# JMAP
# REGENTS AT RANDOM

## The NY Geometry Regents Exams
## Fall 2008-August 2012

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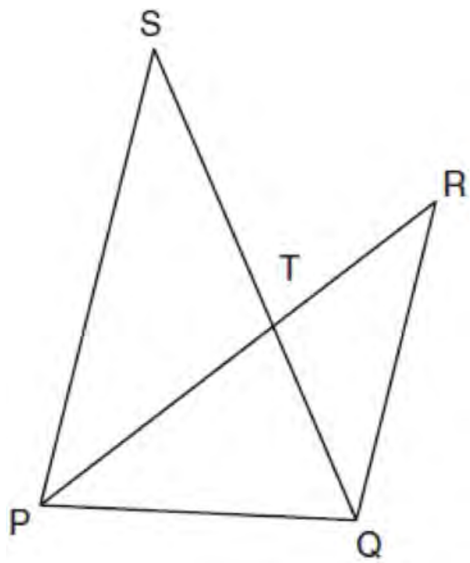
## Geometry Regents at Random

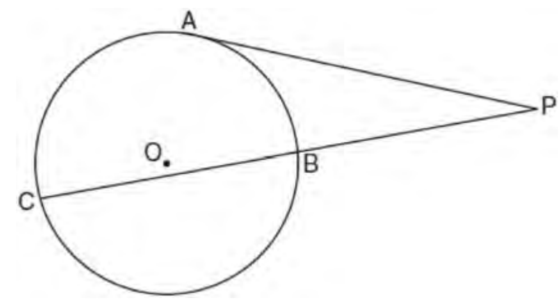
1 In the diagram below, $\overline{SQ}$ and $\overline{PR}$ intersect at $T$, $\overline{PQ}$ is drawn, and $\overline{PS} \parallel \overline{QR}$.




What technique can be used to prove that $\Delta PST \sim \Delta RQT$?
1) SAS
2) SSS
3) ASA
4) AA

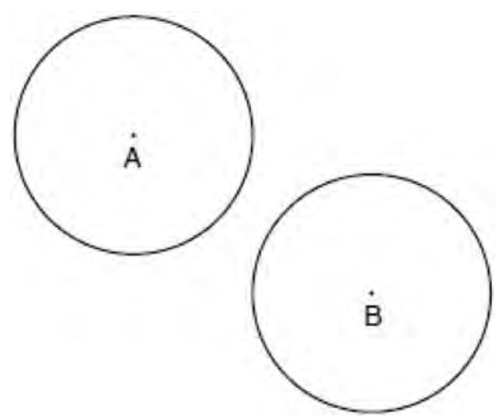
2 Lines $j$ and $k$ intersect at point $P$. Line $m$ is drawn so that it is perpendicular to lines $j$ and $k$ at point $P$. Which statement is correct?
1) Lines $j$ and $k$ are in perpendicular planes.
2) Line $m$ is in the same plane as lines $j$ and $k$.
3) Line $m$ is parallel to the plane containing lines $j$ and $k$.
4) Line $m$ is perpendicular to the plane containing lines $j$ and $k$.

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



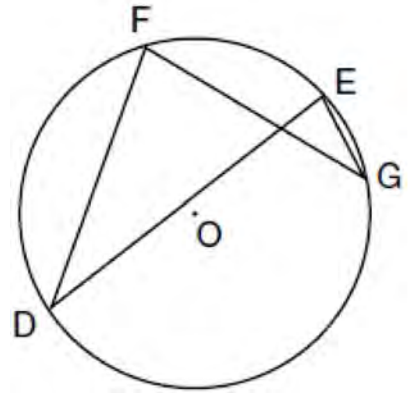

If $PB = 4$ and $BC = 5$, what is the length of $\overline{PA}$?
1) 20
2) 9
3) 8
4) 6

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

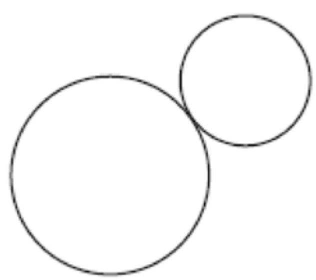



What is the total number of lines of tangency that are common to circle $A$ and circle $B$?
1) 1
2) 2
3) 3
4) 4

5 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.




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



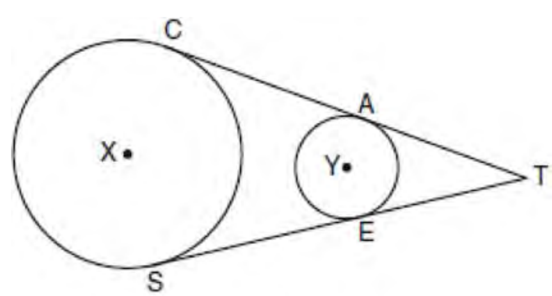
1) 1
2) 2
3) 3
4) 4

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

8 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

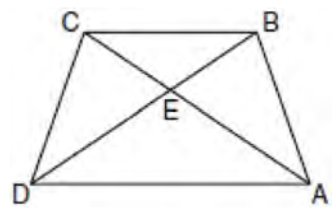
9 What is an equation of a circle with its center at $(-3,5)$ and a radius of 4?
1) $(x-3)^2 + (y+5)^2 = 16$
2) $(x+3)^2 + (y-5)^2 = 16$
3) $(x-3)^2 + (y+5)^2 = 4$
4) $(x+3)^2 + (y-5)^2 = 4$

10 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)

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

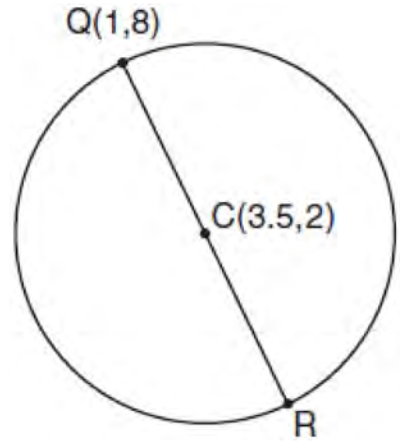



Which statement is true based on the given information?
1) $\overline{AC} \cong \overline{BC}$
2) $\overline{CD} \cong \overline{AD}$
3) $\angle CDE \cong \angle BAD$
4) $\angle CDB \cong \angle BAC$

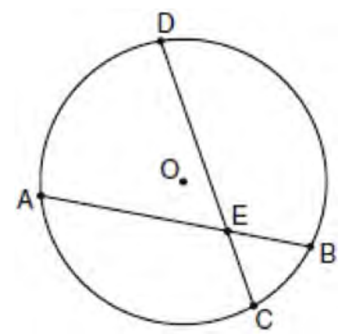
12 Which equation represents a line perpendicular to the line whose equation is $2x + 3y = 12$?
1) $6y = -4x + 12$
2) $2y = 3x + 6$
3) $2y = -3x + 6$
4) $3y = -2x + 12$

13 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) $(1,-1)$

14 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 $R$.




15 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

16 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

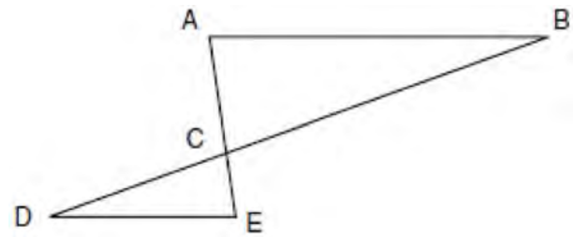
17 Given: Two is an even integer or three is an even integer.
Determine the truth value of this disjunction.
Justify your answer.

18 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) $(7,-4)$

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

20 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 $cm^3$.

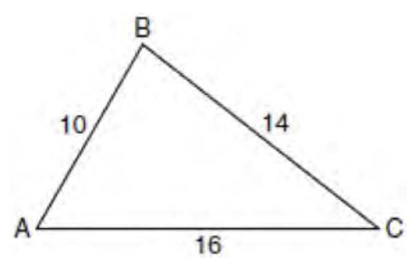
21 In the diagram of $\triangle ABC$ and $\triangle EDC$ below, $\overline{AE}$ and $\overline{BD}$ intersect at $C$, and $\angle CAB \cong \angle CED$.




Which method can be used to show that $\triangle ABC$ must be similar to $\triangle EDC$?
1) SAS
2) AA
3) SSS
4) HL

22 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.

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



24 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.

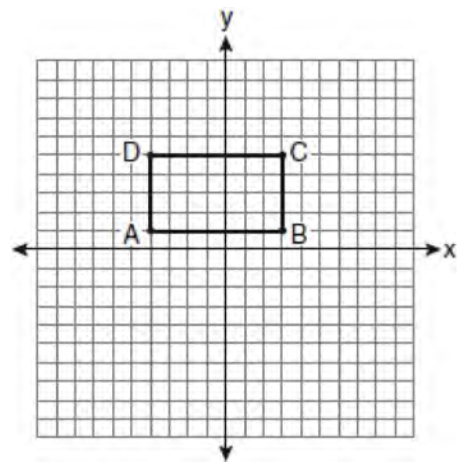
25 In a coordinate plane, how many points are both 5 units from the origin and 2 units from the $x$-axis?
1) 1
2) 2
3) 3
4) 4

26 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

27 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

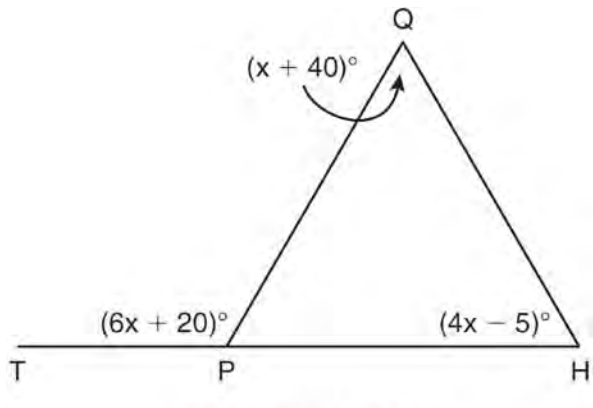
28 The endpoints of $\overline{AB}$ are $A(3,2)$ and $B(7,1)$. If $\overline{A''B''}$ is the result of the transformation of $\overline{AB}$ under $D_2 \circ T_{-4,3}$ what are the coordinates of $A''$ and $B''$?
1) $A''(-2,10)$ and $B''(6,8)$
2) $A''(-1,5)$ and $B''(3,4)$
3) $A''(2,7)$ and $B''(10,5)$
4) $A''(14,-2)$ and $B''(22,-4)$

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



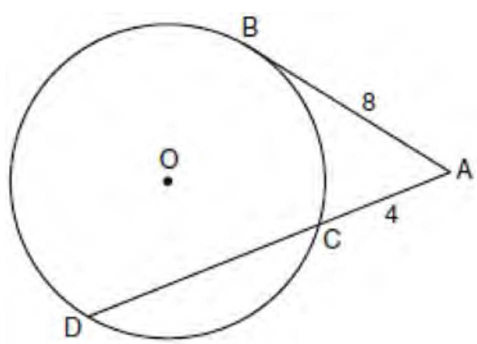

What will be the area of the rectangle after these transformations?
1) exactly 28 square units
2) less than 28 square units
3) greater than 28 square units
4) It cannot be determined from the information given.

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




(Not drawn to scale)

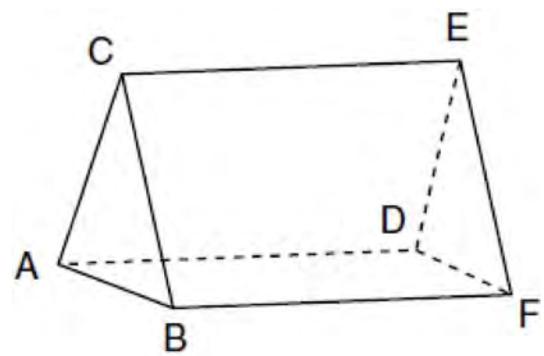
31 In the diagram below, tangent $\overline{AB}$ and secant $\overline{ACD}$ are drawn to circle $O$ from an external point $A$, $AB = 8$, and $AC = 4$.




What is the length of $\overline{CD}$?
1) 16
2) 13
3) 12
4) 10

32 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.

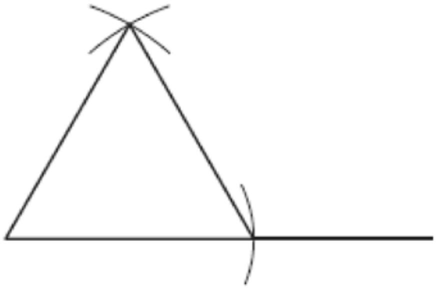
33 The figure in the diagram below is a triangular prism.



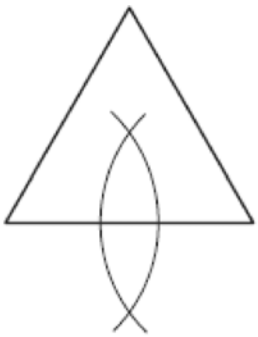

Which statement must be true?
1) $\overline{DE} \cong \overline{AB}$
2) $\overline{AD} \cong \overline{BC}$
3) $\overline{AD} \parallel \overline{CE}$
4) $\overline{DE} \parallel \overline{BC}$

34 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

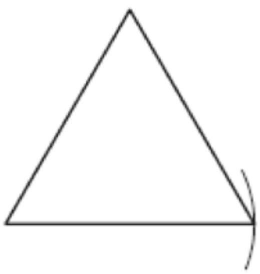
35 Which diagram shows the construction of an equilateral triangle?



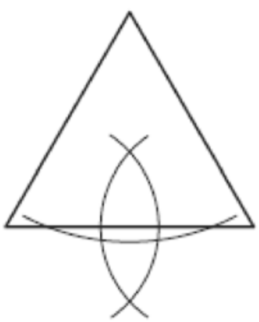
1)



2)



3)

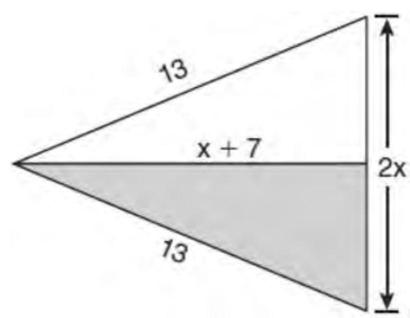


4)

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

37 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

38 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

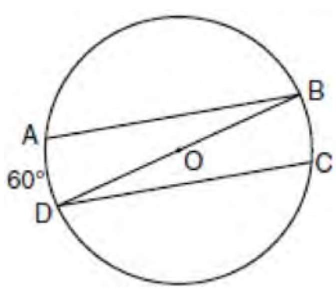
39 What is an equation of the line that passes through the point $(-2, 5)$ and is perpendicular to the line whose equation is $y = \frac{1}{2}x + 5$?

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

40 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.

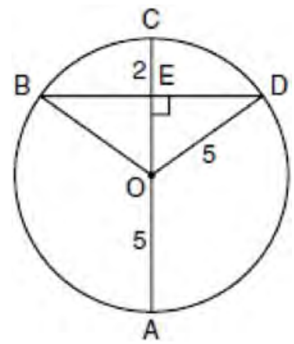
41 In the diagram of circle $O$ below, chords $\overline{AB}$ and $\overline{CD}$ are parallel, and $\overline{BD}$ is a diameter of the circle.




If m$\overset{\frown}{AD} = 60$, what is m$\angle CDB$?

1) 20
2) 30
3) 60
4) 120

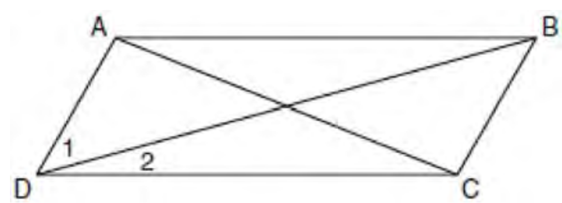
42 In the diagram below, circle $O$ has a radius of 5, and $CE = 2$. Diameter $\overline{AC}$ is perpendicular to chord $\overline{BD}$ at $E$.




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

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

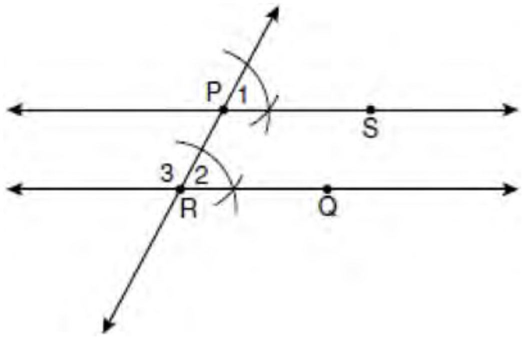
43 In the diagram below of parallelogram $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$, m$\angle 1 = 45$ and m$\angle DCB = 120$.




What is the measure of $\angle 2$?

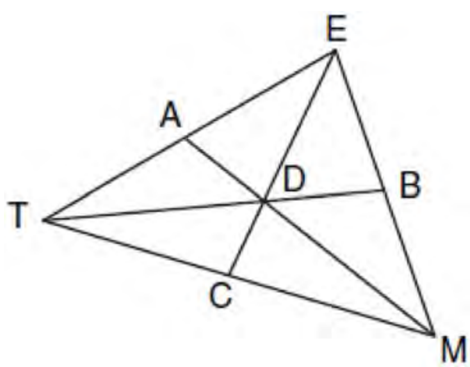
1) 15º
2) 30º
3) 45º
4) 60º

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

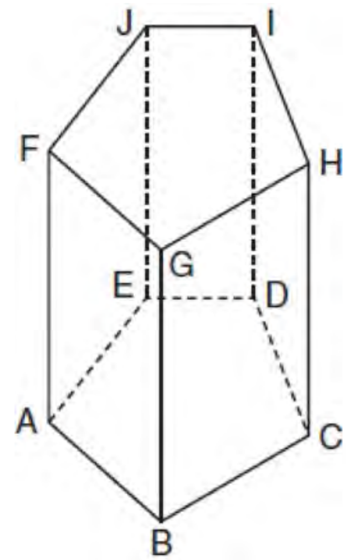



Which statement justifies this construction?
1) $m\angle 1 = m\angle 2$
2) $m\angle 1 = m\angle 3$
3) $\overline{PR} \cong \overline{RQ}$
4) $\overline{PS} \cong \overline{RQ}$

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




46 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) $\overline{GB} \parallel \overline{HC}$

47 Which transformation produces a figure similar but not congruent to the original figure?
1) $T_{1,3}$
2) $D_{\frac{1}{2}}$
3) $R_{90^\circ}$
4) $r_{y=x}$

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

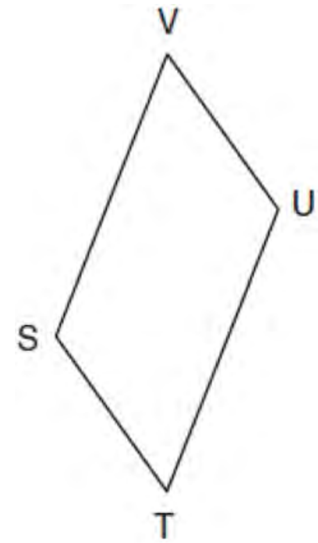
49 In $\triangle ABC$, point $D$ is on $\overline{AB}$, and point $E$ is on $\overline{BC}$ such that $\overline{DE} \parallel \overline{AC}$. If $DB = 2$, $DA = 7$, and $DE = 3$, what is the length of $\overline{AC}$?
1) 8
2) 9
3) 10.5
4) 13.5

50 In $\triangle ABC$, $m\angle A = 95$, $m\angle B = 50$, and $m\angle C = 35$. Which expression correctly relates the lengths of the sides of this triangle?
1) $AB < BC < CA$
2) $AB < AC < BC$
3) $AC < BC < AB$
4) $BC < AC < AB$

51 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.

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

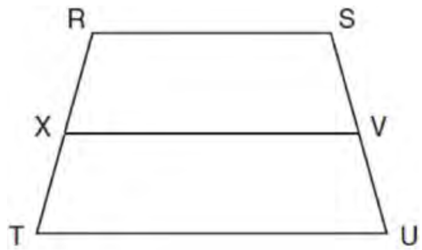
53 In the diagram below of parallelogram $STUV$, $SV = x + 3$, $VU = 2x - 1$, and $TU = 4x - 3$.




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

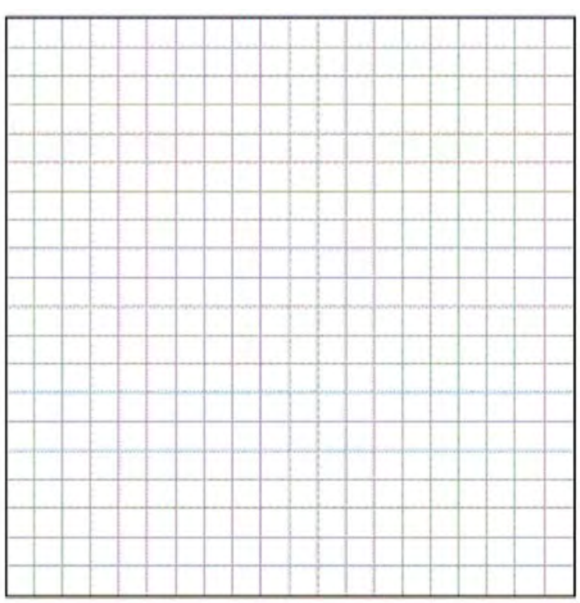
54 Through a given point, $P$, on a plane, how many lines can be drawn that are perpendicular to that plane?
1) 1
2) 2
3) more than 2
4) none

55 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 $\overline{SU}$.

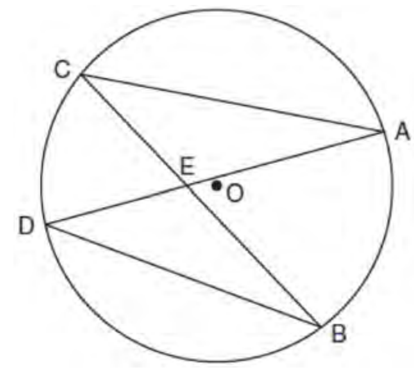



If $RS = 30$ and $XV = 44$, what is the length of $\overline{TU}$?
1) 37
2) 58
3) 74
4) 118

56 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.]



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



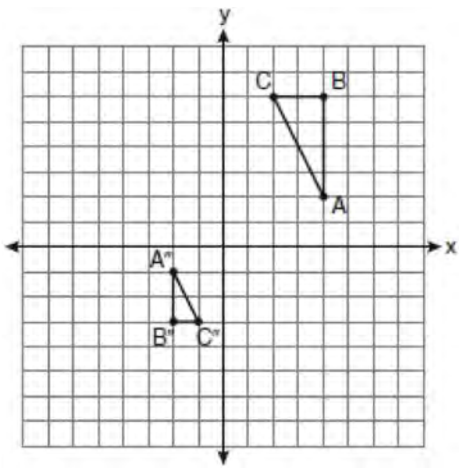

Which relationship must be true?
1) $\triangle CAE \cong \triangle DBE$
2) $\triangle AEC \sim \triangle BED$
3) $\angle ACB \cong \angle CBD$
4) $\overset{\frown}{CA} \cong \overset{\frown}{DB}$

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

59 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

60 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*.

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

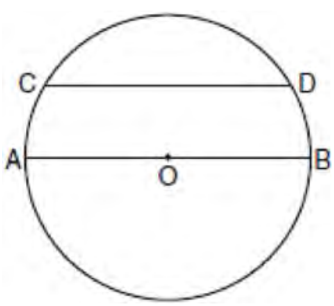



Which composition of transformations was used?
1) $R_{180^\circ} \circ D_2$
2) $R_{90^\circ} \circ D_2$
3) $D_{\frac{1}{2}} \circ R_{180^\circ}$
4) $D_{\frac{1}{2}} \circ R_{90^\circ}$

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

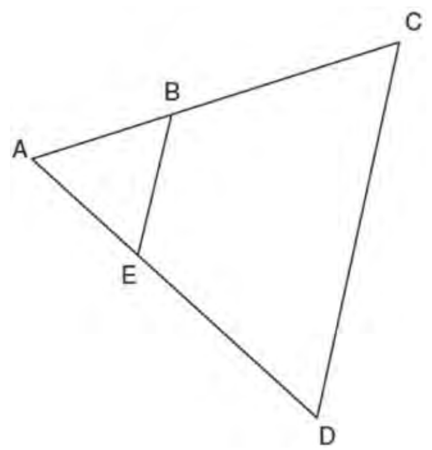
63 On the line segment below, use a compass and straightedge to construct equilateral triangle $ABC$. [Leave all construction marks.]


64 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

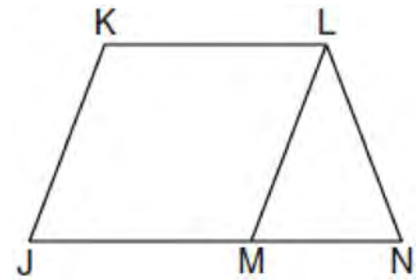
65 In the diagram below of $\Delta ACD$, $E$ is a point on $\overline{AD}$ and $B$ is a point on $\overline{AC}$, such that $\overline{EB} \parallel \overline{DC}$. If $AE = 3$, $ED = 6$, and $DC = 15$, find the length of $\overline{EB}$.



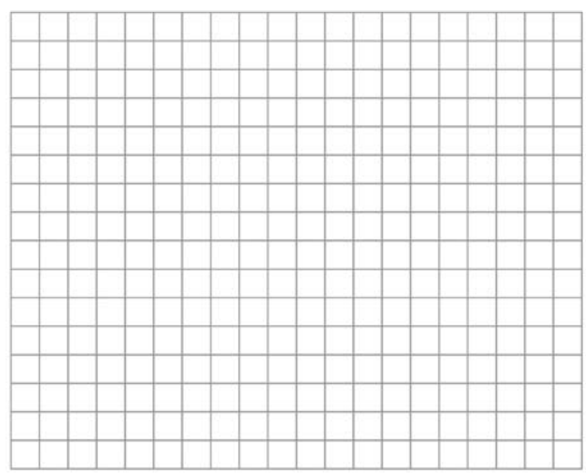

66 Using a compass and straightedge, and $\overline{AB}$ below, construct an equilateral triangle with all sides congruent to $\overline{AB}$. [Leave all construction marks.]


67 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) $2\sqrt{5}$

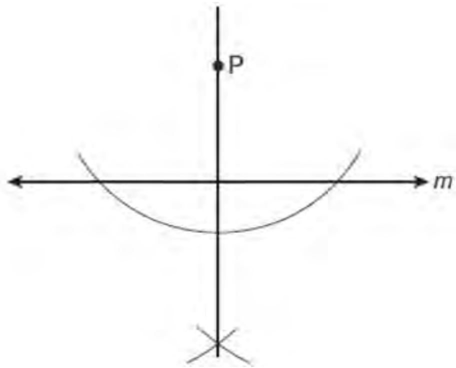
68 Given: $JKLM$ is a parallelogram.
$\overline{JM} \cong \overline{LN}$
$\angle LMN \cong \angle LNM$
Prove: $JKLM$ is a rhombus.




69 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.]



70 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.

71 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 $R$.

72 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) $r_{x = 1}$

73 In $\triangle PQR$, $PQ = 8$, $QR = 12$, and $RP = 13$. Which statement about the angles of $\triangle PQR$ must be true?

1) $m\angle Q > m\angle P > m\angle R$
2) $m\angle Q > m\angle R > m\angle P$
3) $m\angle R > m\angle P > m\angle Q$
4) $m\angle P > m\angle R > m\angle Q$

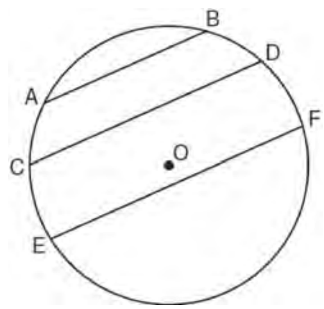
74 If a line segment has endpoints $A(3x + 5, 3y)$ and $B(x - 1, -y)$, what are the coordinates of the midpoint of $\overline{AB}$?

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

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

76 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) $\overset{\frown}{EF} \cong \overset{\frown}{CD}$

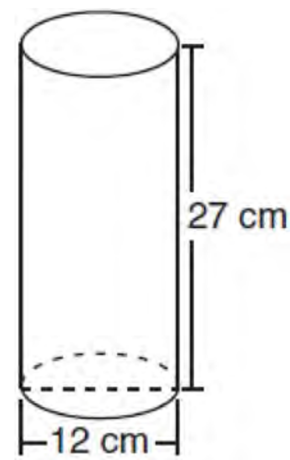
77 Tim has a rectangular prism with a length of 10 centimeters, a width of 2 centimeters, and an unknown height. He needs to build another rectangular prism with a length of 5 centimeters and the same height as the original prism. The volume of the two prisms will be the same. Find the width, in centimeters,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

78 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) $(2,-4)$

79 The volume of a cylinder is 12,566.4 $\text{cm}^3$. The height of the cylinder is 8 cm. Find the radius of the cylinder to the *nearest tenth of a centimeter*.

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



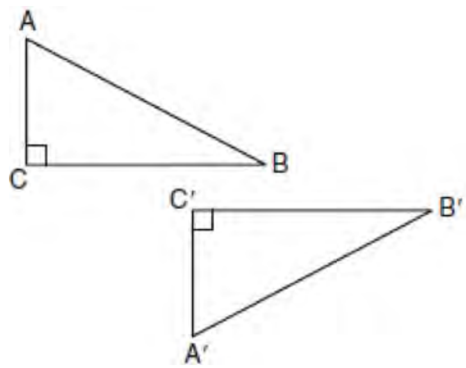

1) $162\pi$
2) $324\pi$
3) $972\pi$
4) $3,888\pi$

81 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) 140º
2) 100º
3) 70º
4) 50º

82 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) $(4,3)$

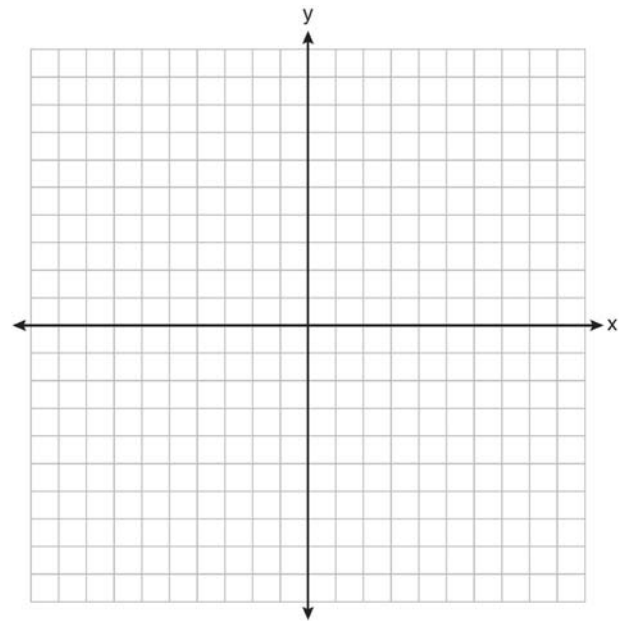
83 In the diagram below, which transformation was used to map $\Delta ABC$ to $\Delta A'B'C'$?




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

84 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°

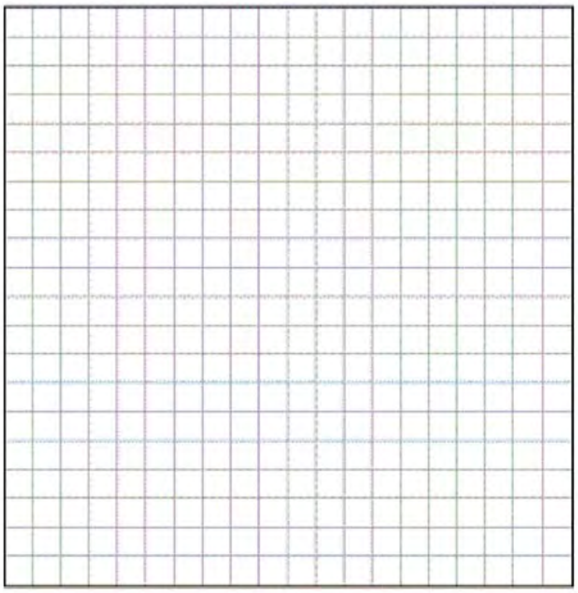
85 The coordinates of the vertices of parallelogram $ABCD$ are $A(-2,2)$, $B(3,5)$, $C(4,2)$, and $D(-1,-1)$. State the coordinates of the vertices of parallelogram $A''B''C''D''$ that result from the transformation $r_{y-\text{axis}} \circ T_{2,-3}$. [The use of the set of axes below is optional. ]




86 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 $\mathcal{P}$

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

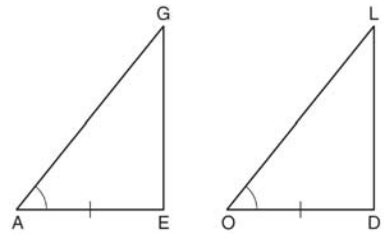
88 Write an equation of the perpendicular bisector of the line segment whose endpoints are $(-1,1)$ and $(7,-5)$. [The use of the grid below is optional]



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

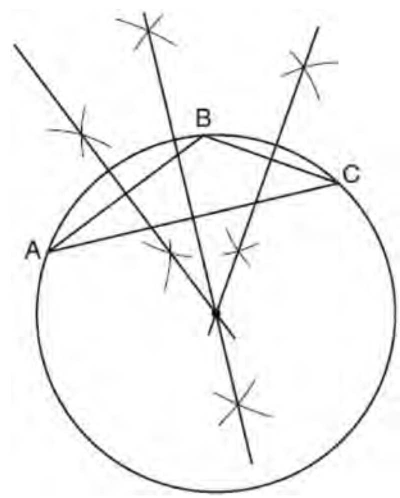
90 In isosceles trapezoid $ABCD$, $\overline{AB} \cong \overline{CD}$. If $BC = 20$, $AD = 36$, and $AB = 17$, what is the length of the altitude of the trapezoid?
1) 10
2) 12
3) 15
4) 16

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



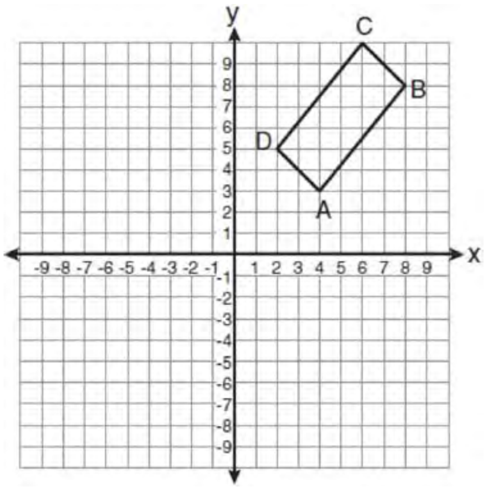

To prove that $\triangle AGE$ and $\triangle OLD$ are congruent by SAS, what other information is needed?
1) $\overline{GE} \cong \overline{LD}$
2) $\overline{AG} \cong \overline{OL}$
3) $\angle AGE \cong \angle OLD$
4) $\angle AEG \cong \angle ODL$

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



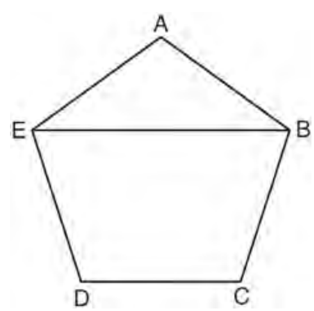

This construction represents how to find the intersection of
1) the angle bisectors of $\triangle ABC$
2) the medians to the sides of $\triangle ABC$
3) the altitudes to the sides of $\triangle ABC$
4) the perpendicular bisectors of the sides of $\triangle ABC$

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



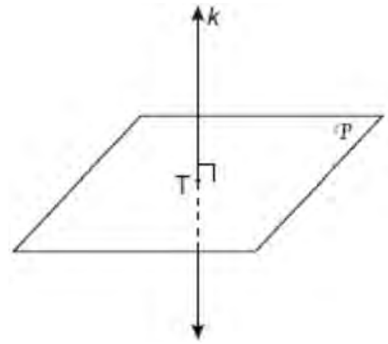

What will *not* be preserved?
1) slope of $\overline{AB}$
2) parallelism of $\overline{AB}$ and $\overline{CD}$
3) length of $\overline{AB}$
4) measure of $\angle A$

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



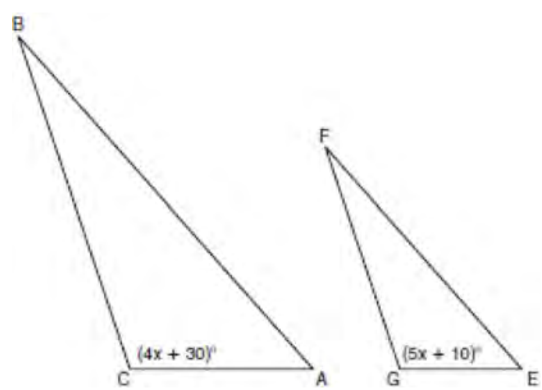

What is the measure of $\angle AEB$?
1) 36º
2) 54º
3) 72º
4) 108º

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

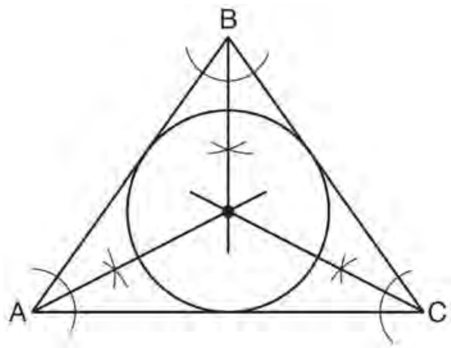



Which statement is true?
1) Any point in plane $\mathcal{P}$ also will be on line *k*.
2) Only one line in plane $\mathcal{P}$ will intersect line *k*.
3) All planes that intersect plane $\mathcal{P}$ will pass through *T*.
4) Any plane containing line *k* is perpendicular to plane $\mathcal{P}$.

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



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



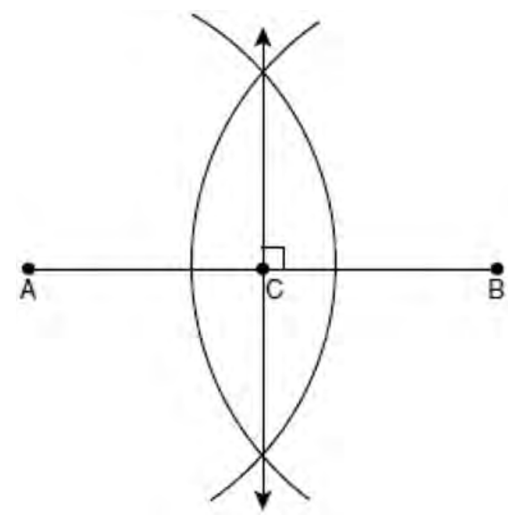

1) The intersection of the angle bisectors of a triangle is the center of the inscribed circle.
2) The intersection of the angle bisectors of a triangle is the center of the circumscribed circle.
3) The intersection of the perpendicular bisectors of the sides of a triangle is the center of the inscribed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

98 The vertices of $\triangle ABC$ are $A(-1,-2)$, $B(-1,2)$ and $C(6,0)$. Which conclusion can be made about the angles of $\triangle ABC$?
1) $m\angle A = m\angle B$
2) $m\angle A = m\angle C$
3) $m\angle ACB = 90$
4) $m\angle ABC = 60$

99 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) $2y + 10x = 8$

100 In $\triangle ABC$, $\overline{AB} \cong \overline{BC}$. An altitude is drawn from $B$ to $\overline{AC}$ and intersects $\overline{AC}$ at $D$. Which conclusion is *not* always true?
1) $\angle ABD \cong \angle CBD$
2) $\angle BDA \cong \angle BDC$
3) $\overline{AD} \cong \overline{BD}$
4) $\overline{AD} \cong \overline{DC}$

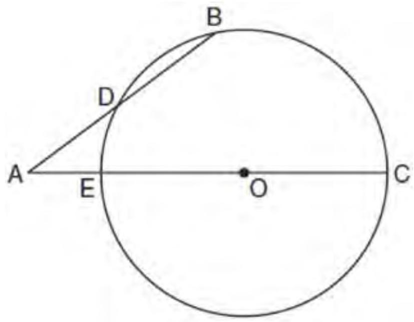
101 The diagram below shows the construction of the perpendicular bisector of $\overline{AB}$.




Which statement is *not* true?
1) $AC = CB$
2) $CB = \frac{1}{2}AB$
3) $AC = 2AB$
4) $AC + CB = AB$

102 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

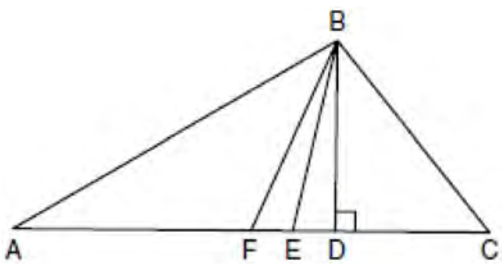
103 In the diagram below of circle $O$, secant $\overline{AB}$ intersects circle $O$ at $D$, secant $\overline{AOC}$ intersects circle $O$ at $E$, $AE = 4$, $AB = 12$, and $DB = 6$.




(Not drawn to scale)

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

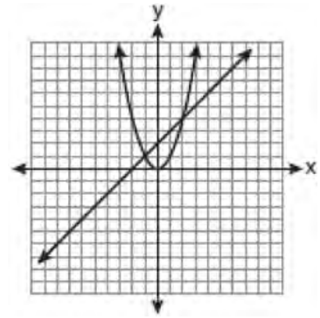
104 Given $\Delta ABC$ with base $\overline{AFEDC}$, median $\overline{BF}$, altitude $\overline{BD}$, and $\overline{BE}$ bisects $\angle ABC$, which conclusion is valid?

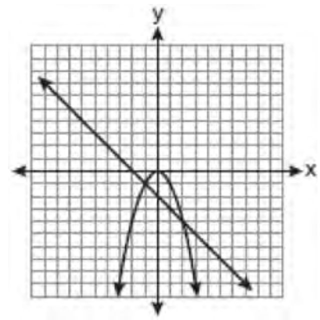


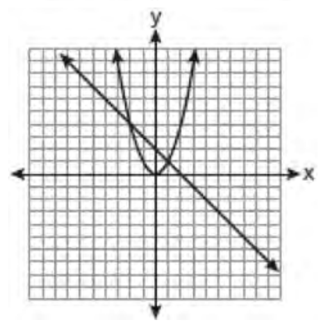

1) $\angle FAB \cong \angle ABF$
2) $\angle ABF \cong \angle CBD$
3) $\overline{CE} \cong \overline{EA}$
4) $\overline{CF} \cong \overline{FA}$

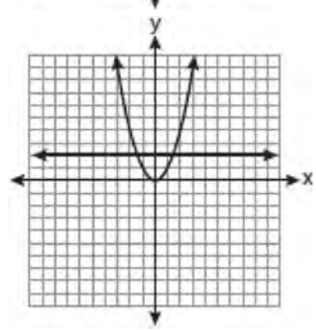
105 Which graph could be used to find the solution to the following system of equations?

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

1) 


2) 


3) 


4) 

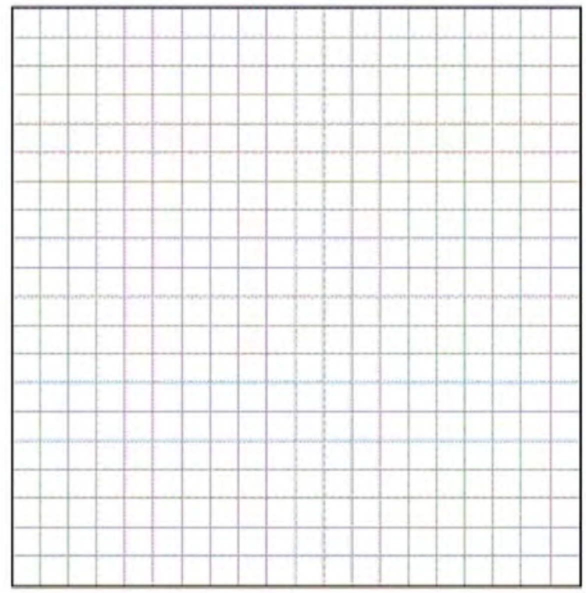
106 Point $P$ is on line $m$. What is the total number of planes that are perpendicular to line $m$ and pass through point $P$?
1) 1
2) 2
3) 0
4) infinite

107 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

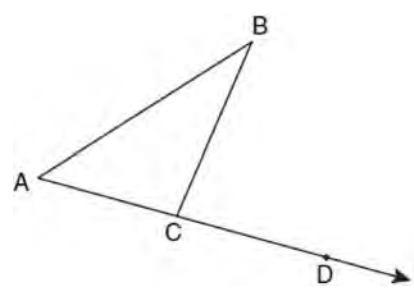
108 What is the slope of a line perpendicular to the line whose equation is $y = -\frac{2}{3}x - 5$?
1) $-\frac{3}{2}$
2) $-\frac{2}{3}$
3) $\frac{2}{3}$
4) $\frac{3}{2}$

109 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

110 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.]



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



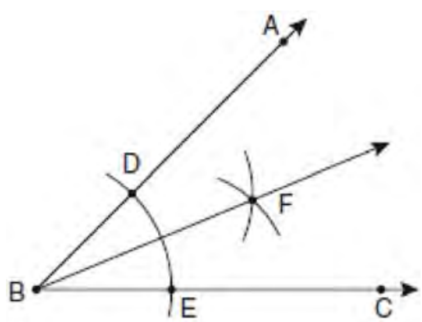

If $m\angle BCD = 6x + 2$, $m\angle BAC = 3x + 15$, and $m\angle ABC = 2x - 1$, what is the value of $x$?
1) 12
2) $14\frac{10}{11}$
3) 16
4) $18\frac{1}{9}$

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

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

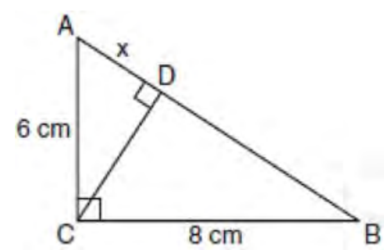
114 The diagram below shows the construction of the bisector of $\angle ABC$.




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

115 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 $\Delta ABC$.




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

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

116 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

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

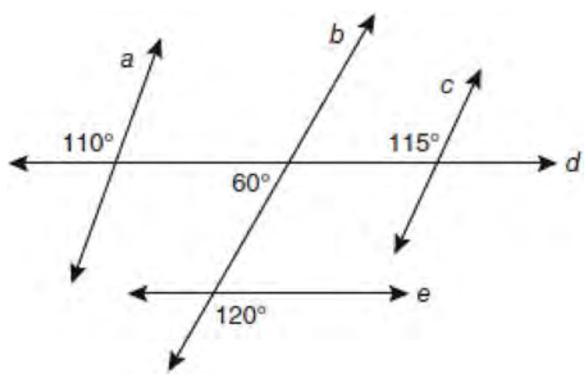
1) $\frac{BC}{EF}=\frac{3}{2}$
2) $\frac{m\angle A}{m\angle D}=\frac{3}{2}$
3) $\frac{\text{area of }\Delta ABC}{\text{area of }\Delta DEF}=\frac{9}{4}$
4) $\frac{\text{perimeter of }\Delta ABC}{\text{perimeter of }\Delta DEF}=\frac{3}{2}$

118 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.

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

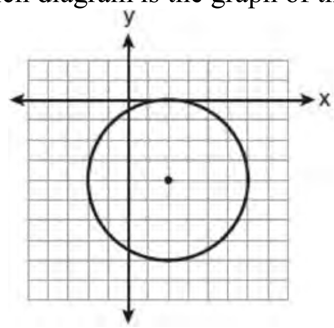
120 The degree measures of the angles of $\triangle ABC$ are represented by $x$, $3x$, and $5x - 54$. Find the value of $x$.

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

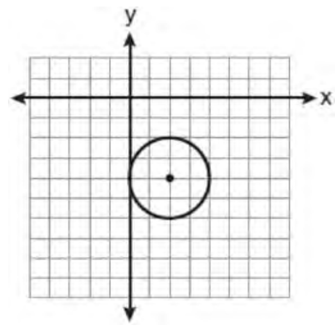



1) $a \parallel b$
2) $a \parallel c$
3) $b \parallel c$
4) $d \parallel e$

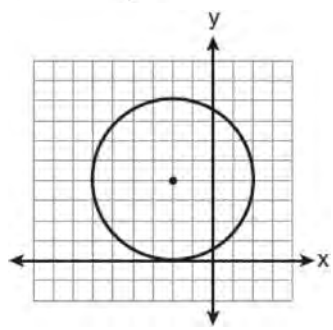
122 The equation of a circle is $(x-2)^2 + (y+4)^2 = 4$. Which diagram is the graph of the circle?



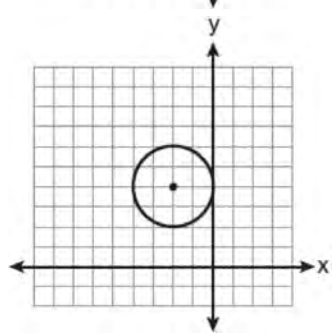

1)




2)

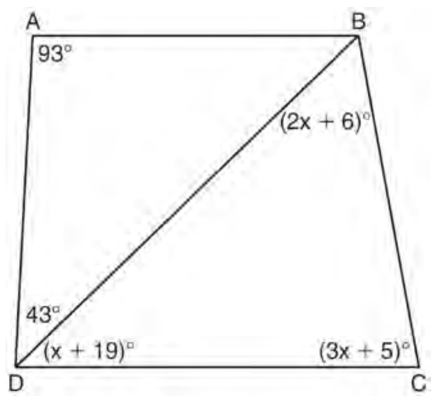



3)




4)

123 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.

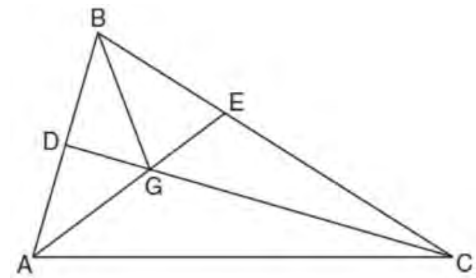



124 Find an equation of the line passing through the point $(6,5)$ and perpendicular to the line whose equation is $2y + 3x = 6$.

125 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

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

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




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

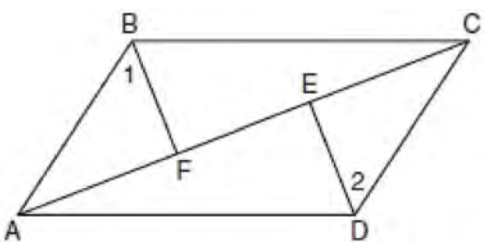
128 A transformation of a polygon that always preserves both length and orientation is
1) dilation
2) translation
3) line reflection
4) glide reflection

129 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 $\pi$, the number of square centimeters in the lateral area of the cone.

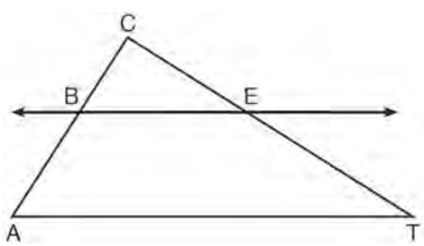
130 A quadrilateral whose diagonals bisect each other and are perpendicular is a
1) rhombus
2) rectangle
3) trapezoid
4) parallelogram

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

132 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.

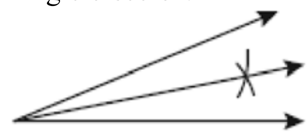


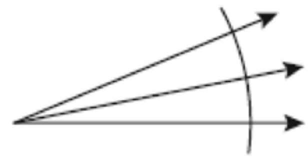

133 In the diagram below of $\triangle ACT$, $\overleftrightarrow{BE} \parallel \overline{AT}$.

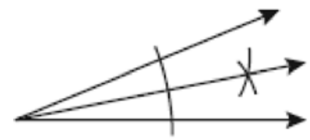



If $CB = 3$, $CA = 10$, and $CE = 6$, what is the length of $\overline{ET}$?
1) 5
2) 14
3) 20
4) 26

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

1) 

2) 

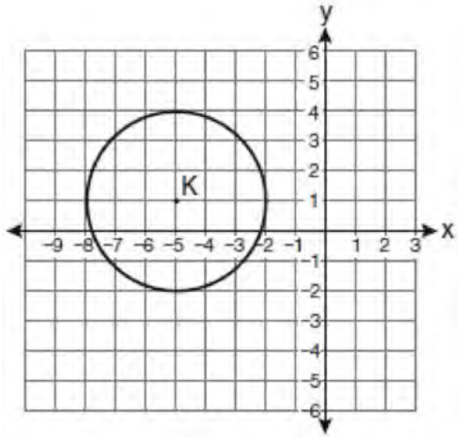
3) 

4) 

135 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.

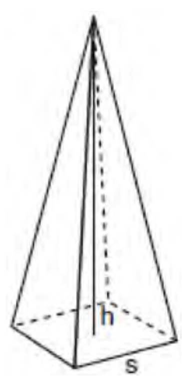
136 What is the slope of a line perpendicular to the line whose equation is $2y = -6x + 8$?
1) $-3$
2) $\frac{1}{6}$
3) $\frac{1}{3}$
4) $-6$

137 Which equation represents circle $K$ shown in the graph below?



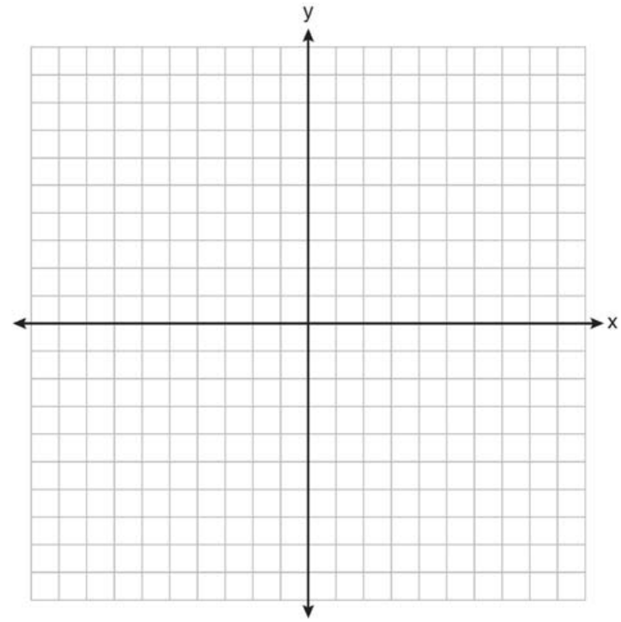

1) $(x+5)^2+(y-1)^2=3$
2) $(x+5)^2+(y-1)^2=9$
3) $(x-5)^2+(y+1)^2=3$
4) $(x-5)^2+(y+1)^2=9$

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

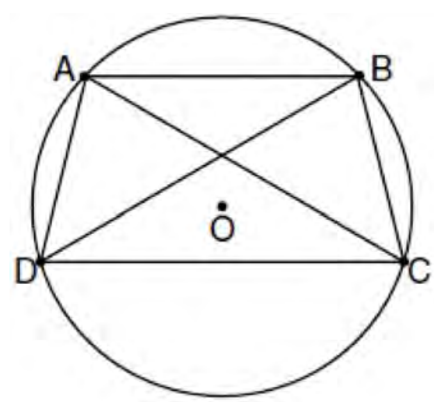



A side, $s$, of the base of the pyramid is 12 meters, and the height, $h$, is 42 meters. What is the volume of the pyramid in cubic meters?

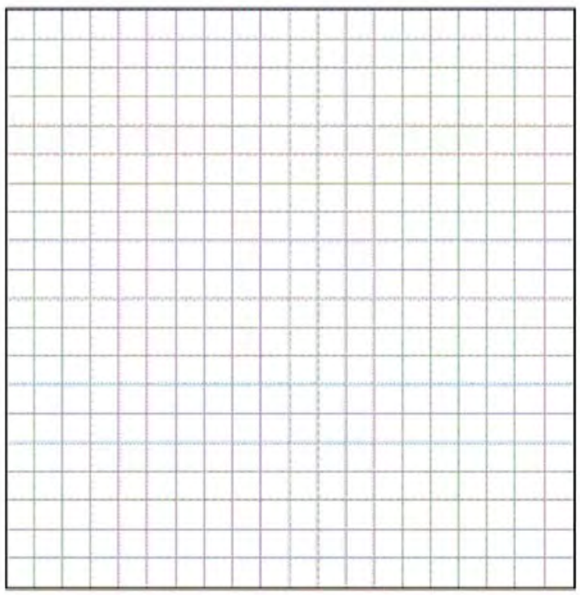
139 On the set of axes below, graph and label $\Delta DEF$ with vertices at $D(-4,-4)$, $E(-2,2)$, and $F(8,-2)$. If $G$ is the midpoint of $\overline{EF}$ and $H$ is the midpoint of $\overline{DF}$, state the coordinates of $G$ and $H$ and label each point on your graph. Explain why $\overline{GH} \parallel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




140 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 $\Delta ACD \cong \Delta BDC$.



141 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.



142 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) $\sqrt{145}$

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

144 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

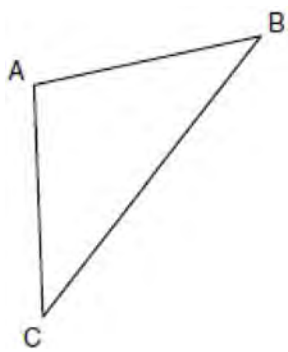
145 What is the measure of an interior angle of a regular octagon?
1) 45º
2) 60º
3) 120º
4) 135º

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

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

148 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

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



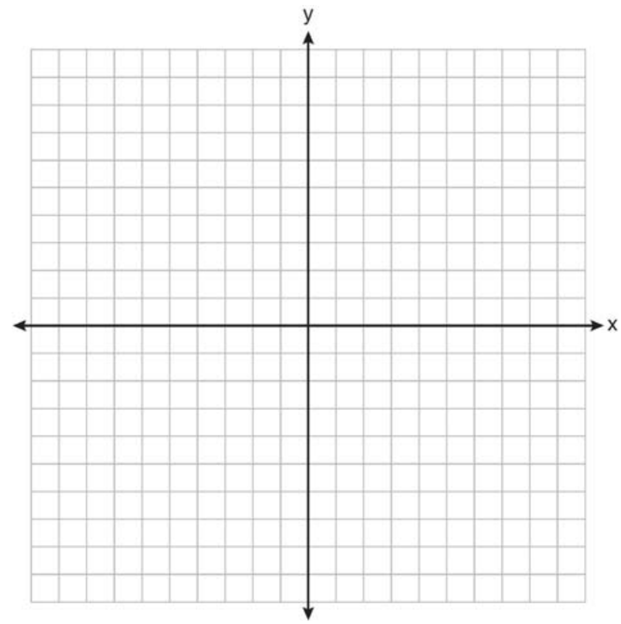

What is the measure of $\angle A$?
1) 40°
2) 50°
3) 70°
4) 100°

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

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

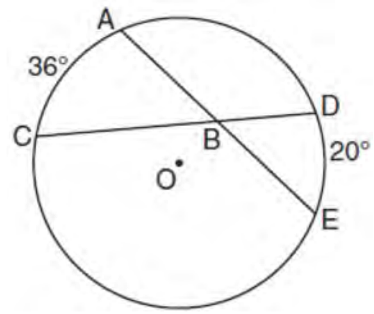
1) $(0,-4)$
2) $(-4,0)$
3) $(-4,-3)$ and $(0,5)$
4) $(-3,-4)$ and $(5,0)$

151 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.



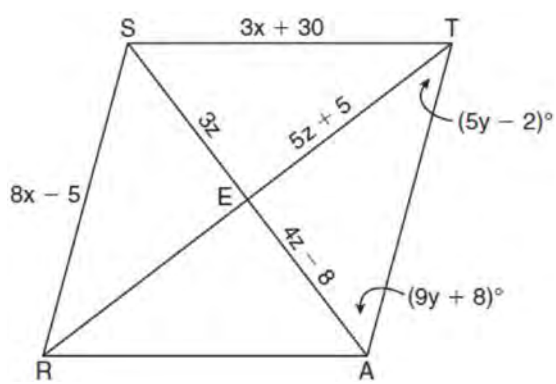

152 What is the inverse of the statement "If two triangles are not similar, their corresponding angles are not congruent"?
1) If two triangles are similar, their corresponding angles are not congruent.
2) If corresponding angles of two triangles are not congruent, the triangles are not similar.
3) If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

153 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 $m\overset{\frown}{DE} = 20$.

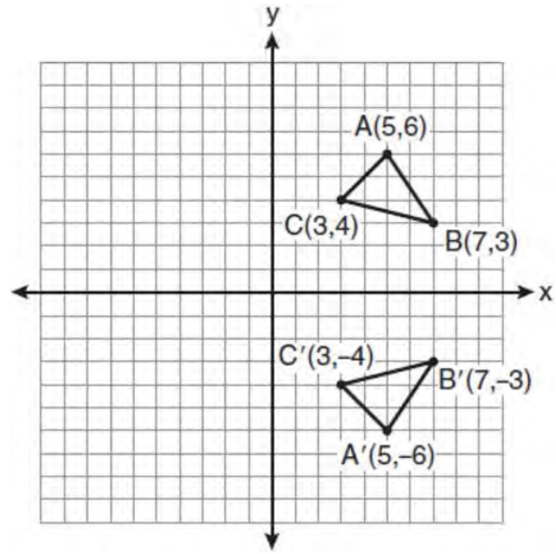



What is $m\angle ABC$?
1) 56
2) 36
3) 28
4) 8

154 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 $m\angle TAS$.

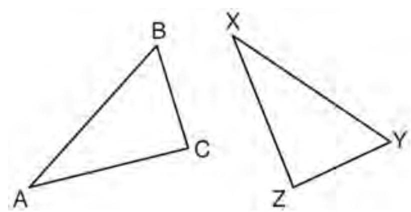



155 Which expression best describes the transformation shown in the diagram below?



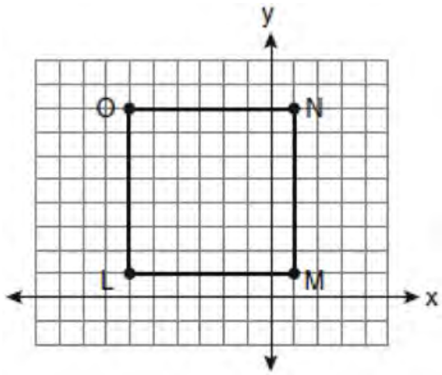

1) same orientation; reflection
2) opposite orientation; reflection
3) same orientation; translation
4) opposite orientation; translation

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




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

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

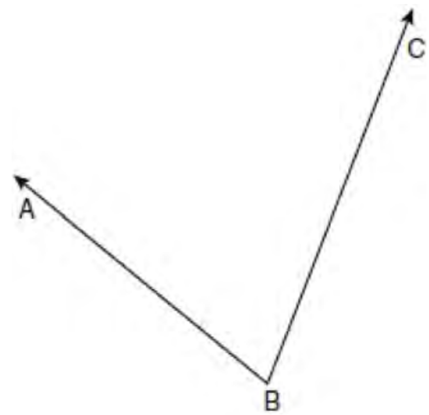
158 A right circular cylinder has an altitude of 11 feet and a radius of 5 feet. What is the lateral area, in square feet, of the cylinder, to the *nearest tenth*?

1) 172.7
2) 172.8
3) 345.4
4) 345.6

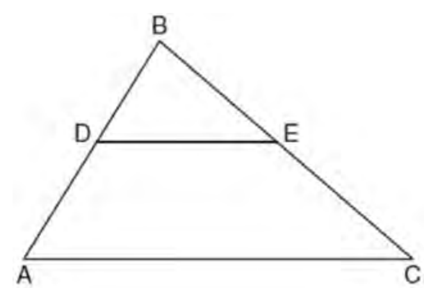
159 The diagonal $\overline{AC}$ is drawn in parallelogram $ABCD$. Which method can *not* be used to prove that $\triangle ABC \cong \triangle CDA$?

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

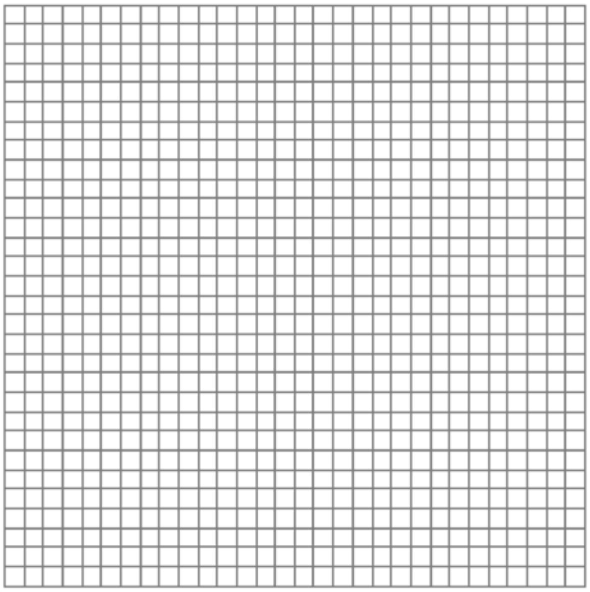
160 Using a compass and straightedge, construct the angle bisector of $\angle ABC$ shown below. [Leave all construction marks.]



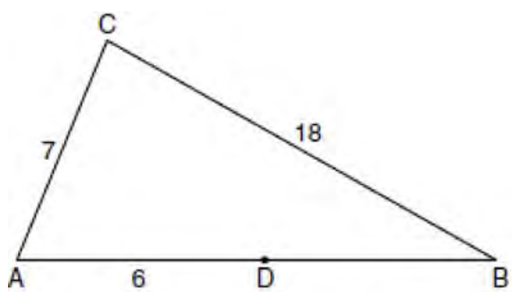

161 In the diagram below of $\triangle ABC$, $\overline{DE}$ is a midsegment of $\triangle ABC$, $DE = 7$, $AB = 10$, and $BC = 13$. Find the perimeter of $\triangle ABC$.



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



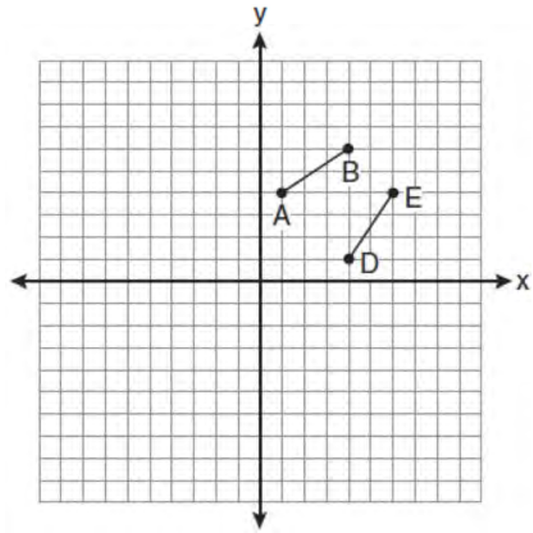
163 In the diagram below of $\triangle ABC$, $D$ is a point on $\overline{AB}$, $AC = 7$, $AD = 6$, and $BC = 18$.



(Not drawn to scale)

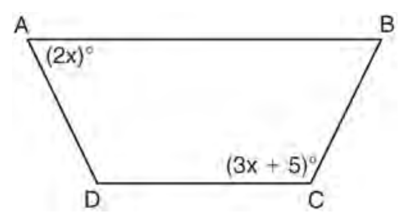
The length of $\overline{DB}$ could be
1) 5
2) 12
3) 19
4) 25

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

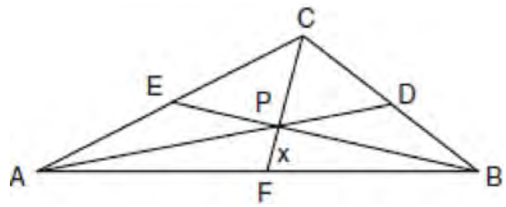



Which transformation will move $\overline{AB}$ onto $\overline{DE}$ such that point $D$ is the image of point $A$ and point $E$ is the image of point $B$?
1) $T_{3,-3}$
2) $D_{\frac{1}{2}}$
3) $R_{90^\circ}$
4) $r_{y=x}$

165 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 $m\angle BAD$.

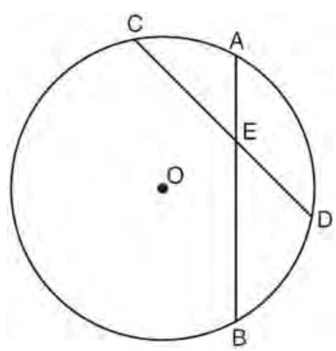


166 In the diagram of $\triangle ABC$ below, Jose found centroid $P$ by constructing the three medians. He measured $\overline{CF}$ and found it to be 6 inches.



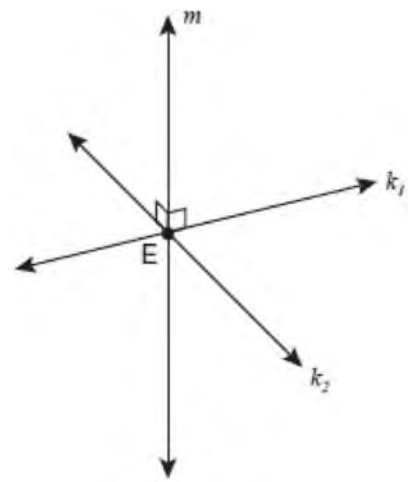

If $PF = x$, which equation can be used to find $x$?
1) $x + x = 6$
2) $2x + x = 6$
3) $3x + 2x = 6$
4) $x + \frac{2}{3}x = 6$

167 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

168 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 $k_2$.

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

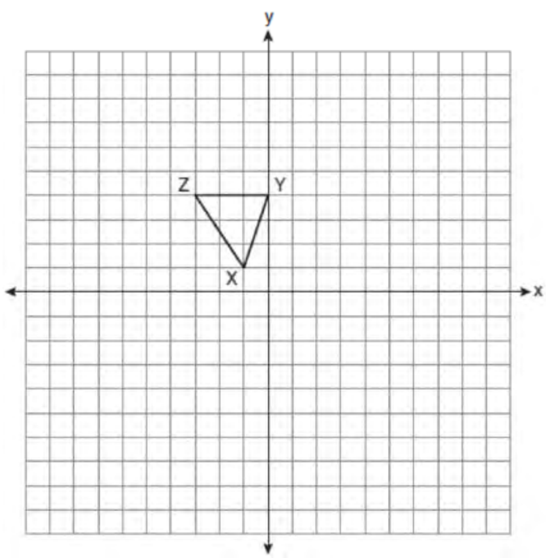
170 Given: $y = \frac{1}{4}x - 3$

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

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

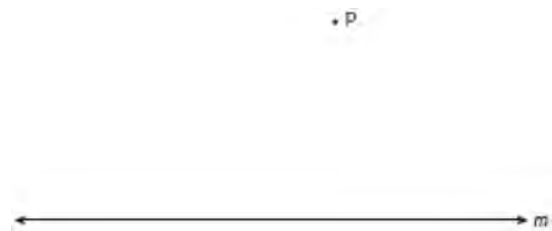
1) I
2) II
3) III
4) IV

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

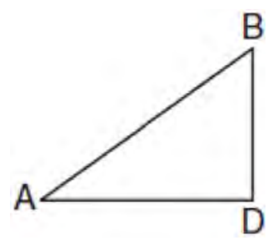



172 Write a statement that is logically equivalent to the statement "If two sides of a triangle are congruent, the angles opposite those sides are congruent." Identify the new statement as the converse, inverse, or contrapositive of the original statement.

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



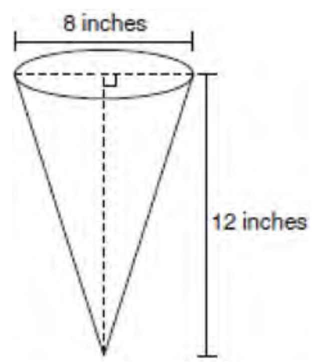

174 In the diagram below of $\triangle ADB$, $m\angle BDA = 90$, $AD = 5\sqrt{2}$, and $AB = 2\sqrt{15}$.




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

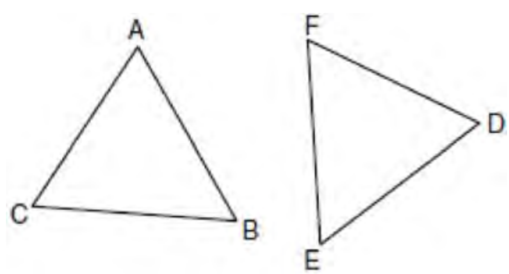
1) $\sqrt{10}$
2) $\sqrt{20}$
3) $\sqrt{50}$
4) $\sqrt{110}$

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



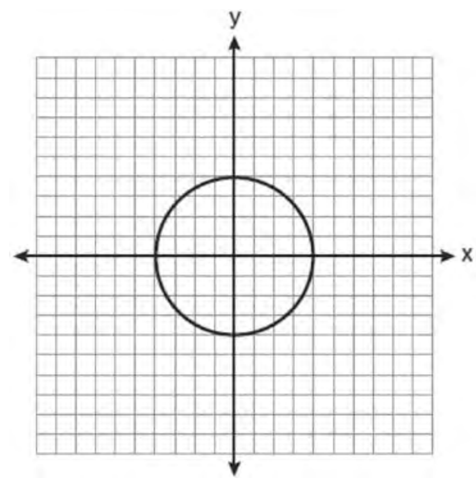

What is the volume of the cone to the *nearest cubic inch*?
1) 201
2) 481
3) 603
4) 804

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




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

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

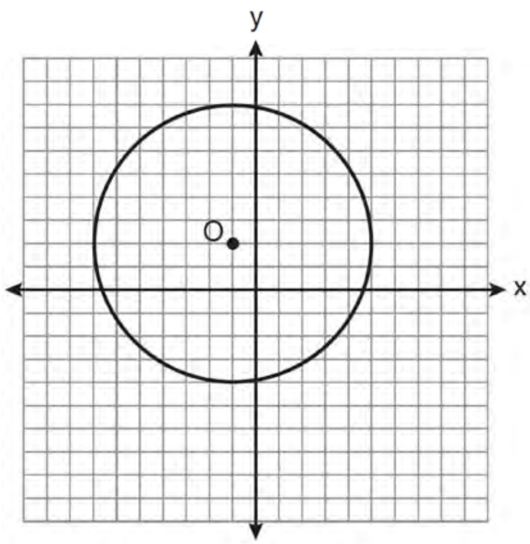



1) $x^2 + y^2 = 2$
2) $x^2 + y^2 = 4$
3) $x^2 + y^2 = 8$
4) $x^2 + y^2 = 16$

178 $\triangle ABC$ is similar to $\triangle DEF$. The ratio of the length of $\overline{AB}$ to the length of $\overline{DE}$ is $3:1$. Which ratio is also equal to $3:1$?
1) $\frac{m\angle A}{m\angle D}$
2) $\frac{m\angle B}{m\angle F}$
3) $\frac{\text{area of } \triangle ABC}{\text{area of } \triangle DEF}$
4) $\frac{\text{perimeter of } \triangle ABC}{\text{perimeter of } \triangle DEF}$

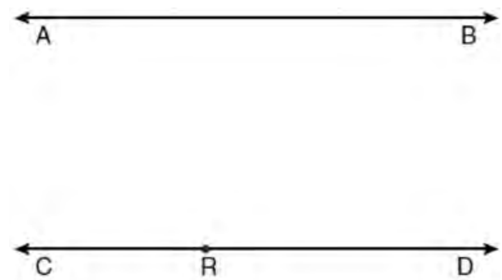
179 The coordinates of the vertices of parallelogram $ABCD$ are $A(-3,2)$, $B(-2,-1)$, $C(4,1)$, and $D(3,4)$. The slopes of which line segments could be calculated to show that $ABCD$ is a rectangle?
1) $\overline{AB}$ and $\overline{DC}$
2) $\overline{AB}$ and $\overline{BC}$
3) $\overline{AD}$ and $\overline{BC}$
4) $\overline{AC}$ and $\overline{BD}$

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




181 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) $-3$

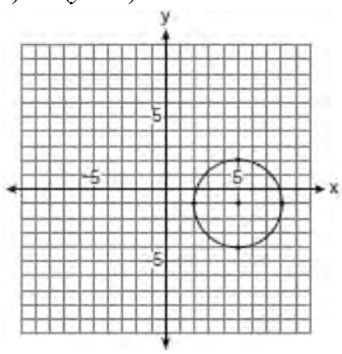
182 Two lines, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CRD}$, are parallel and 10 inches apart. Sketch the locus of all points that are equidistant from $\overleftrightarrow{AB}$ and $\overleftrightarrow{CRD}$ and 7 inches from point $R$. Label with an **X** each point that satisfies both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

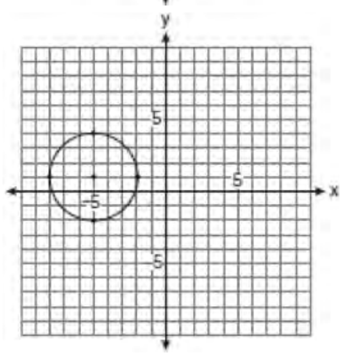


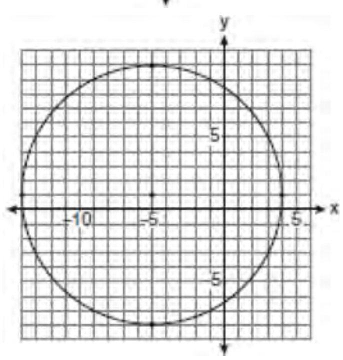

183 The lateral faces of a regular pyramid are composed of
1) squares
2) rectangles
3) congruent right triangles
4) congruent isosceles triangles

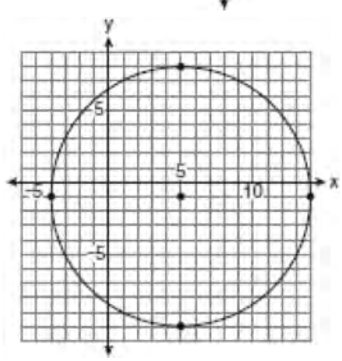
184 Given the system of equations: $y = x^2 - 4x$
$x = 4$
The number of points of intersection is
1) 1
2) 2
3) 3
4) 0

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

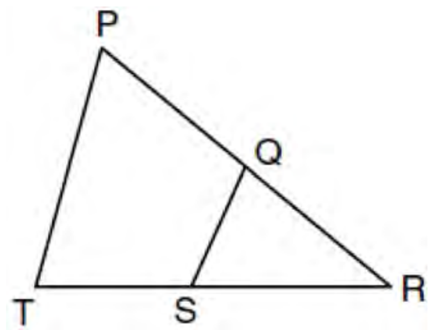
1) 

2) 

3) 

4) 

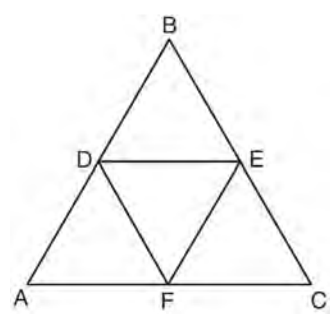
186 In the diagram below of $\triangle PRT$, $Q$ is a point on $\overline{PR}$, $S$ is a point on $\overline{TR}$, $\overline{QS}$ is drawn, and $\angle RPT \cong \angle RSQ$.




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

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

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

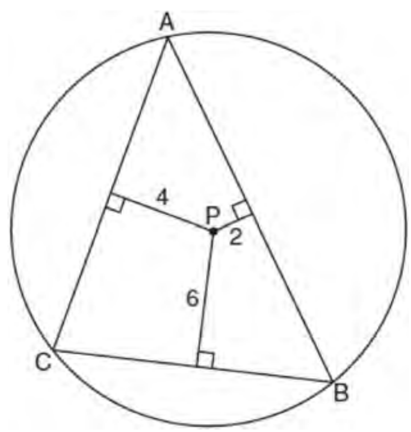



What is the length, in centimeters, of $\overline{EF}$?

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

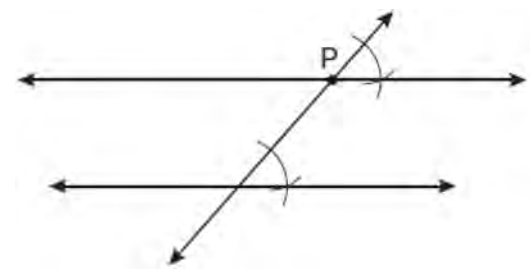
188 Line segment $AB$ is tangent to circle $O$ at $A$. Which type of triangle is always formed when points $A$, $B$, and $O$ are connected?
1) right
2) obtuse
3) scalene
4) isosceles

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




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

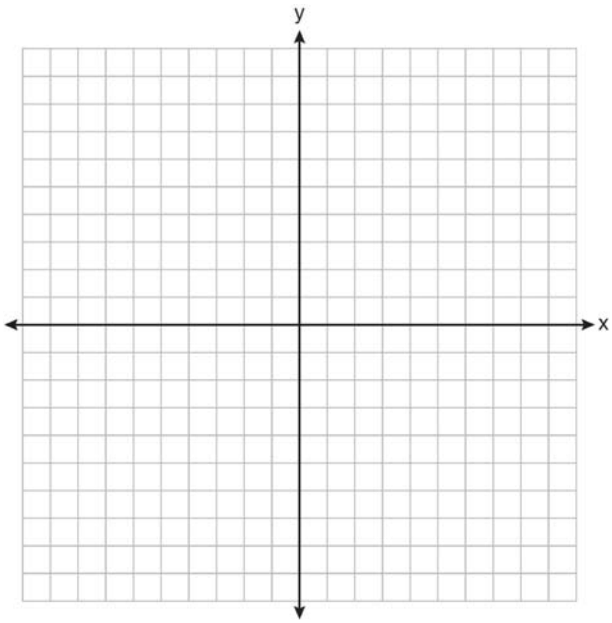
190 Which geometric principle is used to justify the construction below?




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.

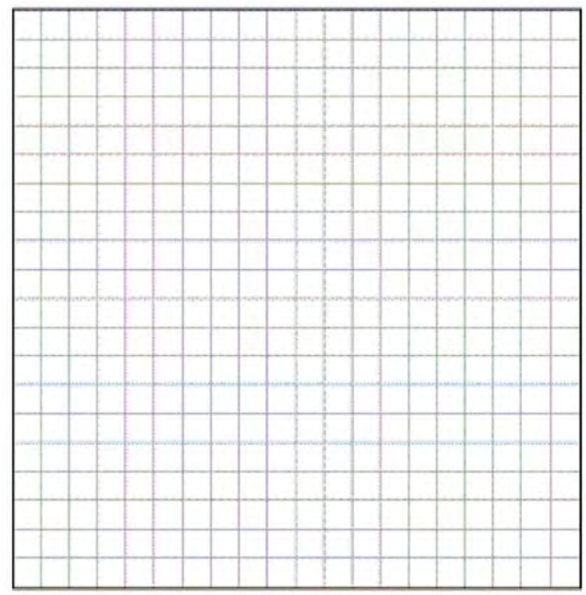
191 In the diagram below, car $A$ is parked 7 miles from car $B$. Sketch the points that are 4 miles from car $A$ and sketch the points that are 4 miles from car $B$. Label with an **X** all points that satisfy both conditions.

192 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.

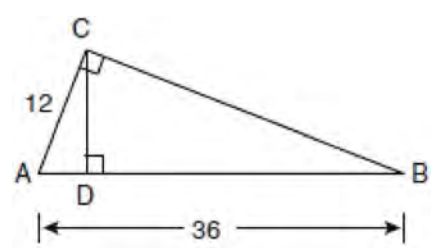



193 If $\triangle ABC \sim \triangle ZXY$, $m\angle A = 50$, and $m\angle C = 30$, what is $m\angle X$?
1) 30
2) 50
3) 80
4) 100

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



195 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

196 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) $-\frac{5}{3}$

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

198 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 = $\sqrt{C}$

199 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

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

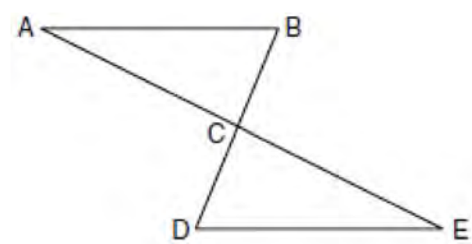
1) $y = \frac{1}{2}x - \frac{1}{2}$
2) $y = -\frac{1}{2}x + \frac{13}{2}$
3) $y = 2x - 11$
4) $y = -2x + 17$

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

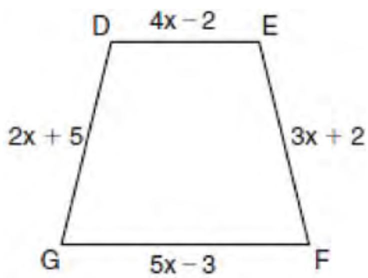
1) $(x - 2)^2 + (y + 3)^2 = 5$
2) $(x + 2)^2 + (y - 3)^2 = 5$
3) $(x + 2)^2 + (y - 3)^2 = 25$
4) $(x - 2)^2 + (y + 3)^2 = 25$

202 Given: $\triangle ABC$ and $\triangle EDC$, $C$ is the midpoint of $\overline{BD}$ and $\overline{AE}$

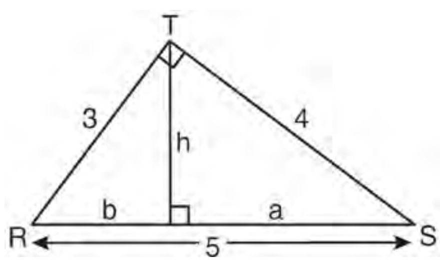
Prove: $\overline{AB} \parallel \overline{DE}$



203 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 $x$.



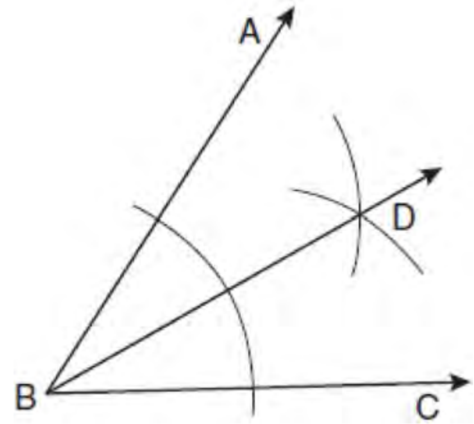

204 In the diagram below, $\triangle RST$ is a $3-4-5$ right triangle. The altitude, $h$, to the hypotenuse has been drawn. Determine the length of $h$.




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

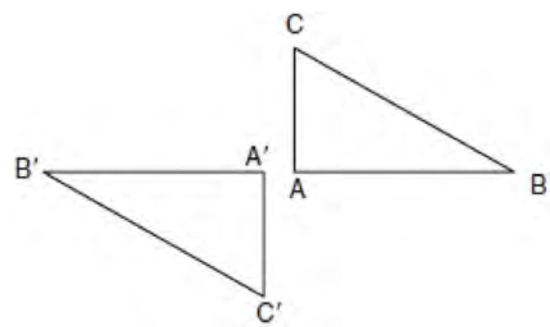
1) the same line
2) parallel
3) perpendicular
4) neither parallel nor perpendicular

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

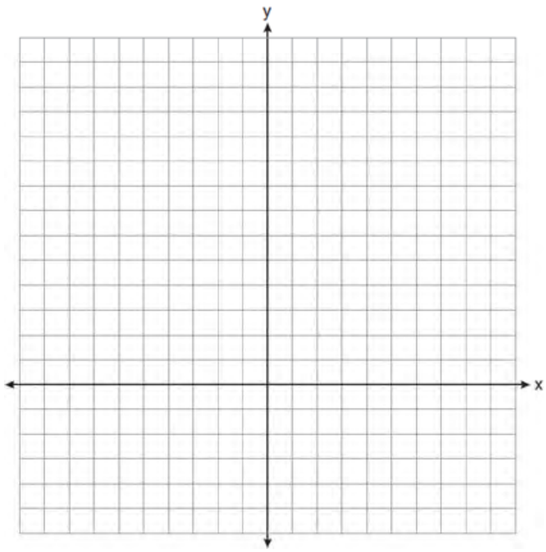
207 In the diagram below, under which transformation will $\triangle A'B'C'$ be the image of $\triangle ABC$?



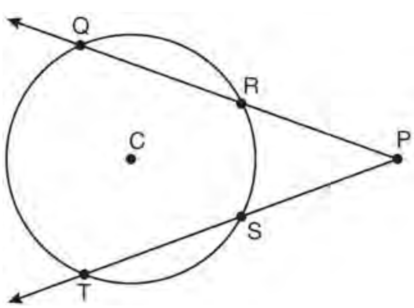

1) rotation
2) dilation
3) translation
4) glide reflection

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

$$y = (x - 2)^2 + 4$$
$$4x + 2y = 14$$

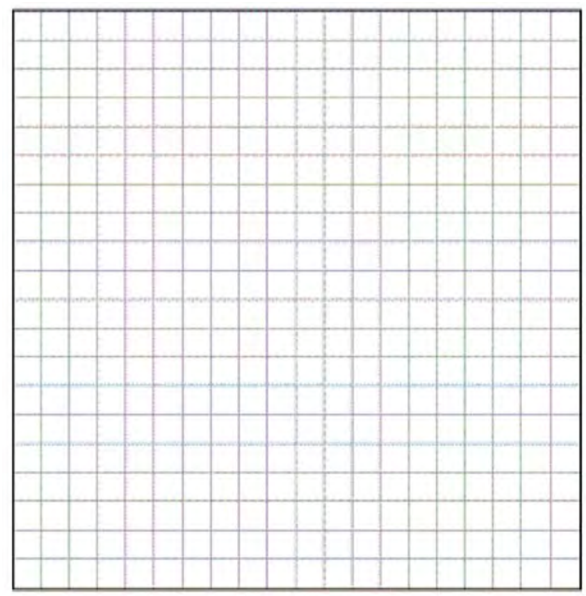



209 In the diagram below of circle $C$, $m\overset{\frown}{QT} = 140$, and $m\angle P = 40$.

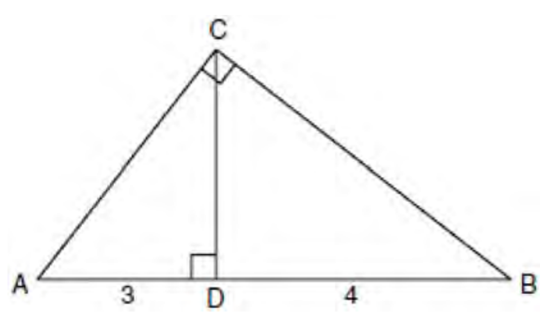



What is $m\overset{\frown}{RS}$?
1) 50
2) 60
3) 90
4) 110

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

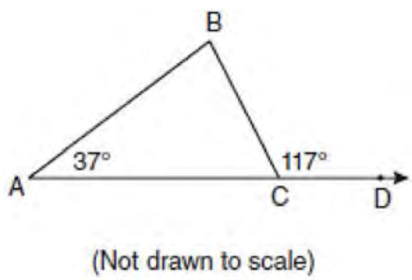


211 In the diagram below of right triangle $ACB$, altitude $\overline{CD}$ intersects $\overline{AB}$ at $D$. If $AD = 3$ and $DB = 4$, find the length of $\overline{CD}$ in simplest radical form.



212 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) $y - 2x = 3$

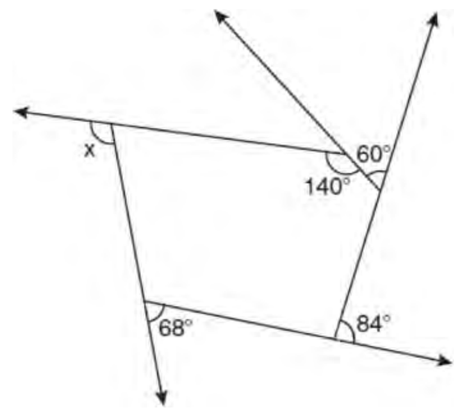
213 In the diagram below of $\Delta ABC$ with side $\overline{AC}$ extended through $D$, $m\angle A = 37$ and $m\angle BCD = 117$. Which side of $\Delta ABC$ is the longest side? Justify your answer.




214 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 $2:1$.

215 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 $\sqrt{13}$

216 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

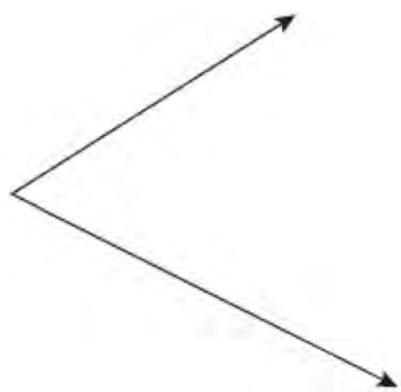
217 Which set of numbers represents the lengths of the sides of a triangle?
1) $\{5, 18, 13\}$
2) $\{6, 17, 22\}$
3) $\{16, 24, 7\}$
4) $\{26, 8, 15\}$

218 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

219 In $\triangle ABC$, $AB = 7$, $BC = 8$, and $AC = 9$. Which list has the angles of $\triangle ABC$ in order from smallest to largest?
1) $\angle A, \angle B, \angle C$
2) $\angle B, \angle A, \angle C$
3) $\angle C, \angle B, \angle A$
4) $\angle C, \angle A, \angle B$

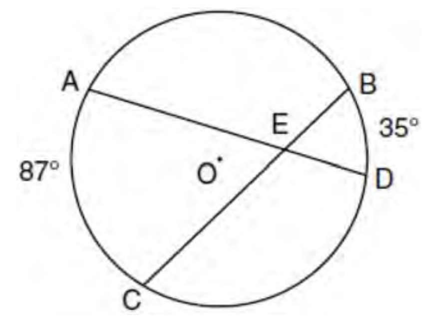
220 Write an equation of the line that passes through the point $(6,-5)$ and is parallel to the line whose equation is $2x - 3y = 11$.

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



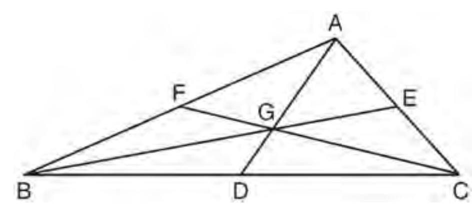
222 Side $\overline{PQ}$ of $\triangle PQR$ is extended through $Q$ to point $T$. Which statement is *not* always true?
1) $m\angle RQT > m\angle R$
2) $m\angle RQT > m\angle P$
3) $m\angle RQT = m\angle P + m\angle R$
4) $m\angle RQT > m\angle PQR$

223 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

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




If $CF = 24$, what is the length of $\overline{FG}$?
1) 8
2) 10
3) 12
4) 16

225 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.

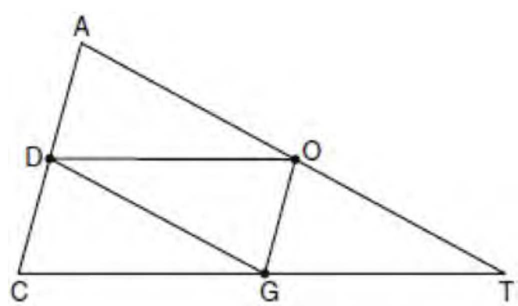

226 Given the equations: $y = x^2 - 6x + 10$

$$y + x = 4$$

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 $(3,1)$

227 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 $\overline{N'O'}$

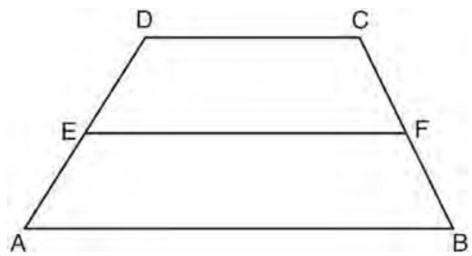
228 In the diagram below of $\triangle ACT$, $D$ is the midpoint of $\overline{AC}$, $O$ is the midpoint of $\overline{AT}$, and $G$ is the midpoint of $\overline{CT}$.




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

## Geometry Regents at Random

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

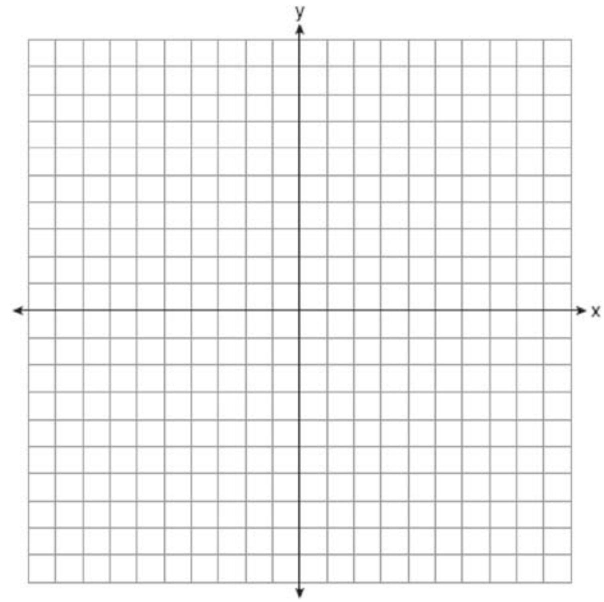



If $AB = 5x - 9$, $DC = x + 3$, and $EF = 2x + 2$, what is the value of $x$?
1) 5
2) 2
3) 7
4) 8

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

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

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



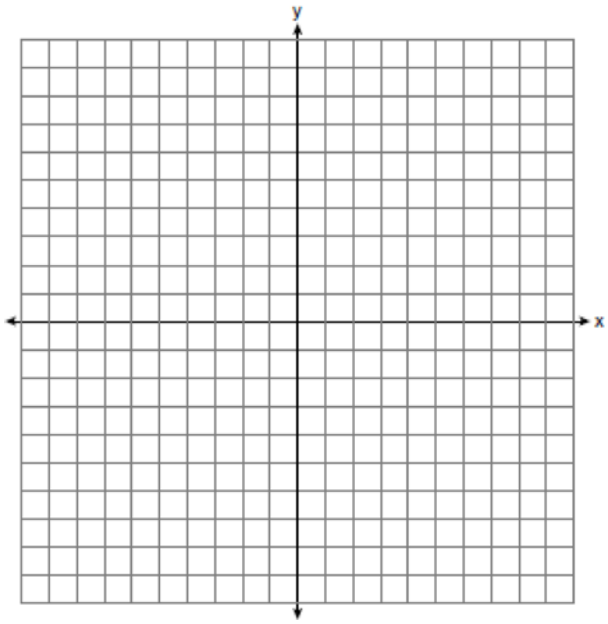

233 Which statement is true about every parallelogram?
1) All four sides are congruent.
2) The interior angles are all congruent.
3) Two pairs of opposite sides are congruent.
4) The diagonals are perpendicular to each other.

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

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

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

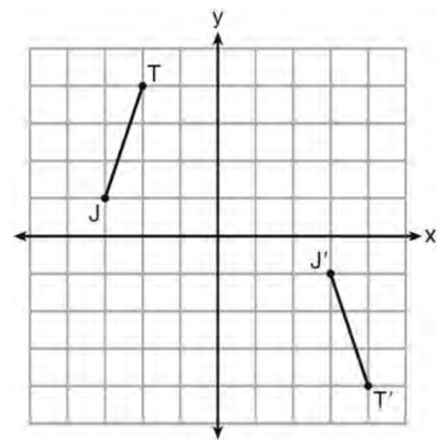
$$2y+4=-x$$




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

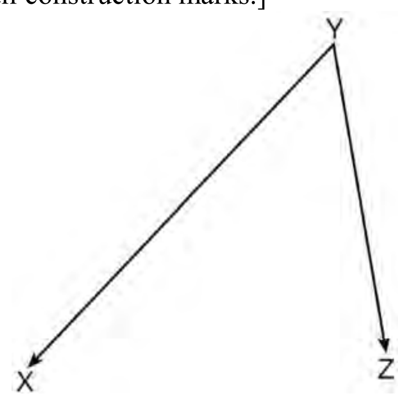
1) $-\frac{3}{5}$
2) $\frac{3}{5}$
3) $-\frac{5}{3}$
4) $\frac{5}{3}$

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

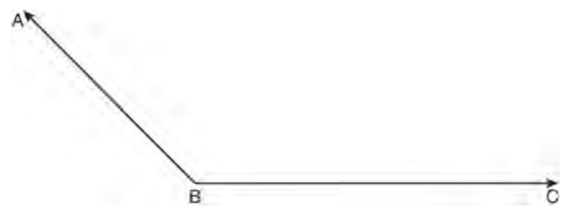



Which transformation would map $\overline{JT}$ onto $\overline{J'T'}$?
1) translation
2) glide reflection
3) rotation centered at the origin
4) reflection through the origin

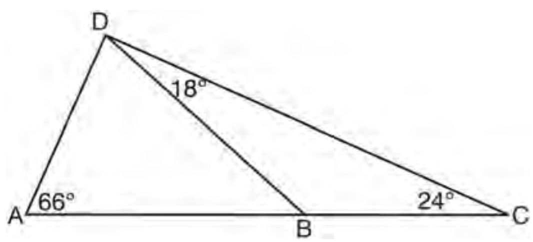
238 On the diagram below, use a compass and straightedge to construct the bisector of $\angle XYZ$. [Leave all construction marks.]



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



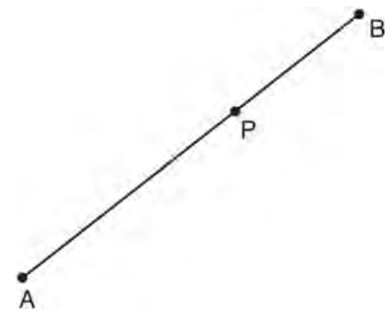

240 As shown in the diagram of $\triangle ACD$ below, $B$ is a point on $\overline{AC}$ and $\overline{DB}$ is drawn.




If $m\angle A = 66$, $m\angle CDB = 18$, and $m\angle C = 24$, what is the longest side of $\triangle ABD$?
1) $\overline{AB}$
2) $\overline{DC}$
3) $\overline{AD}$
4) $\overline{BD}$

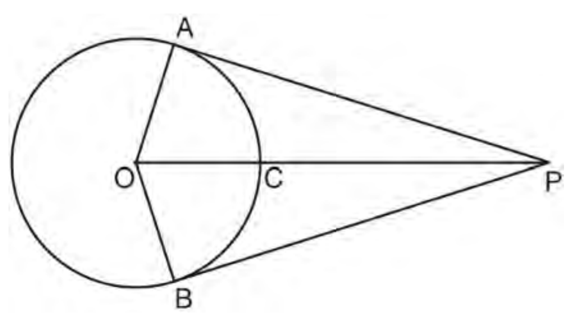
241 The number of degrees in the sum of the interior angles of a pentagon is
1) 72
2) 360
3) 540
4) 720

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

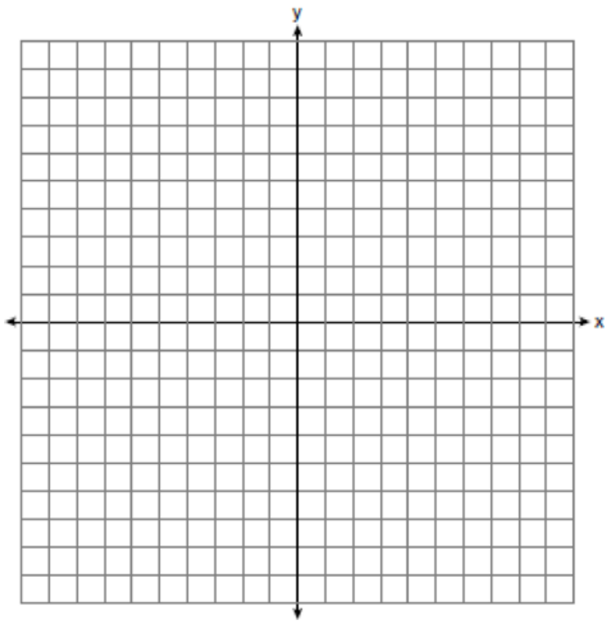



243 For which polygon does the sum of the measures of the interior angles equal the sum of the measures of the exterior angles?
1) hexagon
2) pentagon
3) quadrilateral
4) triangle

244 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: $\angle AOP \cong \angle BOP$



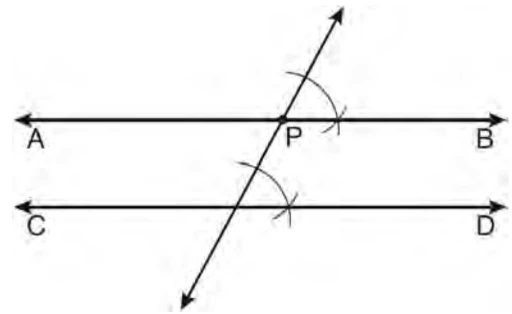
245 On the set of axes below, graph the locus of points that are 4 units from the line $x = 3$ and the locus of points that are 5 units from the point $(0, 2)$. Label with an **X** all points that satisfy both conditions.




246 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

247 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.

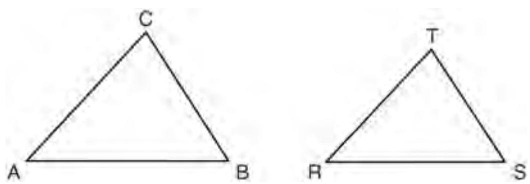
248 The diagram below shows the construction of $\overleftrightarrow{AB}$ through point $P$ parallel to $\overleftrightarrow{CD}$.




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.

249 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

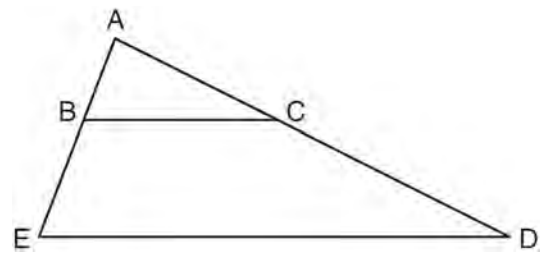
250 In the diagram below, $\triangle ABC \sim \triangle RST$.




Which statement is *not* true?
1) $\angle A \cong \angle R$
2) $\dfrac{AB}{RS} = \dfrac{BC}{ST}$
3) $\dfrac{AB}{BC} = \dfrac{ST}{RS}$
4) $\dfrac{AB+BC+AC}{RS+ST+RT} = \dfrac{AB}{RS}$

251 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.]

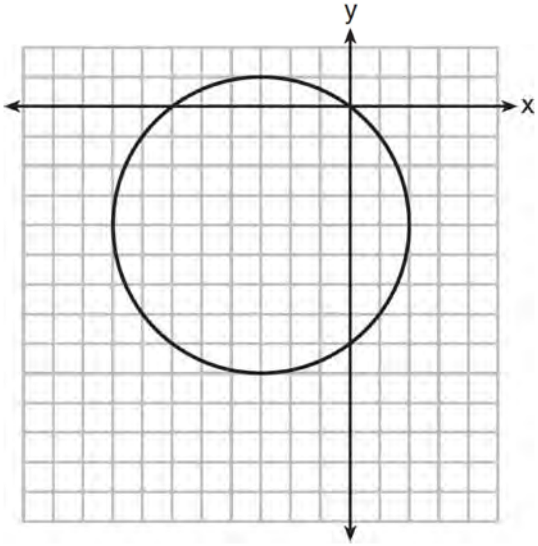

252 In the diagram below of $\triangle ADE$, $B$ is a point on $\overline{AE}$ and $C$ is a point on $\overline{AD}$ such that $\overline{BC} \parallel \overline{ED}$, $AC = x - 3$, $BE = 20$, $AB = 16$, and $AD = 2x + 2$. Find the length of $\overline{AC}$.




253 What is the volume, in cubic centimeters, of a cylinder that has a height of 15 cm and a diameter of 12 cm?
1) $180\pi$
2) $540\pi$
3) $675\pi$
4) $2,160\pi$

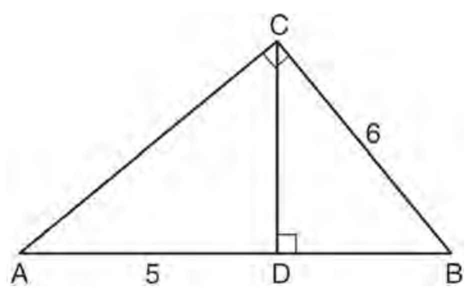
254 Which equation of a circle will have a graph that lies entirely in the first quadrant?
1) $(x-4)^2 + (y-5)^2 = 9$
2) $(x+4)^2 + (y+5)^2 = 9$
3) $(x+4)^2 + (y+5)^2 = 25$
4) $(x-5)^2 + (y-4)^2 = 25$

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

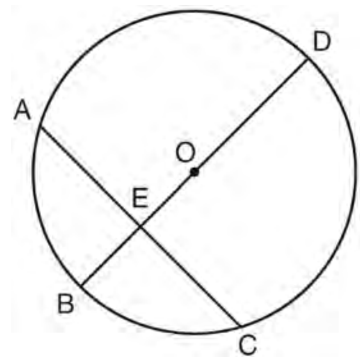
256 In the diagram below of right triangle $ABC$, $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$, $CB=6$, and $AD=5$.




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

257 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

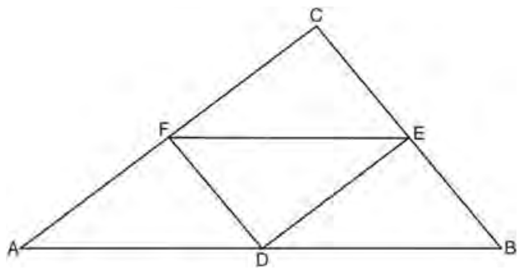
258 In circle $O$ shown below, diameter $\overline{DB}$ is perpendicular to chord $\overline{AC}$ at $E$.




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

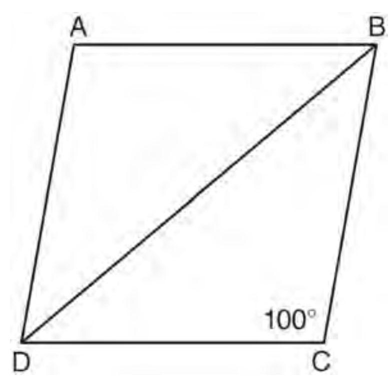
259 Parallelogram $ABCD$ has coordinates $A(1,5)$, $B(6,3)$, $C(3,-1)$, and $D(-2,1)$. What are the coordinates of $E$, the intersection of diagonals $\overline{AC}$ and $\overline{BD}$?
1) $(2,2)$
2) $(4.5,1)$
3) $(3.5,2)$
4) $(-1,3)$

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



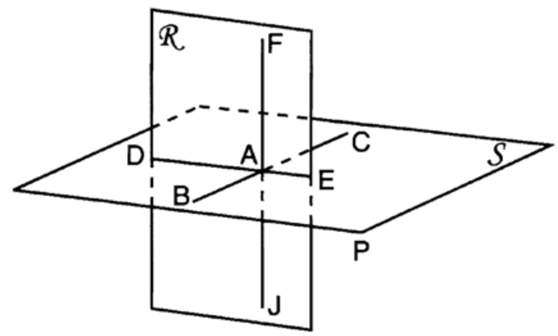

If $AB = 20$, $BC = 12$, and $AC = 16$, what is the perimeter of trapezoid $ABEF$?
1) 24
2) 36
3) 40
4) 44

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



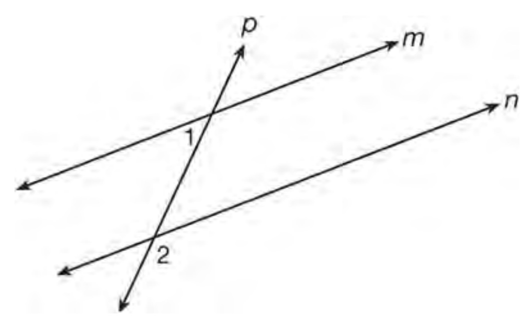

What is $m\angle DBC$?
1) 40
2) 45
3) 50
4) 80

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




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

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

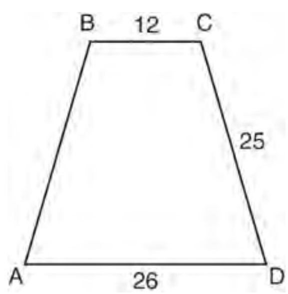



If $m\angle 1 = 4x + 14$ and $m\angle 2 = 8x + 10$, lines $m$ and $n$ are parallel when $x$ equals
1) 1
2) 6
3) 13
4) 17

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

265 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

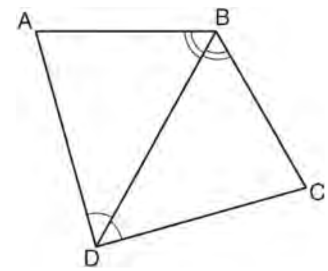
266 In the diagram below of isosceles trapezoid $ABCD$, $AB = CD = 25$, $AD = 26$, and $BC = 12$.




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

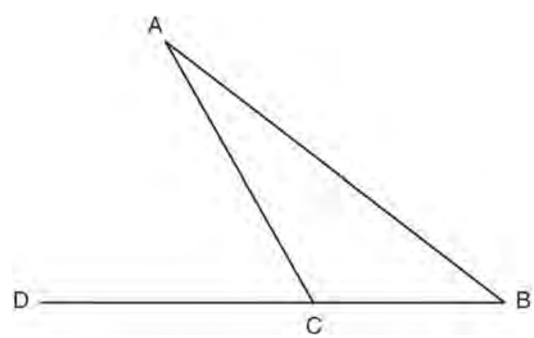
267 Find the slope of a line perpendicular to the line whose equation is $2y - 6x = 4$.

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



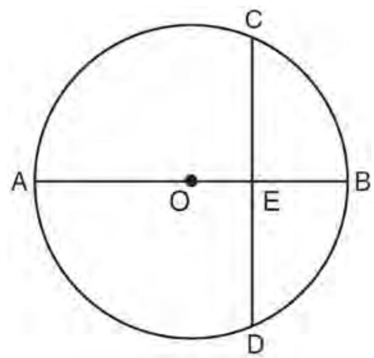

Which statement must be true?
1) $\angle ADB \cong \angle CBD$
2) $\angle ABC \cong \angle ADC$
3) $\overline{AB} \cong \overline{CD}$
4) $\overline{AD} \cong \overline{CD}$

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



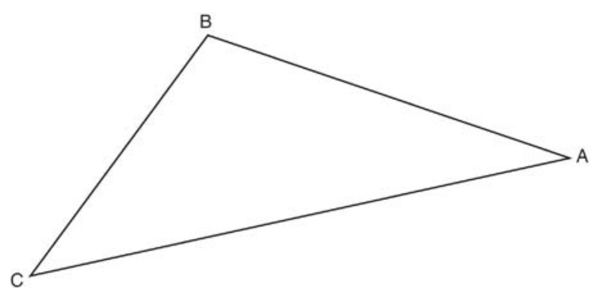

What is $m\angle B$?
1) 5
2) 20
3) 25
4) 55

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



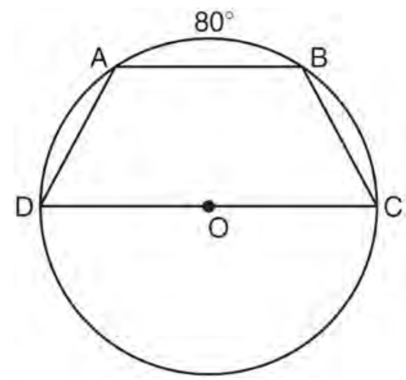

What is the length of $\overline{CE}$?
1) $4\sqrt{3}$
2) $2\sqrt{3}$
3) $8\sqrt{2}$
4) $4\sqrt{2}$

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



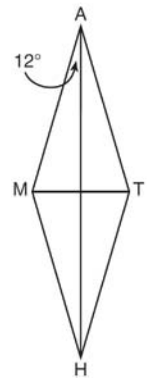

272 What is an equation of a circle with center $(7,-3)$ and radius 4?
1) $(x-7)^2+(y+3)^2=4$
2) $(x+7)^2+(y-3)^2=4$
3) $(x-7)^2+(y+3)^2=16$
4) $(x+7)^2+(y-3)^2=16$

273 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 $m\overset{\frown}{BC}$.



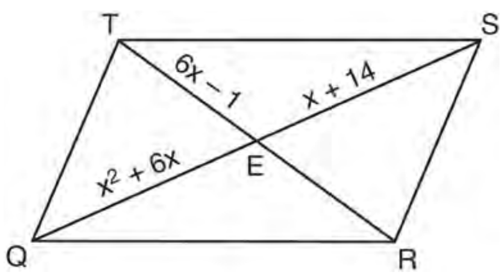

274 Which equation represents the perpendicular bisector of $\overline{AB}$ whose endpoints are $A(8,2)$ and $B(0,6)$?
1) $y=2x-4$
2) $y=-\frac{1}{2}x+2$
3) $y=-\frac{1}{2}x+6$
4) $y=2x-12$

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



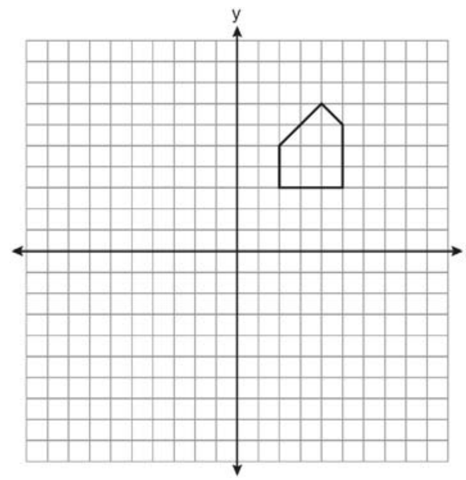

If m$\angle HAM$ = 12, what is m$\angle AMT$?
1) 12
2) 78
3) 84
4) 156

276 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.




277 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 $\pi$?
1) $12\pi$
2) $36\pi$
3) $48\pi$
4) $288\pi$

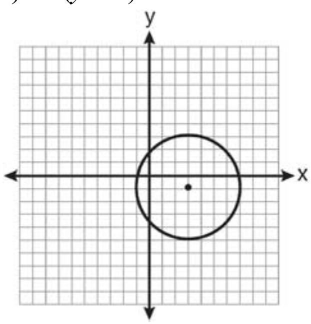
278 A pentagon is drawn on the set of axes below. If the pentagon is reflected over the $y$-axis, determine if this transformation is an isometry. Justify your answer. [The use of the set of axes is optional.]

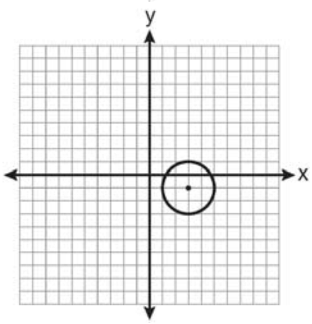


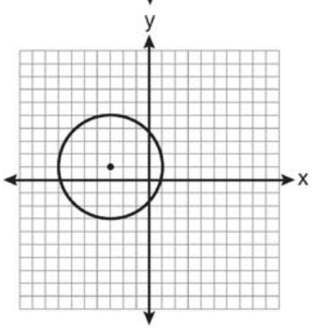

279 In the diagram below of $\overline{ABCD}$, $\overline{AC} \cong \overline{BD}$.

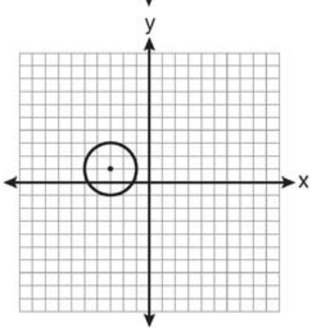

Using this information, it could be proven that
1) $BC = AB$
2) $AB = CD$
3) $AD - BC = CD$
4) $AB + CD = AD$

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

1) 

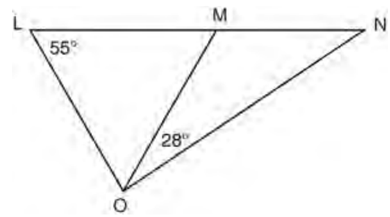

2) 


3) 


4) 


281 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.

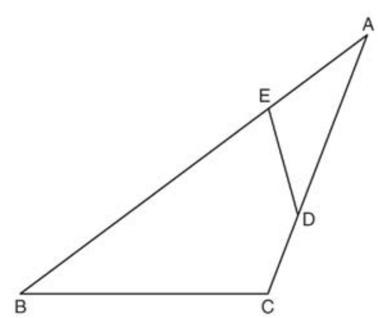
282 In the diagram below, $\triangle LMO$ is isosceles with $LO = MO$.



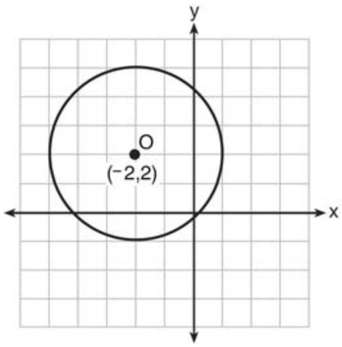

If $m\angle L = 55$ and $m\angle NOM = 28$, what is $m\angle N$?
1) 27
2) 28
3) 42
4) 70

283 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.

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



285 What is an equation of circle $O$ shown in the graph below?

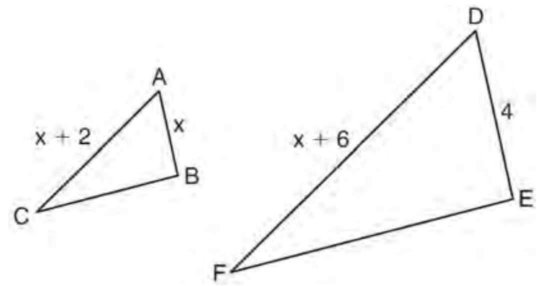



1) $(x+2)^2+(y-2)^2=9$
2) $(x+2)^2+(y-2)^2=3$
3) $(x-2)^2+(y+2)^2=9$
4) $(x-2)^2+(y+2)^2=3$

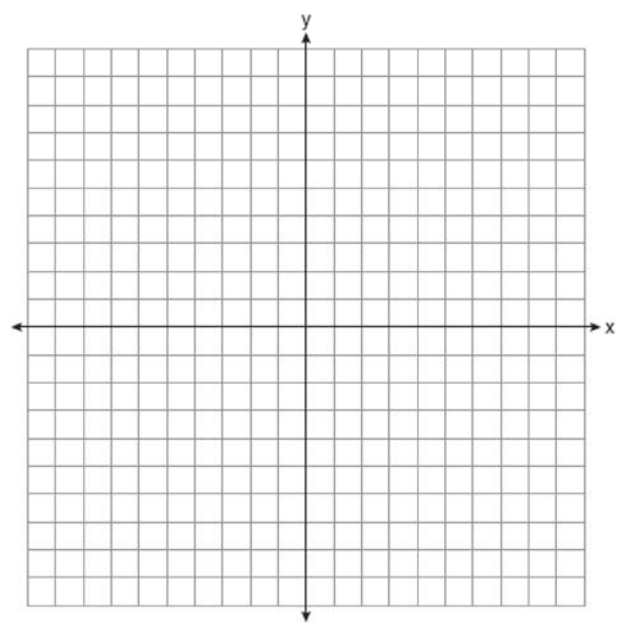
286 Plane $\mathcal{A}$ is parallel to plane $\mathcal{B}$. Plane $\mathcal{C}$ intersects plane $\mathcal{A}$ in line $m$ and intersects plane $\mathcal{B}$ in line $n$. Lines $m$ and $n$ are
1) intersecting
2) parallel
3) perpendicular
4) skew

287 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 $\mathcal{D}$.

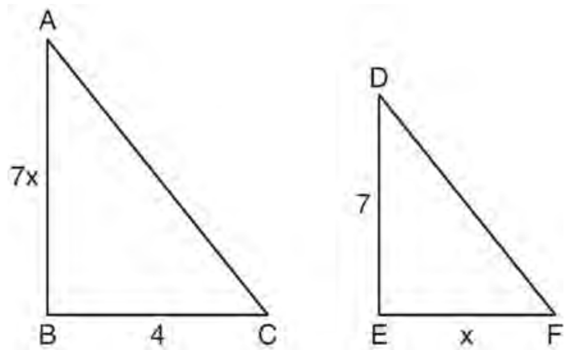
288 In the diagram below, $\triangle ABC \sim \triangle DEF$, $DE = 4$, $AB = x$, $AC = x + 2$, and $DF = x + 6$. Determine the length of $\overline{AB}$. [Only an algebraic solution can receive full credit.]




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

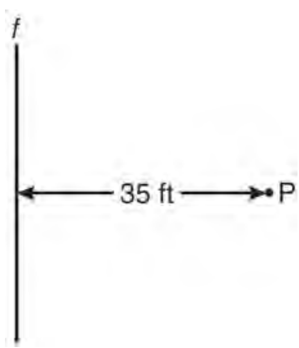


290 As shown in the diagram below, $\Delta ABC \sim \Delta DEF$, $AB = 7x$, $BC = 4$, $DE = 7$, and $EF = x$.



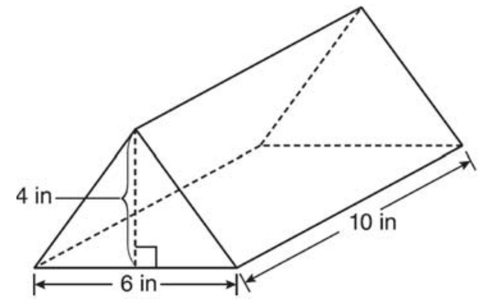

What is the length of $\overline{AB}$?
1) 28
2) 2
3) 14
4) 4

291 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

292 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

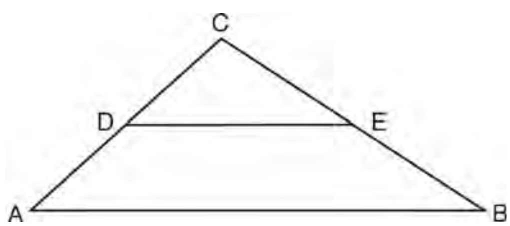
293 Which equation represents the line that is perpendicular to $2y = x + 2$ and passes through the point $(4,3)$?
1) $y = \frac{1}{2}x - 5$
2) $y = \frac{1}{2}x + 1$
3) $y = -2x + 11$
4) $y = -2x - 5$

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

295 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

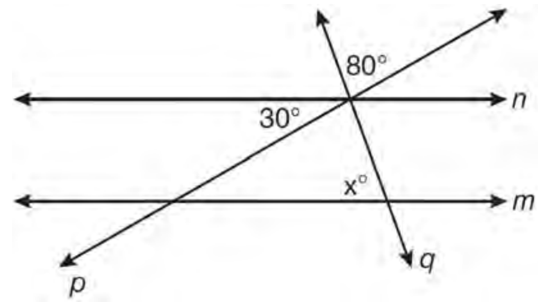
296 In $\triangle ABC$, $AB = 5$ feet and $BC = 3$ feet. Which inequality represents all possible values for the length of $\overline{AC}$, in feet?
1) $2 \le AC \le 8$
2) $2 < AC < 8$
3) $3 \le AC \le 7$
4) $3 < AC < 7$

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



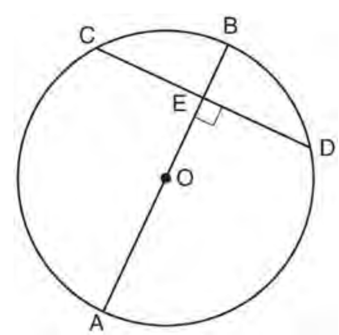

Which statement is *not* true?
1) $CE = \frac{1}{2} CB$
2) $DE = \frac{1}{2} AB$
3) area of $\triangle CDE = \frac{1}{2}$ area of $\triangle CAB$
4) perimeter of $\triangle CDE = \frac{1}{2}$ perimeter of $\triangle CAB$

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

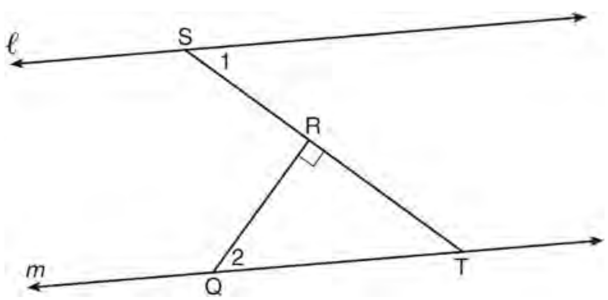



What value of $x$ would make lines $n$ and $m$ parallel?
1) 110
2) 80
3) 70
4) 50

299 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 $\overline{CE}$.

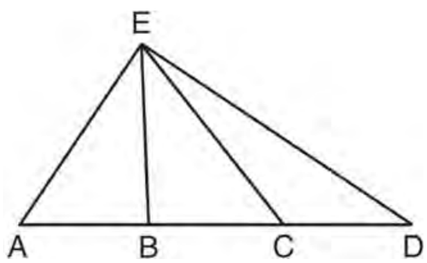


300 In the diagram below, $\ell \parallel m$ and $\overline{QR} \perp \overline{ST}$ at $R$.




If m∠1 = 63, find m∠2.

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



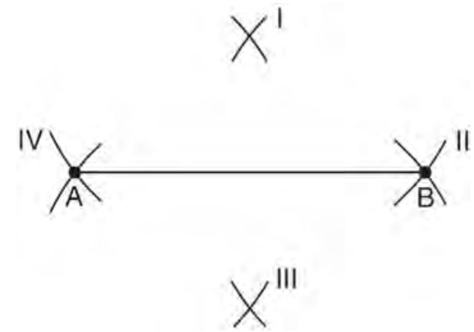

If $\overline{AB} \cong \overline{CD}$, which statement could always be proven?

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

302 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) $\{15, 36, 39\}$

303 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

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

305 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) $2\sqrt{26}$

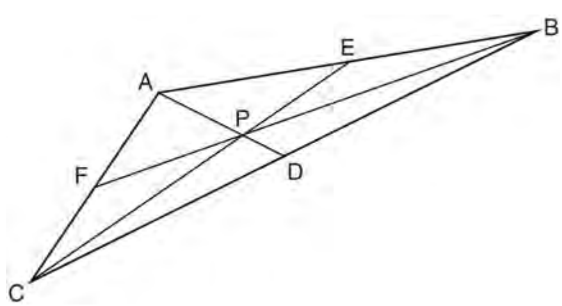
306 When solved graphically, what is the solution to the following system of equations?

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

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

307 A paint can is in the shape of a right circular cylinder. The volume of the paint can is $600\pi$ 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.

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

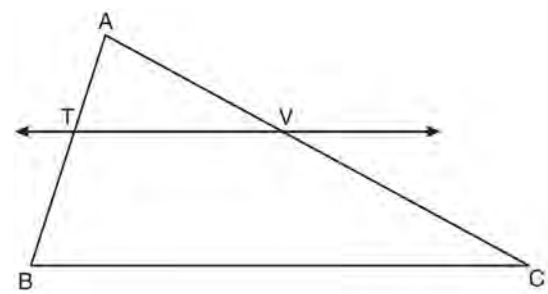



Point $P$ must be the
1) centroid
2) circumcenter
3) Incenter
4) orthocenter

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

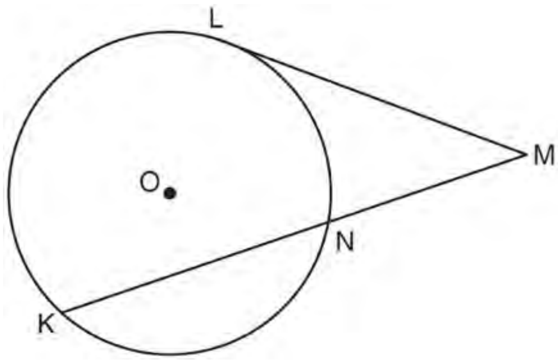
310 In the diagram below of $\triangle ABC$, $\overleftrightarrow{TV} \parallel \overline{BC}$, $AT = 5$, $TB = 7$, and $AV = 10$.




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

311 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) $\frac{(n-2)\cdot 180}{n}$

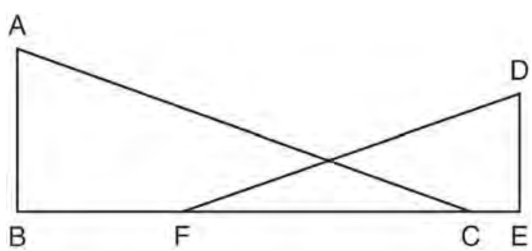
312 In the diagram below, tangent $\overline{ML}$ and secant $\overline{MNK}$ are drawn to circle $O$. The ratio $m\overset{\frown}{LN} : m\overset{\frown}{NK} : m\overset{\frown}{KL}$ is $3:4:5$. Find $m\angle LMK$.



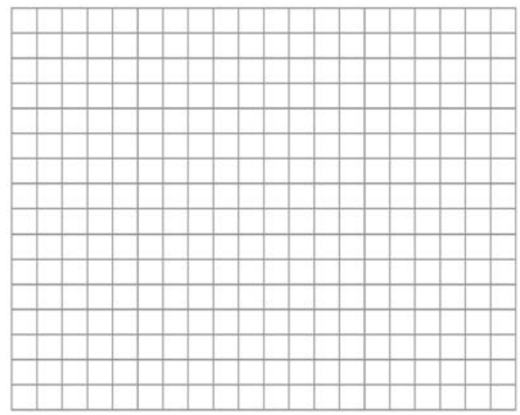

313 What is the image of the point $(2,-3)$ after the transformation $r_{y-\text{axis}}$?

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

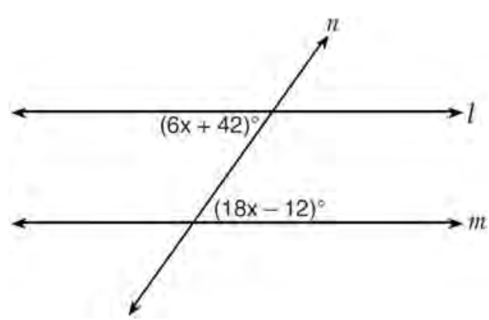
314 In the diagram below, $\overline{BFCE}$, $\overline{AB} \perp \overline{BE}$, $\overline{DE} \perp \overline{BE}$, and $\angle BFD \cong \angle ECA$. Prove that $\Delta ABC \sim \Delta DEF$.




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



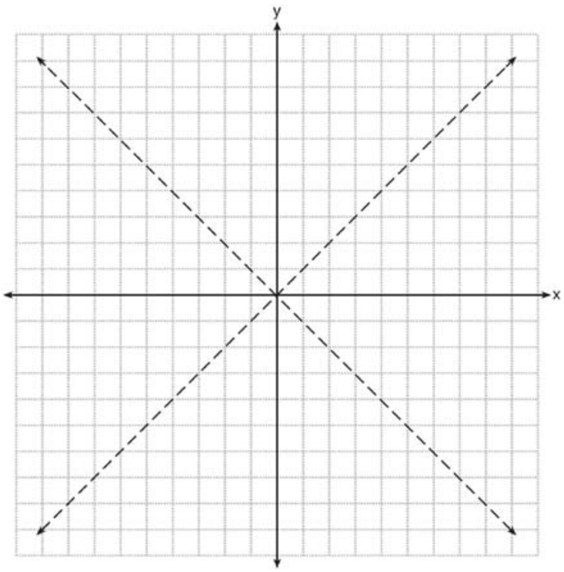
316 Line $n$ intersects lines $l$ and $m$, forming the angles shown in the diagram below.




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

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

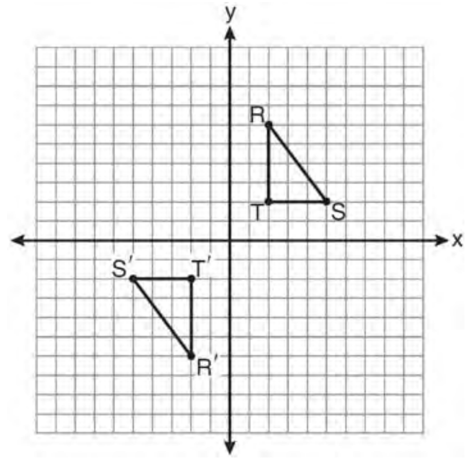
317 The graph below shows the locus of points equidistant from the $x$-axis and $y$-axis. On the same set of axes, graph the locus of points 3 units from the line $x = 0$. Label with an **X** *all* points that satisfy both conditions.




318 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

319 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) $\sqrt{50}$

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




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

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

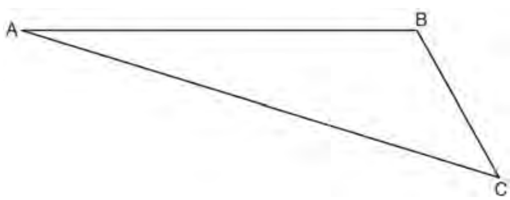
$$x + 6y = 12$$

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

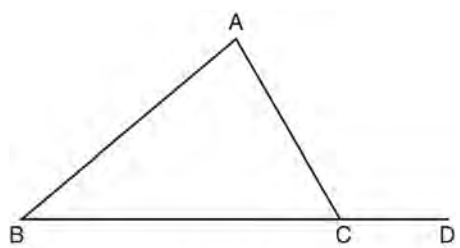
Which statement best describes the two lines?
1) The lines are parallel.
2) The lines are the same line.
3) The lines are perpendicular.
4) The lines intersect at an angle other than 90°.

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

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




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

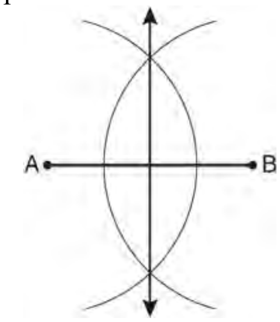


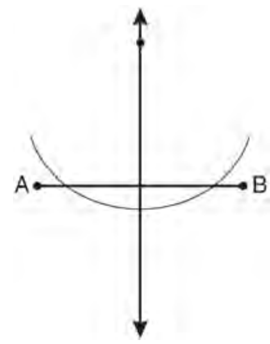
(Not drawn to scale)

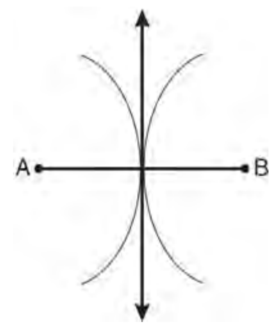
If $m\angle A = x^2 - 6x$, $m\angle B = 2x - 3$, and $m\angle ACD = 9x + 27$, what is the value of $x$?
1) 10
2) 2
3) 3
4) 15

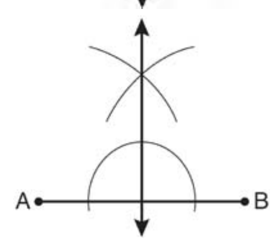
325 A sphere has a diameter of 18 meters. Find the volume of the sphere, in cubic meters, in terms of $\pi$.

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

1) 


2) 

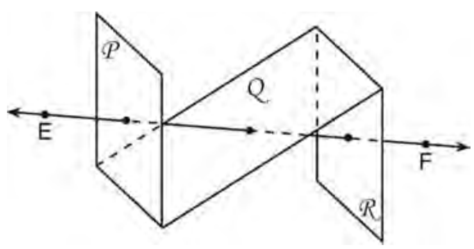

3) 


4) 

327 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

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

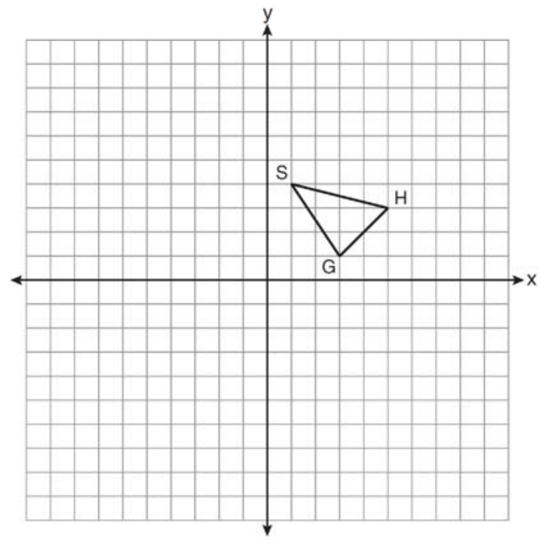
329 As shown in the diagram below, $\overleftrightarrow{EF}$ intersects planes $\mathcal{P}$, $\mathcal{Q}$, and $\mathcal{R}$.




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 $\mathcal{P}$.

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

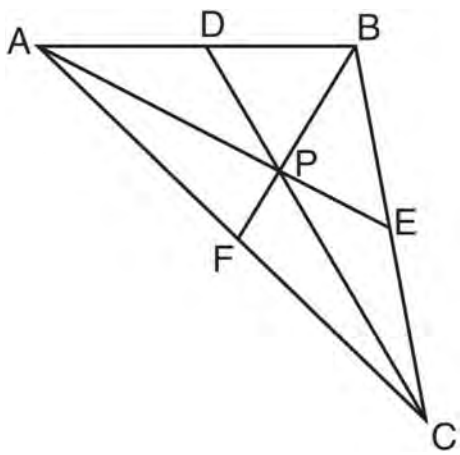
331 As shown on the set of axes below, $\triangle GHS$ has vertices $G(3,1)$, $H(5,3)$, and $S(1,4)$. Graph and state the coordinates of $\triangle G''H''S''$, the image of $\triangle GHS$ after the transformation $T_{-3,1} \circ D_2$.




332 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

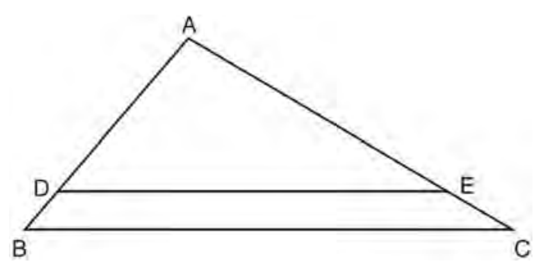
333 Triangle $PQR$ has angles in the ratio of $2:3:5$. Which type of triangle is $\triangle PQR$?
1) acute
2) isosceles
3) obtuse
4) right

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



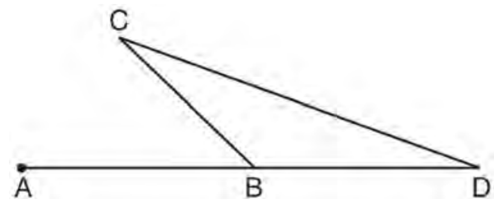

What is the length of $\overline{BP}$?
1) 6
2) 9
3) 3
4) 12

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



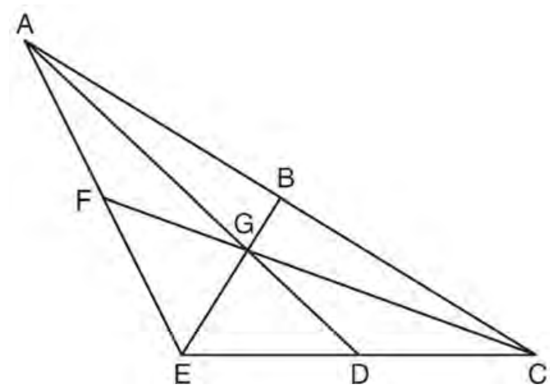

If $AB = 10$, $AD = 8$, and $AE = 12$, what is the length of $\overline{EC}$?
1) 6
2) 2
3) 3
4) 15

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



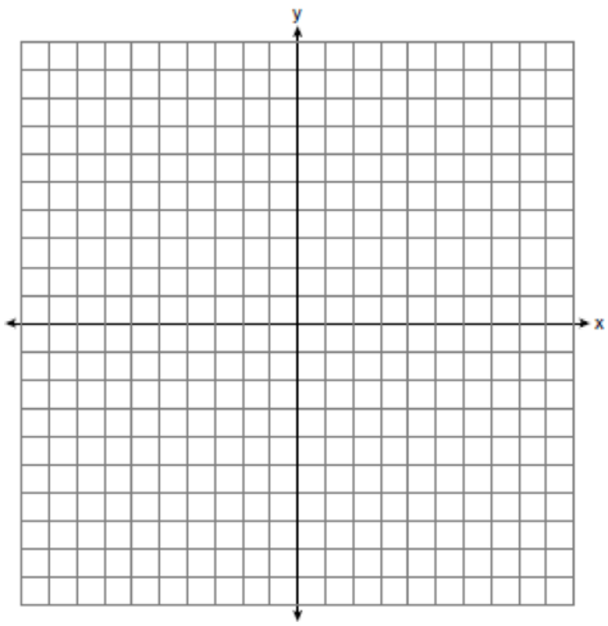

Which statement must be true?
1) $m\angle C > m\angle D$
2) $m\angle ABC < m\angle D$
3) $m\angle ABC > m\angle C$
4) $m\angle ABC > m\angle C + m\angle D$

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

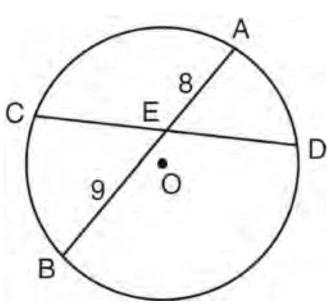



What is the length, in centimeters, of $\overline{GC}$?
1) 24
2) 12
3) 6
4) 4

338 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.




339 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.




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

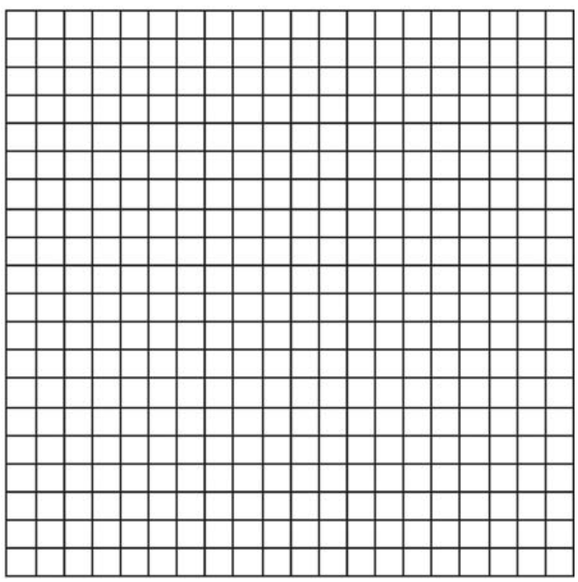
341 Which statement is the negation of “Two is a prime number” and what is the truth value of the negation?
1) Two is not a prime number; false
2) Two is not a prime number; true
3) A prime number is two; false
4) A prime number is two; true

342 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) $(-5, 2)$

343 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

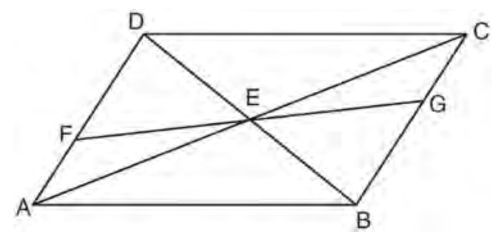
344 The diameter of a sphere is 15 inches. What is the volume of the sphere, to the *nearest tenth of a cubic inch*?
1) 706.9
2) 1767.1
3) 2827.4
4) 14,137.2

345 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.]

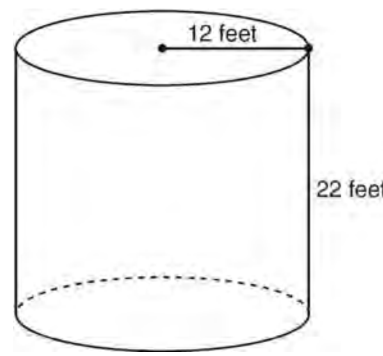


346 In $\triangle PQR$, $\angle PRQ$ is a right angle and $\overline{RT}$ is drawn perpendicular to hypotenuse $\overline{PQ}$. If $PT = x$, $RT = 6$, and $TQ = 4x$, what is the length of $\overline{PQ}$?
1) 9
2) 12
3) 3
4) 15

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




348 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?




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

350 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

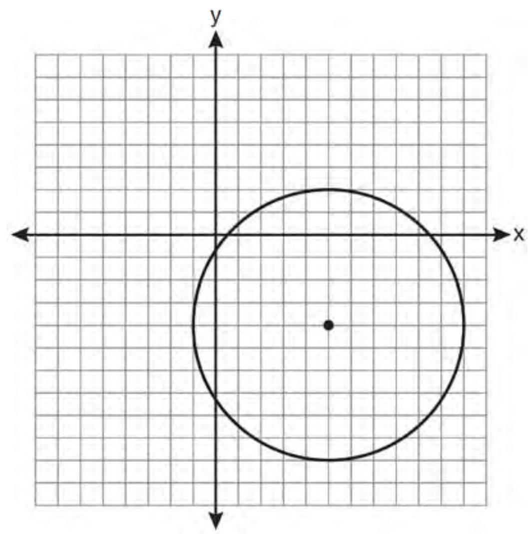
351 The volume, in cubic centimeters, of a sphere whose diameter is 6 centimeters is
1) $12\pi$
2) $36\pi$
3) $48\pi$
4) $288\pi$

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

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

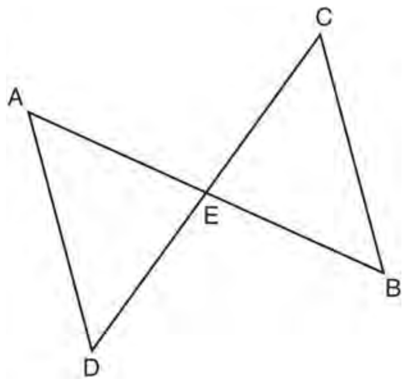
354 If the vertex angles of two isosceles triangles are congruent, then the triangles must be
1) acute
2) congruent
3) right
4) similar

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




356 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

357 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 $\angle BCE \cong \angle DAE$.

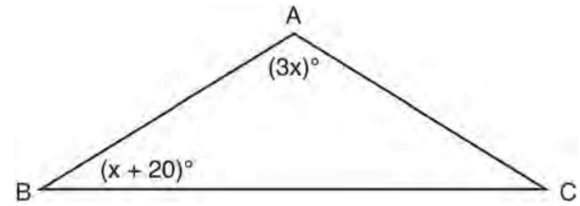



Triangle $DAE$ can be proved congruent to triangle $BCE$ by
1) ASA
2) SAS
3) SSS
4) HL

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

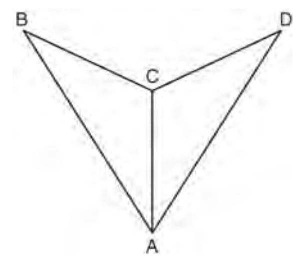
359 In circle $O$, diameter $\overline{RS}$ has endpoints $R(3a, 2b - 1)$ and $S(a - 6, 4b + 5)$. Find the coordinates of point $O$, in terms of $a$ and $b$. Express your answer in simplest form.

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




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

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




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

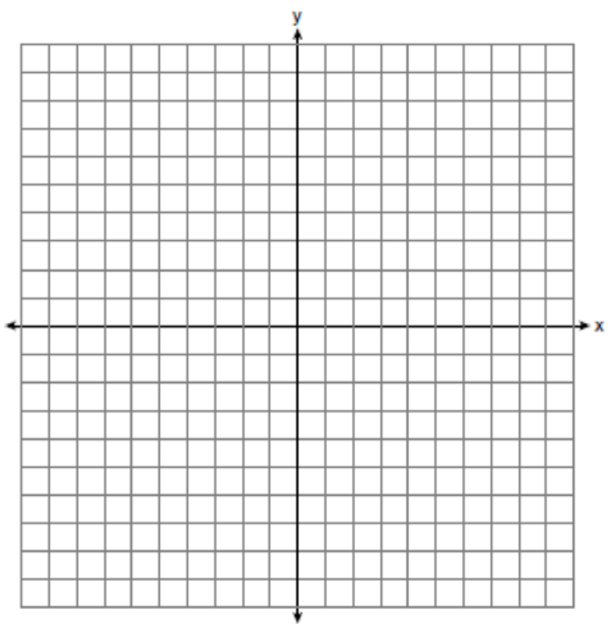
362 Which quadrilateral has diagonals that always bisect its angles and also bisect each other?
1) rhombus
2) rectangle
3) parallelogram
4) isosceles trapezoid

363 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) $\sqrt{233}$

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

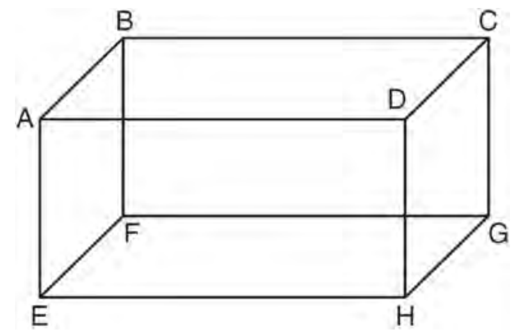
$$y = (x-2)^2 - 3$$
$$2y + 16 = 4x$$




365 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

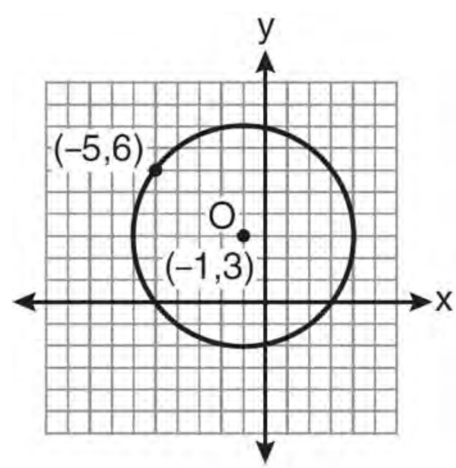
366 The diagram below shows a rectangular prism.




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

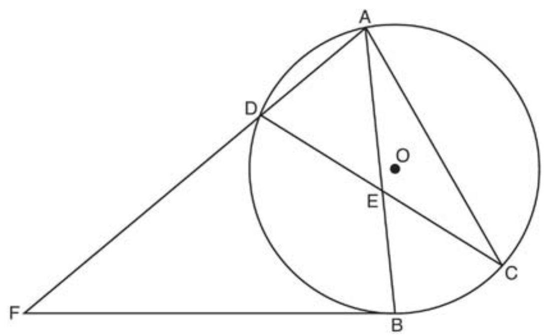
1) $\overline{AB}$ and $\overline{DH}$
2) $\overline{AE}$ and $\overline{DC}$
3) $\overline{BC}$ and $\overline{EH}$
4) $\overline{CG}$ and $\overline{EF}$

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

368 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 $m\angle DAC$.

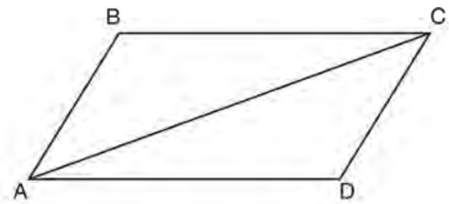
369 An equation of the line that passes through $(2,-1)$ and is parallel to the line $2y + 3x = 8$ is

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

370 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) $(-4b, -3a)$

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

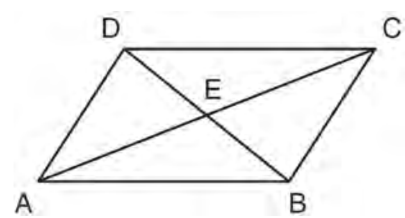



| Statement | Reason |
|---|---|
| 1. ABCD is a parallelogram. | 1. Given |
| 2. $\overline{BC} \cong \overline{AD}$ <br> $\overline{AB} \cong \overline{DC}$ | 2. Opposite sides of a parallelogram are congruent. |
| 3. $\overline{AC} \cong \overline{CA}$ | 3. Reflexive Postulate of Congruency |
| 4.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

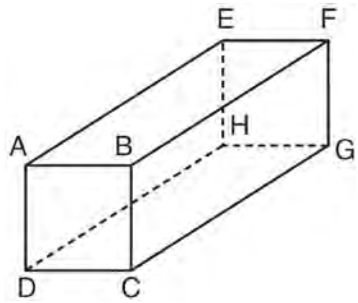
372 In the diagram below, parallelogram $ABCD$ has diagonals $\overline{AC}$ and $\overline{BD}$ that intersect at point $E$.




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) $\overline{DE} \cong \overline{EB}$

373 The diagram below represents a rectangular solid.



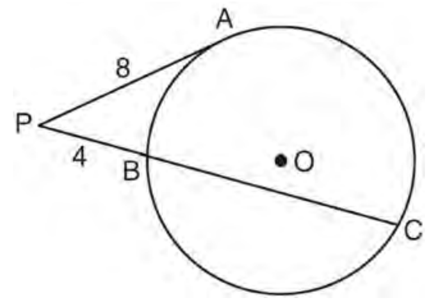

Which statement must be true?
1) $\overline{EH}$ and $\overline{BC}$ are coplanar
2) $\overline{FG}$ and $\overline{AB}$ are coplanar
3) $\overline{EH}$ and $\overline{AD}$ are skew
4) $\overline{FG}$ and $\overline{CG}$ are skew

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

375 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

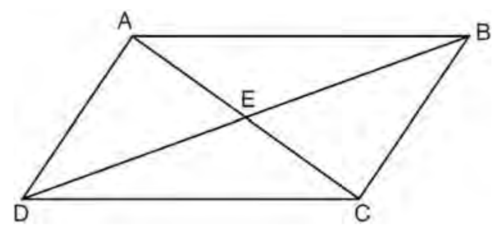
376 The coordinates of the endpoints of $\overline{AB}$ are $A(0,0)$ and $B(0,6)$. The equation of the perpendicular bisector of $\overline{AB}$ is
1) $x = 0$
2) $x = 3$
3) $y = 0$
4) $y = 3$

377 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

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

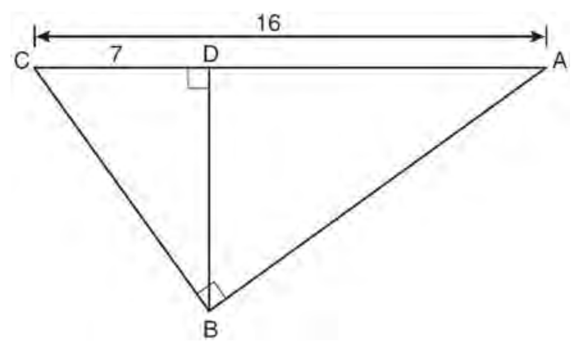



Which statement must be true?
1) $\overline{AC} \cong \overline{DB}$
2) $\angle ABD \cong \angle CBD$
3) $\Delta AED \cong \Delta CEB$
4) $\Delta DCE \cong \Delta BCE$

379 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) $y = 2x - 1$

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



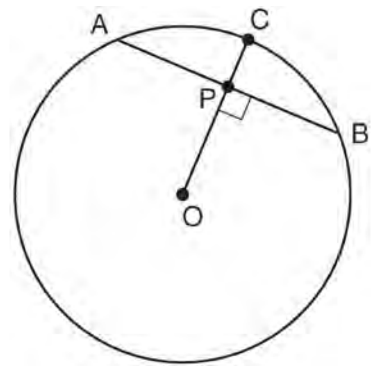

What is the length of $\overline{BD}$?

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

381 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 $n$.

382 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

383 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?

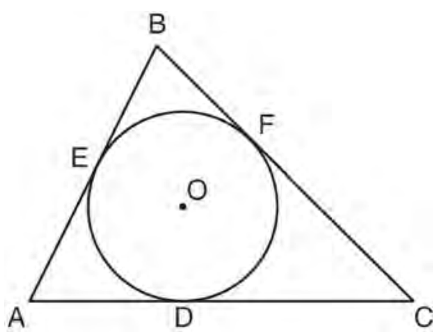
1) $(-2,3)$ and 6
2) $(2,-3)$ and 6
3) $(-2,3)$ and 36
4) $(2,-3)$ and 36

384 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

385 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) $3x + 4y = 14$

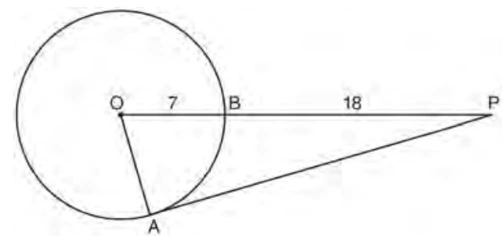
386 In the diagram below, $\triangle ABC$ is circumscribed about circle $O$ and the sides of $\triangle ABC$ are tangent to the circle at points $D$, $E$, and $F$.




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

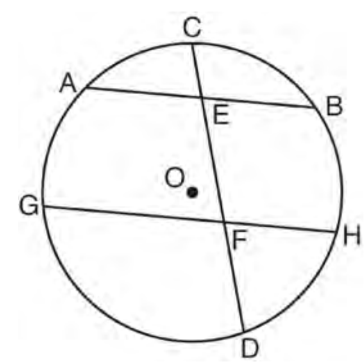
387 Point M is the midpoint of $\overline{AB}$. If the coordinates of $A$ are $(-3, 6)$ and the coordinates of $M$ are $(-5, 2)$, what are the coordinates of $B$?
1) $(1, 2)$
2) $(7, 10)$
3) $(-4, 4)$
4) $(-7, -2)$

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



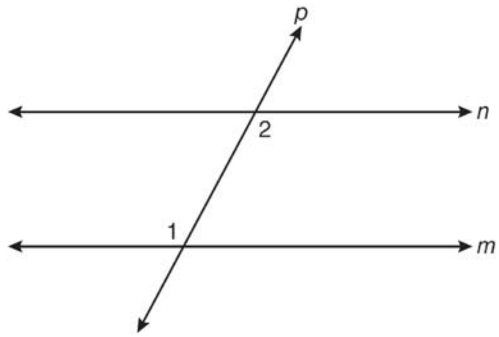

What is the length of $\overline{AP}$?
1) 10
2) 12
3) 17
4) 24

389 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 $F$.



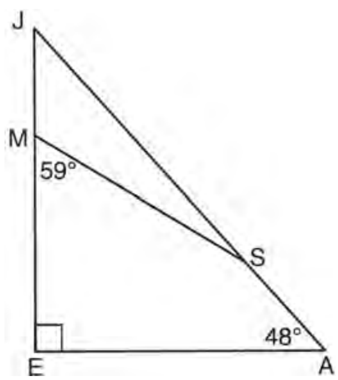

Which statement must always be true?
1) $\overset{\frown}{AC} \cong \overset{\frown}{CB}$
2) $\overset{\frown}{DH} \cong \overset{\frown}{BH}$
3) $\overset{\frown}{AB} \cong \overset{\frown}{GH}$
4) $\overset{\frown}{AG} \cong \overset{\frown}{BH}$

390 In the diagram below, line $p$ intersects line $m$ and line $n$.



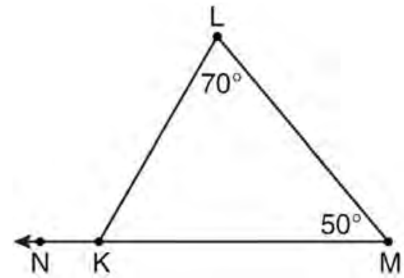

If $m\angle 1 = 7x$ and $m\angle 2 = 5x + 30$, lines $m$ and $n$ are parallel when $x$ equals
1) 12.5
2) 15
3) 87.5
4) 105

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



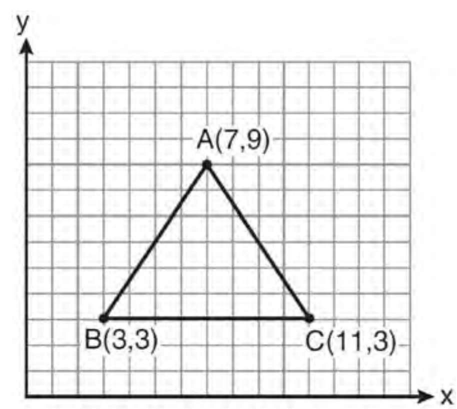

What is $m\angle JSM$?
1) 163
2) 121
3) 42
4) 17

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




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

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

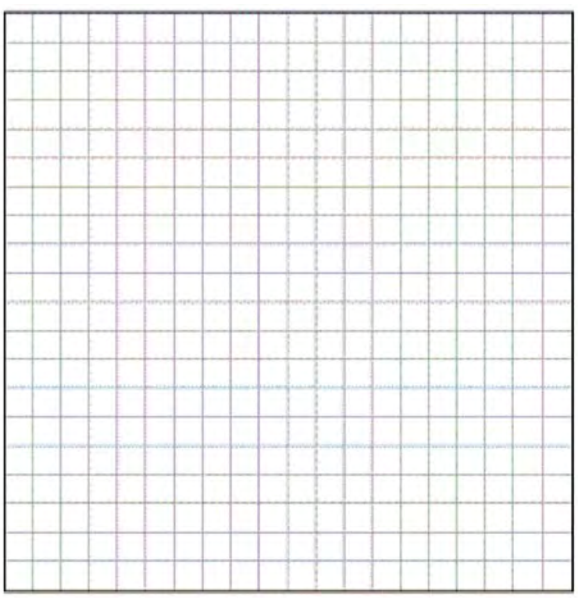



What are the coordinates of the centroid of $\triangle ABC$?
1) $(5,6)$
2) $(7,3)$
3) $(7,5)$
4) $(9,6)$

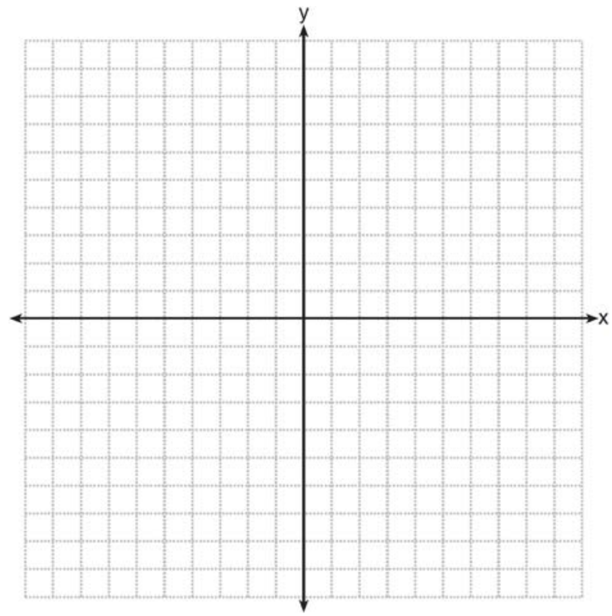
394 What is an equation of the line that passes through the point $(-2, 3)$ and is parallel to the line whose equation is $y = \frac{3}{2}x - 4$?

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

395 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 $\Delta ABC$ after the transformation $r_{\text{x-axis}}$. [The use of the grid is optional.]



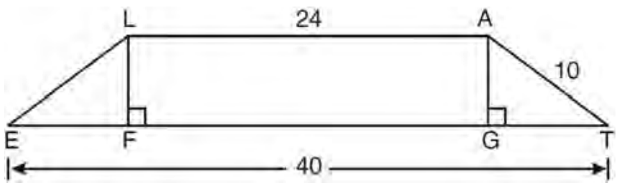
396 The coordinates of the vertices of $\Delta ABC$ are $A(1, 2)$, $B(-4, 3)$, and $C(-3, -5)$. State the coordinates of $\Delta A'B'C'$, the image of $\Delta ABC$ after a rotation of 90º about the origin. [The use of the set of axes below is optional.]




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

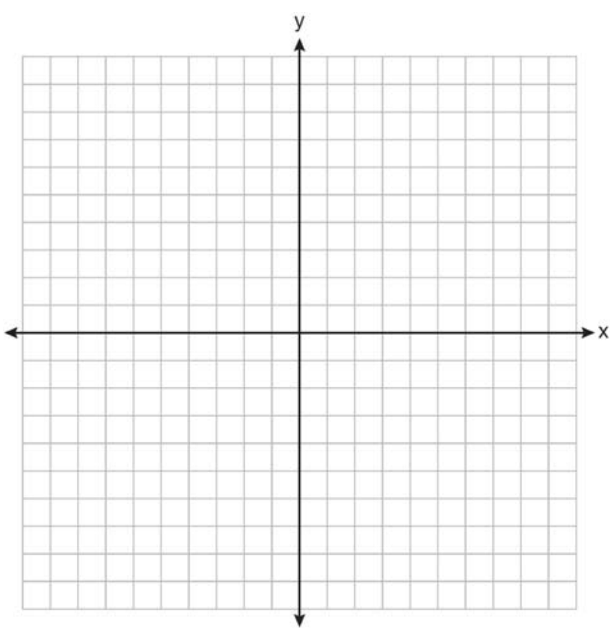
1) $(x + 2)^2 + (y - 8)^2 = 9$
2) $(x - 2)^2 + (y + 8)^2 = 9$
3) $(x + 2)^2 + (y - 8)^2 = 81$
4) $(x - 2)^2 + (y + 8)^2 = 81$

398 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.



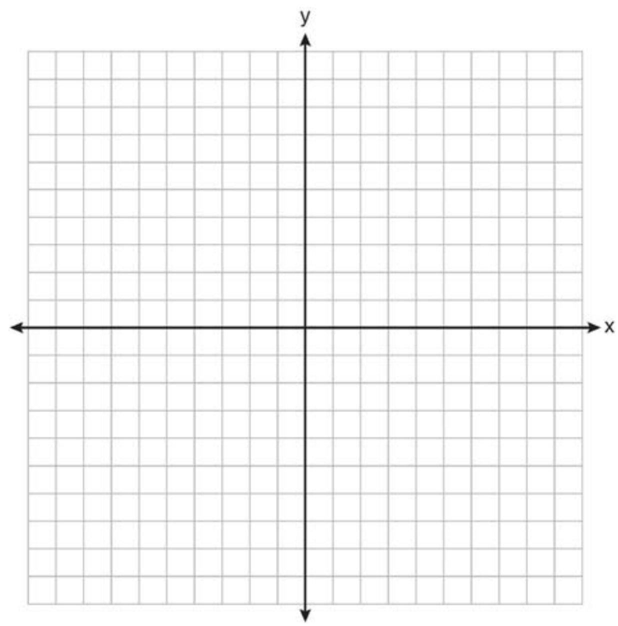

What is the length of $\overline{LF}$?
1) 6
2) 8
3) 3
4) 4

399 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.]




400 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°

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

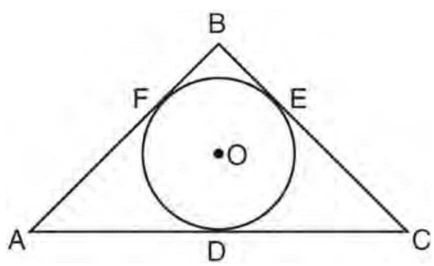



402 Which reason could be used to prove that a parallelogram is a rhombus?
1) Diagonals are congruent.
2) Opposite sides are parallel.
3) Diagonals are perpendicular.
4) Opposite angles are congruent.

403 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

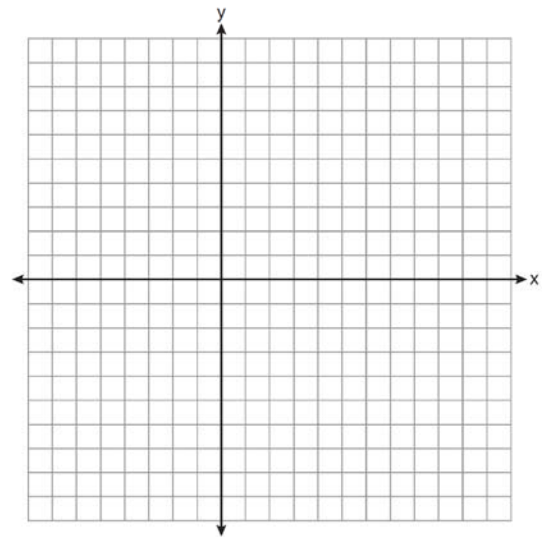
404 Two lines are represented by the equations $x + 2y = 4$ and $4y - 2x = 12$. Determine whether these lines are parallel, perpendicular, or neither. Justify your answer.

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

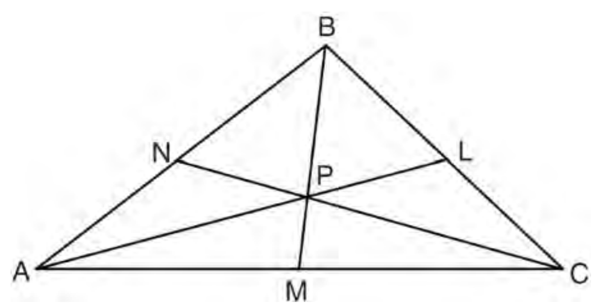



What is the perimeter of $\triangle ABC$?
1) 15
2) 25
3) 30
4) 60

406 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.]

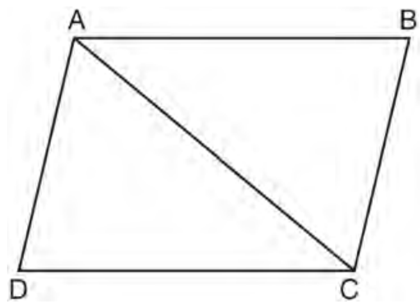



407 In the diagram below, point $P$ is the centroid of $\triangle ABC$.



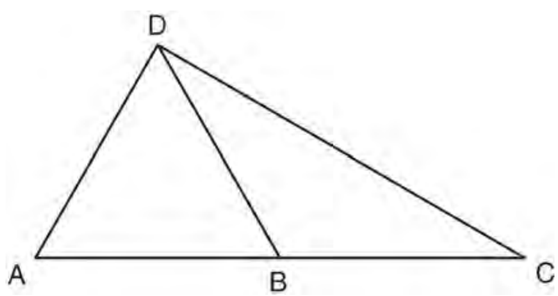

If $PM = 2x + 5$ and $BP = 7x + 4$, what is the length of $\overline{PM}$?
1) 9
2) 2
3) 18
4) 27

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

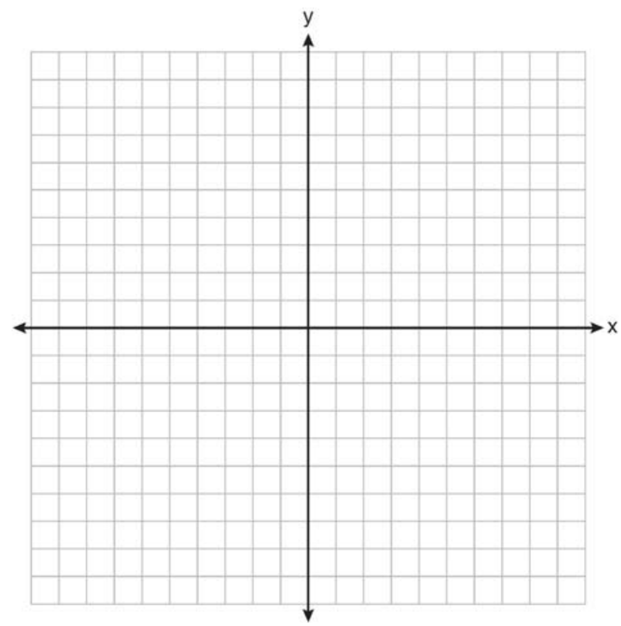



Which method can be used to prove $\triangle ABC$ is congruent to $\triangle CDA$?
1) AAS
2) SSA
3) SAS
4) SSS

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



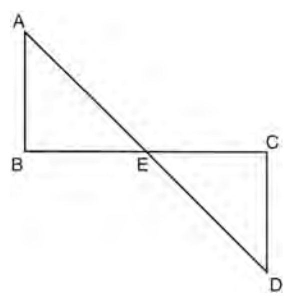

410 Triangle $ABC$ has coordinates $A(2,-2)$, $B(2,1)$, and $C(4,-2)$. Triangle $A'B'C'$ is the image of $\triangle ABC$ under $T_{5,-2}$. On the set of axes below, graph and label $\triangle ABC$ and its image, $\triangle A'B'C'$. Determine the relationship between the area of $\triangle ABC$ and the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




411 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 $c$.

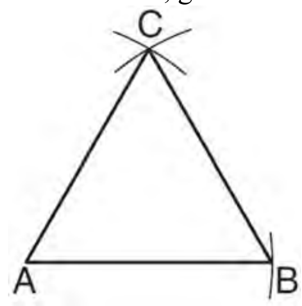
412 The volume of a rectangular prism is 144 cubic inches. The height of the prism is 8 inches. Which measurements, in inches, could be the dimensions of the base?
1) 3.3 by 5.5
2) 2.5 by 7.2
3) 12 by 8
4) 9 by 9

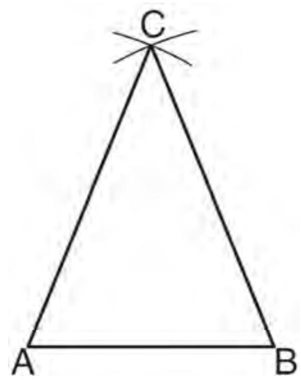
413 Given: $\overline{AD}$ bisects $\overline{BC}$ at $E$.
$\overline{AB} \perp \overline{BC}$
$\overline{DC} \perp \overline{BC}$
Prove: $\overline{AB} \cong \overline{DC}$

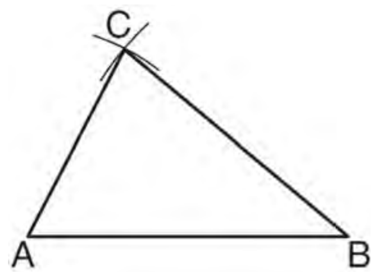


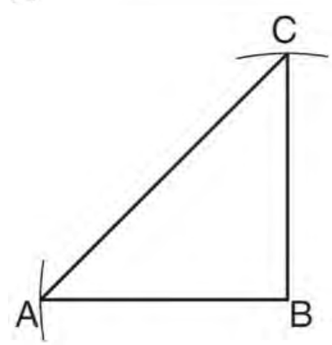

414 What is the slope of a line that is perpendicular to the line represented by the equation $x + 2y = 3$?
1) $-2$
2) $2$
3) $-\frac{1}{2}$
4) $\frac{1}{2}$

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

1) 

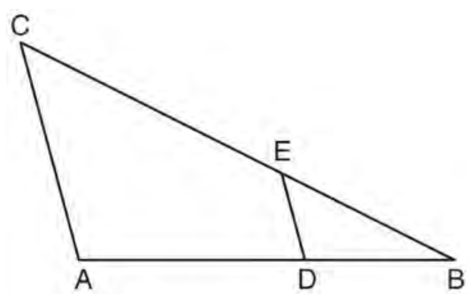

2) 


3) 


4) 

416 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 $\mathcal{R}$.

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

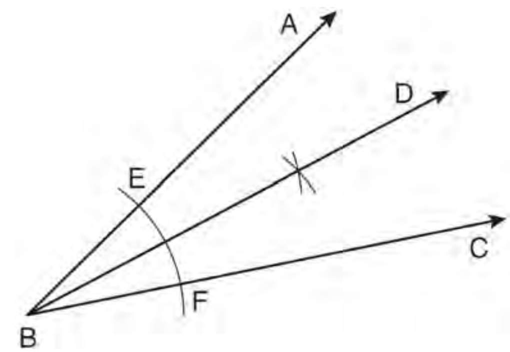



418 A line segment has endpoints $A(7,-1)$ and $B(-3,3)$. What are the coordinates of the midpoint of $\overline{AB}$?
1) $(1,2)$
2) $(2,1)$
3) $(-5,2)$
4) $(5,-2)$

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

420 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

421 .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 $F$.

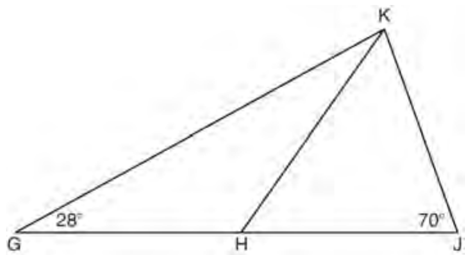



Which statement is *false*?
1) $m\angle ABD = m\angle DBC$
2) $\frac{1}{2}(m\angle ABC) = m\angle ABD$
3) $2(m\angle DBC) = m\angle ABC$
4) $2(m\angle ABC) = m\angle CBD$

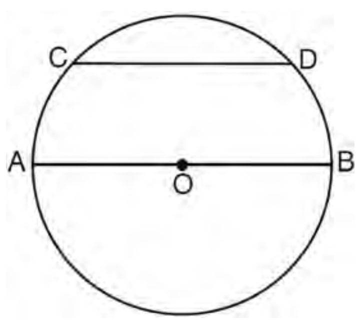
422 What is the image of the point $(-5,2)$ under the translation $T_{3,-4}$?
1) $(-9,5)$
2) $(-8,6)$
3) $(-2,-2)$
4) $(-15,-8)$

423 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 $\pi$.

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



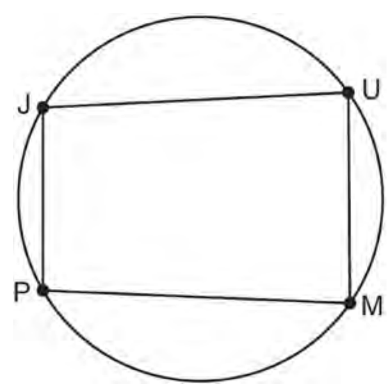

425 In the diagram below of circle $O$, diameter $\overline{AB}$ is parallel to chord $\overline{CD}$.




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

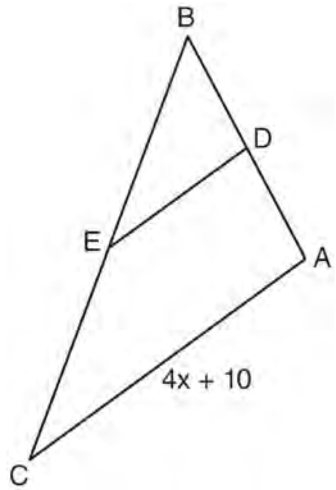
426 In the diagram below, point $M$ is located on $\overleftrightarrow{AB}$. Sketch the locus of points that are 1 unit from $\overleftrightarrow{AB}$ and the locus of points 2 units from point $M$. Label with an **X** all points that satisfy both conditions.


427 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

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

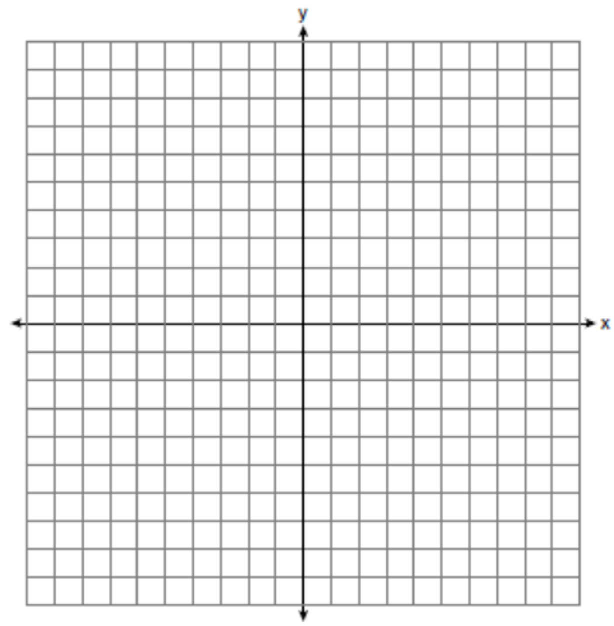



If $AC = 4x + 10$, which expression represents $DE$?
1) $x + 2.5$
2) $2x + 5$
3) $2x + 10$
4) $8x + 20$

429 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

430 Solve the following system of equations graphically.

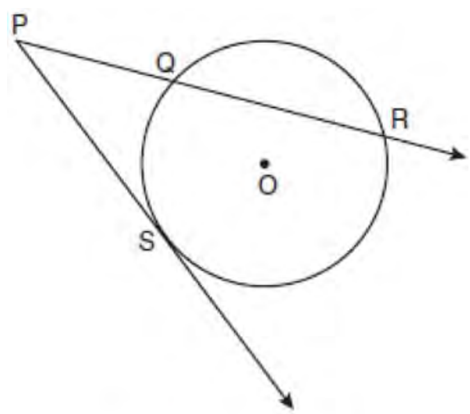
$$2x^2 - 4x = y + 1$$
$$x + y = 1$$




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

432 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

433 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 $PR = x + 18$.



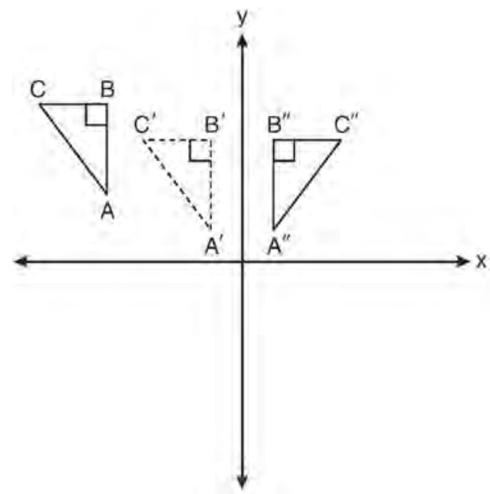
(Not drawn to scale)

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

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

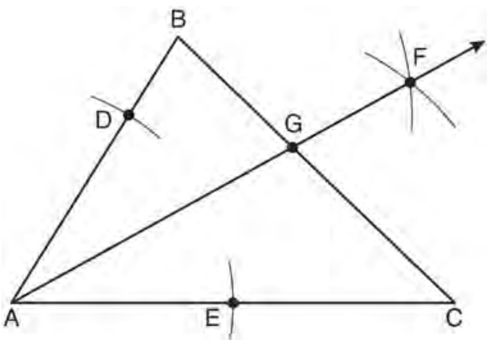
435 In $\Delta DEF$, $m\angle D = 3x + 5$, $m\angle E = 4x - 15$, and $m\angle F = 2x + 10$. Which statement is true?
1) $DF = FE$
2) $DE = FE$
3) $m\angle E = m\angle F$
4) $m\angle D = m\angle F$

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




The composite transformation of $\Delta ABC$ 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

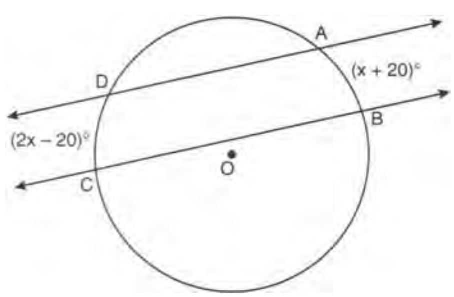
437 As shown in the diagram below of $\triangle ABC$, a compass is used to find points $D$ and $E$, equidistant from point $A$. Next, the compass is used to find point $F$, equidistant from points $D$ and $E$. Finally, a straightedge is used to draw $\overrightarrow{AF}$. Then, point $G$, the intersection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



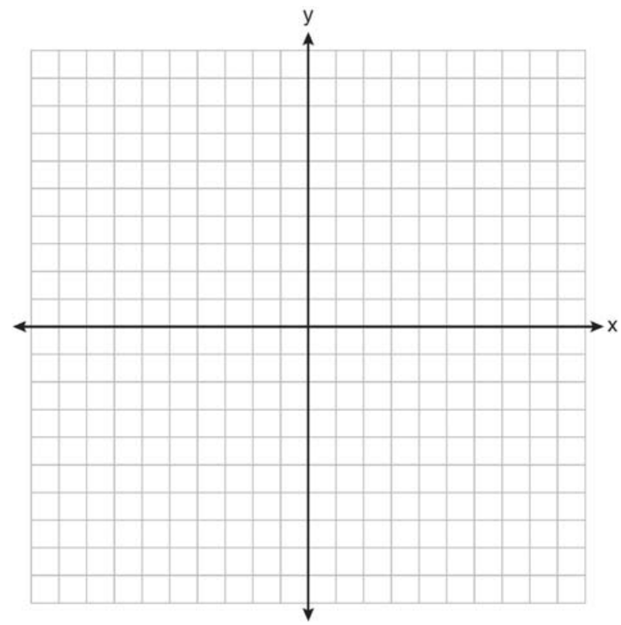

Which statement must be true?

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

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




439 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.

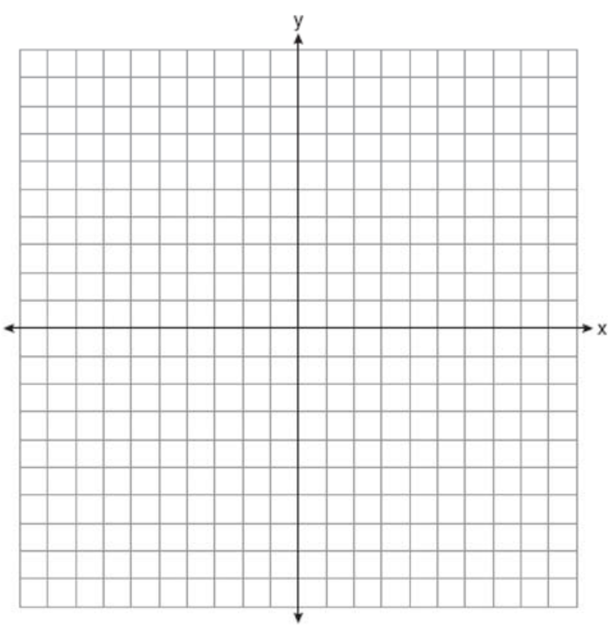



440 When a quadrilateral is reflected over the line $y = x$, which geometric relationship is *not* preserved?

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

441 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) $\frac{1}{10}$

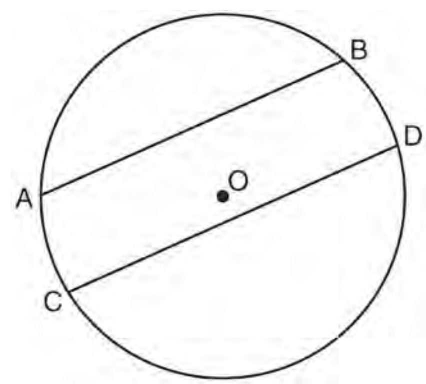
442 The coordinates of trapezoid $ABCD$ are $A(-4,5)$, $B(1,5)$, $C(1,2)$, and $D(-6,2)$. Trapezoid $A''B''C''D''$ is the image after the composition $r_{x\text{-axis}} \circ r_{y=x}$ is performed on trapezoid $ABCD$. State the coordinates of trapezoid $A''B''C''D''$. [The use of the set of axes below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




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

444 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) $\angle ABC \cong \angle EDF$

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



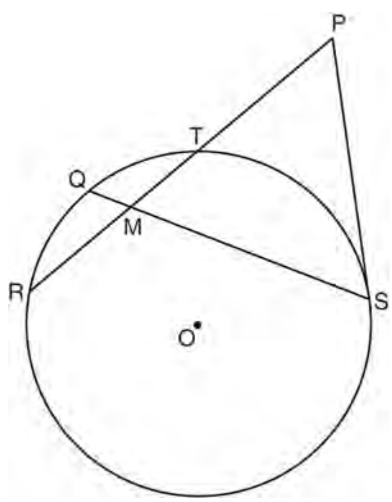

Which statement must be true?
1) $\overset{\frown}{AC} \cong \overset{\frown}{BD}$
2) $\overset{\frown}{AB} \cong \overset{\frown}{CD}$
3) $\overline{AB} \cong \overline{CD}$
4) $\overset{\frown}{ABD} \cong \overset{\frown}{CDB}$

446 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.

447 In circle $O$, a diameter has endpoints $(-5,4)$ and $(3,-6)$. What is the length of the diameter?

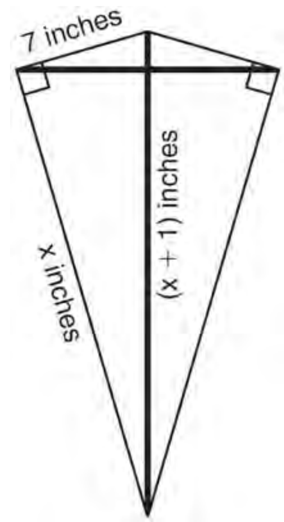
1) $\sqrt{2}$
2) $2\sqrt{2}$
3) $\sqrt{10}$
4) $2\sqrt{41}$

448 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 $\overline{PS}$.

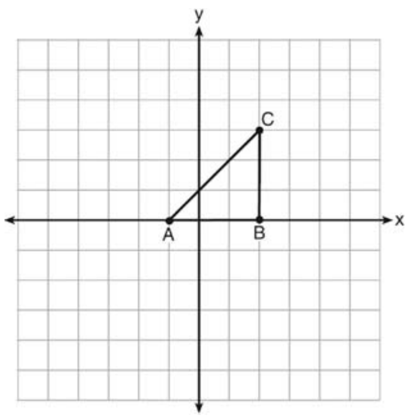
449 As shown in the diagram below, a kite needs a vertical and a horizontal support bar attached at opposite corners. The upper edges of the kite are 7 inches, the side edges are $x$ inches, and the vertical support bar is $(x + 1)$ inches.




What is the measure, in inches, of the vertical support bar?

1) 23
2) 24
3) 25
4) 26

450 Triangle $ABC$ is graphed on the set of axes below.




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

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

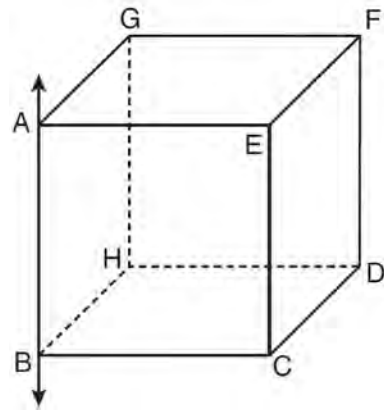
451 The vertices of parallelogram $ABCD$ are $A(2,0)$, $B(0,-3)$, $C(3,-3)$, and $D(5,0)$. If $ABCD$ is reflected over the $x$-axis, how many vertices remain invariant?

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

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

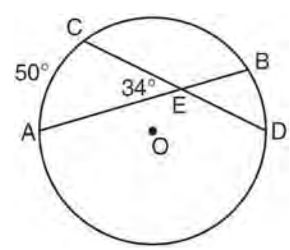
453 In the diagram below, $\overleftrightarrow{AB}$ is perpendicular to plane $AEFG$.




Which plane must be perpendicular to plane $AEFG$?

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

454 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 $m\overset{\frown}{DB}$?

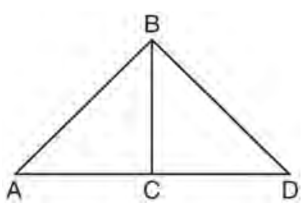
1) 16
2) 18
3) 68
4) 118

## Geometry Regents at Random

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

456 Given: $\triangle ABD$, $\overline{BC}$ is the perpendicular bisector of $\overline{AD}$



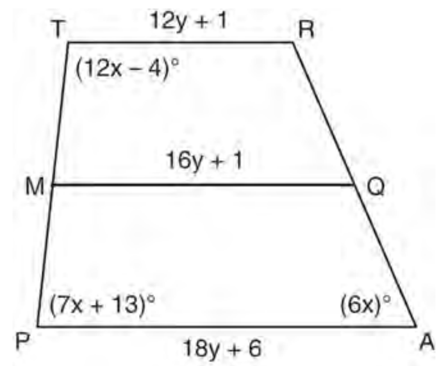

Which statement can *not* always be proven?

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

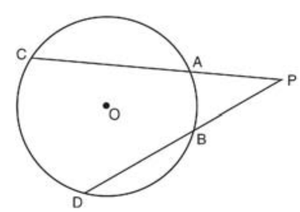
457 Triangle *ABC* is similar to triangle *DEF*. The lengths of the sides of $\triangle ABC$ are 5, 8, and 11. What is the length of the shortest side of $\triangle DEF$ if its perimeter is 60?

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

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




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



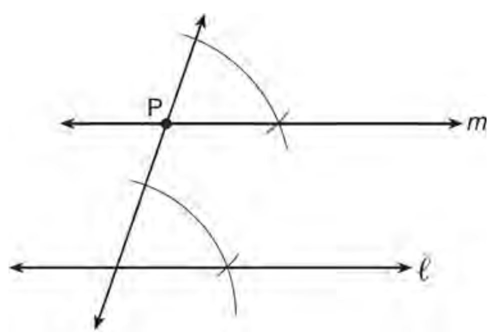

If $m\overset{\frown}{CD} = 70$ and $m\overset{\frown}{AB} = 20$, what is the degree measure of $\angle P$?

1) 25
2) 35
3) 45
4) 50

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

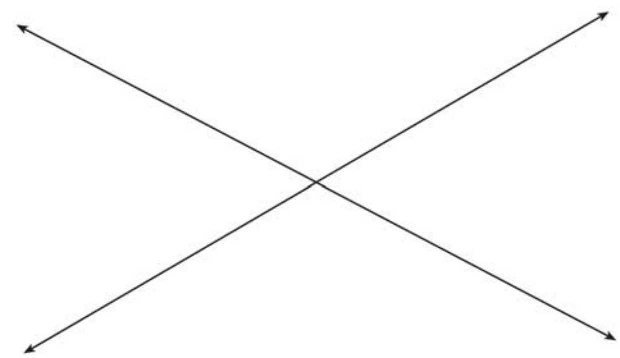
461 In $\triangle ABC$, $m\angle A = 3x + 1$, $m\angle B = 4x - 17$, and $m\angle C = 5x - 20$. Which type of triangle is $\triangle ABC$?
1) right
2) scalene
3) isosceles
4) equilateral

462 The diagram below shows the construction of line $m$, parallel to line $\ell$, 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.

463 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.



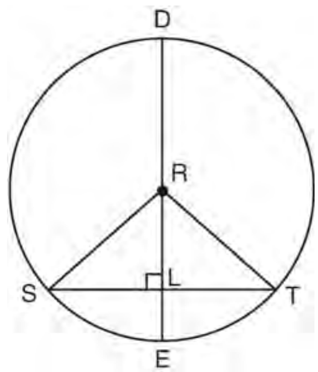
464 In $\triangle ABC$, $m\angle A = 60$, $m\angle B = 80$, and $m\angle C = 40$. Which inequality is true?
1) $AB > BC$
2) $AC > BC$
3) $AC < BA$
4) $BC < BA$

465 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) $\{8, 15, 17\}$

466 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.

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

468 In circle $R$ shown below, diameter $\overline{DE}$ is perpendicular to chord $\overline{ST}$ at point $L$.



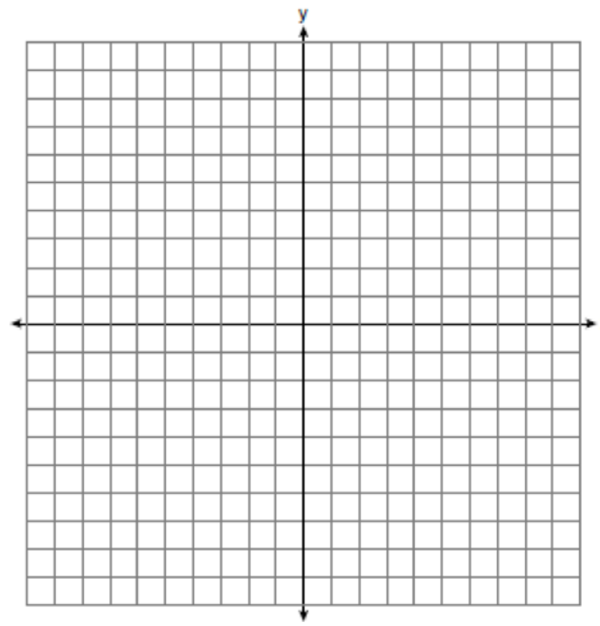

Which statement is *not* always true?

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

469 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

470 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.



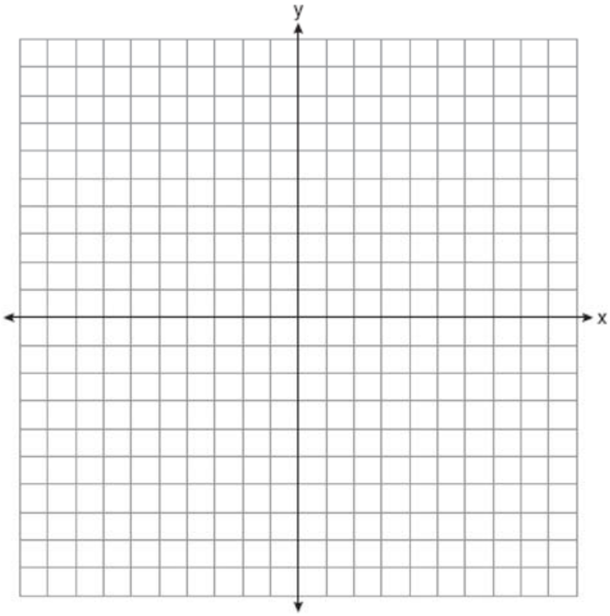

471 In $\triangle ABC$, $\angle A \cong \angle B$ and $\angle C$ is an obtuse angle. Which statement is true?

1) $\overline{AC} \cong \overline{AB}$ and $\overline{BC}$ is the longest side.
2) $\overline{AC} \cong \overline{BC}$ and $\overline{AB}$ is the longest side.
3) $\overline{AC} \cong \overline{AB}$ and $\overline{BC}$ is the shortest side.
4) $\overline{AC} \cong \overline{BC}$ and $\overline{AB}$ is the shortest side.

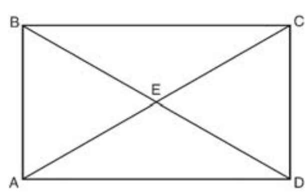
472 Line segment $AB$ is a diameter of circle $O$ whose center has coordinates $(6,8)$. What are the coordinates of point $B$ if the coordinates of point $A$ are $(4,2)$?

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

473 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.]

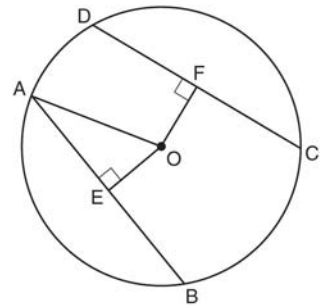



474 As shown in the diagram of rectangle $ABCD$ below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at $E$.



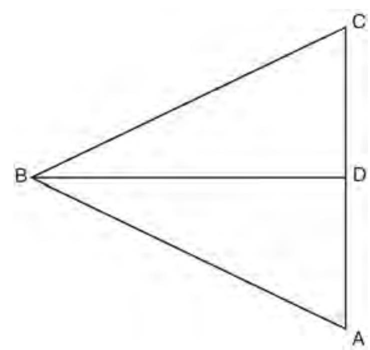

If $AE = x + 2$ and $BD = 4x - 16$, then the length of $\overline{AC}$ is
1) 6
2) 10
3) 12
4) 24

475 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 $CD = 4y - 20$.



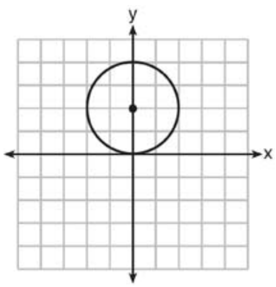

Determine the length of $\overline{DF}$. Determine the length of $\overline{OA}$.

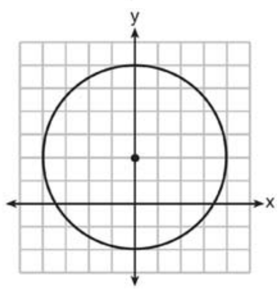
476 Given: $\triangle ABC$, $\overline{BD}$ bisects $\angle ABC$, $\overline{BD} \perp \overline{AC}$
Prove: $\overline{AB} \cong \overline{CB}$

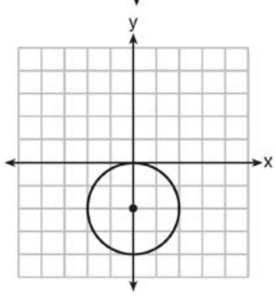


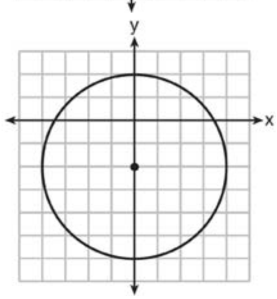
477 Chords $\overline{AB}$ and $\overline{CD}$ intersect at point $E$ in a circle with center at $O$. If $AE = 8$, $AB = 20$, and $DE = 16$, what is the length of $\overline{CE}$?
1) 6
2) 9
3) 10
4) 12

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

1) 


2) 

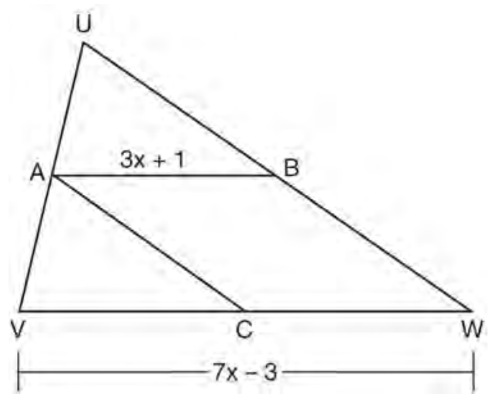

3) 


4) 


479 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

480 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

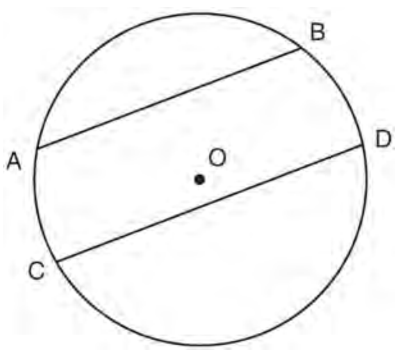
481 In the diagram of $\triangle UVW$ below, $A$ is the midpoint of $\overline{UV}$, $B$ is the midpoint of $\overline{UW}$, $C$ is the midpoint of $\overline{VW}$, and $\overline{AB}$ and $\overline{AC}$ are drawn.




If $VW = 7x - 3$ and $AB = 3x + 1$, what is the length of $\overline{VC}$?
1) 5
2) 13
3) 16
4) 32

482 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

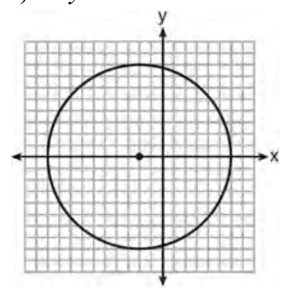
483 In circle $O$ shown in the diagram below, chords $\overline{AB}$ and $\overline{CD}$ are parallel.

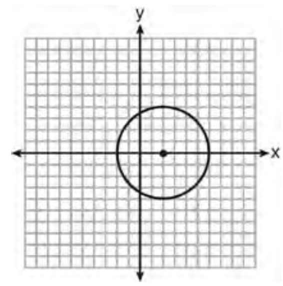


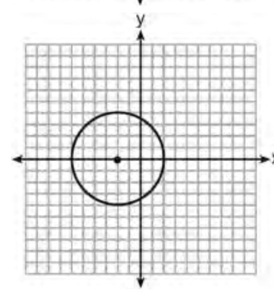

If $m\overset{\frown}{AB} = 104$ and $m\overset{\frown}{CD} = 168$, what is $m\overset{\frown}{BD}$?
1) 38
2) 44
3) 88
4) 96

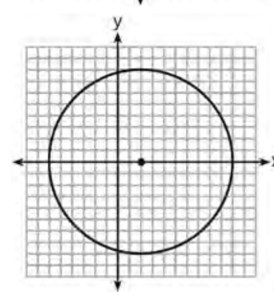
484 Square $ABCD$ has vertices $A(-2,-3)$, $B(4,-1)$, $C(2,5)$, and $D(-4,3)$. What is the length of a side of the square?
1) $2\sqrt{5}$
2) $2\sqrt{10}$
3) $4\sqrt{5}$
4) $10\sqrt{2}$

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

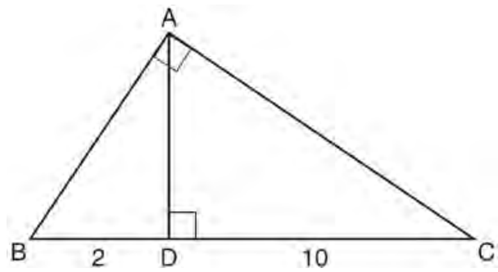
1) 


2) 


3) 


4) 

486 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) $2\sqrt{30}$

487 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.

488 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 $(6,6)$

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

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

491 What are the coordinates of $A'$, the image of $A(-3,4)$, after a rotation of 180º about the origin?
1) $(4,-3)$
2) $(-4,-3)$
3) $(3,4)$
4) $(3,-4)$

492 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

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

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

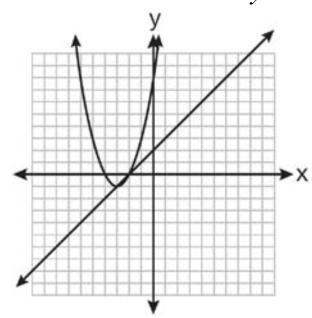
495 In a park, two straight paths intersect. The city wants to install lampposts that are both equidistant from each path and also 15 feet from the intersection of the paths. How many lampposts are needed?
1) 1
2) 2
3) 3
4) 4

496 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

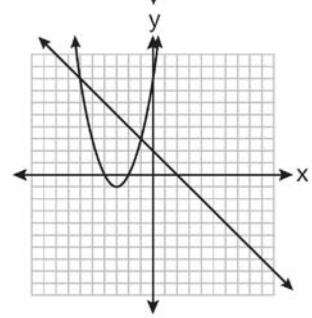
497 The equation of a circle is $(x - 2)^2 + (y + 5)^2 = 32$. What are the coordinates of the center of this circle and the length of its radius?
1) $(-2, 5)$ and 16
2) $(2, -5)$ and 16
3) $(-2, 5)$ and $4\sqrt{2}$
4) $(2, -5)$ and $4\sqrt{2}$

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

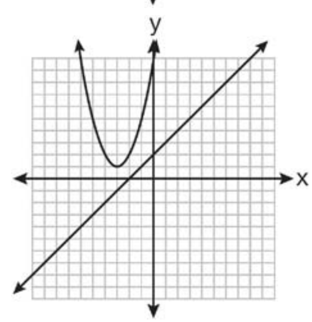
$$y = (x + 3)^2 - 1$$
$$x + y = 2$$



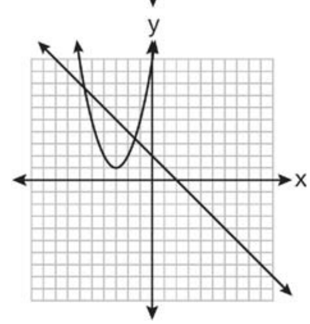
1)



2)

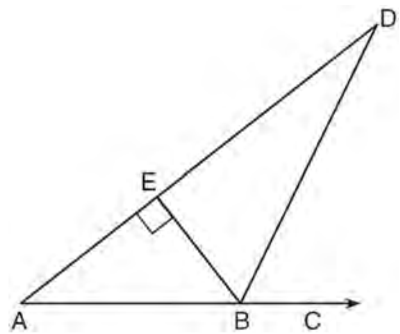


3)



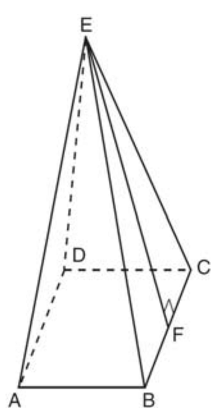
4)

499 The diagram below shows $\Delta ABD$, with $\overrightarrow{ABC}$, $\overline{BE} \perp \overline{AD}$, and $\angle EBD \cong \angle CBD$.




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

500 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) $\Delta CED$ is isosceles

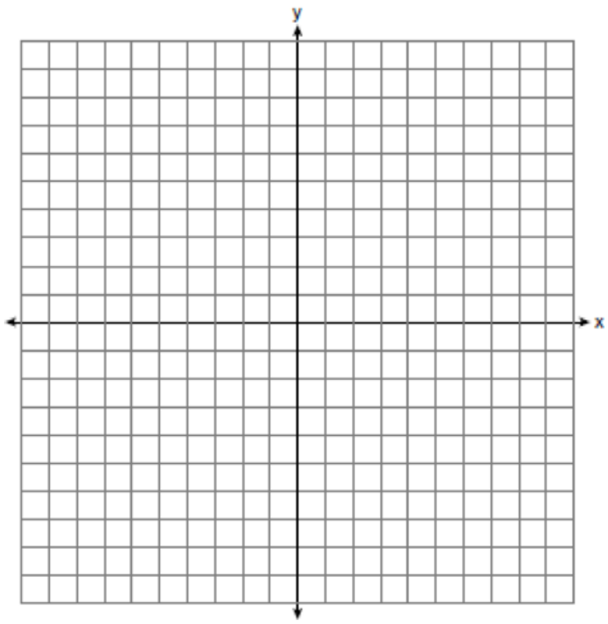
501 What is the difference between the sum of the measures of the interior angles of a regular pentagon and the sum of the measures of the exterior angles of a regular pentagon?
1) 36
2) 72
3) 108
4) 180

502 The lateral area of a right circular cone is equal to $120\pi$ 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

503 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) $(5.5,3)$

504 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

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




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

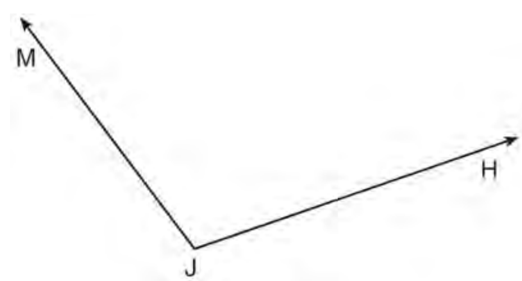
507 Triangle $ABC$ has vertices $A(0,0)$, $B(6,8)$, and $C(8,4)$. Which equation represents the perpendicular bisector of $\overline{BC}$?
1) $y = 2x - 6$
2) $y = -2x + 4$
3) $y = \frac{1}{2}x + \frac{5}{2}$
4) $y = -\frac{1}{2}x + \frac{19}{2}$

508 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 $\pi$.

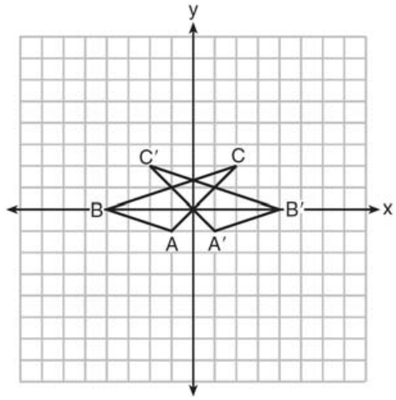
509 In a coordinate plane, the locus of points 5 units from the $x$-axis is the
1) lines $x = 5$ and $x = -5$
2) lines $y = 5$ and $y = -5$
3) line $x = 5$, only
4) line $y = 5$, only

510 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

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

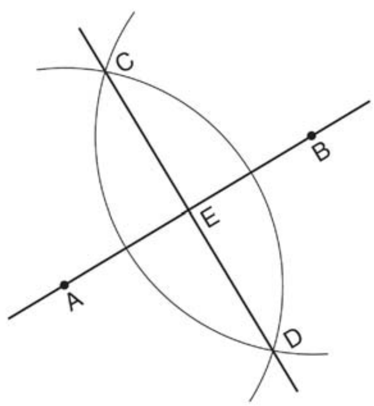


512 In the diagram below, under which transformation is $\triangle A'B'C'$ the image of $\triangle ABC$?




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

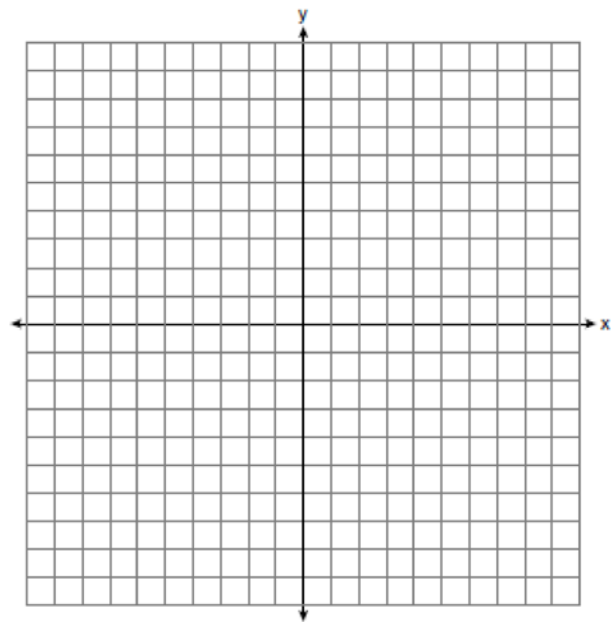
513 Based on the construction below, which conclusion is *not* always true?




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

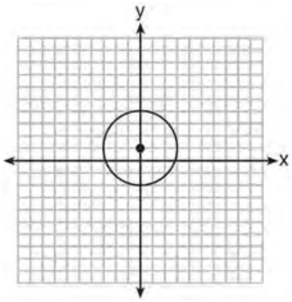
514 If the vertices of $\triangle ABC$ are $A(-2,4)$, $B(-2,8)$, and $C(-5,6)$, then $\triangle ABC$ is classified as
1) right
2) scalene
3) isosceles
4) equilateral

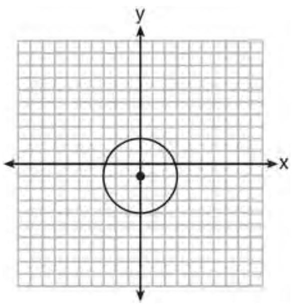
515 Write an equation of the line that is the perpendicular bisector of the line segment having endpoints $(3,-1)$ and $(3,5)$. [The use of the grid below is optional]

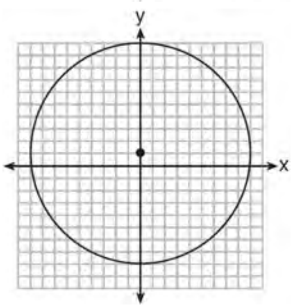


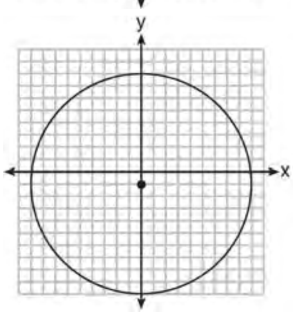

516 If $\triangle ABC \cong \triangle JKL \cong \triangle RST$, then $\overline{BC}$ must be congruent to
1) $\overline{JL}$
2) $\overline{JK}$
3) $\overline{ST}$
4) $\overline{RS}$

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

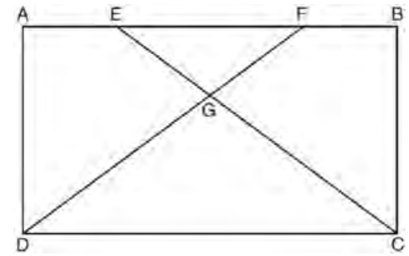
1) 


2) 

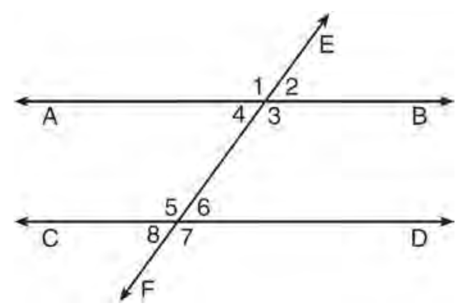

3) 


4) 


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



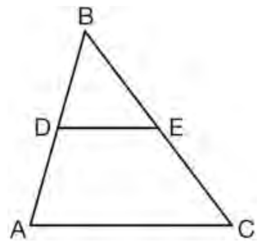

519 Transversal $\overleftrightarrow{EF}$ intersects $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$, as shown in the diagram below.




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

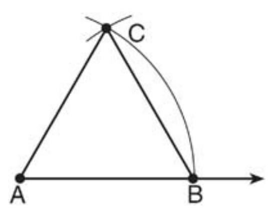
520 In $\triangle ABC$, $D$ is the midpoint of $\overline{AB}$ and $E$ is the midpoint of $\overline{BC}$. If $AC = 3x - 15$ and $DE = 6$, what is the value of $x$?




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

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

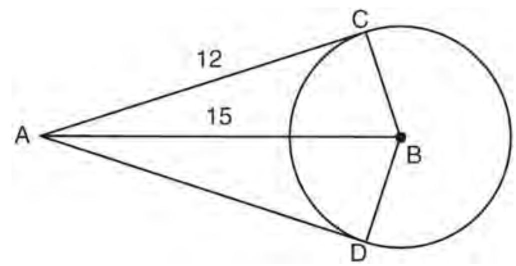
522 The diagram below shows the construction of an equilateral triangle.




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) $AB + BC > AC$

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

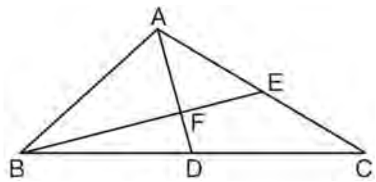
524 In the diagram below, $\overline{AC}$ and $\overline{AD}$ are tangent to circle $B$ at points $C$ and $D$, respectively, and $\overline{BC}$, $\overline{BD}$, and $\overline{BA}$ are drawn.




If $AC = 12$ and $AB = 15$, what is the length of $\overline{BD}$?
1) 5.5
2) 9
3) 12
4) 18

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

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



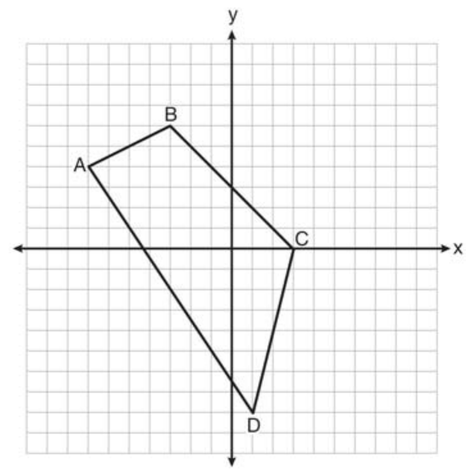

If $AF = 6$, what is the length of $\overline{FD}$?
1) 6
2) 2
3) 3
4) 9

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

528 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.

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

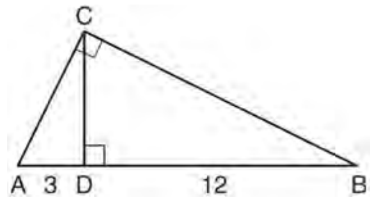
530 Quadrilateral $ABCD$ with vertices $A(-7,4)$, $B(-3,6)$, $C(3,0)$, and $D(1,-8)$ is graphed on the set of axes below. Quadrilateral $MNPQ$ is formed by joining $M$, $N$, $P$, and $Q$, the midpoints of $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, and $\overline{AD}$, respectively. Prove that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




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

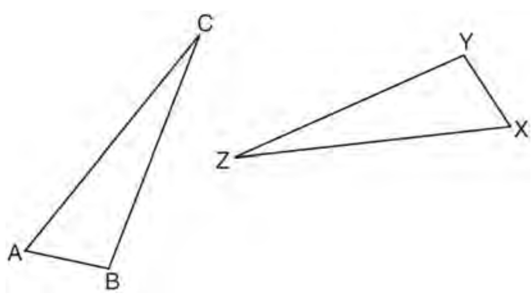
532 After the transformation $r_{y=x}$, the image of $\triangle ABC$ is $\triangle A'B'C'$. If $AB = 2x + 13$ and $A'B' = 9x - 8$, find the value of $x$.

533 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) $3\sqrt{5}$

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

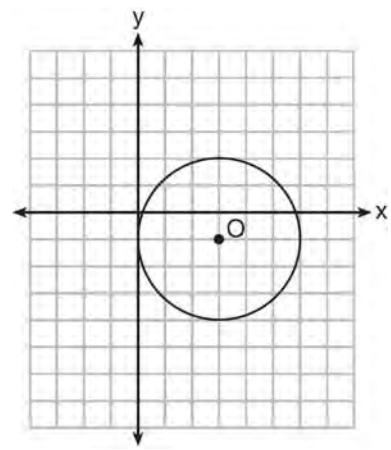



Which statement must be true?
1) $\angle C \cong \angle Y$
2) $\angle A \cong \angle X$
3) $\overline{AC} \cong \overline{YZ}$
4) $\overline{CB} \cong \overline{XZ}$

535 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*.

536 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

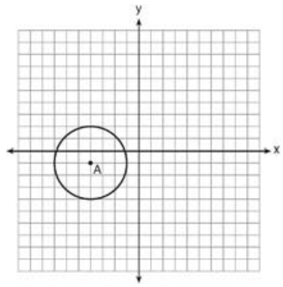
537 What is the equation for circle $O$ shown in the graph below?




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

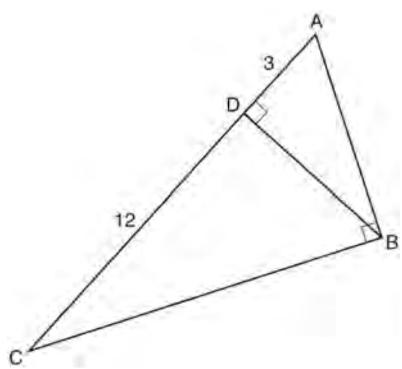
538 If $\triangle MNP \cong \triangle VWX$ and $\overline{PM}$ is the shortest side of $\triangle MNP$, what is the shortest side of $\triangle VWX$?
1) $\overline{XV}$
2) $\overline{WX}$
3) $\overline{VW}$
4) $\overline{NP}$

539 Which equation represents circle $A$ shown in the diagram below?



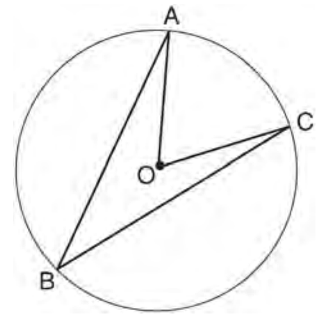

1) $(x-4)^2+(y-1)^2=3$
2) $(x+4)^2+(y+1)^2=3$
3) $(x-4)^2+(y-1)^2=9$
4) $(x+4)^2+(y+1)^2=9$

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



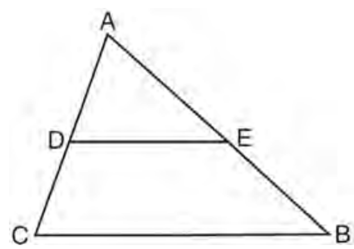

What is the length of $\overline{AB}$?
1) $5\sqrt{3}$
2) 6
3) $3\sqrt{5}$
4) 9

541 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

542 Triangle $ABC$ is shown in the diagram below.

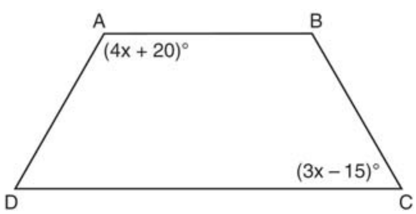



If $\overline{DE}$ joins the midpoints of $\overline{ADC}$ and $\overline{AEB}$, which statement is *not* true?
1) $DE=\frac{1}{2}CB$
2) $\overline{DE}\parallel\overline{CB}$
3) $\frac{AD}{DC}=\frac{DE}{CB}$
4) $\Delta ABC\sim\Delta AED$

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

544 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

545 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

546 Consider the relationship between the two statements below.

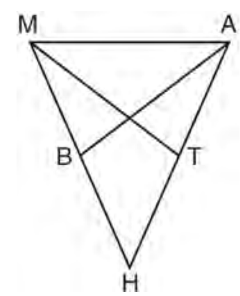
If $\sqrt{16+9} \neq 4+3$, then $5 \neq 4+3$

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

These statements are

1) inverses
2) converses
3) contrapositives
4) biconditionals

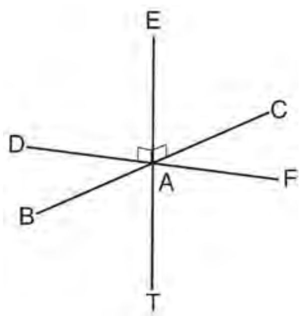
547 In the diagram of $\Delta MAH$ below, $\overline{MH} \cong \overline{AH}$ and medians $\overline{AB}$ and $\overline{MT}$ are drawn.
Prove: $\angle MBA \cong \angle ATM$




548 If line $\ell$ is perpendicular to distinct planes $\mathcal{P}$ and $\mathcal{Q}$, then planes $\mathcal{P}$ and $\mathcal{Q}$

1) are parallel
2) contain line $\ell$
3) are perpendicular
4) intersect, but are *not* perpendicular

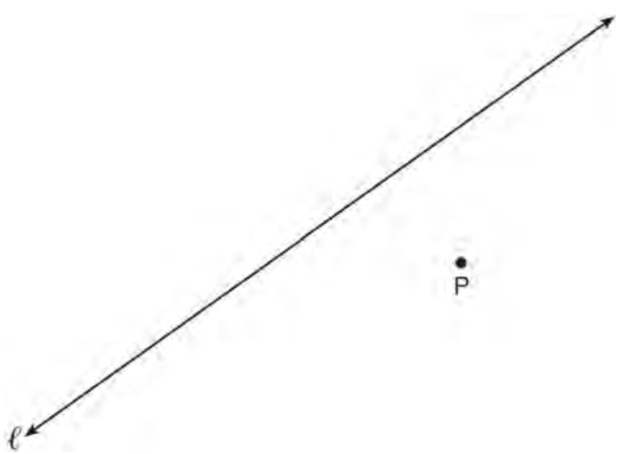
549 As shown in the diagram below, $\overline{FD}$ and $\overline{CB}$ intersect at point $A$ and $\overline{ET}$ is perpendicular to both $\overline{FD}$ and $\overline{CB}$ at $A$.



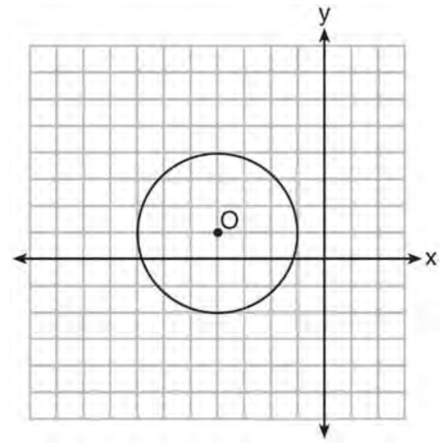

Which statement is *not* true?

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 $BAT$.

550 Using a compass and straightedge, construct a line perpendicular to line $\ell$ through point $P$. [Leave all construction marks.]

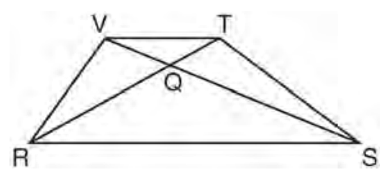



551 What is the equation of circle $O$ shown in the diagram below?




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

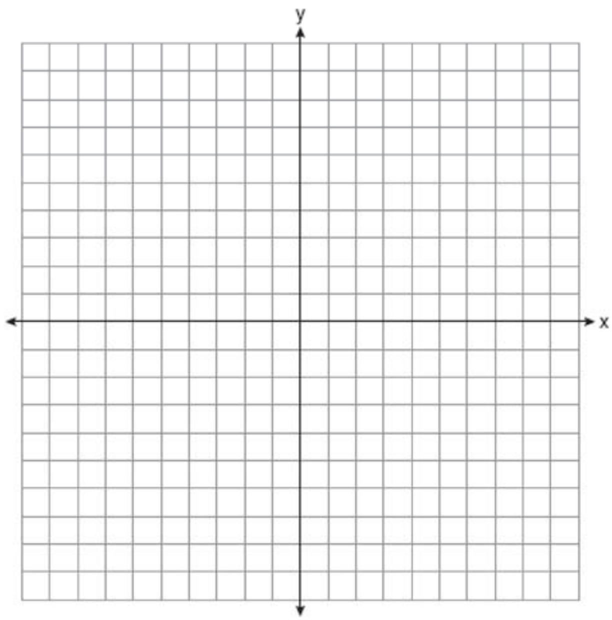
552 In trapezoid $RSTV$ with bases $\overline{RS}$ and $\overline{VT}$, diagonals $\overline{RT}$ and $\overline{SV}$ intersect at $Q$.



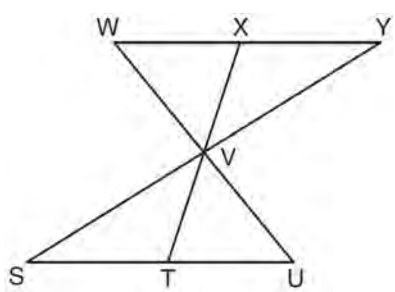

If trapezoid $RSTV$ is *not* isosceles, which triangle is equal in area to $\Delta RSV$?

1) $\Delta RQV$
2) $\Delta RST$
3) $\Delta RVT$
4) $\Delta SVT$

553 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.]



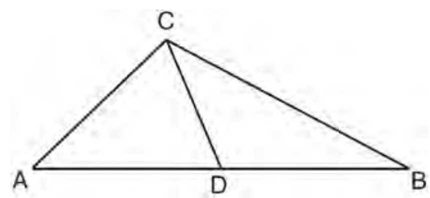

554 In the diagram below, $\triangle XYV \cong \triangle TSV$.




Which statement can *not* be proven?
1) $\angle XVY \cong \angle TVS$
2) $\angle VYX \cong \angle VUT$
3) $\overline{XY} \cong \overline{TS}$
4) $\overline{YV} \cong \overline{SV}$

555 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

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



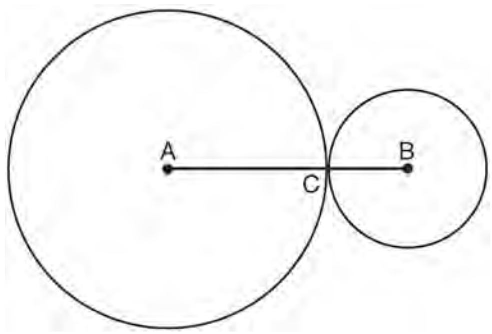

Which statement is *always* true?
1) $\overline{AD} \cong \overline{DB}$
2) $\overline{AC} \cong \overline{AD}$
3) $\angle ACD \cong \angle CDB$
4) $\angle BCD \cong \angle ACD$

557 A student wrote the following equations:

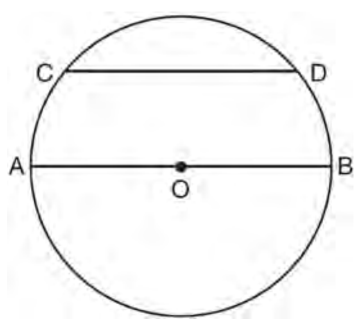
$$3y + 6 = 2x$$
$$2y - 3x = 6$$

The lines represented by these equations are
1) parallel
2) the same line
3) perpendicular
4) intersecting, but *not* perpendicular

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



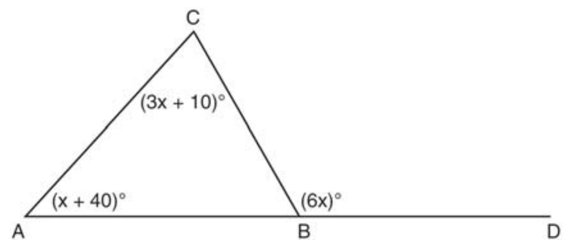

559 In the diagram of circle $O$ below, chord $\overline{CD}$ is parallel to diameter $\overline{AOB}$ and $m\overset{\frown}{CD} = 110$.




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

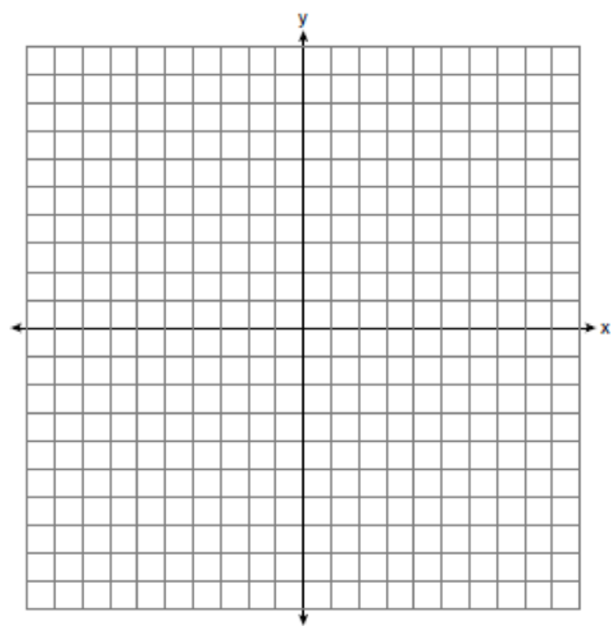
560 Write an equation of a circle whose center is $(-3,2)$ and whose diameter is 10.

561 In the diagram of $\Delta ABC$ below, $\overline{AB}$ is extended to point $D$.

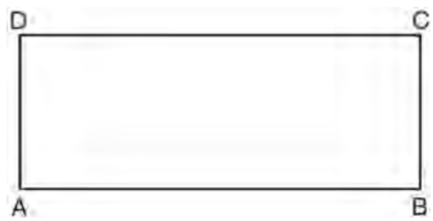



If $m\angle CAB = x + 40$, $m\angle ACB = 3x + 10$, $m\angle CBD = 6x$, what is $m\angle CAB$?
1) 13
2) 25
3) 53
4) 65

562 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.



563 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 $ABCD$.



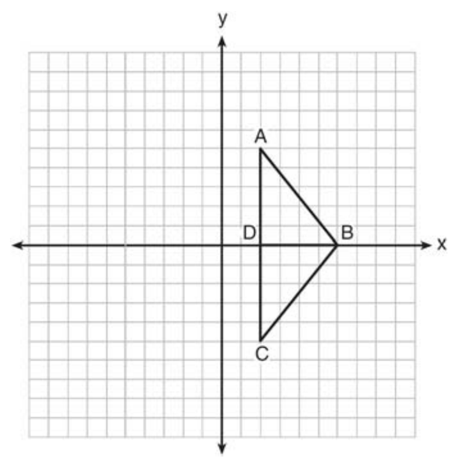


564 The equations $x^2 + y^2 = 25$ and $y = 5$ are graphed on a set of axes. What is the solution of this system?
1) $(0,0)$
2) $(5,0)$
3) $(0,5)$
4) $(5,5)$

565 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.

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

567 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.

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

569 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.

570 Plane $\mathcal{A}$ and plane $\mathcal{B}$ are two distinct planes that are both perpendicular to line $\ell$. 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.

# Geometry Regents at Random
## Answer Section

1 ANS: 4 PTS: 2 REF: 011019ge STA: G.G.44
TOP: Similarity Proofs

2 ANS: 4 PTS: 2 REF: 011012ge STA: G.G.1
TOP: Planes

3 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

4 ANS: 4 PTS: 2 REF: fall0824ge STA: G.G.50
TOP: Tangents KEY: common tangency

5 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

6 ANS: 3 PTS: 2 REF: 080928ge STA: G.G.50
TOP: Tangents KEY: common tangency

7 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

8 ANS: 4 PTS: 2 REF: fall0818ge STA: G.G.61
TOP: Analytical Representations of Transformations

9 ANS: 2 PTS: 2 REF: 060910ge STA: G.G.71
TOP: Equations of Circles

10 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

11 ANS: 4 PTS: 2 REF: 080905ge STA: G.G.29
TOP: Triangle Congruency

12 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

13 ANS: 1
$(x,y) \to (x + 3, y + 1)$

PTS: 2 REF: fall0803ge STA: G.G.54 TOP: Translations

14 ANS:
$(6,-4)$. $C_x = \frac{Q_x + R_x}{2}$. $C_y = \frac{Q_y + R_y}{2}$.

$$\begin{aligned} 3.5 &= \frac{1 + R_x}{2} & 2 &= \frac{8 + R_y}{2} \\ 7 &= 1 + R_x & 4 &= 8 + R_y \\ 6 &= R_x & -4 &= R_y \end{aligned}$$

PTS: 2 REF: 011031ge STA: G.G.66 TOP: Midpoint
KEY: graph

15 ANS: 2

$$\begin{aligned} 4(4x - 3) &= 3(2x + 8) \\ 16x - 12 &= 6x + 24 \\ 10x &= 36 \\ x &= 3.6 \end{aligned}$$

PTS: 2 REF: 080923ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two chords

16 ANS: 4 PTS: 2 REF: 081005ge STA: G.G.18
TOP: Constructions

17 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

18 ANS: 3 PTS: 2 REF: 060905ge STA: G.G.54
TOP: Reflections KEY: basic

19 ANS: 2 PTS: 2 REF: 080927ge STA: G.G.4
TOP: Planes

20 ANS:

18. $V = \frac{1}{3}Bh = \frac{1}{3}lwh$

$$288 = \frac{1}{3} \cdot 8 \cdot 6 \cdot h$$

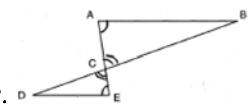
$$288 = 16h$$

$$18 = h$$

PTS: 2 REF: 061034ge STA: G.G.13 TOP: Volume

21 ANS: 2

$\angle ACB$ and $\angle ECD$ are congruent vertical angles and $\angle CAB \cong \angle CED$.



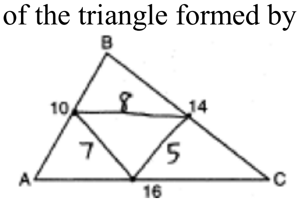

PTS: 2 REF: 060917ge STA: G.G.44 TOP: Similarity Proofs

22 ANS: 3 PTS: 2 REF: 081026ge STA: G.G.26
TOP: Contrapositive

23 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

24 ANS: 4 PTS: 2 REF: fall0802ge STA: G.G.24
TOP: Negations

25 ANS: 4 PTS: 2 REF: 060912ge STA: G.G.23
TOP: Locus

26 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

27 ANS: 3 PTS: 2 REF: 060928ge STA: G.G.8
TOP: Planes

28 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

29 ANS: 1
Translations and reflections do not affect distance.

PTS: 2 REF: 080908ge STA: G.G.61
TOP: Analytical Representations of Transformations

30 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

31 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

32 ANS: 4 PTS: 2 REF: 060913ge STA: G.G.26
TOP: Conditional Statements

33 ANS: 3
The lateral edges of a prism are parallel.

PTS: 2 REF: fall0808ge STA: G.G.10 TOP: Solids

34 ANS: 1 PTS: 2 REF: 080911ge STA: G.G.73
TOP: Equations of Circles

35 ANS: 1 PTS: 2 REF: 061012ge STA: G.G.20
TOP: Constructions

36 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

37 ANS: 4
sum of interior ∠s = sum of exterior ∠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

38 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

39 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

40 ANS: 3 PTS: 2 REF: 080924ge STA: G.G.24
TOP: Negations

41 ANS: 2
Parallel chords intercept congruent arcs. $m\overset{\frown}{AD} = m\overset{\frown}{BC} = 60$. $m\angle CDB = \frac{1}{2}m\overset{\frown}{BC} = 30$.

PTS: 2 REF: 060906ge STA: G.G.52 TOP: Chords

42 ANS: 3
Because $\overline{OC}$ is a radius, its length is 5. Since $CE = 2$ $OE = 3$. $\triangle EDO$ is a 3-4-5 triangle. If $ED = 4$, $BD = 8$.

PTS: 2 REF: fall0811ge STA: G.G.49 TOP: Chords

43 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

44 ANS: 1 PTS: 2 REF: fall0807ge STA: G.G.19
TOP: Constructions

45 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

46 ANS: 4 PTS: 2 REF: 061003ge STA: G.G.10
TOP: Solids

47 ANS: 2
A dilation affects distance, not angle measure.

PTS: 2 REF: 080906ge STA: G.G.60 TOP: Identifying Transformations

48 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

49 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

50 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

51 ANS: 2 PTS: 2 REF: 061002ge STA: G.G.24
TOP: Negations

52 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

53 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

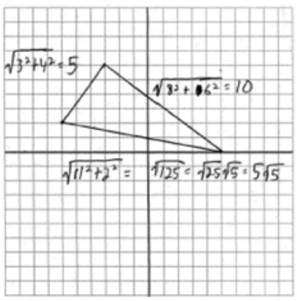
54 ANS: 1 PTS: 2 REF: 011024ge STA: G.G.3
TOP: Planes

55 ANS: 2
The length of the midsegment of a trapezoid is the average of the lengths of its bases. $\frac{x+30}{2} = 44.$

$$x + 30 = 88$$
$$x = 58$$

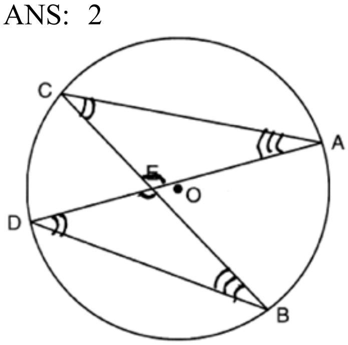
PTS: 2 REF: 011001ge STA: G.G.40 TOP: Trapezoids

56 ANS:
$15 + 5\sqrt{5}.$




PTS: 4 REF: 060936ge STA: G.G.69 TOP: Triangles in the Coordinate Plane

57 ANS: 2




PTS: 2 REF: 061026GE STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inscribed

58 ANS: 2 PTS: 2 REF: 011006ge STA: G.G.56
TOP: Identifying Transformations

59 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

60 ANS:
452. $SA = 4\pi r^2 = 4\pi \cdot 6^2 = 144\pi \approx 452$

PTS: 2 REF: 061029ge STA: G.G.16 TOP: Surface Area

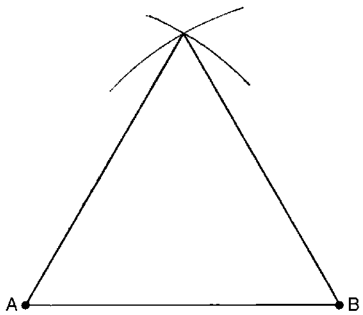
61 ANS: 3 PTS: 2 REF: 060908ge STA: G.G.60
TOP: Identifying Transformations

62 ANS: 3

$m = \frac{-A}{B} = -\frac{3}{4}$

PTS: 2 REF: 011025ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

63 ANS:




PTS: 2 REF: 081032ge STA: G.G.20 TOP: Constructions

64 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

65 ANS:

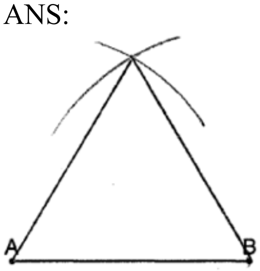
5. $\frac{3}{x} = \frac{6+3}{15}$

$9x = 45$

$x = 5$

PTS: 2 REF: 011033ge STA: G.G.46 TOP: Side Splitter Theorem

66 ANS:




PTS: 2 REF: 011032ge STA: G.G.20 TOP: Constructions

67 ANS: 4

$d = \sqrt{(-3-1)^2 + (2-0)^2} = \sqrt{16+4} = \sqrt{20} = \sqrt{4} \cdot \sqrt{5} = 2\sqrt{5}$

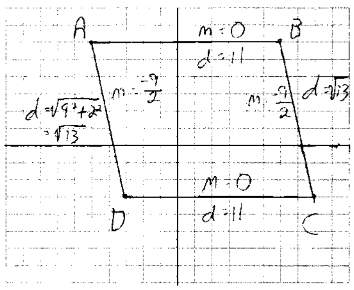
PTS: 2 REF: 011017ge STA: G.G.67 TOP: Distance

KEY: general

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

PTS: 4 REF: 011036ge STA: G.G.41 TOP: Special Quadrilaterals

69 ANS:




$\overline{AB} \parallel \overline{CD}$ and $\overline{AD} \parallel \overline{CB}$ because their slopes are equal. $ABCD$ is a parallelogram because opposite side are parallel. $\overline{AB} \neq \overline{BC}$. $ABCD$ is not a rhombus because all sides are not equal. $\overline{AB} \sim \perp \overline{BC}$ because their slopes are not opposite reciprocals. $ABCD$ is not a rectangle because $\angle ABC$ is not a right angle.

PTS: 4 REF: 081038ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

70 ANS: 2 PTS: 2 REF: 061020ge STA: G.G.19
TOP: Constructions

71 ANS: 2 PTS: 2 REF: fall0806ge STA: G.G.9
TOP: Planes

72 ANS: 3 PTS: 2 REF: 081021ge STA: G.G.57
TOP: Properties of Transformations

73 ANS: 1 PTS: 2 REF: 061010ge STA: G.G.34
TOP: Angle Side Relationship

74 ANS: 2

$M_x = \dfrac{3x+5+x-1}{2} = \dfrac{4x+4}{2} = 2x+2.$ $M_Y = \dfrac{3y+(-y)}{2} = \dfrac{2y}{2} = y.$

PTS: 2 REF: 081019ge STA: G.G.66 TOP: Midpoint
KEY: general

75 ANS: 2

The slope of a line in standard form is $-\dfrac{A}{B}$, so the slope of this line is $\dfrac{-2}{-1} = 2$. A parallel line would also have a slope of 2. Since the answers are in slope intercept form, find the $y$-intercept:

$$\begin{aligned} y &= mx + b \\ -11 &= 2(-3) + b \\ -5 &= b \end{aligned}$$

PTS: 2 REF: fall0812ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

76 ANS: 1
Parallel lines intercept congruent arcs.

PTS: 2 REF: 061001ge STA: G.G.52 TOP: Chords

77 ANS:
4.
$$\begin{aligned} l_1w_1h_1 &= l_2w_2h_2 \\ 10 \times 2 \times h &= 5 \times w_2 \times h \\ 20 &= 5w_2 \\ w_2 &= 4 \end{aligned}$$

PTS: 2 REF: 011030ge STA: G.G.11 TOP: Volume

78 ANS: 1
$A'(2,4)$

PTS: 2 REF: 011023ge STA: G.G.54 TOP: Compositions of Transformations
KEY: basic

79 ANS:
22.4.
$$\begin{aligned} V &= \pi r^2 h \\ 12566.4 &= \pi r^2 \cdot 8 \\ r^2 &= \frac{12566.4}{8\pi} \\ r &\approx 22.4 \end{aligned}$$

PTS: 2 REF: fall0833ge STA: G.G.14 TOP: Volume

80 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

81 ANS: 1 PTS: 2 REF: 081012ge STA: G.G.50
TOP: Tangents KEY: two tangents

82 ANS: 2
$M_x = \frac{-2+6}{2} = 2.\ \ M_y = \frac{-4+2}{2} = -1$

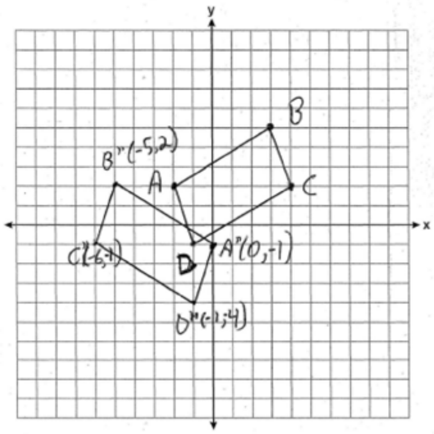
PTS: 2 REF: 080910ge STA: G.G.66 TOP: Midpoint
KEY: general

83 ANS: 4 PTS: 2 REF: 080915ge STA: G.G.56
TOP: Identifying Transformations

84 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

85 ANS:




PTS: 4 REF: 060937ge STA: G.G.54 TOP: Compositions of Transformations
KEY: grids

86 ANS: 3 PTS: 2 REF: 061017ge STA: G.G.1
TOP: Planes

87 ANS:

$y = -2x + 14$. The slope of $2x + y = 3$ is $\frac{-A}{B} = \frac{-2}{1} = -2$. $y = mx + b$ .

$$4 = (-2)(5) + b$$

$$b = 14$$

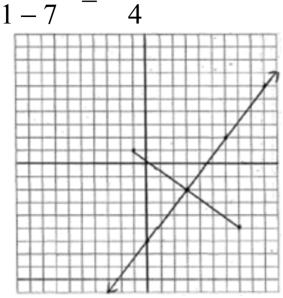
PTS: 2 REF: 060931ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

88 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 $\frac{4}{3}$.

$$M_y = \frac{1+(-5)}{2} = -2$$

$$m = \frac{1-(-5)}{-1-7} = -\frac{3}{4}$$



$y - y_M = m(x - x_M)$.

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

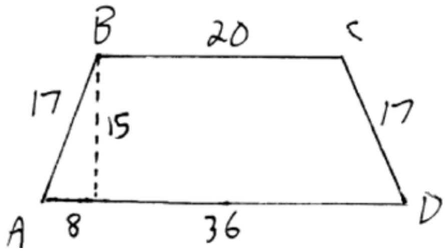
PTS: 4 REF: 080935ge STA: G.G.68 TOP: Perpendicular Bisector

89 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

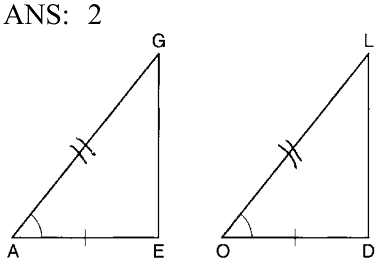
90 ANS: 3




$\frac{36-20}{2} = 8.$ $\sqrt{17^2 - 8^2} = 15$

PTS: 2 REF: 061016ge STA: G.G.40 TOP: Trapezoids

91 ANS: 2




PTS: 2 REF: 081007ge STA: G.G.28 TOP: Triangle Congruency

92 ANS: 4 PTS: 2 REF: 080925ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

93 ANS: 1 PTS: 2 REF: 061005ge STA: G.G.55
TOP: Properties of Transformations

94 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

95 ANS: 4 PTS: 2 REF: 080914ge STA: G.G.7
TOP: Planes

96 ANS:

20. $5x + 10 = 4x + 30$
$$x = 20$$

PTS: 2 REF: 060934ge STA: G.G.45 TOP: Similarity
KEY: basic

97 ANS: 1 PTS: 2 REF: 081028ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

98 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

99 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

100 ANS: 3 PTS: 2 REF: 011007ge STA: G.G.31
TOP: Isosceles Triangle Theorem

101 ANS: 3 PTS: 2 REF: fall0804ge STA: G.G.18
TOP: Constructions

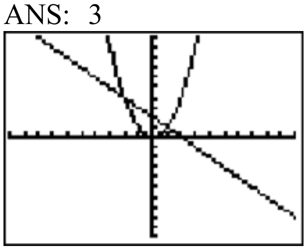
102 ANS: 3 PTS: 2 REF: fall0825ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

103 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

104 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

105 ANS: 3


PTS: 2 REF: fall0805ge STA: G.G.70 TOP: Quadratic-Linear Systems

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

107 ANS: 3 PTS: 2 REF: 081002ge STA: G.G.9
TOP: Planes

108 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

109 ANS: 4 PTS: 2 REF: 061008ge STA: G.G.40
TOP: Trapezoids

110 ANS:

Midpoint: $\left(\dfrac{-4+4}{2}, \dfrac{2+(-4)}{2}\right) = (0,-1)$. Distance: $d = \sqrt{(-4-4)^2 + (2-(-4))^2} = \sqrt{100} = 10$

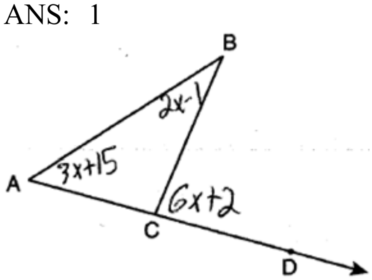
$$r = 5$$

$$r^2 = 25$$

$x^2 + (y+1)^2 = 25$

PTS: 4 REF: 061037ge STA: G.G.71 TOP: Equations of Circles

111 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

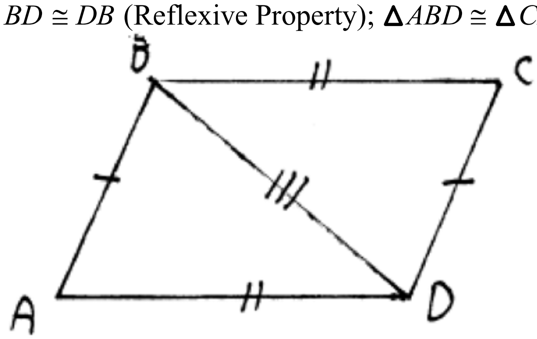
112 ANS: 1

$M_x = \dfrac{-2+6}{2} = 2$. $M_y = \dfrac{3+3}{2} = 3$. The center is $(2,3)$. $d = \sqrt{(-2-6)^2 + (3-3)^2} = \sqrt{64+0} = 8$. If the diameter is 8, the radius is 4 and $r^2 = 16$.

PTS: 2 REF: fall0820ge STA: G.G.71 TOP: Equations of Circles

113 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

114 ANS: 3 PTS: 2 REF: 080902ge STA: G.G.17
TOP: Constructions

115 ANS: 1

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

$$3.6 = x$$

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

116 ANS: 1 PTS: 2 REF: 081009ge STA: G.G.73
TOP: Equations of Circles

117 ANS: 2

Because the triangles are similar, $\dfrac{m\angle A}{m\angle D} = 1$

PTS: 2 REF: 011022ge STA: G.G.45 TOP: Similarity
KEY: perimeter and area

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

119 ANS:

67. $\dfrac{180-46}{2} = 67$

PTS: 2 REF: 011029ge STA: G.G.31 TOP: Isosceles Triangle Theorem

120 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

121 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

122 ANS: 2 PTS: 2 REF: 011020ge STA: G.G.74
TOP: Graphing Circles

123 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

124 ANS:

$y = \frac{2}{3}x + 1$. $2y + 3x = 6$ . $y = mx + b$

$$\begin{aligned} 2y &= -3x + 6 \\ y &= -\frac{3}{2}x + 3 \\ m &= -\frac{3}{2} \\ m_{\perp} &= \frac{2}{3} \end{aligned} \qquad \begin{aligned} 5 &= \frac{2}{3}(6) + b \\ 5 &= 4 + b \\ 1 &= b \\ y &= \frac{2}{3}x + 1 \end{aligned}$$

PTS: 4 REF: 061036ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

125 ANS: 4

$3y + 1 = 6x + 4$. $2y + 1 = x - 9$

$$\begin{aligned} 3y &= 6x + 3 \\ y &= 2x + 1 \end{aligned} \qquad \begin{aligned} 2y &= x - 10 \\ y &= \frac{1}{2}x - 5 \end{aligned}$$

PTS: 2 REF: fall0822ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

126 ANS: 4

$SA = 4\pi r^2$ $V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot 6^3 = 288\pi$

$$\begin{aligned} 144\pi &= 4\pi r^2 \\ 36 &= r^2 \\ 6 &= r \end{aligned}$$

PTS: 2 REF: 081020ge STA: G.G.16 TOP: Surface Area

127 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

128 ANS: 2 PTS: 2 REF: 081015ge STA: G.G.55
TOP: Properties of Transformations

129 ANS:

$375\pi$ $L = \pi r l = \pi(15)(25) = 375\pi$

PTS: 2 REF: 081030ge STA: G.G.15 TOP: Lateral Area

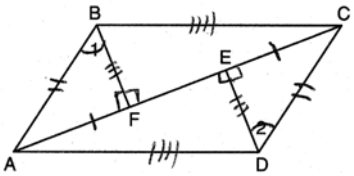
130 ANS: 1 PTS: 2 REF: 080918ge STA: G.G.41
TOP: Special Quadrilaterals

131 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

132 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.41 TOP: Special Quadrilaterals

133 ANS: 2

$$\frac{3}{7} = \frac{6}{x}$$

$$3x = 42$$

$$x = 14$$

PTS: 2 REF: 081027ge STA: G.G.46 TOP: Side Splitter Theorem

134 ANS: 3 PTS: 2 REF: 060925ge STA: G.G.17
TOP: Constructions

135 ANS: 1 PTS: 2 REF: 061009ge STA: G.G.26
TOP: Converse and Biconditional

136 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

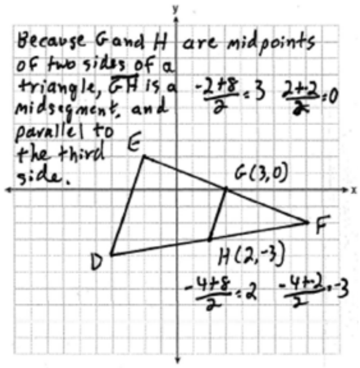
137 ANS: 2 PTS: 2 REF: 080921ge STA: G.G.72
TOP: Equations of Circles

138 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

139 ANS:



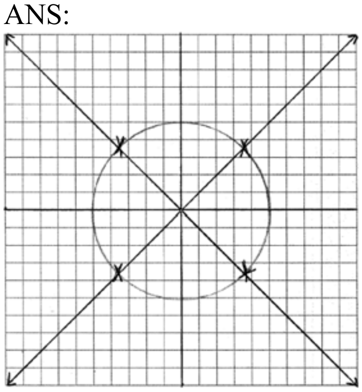

PTS: 4 REF: fall0835ge STA: G.G.42 TOP: Midsegments

140 ANS:

Because $\overline{AB} \parallel \overline{DC}$, $\overset{\frown}{AD} \cong \overset{\frown}{BC}$ since parallel chords intersect congruent arcs. $\angle BDC \cong \angle ACD$ because inscribed angles that intercept congruent arcs are congruent. $\overline{AD} \cong \overline{BC}$ since congruent chords intersect congruent arcs. $\overline{DC} \cong \overline{CD}$ because of the reflexive property. Therefore, $\Delta ACD \cong \Delta BDC$ because of SAS.

PTS: 6 REF: fall0838ge STA: G.G.27 TOP: Circle Proofs

141 ANS:



PTS: 4 REF: 011037ge STA: G.G.23 TOP: Locus

142 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

143 ANS: 4

The slope of $y = -3x + 2$ is $-3$. The perpendicular slope is $\frac{1}{3}$.

$$\begin{aligned} -1 &= \frac{1}{3}(3) + b \\ -1 &= 1 + b \\ b &= -2 \end{aligned}$$

PTS: 2 REF: 011018ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

144 ANS: 1 PTS: 2 REF: 081008ge STA: G.G.3
TOP: Planes

145 ANS: 4

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

PTS: 2 REF: fall0827ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

146 ANS: 3 PTS: 2 REF: 061004ge STA: G.G.31
TOP: Isosceles Triangle Theorem

147 ANS: 2

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

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

148 ANS: 1

$$\begin{aligned} V &= \pi r^2 h \\ 1000 &= \pi r^2 \cdot 8 \\ r^2 &= \frac{1000}{8\pi} \\ r &\approx 6.3 \end{aligned}$$

PTS: 2 REF: 080926ge STA: G.G.14 TOP: Volume

149 ANS: 4

$180 - (40+40) = 100$

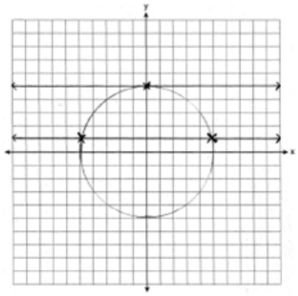
PTS: 2 REF: 080903ge STA: G.G.31 TOP: Isosceles Triangle Theorem

150 ANS: 3

$$\begin{aligned} (x+3)^2 - 4 &= 2x+5 \\ x^2 + 6x + 9 - 4 &= 2x+5 \\ x^2 + 4x &= 0 \\ x(x+4) &= 0 \\ x &= 0, -4 \end{aligned}$$

PTS: 2 REF: 081004ge STA: G.G.70 TOP: Quadratic-Linear Systems

151 ANS:



PTS: 4 REF: 080936ge STA: G.G.23 TOP: Locus

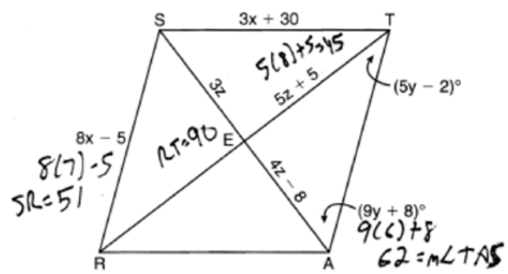
152 ANS: 3 PTS: 2 REF: 011028ge STA: G.G.26
TOP: Conditional Statements

153 ANS: 3

$$\frac{36+20}{2}=28$$

PTS: 2 REF: 061019ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inside circle

154 ANS:




$8x-5=3x+30$. $4z-8=3z$. $9y+8+5y-2=90$.

$5x=35$ $\quad z=8$ $\quad 14y+6=90$

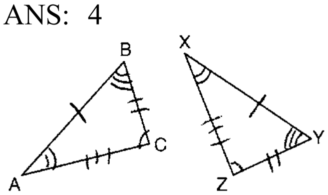
$x=7$ $\quad 14y=84$

$y=6$

PTS: 6 REF: 061038ge STA: G.G.39 TOP: Special Parallelograms

155 ANS: 2 PTS: 2 REF: 011003ge STA: G.G.55
TOP: Properties of Transformations

156 ANS: 4




PTS: 2 REF: 081001ge STA: G.G.29 TOP: Triangle Congruency

157 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

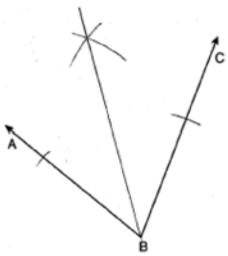
158 ANS: 4

$L = 2\pi rh = 2\pi \cdot 5 \cdot 11 \approx 345.6$

PTS: 2 REF: 061006ge STA: G.G.14 TOP: Volume

159 ANS: 3 PTS: 2 REF: 080913ge STA: G.G.28
TOP: Triangle Congruency

160 ANS:



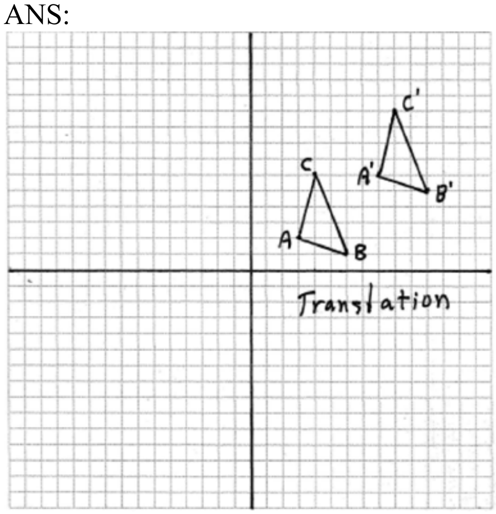

PTS: 2 REF: 080932ge STA: G.G.17 TOP: Constructions

161 ANS:

37. Since $\overline{DE}$ is a midsegment, $AC = 14$. $10 + 13 + 14 = 37$

PTS: 2 REF: 061030ge STA: G.G.42 TOP: Midsegments

162 ANS:




PTS: 2 REF: fall0830ge STA: G.G.55 TOP: Properties of Transformations

163 ANS: 2

$7 + 18 > 6 + 12$

PTS: 2 REF: fall0819ge STA: G.G.33 TOP: Triangle Inequality Theorem

164 ANS: 4 PTS: 2 REF: 061018ge STA: G.G.56
TOP: Identifying Transformations

165 ANS:
70. $3x+5+3x+5+2x+2x=180$

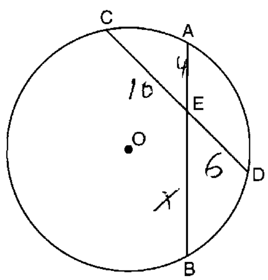
$$10x+10=360$$
$$10x=350$$
$$x=35$$
$$2x=70$$

PTS: 2 REF: 081029ge STA: G.G.40 TOP: Trapezoids

166 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

167 ANS: 1




$4x=6\cdot 10$

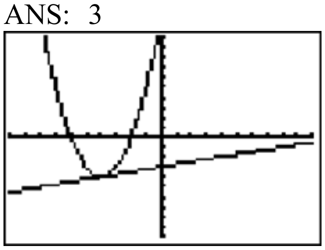
$x=15$

PTS: 2 REF: 081017ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two chords

168 ANS: 3 PTS: 2 REF: fall0816ge STA: G.G.1
TOP: Planes

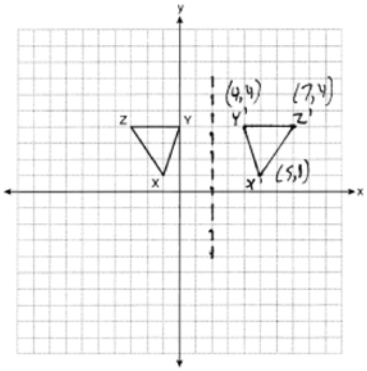
169 ANS: 4 PTS: 2 REF: 061015ge STA: G.G.56
TOP: Identifying Transformations

170 ANS: 3



PTS: 2 REF: 061011ge STA: G.G.70 TOP: Quadratic-Linear Systems

171 ANS:

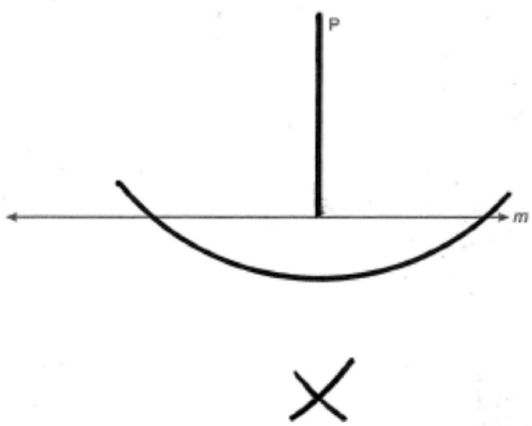



PTS: 2 REF: 061032ge STA: G.G.54 TOP: Reflections
KEY: grids

172 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

173 ANS:




PTS: 2 REF: 060930ge STA: G.G.19 TOP: Constructions

174 ANS: 1

$$a^2 + (5\sqrt{2})^2 = (2\sqrt{15})^2$$
$$a^2 + (25 \times 2) = 4 \times 15$$
$$a^2 + 50 = 60$$
$$a^2 = 10$$
$$a = \sqrt{10}$$

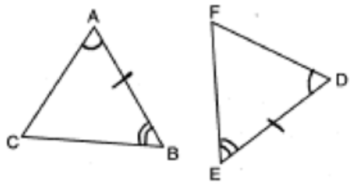
PTS: 2 REF: 011016ge STA: G.G.48 TOP: Pythagorean Theorem

175 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

176 ANS: 3




PTS: 2 REF: 060902ge STA: G.G.28 TOP: Triangle Congruency

177 ANS: 4

The radius is 4. $r^2 = 16$.

PTS: 2 REF: 061014ge STA: G.G.72 TOP: Equations of Circles

178 ANS: 4 PTS: 2 REF: 081023ge STA: G.G.45
TOP: Similarity KEY: perimeter and area

179 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

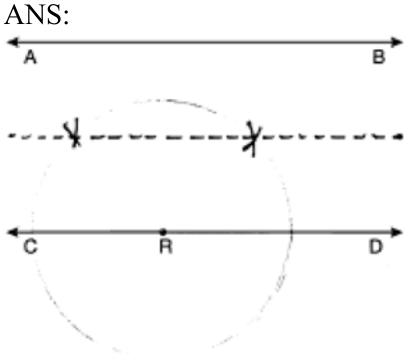
180 ANS:

$(x+1)^2 + (y-2)^2 = 36$

PTS: 2 REF: 081034ge STA: G.G.72 TOP: Equations of Circles

181 ANS: 2 PTS: 2 REF: 061022ge STA: G.G.62
TOP: Parallel and Perpendicular Lines

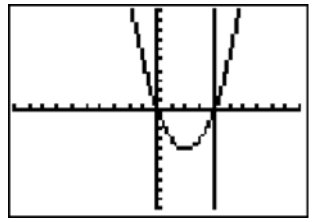
182 ANS:




PTS: 2 REF: 061033ge STA: G.G.22 TOP: Locus

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

184 ANS: 1



$y = x^2 - 4x = (4)^2 - 4(4) = 0$. $(4, 0)$ is the only intersection.

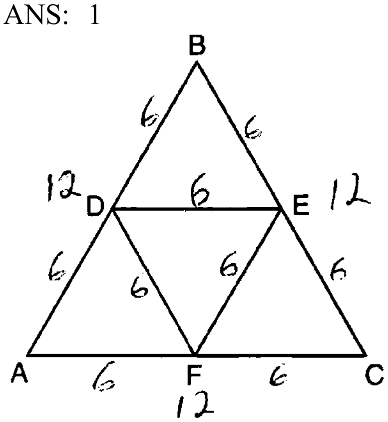
PTS: 2 REF: 060923ge STA: G.G.70 TOP: Quadratic-Linear Systems

185 ANS: 1 PTS: 2 REF: 060920ge STA: G.G.74
TOP: Graphing Circles

186 ANS: 1
$\Delta PRT$ and $\Delta SRQ$ share $\angle R$ and it is given that $\angle RPT \cong \angle RSQ$.

PTS: 2 REF: fall0821ge STA: G.G.44 TOP: Similarity Proofs

187 ANS: 1




PTS: 2 REF: 081003ge STA: G.G.42 TOP: Midsegments

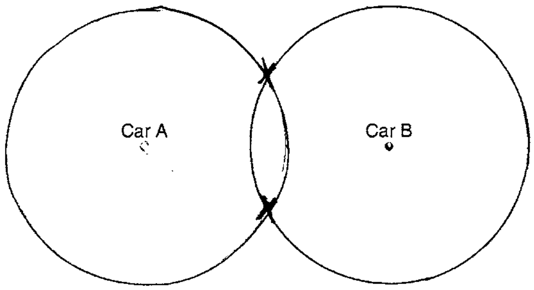
188 ANS: 1 PTS: 2 REF: 061013ge STA: G.G.50
TOP: Tangents KEY: point of tangency

189 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

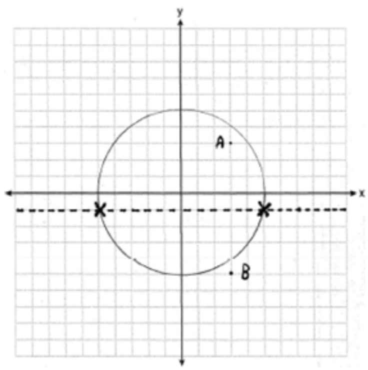
190 ANS: 4 PTS: 2 REF: 011009ge STA: G.G.19
TOP: Constructions

191 ANS:




PTS: 2 REF: 081033ge STA: G.G.22 TOP: Locus

192 ANS:



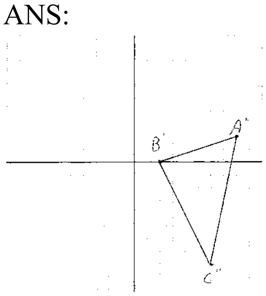

PTS: 4 REF: fall0837ge STA: G.G.23 TOP: Locus

193 ANS: 4

$180-(50+30)=100$

PTS: 2 REF: 081006ge STA: G.G.45 TOP: Similarity
KEY: basic

194 ANS:



$A''(8,2),\ B''(2,0),\ C''(6,-8)$

PTS: 4 REF: 081036ge STA: G.G.58 TOP: Compositions of Transformations

195 ANS: 4

Let $\overline{AD}=x$. $36x=12^2$

$x=4$

PTS: 2 REF: 080922ge STA: G.G.47 TOP: Similarity
KEY: leg

196 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

197 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

198 ANS: 3 PTS: 2 REF: fall0814ge STA: G.G.73
TOP: Equations of Circles

199 ANS: 2 PTS: 2 REF: 011011ge STA: G.G.22
TOP: Locus

200 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:

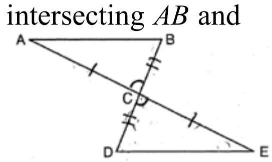
$$\begin{aligned} y &= mx + b \\ 3 &= -2(7) + b \\ 17 &= b \end{aligned}$$

PTS: 2 REF: 081010ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

201 ANS: 3 PTS: 2 REF: 011010ge STA: G.G.71
TOP: Equations of Circles

202 ANS:

$\overline{AC} \cong \overline{EC}$ and $\overline{DC} \cong \overline{BC}$ because of the definition of midpoint. $\angle ACB \cong \angle ECD$ because of vertical angles. $\triangle ABC \cong \triangle EDC$ because of SAS. $\angle CDE \cong \angle CBA$ because of CPCTC. $\overline{BD}$ is a transversal intersecting $\overline{AB}$ and $\overline{ED}$. Therefore $\overline{AB} \parallel \overline{DE}$ because $\angle CDE$ and $\angle CBA$ are congruent alternate interior angles.




PTS: 6 REF: 060938ge STA: G.G.27 TOP: Triangle Proofs

203 ANS:

3. The non-parallel sides of an isosceles trapezoid are congruent.

$$\begin{aligned} 2x + 5 &= 3x + 2 \\ x &= 3 \end{aligned}$$

PTS: 2 REF: 080929ge STA: G.G.40 TOP: Trapezoids

204 ANS:

2.4. $5a = 4^2$ $5b = 3^2$ $h^2 = ab$

$a = 3.2$ $b = 1.8$ $h^2 = 3.2 \cdot 1.8$

$h = \sqrt{5.76} = 2.4$

PTS: 4 REF: 081037ge STA: G.G.47 TOP: Similarity
KEY: altitude

205 ANS: 2

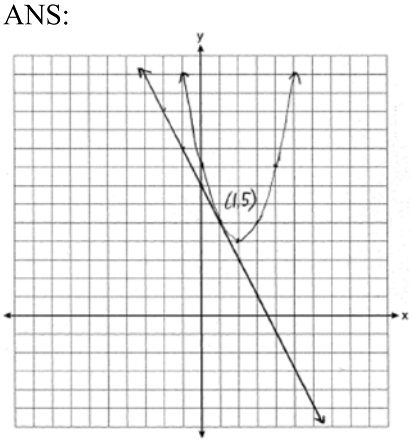
$$y + \frac{1}{2}x = 4 \qquad 3x + 6y = 12$$
$$y = -\frac{1}{2}x + 4 \qquad 6y = -3x + 12$$
$$m = -\frac{1}{2} \qquad y = -\frac{3}{6}x + 2$$
$$y = -\frac{1}{2}x + 2$$

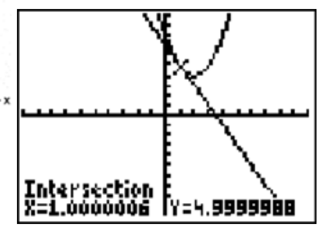
PTS: 2 REF: 081014ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

206 ANS: 2 PTS: 2 REF: 011004ge STA: G.G.17
TOP: Constructions

207 ANS: 1 PTS: 2 REF: 060903ge STA: G.G.56
TOP: Identifying Transformations

208 ANS:



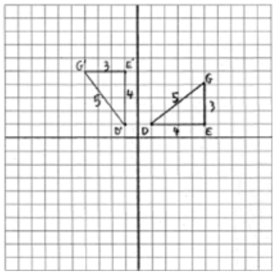

PTS: 6 REF: 011038ge STA: G.G.70 TOP: Quadratic-Linear Systems

209 ANS: 2

$$\frac{140 - \overline{RS}}{2} = 40$$
$$140 - \overline{RS} = 80$$
$$\overline{RS} = 60$$

PTS: 2 REF: 081025ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: outside circle

210 ANS:


$D'(-1, 1)$, $E'(-1, 5)$, $G'(-4, 5)$

PTS: 4 REF: 080937ge STA: G.G.55 TOP: Properties of Transformations

211 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

212 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

213 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

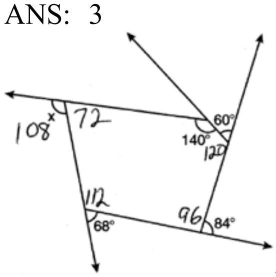
214 ANS: 4

Corresponding angles of similar triangles are congruent.

PTS: 2 REF: fall0826ge STA: G.G.45 TOP: Similarity
KEY: perimeter and area

215 ANS: 4 PTS: 2 REF: 060922ge STA: G.G.73
TOP: Equations of Circles

216 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

217 ANS: 2

$6 + 17 > 22$

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

218 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

219 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

220 ANS:

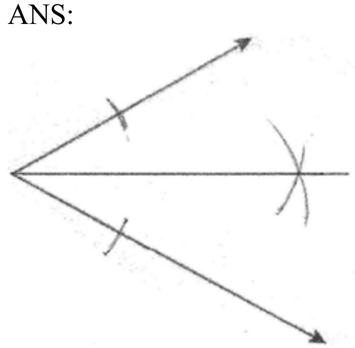
$y = \frac{2}{3}x - 9$. The slope of $2x - 3y = 11$ is $-\frac{A}{B} = \frac{-2}{-3} = \frac{2}{3}$. $-5 = \left(\frac{2}{3}\right)(6) + b$

$$-5 = 4 + b$$

$$b = -9$$

PTS: 2 REF: 080931ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

221 ANS:



PTS: 2 REF: fall0832ge STA: G.G.17 TOP: Constructions

222 ANS: 4

(4) is not true if $\angle PQR$ is obtuse.

PTS: 2 REF: 060924ge STA: G.G.32 TOP: Exterior Angle Theorem

223 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

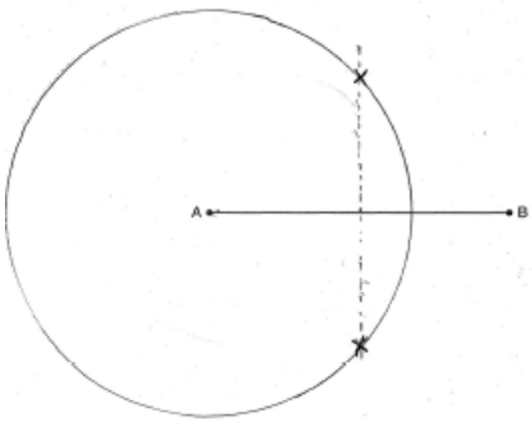
224 ANS: 1

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

$$\overline{GC} = 2\overline{FG}$$
$$\overline{GC} + \overline{FG} = 24$$
$$2\overline{FG} + \overline{FG} = 24$$
$$3\overline{FG} = 24$$
$$\overline{FG} = 8$$

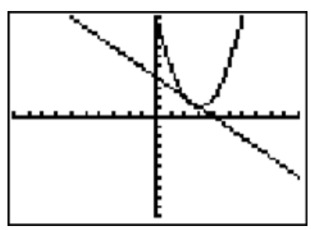
PTS: 2 REF: 081018ge STA: G.G.43 TOP: Centroid

225 ANS:




PTS: 2 REF: 060932ge STA: G.G.22 TOP: Locus

226 ANS: 4



$y + x = 4$ . $x^2 - 6x + 10 = -x + 4$. $y + x = 4$. $y + 2 = 4$

$y = -x + 4$  $x^2 - 5x + 6 = 0$  $y + 3 = 4$  $y = 2$

$(x - 3)(x - 2) = 0$  $y = 1$

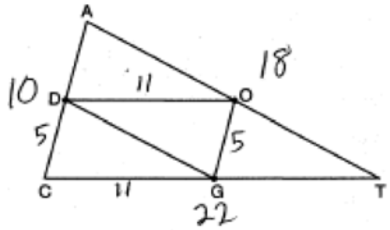
$x = 3 \text{ or } 2$

PTS: 2 REF: 080912ge STA: G.G.70 TOP: Quadratic-Linear Systems

227 ANS: 1 PTS: 2 REF: 011102ge STA: G.G.55

TOP: Properties of Transformations

228 ANS: 3




PTS: 2 REF: 080920ge STA: G.G.42 TOP: Midsegments

# Geometry Regents at Random
## Answer Section

229 ANS: 1

The length of the midsegment of a trapezoid is the average of the lengths of its bases. $\dfrac{x+3+5x-9}{2}=2x+2.$

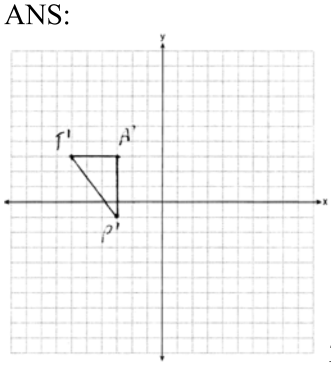
$$6x-6=4x+4$$
$$2x=10$$
$$x=5$$

PTS: 2 REF: 081221ge STA: G.G.40 TOP: Trapezoids

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

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

232 ANS:



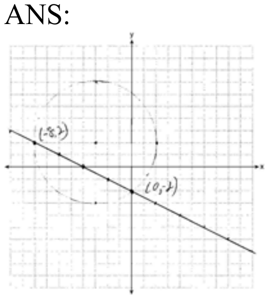

$T'(-6,3), A'(-3,3), P'(-3,-1)$

PTS: 2 REF: 061229ge STA: G.G.54 TOP: Translations

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

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

235 ANS:



PTS: 4 REF: 081237ge STA: G.G.70 TOP: Quadratic-Linear Systems

236 ANS: 4

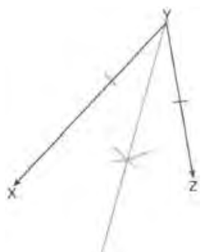
The slope of $3x + 5y = 4$ is $m = \frac{-A}{B} = \frac{-3}{5}$. $m_{\perp} = \frac{5}{3}$.

PTS: 2 REF: 061127ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

237 ANS: 2 PTS: 2 REF: 061227ge STA: G.G.56

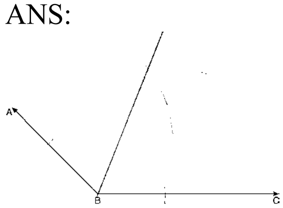
TOP: Identifying Transformations

238 ANS:



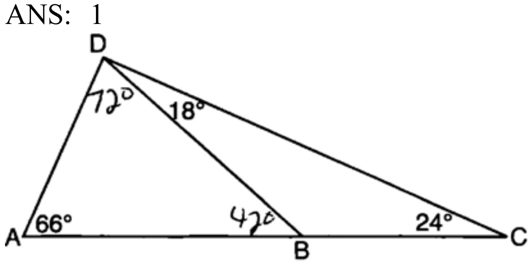

PTS: 2 REF: 011233ge STA: G.G.17 TOP: Constructions

239 ANS:




PTS: 2 REF: 011133ge STA: G.G.17 TOP: Constructions

240 ANS: 1



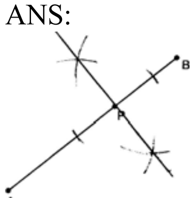

PTS: 2 REF: 081219ge STA: G.G.34 TOP: Angle Side Relationship

241 ANS: 3

$(n-2)180 = (5-2)180 = 540$

PTS: 2 REF: 011223ge STA: G.G.36 TOP: Interior and Exterior Angles of Polygons

242 ANS:




PTS: 2 REF: 081233ge STA: G.G.19 TOP: Constructions

243 ANS: 3

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

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

$$180n = 720$$

$$n = 4$$

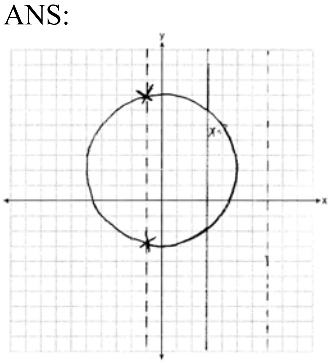
PTS: 2 REF: 081223ge STA: G.G.36 TOP: Interior and Exterior Angles of Polygons

244 ANS:

$\overline{OA} \cong \overline{OB}$ because all radii are equal. $\overline{OP} \cong \overline{OP}$ because of the reflexive property. $\overline{OA} \perp \overline{PA}$ and $\overline{OB} \perp \overline{PB}$ because tangents to a circle are perpendicular to a radius at a point on a circle. $\angle PAO$ and $\angle PBO$ are right angles because of the definition of perpendicular. $\angle PAO \cong \angle PBO$ because all right angles are congruent. $\triangle AOP \cong \triangle BOP$ because of HL. $\angle AOP \cong \angle BOP$ because of CPCTC.

PTS: 6 REF: 061138ge STA: G.G.27 TOP: Circle Proofs

245 ANS:



PTS: 2 REF: 061234ge STA: G.G.23 TOP: Locus

246 ANS: 4 PTS: 2 REF: 061114ge STA: G.G.73
TOP: Equations of Circles

247 ANS:

9.1. $(11)(8)h = 800$

$$h \approx 9.1$$

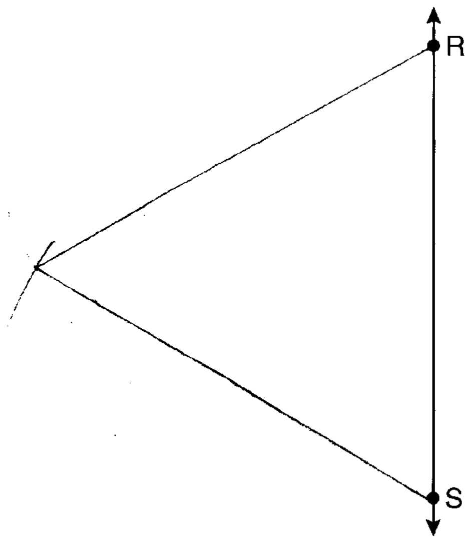
PTS: 2 REF: 061131ge STA: G.G.12 TOP: Volume

248 ANS: 2 PTS: 2 REF: 061208ge STA: G.G.19
TOP: Constructions

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

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

251 ANS:




PTS: 2 REF: 061130ge STA: G.G.20 TOP: Constructions

252 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

253 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

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

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

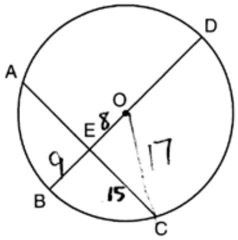
256 ANS: 4

$$6^2 = x(x+5)$$
$$36 = x^2 + 5x$$
$$0 = x^2 + 5x - 36$$
$$0 = (x+9)(x-4)$$
$$x = 4$$

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

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

258 ANS: 2




$\sqrt{17^2 - 15^2} = 8.\ \ 17 - 8 = 9$

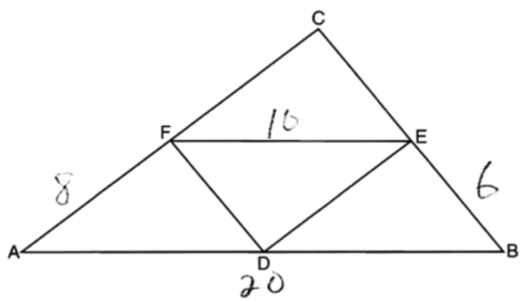
PTS: 2 REF: 061221ge STA: G.G.49 TOP: Chords

259 ANS: 1

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

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

260 ANS: 4




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

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

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

262 ANS: 4 PTS: 2 REF: 081211ge STA: G.G.5
TOP: Planes

263 ANS: 3

$$\begin{aligned} 4x + 14 + 8x + 10 &= 180 \\ 12x &= 156 \\ x &= 13 \end{aligned}$$

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

264 ANS: 3

$(3,-2) \rightarrow (2,3) \rightarrow (8,12)$

PTS: 2 REF: 011126ge STA: G.G.54 TOP: Compositions of Transformations
KEY: basic

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

266 ANS: 4

$$\sqrt{25^2 - \left(\frac{26-12}{2}\right)^2} = 24$$

PTS: 2 REF: 011219ge STA: G.G.40 TOP: Trapezoids

267 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

268 ANS: 4 PTS: 2 REF: 011216ge STA: G.G.29
TOP: Triangle Congruency

269 ANS: 3

$$x + 2x + 15 = 5x + 15 \quad 2(5) + 15 = 25$$
$$3x + 15 = 5x + 5$$
$$10 = 2x$$
$$5 = x$$

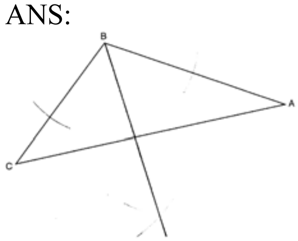
PTS: 2 REF: 011127ge STA: G.G.32 TOP: Exterior Angle Theorem

270 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

271 ANS:




PTS: 2 REF: 061232ge STA: G.G.17 TOP: Constructions

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

273 ANS:

$$\frac{180-80}{2} = 50$$

PTS: 2 REF: 081129ge STA: G.G.52 TOP: Chords

274 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

275 ANS: 2

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

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

276 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

277 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

278 ANS:

Yes. A reflection is an isometry.

PTS: 2 REF: 061132ge STA: G.G.56 TOP: Identifying Transformations

279 ANS: 2

$$AC=BD$$
$$AC-BC=BD-BC$$
$$AB=CD$$

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

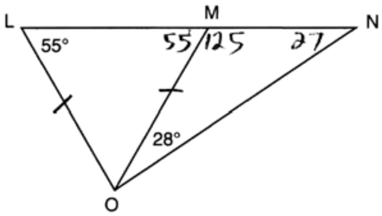
280 ANS: 2 PTS: 2 REF: 011125ge STA: G.G.74
TOP: Graphing Circles

281 ANS:

The medians of a triangle are not concurrent. False.

PTS: 2 REF: 061129ge STA: G.G.24 TOP: Negations

282 ANS: 1




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

283 ANS: 4 PTS: 2 REF: 011118ge STA: G.G.25
TOP: Compound Statements KEY: general

284 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

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

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

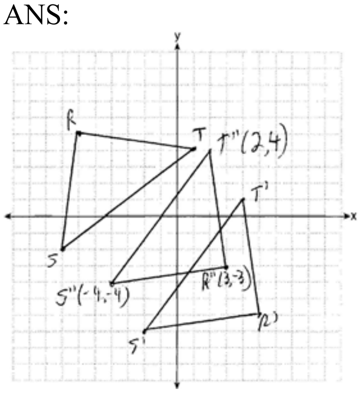
287 ANS: 2 PTS: 2 REF: 011109ge STA: G.G.9
TOP: Planes

288 ANS:
2

$$\begin{aligned} \frac{x+2}{x} &= \frac{x+6}{4} \\ x^2+6x &= 4x+8 \\ x^2+2x-8 &= 0 \\ (x+4)(x-2) &= 0 \\ x &= 2 \end{aligned}$$

PTS: 4 REF: 081137ge STA: G.G.45 TOP: Similarity
KEY: basic

289 ANS:




PTS: 4 REF: 081236ge STA: G.G.58 TOP: Compositions of Transformations
KEY: grids

290 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

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

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

293 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

294 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

295 ANS: 3

$\sqrt{5^2 + 12^2} = 13$

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

296 ANS: 2

$5 - 3 = 2, 5 + 3 = 8$

PTS: 2 REF: 011228ge STA: G.G.33 TOP: Triangle Inequality Theorem

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

298 ANS: 3

$7x = 5x + 30$

$2x = 30$

$x = 15$

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

299 ANS:

$EO = 6$. $CE = \sqrt{10^2 - 6^2} = 8$

PTS: 2 REF: 011234ge STA: G.G.49 TOP: Chords

300 ANS:
$180 - (90 + 63) = 27$

PTS: 2 REF: 061230ge STA: G.G.35 TOP: Parallel Lines and Transversals

301 ANS: 1

$$\begin{aligned} AB &= CD \\ AB + BC &= CD + BC \\ AC &= BD \end{aligned}$$

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

302 ANS: 3
$8^2 + 24^2 \neq 25^2$

PTS: 2 REF: 011111ge STA: G.G.48 TOP: Pythagorean Theorem

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

304 ANS: 4

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

$$\begin{aligned} 6 &= -\frac{1}{3}(-9) + b \\ 6 &= 3 + b \\ 3 &= b \end{aligned}$$

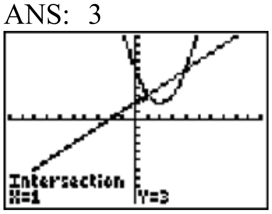
PTS: 2 REF: 061215ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

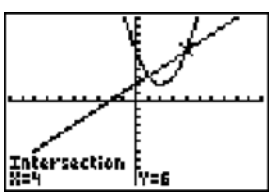
305 ANS: 3

$d = \sqrt{(1-9)^2 + (-4-2)^2} = \sqrt{64+36} = \sqrt{100} = 10$

PTS: 2 REF: 081107ge STA: G.G.67 TOP: Distance
KEY: general

306 ANS: 3






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

307 ANS:

$$V = \pi r^2 h \quad . \quad L = 2\pi rh = 2\pi \cdot 5\sqrt{2} \cdot 12 \approx 533.1$$

$$600\pi = \pi r^2 \cdot 12$$

$$50 = r^2$$

$$\sqrt{25}\sqrt{2} = r$$

$$5\sqrt{2} = r$$

PTS: 4 REF: 011236ge STA: G.G.14 TOP: Volume

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

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

310 ANS: 3

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

$$5x = 70$$

$$x = 14$$

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

311 ANS: 3 PTS: 2 REF: 061218ge STA: G.G.36
TOP: Interior and Exterior Angles of Polygons

312 ANS:

30. $3x + 4x + 5x = 360$. $m\overset{\frown}{LN} : m\overset{\frown}{NK} : m\overset{\frown}{KL} = 90:120:150$. $\dfrac{150 - 90}{2} = 30$

$x = 20$

PTS: 4 REF: 061136ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: outside circle

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

314 ANS:

$\angle B$ and $\angle E$ are right angles because of the definition of perpendicular lines. $\angle B \cong \angle E$ because all right angles are congruent. $\angle BFD$ and $\angle DFE$ are supplementary and $\angle ECA$ and $\angle ACB$ are supplementary because of the definition of supplementary angles. $\angle DFE \cong \angle ACB$ because angles supplementary to congruent angles are congruent. $\triangle ABC \sim \triangle DEF$ because of AA.

PTS: 4 REF: 011136ge STA: G.G.44 TOP: Similarity Proofs

315 ANS:

$m_{\overline{AB}} = \left(\frac{-6+2}{2}, \frac{-2+8}{2}\right) = D(2,3)$ $m_{\overline{BC}} = \left(\frac{2+6}{2}, \frac{8+-2}{2}\right) = E(4,3)$ $F(0,-2)$. To prove that *ADEF* is a parallelogram, show that both pairs of opposite sides of the parallelogram are parallel by showing the opposite sides have the same slope: $\mathrm{m}_{\overline{AD}} = \frac{3--2}{-2--6} = \frac{5}{4}$ $\overline{AF} \parallel \overline{DE}$ because all horizontal lines have the same slope. *ADEF*

$$\mathrm{m}_{FE} = \frac{3--2}{4-0} = \frac{5}{4}$$

is not a rhombus because not all sides are congruent. $AD = \sqrt{5^2+4^2} = \sqrt{41}$ $AF = 6$

PTS: 6 REF: 081138ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

316 ANS: 2

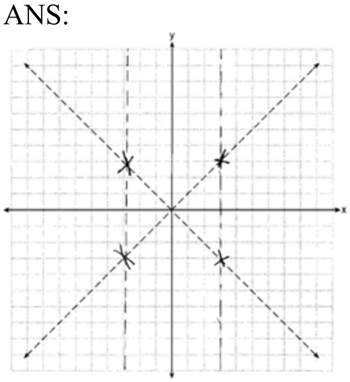
$6x + 42 = 18x - 12$

$54 = 12x$

$x = \frac{54}{12} = 4.5$

PTS: 2 REF: 011201ge STA: G.G.35 TOP: Parallel Lines and Transversals

317 ANS:



PTS: 2 REF: 081234ge STA: G.G.23 TOP: Locus

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

319 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

320 ANS: 3 PTS: 2 REF: 061122ge STA: G.G.56
TOP: Identifying Transformations

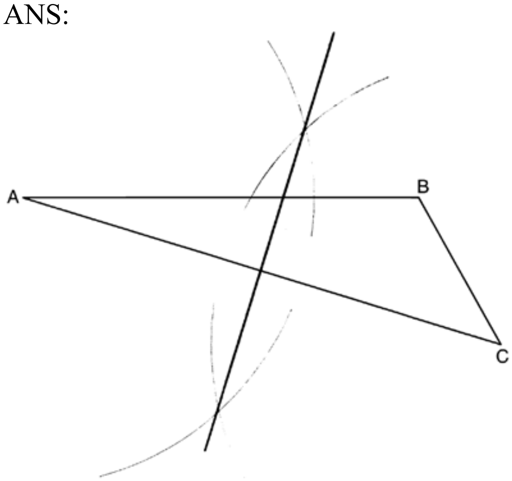
321 ANS: 4

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

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

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

323 ANS:




PTS: 2 REF: 081130ge STA: G.G.18 TOP: Constructions

324 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

325 ANS:

$$V = \frac{4}{3}\pi \cdot 9^3 = 972\pi$$

PTS: 2 REF: 081131ge STA: G.G.16 TOP: Surface Area

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

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

328 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

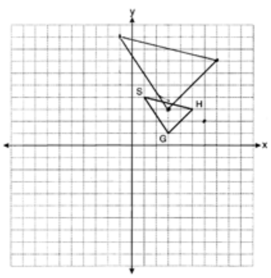
329 ANS: 4 PTS: 2 REF: 061203ge STA: G.G.9
TOP: Planes

330 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

331 ANS:




$G''(3,3), H''(7,7), S''(-1,9)$

PTS: 4 REF: 081136ge STA: G.G.58 TOP: Compositions of Transformations

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

333 ANS: 4

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

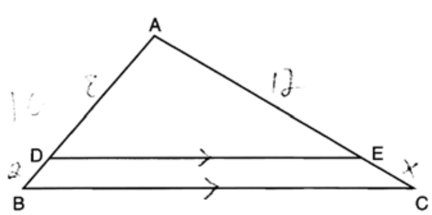
PTS: 2 REF: 081119ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

334 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

335 ANS: 3

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

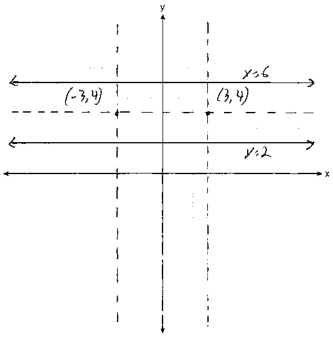



$8x = 24$

$x = 3$

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

336 ANS: 3 PTS: 2 REF: 081111ge STA: G.G.32
TOP: Exterior Angle Theorem
337 ANS: 1 PTS: 2 REF: 061104ge STA: G.G.43
TOP: Centroid
338 ANS:




PTS: 4 REF: 061135ge STA: G.G.23 TOP: Locus
339 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
340 ANS: 3 PTS: 2 REF: 081209ge STA: G.G.71
TOP: Equations of Circles
341 ANS: 1 PTS: 2 REF: 011213ge STA: G.G.24
TOP: Negations
342 ANS: 1

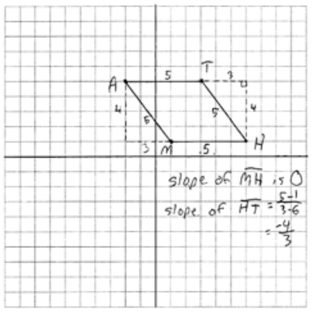
$$1 = \frac{-4+x}{2}. \qquad 5 = \frac{3+y}{2}.$$
$$-4+x=2 \qquad 3+y=10$$
$$x=6 \qquad y=7$$

PTS: 2 REF: 081115ge STA: G.G.66 TOP: Midpoint
343 ANS: 2 PTS: 2 REF: 061115ge STA: G.G.69
TOP: Triangles in the Coordinate Plane
344 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

345 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

346 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

347 ANS:

Quadrilateral *ABCD*, $\overline{AD} \cong \overline{BC}$ and $\angle DAE \cong \angle BCE$ are given. $\overline{AD} \parallel \overline{BC}$ because if two lines are cut by a transversal so that a pair of alternate interior angles are congruent, the lines are parallel. *ABCD* is a parallelogram because if one pair of opposite sides of a quadrilateral are both congruent and parallel, the quadrilateral is a parallelogram. $\overline{AE} \cong \overline{CE}$ because the diagonals of a parallelogram bisect each other. $\angle FEA \cong \angle GEC$ as vertical angles. $\triangle AEF \cong \triangle CEG$ by ASA.

PTS: 6 REF: 011238ge STA: G.G.27 TOP: Quadrilateral Proofs

348 ANS:

$L = 2\pi rh = 2\pi \cdot 12 \cdot 22 \approx 1659$. $\frac{1659}{600} \approx 2.8$. 3 cans are needed.

PTS: 2 REF: 061233ge STA: G.G.14 TOP: Lateral Area

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

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

351 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

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

353 ANS: 4
$m\angle A = 80$

PTS: 2 REF: 011115ge STA: G.G.34 TOP: Angle Side Relationship

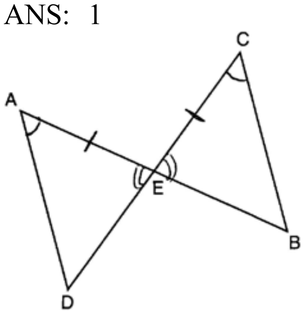
354 ANS: 4 PTS: 2 REF: 061124ge STA: G.G.31
TOP: Isosceles Triangle Theorem

355 ANS:
$(x-5)^2 + (y+4)^2 = 36$

PTS: 2 REF: 081132ge STA: G.G.72 TOP: Equations of Circles

356 ANS: 1 PTS: 2 REF: 081121ge STA: G.G.39
TOP: Special Parallelograms

357 ANS: 1




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

358 ANS: 2

$$m = \frac{-A}{B} = \frac{-4}{2} = -2 \quad \begin{aligned} y &= mx + b \\ 2 &= -2(2) + b \\ 6 &= b \end{aligned}$$

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

359 ANS:
$$(2a-3, 3b+2).\ \left(\frac{3a+a-6}{2}, \frac{2b-1+4b+5}{2}\right) = \left(\frac{4a-6}{2}, \frac{6b+4}{2}\right) = (2a-3, 3b+2)$$

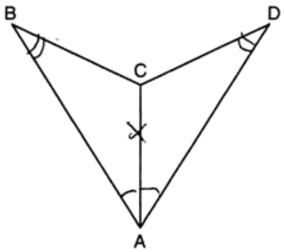
PTS: 2 REF: 061134ge STA: G.G.66 TOP: Midpoint

360 ANS: 2

$$\begin{aligned} 3x + x + 20 + x + 20 &= 180 \\ 5x &= 40 \\ x &= 28 \end{aligned}$$

PTS: 2 REF: 081222ge STA: G.G.31 TOP: Isosceles Triangle Theorem

361 ANS: 4




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

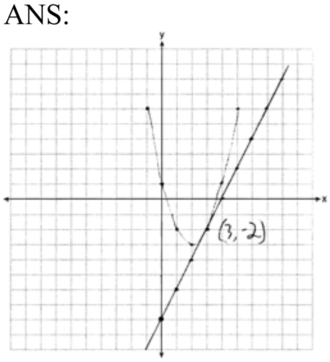
362 ANS: 1 PTS: 2 REF: 061125ge STA: G.G.39
TOP: Special Parallelograms

363 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

364 ANS:




PTS: 6 REF: 061238ge STA: G.G.70 TOP: Quadratic-Linear Systems

365 ANS: 3

$\dfrac{3}{8+3+4} \times 180 = 36$

PTS: 2 REF: 011210ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

366 ANS: 3 PTS: 2 REF: 011105ge STA: G.G.10
TOP: Solids

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

368 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

369 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

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

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

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

373 ANS: 1 PTS: 2 REF: 011221ge STA: G.G.10
TOP: Solids

374 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

375 ANS: 1 PTS: 2 REF: 011218ge STA: G.G.3
TOP: Planes

376 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

377 ANS: 4

$$4(x+4)=8^2$$

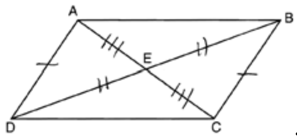
$$4x+16=64$$

$$4x=48$$

$$x=12$$

PTS: 2 REF: 061117ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

378 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

379 ANS: 3

$$y = mx + b$$
$$-1 = 2(2) + b$$
$$-5 = b$$

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

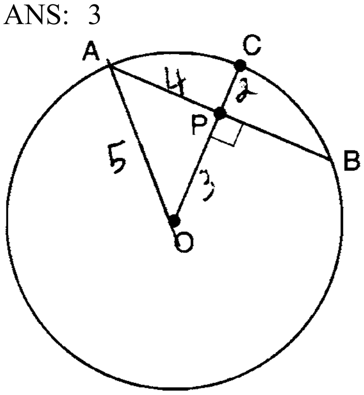
380 ANS: 1

$$x^2 = 7(16 - 7)$$
$$x^2 = 63$$
$$x = \sqrt{9}\sqrt{7}$$
$$x = 3\sqrt{7}$$

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

381 ANS: 4 PTS: 2 REF: 061118ge STA: G.G.1
TOP: Planes

382 ANS: 3




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

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

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

385 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

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

387 ANS: 4

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

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

388 ANS: 4

$$\sqrt{25^2-7^2}=24$$

PTS: 2 REF: 081105ge STA: G.G.50 TOP: Tangents
KEY: point of tangency

389 ANS: 4

Parallel lines intercept congruent arcs.

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

390 ANS: 2

$$7x=5x+30$$
$$2x=30$$
$$x=15$$

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

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

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

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

394 ANS: 4

$y = mx + b$

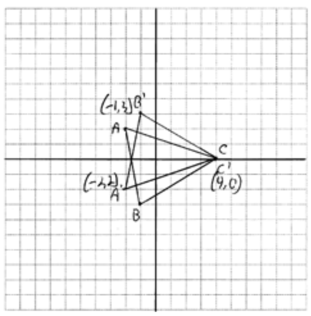
$3 = \frac{3}{2}(-2) + b$

$3 = -3 + b$

$6 = b$

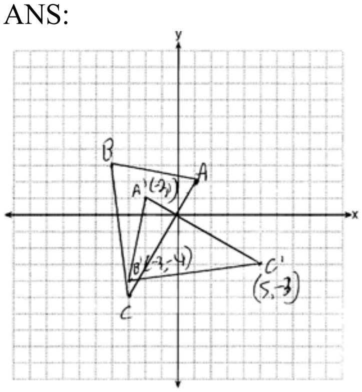
PTS: 2 REF: 011114ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

395 ANS:




PTS: 2 REF: 011130ge STA: G.G.54 TOP: Reflections
KEY: grids

396 ANS:



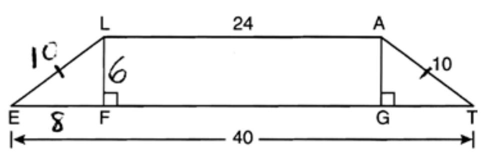

$A'(-2,1)$, $B'(-3,-4)$, and $C'(5,-3)$

PTS: 2 REF: 081230ge STA: G.G.54 TOP: Rotations

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

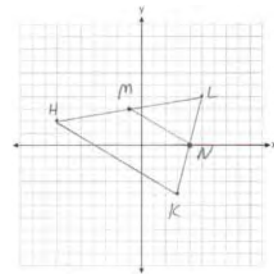
398 ANS: 1

$\frac{40-24}{2} = 8.$ $\sqrt{10^2 - 8^2} = 6.$




PTS: 2 REF: 061204ge STA: G.G.40 TOP: Trapezoids

399 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

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

401 ANS:
$R'(-3,-2)$, $S'(-4,4)$, and $T'(2,2)$.

PTS: 2 REF: 011232ge STA: G.G.54 TOP: Rotations

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

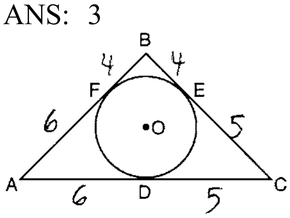
403 ANS: 1
$d = \sqrt{(4-1)^2 + (7-11)^2} = \sqrt{9+16} = \sqrt{25} = 5$

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

404 ANS:
The slope of $x + 2y = 4$ is $m = \frac{-A}{B} = \frac{-1}{2}$. The slope of $4y - 2x = 12$ is $\frac{-A}{B} = \frac{2}{4} = \frac{1}{2}$. Since the slopes are neither equal nor opposite reciprocals, the lines are neither parallel nor perpendicular.

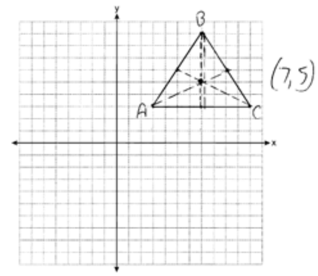
PTS: 2 REF: 061231ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

405 ANS: 3




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

406 ANS:




$(7,5)$ $m_{\overline{AB}} = \left(\dfrac{3+7}{2}, \dfrac{3+9}{2}\right) = (5,6)$ $m_{\overline{BC}} = \left(\dfrac{7+11}{2}, \dfrac{9+3}{2}\right) = (9,6)$

PTS: 2 REF: 081134ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

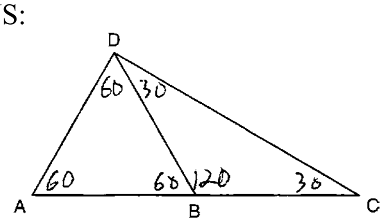
407 ANS: 1
$7x + 4 = 2(2x + 5)$. $PM = 2(2) + 5 = 9$

$$
\begin{aligned}
7x + 4 &= 4x + 10 \\
3x &= 6 \\
x &= 2
\end{aligned}
$$

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

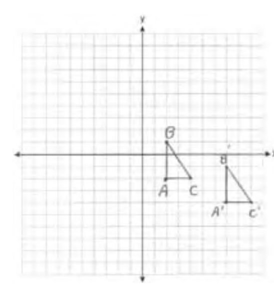
408 ANS: 1 PTS: 2 REF: 011122ge STA: G.G.28
TOP: Triangle Congruency

409 ANS:

30. 


PTS: 2 REF: 011129ge STA: G.G.31 TOP: Isosceles Triangle Theorem

410 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

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

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

413 ANS:
$\angle B$ and $\angle C$ are right angles because perpendicular lines form right angles. $\angle B \cong \angle C$ because all right angles are congruent. $\angle AEB \cong \angle DEC$ because vertical angles are congruent. $\triangle ABE \cong \triangle DCE$ because of ASA. $\overline{AB} \cong \overline{DC}$ because CPCTC.

PTS: 4 REF: 061235ge STA: G.G.27 TOP: Triangle Proofs

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

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

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

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

417 ANS:
16.7. $\dfrac{x}{25} = \dfrac{12}{18}$

$18x = 300$

$x \approx 16.7$

PTS: 2 REF: 061133ge STA: G.G.46 TOP: Side Splitter Theorem

418 ANS: 2
$M_x = \dfrac{7 + (-3)}{2} = 2$. $M_Y = \dfrac{-1 + 3}{2} = 1$.

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

419 ANS:
$(5-2)180 = 540$. $\dfrac{540}{5} = 108$ interior. $180 - 108 = 72$ exterior

PTS: 2 REF: 011131ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

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

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

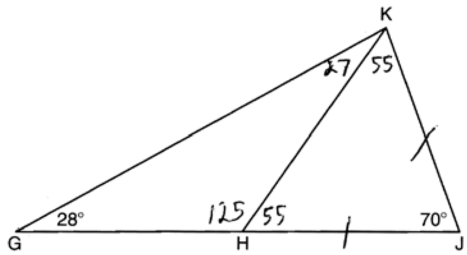
422 ANS: 3
$-5 + 3 = -2$ $\quad$ $2 + -4 = -2$

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

423 ANS:
$V = \pi r^2 h = \pi(5)^2 \cdot 7 = 175\pi$

PTS: 2 REF: 081231ge STA: G.G.14 TOP: Volume

424 ANS:




No, $\angle KGH$ is not congruent to $\angle GKH$.

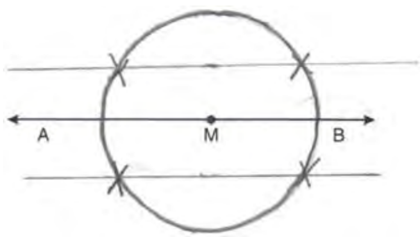
PTS: 2 REF: 081135ge STA: G.G.31 TOP: Isosceles Triangle Theorem

425 ANS: 3

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

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

426 ANS:




PTS: 2 REF: 011230ge STA: G.G.22 TOP: Locus

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

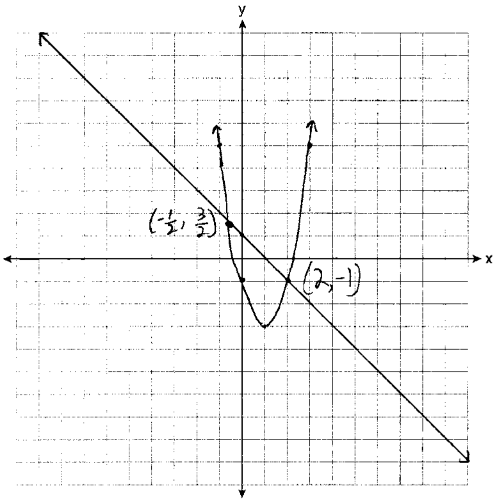
428 ANS: 2

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

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

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

430 ANS:




PTS: 4 REF: 061137ge STA: G.G.70 TOP: Quadratic-Linear Systems

431 ANS: 1

$$m = \frac{3}{2} \qquad y = mx + b$$
$$2 = \frac{3}{2}(1) + b$$
$$\frac{1}{2} = b$$

PTS: 2 REF: 081217ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

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

433 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

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

435 ANS: 1

$3x + 5 + 4x - 15 + 2x + 10 = 180$. $m\angle D = 3(20) + 5 = 65$. $m\angle E = 4(20) - 15 = 65$.
$$9x = 180$$
$$x = 20$$

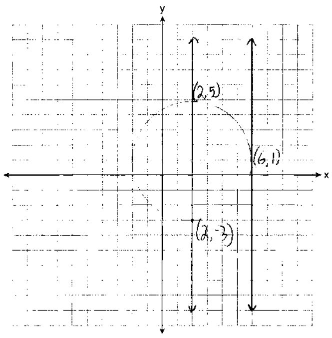
PTS: 2 REF: 061119ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

436 ANS: 4 PTS: 2 REF: 061103ge STA: G.G.60
TOP: Identifying Transformations
437 ANS: 2 PTS: 2 REF: 081205ge STA: G.G.17
TOP: Constructions
438 ANS:

$2x - 20 = x + 20.$ $m\overset{\frown}{AB} = x + 20 = 40 + 20 = 60$

$x = 40$

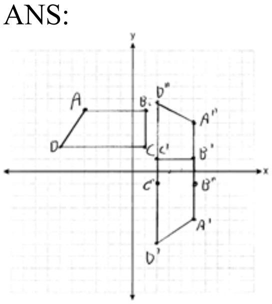
PTS: 2 REF: 011229ge STA: G.G.52 TOP: Chords
439 ANS:




PTS: 4 REF: 011135ge STA: G.G.23 TOP: Locus
440 ANS: 2 PTS: 2 REF: 011211ge STA: G.G.55
TOP: Properties of Transformations
441 ANS: 2

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

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




$A'(5,-4), B'(5,1), C'(2,1), D'(2,-6); A''(5,4), B''(5,-1), C''(2,-1), D''(2,6)$

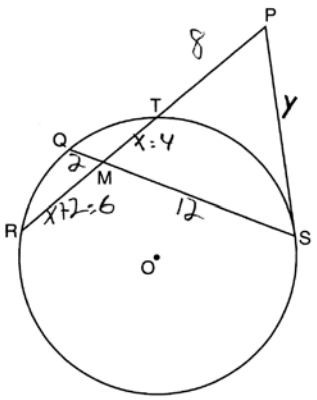
PTS: 4 REF: 061236ge STA: G.G.58 TOP: Compositions of Transformations
KEY: grids
443 ANS:
2 is not a prime number, false.

PTS: 2 REF: 081229ge STA: G.G.24 TOP: Negations
444 ANS: 4 PTS: 2 REF: 081216ge STA: G.G.45
TOP: Similarity KEY: basic

445 ANS: 1
Parallel lines intercept congruent arcs.

PTS: 2 REF: 061105ge STA: G.G.52 TOP: Chords
446 ANS: 3 PTS: 2 REF: 081218ge STA: G.G.1
TOP: Planes
447 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
448 ANS:




$x(x+2) = 12 \cdot 2$. $\overline{RT} = 6 + 4 = 10$. $y \cdot y = 18 \cdot 8$

$$x^2 + 2x - 24 = 0 \qquad y^2 = 144$$
$$(x+6)(x-4) = 0 \qquad y = 12$$
$$x = 4$$

PTS: 4 REF: 061237ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant
449 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
450 ANS: 2 PTS: 2 REF: 061201ge STA: G.G.59
TOP: Properties of Transformations
451 ANS: 2 PTS: 2 REF: 081202ge STA: G.G.55
TOP: Properties of Transformations
452 ANS: 3 PTS: 2 REF: 061210ge STA: G.G.71
TOP: Equations of Circles
453 ANS: 1 PTS: 2 REF: 081116ge STA: G.G.7
TOP: Planes

454 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

# Geometry Regents at Random
## Answer Section

455 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

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

457 ANS: 2

Perimeter of $\Delta DEF$ 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

458 ANS:

$$\begin{aligned} 12x - 4 + 180 - 6x + 6x + 7x + 13 &= 360. \\ 19x + 189 &= 360 \\ 19x &= 171 \\ x &= 9 \end{aligned} \qquad \begin{aligned} 16y + 1 &= \frac{12y + 1 + 18y + 6}{2} \\ 32y + 2 &= 30y + 7 \\ 2y &= 5 \\ y &= \frac{5}{2} \end{aligned}$$

PTS: 4 REF: 081337ge STA: G.G.40 TOP: Trapezoids

459 ANS: 1

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

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

460 ANS: 2

$\sqrt{8^2 + 15^2} = 17$

PTS: 2 REF: 061326ge STA: G.G.39 TOP: Special Parallelograms

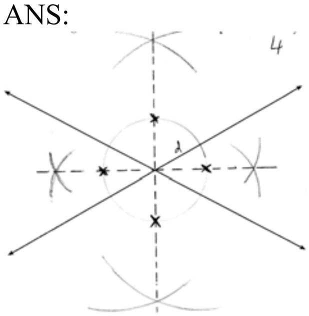
461 ANS: 3

$$\begin{aligned} 3x + 1 + 4x - 17 + 5x - 20 &= 180. \\ 12x - 36 &= 180 \\ 12x &= 216 \\ x &= 18 \end{aligned} \qquad \begin{aligned} 3(18) + 1 &= 55 \\ 4(18) - 17 &= 55 \\ 5(18) - 20 &= 70 \end{aligned}$$

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

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

463 ANS:




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

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

465 ANS: 2

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

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

466 ANS:

center: $(3,-4)$; radius: $\sqrt{10}$

PTS: 2 REF: 081333ge STA: G.G.73 TOP: Equations of Circles

467 ANS:

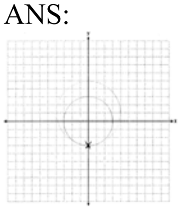
$m_{\overline{AB}} = \dfrac{4-1}{4-2} = \dfrac{3}{2}$. $m_{\overline{BC}} = -\dfrac{2}{3}$

PTS: 4 REF: 061334ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

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

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

470 ANS:



PTS: 2 REF: 011331ge STA: G.G.23 TOP: Locus

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

472 ANS: 3

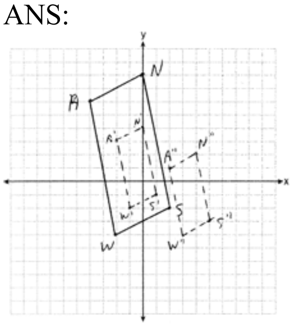
$6 = \frac{4+x}{2}$. $\quad 8 = \frac{2+y}{2}$.

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

$x = 8 \quad y = 14$

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

473 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

474 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

475 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

476 ANS:

$\Delta ABC$, $\overline{BD}$ bisects $\angle ABC$, $\overline{BD} \perp \overline{AC}$ (Given). $\angle CBD \cong \angle ABD$ (Definition of angle bisector). $\overline{BD} \cong \overline{BD}$ (Reflexive property). $\angle CDB$ and $\angle ADB$ are right angles (Definition of perpendicular). $\angle CDB \cong \angle ADB$ (All right angles are congruent). $\Delta CDB \cong \Delta ADB$ (SAS). $\overline{AB} \cong \overline{CB}$ (CPCTC).

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

477 ANS: 1

$8 \times 12 = 16x$

$6 = x$

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

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

479 ANS: 4
Distance is preserved after a rotation.

PTS: 2 REF: 081304ge STA: G.G.55 TOP: Properties of Transformations

480 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

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

482 ANS: 3

$$\frac{15}{18} = \frac{5}{6}$$

PTS: 2 REF: 081317ge STA: G.G.45 TOP: Similarity
KEY: perimeter and area

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

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

484 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.39 TOP: Special Parallelograms

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

486 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

487 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

488 ANS: 2

$$\begin{aligned}(x-4)^2-2&=-2x+6. \quad y=-2(4)+6=-2\\ x^2-8x+16-2&=-2x+6 \quad y=-2(2)+6=2\\ x^2-6x+8&=0\\ (x-4)(x-2)&=0\\ x&=4,2\end{aligned}$$

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

489 ANS:

$$\begin{aligned}x^2-8x&=5x+30. \quad \mathrm{m}\angle C=4(15)-5=55\\ x^2-13x-30&=0\\ (x-15)(x+2)&=0\\ x&=15\end{aligned}$$

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

490 ANS: 2 PTS: 2 REF: 081311ge STA: G.G.10
TOP: Solids

491 ANS: 4
$(x,y)\rightarrow(-x,-y)$

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

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

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

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

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

PTS: 2 REF: 011310ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

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

496 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

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

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

499 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

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

501 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

502 ANS: 3

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

$$10 = l$$

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

503 ANS: 2

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

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

504 ANS: 1

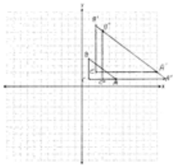
$$12(8) = x(6)$$

$$96 = 6x$$

$$16 = x$$

PTS: 2 REF: 061328ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two secants

505 ANS:



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

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

506 ANS:

$x^2+12+11x+5+13x-17=180$. $m\angle A=6^2+12=48$. $\angle B$ is the largest angle, so $\overline{AC}$ in the longest side.

$$x^2+24x-180=0 \qquad m\angle B=11(6)+5=71$$
$$(x+30)(x-6)=0 \qquad m\angle C=13(6)-7=61$$
$$x=6$$

PTS: 4 REF: 011337ge STA: G.G.34 TOP: Angle Side Relationship

507 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

508 ANS:

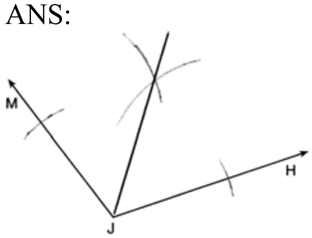
$L=2\pi rh=2\pi\cdot 3\cdot 7=42\pi$

PTS: 2 REF: 061329ge STA: G.G.14 TOP: Volume

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

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

511 ANS:




PTS: 2 REF: 081330ge STA: G.G.17 TOP: Constructions

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

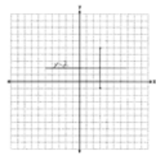
513 ANS: 2 PTS: 2 REF: 061305ge STA: G.G.18
TOP: Constructions

514 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

515 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

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

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

518 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

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

520 ANS: 3

$$\begin{aligned} 3x - 15 &= 2(6) \\ 3x &= 27 \\ x &= 9 \end{aligned}$$

PTS: 2 REF: 061311ge STA: G.G.42 TOP: Midsegments

521 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

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

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

524 ANS: 2

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

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

525 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

526 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

527 ANS: 4 PTS: 2 REF: 081305ge STA: G.G.71
TOP: Equations of Circles

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

529 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

530 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

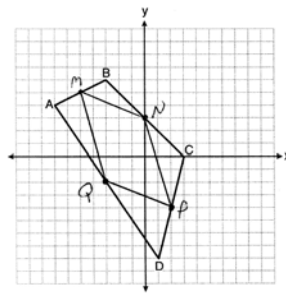
$N\left(\frac{-3+3}{2}, \frac{6+0}{2}\right) = N(0,3)$ $\quad m_{\overline{PQ}} = \frac{-4--2}{2--3} = \frac{-2}{5}$

$P\left(\frac{3+1}{2}, \frac{0+-8}{2}\right) = P(2,-4)$ $\quad m_{\overline{NA}} = \frac{3--4}{0-2} = \frac{7}{-2}$

$Q\left(\frac{-7+1}{2}, \frac{4+-8}{2}\right) = Q(-3,-2)$ $\quad m_{\overline{QM}} = \frac{-2-5}{-3--5} = \frac{-7}{2}$

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

531 ANS: 3

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

$y = \frac{3}{2}x-2 \quad 1 = 9+b$

$-8 = b$

PTS: 2 REF: 061316ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

532 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

533 ANS: 1

$x^2 = 3 \times 12$

$x = 6$

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

KEY: altitude

534 ANS: 2 PTS: 2 REF: 081102ge STA: G.G.29

TOP: Triangle Congruency

535 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

536 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

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

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

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

540 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

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

542 ANS: 3 PTS: 2 REF: 011311ge STA: G.G.42
TOP: Midsegments

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

544 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

545 ANS: 1 PTS: 2 REF: 061310ge STA: G.G.2
TOP: Planes

546 ANS: 1 PTS: 2 REF: 011320ge STA: G.G.26
TOP: Conditional Statements

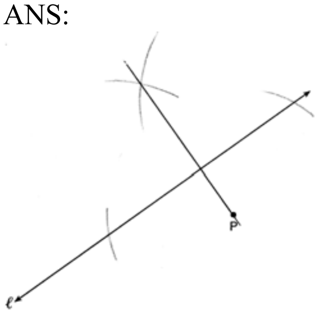
547 ANS:
$\Delta MAH$, $\overline{MH} \cong \overline{AH}$ and medians $\overline{AB}$ and $\overline{MT}$ are given. $\overline{MA} \cong \overline{AM}$ (reflexive property). $\Delta MAH$ is an isosceles triangle (definition of isosceles triangle). $\angle AMB \cong \angle MAT$ (isosceles triangle theorem). $B$ 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

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

549 ANS: 4 PTS: 2 REF: 011315ge STA: G.G.1
TOP: Planes

550 ANS:



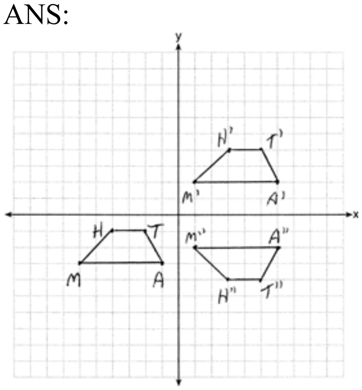

PTS: 2 REF: 011333ge STA: G.G.19 TOP: Constructions

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

552 ANS: 2
Isosceles or not, $\Delta RSV$ and $\Delta RST$ have a common base, and since $\overline{RS}$ and $\overline{VT}$ are bases, congruent altitudes.

PTS: 2 REF: 061301ge STA: G.G.40 TOP: Trapezoids

553 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

554 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

555 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

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

557 ANS: 4

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

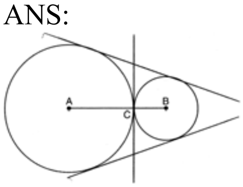
$3y = 2x - 6 \qquad 2y = 3x + 6$

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

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

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

558 ANS:




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

559 ANS: 1

Parallel chords intercept congruent arcs. $m\overset{\frown}{AC} = m\overset{\frown}{BD}$. $\frac{180 - 110}{2} = 35$.

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

560 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

561 ANS: 4

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

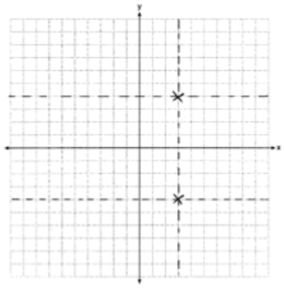
$6x = 4x + 50$

$2x = 50$

$x = 25$

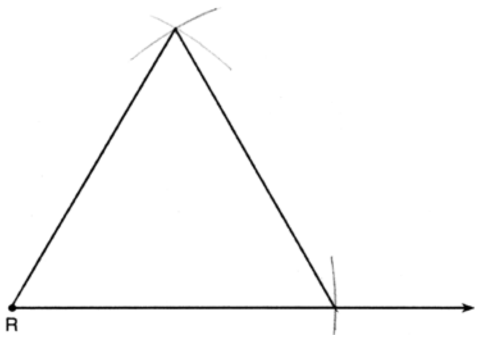
PTS: 2 REF: 081310ge STA: G.G.32 TOP: Exterior Angle Theorem

562 ANS:



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

563 ANS:




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

564 ANS: 3

$x^2 + 5^2 = 25$

$x = 0$

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

565 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

566 ANS: 2 PTS: 2 REF: 061324ge STA: G.G.44
TOP: Similarity Proofs

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

568 ANS:

$A = 2B - 15$ . $2B - 15 + B + 2B - 15 + B = 180$

$C = A + B$ $\qquad 6B - 30 = 180$

$C = 2B - 15 + B$ $\qquad 6B = 210$

$B = 35$

PTS: 2 REF: 081332ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

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

570 ANS: 4 PTS: 2 REF: 011306ge STA: G.G.9
TOP: Planes