

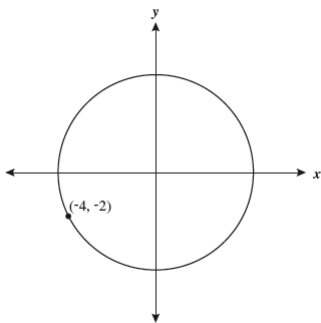
**Geometry Item Specs Practice Test**

\_\_\_\_\_ 1. Which of the following is the **converse** of the following statement?

“If today is Sunday, then tomorrow is Monday.”

- a. If tomorrow is Monday, then today is Sunday.
- b. If tomorrow is not Monday, then today is Sunday.
- c. today is not Sunday, then tomorrow is not Monday.
- d. If tomorrow is not Monday, then today is not Sunday.

\_\_\_\_\_ 2. The circle shown below is centered at the origin and contains the point (-4, -2).



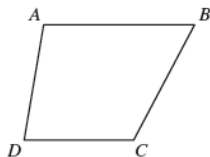
Which of the following is closest to the length of the diameter of the circle?

- a. 13.41
- b. 11.66
- c. 8.94
- d. 4.47

3. On a coordinate grid,  $AB$  has end point  $B$  at  $(24, 16)$ . The midpoint of  $AB$  is  $P(4, -3)$ . What is the  $y$ -coordinate of Point  $A$ ?

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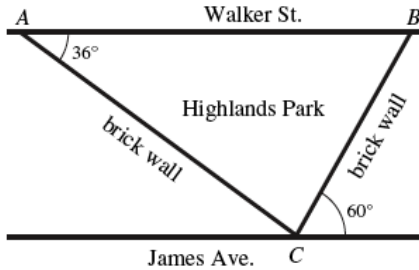
\_\_\_\_\_ 4. In the figure below,  $\overline{AB}$  is parallel to  $\overline{DC}$ .



Which of the following statements about the figure must be true?

- a.  $m\angle DAB + m\angle ABC = 180^\circ$
- b.  $m\angle DAB + m\angle CDA = 180^\circ$
- c.  $\angle DAB \cong \angle ADC$
- d.  $\angle ADC \cong \angle ABC$

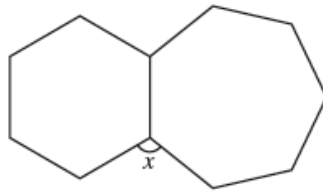
5. Highlands Park is located between two parallel streets, Walker Street and James Avenue. The park faces Walker Street and is bordered by two brick walls that intersect James Avenue at point C, as shown below.



What is the measure, in degrees, of  $\angle ACB$ , the angle formed by the park's two brick walls?

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6. A regular hexagon and a regular heptagon share one side, as shown in the diagram below.



Which of the following is closest to the measure of  $x$ , the angle formed by one side of the hexagon and one side of the heptagon?

- a.  $102.9^\circ$       b.  $111.4^\circ$       c.  $120.0^\circ$       d.  $124.5^\circ$

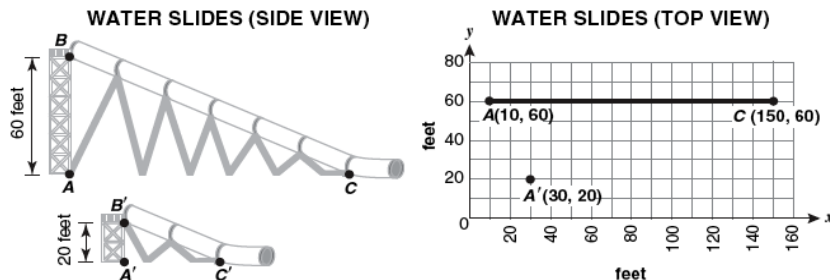
7. Claire is drawing a regular polygon. She has drawn two of the sides with an interior angle of  $140^\circ$ , as shown below.



When Claire completes the regular polygon, what should be **the sum**, in degrees, of the measures of the interior angles?

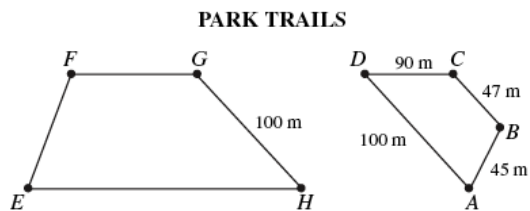
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8. The owners of a water park want to build a scaled-down version of a popular tubular water slide for the children’s section of the park. The side view of the water slide, labeled  $ABC$ , is shown below.



Points  $A'$ ,  $B'$  and  $C'$ , shown above, are the corresponding points of the scaled-down slide. Which of the following would be closest to the coordinates of a new point  $C'$  that will make slide  $A'B'C'$  similar to slide  $ABC$ ?

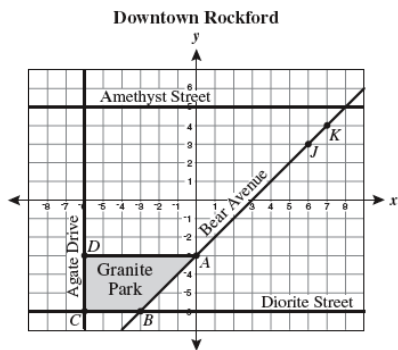
- a.  $(90, 20)$       b.  $(77, 20)$       c.  $(50, 20)$       d.  $(47, 20)$
9. Malik runs on the trails in the park. He normally runs 1 complete lap around trail  $ABCD$ . The length of each side of trail  $ABCD$  is shown in meters (m) in the diagram below.



If trail  $EFGH$  is similar in shape to trail  $ABCD$ , what is the minimum distance, to the nearest whole meter, Malik would have to run to complete one lap around trail  $EFGH$ ?

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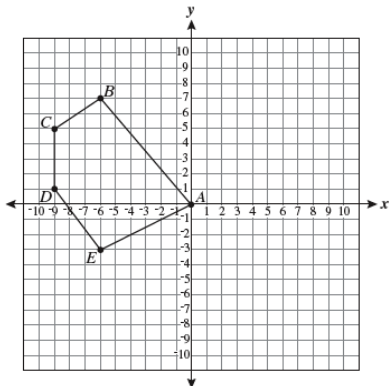
10. A top view of downtown Rockford is shown on the grid below, with Granite Park represented by quadrilateral  $ABCD$ . The shape of a new park, Mica Park, will be similar to the shape of Granite Park. Vertices  $L$  and  $M$  will be plotted on the grid to form quadrilateral  $JKLM$ , representing Mica Park.



Which of the following coordinates for  $L$  and  $M$  could be vertices of  $JKLM$  so that the shape of Mica Park is similar to the shape of Granite Park?

- a.  $L(4, 4), M(4, 3)$       c.  $L(7, 6), M(6, 6)$   
 b.  $L(7, 1), M(6, 1)$       d.  $L(8, 4), M(8, 3)$

11. Pentagon  $ABCDE$  is shown below on a coordinate grid. The coordinates of  $A$ ,  $B$ ,  $C$ ,  $D$ , and  $E$  all have integer values.

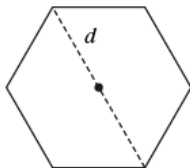


If pentagon  $ABCDE$  is rotated  $90^\circ$  clockwise about point  $A$  to create pentagon  $A'B'C'D'E'$ , what will be the  $x$ -coordinate of  $E'$ ?

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12. Marisol is creating a custom window frame that is in the shape of a regular hexagon. She wants to find the area of the hexagon to determine the amount of glass needed. She measured diagonal  $d$  and determined it was 40 inches. A diagram of the window frame is shown below.

Custom Window Frame



Which of the following is closest to the area, in square inches, of the hexagon?

- a. 600                      b. 849                      c. 1,039                      d. 1,200

13. A package shaped like a rectangular prism needs to be mailed. For this package to be mailed at the standard parcel-post rate, the sum of the length of the longest side and the girth (the perimeter around its other two dimensions) must be less than or equal to 108 inches (in.). Figure 1 shows how to measure the girth of a package.

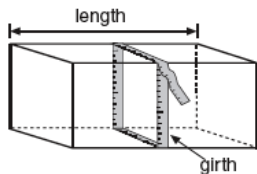


Figure 1

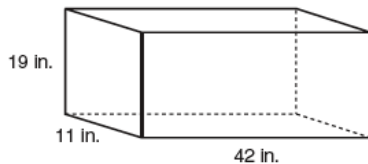
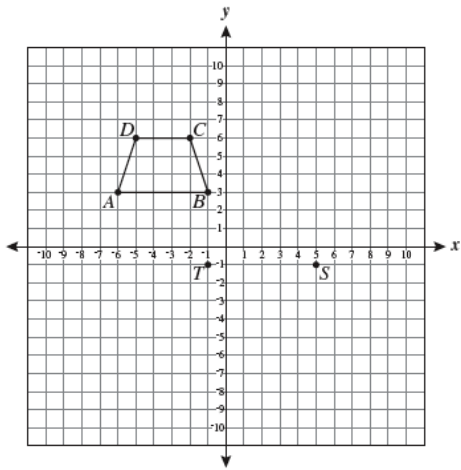


Figure 2

What is the sum of the length, in inches, of the longest side and the girth of the package shown in Figure 2?

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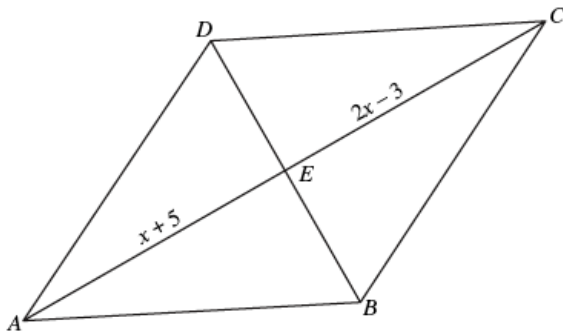
14. On the coordinate grid below, quadrilateral  $ABCD$  has vertices with integer coordinates.



Quadrilateral  $QRST$  is similar to quadrilateral  $ABCD$  with point  $S$  located at  $(5, -1)$  and point  $T$  located at  $(-1, -1)$ . Which of the following could be possible coordinates for point  $Q$ ?

- a.  $(6, -4)$       b.  $(7, -7)$       c.  $(-3, -7)$       d.  $(-2, -4)$

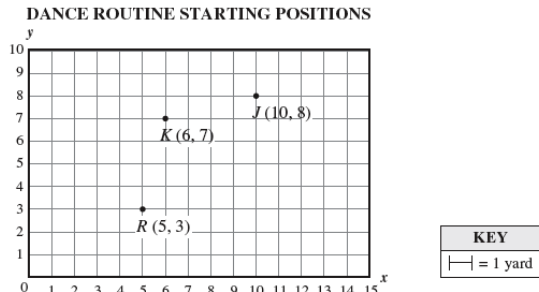
15. Figure  $ABCD$  is a rhombus. The length of  $\overline{AE}$  is  $(x + 5)$  units, and the length of  $\overline{EC}$  is  $(2x - 3)$  units.



Which statement best explains why the equation  $x + 5 = 2x - 3$  can be used to solve for  $x$ ?

- a. All four sides of a rhombus are congruent.      c. Diagonals of a rhombus are perpendicular.  
 b. Opposite sides of a rhombus are parallel.      d. Diagonals of a rhombus bisect each other.

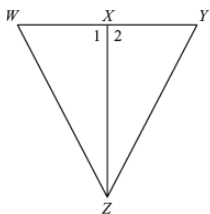
16. Four students are choreographing their dance routine for the high school talent show. The stage is rectangular and measures 15 yards by 10 yards. The stage is represented by the coordinate grid below. Three of the students—Riley ( $R$ ), Krista ( $K$ ), and Julian ( $J$ )—graphed their starting positions, as shown below.



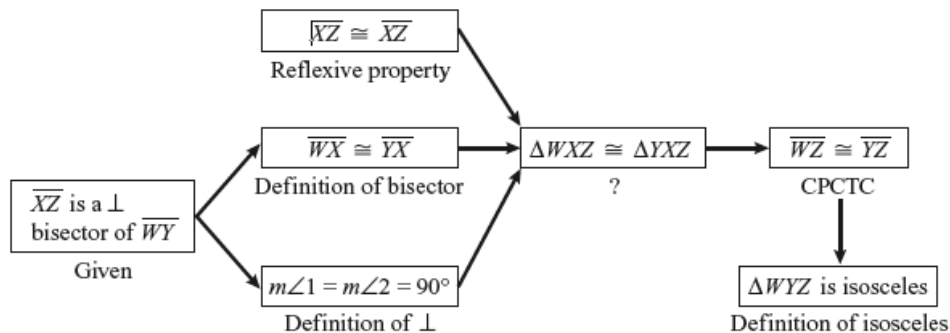
Let  $H$  represent Hannah's starting position on the stage. What should be the  $x$ -coordinate of point  $H$  so that  $RKJH$  is a parallelogram?

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- \_\_\_\_\_ 17. Nancy wrote a proof about the figure shown below.



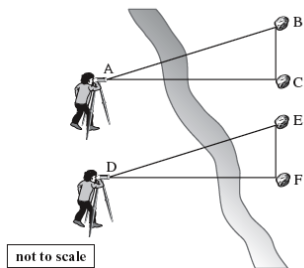
In the proof below, Nancy started with the fact that  $XZ$  is a perpendicular bisector of  $WY$  and proved that  $\triangle WYZ$  is isosceles.



Which of the following correctly replaces the question mark in Nancy's proof?

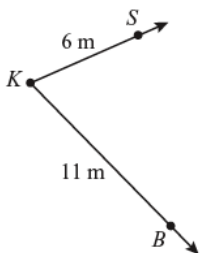
- a. ASA                      b. SAA                      c. SAS                      d. SSS

- \_\_\_\_\_ 18. A surveyor took some measurements across a river, as shown below. In the diagram,  $AC = DF$  and  $AB = DE$ .



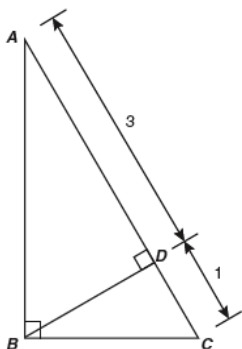
The surveyor determined that  $m\angle BAC = 29$  and  $m\angle EDF = 32$ . Which of the following can he conclude?

- a.  $BC > EF$       b.  $BC < EF$       c.  $AC > DE$       d.  $AC < DF$
- \_\_\_\_\_ 19. Kristin has two dogs, Buddy and Socks. She stands at point  $K$  in the diagram and throws two disks. Buddy catches one at point  $B$ , which is 11 meters (m) from Kristin. Socks catches the other at point  $S$ , which is 6 m from Kristin.



If  $KSB$  forms a triangle, which could be the length, in meters, of segment  $SB$ ?

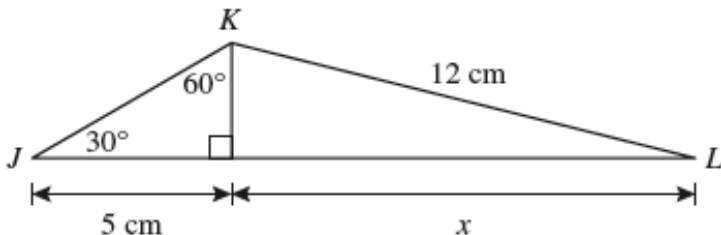
- a. 5 m      b. 8 m      c. 17 m      d. 22 m
- \_\_\_\_\_ 20. In  $\triangle ABC$ ,  $\overline{BD}$  is an altitude.



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

- a. 1      b. 2      c.  $\sqrt{3}$       d.  $2\sqrt{3}$

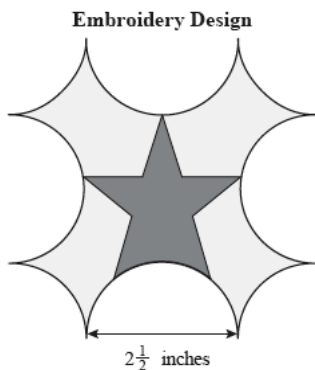
21. Nara created two right triangles. She started with  $\triangle JKL$  and drew an altitude from point  $K$  to side  $JL$ . The diagram below shows  $\triangle JKL$  and some of its measurements, in centimeters (cm).



Based on the information in the diagram, what is the measure of  $x$  to the nearest tenth of a centimeter?

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22. Allison created an embroidery design of a stylized star emblem. The perimeter of the design is made by alternating semicircle and quarter-circle arcs. Each arc is formed from a circle with a  $2\frac{1}{2}$ -inch diameter. There are 4 semicircle and 4 quarter-circle arcs, as shown in the diagram below.



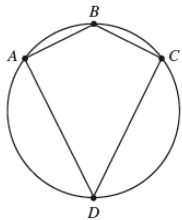
To the nearest whole inch, what is the **perimeter** of Allison's design?

- a. 15 inches      b. 20 inches      c. 24 inches      d. 31 inches
23. Circle  $Q$  has a radius of 5 units with center  $Q(3.7, -2)$ . Which of the following equations defines circle  $Q$ ?

- a.  $(x+3.7)^2 + (y-2)^2 = 5$       c.  $(x-3.7)^2 + (y+2)^2 = 5$   
 b.  $(x+3.7)^2 + (y-2)^2 = 25$       d.  $(x-3.7)^2 + (y+2)^2 = 25$



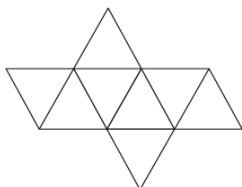
24. Kayla inscribed kite  $ABCD$  in a circle, as shown below.



If the measure of arc  $ADC$  is  $255^\circ$  in Kayla's design, what is the measure, in degrees, of  $\angle ADC$ ?

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25. Below is a net of a polyhedron.



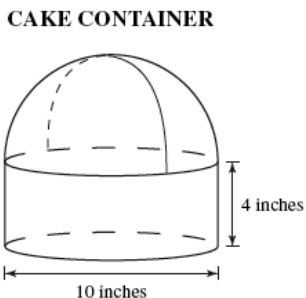
How many edges does the polyhedron have?

- a. 6                      b. 8                      c. 12                      d. **24**

26. How many faces does a dodecahedron have?

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27. Abraham works at the Delicious Cake Factory and packages cakes in cardboard containers shaped like right circular cylinders with hemispheres on top, as shown in the diagram below.

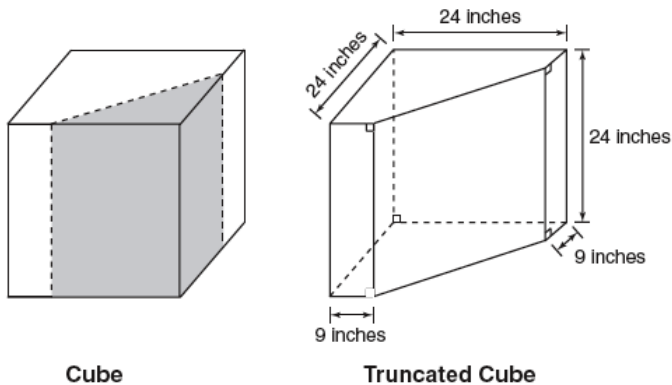


Abraham wants to wrap the cake containers completely in colored plastic wrap and needs to know how much wrap he will need. What is the total exterior surface area of the container?

- a.  $90\pi$  square inches                      c.  $190\pi$  square inches  
 b.  $115\pi$  square inches                      d.  $308\pi$  square inches

28. At a garage sale, Jason bought an aquarium shaped like a truncated cube. A truncated cube can be made by slicing a cube with a plane perpendicular to the base of the cube and removing the resulting triangular prism, as shown in the cube diagram below.

Jason's Aquarium



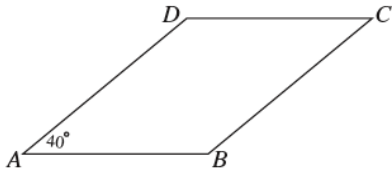
What is the capacity, **in cubic inches**, of this truncated cube aquarium?

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29. Kendra has a compost box that has the shape of a cube. She wants to increase the size of the box by extending every edge of the box by half of its original length. After the box is increased in size, which of the following statements is true?
- a. The volume of the new compost box is exactly 112.5% of the volume of the original box.
  - b. The volume of the new compost box is exactly 150% of the volume of the original box.
  - c. The volume of the new compost box is exactly 337.5% of the volume of the original box.
  - d. The volume of the new compost box is exactly 450% of the volume of the original box.
30. A city is planning to replace one of its water storage tanks with a larger one. The city's old tank is a right circular cylinder with a radius of 12 feet and a volume of 10,000 cubic feet. The new tank is a right circular cylinder with a radius of 15 feet and the same height as the old tank. What is the maximum number of cubic feet of water the new storage tank will hold?

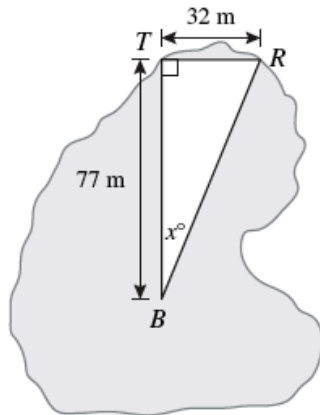
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- \_\_\_\_\_ 31. For his mathematics assignment, Armando must determine the conditions that will make quadrilateral  $ABCD$ , shown below, a parallelogram.



Given that the  $m\angle DAB = 40^\circ$ , which of the following statements will guarantee that  $ABCD$  is a parallelogram?

- a.  $m\angle ADC + m\angle DCB + m\angle ABC + 40^\circ = 360^\circ$
- b.  $m\angle DCB = 40^\circ$ ;  $m\angle ABC = 140^\circ$
- c.  $m\angle ABC + 40^\circ = 180^\circ$
- d.  $m\angle DCB = 40^\circ$
- \_\_\_\_\_ 32. A tackle shop and restaurant are located on the shore of a lake and are 32 meters (m) apart. A boat on the lake heading toward the tackle shop is a distance of 77 meters from the tackle shop. This situation is shown in the diagram below, where point  $T$  represents the location of the tackle shop, point  $R$  represents the location of the restaurant, and point  $B$  represents the location of the boat.



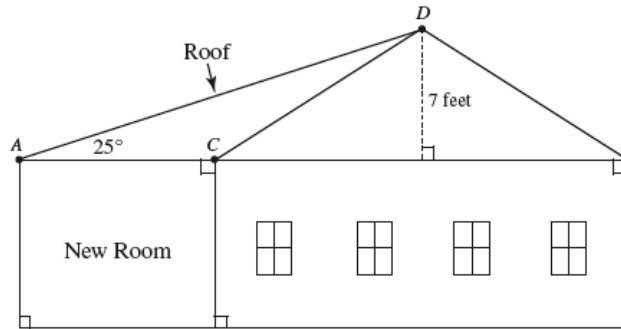
The driver of the boat wants to change direction to sail toward the restaurant. Which of the following is closest to the value of  $x$ ?

- a. 23                      b. 25                      c. 65                      d. 67

Name: \_\_\_\_\_

ID: A

33. Mr. Rose is remodeling his house by adding a room to one side, as shown in the diagram below. In order to determine the length of the boards he needs for the roof of the room, he must calculate the distance from point  $A$  to point  $D$ .



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

## Geometry Item Specs Practice Test Answer Section

- |                 |        |                   |
|-----------------|--------|-------------------|
| 1. ANS: A       | PTS: 1 | STA: MA.912.D.6.2 |
| 2. ANS: C       | PTS: 1 | STA: MA.912.G.1.1 |
| 3. ANS:<br>-22  |        |                   |
|                 | PTS: 1 | STA: MA.912.G.1.1 |
| 4. ANS: B       | PTS: 1 | STA: MA.912.G.1.3 |
| 5. ANS:<br>84   |        |                   |
|                 | PTS: 1 | STA: MA.912.G.1.3 |
| 6. ANS: B       | PTS: 1 | STA: MA.912.G.2.2 |
| 7. ANS:<br>1260 |        |                   |
|                 | PTS: 1 | STA: MA.912.G.2.2 |
| 8. ANS: B       | PTS: 1 | STA: MA.912.G.2.3 |
| 9. ANS:<br>313  |        |                   |
|                 | PTS: 1 | STA: MA.912.G.2.3 |
| 10. ANS: D      | PTS: 1 | STA: MA.912.G.2.4 |
| 11. ANS:<br>-3  |        |                   |
|                 | PTS: 1 | STA: MA.912.G.2.4 |
| 12. ANS: C      | PTS: 1 | STA: MA.912.G.2.5 |
| 13. ANS:<br>102 |        |                   |
|                 | PTS: 1 | STA: MA.912.G.2.5 |
| 14. ANS: C      | PTS: 1 | STA: MA.912.G.3.3 |
| 15. ANS: D      | PTS: 1 | STA: MA.912.G.3.4 |
| 16. ANS:<br>9   |        |                   |
|                 | PTS: 1 | STA: MA.912.G.3.4 |
| 17. ANS: C      | PTS: 1 | STA: MA.912.G.4.6 |
| 18. ANS: B      | PTS: 1 | STA: MA.912.G.4.7 |
| 19. ANS: B      | PTS: 1 | STA: MA.912.G.4.7 |
| 20. ANS: C      | PTS: 1 | STA: MA.912.G.5.4 |

21. ANS:  
11.6

PTS: 1

STA: MA.912.G.5.4

22. ANS: C

PTS: 1

STA: MA.912.G.6.5

23. ANS: D

PTS: 1

STA: MA.912.G.6.6

24. ANS:  
52.5

PTS: 1

STA: MA.912.G.6.5

25. ANS: C

PTS: 1

STA: MA.912.G.7.1

26. ANS:  
12

PTS: 1

STA: MA.912.G.7.1

27. ANS: B

PTS: 1

STA: MA.912.G.7.5

28. ANS:  
11124

PTS: 1

STA: MA.912.G.7.5

29. ANS: C

PTS: 1

STA: MA.912.G.7.7

30. ANS:  
15625

PTS: 1

STA: MA.912.G.7.7

31. ANS: B

PTS: 1

STA: MA.912.G.8.4

32. ANS: A

PTS: 1

STA: MA.912.T.2.1

33. ANS:  
16.6

PTS: 1

STA: MA.912.T.2.1