

**Common Core Georgia**  
**Free Response Summer Work due on the first day of school!**  
**Accelerated Analytic Geometry/Advanced Algebra**

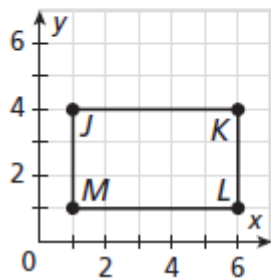
Name \_\_\_\_\_

1. The city commission wants to construct a new street that connects Main Street and North Boulevard as shown in the diagram below. The construction cost has been estimated at \$100 per linear foot. Which is the best estimate of the cost to construct the street?



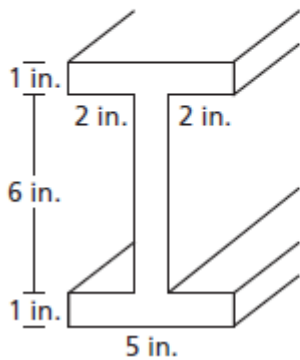
2. Apply the dilation  $D$  to the polygon shown. What are the coordinates of the image points?

$$D: (x, y) \rightarrow (1.5x, 1.5y)$$

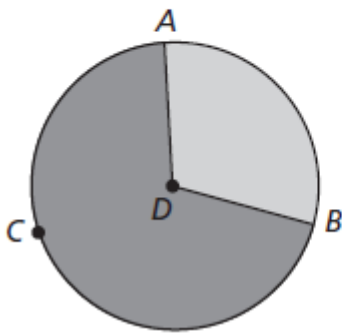


3. Circle  $O$  has center  $(5, 5)$  and radius 4.  
 Circle  $P$  has center  $(-2, -3)$  and radius 6.  
 Which describes how circle  $O$  can be transformed to show that circle  $P$  is similar to circle  $O$ ?

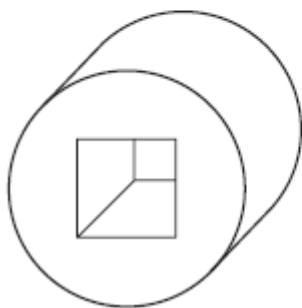
4. The total length of the I-beam shown below is 216 inches. How many cubic inches of steel are contained in the I-beam?



5. The area of  $\odot D$  is 688 square inches. The area of sector  $ADB$  is 225 square inches. What is the measure of  $\widehat{ACB}$  to the nearest tenth of a degree?



6. A right cylinder has a rectangular prism removed from it as shown. The cylinder has a height of 4 inches and a radius of 3 inches. The base of the rectangular prism is a square with side length 3 inches. What is the volume of the cylinder after the rectangular prism is removed? Round your answer to the nearest hundredth if necessary.

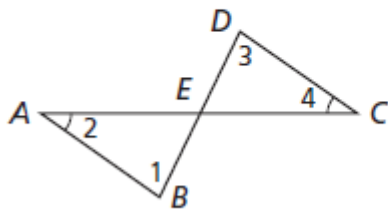


7. On a map represented by a coordinate plane, a radio tower is located at  $(0, 0)$ . The farthest location from the tower that a signal has been received is located at  $(49, 12)$ . The entire area that a signal from this tower can reach is represented by a circle whose center is at  $(0, 0)$  and whose radius is equal to the distance between the tower and  $(49, 12)$ . Each grid unit on the map represents one mile.

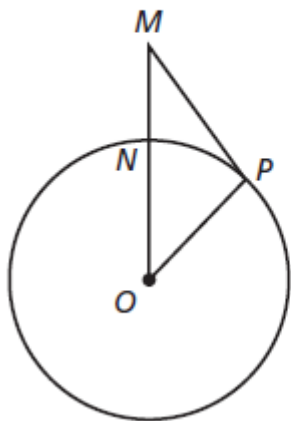
**Part A:** Find the radius of the circle that represents the area reached by a signal from this tower. Round to the nearest whole number.

**Part B:** Use your answer to **Part A** to write the equation of the circle.

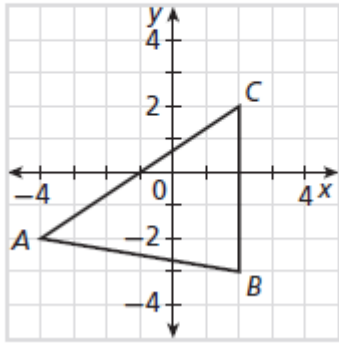
8. Write a paragraph proof to show that  $m\angle 1 = m\angle 3$  if  $m\angle 2 = m\angle 4$ . Include Given and Prove statements.



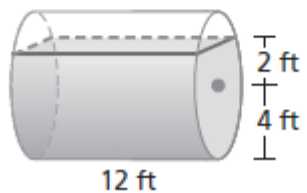
9. The radius of circle  $O$  is 3 and  $MN = 5$ .  $\overline{MP}$  is tangent to circle  $O$  at point  $P$ . Describe how to find  $MP$ .



10. Find the area of the triangle with vertices  $A(-4, -2)$ ,  $B(2, -3)$  and  $C(2, 2)$ .

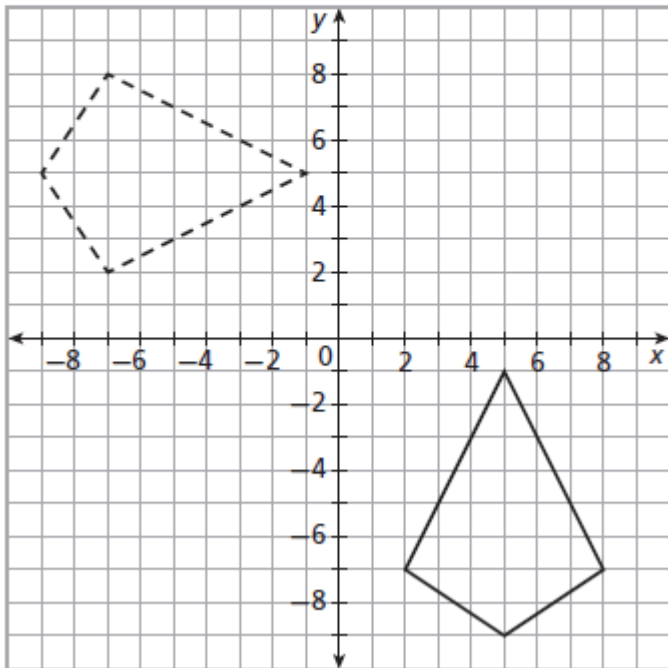


11. A cylindrical water tank with radius 4 feet and length 12 feet is filled with water to a depth of 6 feet when in a horizontal position. The chord formed by the level of the water intersecting the circular end of the tank has a length of  $4\sqrt{3}$  feet. Find the volume of the water to the nearest cubic foot.

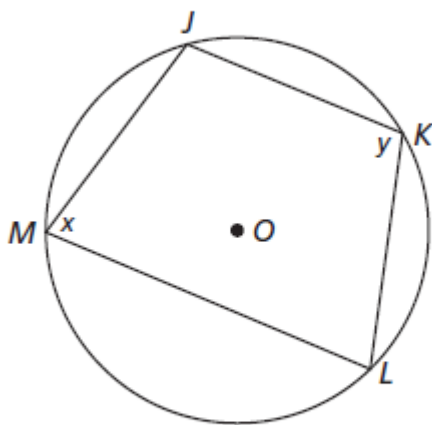


12. Prove that  $A(1, 1)$ ,  $B(4, 4)$ , and  $C(6, 2)$  are the vertices of a right triangle.
13. A group of students is digging out a rectangular garden bed that covers an area of 42 square feet to fill with planting soil. The students have a budget of \$85 to purchase the soil. If 1 cubic foot of soil costs \$3.00 and the depth of the soil is 8 inches, do the students have enough money? Explain your solution.

14. Tell whether a rigid motion can move the dashed figure onto the solid figure. If so, describe the transformation that you can use. If not, explain why the figures are not congruent.



15. Quadrilateral  $JKLM$  is inscribed in circle  $O$ .



Write a formal proof that  $\angle x$  and  $\angle y$  are supplementary.

**Accelerated Analytic Geometry and Advanced Algebra: Summer Work**

**SUMMER WORK is due at the beginning of class on the first day of school. It is graded!**

Welcome to AAG-AA at Sandy Creek High School:

I hope you have a great summer. Since it would be in your best interest to review some mathematics this summer in preparation for this challenging and fun class, I am providing you with a review packet of problems for you to complete before the next school year begins. These problems cover prerequisite knowledge necessary for success in AAG-AA. Most of the problems are concepts from ACA-AG. **Please record your answers to #1-76 for the Multiple Choice section on this answer sheet. On notebook paper, number all work and circle answers for free response section and attach work behind answer sheet.** *I will collect these problems on the first day of school.* This packet will be your first grade. The packet will be graded for accuracy and completion.

Start your year off on the right track by completing these problems before school begins! As you complete this packet, you may want to use a calculator. I would recommend that you have a **TI-84 Plus graphing calculator** for the class this upcoming year.

I look forward to seeing you in August.

*Accelerated Analytic Geometry and Advanced Algebra Teacher*

- |           |           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|-----------|
| 1. _____  | 14. _____ | 27. _____ | 40. _____ | 53. _____ | 66. _____ |
| 2. _____  | 15. _____ | 28. _____ | 41. _____ | 54. _____ | 67. _____ |
| 3. _____  | 16. _____ | 29. _____ | 42. _____ | 55. _____ | 68. _____ |
| 4. _____  | 17. _____ | 30. _____ | 43. _____ | 56. _____ | 69. _____ |
| 5. _____  | 18. _____ | 31. _____ | 44. _____ | 57. _____ | 70. _____ |
| 6. _____  | 19. _____ | 32. _____ | 45. _____ | 58. _____ | 71. _____ |
| 7. _____  | 20. _____ | 33. _____ | 46. _____ | 59. _____ | 72. _____ |
| 8. _____  | 21. _____ | 34. _____ | 47. _____ | 60. _____ | 73. _____ |
| 9. _____  | 22. _____ | 35. _____ | 48. _____ | 61. _____ | 74. _____ |
| 10. _____ | 23. _____ | 36. _____ | 49. _____ | 62. _____ | 75. _____ |
| 11. _____ | 24. _____ | 37. _____ | 50. _____ | 63. _____ | 76. _____ |
| 12. _____ | 25. _____ | 38. _____ | 51. _____ | 64. _____ |           |
| 13. _____ | 26. _____ | 39. _____ | 52. _____ | 65. _____ |           |

# AAG-AA- Summer Work Multiple Choice

## Select the best answer.

- A car salesman makes \$445 per week plus commission. If during the week he sells a new van for \$34,960 and earns a 2.5% commission on the sale, how much money did he earn for the week?
 

A \$429	C \$885
B \$874	D \$1319
- What is the value of  $f(-3)$  for the function  $f(x) = 4.7x + 1.6$ ?
 

A -18.3	C -12.5
B -15.7	D 15.7
- If  $\angle A$  and  $\angle B$  are supplementary, and  $m\angle A = 57^\circ$ , what is  $m\angle B$ ?
 

A $33^\circ$	C $213^\circ$
B $123^\circ$	D $303^\circ$
- Solve for  $k$ ,  $\frac{4}{5}k + \frac{7}{10} = \frac{13}{15}k - \frac{3}{5}$ 

A $k = \frac{1}{10}$	C $k = 19\frac{1}{2}$
B $k = 1\frac{1}{2}$	D $k = 21\frac{2}{5}$
- Evaluate for  $\frac{3+k+9}{2}$  for  $k = -16$ .
 

A -2	C -4
B 2	D 14
- Find the mean, median, and mode of the data set. 5, 8, 6, 5, 8, 4, 8, 4
 

A 6, 5.5, 8	C 8, 5.5, 8
B 5.5, 6, 6	D 6, 5.5, 5

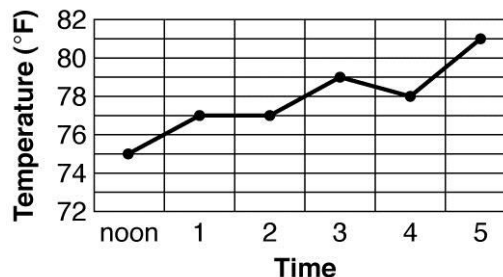
- If a pool table measures 4 ft by 8 ft, what is the length from the back edge of the top left pocket to the bottom right pocket to the nearest tenth?

A 80 ft	C 6.9 ft
B 24.3 ft	D 8.9 ft

- A housing subdivision has 200 homes. Their growth pattern follows the equation  $y = 50x + 200$ , where  $x$  is the number of years and  $y$  is the number of homes. How many years will it be before they reach 650 homes?

A 7	C 9
B 8	D 10

- How many times did the temperature rise one degree per hour?



A none	C 2
B 1	D 3

- Give the 9<sup>th</sup> term in the sequence 2, -6, 18, -54, ...

A -39,366	C 1459
B -4374	D 13,122

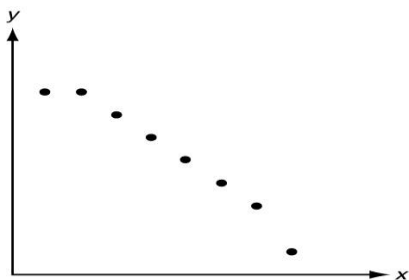
- What is the range and the first and third quartiles of the data set?

14, 16, 12, 15, 22, 18, 16, 10, 12

A 22, 12, 17	C 12, 12, 17
B 22, 15, 17	D 12, 12, 15

12. Which of these describes the transformation in terms of  $f(x)$ ?  
Horizontal translation 6 units left
- A  $f(x) - 6$                       C  $f(x + 6)$   
B  $-6f(x)$                         D  $f(x - 6)$
13. Which of the following statements is true?
- A The dependent variable is the input of the function.  
B The dependent variable determines the domain of the function.  
C In  $f(x) = 2x + 1$ ,  $x$  is the dependent variable.  
D In  $f(x) = 2x + 1$ ,  $f(x)$  is the dependent variable.
14. Which function has  $(0, 7)$  on its graph?
- A  $-3x + y = 7$                       C  $y = 14 - x$   
B  $y = x - 7$                         D  $-7x + y = 2$

15. Which situation best fits the graph below and what type of correlation is it?



- A distance traveled vs. cost of gas; negative correlation  
B distance traveled vs. cost of gas; positive correlation  
C time traveled vs. distance from destination; negative correlation  
D time traveled vs. distance from destination; positive correlation

16. A function has  $x$ -intercept 3 and  $y$ -intercept 2. Which of the functions below could be this function?
- A  $4 + 3x = 2y$   
B  $2x - 3y = -6$   
C  $2y + 3x = 4$   
D  $3y - 6 = -2x$
17. The scoring for a football game by quarters was recorded as the ordered pairs  $\{(1, 7), (2, 10), (3, 21), (4, 21)\}$ . Which of the following statements is true?
- A The relation is a function with domain  $\{1, 2, 3, 4\}$ .  
B The relation is a function with domain  $\{7, 10, 21\}$ .  
C The relation is not a function.  
D The relation is a function with domain  $\{1 \leq x \leq 4\}$ .
18. Which equation describes a line that passes through  $(7, 1)$  and is perpendicular to the line described by  $y = -\frac{1}{2}x + 3$ ?
- A  $y = 2x - 13$                       C  $y = 2x - 6$   
B  $y = 2x - 7$                         D  $y = 2x + 3$
19. The change from  $f(x) = 4x + 2$  to  $g(x) = 3x + 2$  is an example of which type of transformation?
- A rotation                              C translation up  
B reflection                             D translation down
20. A local video store has two new renting plans. Plan A charges a \$10 monthly fee and \$2 for every movie rented. Plan B charges \$40 per month but then each movie rented is only 25¢. How many movies must be rented in a month to make plan B the cheaper option?
- A 17                                        C 28  
B 18                                        D 29



21. Which point is a solution of  $\begin{cases} y - 3x \geq 2 \\ y \leq x + 9 \end{cases}$  ?

- A (-2, 8)                      C (4, -1)  
 B (-1, 4)                      D (8, -2)

22. Which of the following is NOT equivalent to

$$\left(\frac{x^2y}{4x^5}\right)^{-2} ?$$

- A  $\left(\frac{y}{4x^3}\right)^{-2}$                       C  $\left(\frac{16x^5}{y^2}\right)$   
 B  $\left(\frac{4x^3}{y}\right)^2$                       D  $\left(\frac{4x^5}{x^2y}\right)^2$

23. Describe the transformation of the graph from  $f(x) = 10x + 16$  to  $g(x) = 10x + 11$ .

- A  $g(x)$  is less steep.  
 B  $g(x)$  is steeper.  
 C  $g(x)$  is translated 5 units down.  
 D  $g(x)$  is translated 5 units up.

24. The table shows the number of customers at an ice cream shop and the number of sundaes sold. Which is the best line of fit for the data?

Customers	10	12	20	24
Sundaes	60	70	118	148

- A  $y \approx 6.24x - 4.0$     C  $y \approx 6.82x - 11.0$   
 B  $y \approx 6.0x - 1.3$     D  $y \approx 4.0x - 48.7$

25. Which function has the higher rate of change over the interval  $[0, 3]$ ?

- A  $y = 2x + 4$                       B  $y = -x - 3$   
 C  $y = 2x^2 - 1$                       D  $y = 2(3)^x$

26. What is the x-value for the solution to the system of equations below?

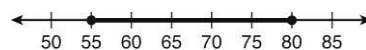
$$\begin{cases} 2x + y = 8 \\ -4x - y = -14 \end{cases}$$

- A -3                      C 3  
 B -2                      D 4

27. A research biologist starts with 100 bacteria and watches it double in number each day. Which equation will give the number of bacteria as a function of  $x$ , the number of days?

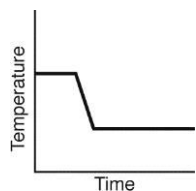
- A  $y = 2^x$   
 B  $y = 100^x$   
 C  $y = 2(100)^x$   
 D  $y = 100(2)^x$

28. Which situation matches the graph below?



- A The medicine should be kept at a temperature greater than or equal to  $55^\circ$ .  
 B The medicine should be kept at a temperature less than or equal to  $80^\circ$ .  
 C The medicine should be kept at a temperature between  $55^\circ$  and  $80^\circ$  inclusive.  
 D The medicine should be kept at a temperature below  $55^\circ$  or above  $80^\circ$ .

29. Which situation could the graph below represent?

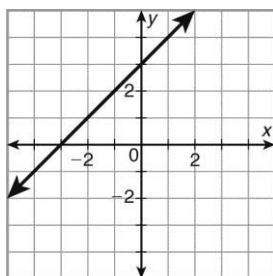


- A In the morning, the temperature was steady. Then it dropped quickly before leveling off again.  
 B The temperature rose slowly throughout the day and then fell quickly.  
 C The temperature rose quickly, remained steady, and then dropped slowly.  
 D The temperature rose and fell several times throughout the day.

30. Which is the dependent variable in the following situation?

The cost of a medium pizza is \$8 plus \$1.25 per topping.

- A number of toppings  
 B estimated time of delivery  
 C cost of each topping  
 D total cost of a medium pizza
31. Which function is shown in the graph below?



- A  $f(x) = x - 3$       C  $f(x) = 3x$   
 B  $f(x) = x + 3$       D  $f(x) = \frac{3}{x}$

32. Find the common difference in the arithmetic sequence below.

68, 61, 54, 47, 40, . . .

- A -7      C 28  
 B -4      D 33

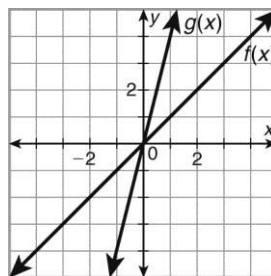
33. What is the y-intercept of  $6x - 4y = 12$ ?

- A -3      C 2  
 B -2      D 3

34. Find the slope of the line that contains (5, 8) and (10, 12).

- A  $\frac{2}{3}$       C  $\frac{5}{4}$   
 B  $\frac{4}{5}$       D  $\frac{3}{2}$

35. The graphs of  $f(x)$  and  $g(x)$  are shown below. Which describes the transformation from  $f(x)$  to  $g(x)$ ?



- A translation up  
 B translation down  
 C rotation  
 D reflection

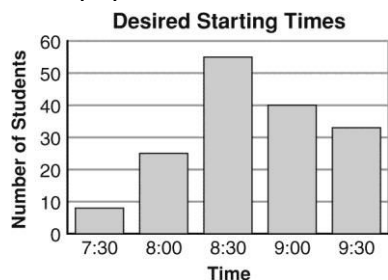
36. Solve the system  $\begin{cases} x + y = 3 \\ 2x - y = -9 \end{cases}$

- A (-2, 5)      C (2, 1)  
 B (-2, 1)      D (5, -2)

37. Which ordered pair is a solution of  $y > 3x - 8$ ?

- A (1, -7)                      C (4, 4)  
 B (1, -5)                      D (4, 7)

38. Seniors at a local high school were recently asked, "What time do you think school should start?" According to the chart below, which time was the second-most popular choice?



- A 7:30                      C 9:00  
 B 8:00                      D 9:30

39. Teresa weighed her kitten every week for one year. Which type of graph would be best to display the data?

- A bar                      C line  
 B circle                      D stem-and-leaf

40. What is the next number in the sequence? 4, 12, 36, 108, . . .

- A 116                      C 324  
 B 144                      D 432

41. A trading card increases in value by 2% each year. In 2005, it was worth \$8. About how much is it worth in 2011?

- A \$9.00                      C \$17.60  
 B \$9.20                      D \$20.00

42. The ratio of the measures of two supplementary angles is 8 : 4. What is the measure of the smaller angle?

- A  $12^\circ$                       C  $60^\circ$   
 B  $40^\circ$                       D  $80^\circ$

43. To the nearest tenth, what is the distance between the points (10, -11) and (-1, -5)?

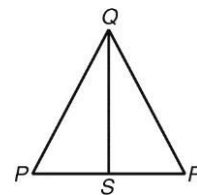
- A 2.6                      C 12.5  
 B 4.1                      D 18.4

44. Which is next in the sequence? -1, 2, 7, 14, 23, . . .

- A 24                      C 32  
 B 25                      D 34

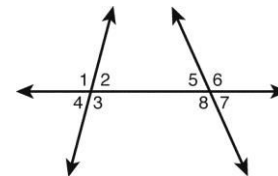
45. In the figure, why is  $\overline{QS} \cong \overline{QS}$ ?

- A All altitudes are congruent.  
 B Symmetric Property of Congruence  
 C Reflexive Property of Congruence  
 D Transitive Property of Congruence



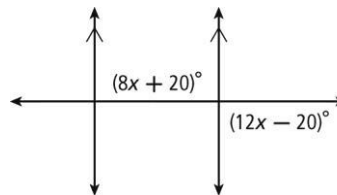
46. Which names a pair of corresponding angles?

- A  $\angle 1$  and  $\angle 6$                       C  $\angle 2$  and  $\angle 7$   
 B  $\angle 3$  and  $\angle 8$                       D  $\angle 3$  and  $\angle 7$



47. What is the value of  $12x - 20$ ?

- A 34                      C 90  
 B 88                      D 100



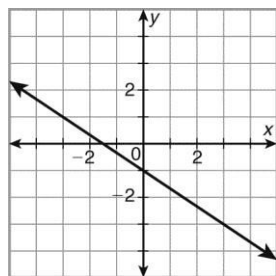
48. Which is the equation of the line in the graph?

A  $y = -2x - 3$

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

C  $y = -3x - 1$

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



49. Two of the three angle measures in a triangle are given. Which are angle measures of an acute triangle?

A  $11^\circ, 79^\circ$

C  $11^\circ, 89^\circ$

B  $11^\circ, 59^\circ$

D  $11^\circ, 29^\circ$

50. Which polygon has line symmetry but not rotational symmetry?

A rectangle

C rhombus

B square

D kite

51. To the nearest tenth, what is the altitude of an equilateral triangle whose sides measure 43 centimeters?

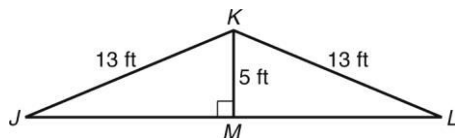
A 21.5 cm

C 37.2 cm

B 24.8 cm

D 74.5 cm

The figure represents the wooden truss used to support the roof of a garage. Use the figure for Exercises 52 and 53.



52. What postulate or theorem can be used to prove  $\triangle JKM \cong \triangle LKM$ ?

A SSS

C ASA

B SAS

D HL

53. Given that  $ML = 12$  feet, how wide is the garage?

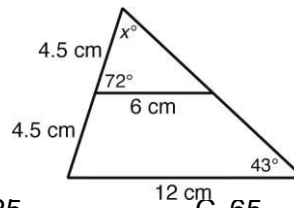
A 12 ft

C 25 ft

B 24 ft

D 26 ft

54. What is the value of  $x$ ?



A 25

C 65

B 29

D 115

55. Which CANNOT be used to prove that a quadrilateral is a parallelogram?

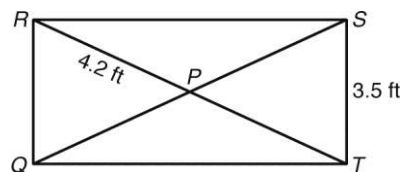
A One pair of opposite angles is congruent.

B Both pairs of opposite sides are parallel.

C Both pairs of opposite sides are congruent.

D One pair of opposite sides is both parallel and congruent.

56. The figure represents a rectangular gate with diagonal braces. To the nearest tenth, what is the width,  $QT$ , of the gate?



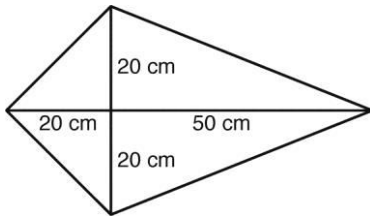
A 3.9 ft

C 7.0 ft

B 4.9 ft

D 7.6 ft

Refer to the figure for Exercises 57 and 58.



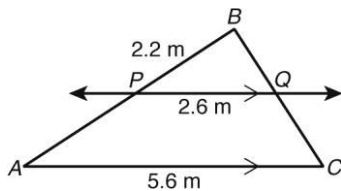
57. Kim is making a kite with a wooden frame. The measures of the frame are shown. She will use cloth binding to cover the outer edges of the kite. To the nearest tenth, how many centimeters of binding will she need?

- A 58.1 cm      C 116.2 cm  
B 82.1 cm      D 164.3 cm

58. What is the area of the kite?

- A  $200 \text{ cm}^2$       C  $1400 \text{ cm}^2$   
B  $400 \text{ cm}^2$       D  $2800 \text{ cm}^2$

59. To the nearest tenth, what is  $AP$ ?



- A 1.0 m      C 2.5 m  
B 2.2 m      D 4.7 m

60. Starla is 5 feet 9 inches tall. To find the height of a tree, she measured her shadow and the tree's shadow. Her shadow was 8 feet long when the tree's shadow was 30 feet long. To the nearest foot, how tall is the tree?

- A 15 ft      C 28 ft  
B 22 ft      D 42 ft

61.  $\overline{MN}$  with endpoints  $M(9, 3)$  and  $N(-1, 5)$  is dilated by a scale factor of 2.5. To the nearest tenth, what is the length of  $\overline{M'N'}$ ?

- A 16.1      C 25.5  
B 17.9      D 28.3

62. The legs of a right triangle measure 11.4 meters and 15.1 meters. To the nearest tenth, which could be the measure of the smallest angle?

- A  $31.1^\circ$       C  $38.6^\circ$   
B  $37.1^\circ$       D  $52.9^\circ$

63. What is the volume of a rectangular prism that is 4 inches wide, 9 inches long, and 3 inches high?

- A  $36 \text{ cm}^3$       C  $324 \text{ cm}^3$   
B  $108 \text{ cm}^3$       D  $432 \text{ cm}^3$

64. To the nearest tenth, what is the volume of a cylinder with a diameter of 22 centimeters and a height of 13 centimeters?

- A  $4941.7 \text{ cm}^3$       C  $6589.0 \text{ cm}^3$   
B  $5321.9 \text{ cm}^3$       D  $19,766.9 \text{ cm}^3$

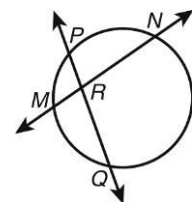
65. What is the volume of a square pyramid with base area of 4 square meters and a height of 6 meters?

- A  $6 \text{ m}^3$       C  $12 \text{ m}^3$   
B  $8 \text{ m}^3$       D  $24 \text{ m}^3$

66. To the nearest tenth, what is the area of a sector of a circle of radius of 9 meters if the central angle is  $50^\circ$ ?

- A  $1.3 \text{ m}^2$       C  $35.3 \text{ m}^2$   
B  $5.1 \text{ m}^2$       D  $70.7 \text{ m}^2$

Refer to the figure for Exercises 67 and 68.



67.  $m\widehat{PN} = 78^\circ$   
 $m\widehat{QN} = 163.5^\circ$  and  
 $m\widehat{MQ} = 72^\circ$ . What is  $m\angle PRM$ ?

- A  $47^\circ$       C  $94^\circ$   
B  $57^\circ$       D  $105^\circ$

68.  $PR = 6$ ,  $NR = 15$ , and  $QR = 14$ .  
To the nearest tenth, what is  $MR$ ?
- A 5.6                      C 6.4  
B 6.0                      D 7.0

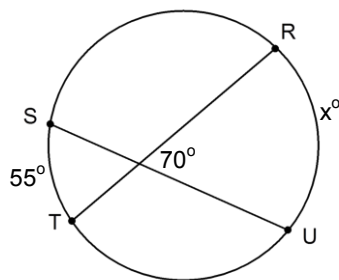
69. Which expression represents the  $n^{\text{th}}$  term of the sequence 1, 5, 9, 13, ...?
- A  $a_n = 2n - 1$       C  $a_n = 4n - 3$   
B  $a_n = 3n - 4$       D  $a_n = 3n - 2$

70. Alex started a business making bracelets. She sold 30 bracelets the first month. Her goal is to sell 6 more bracelets each month than she sold the previous month. If Alex meets her goal, how many bracelets will she sell in the 15<sup>th</sup> month?
- A 108                      C 120  
B 114                      D 126

71. A circular pizza with a diameter of 15 in. is cut into 8 equal slices. What is the area of one slice?
- A  $5.9 \text{ in}^2$                       C  $88.4 \text{ in}^2$   
B  $22.1 \text{ in}^2$                       D  $120 \text{ in}^2$

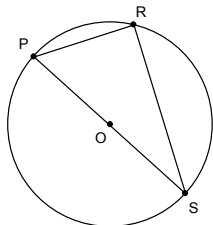
72. Points R, S, T, and U lie on the circle. The measure of  $\widehat{RU}$  is represented by  $x$ . What is the value of  $x$ ?

- A 70  
B 85  
C 110  
D 140



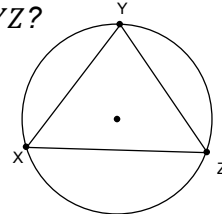
73. In circle O,  $\overline{PS}$  is a diameter. The measure of  $\widehat{PR}$  is  $72^\circ$ . What is the measure of  $\angle SPR$ ?

- A  $36^\circ$                       C  $72^\circ$   
B  $54^\circ$                       D  $108^\circ$



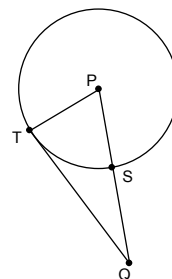
74. Isosceles triangle XYZ is inscribed in this circle.  $\overline{XY} \cong \overline{ZY}$  and  $m\widehat{YZ} = 108^\circ$ . What is the measure of  $\angle XYZ$ ?

- A  $48^\circ$   
B  $54^\circ$   
C  $72^\circ$   
D  $108^\circ$



75. In this diagram, segment  $\overline{QT}$  is tangent to circle P at point T. The measure of minor arc  $\widehat{ST}$  is  $70^\circ$ . What is the  $m\angle TQP$ ?

- A  $20^\circ$                       C  $35^\circ$   
B  $25^\circ$                       D  $40^\circ$



76. Points A, B, D, and E line on the circle. Point C is outside the circle.  $\overline{AE} \cong \overline{DE}$ ,  $m\widehat{BD} = 56^\circ$ , and  $m\angle EAC = 84^\circ$ . What is the measure of  $\angle ACE$ ?

- A  $28^\circ$                       C  $56^\circ$   
B  $42^\circ$                       D  $84^\circ$

