



Arkansas
Comprehensive Testing, Assessment
& Accountability Program

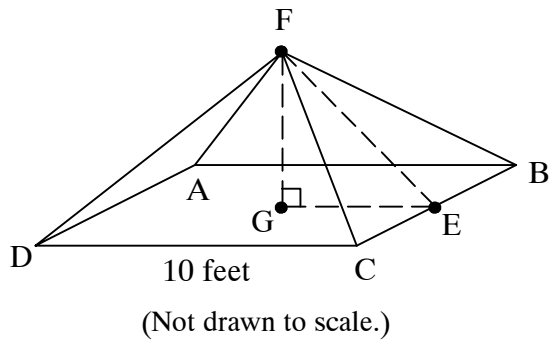
***Geometry Midyear
End of Course Examination
Released Item Booklet***

January 2005 Administration

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Arkansas Department of Education

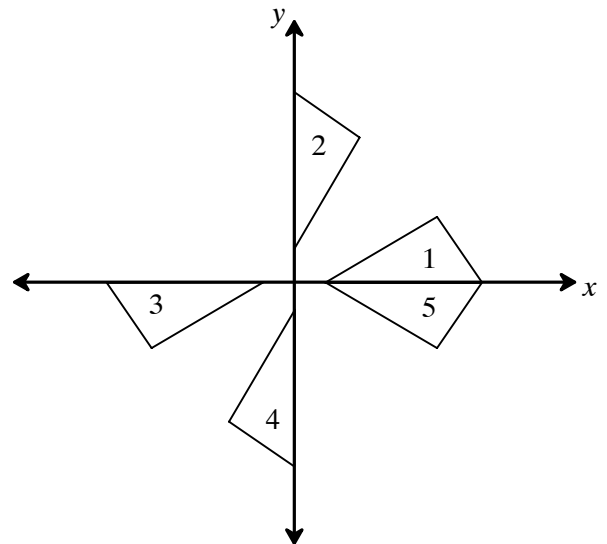
Use the figure below to answer question 1.



- A tent is in the shape of a square pyramid as shown above. The center pole, \overline{FG} , is 5 feet long. A zipper is installed from the top of the tent, point F, to the midpoint of a side, point E. What is the length of the zipper?

 - A. 5 feet
 - * B. $5\sqrt{2}$ feet
 - C. $5\sqrt{3}$ feet
 - D. 10 feet

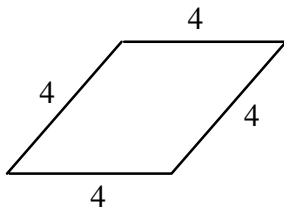
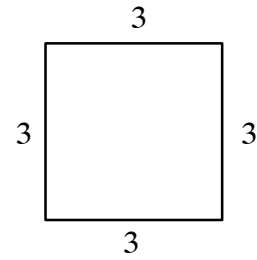
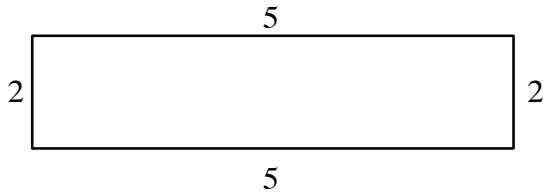
Use the diagram below to answer question 2.



- Which figure represents a rotation of figure 1?

 - A. figure 2
 - * B. figure 3
 - C. figure 4
 - D. figure 5

Use the figures below to answer question 3.



(Not drawn to scale.)

3. All of these figures can be used as examples of which statement?

- * A. All parallelograms have two pairs of congruent sides.
- B. All rectangles have four right angles.
- C. All rhombi have four congruent sides.
- D. All squares have four right angles and four congruent sides.

Use the statements below to answer question 4.

- If Delphie has sugar in her cupboard, then she can make apple pie.
- Delphie has sugar in her cupboard.

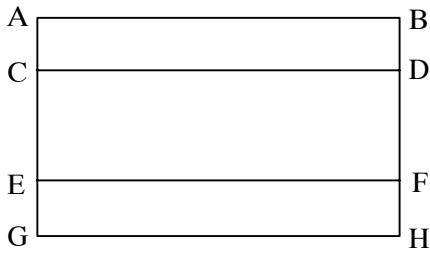
4. What logical conclusion can be made from the statements above?

- A. Delphie just bought some sugar.
- B. Apples make good pie.
- * C. Delphie can make apple pie.
- D. Apple pie is made with sugar.

5. Which equation represents a line that is **perpendicular** to the graph of $y = -3x + 9$?

- A. $y = -3x - \frac{1}{9}$
- B. $y = -3x + \frac{1}{9}$
- * C. $y = \frac{1}{3}x + 9$
- D. $y = -\frac{1}{3}x + 9$

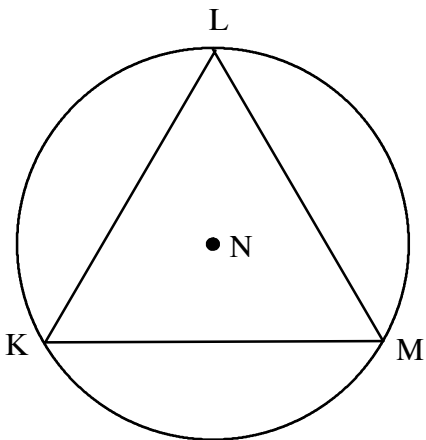
Use the figure below to answer question 6.



6. What is the length of \overline{CG} ?

- A. $\frac{7}{16}$ inch
- * B. $\frac{7}{8}$ inch
- C. $1\frac{5}{16}$ inches
- D. $3\frac{1}{8}$ inches

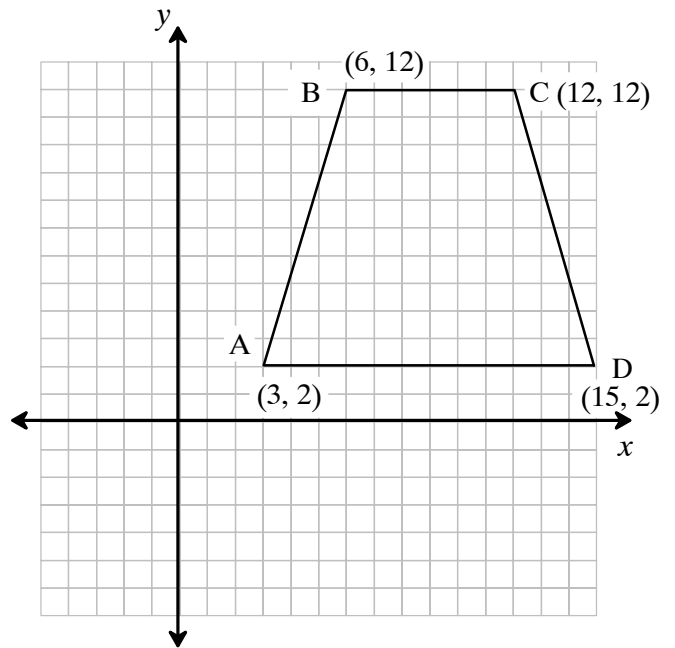
Use the figure below to answer question 7.



7. Equilateral triangle KLM is inscribed in circle N. What is the measure of \widehat{LM} ?

- A. 30°
- B. 60°
- C. 90°
- * D. 120°

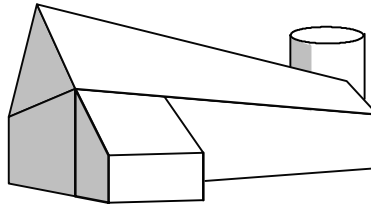
Use the figure below to answer question 8.



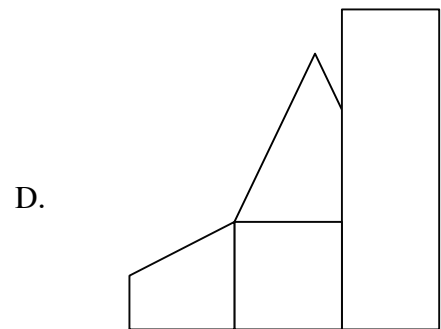
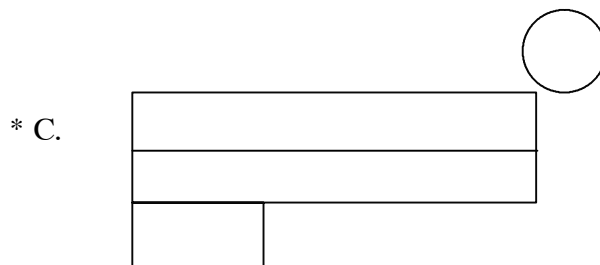
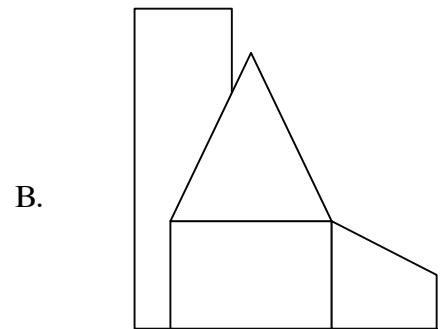
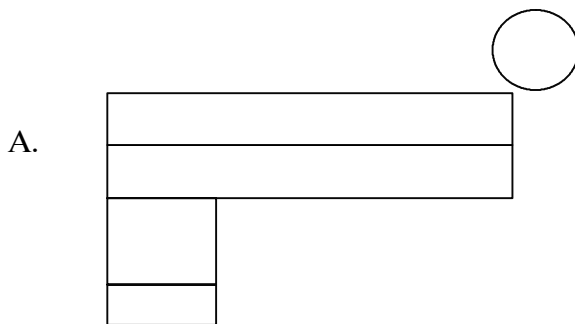
8. ABCD drawn above is an isosceles trapezoid. What is the length of \overline{CD} ? (Round to the nearest hundredth.)

- A. 7.00 units
 - B. 9.54 units
 - * C. 10.44 units
 - D. 13.45 units
9. Chad is making a scale model of his house for art class. Each foot will equal $\frac{1}{4}$ inch. The house is 30 feet by 40 feet. What are the dimensions of the model?
- A. 7.5 inches by 9 inches
 - * B. 7.5 inches by 10 inches
 - C. 10 inches by 16 inches
 - D. 9 inches by 16 inches

Use the figure below to answer question 10.



10. Which is the top view of the farm buildings shown above?



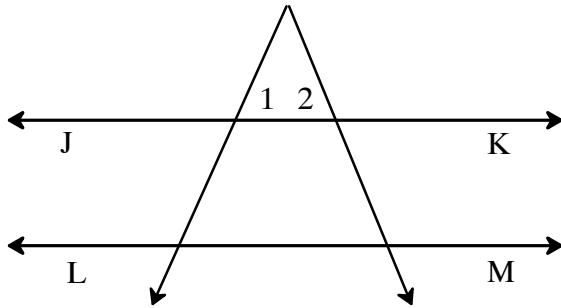
11. The first 5 terms of a sequence are 900, 894, 888, 882, and 876. What is the **tenth** term?

- * A. 846
- B. 852
- C. 858
- D. 866

12. Karina's sewing box is a rectangular prism. It has a volume of $1,280 \text{ cm}^3$. It is 8 cm high and twice as long as it is high. What is the width of the box?

- * A. 10 cm
- B. 16 cm
- C. 20 cm
- D. 40 cm

Use the figure below to answer question 13.



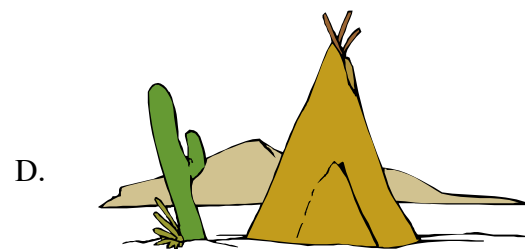
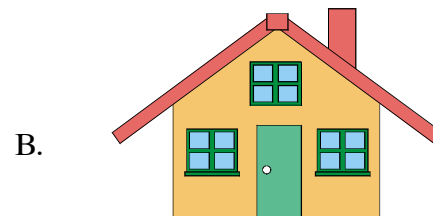
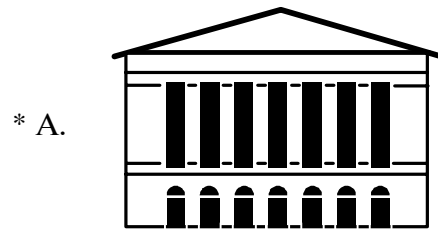
13. Carl is cutting triangular tiles for his kitchen. He wants to move \overleftrightarrow{JK} toward \overleftrightarrow{LM} while keeping the lines parallel in order to make larger tiles. Which is the most accurate description of the effect on the measures of $\angle 1$ and $\angle 2$?

- A. $m\angle 1$ and $m\angle 2$ increase.
- * B. $m\angle 1$ and $m\angle 2$ stay the same.
- C. $m\angle 1$ and $m\angle 2$ decrease.
- D. $m\angle 1$ increases and $m\angle 2$ decreases.

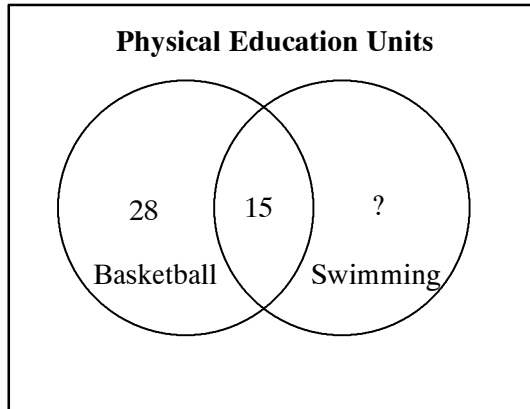
14. A round picnic table has a radius of 3 feet. The distance around the outside of the table is about 18.84 feet. What is the ratio of the distance around the outside of the table to the diameter of the table?

- A. $\frac{3}{18.84} \approx 0.16$
- B. $\frac{6}{18.84} \approx 0.32$
- * C. $\frac{18.84}{6} \approx 3.14$
- D. $\frac{18.84}{3} \approx 6.28$

15. Which figure has a vertical line of symmetry?



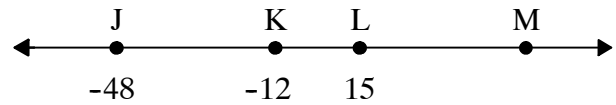
Use the figure below to answer question 16.



16. During a recent physical education unit, 60 students were given daily options of either swimming or basketball. Over the course of the unit, 43 students played basketball. There were 15 students that participated in both swimming and basketball. How many students chose to only swim?

- A. 13
- * B. 17
- C. 43
- D. 45

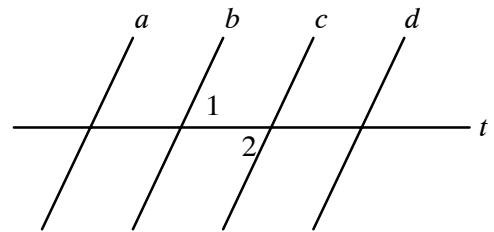
Use the number line below to answer question 17.



(Not drawn to scale.)

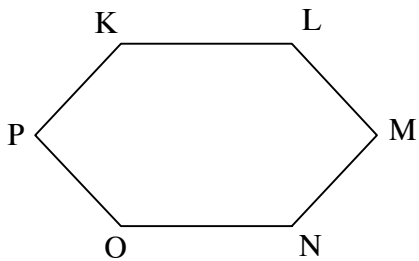
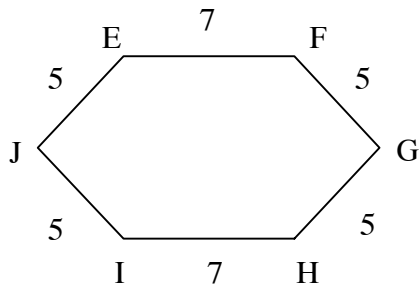
17. On the number line above, $JL = KM$. What is the coordinate of M?
- A. 27
 - B. 36
 - * C. 51
 - D. 63

Use the figure below to answer question 18.



18. The parking lot at the grocery store looks like a series of parallel lines (a, b, c, d) intersected by a transversal t . Which statement is true about angles 1 and 2?
- A. They are alternate exterior angles.
 - * B. They are alternate interior angles.
 - C. They are complementary.
 - D. They are supplementary.

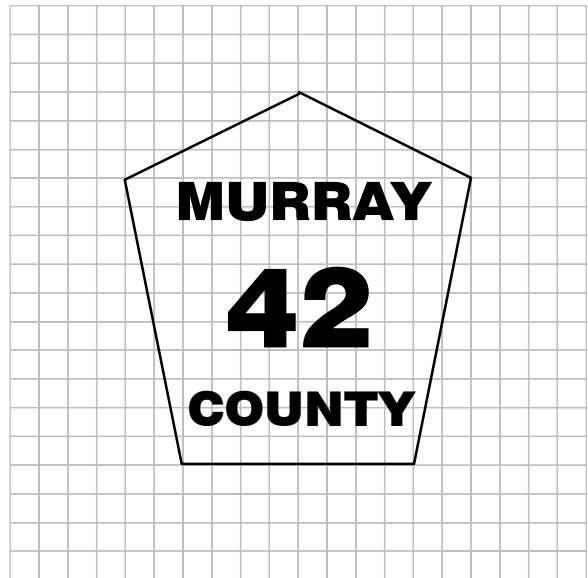
Use the figures below to answer question 19.



(Not drawn to scale.)

19. $EFGHIJ \cong KLMNOP$. What is the length of \overline{KL} ?
- A. 2
 - B. 5
 - * C. 7
 - D. 12

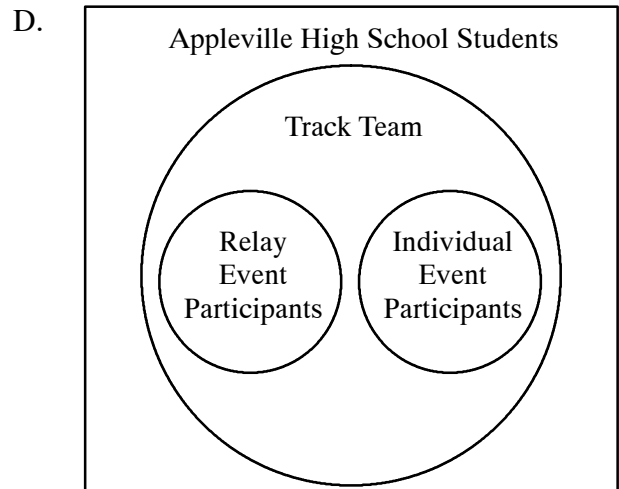
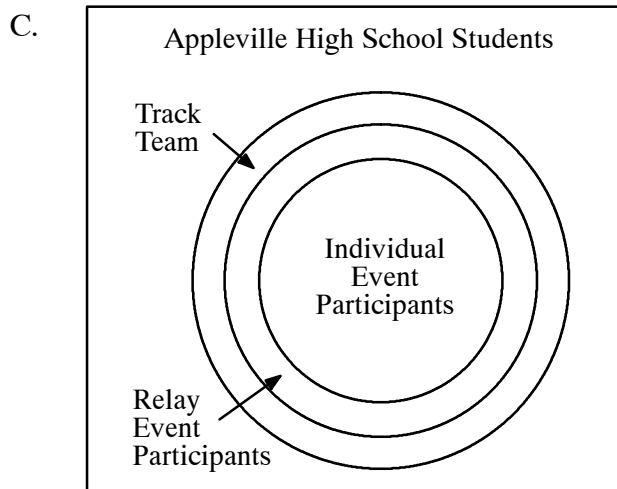
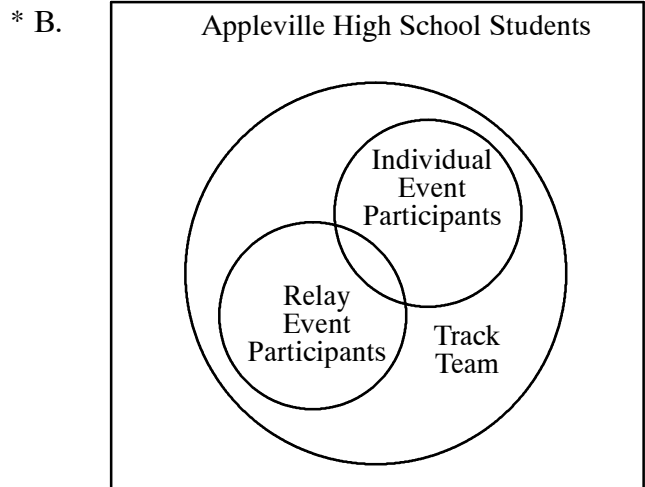
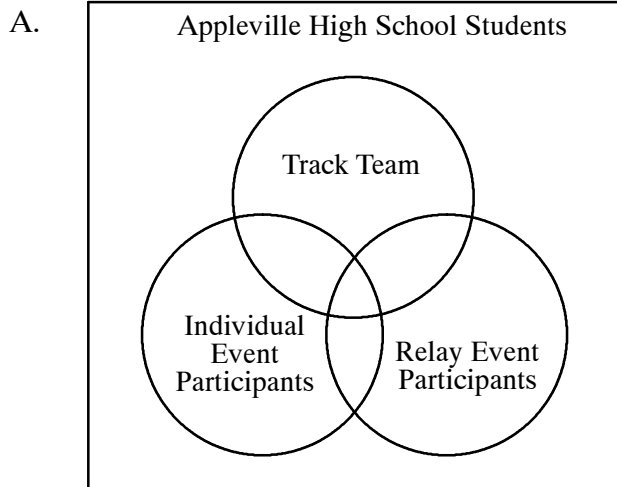
Use the figure below to answer question 20.



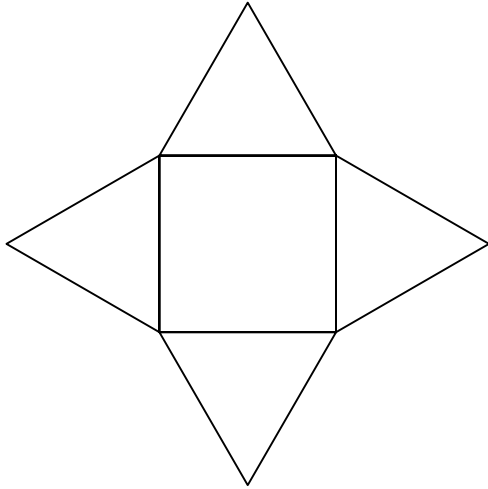
20. What is the area of the county road sign shown above?
- A. 40 units²
 - B. 104 units²
 - * C. 118 units²
 - D. 120 units²

PART II Released Multiple-Choice Items – Geometry

21. Some of the students at Appleville High School are on the track team. Every member of the track team runs either an individual event or a relay event. Some students run only individual events. Some students run only relay events. Some students run both individual and relay events. Which Venn diagram represents this situation?



Use the figure below to answer question 22.



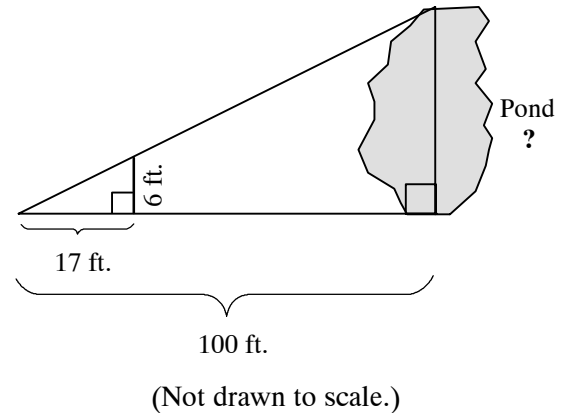
22. Jeremy's class is creating a model town. Jeremy used the figure above for the top of his building. What shape was the top of Jeremy's building after he assembled the figure above?

- * A. square pyramid
- B. square prism
- C. triangular prism
- D. triangular pyramid

23. Which type of triangle has an angle measure **greater** than ninety degrees?

- A. acute
- B. equilateral
- * C. obtuse
- D. right

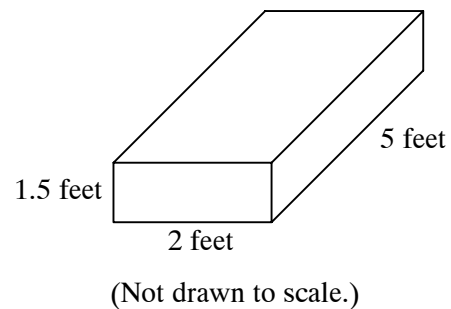
Use the map below to answer question 24.



24. A surveyor drew a map to determine the distance across a pond. What is the approximate distance across the pond?

- A. 29.3 ft.
- * B. 35.3 ft.
- C. 235.2 ft.
- D. 283.3 ft.

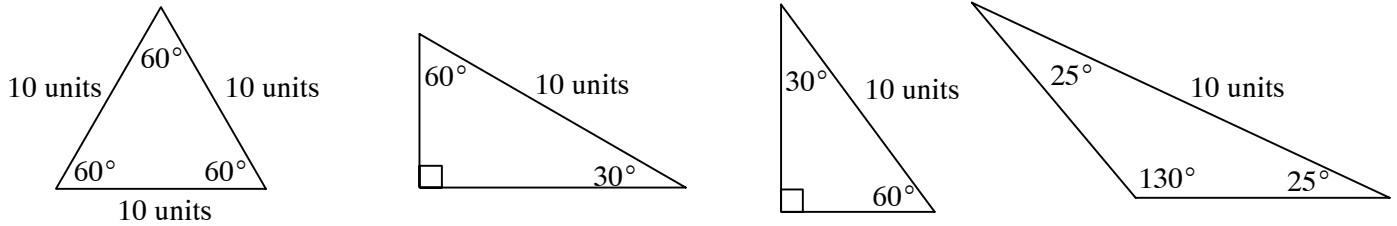
Use the figure below to answer question 25.



25. What is the change in volume when the length of the shipping box shown above increases from 5 feet to 6 feet?

- * A. 3 cubic feet
- B. 8.5 cubic feet
- C. 15 cubic feet
- D. 18 cubic feet

Use the figures below to answer question 26.



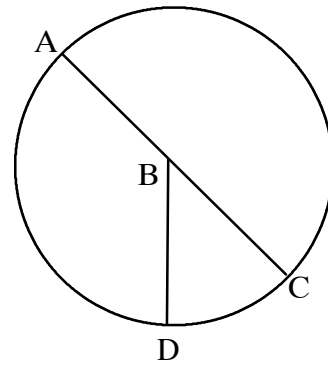
(Not drawn to scale.)

- 26.** Which mathematical theorem do all of the above figures support?
- A. The angles in an equilateral triangle all have equal measure.
 - * B. The sum of the measures of the angles of a triangle equals 180° .
 - C. All right triangles have an acute angle.
 - D. The formula $a^2 + b^2 = c^2$ can be used to find the length of the sides in right triangles.

27. Kaleigh and 4 friends are participating in a 165-kilometer bicycle relay. Kaleigh will ride a hilly section from kilometer 27 to kilometer 58. When is Kaleigh halfway to her destination?

- A. at kilometer 29
- B. at kilometer 33
- C. at kilometer $41\frac{1}{4}$
- * D. at kilometer $42\frac{1}{2}$

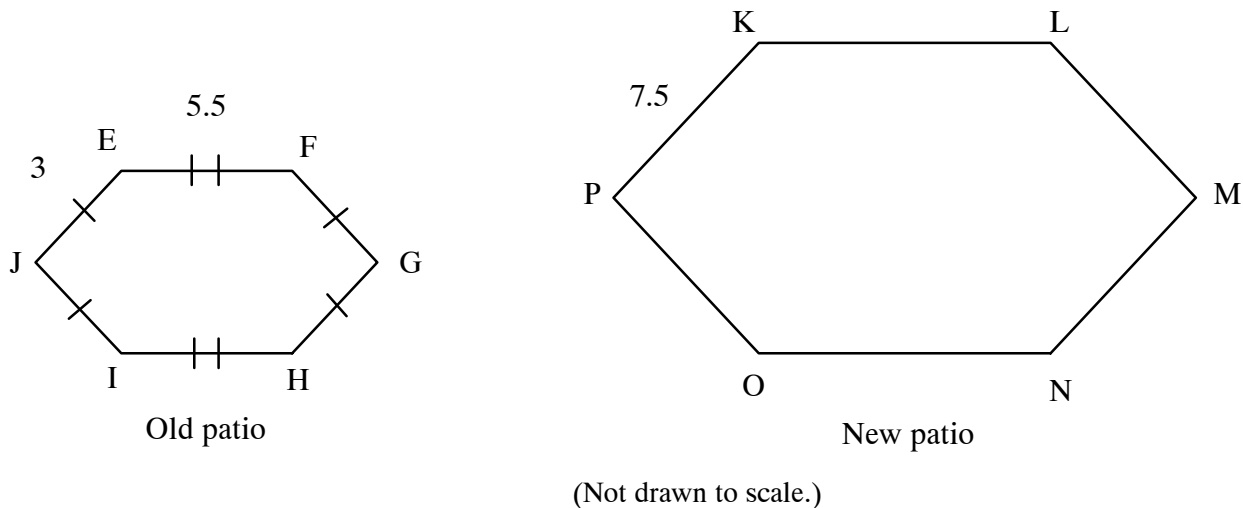
Use the figure below to answer question 28.



28. Which is a radius of circle B?

- * A. \overline{AB}
- B. \overline{AC}
- C. \widehat{AC}
- D. \widehat{CD}

Use the figures below to answer question 29.



29. Anika’s family plans to enlarge their old patio to the new patio as shown above. KLMNOP will be similar to EFGHIJ. The old patio has a tile border. The new patio will also have a tile border using the same size tile as the old patio border. By what number will Anika multiply the number of tiles in the old patio to determine the number of tiles needed for the new patio?
- A. 0.4
 - * B. 2.5
 - C. 3
 - D. 7.5

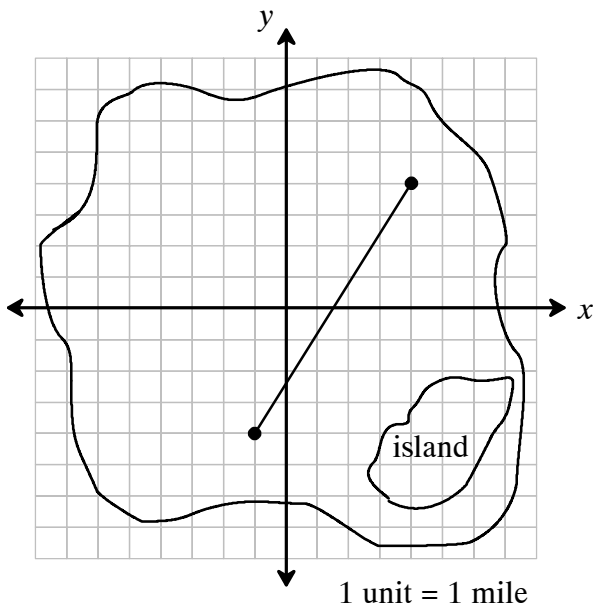
30. Nancy has 2 spherical balloons. The diameters differ by 3 inches. What is the difference in circumference between the 2 balloons?
- A. $(\pi + 3)$ inches
 - B. $(\pi + 6)$ inches
 - * C. 3π inches
 - D. 6π inches

Use the statement below to answer question 31.

All fruits grow on trees.

31. Which proves the statement false?
- A. Oranges are fruits. Oranges grow on trees.
 - B. Acorns grow on trees. Acorns are not fruits.
 - * C. Strawberries are fruits. Strawberries do not grow on trees.
 - D. Potatoes are not fruits. Potatoes do not grow on trees.

Use the map below to answer question 32.


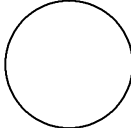
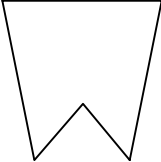
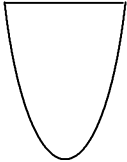


32. Tonya has marked her favorite fishing spots on the map of the lake shown above. What is the distance between the 2 fishing locations?
- A. 3 miles
 - B. $\sqrt{26}$ miles
 - C. $\sqrt{39}$ miles
 - * D. $\sqrt{89}$ miles

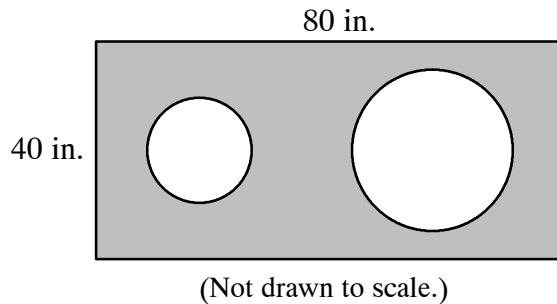
33. What is the measure of each interior angle of a regular 9-sided polygon?

- A. 90°
- * B. 140°
- C. 180°
- D. $1,260^\circ$

34. Which figure will tessellate?

- * A. 
- B. 
- C. 
- D. 

Use the figure below to answer question 35.



35. William's Welding was hired to make a rectangular steel plate measuring 40 inches by 80 inches, with 2 circular holes removed. The smaller hole has a diameter of 15 inches. The larger hole has a diameter of 20 inches. What is the area of the finished steel plate? Use $\pi = 3.14$. (Round to the nearest whole number.)

- A. 1,238 in.²
- * B. 2,709 in.²
- C. 3,090 in.²
- D. 3,200 in.²

36. A and B are points on a number line. Which expression will **always** represent the distance between A and B?

- A. $A - B$
- B. $A + B$
- * C. $|A - B|$
- D. $|A + B|$

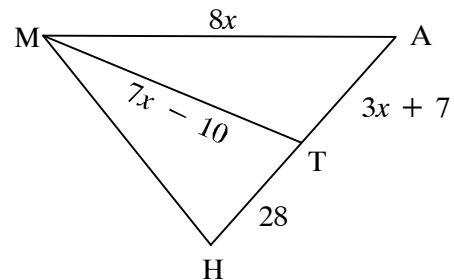
37. The following statements are true:

- If the phone rings, Antoine will answer it.
- If Antoine answers the phone, he will have to take a message.
- Antoine has not taken any messages.

Which statement must be true?

- * A. The phone has not rung.
- B. Antoine does not have any paper.
- C. Antoine has answered the phone.
- D. The phone has been busy all day.

Use the figure below to answer question 38.

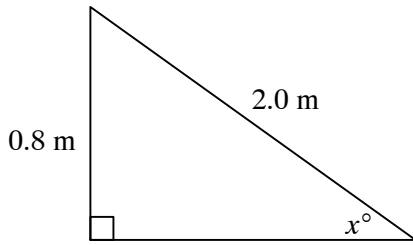


(Not drawn to scale.)

38. In $\triangle MAH$, \overline{MT} is a median. What is the length of \overline{MT} ?

- A. 7
- B. 28
- * C. 39
- D. 56

Use the figure below to answer question 39.

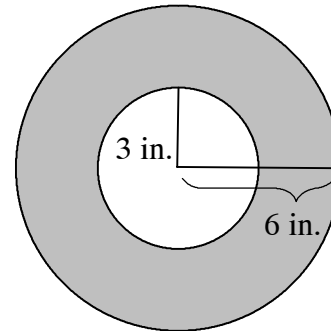


(Not drawn to scale.)

39. The ramp for a loading van is 2.0 meters long. The floor of the loading van is 0.8 meters above the ground. What is the measure of the angle that the ramp forms with the ground (x)? (Round to the nearest tenth.)

- A. 21.8°
- * B. 23.6°
- C. 66.4°
- D. 68.2°

Use the figure below to answer question 40.



(Not drawn to scale.)

40. An insulated foam sleeve is made to fit over a water pipe. The sleeve has a radius of 6 inches. The hole in the center has a radius of 3 inches. What is the area of the face of the foam sleeve? Use $\pi = 3.14$.

- A. 9.42 in.^2
- B. 18.84 in.^2
- * C. 84.78 in.^2
- D. 141.30 in.^2

41. Which shows a correct conclusion?

- A. Randy is happy when he eats chocolate ice cream.
Randy is eating vanilla ice cream.
Therefore, Randy is not happy.
- B. Paul's vacuum cleaner makes noise.
Paul's vacuum cleaner is unplugged now.
Therefore, Paul does not hear any noise now.
- C. Melissa has five coins in her purse.
A penny is a coin.
Therefore, Melissa has five pennies in her purse.
- * D. Pine Bluff is north of Monticello.
Tom is in Pine Bluff.
Therefore, Tom is north of Monticello.

42. Points A and B are the endpoints of a circle's diameter. Point A is at (8, -5). Point B is at (-2, 5). What are the coordinates of the center of the circle?

- A. (0, 3)
- B. (5, -5)
- * C. (3, 0)
- D. (10, -10)

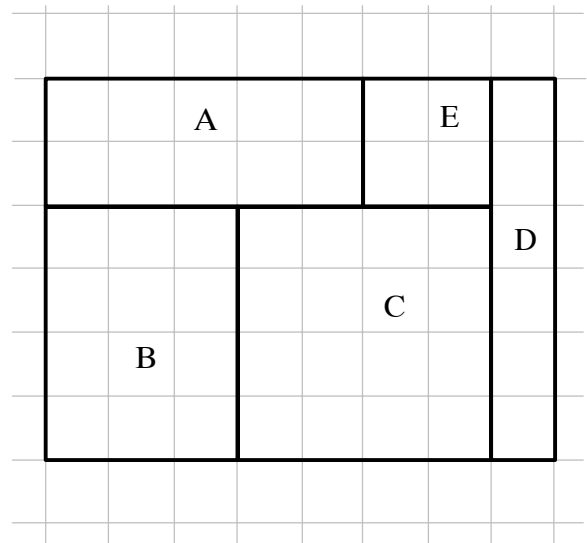
Use the equation below to answer question 43.

$$(x - 2)^2 + (y - 9)^2 = 36$$

43. The equation of a circle is shown above. What is the y-coordinate of the center of the circle?

- A. 2
- B. 6
- * C. 9
- D. 36

Use the diagram below to answer question 44.

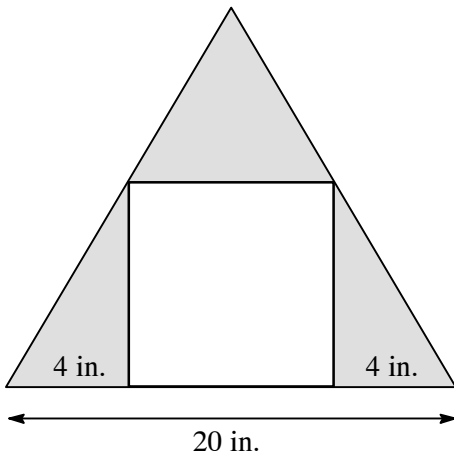


$$\text{Grid Line} = \frac{1}{4} \text{ inch}$$

44. The diagram above shows 5 spaces in Paul's house. The scale for the diagram is 1 inch = 10 feet. Paul has a rectangular rug that is 12 feet long and 5 feet wide. Which is the smallest space in which Paul's rug will fit?

- * A. A
- B. B
- C. C
- D. D

Use the diagram below to answer question 45.



(Not drawn to scale.)

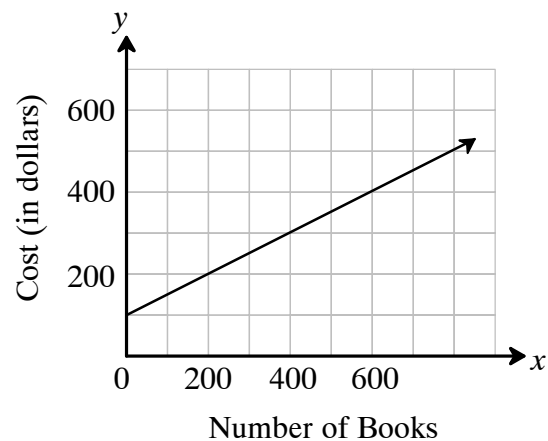
45. Andy made a replacement part for an air conditioner. He made it by cutting a square out of a triangular piece of steel as shown in the diagram above. What is the perimeter of the square cutout piece?

- A. 12 in.
- * B. 48 in.
- C. 64 in.
- D. 144 in.

46. Every Monday for the past 4 weeks, Therese has gone to the library and found it was closed. To find it open, she decides that she should start going to the library on Tuesday instead. What kind of reasoning did Therese use to plan her schedule?

- A. absolute
- B. deductive
- * C. inductive
- D. theoretical

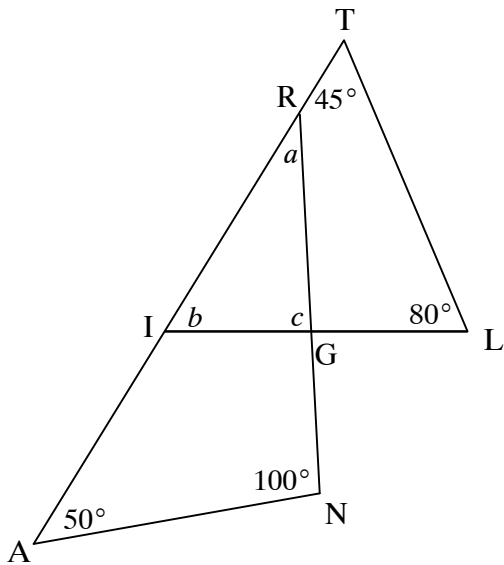
Use the graph below to answer question 47.



47. The cost of printing a book is shown in the graph above, where y is the cost and x is the number of books being printed. Which equation represents the graph shown above?

- A. $y = \frac{1}{2}x - 200$
- * B. $y = \frac{1}{2}x + 100$
- C. $y = 2x + 100$
- D. $y = 2x - 200$

Use the figure below to answer question 48.



(Not drawn to scale.)

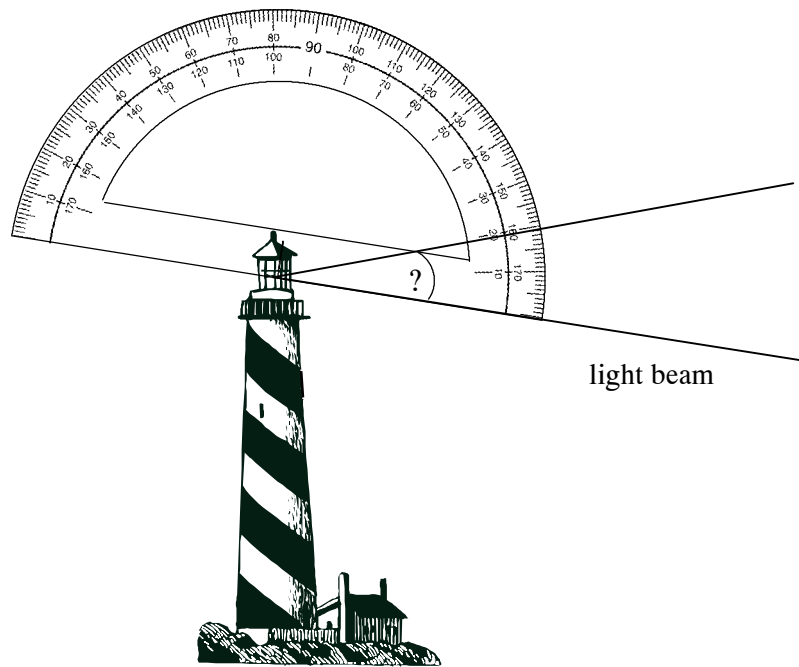
48. $\triangle TIL$ overlaps $\triangle RAN$. $\triangle RIG$ is formed.
What is the $m\angle c$ in $\triangle RIG$?

- A. 30°
- B. 55°
- C. 85°
- * D. 95°

49. After translating the point (x, y) four units to the right, what are its new coordinates?

- A. $(x, y + 4)$
- B. $(x, y - 4)$
- * C. $(x + 4, y)$
- D. $(x - 4, y)$

Use the figure below to answer question 50.



50. Janeka used a protractor to measure the angle formed by the light beam from the lighthouse shown in the figure above. What is the most reasonable angle measure Janeka found?

- * A. 19°
- B. 96°
- C. 102°
- D. 161°

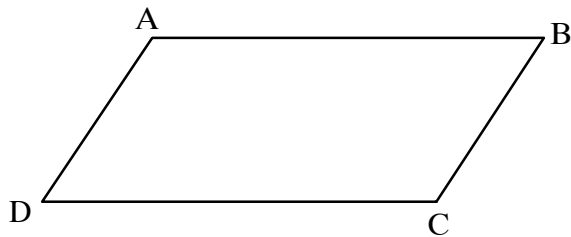
Use the table below to answer question 51.

Number of Seconds Elapsed	Quantity of Nitrogen 16 (micrograms)
0	240
7	120
14	60
21	30

51. The population of Nitrogen 16 particles in a sample goes down by half every 7 seconds as shown in the table above. By extending the sequence, how much time has passed when there are 1.875 micrograms left?

- A. 35 seconds
- B. 42 seconds
- * C. 49 seconds
- D. 56 seconds

Use the figure below to answer question 52.

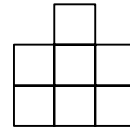


(Not drawn to scale.)

52. Parallelogram ABCD is shown above. $m \angle A$ is 5 times $m \angle B$. What is $m \angle C$?

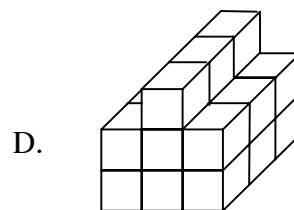
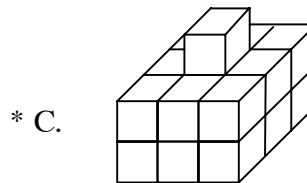
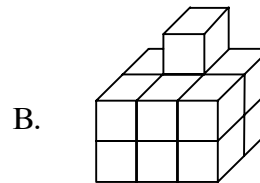
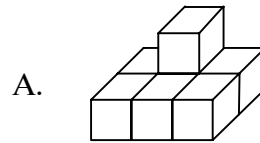
- A. 30°
- B. 60°
- C. 120°
- * D. 150°

Use the figure below to answer question 53.

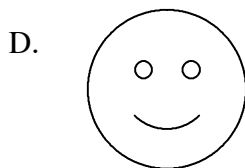
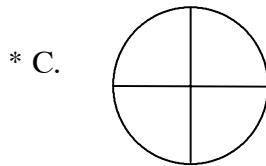
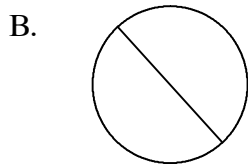
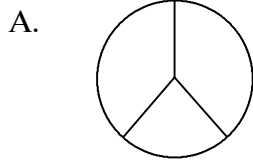


53. All four sides of a building have the profile shown above.

Which is the view of the entire building?



54. Which figure has 90° rotational symmetry?



55. A soccer ball is sewn from a series of interlocking pentagons and hexagons. Each pentagon is surrounded by one hexagon per side. How many hexagons touch the perimeter of each pentagon?

- A. 4
- * B. 5
- C. 6
- D. 8

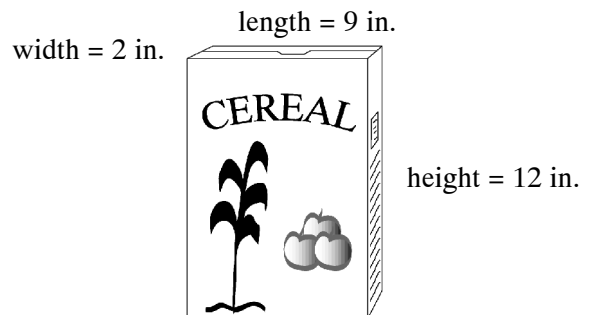
56. Quincy, Rita, Sheila, and Theo all parked their cars next to each other in the school parking lot. The cars each have a different color: blue, green, red, and white.

- The blue car is between Quincy's car and the green car.
- Rita parked her car next to the green car.
- Theo owns the red car which is parked next to Sheila's car.

Based on the statements above, who has the blue car?

- A. Quincy
- * B. Rita
- C. Sheila
- D. Theo

Use the figure below to answer question 57.

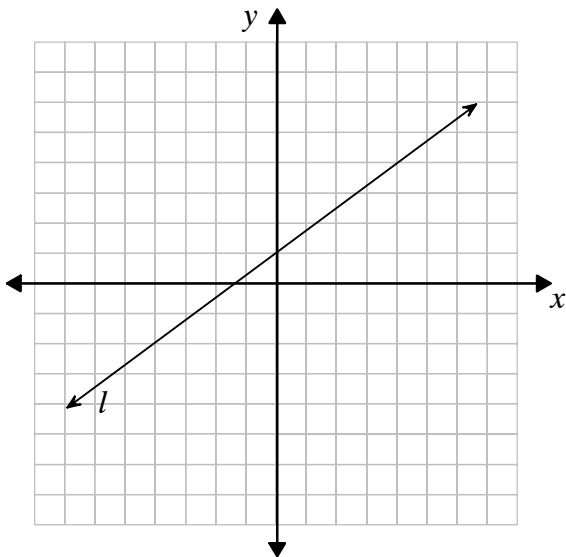


(Not drawn to scale.)

57. A cereal company uses a standard-size box for its cereal, as shown above. How many cubic inches of cereal does the box hold when it is full?

- A. 18 in.^3
- B. 23 in.^3
- * C. 216 in.^3
- D. 252 in.^3

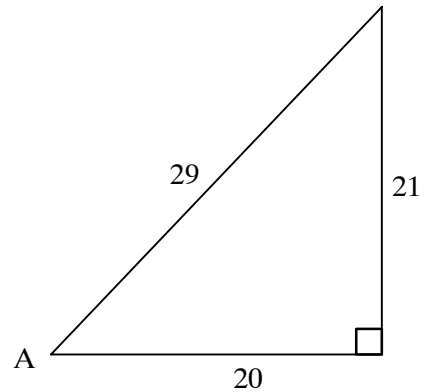
Use the graph below to answer question 58.



58. Which equation represents a line that is **parallel** to line l ?

- A. $y = -\frac{3}{4}x + 2$
- * B. $y = \frac{3}{4}x - 1$
- C. $y = -\frac{4}{3}x + 4$
- D. $y = \frac{4}{3}x - 3$

Use the figure below to answer question 59.



(Not drawn to scale.)

59. What is $\tan A$?

- A. 0.6897
- B. 0.7241
- C. 0.9524
- * D. 1.0500

60. A sign is shaped like a regular octagon. One side of the sign is 3 feet long. What is the perimeter of the sign?

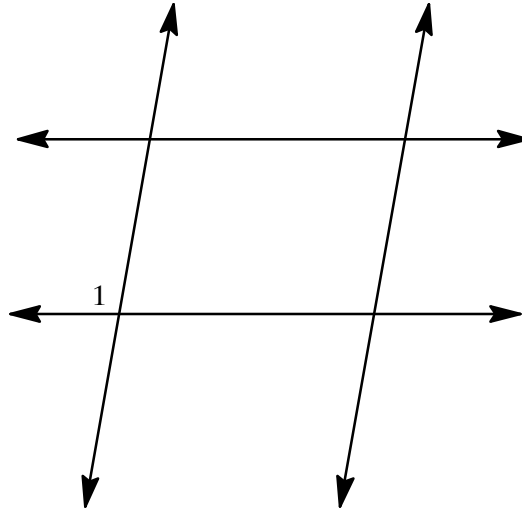
- A. 15 feet
- B. 18 feet
- C. 21 feet
- * D. 24 feet

CALCULATOR PERMITTED ON ALL ITEMS

GEOMETRY OPEN-RESPONSE ITEM A

- A. Seymour designs amusement parks. In order to decide the best placement of the rides, he uses transformations on a coordinate grid to determine the starting and ending points of each ride.
1. Seymour graphs the starting point of the Giant Slide at $(-8, 6)$. The ending point can be found with a translation 3 units to the left and 9 units down. On the grid in your Student Answer Document, graph the starting point and ending point of the Giant Slide. Label the starting point G and the ending point G' and include the coordinate pair for each point.
 2. Seymour graphs the starting point of the Big Flip at $(5, 7)$. The ending point can be found with a reflection across the x -axis. On the grid in your Student Answer Document, graph the starting point and ending point of the Big Flip. Label the starting point B and the ending point B' and include the coordinate pair for each point.
 3. Seymour graphs the starting point of the Twister at $(3, -2)$. The ending point can be found with a 90° clockwise rotation about the origin. On the grid in your Student Answer Document, graph the starting point and ending point of the Twister. Label the starting point T and the ending point T' and include the coordinate pair for each point.

GEOMETRY OPEN-RESPONSE ITEM B



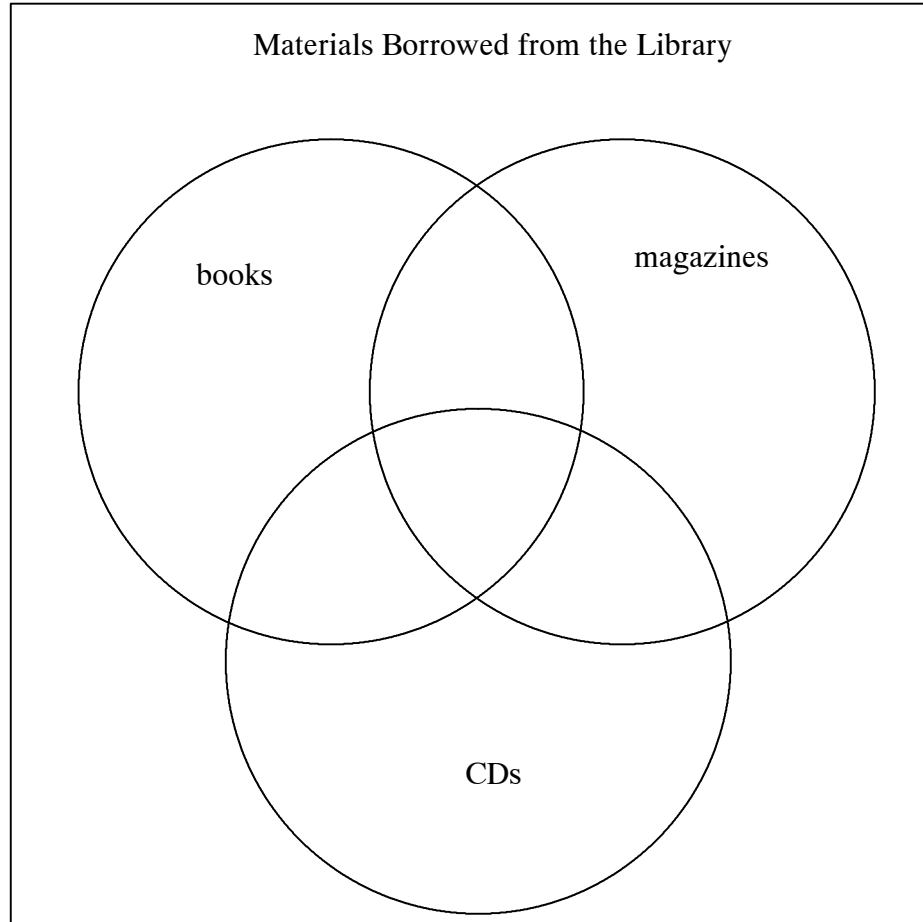
(Not drawn to scale.)

B. The figure above shows 2 sets of parallel lines. Angle 1 is already labeled. Information about angles 2, 3, 4, and 5 is given below.

- Angles 1 and 2 are vertical angles.
- Angles 2 and 3 are supplementary and non-adjacent.
- Angle 4 is in the interior of the parallelogram and is acute.
- Angle 5 is adjacent to angle 3 and measures 105° .

Copy and complete the diagram above in your Student Answer Document. Label angles 2, 3, 4, and 5 on the figure. Also, determine the angle measure of each of the numbered angles, and clearly label each angle with its measure.

GEOMETRY OPEN-RESPONSE ITEM C



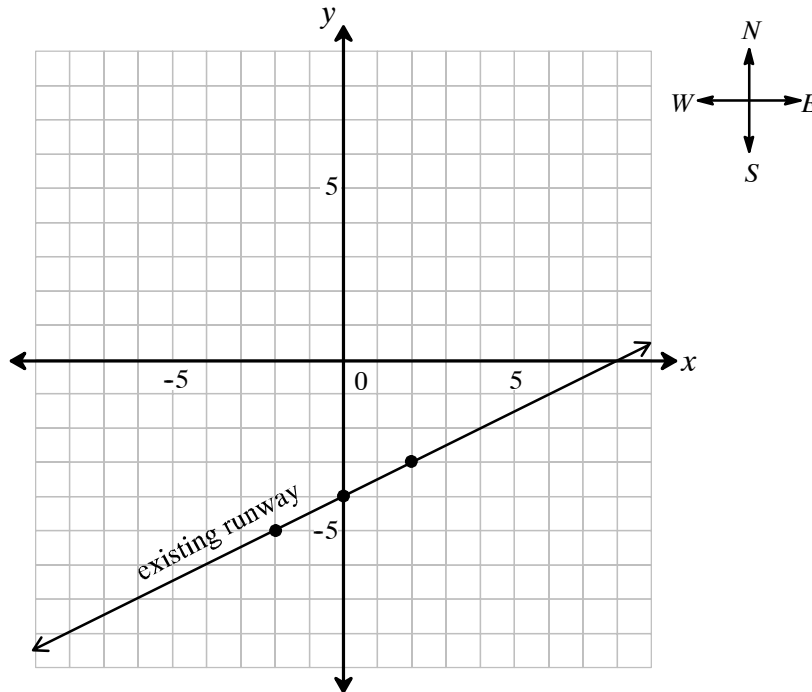
C. At Eastview High School, 257 students borrowed materials from the library.

- 111 students borrowed CDs
- 15 students borrowed **only** CDs
- 47 students borrowed magazines and CDs, but no books
- 21 students borrowed CDs, magazines, and books
- 27 students borrowed materials other than books, magazines, and CDs
- 73 students borrowed books and magazines
- 137 students borrowed books

Copy the Venn diagram above into your Student Answer Document. Complete the diagram by placing the correct number of students in the proper regions. Show or explain all of your work even if you use mental math or a calculator.

GEOMETRY OPEN-RESPONSE ITEM E

Thomasville Airport



- E. Thomasville has an airport with one runway as shown above. The city plans to add another runway. The new runway will be 3 units north of and parallel to the existing runway.
- To build the new runway, the construction company represents its location with an equation. Write an equation in slope-intercept form that represents the new runway. Show or explain all of your work even if you use mental math or a calculator.
 - A new service road will be built perpendicular to the existing runway at the point $(2, -3)$. Write an equation in slope-intercept form the construction company could use to represent the service road. Show or explain all of your work even if you use mental math or a calculator.

BE SURE TO LABEL YOUR RESPONSES (1) AND (2).

GEOMETRY OPEN-RESPONSE ITEM F

- F.** Jim is designing 2 containers in which to sell popcorn. One container is a cylinder with a radius of 1.75 inches and a height of 6.5 inches. The other container is a box with a length of 4 inches, a width of 2.5 inches, and a height of 6.75 inches. Jim wants to know the amount of material it takes to make each container and the amount of popcorn each container can hold.
1. Determine the amount of material it takes to make each container. Neither container has a top. Show or explain all of your work even if you use mental math or a calculator. Include units in your answer. Use $\pi = 3.14$.
 2. Determine the volume of each container. Show or explain all of your work even if you use mental math or a calculator. Include units in your answer. Use $\pi = 3.14$.

BE SURE TO LABEL YOUR RESPONSES (1) AND (2).