construct a line perpendicular to $\overline{AB}$ through point P. [Leave all construction marks.]



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



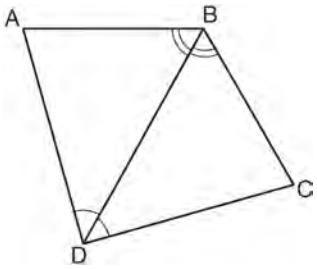
568 In ΔABC shown below, P is the centroid and $BF = 18$.



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

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

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



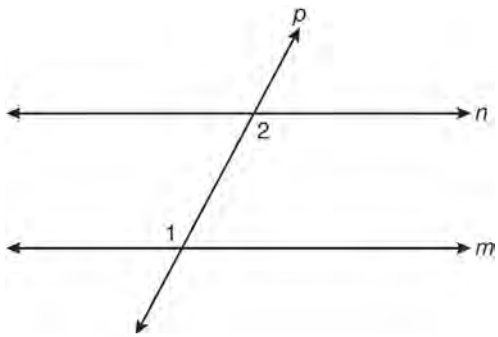
Which statement must be true?

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

570 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) $2\sqrt{41}$

571 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

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

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

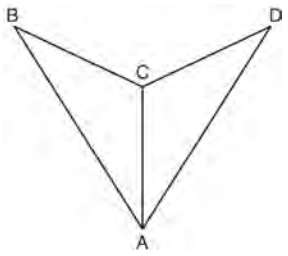
573 In rhombus $ABCD$, the diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E. If $AE = 5$ and $BE = 12$, what is the length of $\overline{AB}$?

1) 7
2) 10
3) 13
4) 17

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

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

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



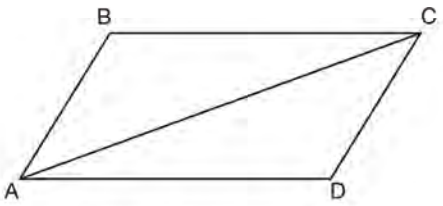
Which method could be used to prove $\Delta ABC \cong \Delta ADC$?

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

576 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

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

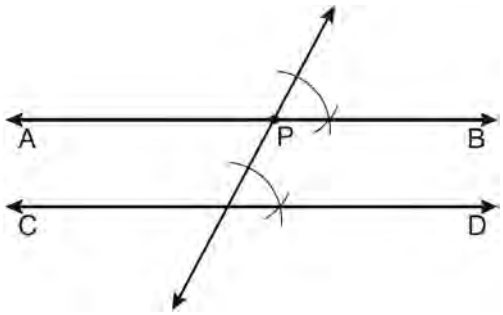


Statement	Reason
1. ABCD is a parallelogram.	1. Given
2. $\overline{BC} \cong \overline{AD}$ $\overline{AB} \cong \overline{DC}$	2. Opposite sides of a parallelogram are congruent.
3. $\overline{AC} \cong \overline{CA}$	3. Reflexive Postulate of Congruency
4. $\triangle ABC \cong \triangle CDA$	4. Side-Side-Side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

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



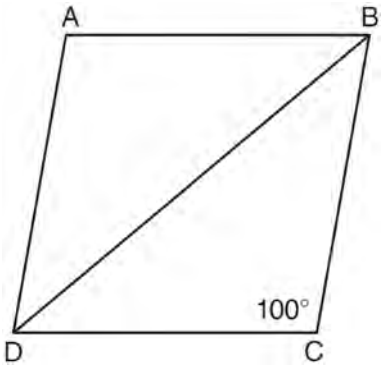
Which theorem justifies this method of construction?

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.

579 In ΔABC and ΔDEF, $\frac{AC}{DF} = \frac{CB}{FE}$. Which additional information would prove $\Delta ABC \sim \Delta DEF$?

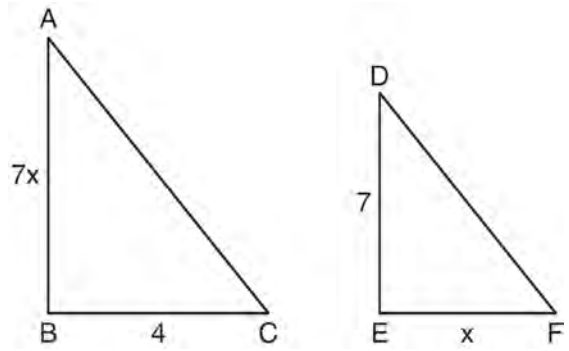
1) $AC = DF$
2) $CB = FE$
3) $\angle ACB \cong \angle DFE$
4) $\angle BAC \cong \angle EDF$

580 In the diagram below of rhombus *ABCD*, $m\angle C = 100$.



What is $m\angle DBC$?
1) 40
2) 45
3) 50
4) 80

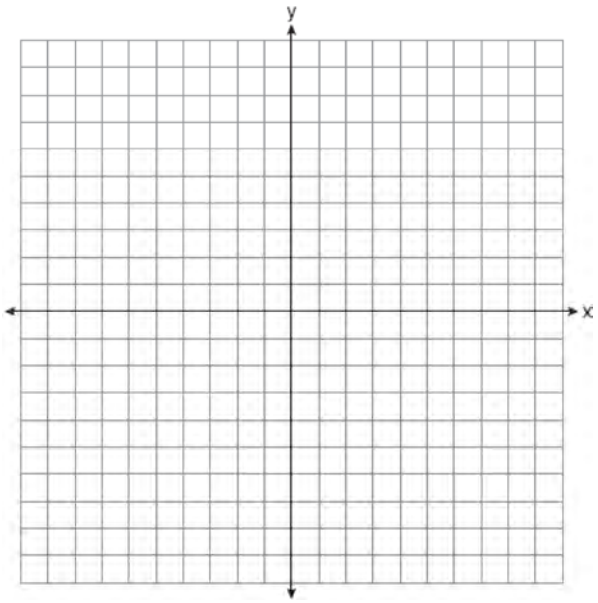
581 As shown in the diagram below, $\Delta ABC \sim \Delta DEF$, $AB = 7x$, $BC = 4$, $DE = 7$, and $EF = x$.



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

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

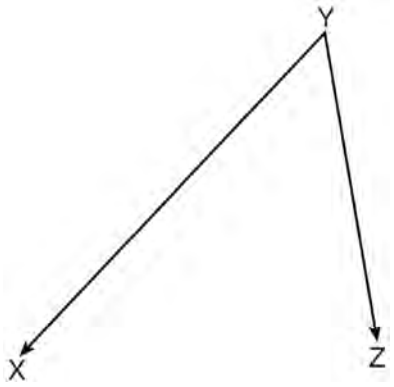
583 Triangle *TAP* has coordinates $T(-1, 4)$, $A(2, 4)$, and $P(2, 0)$. On the set of axes below, graph and label $\Delta T'A'P'$, the image of ΔTAP after the translation $(x, y) \rightarrow (x - 5, y - 1)$.



584 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) $\{15, 36, 39\}$

585 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.]

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



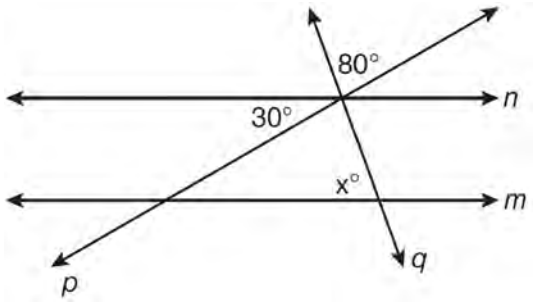
587 The sum of the interior angles of a polygon of n sides is

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

588 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

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

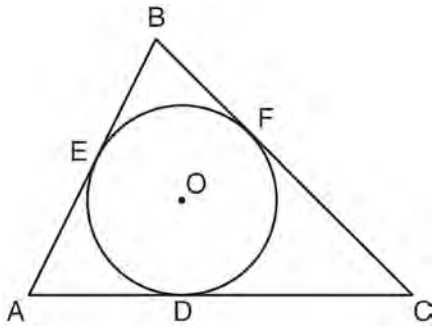


What value of x would make lines n and m parallel?

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

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

591 In the diagram below, ΔABC is circumscribed about circle O and the sides of ΔABC 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

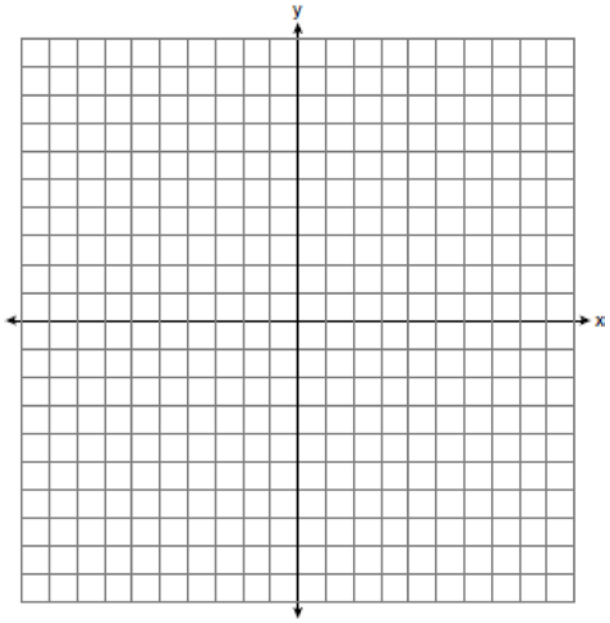
592 A student wrote the sentence "4 is an odd integer." What is the negation of this sentence and the truth value of the negation?

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

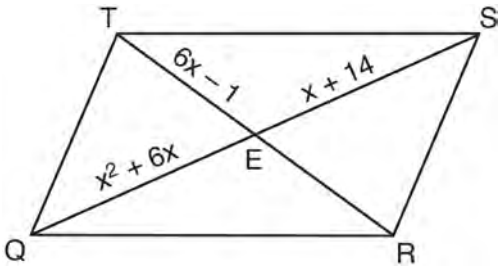
593 On the set of axes below, solve the following system of equations graphically and state the coordinates of *all* points in the solution.

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

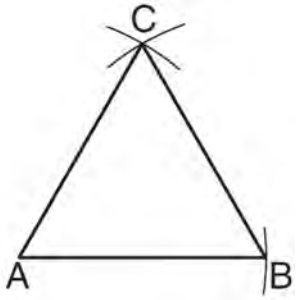
$$2y + 4 = -x$$

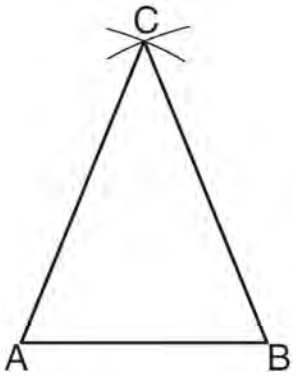


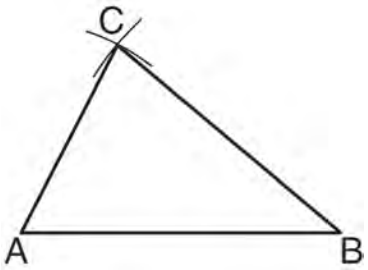
594 As shown in the diagram below, the diagonals of parallelogram $QRST$ intersect at E. If $QE = x^2 + 6x$, $SE = x + 14$, and $TE = 6x - 1$, determine TE algebraically.

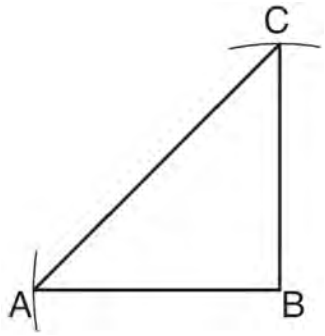


595 Which diagram represents a correct construction of equilateral ΔABC, given side $\overline{AB}$?

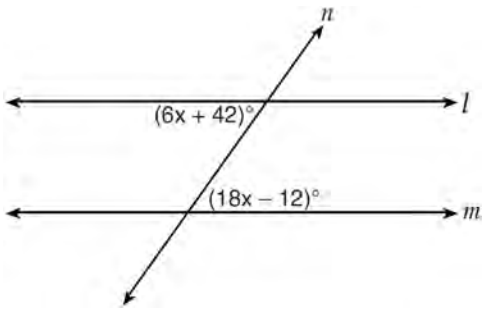
1) 

2) 

3) 

4) 

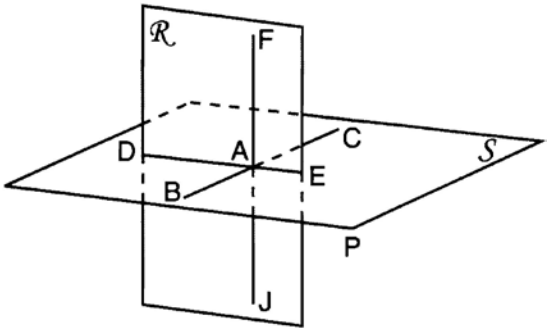
596 Line n intersects lines l and m, forming the angles shown in the diagram below.



Which value of x would prove $l \parallel m$?

1) 2.5
2) 4.5
3) 6.25
4) 8.75

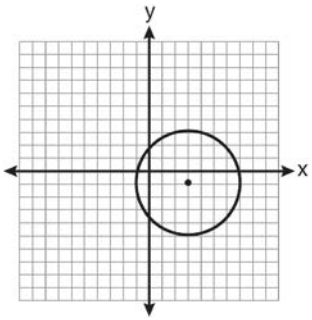
597 As shown in the diagram below, $\overline{FJ}$ is contained in plane $\mathcal{R}$, $\overline{BC}$ and $\overline{DE}$ are contained in plane $\mathcal{S}$, and $\overline{FJ}$, $\overline{BC}$, and $\overline{DE}$ intersect at A.

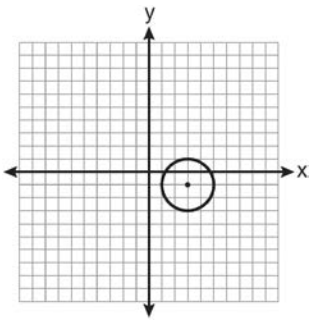


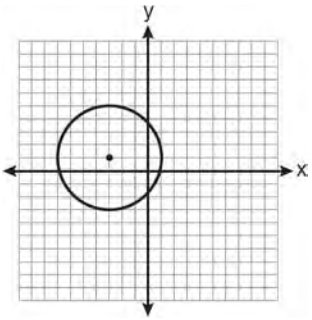
Which fact is sufficient to show that planes $\mathcal{R}$ and $\mathcal{S}$ are perpendicular?

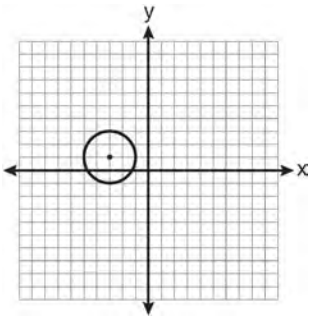
1) $\overline{FA} \perp \overline{DE}$
2) $\overline{AD} \perp \overline{AF}$
3) $\overline{BC} \perp \overline{FJ}$
4) $\overline{DE} \perp \overline{BC}$

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

1) 

2) 

3) 

4) 

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

600 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

601 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

602 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) $AB+CD=AD$

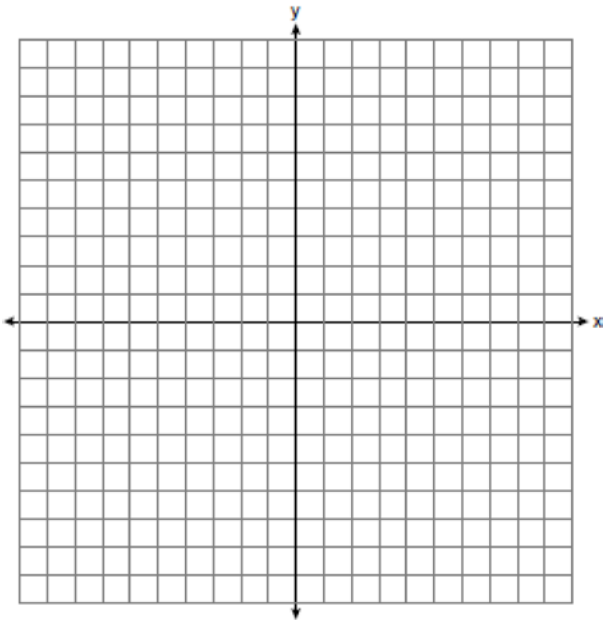
603 What is the image of the point $(-5, 2)$ under the translation $T_{3,-4}$?

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

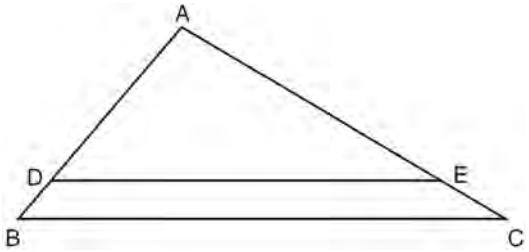
604 When writing a geometric proof, which angle relationship could be used alone to justify that two angles are congruent?

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

605 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.



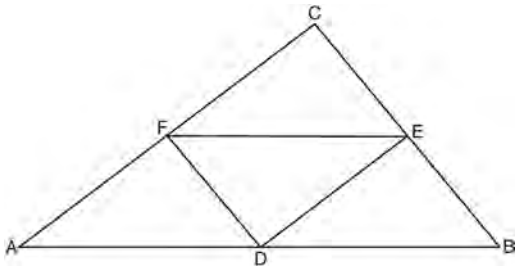
606 In the diagram of ΔABC shown below, $\overline{DE} \parallel \overline{BC}$.



If $AB = 10$, $AD = 8$, and $AE = 12$, what is the length of $\overline{EC}$?

1) 6
2) 2
3) 3
4) 15

607 In the diagram of ΔABC 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

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

Geometry Regents at Random
Answer Section

1 ANS: 3

$m = \frac{-A}{B} = \frac{-3}{-2} = \frac{3}{2}$

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

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

3 ANS: 3

midpoint: $\left(\frac{6+8}{2}, \frac{8+4}{2}\right) = (7,6)$. slope: $\frac{8-4}{6-8} = \frac{4}{-2} = -2$; $m_{\perp} = \frac{1}{2}$. $6 = \frac{1}{2}(7) + b$

$\frac{12}{2} = \frac{7}{2} + b$

$\frac{5}{12} = b$

PTS: 2 REF: 081327ge STA: G.G.68 TOP: Perpendicular Bisector

4 ANS: 3 PTS: 2 REF: 081320ge STA: G.G.42
TOP: Midsegments

5 ANS: 1 PTS: 2 REF: 081303ge STA: G.G.24
TOP: Negations

6 ANS: 4

$(x, y) \rightarrow (-x, -y)$

PTS: 2 REF: 061304ge STA: G.G.54 TOP: Rotations

7 ANS: 2

$18\pi \cdot 42 \approx 2375$

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

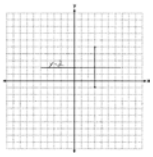
8 ANS: 2

Isosceles or not, ΔRSV and ΔRST 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

9 ANS:

$M = \left(\frac{3+3}{2}, \frac{-1+5}{2}\right) = (3,2)$. $y = 2$.



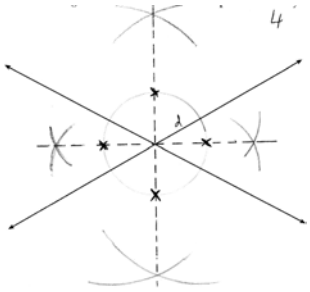
PTS: 2 REF: 011334ge STA: G.G.68 TOP: Perpendicular Bisector

10 ANS: 1 PTS: 2 REF: 011404ge STA: G.G.9
TOP: Planes

11 ANS: 3 PTS: 2 REF: 011427ge STA: G.G.56
TOP: Identifying Transformations

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

13 ANS:



PTS: 2 REF: 081334ge STA: G.G.22 TOP: Locus

14 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). $\text{m}\overline{MB} = \frac{1}{2}\,\text{m}\overline{MH}$ and $\text{m}\overline{AT} = \frac{1}{2}\,\text{m}\overline{AH}$ (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

15 ANS:

$Bh = V$

$12h = 84$

$h = 7$

PTS: 2 REF: 011432ge STA: G.G.12 TOP: Volume

16 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

17 ANS:

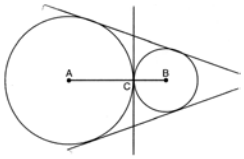
$\sqrt{(3-7)^2 + (-4-2)^2} = \sqrt{16+36} = \sqrt{52} = \sqrt{4}\sqrt{13} = 2\sqrt{13}$.

PTS: 2 REF: 011431ge STA: G.G.67 TOP: Distance

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

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

20 ANS:



PTS: 2 REF: 011330ge STA: G.G.50 TOP: Tangents
KEY: common tangency

21 ANS: 2

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

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

22 ANS: 3 PTS: 2 REF: 081312ge STA: G.G.72
TOP: Equations of Circles

23 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

24 ANS: 3

$x^2+5^2=25$

$x=0$

PTS: 2 REF: 011312ge STA: G.G.70 TOP: Quadratic-Linear Systems

25 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

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

27 ANS:

$A'(2,2), B'(3,0), C(1,-1)$

PTS: 2 REF: 081329ge STA: G.G.58 TOP: Dilations

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

29 ANS: 4 PTS: 2 REF: 061319ge STA: G.G.73
TOP: Equations of Circles

30 ANS:

$2(y + 10) = 4y - 20$. $\overline{DF} = y + 10 = 20 + 10 = 30$. $\overline{OA} = \overline{OD} = \sqrt{16^2 + 30^2} = 34$

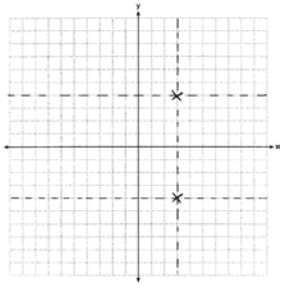
$2y + 20 = 4y - 20$

$40 = 2y$

$20 = y$

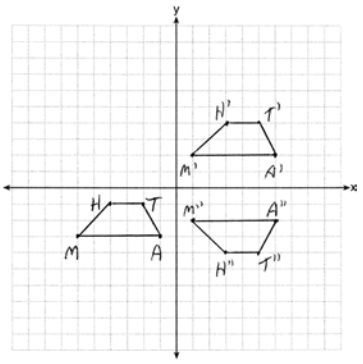
PTS: 4 REF: 061336ge STA: G.G.49 TOP: Chords

31 ANS:



PTS: 2 REF: 061333ge STA: G.G.23 TOP: Locus

32 ANS:



$M''(1, -2), A''(6, -2), T''(5, -4), H''(3, -4)$

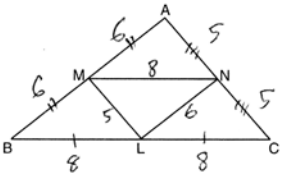
PTS: 4 REF: 081336ge STA: G.G.58 TOP: Compositions of Transformations
KEY: grids

33 ANS:

ΔABC, $\overline{BD}$ 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). $\Delta CDB \cong \Delta ADB$ (SAS). $\overline{AB} \cong \overline{CB}$ (CPCTC).

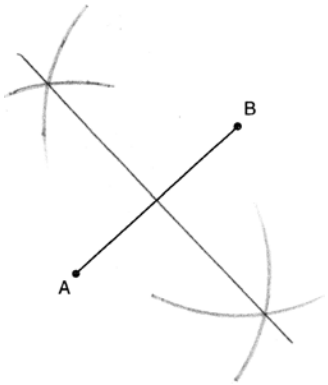
PTS: 4 REF: 081335ge STA: G.G.27 TOP: Triangle Proofs

34 ANS: 1



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

35 ANS:



PTS: 2 REF: 011430ge STA: G.G.18 TOP: Constructions

36 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

37 ANS: 3

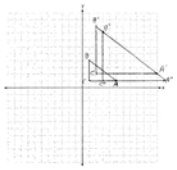
$6 = \frac{4+x}{2}$. $8 = \frac{2+y}{2}$.

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

$x = 8$ $y = 14$

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

38 ANS:



$A''(11, 1),\ B''(3, 7),\ C''(3, 1)$

PTS: 4 REF: 011336ge STA: G.G.58 TOP: Compositions of Transformations

39 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

40 ANS: 2

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

PTS: 2 REF: 081325ge STA: G.G.50 TOP: Tangents
KEY: point of tangency

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

42 ANS: 1 PTS: 2 REF: 011301ge STA: G.G.29
TOP: Triangle Congruency

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

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

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

46 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

47 ANS: 4

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

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

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

$m = \frac{2}{3}$ $m = \frac{3}{2}$

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

48 ANS: 2

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

$24x = 300$

$x = 12.5$

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

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

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

51 ANS:

$x^2 - 8x = 5x + 30$. $m\angle C = 4(15) - 5 = 55$

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

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

$x = 15$

PTS: 4 REF: 061337ge STA: G.G.45 TOP: Similarity
KEY: basic

52 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

53 ANS: 1

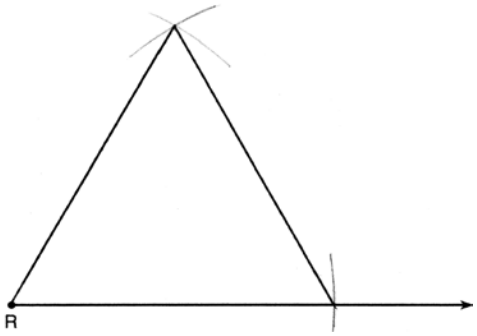
$2x + x = 12$. $\overline{BD} = 2(4) = 8$

$3x = 12$

$x = 4$

PTS: 2 REF: 011408ge STA: G.G.43 TOP: Centroid

54 ANS:



PTS: 2 REF: 061332ge STA: G.G.20 TOP: Constructions

55 ANS:

Neither. The slope of $y = \frac{1}{2}x - 1$ is $\frac{1}{2}$. The slope of $y + 4 = -\frac{1}{2}(x - 2)$ is $-\frac{1}{2}$. The slopes are neither the same nor opposite reciprocals.

PTS: 2 REF: 011433ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

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

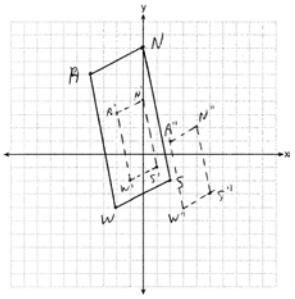
57 ANS: 3

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

$10 = l$

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

58 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

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

60 ANS: 1

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

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

61 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

62 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

63 ANS: 3 PTS: 2 REF: 061306ge STA: G.G.71
TOP: Equations of Circles

64 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

65 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

66 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

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

68 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

69 ANS:

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

PTS: 2 REF: 061330ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

70 ANS: 4 PTS: 2 REF: 011323ge STA: G.G.72
TOP: Equations of Circles

71 ANS: 2

$(x-4)^2 - 2 = -2x + 6$. $y = -2(4) + 6 = -2$

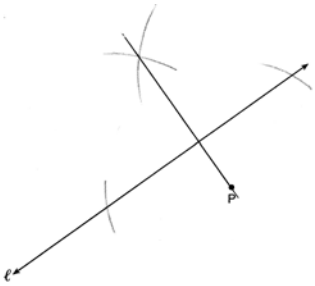
$x^2 - 8x + 16 - 2 = -2x + 6$ $y = -2(2) + 6 = 2$

$$x^2 - 6x + 8 = 0$$
$$(x-4)(x-2) = 0$$
$$x = 4, 2$$

PTS: 2 REF: 081319ge STA: G.G.70 TOP: Quadratic-Linear Systems

72 ANS: 2 PTS: 2 REF: 081301ge STA: G.G.24
TOP: Statements

73 ANS:



PTS: 2 REF: 011333ge STA: G.G.19 TOP: Constructions

74 ANS:

Rectangle $ABCD$ with points E and F on side $\overline{AB}$, segments CE and DF intersect at G, and $\angle ADG \cong \angle BCE$ are given. $\overline{AD} \cong \overline{BC}$ because opposite sides of a rectangle are congruent. $\angle A$ and $\angle B$ are right angles and congruent because all angles of a rectangle are right and congruent. $\Delta ADF \cong \Delta BCE$ 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

75 ANS: 2 PTS: 2 REF: 061315ge STA: G.G.13
TOP: Solids

76 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

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

78 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

79 ANS: 3 PTS: 2 REF: 081309ge STA: G.G.29
TOP: Triangle Congruency

80 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

81 ANS: 3 PTS: 2 REF: 011322ge STA: G.G.49
TOP: Chords

82 ANS:

$M\left(\frac{-7+-3}{2}, \frac{4+6}{2}\right) = M(-5,5)$. $m_{\overline{MN}} = \frac{5-3}{-5-0} = \frac{2}{-5}$. Since both opposite sides have equal slopes and are

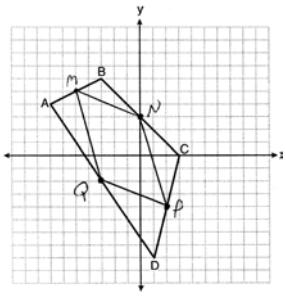
$N\left(\frac{-3+3}{2}, \frac{6+0}{2}\right) = N(0,3)$ $\quad m_{\overline{PQ}} = \frac{-4--2}{2--3} = \frac{-2}{5}$

$P\left(\frac{3+1}{2}, \frac{0+-8}{2}\right) = P(2,-4)$ $\quad m_{\overline{NA}} = \frac{3--4}{0-2} = \frac{7}{-2}$

$Q\left(\frac{-7+1}{2}, \frac{4+-8}{2}\right) = Q(-3,-2)$ $\quad m_{\overline{QM}} = \frac{-2-5}{-3--5} = \frac{-7}{2}$

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

83 ANS: 4 PTS: 2 REF: 011426ge STA: G.G.73
TOP: Equations of Circles

84 ANS: 2

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

$180n - 360 = 120n$

$60n = 360$

$n = 6$

PTS: 2 REF: 011326ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

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

86 ANS: 3

$3x - 15 = 2(6)$

$3x = 27$

$x = 9$

PTS: 2 REF: 061311ge STA: G.G.42 TOP: Midsegments

87 ANS: 4

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

$180(5) - 720 = 180$

PTS: 2 REF: 081322ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

88 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

89 ANS: 2

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

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

90 ANS:

$12x - 4 + 180 - 6x + 6x + 7x + 13 = 360.$

$19x + 189 = 360$

$19x = 171$

$x = 9$

$16y + 1 = \frac{12y + 1 + 18y + 6}{2}$

$32y + 2 = 30y + 7$

$2y = 5$

$y = \frac{5}{2}$

PTS: 4 REF: 081337ge STA: G.G.40 TOP: Trapezoids

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

92 ANS: 4

Distance is preserved after a rotation.

PTS: 2 REF: 081304ge STA: G.G.55 TOP: Properties of Transformations

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

94 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

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

96 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

97 ANS: 3
$\frac{15}{18} = \frac{5}{6}$

PTS: 2 REF: 081317ge STA: G.G.45 TOP: Similarity
KEY: perimeter and area

98 ANS: 1
$x^2 = 3 \times 12$

$x = 6$

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

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

100 ANS: 1 PTS: 2 REF: 011320ge STA: G.G.26
TOP: Conditional Statements

101 ANS: 4 PTS: 2 REF: 011406ge STA: G.G.10
TOP: Solids

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

103 ANS: 2
$m\angle ABC = 55$, so $m\angle ACR = 60 + 55 = 115$

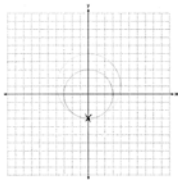
PTS: 2 REF: 011414ge STA: G.G.32 TOP: Exterior Angle Theorem

104 ANS: 1
$8 \times 12 = 16x$

$6 = x$

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

105 ANS:



PTS: 2 REF: 011331ge STA: G.G.23 TOP: Locus

106 ANS: 2 PTS: 2 REF: 081311ge STA: G.G.10
TOP: Solids
107 ANS: 2 PTS: 2 REF: 061313ge STA: G.G.70
TOP: Quadratic-Linear Systems
108 ANS: 4 PTS: 2 REF: 061303ge STA: G.G.22
TOP: Locus
109 ANS: 4 PTS: 2 REF: 011306ge STA: G.G.9
TOP: Planes
110 ANS: 1

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

PTS: 2 REF: 011314ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles
111 ANS: 1 PTS: 2 REF: 061310ge STA: G.G.2
TOP: Planes
112 ANS: 4 PTS: 2 REF: 011407ge STA: G.G.23
TOP: Locus
113 ANS: 4 PTS: 2 REF: 011315ge STA: G.G.1
TOP: Planes
114 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
115 ANS: 4

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

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

$8 = b$

PTS: 2 REF: 011319ge STA: G.G.64 TOP: Parallel and Perpendicular Lines
116 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
117 ANS: 1 PTS: 2 REF: 061325ge STA: G.G.74
TOP: Graphing Circles

118 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

119 ANS: 4

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

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

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

121 ANS:

$x + 3x - 60 + 5x - 30 = 180$

$9x - 90 = 180$

$9x = 270$

$x = 30 = \text{m}\angle D$

$5(30) - 30 = 120$

$\text{m}\angle BAC = 180 - 120 = 60$

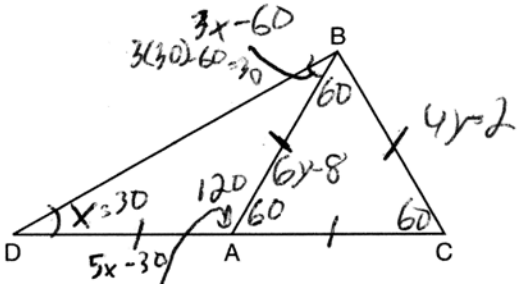
$6y - 8 = 4y - 2$

$2y = 6$

$y = 3$

$4(3) - 2 = 10 = \overline{BC}$

$\overline{DC} = 10 + 10 = 20$



PTS: 3 REF: 011435ge STA: G.G.31 TOP: Isosceles Triangle Theorem

122 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

123 ANS: 3

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

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

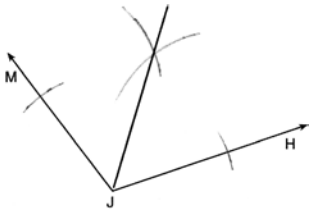
$12x = 216$ $5(18) - 20 = 70$

$x = 18$

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

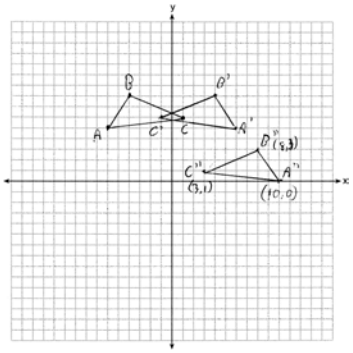
124 ANS: 2 PTS: 2 REF: 061324ge STA: G.G.44
TOP: Similarity Proofs

125 ANS:



PTS: 2 REF: 081330ge STA: G.G.17 TOP: Constructions

126 ANS:



PTS: 3 REF: 011436ge STA: G.G.58 TOP: Compositions of Transformations
KEY: grids

127 ANS: 3

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

$$8x + 40 + 6x - 30 = 360$$
$$14x + 10 = 360$$
$$14x = 350$$
$$x = 25$$

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

128 ANS: 1 PTS: 2 REF: 011405ge STA: G.G.59
TOP: Properties of Transformations

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

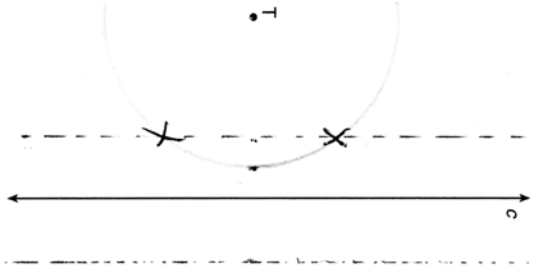
130 ANS: 3 PTS: 2 REF: 011425ge STA: G.G.39
TOP: Special Parallelograms

131 ANS: 2

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

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

132 ANS:



PTS: 2 REF: 011434ge STA: G.G.22 TOP: Locus

133 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

134 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

135 ANS: 2

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

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

136 ANS: 4 PTS: 2 REF: 081305ge STA: G.G.71
TOP: Equations of Circles

137 ANS:

$x^2 + 12 + 11x + 5 + 13x - 17 = 180$. $\text{m}\angle A = 6^2 + 12 = 48$. $\angle B$ is the largest angle, so $\overline{AC}$ in the longest side.

$x^2 + 24x - 180 = 0$ $\text{m}\angle B = 11(6) + 5 = 71$

$(x + 30)(x - 6) = 0$ $\text{m}\angle C = 13(6) - 7 = 61$

$x = 6$

PTS: 4 REF: 011337ge STA: G.G.34 TOP: Angle Side Relationship

138 ANS: 2

$\sqrt{8^2 + 15^2} = 17$

PTS: 2 REF: 061326ge STA: G.G.39 TOP: Special Parallelograms

139 ANS: 1

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

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

140 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

141 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

142 ANS: 3

$180 - 38 = 142$

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

143 ANS: 3 PTS: 2 REF: 011311ge STA: G.G.42
TOP: Midsegments

144 ANS: 3

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

$y = \frac{3}{2}x - 2$ $1 = 9 + b$

$-8 = b$

PTS: 2 REF: 061316ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

145 ANS: 2

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

PTS: 2 REF: 011310ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

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

147 ANS:

center: $(3, -4)$; radius: $\sqrt{10}$

PTS: 2 REF: 081333ge STA: G.G.73 TOP: Equations of Circles

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

149 ANS:

$m_{\overline{AB}} = \frac{4-1}{4-2} = \frac{3}{2}$. $m_{\overline{BC}} = -\frac{2}{3}$

PTS: 4 REF: 061334ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

150 ANS: 1 PTS: 2 REF: 011412ge STA: G.G.28
TOP: Triangle Congruency

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

152 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

153 ANS: 2

$7 + 18 > 6 + 12$

PTS: 2 REF: fall0819ge STA: G.G.33 TOP: Triangle Inequality Theorem

Geometry Regents at Random

Answer Section

154 ANS: 1
$(x, y) \rightarrow (x + 3, y + 1)$

PTS: 2 REF: fall0803ge STA: G.G.54 TOP: Translations

155 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

156 ANS: 4

$\Delta ABC \sim \Delta DBE$. $\frac{\overline{AB}}{\overline{DB}} = \frac{\overline{AC}}{\overline{DE}}$

$\frac{9}{2} = \frac{x}{3}$

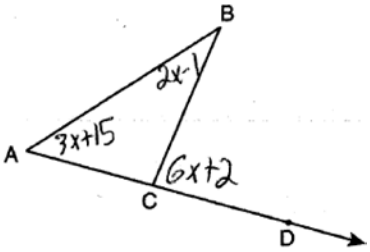
$x = 13.5$

PTS: 2 REF: 060927ge STA: G.G.46 TOP: Side Splitter Theorem

157 ANS: 1
$A'(2, 4)$

PTS: 2 REF: 011023ge STA: G.G.54 TOP: Compositions of Transformations
KEY: basic

158 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

159 ANS: 2 PTS: 2 REF: 081015ge STA: G.G.56
TOP: Identifying Transformations

160 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

161 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

162 ANS: 3 PTS: 2 REF: 080902ge STA: G.G.17
TOP: Constructions

163 ANS: 2

$x^2 = 3(x + 18)$

$x^2 - 3x - 54 = 0$

$(x - 9)(x + 6) = 0$

$x = 9$

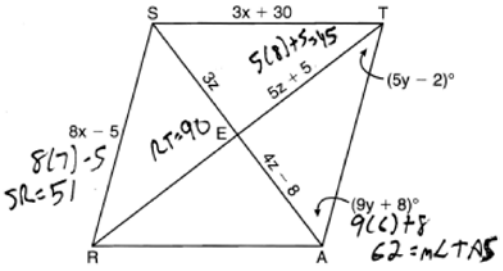
PTS: 2 REF: fall0817ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

164 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

165 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

166 ANS:

$(x + 1)^2 + (y - 2)^2 = 36$

PTS: 2 REF: 081034ge STA: G.G.72 TOP: Equations of Circles

167 ANS: 3 PTS: 2 REF: 011007ge STA: G.G.31
TOP: Isosceles Triangle Theorem

168 ANS:

$y = -2x + 14$. The slope of $2x + y = 3$ is $\frac{-A}{B} = \frac{-2}{1} = -2$. $y = mx + b$.

$4 = (-2)(5) + b$

$b = 14$

PTS: 2 REF: 060931ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

169 ANS: 3 PTS: 2 REF: 060905ge STA: G.G.54
TOP: Reflections KEY: basic

170 ANS: 3

$m = \frac{-A}{B} = -\frac{3}{4}$

PTS: 2 REF: 011025ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

171 ANS: 1

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

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

172 ANS:

5. $\frac{3}{x} = \frac{6+3}{15}$

$9x = 45$

$x = 5$

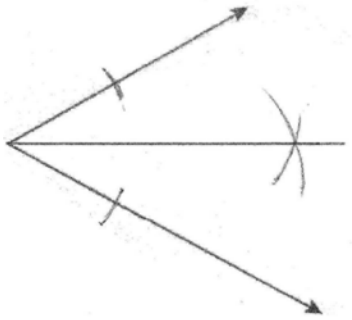
PTS: 2 REF: 011033ge STA: G.G.46 TOP: Side Splitter Theorem

173 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

174 ANS:



PTS: 2 REF: fall0832ge STA: G.G.17 TOP: Constructions

175 ANS: 2

The slope of a line in standard form is $-\frac{A}{B}$ so the slope of this line is $-\frac{5}{3}$ Perpendicular lines have slope that are the opposite and reciprocal of each other.

PTS: 2 REF: fall0828ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

176 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

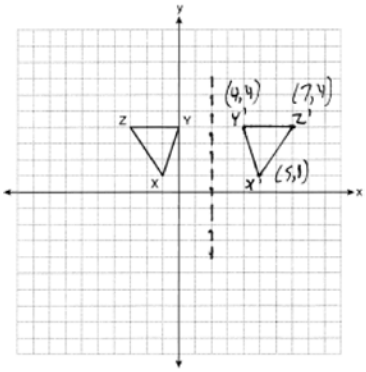
177 ANS: 1 PTS: 2 REF: 061010ge STA: G.G.34
TOP: Angle Side Relationship

178 ANS: 4 PTS: 2 REF: 060912ge STA: G.G.23
TOP: Locus

179 ANS: 4 PTS: 2 REF: 011012ge STA: G.G.1
TOP: Planes

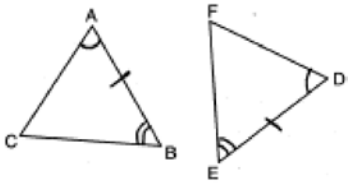
180 ANS: 2 PTS: 2 REF: 011006ge STA: G.G.56
TOP: Identifying Transformations

181 ANS:



PTS: 2 REF: 061032ge STA: G.G.54 TOP: Reflections
KEY: grids

182 ANS: 3



PTS: 2 REF: 060902ge STA: G.G.28 TOP: Triangle Congruency

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

184 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

185 ANS: 4

$\text{SA} = 4\pi r^2 \quad V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot 6^3 = 288\pi$

$144\pi = 4\pi r^2$

$36 = r^2$

$6 = r$

PTS: 2 REF: 081020ge STA: G.G.16 TOP: Surface Area

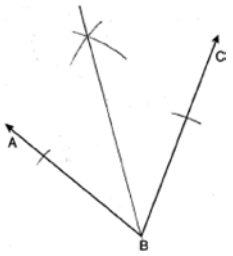
186 ANS: 3 PTS: 2 REF: 080928ge STA: G.G.50
TOP: Tangents KEY: common tangency

187 ANS:

$\angle D$, $\angle G$ and 24° or $\angle E$, $\angle F$ and 84°. $m\overset{\frown}{FE} = \frac{2}{15} \times 360 = 48$. Since the chords forming $\angle D$ and $\angle G$ are intercepted by $\overset{\frown}{FE}$, their measure is 24°. $m\overset{\frown}{GD} = \frac{7}{15} \times 360 = 168$. Since the chords forming $\angle E$ and $\angle F$ are intercepted by $\overset{\frown}{GD}$, their measure is 84°.

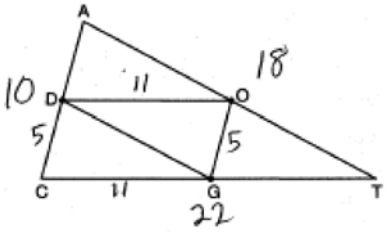
PTS: 4 REF: fall0836ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inscribed

188 ANS:



PTS: 2 REF: 080932ge STA: G.G.17 TOP: Constructions

189 ANS: 3



PTS: 2 REF: 080920ge STA: G.G.42 TOP: Midsegments

190 ANS: 4

Median $\overline{BF}$ bisects $\overline{AC}$ so that $\overline{CF} \cong \overline{FA}$.

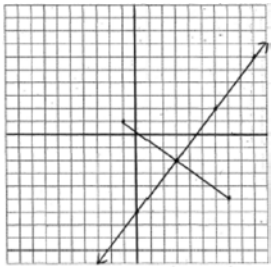
PTS: 2 REF: fall0810ge STA: G.G.24 TOP: Statements

191 ANS:

$y = \frac{4}{3}x - 6$. $M_x = \frac{-1+7}{2} = 3$ The perpendicular bisector goes through $(3, -2)$ and has a slope of $\frac{4}{3}$.

$M_y = \frac{1+(-5)}{2} = -2$

$m = \frac{1-(-5)}{-1-7} = -\frac{3}{4}$

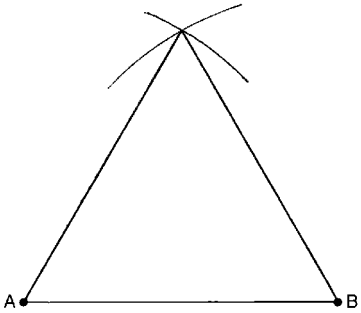


$y - y_M = m(x - x_M)$.

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

PTS: 4 REF: 080935ge STA: G.G.68 TOP: Perpendicular Bisector

192 ANS:



PTS: 2 REF: 081032ge STA: G.G.20 TOP: Constructions

193 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

194 ANS: 2

$M_x = \frac{-2+6}{2} = 2$. $M_y = \frac{-4+2}{2} = -1$

PTS: 2 REF: 080910ge STA: G.G.66 TOP: Midpoint
KEY: general

195 ANS: 4

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

PTS: 2 REF: fall0827ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

196 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

197 ANS: 4 PTS: 2 REF: 080905ge STA: G.G.29 TOP: Triangle Congruency

198 ANS: 2

Because the triangles are similar, $\frac{\text{m}\angle A}{\text{m}\angle D} = 1$

PTS: 2 REF: 011022ge STA: G.G.45 TOP: Similarity KEY: perimeter and area

199 ANS: 1 PTS: 2 REF: 061005ge STA: G.G.55 TOP: Properties of Transformations

200 ANS:

Midpoint: $\left(\frac{-4+4}{2}, \frac{2+(-4)}{2} \right) = (0, -1)$. Distance: $d = \sqrt{(-4-4)^2 + (2-(-4))^2} = \sqrt{100} = 10$

$r = 5$

$r^2 = 25$

$x^2 + (y+1)^2 = 25$

PTS: 4 REF: 061037ge STA: G.G.71 TOP: Equations of Circles

201 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

202 ANS: 1

Opposite sides of a parallelogram are congruent. $4x - 3 = x + 3$. $SV = (2) + 3 = 5$.

$3x = 6$

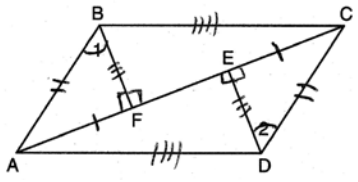
$x = 2$

PTS: 2 REF: 011013ge STA: G.G.38 TOP: Parallelograms

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

PTS: 4 REF: 011036ge STA: G.G.27 TOP: Quadrilateral Proofs

204 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

205 ANS: 3 PTS: 2 REF: 061004ge STA: G.G.31
TOP: Isosceles Triangle Theorem

206 ANS:
2.4. $5a = 4^2 \quad 5b = 3^2 \quad h^2 = ab$

$a = 3.2 \quad b = 1.8 \quad h^2 = 3.2 \cdot 1.8$

$h = \sqrt{5.76} = 2.4$

PTS: 4 REF: 081037ge STA: G.G.47 TOP: Similarity
KEY: altitude

207 ANS:
$(6, -4)$. $C_x = \dfrac{Q_x + R_x}{2}$. $C_y = \dfrac{Q_y + R_y}{2}$.

$3.5 = \dfrac{1 + R_x}{2} \qquad 2 = \dfrac{8 + R_y}{2}$

$7 = 1 + R_x \qquad 4 = 8 + R_y$

$6 = R_x \qquad -4 = R_y$

PTS: 2 REF: 011031ge STA: G.G.66 TOP: Midpoint
KEY: graph

208 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

209 ANS: 3

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

$x^2 + 6x + 9 - 4 = 2x + 5$

$x^2 + 4x = 0$

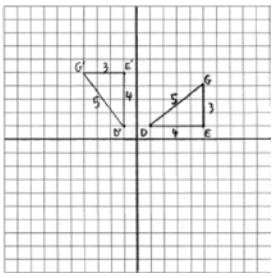
$x(x+4) = 0$

$x = 0, -4$

PTS: 2 REF: 081004ge STA: G.G.70 TOP: Quadratic-Linear Systems

210 ANS: 1 PTS: 2 REF: 061012ge STA: G.G.20
TOP: Constructions

211 ANS:



$D'(-1,1)$, $E'(-1,5)$, $G'(-4,5)$

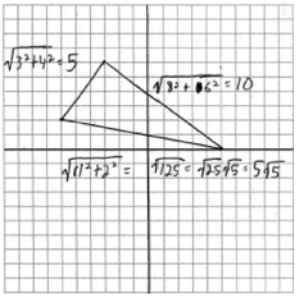
PTS: 4 REF: 080937ge STA: G.G.55 TOP: Properties of Transformations

212 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

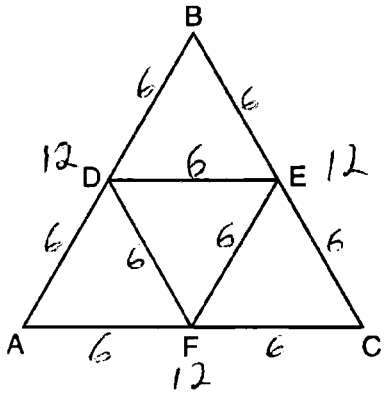
213 ANS:



$15 + 5\sqrt{5}$.

PTS: 4 REF: 060936ge STA: G.G.69 TOP: Triangles in the Coordinate Plane

214 ANS: 1



PTS: 2 REF: 081003ge STA: G.G.42 TOP: Midsegments

215 ANS: 4

(4) is not true if $\angle PQR$ is obtuse.

PTS: 2 REF: 060924ge STA: G.G.32 TOP: Exterior Angle Theorem

216 ANS: 1 PTS: 2 REF: 080911ge STA: G.G.73
TOP: Equations of Circles

217 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

218 ANS: 2 PTS: 2 REF: 011004ge STA: G.G.17
TOP: Constructions

219 ANS: 2

A dilation affects distance, not angle measure.

PTS: 2 REF: 080906ge STA: G.G.60 TOP: Identifying Transformations

220 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

221 ANS: 4

$180 - (40 + 40) = 100$

PTS: 2 REF: 080903ge STA: G.G.31 TOP: Isosceles Triangle Theorem

222 ANS: 2

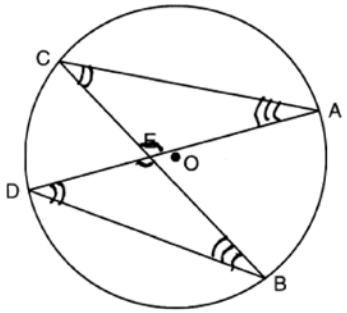
$$\frac{140 - \overline{RS}}{2} = 40$$

$$140 - \overline{RS} = 80$$

$$\overline{RS} = 60$$

PTS: 2 REF: 081025ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: outside circle

223 ANS: 2



PTS: 2 REF: 061026GE STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inscribed

224 ANS: 3 PTS: 2 REF: 081002ge STA: G.G.9
TOP: Planes

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

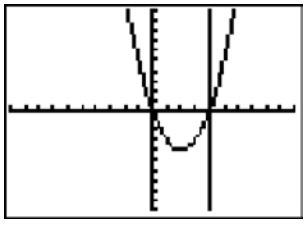
PTS: 4 REF: 011035ge STA: G.G.59 TOP: Properties of Transformations

226 ANS: 3 PTS: 2 REF: 081021ge STA: G.G.57
TOP: Properties of Transformations

227 ANS: 1 PTS: 2 REF: 011024ge STA: G.G.3
TOP: Planes

228 ANS: 1 PTS: 2 REF: 060903ge STA: G.G.56
TOP: Identifying Transformations

229 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

230 ANS:

2016. $V = \frac{1}{3}Bh = \frac{1}{3}s^2h = \frac{1}{3}12^2 \cdot 42 = 2016$

PTS: 2 REF: 080930ge STA: G.G.13 TOP: Volume

231 ANS: 3 PTS: 2 REF: 081026ge STA: G.G.26
TOP: Contrapositive

232 ANS: 4

The radius is 4. $r^2 = 16$.

PTS: 2 REF: 061014ge STA: G.G.72 TOP: Equations of Circles

233 ANS: 1 PTS: 2 REF: 081009ge STA: G.G.73
TOP: Equations of Circles

234 ANS: 4 PTS: 2 REF: 061015ge STA: G.G.56
TOP: Identifying Transformations

235 ANS: 4

Corresponding angles of similar triangles are congruent.

PTS: 2 REF: fall0826ge STA: G.G.45 TOP: Similarity
KEY: perimeter and area

236 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

237 ANS: 4 PTS: 2 REF: fall0818ge STA: G.G.61
TOP: Analytical Representations of Transformations

238 ANS: 4 PTS: 2 REF: fall0824ge STA: G.G.50
TOP: Tangents KEY: common tangency

239 ANS: 2

$(d + 4)4 = 12(6)$

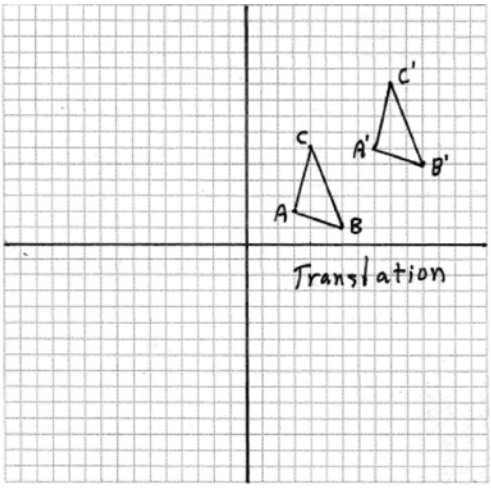
$4d + 16 = 72$

$d = 14$

$r = 7$

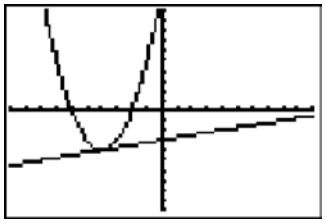
PTS: 2 REF: 061023ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two secants

240 ANS:



PTS: 2 REF: fall0830ge STA: G.G.55 TOP: Properties of Transformations

241 ANS: 3



PTS: 2 REF: 061011ge STA: G.G.70 TOP: Quadratic-Linear Systems

242 ANS: 3

$m = \frac{-A}{B} = \frac{5}{2}$. $m = \frac{-A}{B} = \frac{10}{4} = \frac{5}{2}$

PTS: 2 REF: 011014ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

243 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

244 ANS: 2 PTS: 2 REF: 011003ge STA: G.G.55
TOP: Properties of Transformations

245 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

246 ANS: 2 PTS: 2 REF: 011020ge STA: G.G.74
TOP: Graphing Circles

247 ANS:
20. $5x + 10 = 4x + 30$

$x = 20$

PTS: 2 REF: 060934ge STA: G.G.45 TOP: Similarity
KEY: basic
248 ANS: 2 PTS: 2 REF: 080927ge STA: G.G.4
TOP: Planes
249 ANS: 3 PTS: 2 REF: 011028ge STA: G.G.26
TOP: Conditional Statements
250 ANS: 1 PTS: 2 REF: 060920ge STA: G.G.74
TOP: Graphing Circles
251 ANS: 3 PTS: 2 REF: fall0816ge STA: G.G.1
TOP: Planes
252 ANS: 2
$M_x = \frac{2 + (-4)}{2} = -1$. $M_Y = \frac{-3 + 6}{2} = \frac{3}{2}$.

PTS: 2 REF: fall0813ge STA: G.G.66 TOP: Midpoint
KEY: general
253 ANS:
375π $L = \pi r l = \pi(15)(25) = 375\pi$

PTS: 2 REF: 081030ge STA: G.G.15 TOP: Lateral Area
254 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
255 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
256 ANS: 2 PTS: 2 REF: 061007ge STA: G.G.35
TOP: Parallel Lines and Transversals

257 ANS: 3

$\frac{36+20}{2} = 28$

PTS: 2 REF: 061019ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inside circle

258 ANS: 4

The slope of a line in standard form is $-\frac{A}{B}$, so the slope of this line is $\frac{-4}{2} = -2$. A parallel line would also have a slope of –2. Since the answers are in slope intercept form, find the *y*-intercept: $y = mx + b$

$3 = -2(7) + b$

$17 = b$

PTS: 2 REF: 081010ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

259 ANS: 2

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

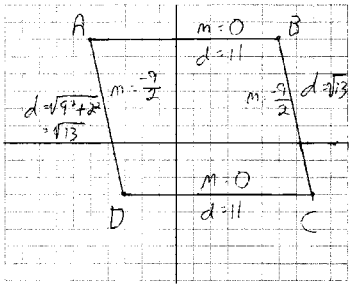
PTS: 2 REF: 081019ge STA: G.G.66 TOP: Midpoint
KEY: general

260 ANS: 2

Parallel chords intercept congruent arcs. $\text{m}\overset{\frown}{AD} = \text{m}\overset{\frown}{BC} = 60$. $\text{m}\angle CDB = \frac{1}{2}\text{m}\overset{\frown}{BC} = 30$.

PTS: 2 REF: 060906ge STA: G.G.52 TOP: Chords

261 ANS:



$\overline{AB} \| \overline{CD}$ and $\overline{AD} \| \overline{CB}$ 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

262 ANS: 4

$M_x = \frac{-6+1}{2} = -\frac{5}{2}$. $M_y = \frac{1+8}{2} = \frac{9}{2}$.

PTS: 2 REF: 060919ge STA: G.G.66 TOP: Midpoint
KEY: graph

263 ANS: 2 PTS: 2 REF: 061022ge STA: G.G.62
TOP: Parallel and Perpendicular Lines

264 ANS: 4 PTS: 2 REF: 061008ge STA: G.G.40
TOP: Trapezoids

265 ANS: 4 PTS: 2 REF: 061003ge STA: G.G.10
TOP: Solids

266 ANS: 3 PTS: 2 REF: fall0804ge STA: G.G.18
TOP: Constructions

267 ANS: 1 PTS: 2 REF: 061009ge STA: G.G.26
TOP: Converse and Biconditional

268 ANS: 3

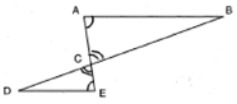
$4(x + 4) = 8^2$

$4x + 16 = 64$

$x = 12$

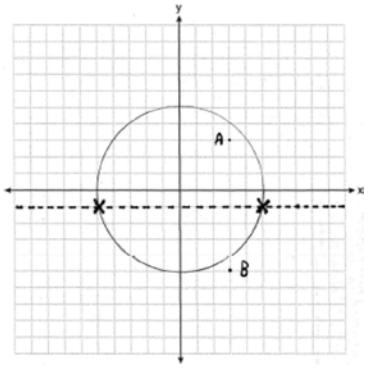
PTS: 2 REF: 060916ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

269 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

270 ANS:



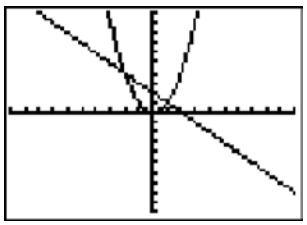
PTS: 4 REF: fall0837ge STA: G.G.23 TOP: Locus

271 ANS: 1

Since $\overline{AC} \cong \overline{BC}$, $m\angle A = m\angle B$ under the Isosceles Triangle Theorem.

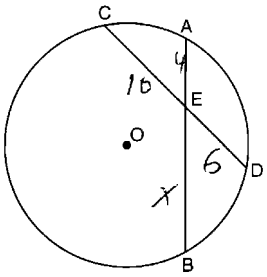
PTS: 2 REF: fall0809ge STA: G.G.69 TOP: Triangles in the Coordinate Plane

272 ANS: 3



PTS: 2 REF: fall0805ge STA: G.G.70 TOP: Quadratic-Linear Systems

273 ANS: 1



$4x = 6 \cdot 10$

$x = 15$

PTS: 2 REF: 081017ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two chords

274 ANS:

Yes, $m\angle ABD = m\angle BDC = 44$ $180 - (93 + 43) = 44$ $x + 19 + 2x + 6 + 3x + 5 = 180$. Because alternate interior

$$6x + 30 = 180$$
$$6x = 150$$
$$x = 25$$
$$x + 19 = 44$$

angles $\angle ABD$ and $\angle CDB$ are congruent, $\overline{AB}$ is parallel to $\overline{DC}$.

PTS: 4 REF: 081035ge STA: G.G.35 TOP: Parallel Lines and Transversals

275 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

276 ANS: 1 PTS: 2 REF: 061013ge STA: G.G.50
TOP: Tangents KEY: point of tangency

277 ANS: 1

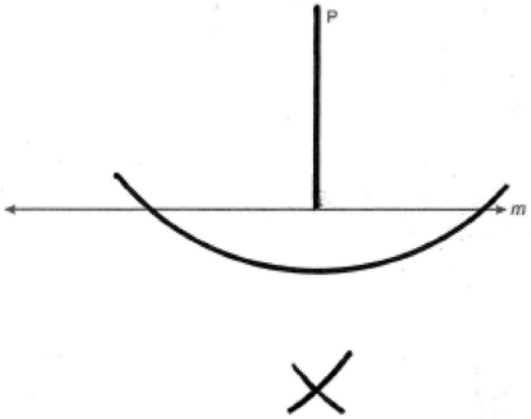
$x + 2x + 2 + 3x + 4 = 180$

$6x + 6 = 180$

$x = 29$

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

278 ANS:

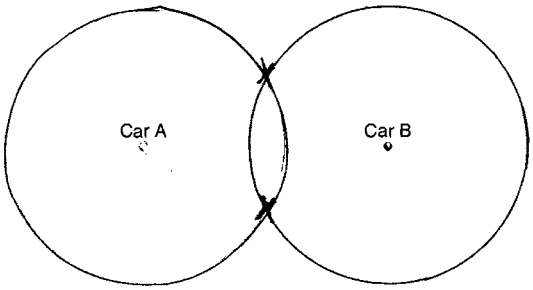


PTS: 2 REF: 060930ge STA: G.G.19 TOP: Constructions

279 ANS: 4 PTS: 2 REF: 080915ge STA: G.G.56
TOP: Identifying Transformations

280 ANS: 1 PTS: 2 REF: 081008ge STA: G.G.3
TOP: Planes

281 ANS:



PTS: 2 REF: 081033ge STA: G.G.22 TOP: Locus

282 ANS: 2

The slope of a line in standard form is $-\frac{A}{B}$, so the slope of this line is $\frac{-2}{-1} = 2$. A parallel line would also have a slope of 2. Since the answers are in slope intercept form, find the *y*-intercept: $y = mx + b$

$$-11 = 2(-3) + b$$

$$-5 = b$$

PTS: 2 REF: fall0812ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

283 ANS: 2 PTS: 2 REF: 061020ge STA: G.G.19
TOP: Constructions

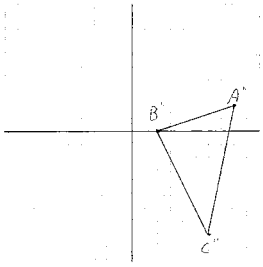
284 ANS: 1

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

285 ANS:



$A''(8,2),\ B''(2,0),\ C''(6,-8)$

PTS: 4 REF: 081036ge STA: G.G.58 TOP: Compositions of Transformations

286 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

287 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

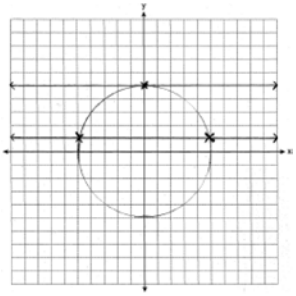
288 ANS: 4

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

289 ANS:



PTS: 4 REF: 080936ge STA: G.G.23 TOP: Locus

290 ANS: 1

$M_x = \frac{-2+6}{2} = 2$. $M_y = \frac{3+3}{2} = 3$. The center is $(2, 3)$. $d = \sqrt{(-2-6)^2 + (3-3)^2} = \sqrt{64+0} = 8$. If the diameter is 8, the radius is 4 and $r^2 = 16$.

PTS: 2 REF: fall0820ge STA: G.G.71 TOP: Equations of Circles

291 ANS: 1

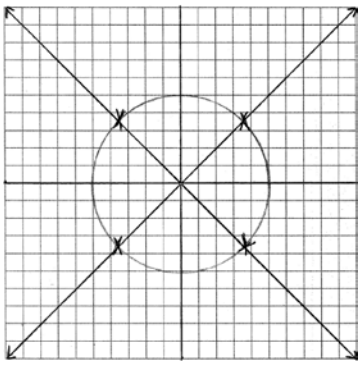
$3x^2 + 18x + 24$

$3(x^2 + 6x + 8)$

$3(x + 4)(x + 2)$

PTS: 2 REF: fall0815ge STA: G.G.12 TOP: Volume

292 ANS:



PTS: 4 REF: 011037ge STA: G.G.23 TOP: Locus

293 ANS: 3 PTS: 2 REF: 080913ge STA: G.G.28 TOP: Triangle Congruency

294 ANS: 4

$3y + 1 = 6x + 4$. $2y + 1 = x - 9$

$3y = 6x + 3$ $2y = x - 10$

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

PTS: 2 REF: fall0822ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

295 ANS: 4 PTS: 2 REF: 060922ge STA: G.G.73
TOP: Equations of Circles

296 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

297 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

298 ANS: 4
$L = 2\pi rh = 2\pi \cdot 5 \cdot 11 \approx 345.6$

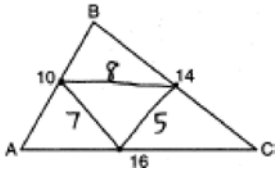
PTS: 2 REF: 061006ge STA: G.G.14 TOP: Volume and Lateral Area

299 ANS: 4 PTS: 2 REF: 081023ge STA: G.G.45
TOP: Similarity KEY: perimeter and area

300 ANS: 4
$180 - (50 + 30) = 100$

PTS: 2 REF: 081006ge STA: G.G.45 TOP: Similarity
KEY: basic

301 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

302 ANS: 4 PTS: 2 REF: 011009ge STA: G.G.19
TOP: Constructions

303 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

304 ANS: 4 PTS: 2 REF: 011019ge STA: G.G.44
TOP: Similarity Proofs

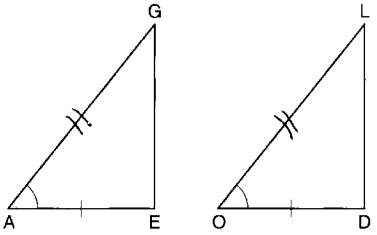
305 ANS: 2

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

306 ANS: 4 PTS: 2 REF: fall0802ge STA: G.G.24 TOP: Negations

307 ANS: 2



PTS: 2 REF: 081007ge STA: G.G.28 TOP: Triangle Congruency

308 ANS: 3

Because $\overline{OC}$ is a radius, its length is 5. Since $CE = 2$ $OE = 3$. ΔEDO is a 3-4-5 triangle. If $ED = 4$, $BD = 8$.

PTS: 2 REF: fall0811ge STA: G.G.49 TOP: Chords

309 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

310 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

311 ANS: 2

The slope of $2x + 3y = 12$ is $-\frac{A}{B} = -\frac{2}{3}$. The slope of a perpendicular line is $\frac{3}{2}$. Rewritten in slope intercept form, (2) becomes $y = \frac{3}{2}x + 3$.

PTS: 2 REF: 060926ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

312 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

313 ANS: 1 PTS: 2 REF: 081028ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

314 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

315 ANS:

18. $V = \frac{1}{3}Bh = \frac{1}{3}lwh$

$288 = \frac{1}{3} \cdot 8 \cdot 6 \cdot h$

$288 = 16h$

$18 = h$

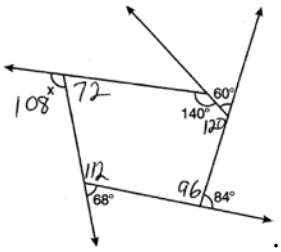
PTS: 2 REF: 061034ge STA: G.G.13 TOP: Volume

316 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

317 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

318 ANS: 4 PTS: 2 REF: 061018ge STA: G.G.56
TOP: Identifying Transformations

319 ANS: 3 PTS: 2 REF: 011010ge STA: G.G.71
TOP: Equations of Circles

320 ANS: 3 PTS: 2 REF: 060908ge STA: G.G.60
TOP: Identifying Transformations

321 ANS: 4 PTS: 2 REF: 060913ge STA: G.G.26
TOP: Conditional Statements

322 ANS: 2 PTS: 2 REF: 061002ge STA: G.G.24
TOP: Negations

323 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

324 ANS: 4 PTS: 2 REF: 080914ge STA: G.G.7
TOP: Planes

325 ANS: 3 PTS: 2 REF: 060928ge STA: G.G.8
TOP: Planes

326 ANS: 2 PTS: 2 REF: 080921ge STA: G.G.72
TOP: Equations of Circles

327 ANS:

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

$2y = -3x + 6$

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

$m = -\frac{3}{2}$

$m_{\perp} = \frac{2}{3}$

. $y = mx + b$

$5 = \frac{2}{3}(6) + b$

$5 = 4 + b$

$1 = b$

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

PTS: 4 REF: 061036ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

328 ANS: 4 PTS: 2 REF: 080925ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

329 ANS: 3 PTS: 2 REF: 080924ge STA: G.G.24
TOP: Negations

330 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

331 ANS: 1

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

$3.6 = x$

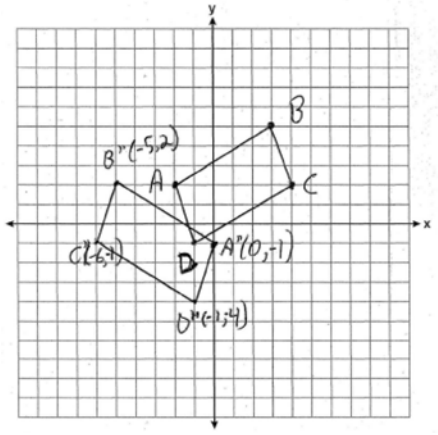
PTS: 2 REF: 060915ge STA: G.G.47 TOP: Similarity
KEY: leg

332 ANS: 1

Parallel lines intercept congruent arcs.

PTS: 2 REF: 061001ge STA: G.G.52 TOP: Chords

333 ANS:



PTS: 4 REF: 060937ge STA: G.G.54 TOP: Compositions of Transformations
KEY: grids

334 ANS: 4 PTS: 2 REF: 081005ge STA: G.G.18
TOP: Constructions

335 ANS:

$y = \frac{2}{3}x - 9$. The slope of $2x - 3y = 11$ is $-\frac{A}{B} = \frac{-2}{-3} = \frac{2}{3}$. $-5 = \left(\frac{2}{3}\right)(6) + b$

$-5 = 4 + b$

$b = -9$

PTS: 2 REF: 080931ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

336 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

337 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

338 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

339 ANS:

22.4. $V = \pi r^2 h$

$12566.4 = \pi r^2 \cdot 8$

$r^2 = \frac{12566.4}{8\pi}$

$r \approx 22.4$

PTS: 2 REF: fall0833ge STA: G.G.14 TOP: Volume and Lateral Area

340 ANS: 2

The length of the midsegment of a trapezoid is the average of the lengths of its bases. $\frac{x+30}{2} = 44.$

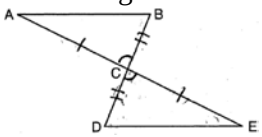
$x + 30 = 88$

$x = 58$

PTS: 2 REF: 011001ge STA: G.G.40 TOP: Trapezoids

341 ANS:

$\overline{AC} \cong \overline{EC}$ and $\overline{DC} \cong \overline{BC}$ because of the definition of midpoint. $\angle ACB \cong \angle ECD$ because of vertical angles. $\Delta ABC \cong \Delta EDC$ because of SAS. $\angle CDE \cong \angle CBA$ because of CPCTC. $\overline{BD}$ is a transversal intersecting $\overline{AB}$ and $\overline{ED}$. Therefore $\overline{AB} \parallel \overline{DE}$ because $\angle CDE$ and $\angle CBA$ are congruent alternate interior angles.



PTS: 6 REF: 060938ge STA: G.G.27 TOP: Triangle Proofs

342 ANS: 3 PTS: 2 REF: fall0814ge STA: G.G.73
TOP: Equations of Circles

343 ANS: 1

Translations and reflections do not affect distance.

PTS: 2 REF: 080908ge STA: G.G.61
TOP: Analytical Representations of Transformations

344 ANS: 2

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

$y = -\frac{1}{2}x + 4$ $6y = -3x + 12$

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

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

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

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

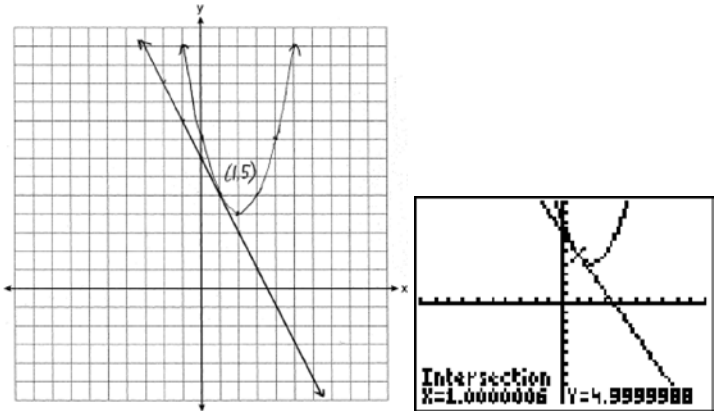
346 ANS: 1
ΔPRT and ΔSRQ share $\angle R$ and it is given that $\angle RPT \cong \angle RSQ$.

PTS: 2 REF: fall0821ge STA: G.G.44 TOP: Similarity Proofs
347 ANS: 2 PTS: 2 REF: 011011ge STA: G.G.22
TOP: Locus
348 ANS: 2
$6 + 17 > 22$

PTS: 2 REF: 080916ge STA: G.G.33 TOP: Triangle Inequality Theorem
349 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
350 ANS:



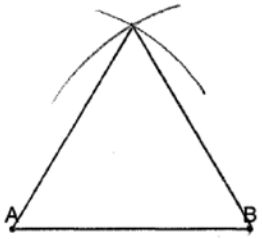
PTS: 6 REF: 011038ge STA: G.G.70 TOP: Quadratic-Linear Systems
351 ANS: 1 PTS: 2 REF: 081012ge STA: G.G.50
TOP: Tangents KEY: two tangents
352 ANS: 2
$\frac{3}{7} = \frac{6}{x}$

$3x = 42$

$x = 14$

PTS: 2 REF: 081027ge STA: G.G.46 TOP: Side Splitter Theorem

353 ANS:



PTS: 2 REF: 011032ge STA: G.G.20 TOP: Constructions

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

355 ANS: 3
The lateral edges of a prism are parallel.

PTS: 2 REF: fall0808ge STA: G.G.10 TOP: Solids

356 ANS: 2

$$\frac{87+35}{2} = \frac{122}{2} = 61$$

PTS: 2 REF: 011015ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inside circle

357 ANS: 3 PTS: 2 REF: fall0825ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

358 ANS: 2 PTS: 2 REF: 060910ge STA: G.G.71
TOP: Equations of Circles

359 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

360 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

361 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

362 ANS:

26. $x + 3x + 5x - 54 = 180$

$9x = 234$

$x = 26$

PTS: 2 REF: 080933ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

363 ANS: 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

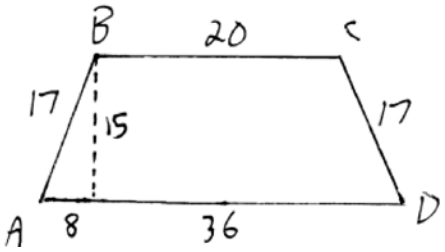
364 ANS: 2 PTS: 2 REF: fall0806ge STA: G.G.9
TOP: Planes

365 ANS:

37. Since $\overline{DE}$ is a midsegment, $AC = 14$. $10 + 13 + 14 = 37$

PTS: 2 REF: 061030ge STA: G.G.42 TOP: Midsegments

366 ANS: 3



$\frac{36-20}{2} = 8$. $\sqrt{17^2 - 8^2} = 15$

PTS: 2 REF: 061016ge STA: G.G.40 TOP: Trapezoids

367 ANS:

34. $2x - 12 + x + 90 = 180$

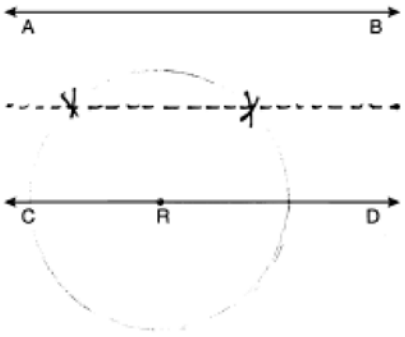
$3x + 78 = 90$

$3x = 102$

$x = 34$

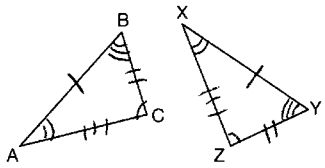
PTS: 2 REF: 061031ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

368 ANS:



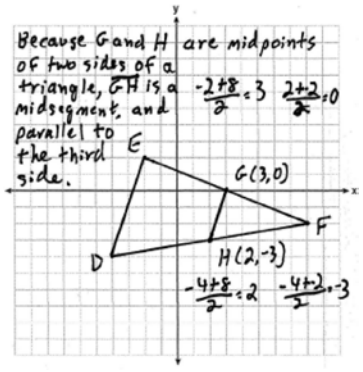
PTS: 2 REF: 061033ge STA: G.G.22 TOP: Locus

369 ANS: 4



PTS: 2 REF: 081001ge STA: G.G.29 TOP: Triangle Congruency

370 ANS:



PTS: 4 REF: fall0835ge STA: G.G.42 TOP: Midsegments

371 ANS: 4

Let $\overline{AD} = x$. $36x = 12^2$

$x = 4$

PTS: 2 REF: 080922ge STA: G.G.47 TOP: Similarity
KEY: leg

372 ANS:

67. $\frac{180 - 46}{2} = 67$

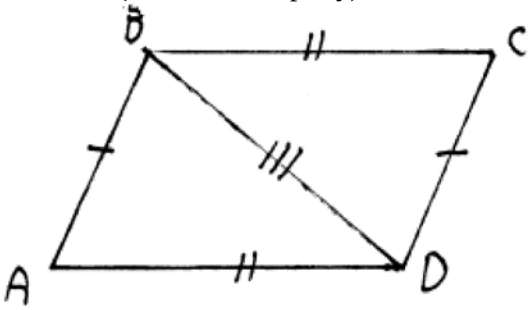
PTS: 2 REF: 011029ge STA: G.G.31 TOP: Isosceles Triangle Theorem

373 ANS: 3 PTS: 2 REF: 061017ge STA: G.G.1
TOP: Planes

374 ANS: 3 PTS: 2 REF: 060925ge STA: G.G.17
TOP: Constructions

375 ANS:

$\overline{BD} \cong \overline{DB}$ (Reflexive Property); $\Delta ABD \cong \Delta CDB$ (SSS); $\angle BDC \cong \angle ABD$ (CPCTC).



PTS: 4 REF: 061035ge STA: G.G.27 TOP: Quadrilateral Proofs

376 ANS: 4

sum of interior $\angle$s = sum of exterior $\angle$s

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

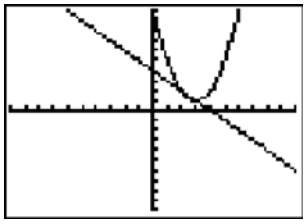
$$180n - 360 = 180n - 180n + 360$$

$$180n = 720$$

$$n = 4$$

PTS: 2 REF: 081016ge STA: G.G.36 TOP: Interior and Exterior Angles of Polygons

377 ANS: 4



$y + x = 4$. $x^2 - 6x + 10 = -x + 4$. $y + x = 4$. $y + 2 = 4$

$y = -x + 4$ $x^2 - 5x + 6 = 0$ $y + 3 = 4$ $y = 2$

$(x-3)(x-2) = 0$ $y = 1$

$x = 3$ or 2

PTS: 2 REF: 080912ge STA: G.G.70 TOP: Quadratic-Linear Systems

378 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.

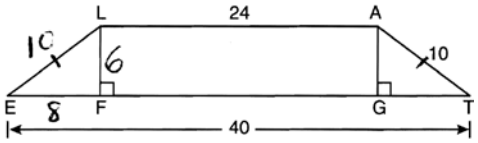
PTS: 6 REF: fall0838ge STA: G.G.27 TOP: Circle Proofs

Geometry Regents at Random

Answer Section

379 ANS: 1

$\frac{40-24}{2} = 8.$ $\sqrt{10^2 - 8^2} = 6.$



PTS: 2 REF: 061204ge STA: G.G.40 TOP: Trapezoids

380 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. $\Delta ABE \cong \Delta DCE$ because of ASA. $\overline{AB} \cong \overline{DC}$ because CPCTC.

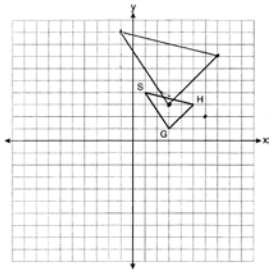
PTS: 4 REF: 061235ge STA: G.G.27 TOP: Triangle Proofs

381 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

382 ANS:



$G''(3,3), H''(7,7), S''(-1,9)$

PTS: 4 REF: 081136ge STA: G.G.58 TOP: Compositions of Transformations

383 ANS:

2 $\dfrac{x+2}{x} = \dfrac{x+6}{4}$

$x^2 + 6x = 4x + 8$

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

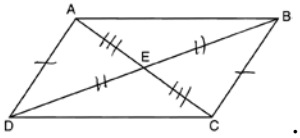
$(x+4)(x-2) = 0$

$x = 2$

PTS: 4 REF: 081137ge STA: G.G.45 TOP: Similarity
KEY: basic

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

385 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

386 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

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

388 ANS: 4

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

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

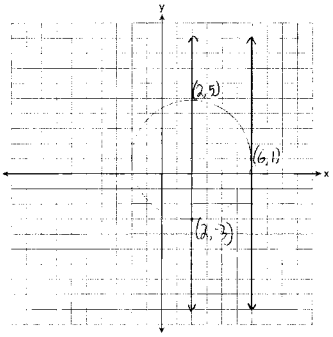
$6 = 3 + b$

$3 = b$

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

389 ANS: 4 PTS: 2 REF: 061203ge STA: G.G.9
TOP: Planes

390 ANS:



PTS: 4 REF: 011135ge STA: G.G.23 TOP: Locus

391 ANS: 3

$y = mx + b$

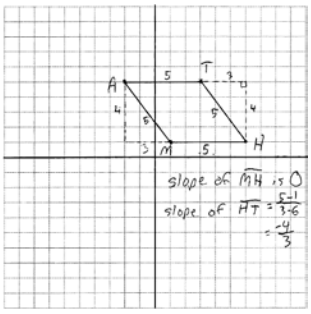
$-1 = 2(2) + b$

$-5 = b$

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

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

393 ANS:



The length of each side of quadrilateral is 5. Since each side is congruent, quadrilateral *MATH* is a rhombus. The slope of $\overline{MH}$ is 0 and the slope of $\overline{HT}$ is $-\frac{4}{3}$. Since the slopes are not negative reciprocals, the sides are not perpendicular and do not form rights angles. Since adjacent sides are not perpendicular, quadrilateral *MATH* is not a square.

PTS: 6 REF: 011138ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

394 ANS:

$L = 2\pi rh = 2\pi \cdot 12 \cdot 22 \approx 1659$. $\frac{1659}{600} \approx 2.8$. 3 cans are needed.

PTS: 2 REF: 061233ge STA: G.G.14 TOP: Volume and Lateral Area

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

396 ANS: 4

$y = mx + b$

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

$3 = -3 + b$

$6 = b$

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

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

398 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

399 ANS: 2

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

$2 = -2(2) + b$

$6 = b$

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

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

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

402 ANS: 3

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

$3x + 15 = 5x + 5$

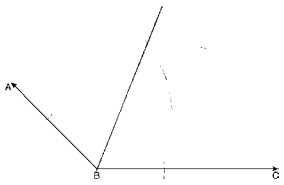
$10 = 2x$

$5 = x$

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

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

404 ANS:



PTS: 2 REF: 011133ge STA: G.G.17 TOP: Constructions

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

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

407 ANS:

$EO = 6$. $CE = \sqrt{10^2 - 6^2} = 8$

PTS: 2 REF: 011234ge STA: G.G.49 TOP: Chords

408 ANS: 2 PTS: 2 REF: 011109ge STA: G.G.9
TOP: Planes

409 ANS: 1 PTS: 2 REF: 011221ge STA: G.G.10
TOP: Solids

410 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

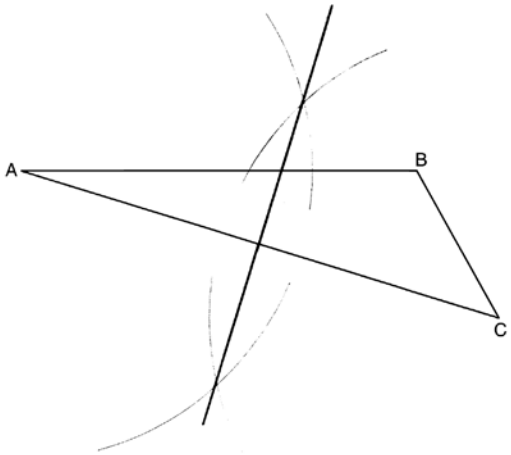
411 ANS: 2 PTS: 2 REF: 011211ge STA: G.G.55
TOP: Properties of Transformations

412 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

413 ANS:



PTS: 2 REF: 081130ge STA: G.G.18 TOP: Constructions

414 ANS:

$180 - (90 + 63) = 27$

PTS: 2 REF: 061230ge STA: G.G.35 TOP: Parallel Lines and Transversals

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

416 ANS: 3

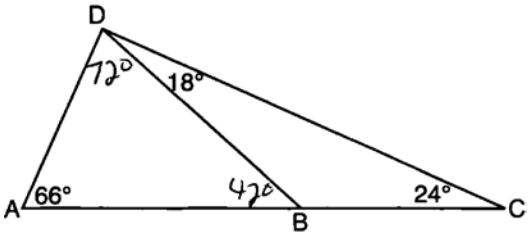
$4x + 14 + 8x + 10 = 180$

$12x = 156$

$x = 13$

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

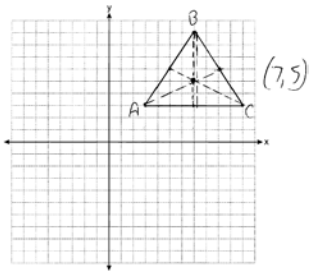
417 ANS: 1



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

418 ANS: 3 PTS: 2 REF: 011105ge STA: G.G.10
TOP: Solids

419 ANS:



(7, 5) $m_{\overline{AB}} = \left(\frac{3+7}{2}, \frac{3+9}{2} \right) = (5, 6)$ $m_{\overline{BC}} = \left(\frac{7+11}{2}, \frac{9+3}{2} \right) = (9, 6)$

PTS: 2 REF: 081134ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

420 ANS: 1

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

$7x + 4 = 4x + 10$

$3x = 6$

$x = 2$

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

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

422 ANS: 3

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

$5x = 70$

$x = 14$

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

423 ANS: 3 PTS: 2 REF: 081209ge STA: G.G.71
TOP: Equations of Circles

424 ANS: 1 PTS: 2 REF: 011102ge STA: G.G.55
TOP: Properties of Transformations

425 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

426 ANS:

$\angle ACB \cong \angle AED$ is given. $\angle A \cong \angle A$ because of the reflexive property. Therefore $\Delta ABC \sim \Delta ADE$ because of AA.

PTS: 2 REF: 081133ge STA: G.G.44 TOP: Similarity Proofs

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

428 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

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

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

431 ANS:

Yes. A reflection is an isometry.

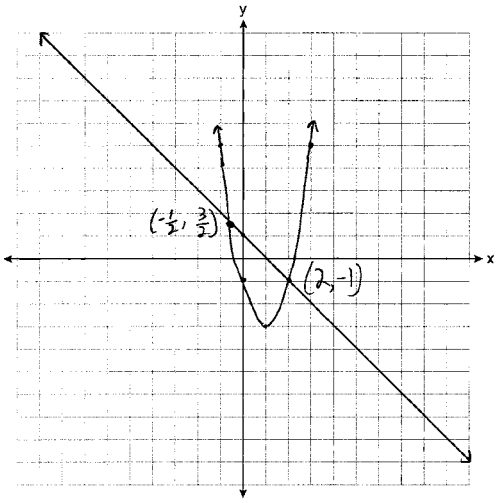
PTS: 2 REF: 061132ge STA: G.G.55 TOP: Properties of Transformations

432 ANS: 4

$\sqrt{25^2 - 7^2} = 24$

PTS: 2 REF: 081105ge STA: G.G.50 TOP: Tangents
KEY: point of tangency

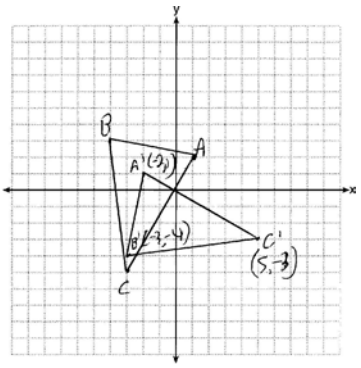
433 ANS:



PTS: 4 REF: 061137ge STA: G.G.70 TOP: Quadratic-Linear Systems

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

435 ANS:



$A'(-2, 1)$, $B'(-3, -4)$, and $C'(5, -3)$

PTS: 2 REF: 081230ge STA: G.G.54 TOP: Rotations

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

437 ANS:
The medians of a triangle are not concurrent. False.

PTS: 2 REF: 061129ge STA: G.G.24 TOP: Negations

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

439 ANS:

30. $3x + 4x + 5x = 360$. $\text{m}\overset{\frown}{LN} : \text{m}\overset{\frown}{NK} : \text{m}\overset{\frown}{KL} = 90 : 120 : 150$. $\frac{150 - 90}{2} = 30$

$x = 20$

PTS: 4 REF: 061136ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: outside circle

440 ANS: 3
$(n - 2)180 = (5 - 2)180 = 540$

PTS: 2 REF: 011223ge STA: G.G.36 TOP: Interior and Exterior Angles of Polygons

441 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

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

443 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

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

445 ANS: 4

$x^2 - 6x + 2x - 3 = 9x + 27$

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

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

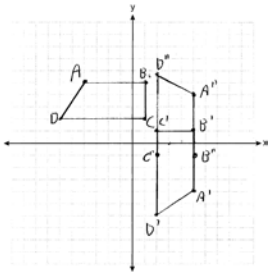
$(x - 15)(x + 2) = 0$

$x = 15, -2$

PTS: 2 REF: 061225ge STA: G.G.32 TOP: Exterior Angle Theorem

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

447 ANS:

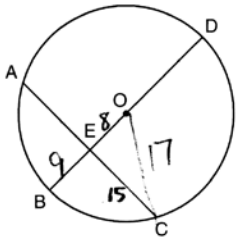


$A'(5,-4)$, $B'(5,1)$, $C'(2,1)$, $D'(2,-6)$; $A''(5,4)$, $B''(5,-1)$, $C''(2,-1)$, $D''(2,6)$

PTS: 4 REF: 061236ge STA: G.G.58 TOP: Compositions of Transformations
KEY: grids

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

449 ANS: 2



$\sqrt{17^2 - 15^2} = 8$. $17 - 8 = 9$

PTS: 2 REF: 061221ge STA: G.G.49 TOP: Chords

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

451 ANS:

$V = \pi r^2 h$. $L = 2\pi rh = 2\pi \cdot 5\sqrt{2} \cdot 12 \approx 533.1$

$600\pi = \pi r^2 \cdot 12$

$50 = r^2$

$\sqrt{25}\sqrt{2} = r$

$5\sqrt{2} = r$

PTS: 4 REF: 011236ge STA: G.G.14 TOP: Volume and Lateral Area

452 ANS: 3

$(3, -2) \rightarrow (2, 3) \rightarrow (8, 12)$

PTS: 2 REF: 011126ge STA: G.G.54 TOP: Compositions of Transformations

KEY: basic

453 ANS: 4

Parallel lines intercept congruent arcs.

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

454 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

455 ANS:

$(2a-3, 3b+2)$. $\left(\frac{3a+a-6}{2}, \frac{2b-1+4b+5}{2}\right) = \left(\frac{4a-6}{2}, \frac{6b+4}{2}\right) = (2a-3, 3b+2)$

PTS: 2 REF: 061134ge STA: G.G.66 TOP: Midpoint

456 ANS: 4

$\sqrt{25^2 - \left(\frac{26-12}{2}\right)^2} = 24$

PTS: 2 REF: 011219ge STA: G.G.40 TOP: Trapezoids

457 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

458 ANS:

$(x-5)^2 + (y+4)^2 = 36$

PTS: 2 REF: 081132ge STA: G.G.72 TOP: Equations of Circles

459 ANS:
$\angle B$ and $\angle E$ are right angles because of the definition of perpendicular lines. $\angle B \cong \angle E$ because all right angles are congruent. $\angle BFD$ and $\angle DFE$ are supplementary and $\angle ECA$ and $\angle ACB$ are supplementary because of the definition of supplementary angles. $\angle DFE \cong \angle ACB$ because angles supplementary to congruent angles are congruent. $\Delta ABC \sim \Delta DEF$ because of AA.

PTS: 4 REF: 011136ge STA: G.G.44 TOP: Similarity Proofs

460 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

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

462 ANS: 1

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

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

$x = 6$ $y = 7$

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

463 ANS:
$m_{\overline{AB}} = \left(\frac{-6 + 2}{2}, \frac{-2 + 8}{2} \right) = D(2, 3)$ $m_{\overline{BC}} = \left(\frac{2 + 6}{2}, \frac{8 + -2}{2} \right) = E(4, 3)$ $F(0, -2)$. To prove that $ADEF$ is a parallelogram, show that both pairs of opposite sides of the parallelogram are parallel by showing the opposite sides have the same slope: $m_{\overline{AD}} = \frac{3 - -2}{-2 - -6} = \frac{5}{4}$ $\overline{AF} \| \overline{DE}$ because all horizontal lines have the same slope. $ADEF$

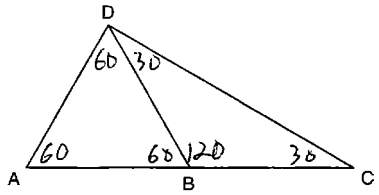
$$m_{FE} = \frac{3 - -2}{4 - 0} = \frac{5}{4}$$

is not a rhombus because not all sides are congruent. $AD = \sqrt{5^2 + 4^2} = \sqrt{41}$ $AF = 6$

PTS: 6 REF: 081138ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

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

465 ANS:



30.

PTS: 2 REF: 011129ge STA: G.G.31 TOP: Isosceles Triangle Theorem

466 ANS: 4

$x \cdot 4x = 6^2$. $PQ = 4x + x = 5x = 5(3) = 15$

$4x^2 = 36$

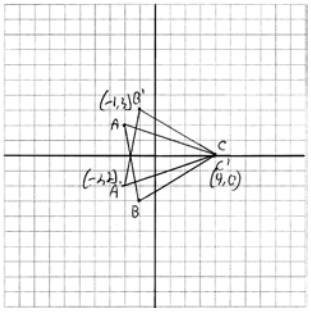
$x = 3$

PTS: 2 REF: 011227ge STA: G.G.47 TOP: Similarity
KEY: leg

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

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

469 ANS:



PTS: 2 REF: 011130ge STA: G.G.54 TOP: Reflections
KEY: grids

470 ANS: 1

$AB = CD$

$AB + BC = CD + BC$

$AC = BD$

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

471 ANS: 1 PTS: 2 REF: 011218ge STA: G.G.3
TOP: Planes

472 ANS:

$2x - 20 = x + 20$. $m\overset{\frown}{AB} = x + 20 = 40 + 20 = 60$

$x = 40$

PTS: 2 REF: 011229ge STA: G.G.52 TOP: Chords

473 ANS: 2 PTS: 2 REF: 061115ge STA: G.G.69
TOP: Triangles in the Coordinate Plane

474 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

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

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

477 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

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

479 ANS:

9.1. $(11)(8)h = 800$

$h \approx 9.1$

PTS: 2 REF: 061131ge STA: G.G.12 TOP: Volume

480 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

481 ANS:

32. $\frac{16}{20} = \frac{x - 3}{x + 5}$. $\overline{AC} = x - 3 = 35 - 3 = 32$

$16x + 80 = 20x - 60$

$140 = 4x$

$35 = x$

PTS: 4 REF: 011137ge STA: G.G.46 TOP: Side Splitter Theorem

482 ANS: 4
$m\angle A = 80$

PTS: 2 REF: 011115ge STA: G.G.34 TOP: Angle Side Relationship

483 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

484 ANS: 4

$x + 6y = 12$

$6y = -x + 12$

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

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

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

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

$m = -3$

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

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

486 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

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

488 ANS: 2

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

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

489 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

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

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

492 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. $\Delta AEF \cong \Delta CEG$ by ASA.

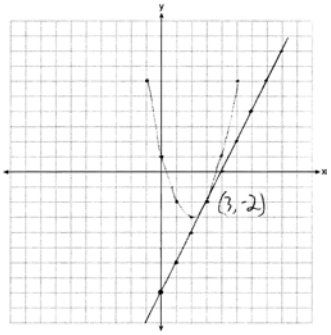
PTS: 6 REF: 011238ge STA: G.G.27 TOP: Quadrilateral Proofs

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

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

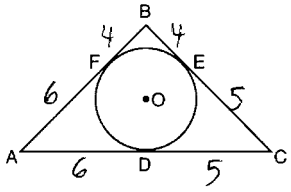
495 ANS: 4 PTS: 2 REF: 011118ge STA: G.G.25
TOP: Compound Statements KEY: general

496 ANS:



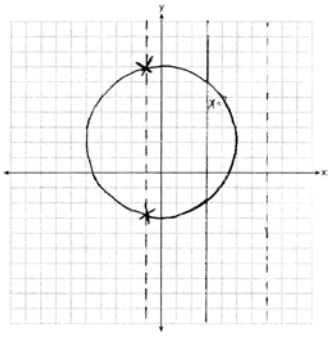
PTS: 6 REF: 061238ge STA: G.G.70 TOP: Quadratic-Linear Systems

497 ANS: 3



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

498 ANS:



PTS: 2 REF: 061234ge STA: G.G.23 TOP: Locus

499 ANS:

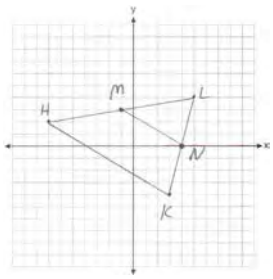
16.7. $\frac{x}{25} = \frac{12}{18}$

$18x = 300$

$x \approx 16.7$

PTS: 2 REF: 061133ge STA: G.G.46 TOP: Side Splitter Theorem

500 ANS:



$M\left(\frac{-7+5}{2}, \frac{2+4}{2}\right) = M(-1, 3)$. $N\left(\frac{3+5}{2}, \frac{-4+4}{2}\right) = N(4, 0)$. $\overline{MN}$ is a midsegment.

PTS: 4 REF: 011237ge STA: G.G.42 TOP: Midsegments

501 ANS:

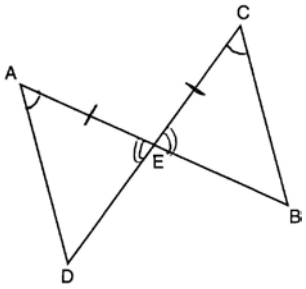
$\frac{180 - 80}{2} = 50$

PTS: 2 REF: 081129ge STA: G.G.52 TOP: Chords

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

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

504 ANS: 1



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

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

506 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

507 ANS: 1

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

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

508 ANS: 1 PTS: 2 REF: fall0807ge STA: G.G.19
TOP: Constructions

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

510 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

511 ANS: 2
$5 - 3 = 2, 5 + 3 = 8$

PTS: 2 REF: 011228ge STA: G.G.33 TOP: Triangle Inequality Theorem

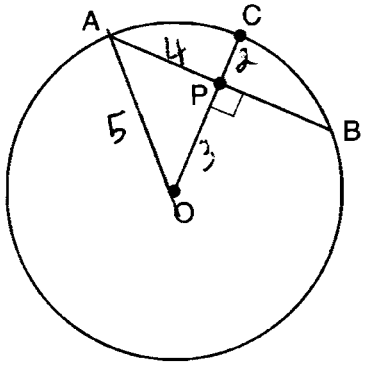
512 ANS: 3 PTS: 2 REF: 061228ge STA: G.G.39
TOP: Special Parallelograms

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

514 ANS: 1
Parallel lines intercept congruent arcs.

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

515 ANS: 3



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

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

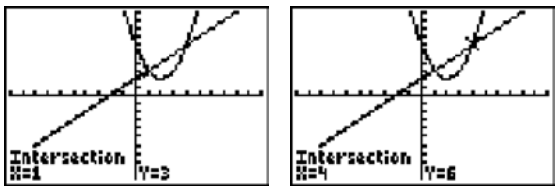
517 ANS: 1 PTS: 2 REF: 081116ge STA: G.G.7
TOP: Planes

518 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

519 ANS: 3



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

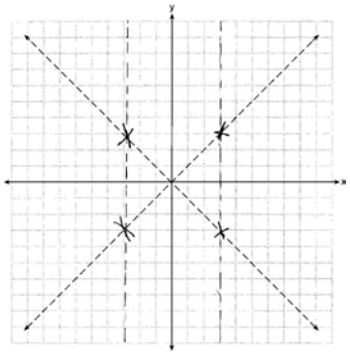
520 ANS: 3

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

$11 = b$

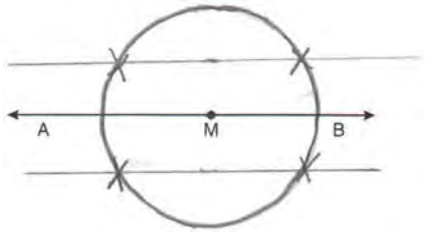
PTS: 2 REF: 081228ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

521 ANS:



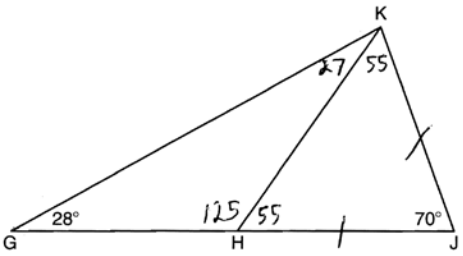
PTS: 2 REF: 081234ge STA: G.G.23 TOP: Locus

522 ANS:



PTS: 2 REF: 011230ge STA: G.G.22 TOP: Locus

523 ANS:



No, $\angle KGH$ is not congruent to $\angle GKH$.

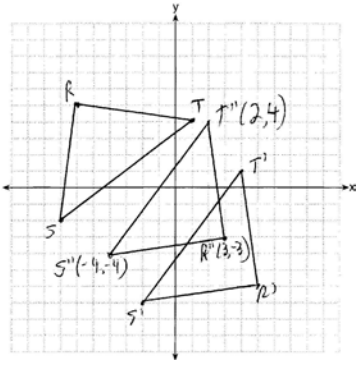
PTS: 2 REF: 081135ge STA: G.G.31 TOP: Isosceles Triangle Theorem

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

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

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

526 ANS:



PTS: 4 REF: 081236ge STA: G.G.58 TOP: Compositions of Transformations
KEY: grids

527 ANS:
$\overline{OA} \cong \overline{OB}$ because all radii are equal. $\overline{OP} \cong \overline{OP}$ because of the reflexive property. $\overline{OA} \perp \overline{PA}$ and $\overline{OB} \perp \overline{PB}$ because tangents to a circle are perpendicular to a radius at a point on a circle. $\angle PAO$ and $\angle PBO$ are right angles because of the definition of perpendicular. $\angle PAO \cong \angle PBO$ because all right angles are congruent. $\Delta AOP \cong \Delta BOP$ because of HL. $\angle AOP \cong \angle BOP$ because of CPCTC.

PTS: 6 REF: 061138ge STA: G.G.27 TOP: Circle Proofs

528 ANS: 2 PTS: 2 REF: 061201ge STA: G.G.59
TOP: Properties of Transformations

529 ANS: 3
$\frac{180 - 70}{2} = 55$

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

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

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

532 ANS: 2

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

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

533 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

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

535 ANS:

52, 40, 80. $360 - (56 + 112) = 192.\ \frac{192-112}{2} = 40.\ \frac{112+48}{2} = 80$

$\frac{1}{4} \times 192 = 48$

$\frac{56+48}{2} = 52$

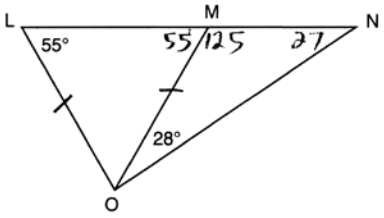
PTS: 6 REF: 081238ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: mixed

536 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

537 ANS: 1



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

538 ANS: 4 PTS: 2 REF: 061118ge STA: G.G.1
TOP: Planes

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

540 ANS: 4 PTS: 2 REF: 061114ge STA: G.G.73
TOP: Equations of Circles
541 ANS: 3 PTS: 2 REF: 081111ge STA: G.G.32
TOP: Exterior Angle Theorem
542 ANS:
$R'(-3,-2)$, $S'(-4,4)$, and $T'(2,2)$.

PTS: 2 REF: 011232ge STA: G.G.54 TOP: Rotations
543 ANS: 3 PTS: 2 REF: 061122ge STA: G.G.56
TOP: Identifying Transformations
544 ANS: 1

$m = \frac{3}{2}$ $y = mx + b$

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

$\frac{1}{2} = b$

PTS: 2 REF: 081217ge STA: G.G.65 TOP: Parallel and Perpendicular Lines
545 ANS:
2 is not a prime number, false.

PTS: 2 REF: 081229ge STA: G.G.24 TOP: Negations
546 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
547 ANS: 3 PTS: 2 REF: 061102ge STA: G.G.29
TOP: Triangle Congruency
548 ANS: 3

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

PTS: 2 REF: 081225ge STA: G.G.62 TOP: Parallel and Perpendicular Lines
549 ANS: 2 PTS: 2 REF: 081202ge STA: G.G.55
TOP: Properties of Transformations
550 ANS:

$V = \frac{4}{3}\pi \cdot 9^3 = 972\pi$

PTS: 2 REF: 081131ge STA: G.G.16 TOP: Volume and Surface Area
551 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

552 ANS: 2

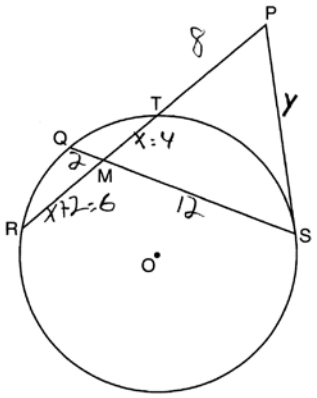
$\frac{4x+10}{2} = 2x+5$

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

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

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

555 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

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

557 ANS: 3 PTS: 2 REF: 081218ge STA: G.G.1
TOP: Planes

558 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

559 ANS: 4

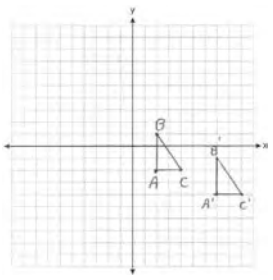
$-5 = \frac{-3+x}{2}$. $2 = \frac{6+y}{2}$

$-10 = -3 + x$ $4 = 6 + y$

$-7 = x$ $-2 = y$

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

560 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

561 ANS: 2

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

$5x = 40$

$x = 28$

PTS: 2 REF: 081222ge STA: G.G.31 TOP: Isosceles Triangle Theorem

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

563 ANS: 2

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

PTS: 2 REF: 061112ge STA: G.G.16 TOP: Volume and Surface Area

564 ANS: 1

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

$4 = 2(4) + b$

$-4 = b$

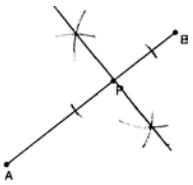
PTS: 2 REF: 081126ge STA: G.G.68 TOP: Perpendicular Bisector

565 ANS:

$(5-2)180 = 540$. $\frac{540}{5} = 108$ interior. $180 - 108 = 72$ exterior

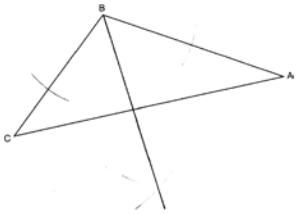
PTS: 2 REF: 011131ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

566 ANS:



PTS: 2 REF: 081233ge STA: G.G.19 TOP: Constructions

567 ANS:



PTS: 2 REF: 061232ge STA: G.G.17 TOP: Constructions

568 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

569 ANS: 4 PTS: 2 REF: 011216ge STA: G.G.29
TOP: Triangle Congruency

570 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

571 ANS: 2

$7x = 5x + 30$

$2x = 30$

$x = 15$

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

572 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

573 ANS: 3

$\sqrt{5^2 + 12^2} = 13$

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

574 ANS: 4

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

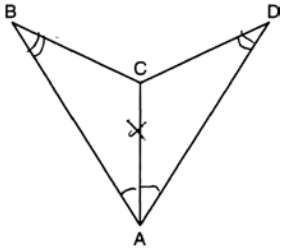
$-1 = \left(\frac{-3}{2} \right)(2) + b$

$-1 = -3 + b$

$2 = b$

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

575 ANS: 4



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

576 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

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

578 ANS: 2 PTS: 2 REF: 061208ge STA: G.G.19
TOP: Constructions

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

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

581 ANS: 3

$\frac{7x}{4} = \frac{7}{x}$. $7(2) = 14$

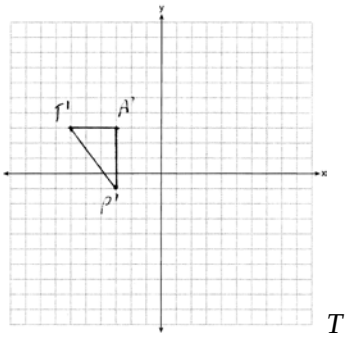
$7x^2 = 28$

$x = 2$

PTS: 2 REF: 061120ge STA: G.G.45 TOP: Similarity
KEY: basic

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

583 ANS:



$T'(-6, 3), A'(-3, 3), P'(-3, -1)$

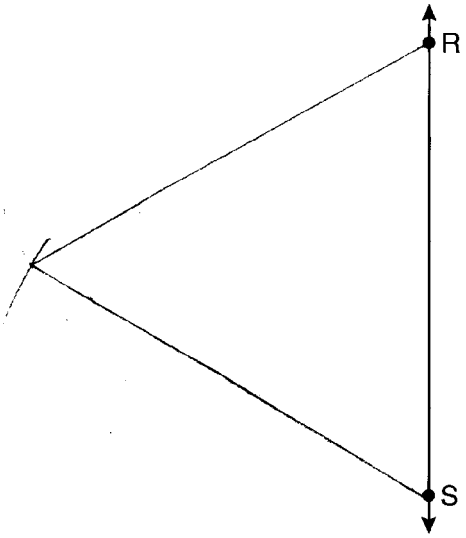
PTS: 2 REF: 061229ge STA: G.G.54 TOP: Translations

584 ANS: 3

$8^2 + 24^2 \neq 25^2$

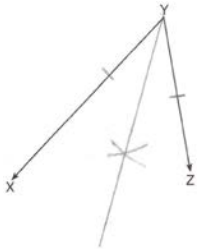
PTS: 2 REF: 011111ge STA: G.G.48 TOP: Pythagorean Theorem

585 ANS:



PTS: 2 REF: 061130ge STA: G.G.20 TOP: Constructions

586 ANS:



PTS: 2 REF: 011233ge STA: G.G.17 TOP: Constructions

587 ANS: 3 PTS: 2 REF: 061218ge STA: G.G.36
TOP: Interior and Exterior Angles of Polygons

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

589 ANS: 3

$7x = 5x + 30$

$2x = 30$

$x = 15$

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

590 ANS:

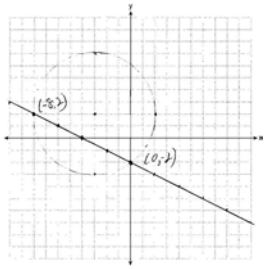
The slope of $y = 2x + 3$ is 2. The slope of $2y + x = 6$ is $\frac{-A}{B} = \frac{-1}{2}$. Since the slopes are opposite reciprocals, the lines are perpendicular.

PTS: 2 REF: 011231ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

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

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

593 ANS:



PTS: 4 REF: 081237ge STA: G.G.70 TOP: Quadratic-Linear Systems

594 ANS:

11. $x^2 + 6x = x + 14$. $6(2) - 1 = 11$

$x^2 + 5x - 14 = 0$

$(x + 7)(x - 2) = 0$

$x = 2$

PTS: 2 REF: 081235ge STA: G.G.38 TOP: Parallelograms

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

596 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

597 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

598 ANS: 2 PTS: 2 REF: 011125ge STA: G.G.74
TOP: Graphing Circles

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

600 ANS: 1 PTS: 2 REF: 081121ge STA: G.G.39
TOP: Special Parallelograms

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

602 ANS: 2

$AC = BD$

$AC - BC = BD - BC$

$AB = CD$

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

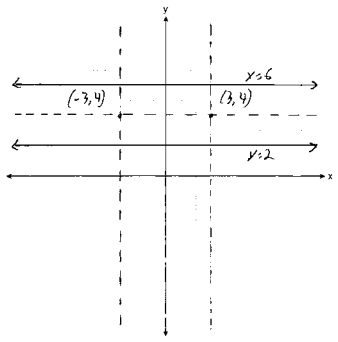
603 ANS: 3

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

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

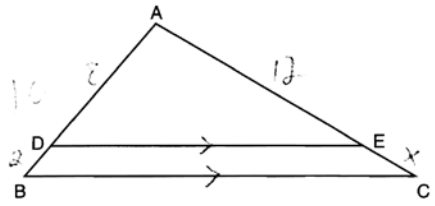
604 ANS: 4 PTS: 2 REF: 011108ge STA: G.G.27
TOP: Angle Proofs

605 ANS:



PTS: 4 REF: 061135ge STA: G.G.23 TOP: Locus

606 ANS: 3



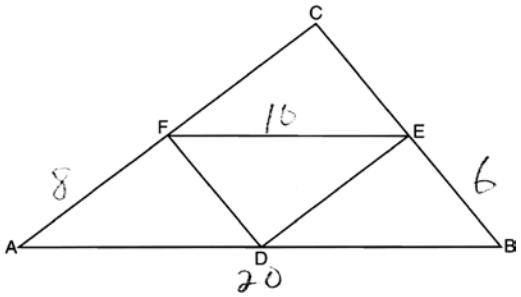
$\frac{8}{2} = \frac{12}{x}$.

$8x = 24$

$x = 3$

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

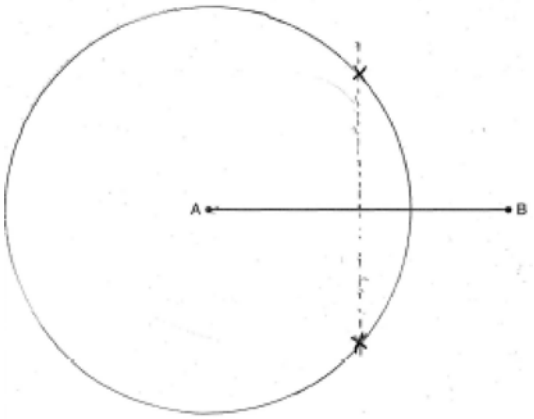
607 ANS: 4



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

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

608 ANS:



PTS: 2 REF: 060932ge STA: G.G.22 TOP: Locus