Geometry Regents Exam 0116
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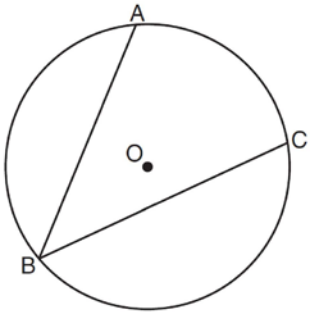
0116ge

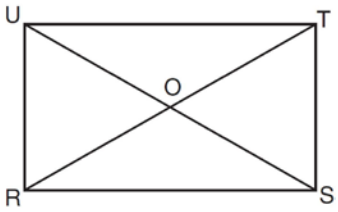
1 What is the equation of a circle with its center at $(5,-2)$ and a radius of 3?
1) $(x-5)^2+(y+2)^2=3$
2) $(x-5)^2+(y+2)^2=9$
3) $(x+5)^2+(y-2)^2=3$
4) $(x+5)^2+(y-2)^2=9$

2 In the diagram below, $\angle ABC$ is inscribed in circle O.



The ratio of the measure of $\angle ABC$ to the measure of $\overset{\frown}{AC}$ is
1) 1 : 1
2) 1 : 2
3) 1 : 3
4) 1 : 4

3 In the diagram below of rectangle $RSTU$, diagonals $\overline{RT}$ and $\overline{SU}$ intersect at O.



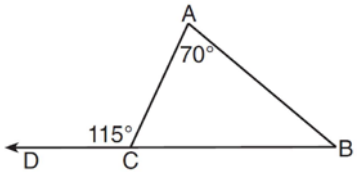
If $RT = 6x+4$ and $SO = 7x-6$, what is the length of $\overline{US}$?
1) 8
2) 2
3) 16
4) 32

4 How many points are 3 units from the origin and also equidistant from both the x-axis and y-axis?
1) 1
2) 2
3) 0
4) 4

5 The converse of the statement "If a triangle has one right angle, the triangle has two acute angles" is
1) If a triangle has two acute angles, the triangle has one right angle.
2) If a triangle has one right angle, the triangle does not have two acute angles.
3) If a triangle does not have one right angle, the triangle does not have two acute angles.
4) If a triangle does not have two acute angles, the triangle does not have one right angle.

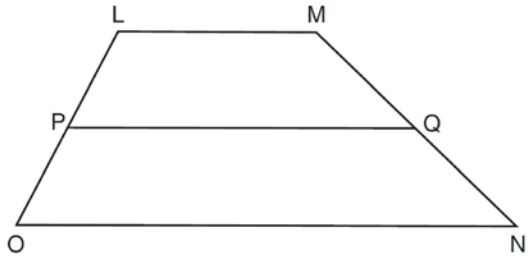
6 The surface area of a sphere is 2304π square inches. The length of a radius of the sphere, in inches, is
1) 12
2) 24
3) 288
4) 576

7 As shown in the diagram below of $\triangle ABC$, $\overline{BC}$ is extended through D, $m\angle A = 70$, and $m\angle ACD = 115$.



Which statement is true?
1) $AC > AB$
2) $AB > BC$
3) $BC < AC$
4) $AC < AB$

8 In trapezoid $LMNO$ below, median $\overline{PQ}$ is drawn.



If $LM = x + 7$, $ON = 3x + 11$, and $PQ = 25$, what is the value of x?

1) 1.75
2) 3.5
3) 8
4) 17

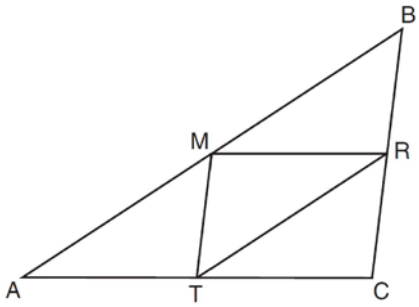
9 Points A and B are on line ℓ. How many points are 3 units from line ℓ and also equidistant from A and B?

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

10 The lines whose equations are $2x + 3y = 4$ and $y = mx + 6$ will be perpendicular when m is

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

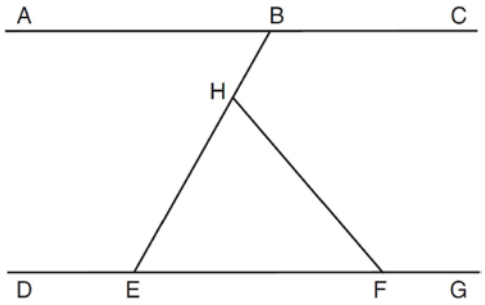
11 As shown in the diagram below, M, R, and T are midpoints of the sides of $\triangle ABC$.



If $AB = 18$, $AC = 14$, and $BC = 10$, what is the perimeter of quadrilateral $ACRM$?

1) 35
2) 32
3) 24
4) 21

12 In the diagram below, $\overline{ABC} \parallel \overline{DEFG}$. Transversal $\overline{BHE}$ and line segment HF are drawn.



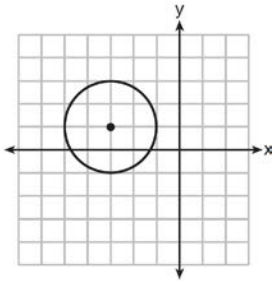
If $m\angle HFG = 130$ and $m\angle EHF = 70$, what is $m\angle ABE$?

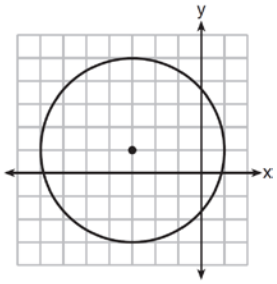
1) 40
2) 50
3) 60
4) 70

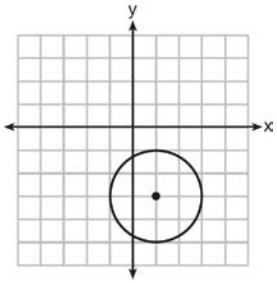
13 The graphs of the lines represented by the equations $y = \frac{1}{3}x + 7$ and $y = -\frac{1}{3}x - 2$ are

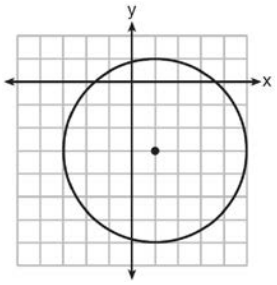
1) parallel
2) horizontal
3) perpendicular
4) intersecting, but not perpendicular

14 Which graph represents a circle whose equation is $(x+3)^2+(y-1)^2=4$?

1) 

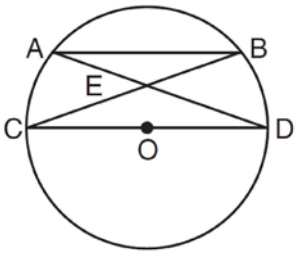
2) 

3) 

4) 

15 In $\triangle ABC$, $m\angle CAB = 2x$ and $m\angle ACB = x+30$. If $\overline{AB}$ is extended through point B to point D, $m\angle CBD = 5x-50$. What is the value of x?
1) 25
2) 30
3) 40
4) 46

16 In circle O shown below, chord $\overline{AB}$ and diameter $\overline{CD}$ are parallel, and chords $\overline{AD}$ and $\overline{BC}$ intersect at point E.

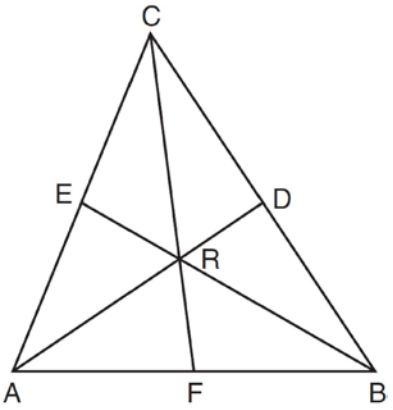


Which statement is *false*?
1) $\overset{\frown}{AC} \cong \overset{\frown}{BD}$
2) $BE = CE$
3) $\triangle ABE \sim \triangle CDE$
4) $\angle B \cong \angle C$

17 When the transformation $T_{2,-1}$ is performed on point A, its image is point $A'(-3,4)$. What are the coordinates of A?
1) $(5,-5)$
2) $(-5,5)$
3) $(-1,3)$
4) $(-6,-4)$

18 If the sum of the interior angles of a polygon is 1440°, then the polygon must be
1) an octagon
2) a decagon
3) a hexagon
4) a nonagon

19 In $\triangle ABC$ shown below, medians $\overline{AD}$, $\overline{BE}$, and $\overline{CF}$ intersect at point R.



If $CR = 24$ and $RF = 2x - 6$, what is the value of x?
1) 9
2) 12
3) 15
4) 27

20 Which equation represents a line that passes through the point $(-2,6)$ and is parallel to the line whose equation is $3x - 4y = 6$?
1) $3x + 4y = 18$
2) $4x + 3y = 10$
3) $-3x + 4y = 30$
4) $-4x + 3y = 26$

21 The bases of a right prism are triangles in which $\triangle MNP \cong \triangle RST$. If $MP = 9$, $MR = 18$, and $MN = 12$, what is the length of $\overline{NS}$?
1) 9
2) 12
3) 15
4) 18

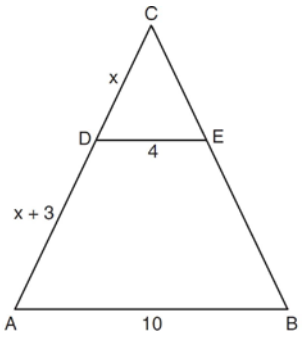
22 Triangle ABC has the coordinates $A(3,0)$, $B(3,8)$, and $C(6,6)$. If $\triangle ABC$ is reflected over the line $y = x$, which statement is true about the image of $\triangle ABC$?
1) One point remains fixed.
2) The size of the triangle changes.
3) The orientation does not change.
4) One side of $\triangle ABC$ is parallel to the line $y = x$.

23 A right circular cone has a diameter of $10\sqrt{2}$ and a height of 12. What is the volume of the cone in terms of π?
1) 200π
2) 600π
3) 800π
4) 2400π

24 Which statement is *not* always true when $\triangle ABC \cong \triangle XYZ$.
1) $\overline{BC} \cong \overline{YZ}$
2) $\overline{CA} \cong \overline{XY}$
3) $\angle CAB \cong \angle ZXY$
4) $\angle BCA \cong \angle YZX$

25 If two sides of a triangle have lengths of $\frac{1}{4}$ and $\frac{1}{5}$, which fraction can *not* be the length of the third side?
1) $\frac{1}{9}$
2) $\frac{1}{8}$
3) $\frac{1}{3}$
4) $\frac{1}{2}$

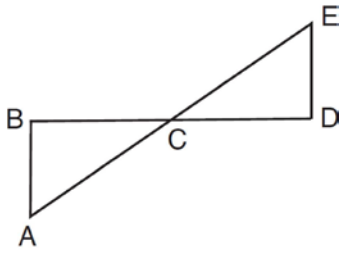
26 In the diagram below of $\triangle ABC$, $\overline{CDA}$, $\overline{CEB}$, $\overline{DE} \parallel \overline{AB}$, $DE = 4$, $AB = 10$, $CD = x$, and $DA = x + 3$.



What is the value of x?

1) 0.5
2) 2
3) 5.5
4) 6

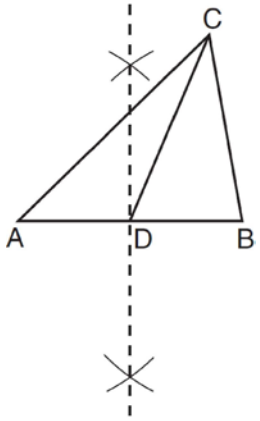
27 Given: $\overline{AE}$ bisects $\overline{BD}$ at C
$\overline{AB}$ and $\overline{DE}$ are drawn
$\angle ABC \cong \angle EDC$



Which statement is needed to prove $\triangle ABC \cong \triangle EDC$ using ASA?

1) $\angle ABC$ and $\angle EDC$ are right angles.
2) $\overline{BD}$ bisects $\overline{AE}$ at C.
3) $\angle BCA \cong \angle DCE$
4) $\angle DEC \cong \angle BAC$

28 In the construction shown below, $\overline{CD}$ is drawn.

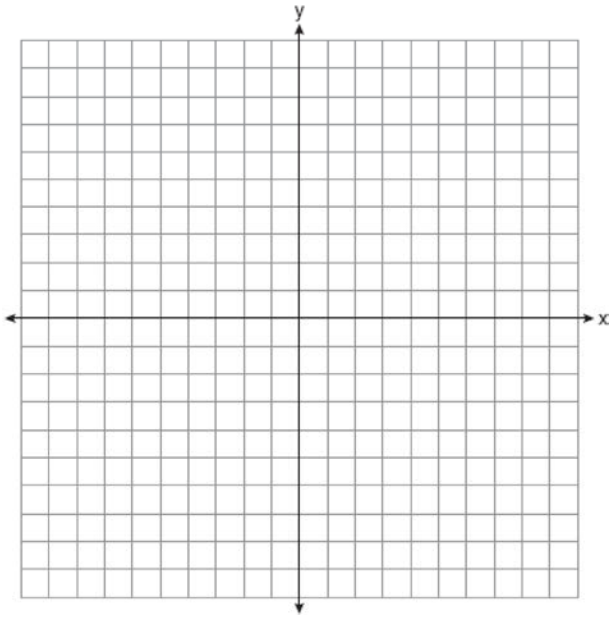


In $\triangle ABC$, $\overline{CD}$ is the

1) perpendicular bisector of side $\overline{AB}$
2) median to side $\overline{AB}$
3) altitude to side $\overline{AB}$
4) bisector of $\angle ACB$

29 The sides of a triangle measure 7, 4, and 9. If the longest side of a similar triangle measures 36, determine and state the length of the shortest side of this triangle.

30 Triangle ABC has coordinates $A(6,-4)$, $B(0,2)$, and $C(6,2)$. On the set of axes below, graph and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation of $\frac{1}{2}$.

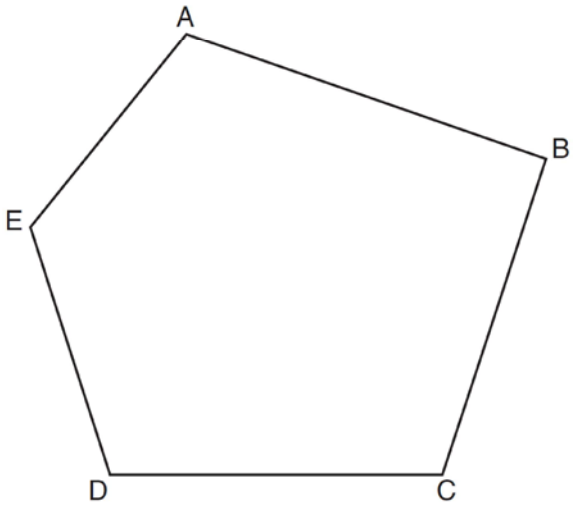


31 In parallelogram $RSTU$, $m\angle R = 5x - 2$ and $m\angle S = 3x + 10$. Determine and state the value of x.

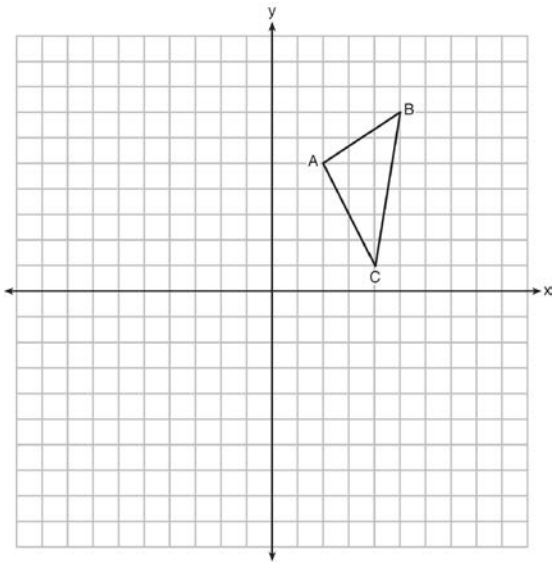
32 Determine and state the length of a line segment whose endpoints are $(6,4)$ and $(-9,-4)$.

33 The base of a right pentagonal prism has an area of 20 square inches. If the prism has an altitude of 8 inches, determine and state the volume of the prism, in cubic inches.

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



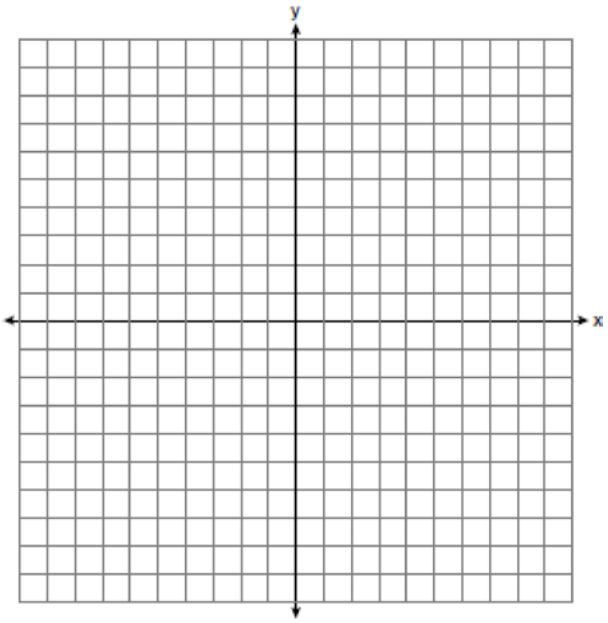
35 The coordinates of $\triangle ABC$, shown on the graph below, are $A(2,5)$, $B(5,7)$, and $C(4,1)$. Graph and label $\triangle A'B'C'$, the image of $\triangle ABC$ after it is reflected over the y-axis. Graph and label $\triangle A''B''C''$, the image of $\triangle A'B'C'$ after it is reflected over the x-axis. State a single transformation that will map $\triangle ABC$ onto $\triangle A''B''C''$.



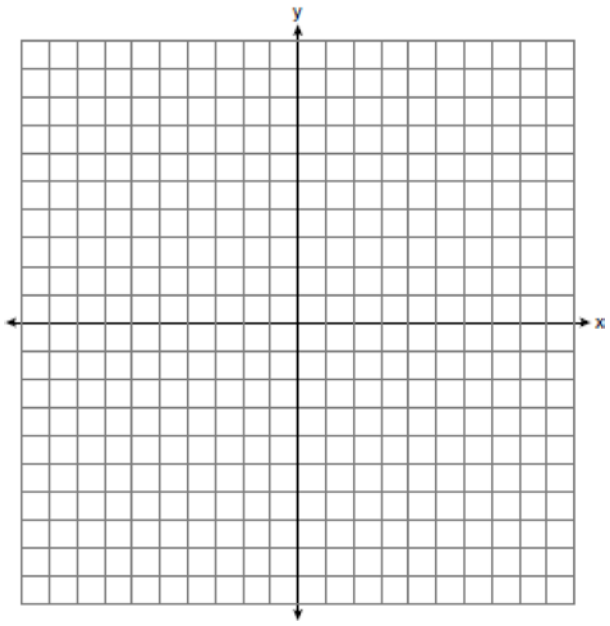
36 On the set of axes below, solve the following system of equations graphically and state the coordinates of all points in the solution.

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

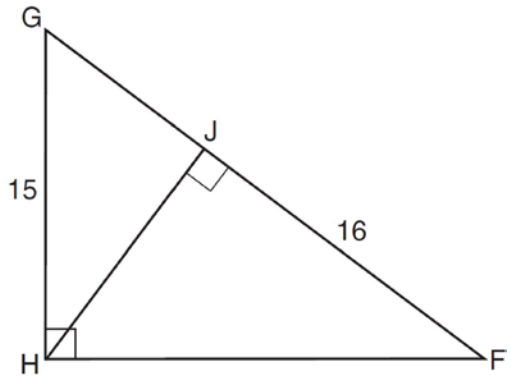
$$y - 2x = 5$$



37 Given: Triangle RST has coordinates $R(-1,7)$, $S(3,-1)$, and $T(9,2)$
Prove: $\triangle RST$ is a right triangle
[The use of the set of axes below is optional.]



38 In right triangle FGH shown below, $m\angle GHF = 90$, altitude $\overline{HJ}$ is drawn to $\overline{FG}$, $FJ = 16$, and $HG = 15$.



Determine and state the length of $\overline{JG}$. Determine and state the length of $\overline{HJ}$. [Only algebraic solutions can receive full credit.]

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Answer Section

1 ANS: 2 PTS: 2 REF: 011601ge STA: G.G.71
TOP: Equations of Circles

2 ANS: 2 PTS: 2 REF: 011602ge STA: G.G.51
TOP: Arcs Determined by Angles KEY: inscribed

3 ANS: 3

$6x + 4 = 2(7x - 6)$ $US = 6(2) + 4 = 16$

$6x + 4 = 14x - 12$

$16 = 8x$

$x = 2$

PTS: 2 REF: 011603ge STA: G.G.39 TOP: Special Parallelograms

4 ANS: 4 PTS: 2 REF: 011604ge STA: G.G.23
TOP: Locus

5 ANS: 1 PTS: 2 REF: 011605ge STA: G.G.26
TOP: Converse and Biconditional

6 ANS: 2

$2304\pi = 4\pi r^2$

$576 = r^2$

$24 = r$

PTS: 2 REF: 011606ge STA: G.G.16 TOP: Volume and Surface Area

7 ANS: 4 PTS: 2 REF: 011607ge STA: G.G.34
TOP: Angle Side Relationship

8 ANS: 3

$\frac{x + 7 + 3x + 11}{2} = 25$

$4x + 18 = 50$

$4x = 32$

$x = 8$

PTS: 2 REF: 011608ge STA: G.G.40 TOP: Trapezoids

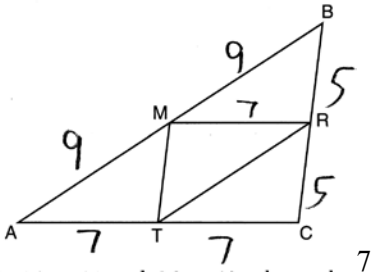
9 ANS: 2 PTS: 2 REF: 011609ge STA: G.G.22
TOP: Locus

10 ANS: 3

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

PTS: 2 REF: 011610ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

11 ANS: 1



$7+7+5+7+9=35$

PTS: 2 REF: 011611ge STA: G.G.42 TOP: Midsegments

12 ANS: 3 PTS: 2 REF: 011612ge STA: G.G.35
TOP: Parallel Lines and Transversals

13 ANS: 4 PTS: 2 REF: 011613ge STA: G.G.63
TOP: Parallel and Perpendicular Lines

14 ANS: 1 PTS: 2 REF: 011614ge STA: G.G.74
TOP: Graphing Circles

15 ANS: 3

$2x+x+30=5x-50$

$80=2x$

$x=40$

PTS: 2 REF: 011615ge STA: G.G.32 TOP: Exterior Angle Theorem

16 ANS: 2 PTS: 2 REF: 011616ge STA: G.G.52
TOP: Chords and Secants

17 ANS: 2 PTS: 2 REF: 011617ge STA: G.G.54
TOP: Translations

18 ANS: 2

$(n-2)180=1440$

$n-2=8$

$n=10$

PTS: 2 REF: 011618ge STA: G.G.36 TOP: Interior and Exterior Angles of Polygons

19 ANS: 1

$2(2x-6)=24$

$2x-6=12$

$2x=18$

$x=9$

PTS: 2 REF: 011619ge STA: G.G.43 TOP: Centroid

20 ANS: 3

$m = \frac{-A}{B} = \frac{-3}{-4} = \frac{3}{4}$ $6 = \frac{3}{4}(-2) + b$ $y = \frac{3}{4}x + \frac{15}{2}$

$\frac{12}{2} = \frac{-3}{2} + b$ $4y = 3x + 30$

$-3x + 4y = 30$

$\frac{15}{2} = b$

PTS: 2 REF: 011620ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

21 ANS: 4 PTS: 2 REF: 011621ge STA: G.G.10 TOP: Solids

22 ANS: 1

$C(6,6)$ remains fixed after the reflection.

PTS: 2 REF: 011622ge STA: G.G.55 TOP: Properties of Transformations

23 ANS: 1

$V = \frac{1}{3}\pi \cdot \left(5\sqrt{2}\right)^2 \cdot 12 = 200\pi$

PTS: 2 REF: 011623ge STA: G.G.15 TOP: Volume and Lateral Area

24 ANS: 2 PTS: 2 REF: 011624ge STA: G.G.29 TOP: Triangle Congruency

25 ANS: 4

$\frac{5}{20} - \frac{4}{20} = \frac{1}{20}$ $\frac{1}{20} < s < \frac{9}{20}$ $\frac{1}{2} > \frac{9}{20}$

$\frac{5}{20} + \frac{4}{20} = \frac{9}{20}$

PTS: 2 REF: 011625ge STA: G.G.33 TOP: Triangle Inequality Theorem

26 ANS: 4

$\frac{x}{4} = \frac{x + x + 3}{10}$

$10x = 8x + 12$

$2x = 12$

$x = 6$

PTS: 2 REF: 011626ge STA: G.G.46 TOP: Side Splitter Theorem

27 ANS: 3 PTS: 2 REF: 011627ge STA: G.G.28 TOP: Triangle Congruency

28 ANS: 2 PTS: 2 REF: 011628ge STA: G.G.18 TOP: Constructions

29 ANS:

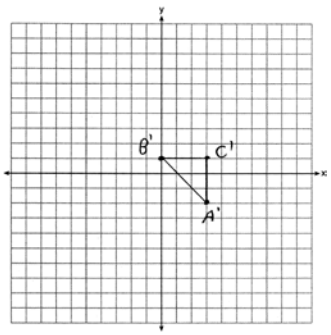
$$\frac{9}{36} = \frac{4}{x}$$

$$9x = 144$$

$$x = 16$$

PTS: 2 REF: 011629ge STA: G.G.45 TOP: Similarity
KEY: basic

30 ANS:



PTS: 2 REF: 011630ge STA: G.G.58 TOP: Dilations

31 ANS:

$$5x - 2 + 3x + 10 = 180$$

$$8x + 8 = 180$$

$$8x = 172$$

$$x = 21.5$$

PTS: 4 REF: 011631ge STA: G.G.38 TOP: Parallelograms

32 ANS:

$$\sqrt{(6 - -9)^2 + (4 - -4)^2} = \sqrt{225 + 64} = \sqrt{289} = 17$$

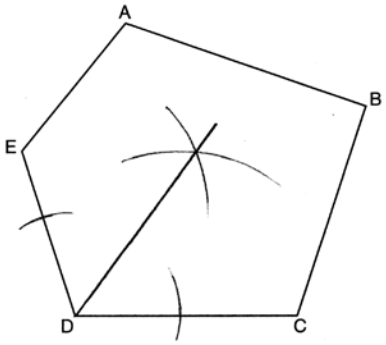
PTS: 2 REF: 011632ge STA: G.G.67 TOP: Distance

33 ANS:

$$V = 20 \times 8 = 160$$

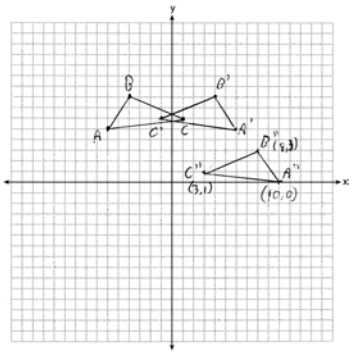
PTS: 2 REF: 011633ge STA: G.G.12 TOP: Volume

34 ANS:



PTS: 2 REF: 011634ge STA: G.G.17 TOP: Constructions

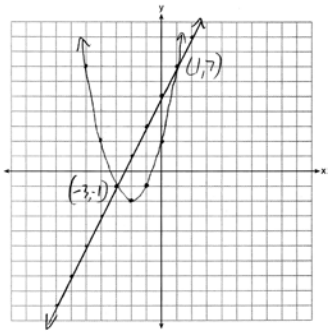
35 ANS:



$R_{180°}$

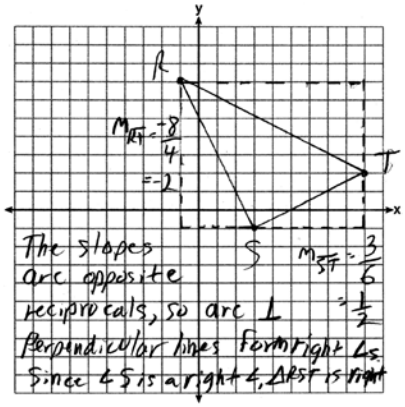
PTS: 4 REF: 011635ge STA: G.G.58 TOP: Compositions of Transformations
KEY: grids

36 ANS:



PTS: 4 REF: 011636ge STA: G.G.70 TOP: Quadratic-Linear Systems

37 ANS:



PTS: 4 REF: 011638ge STA: G.G.69 TOP: Triangles in the Coordinate Plane

38 ANS:

$x(x+16) = 15^2 \quad y^2 = 16 \cdot 9$

$x^2 + 16x - 225 = 0 \quad y^2 = 144$

$(x+25)(x-9) = 0 \quad y = 12$

$x = 9$

PTS: 6 REF: 011638ge STA: G.G.47 TOP: Similarity
KEY: leg