



Arkansas Comprehensive Testing, Assessment, and Accountability Program

**RELEASED ITEM**  
**BOOKLET**  
**Geometry**  
**End-of-Course Examinations**  
**2010-2011 Administrations**

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**Arkansas Department of Education**

## PART II MID-YEAR RELEASED GEOMETRY ITEMS

1. A food company packages soup in a cylindrical can with radius 4 cm and height 12 cm. What is the surface area of the can? Use 3.14 for  $\pi$ .

A. 251.20 cm<sup>2</sup>  
B. 351.68 cm<sup>2</sup>  
\*C. 401.92 cm<sup>2</sup>  
D. 602.88 cm<sup>2</sup>

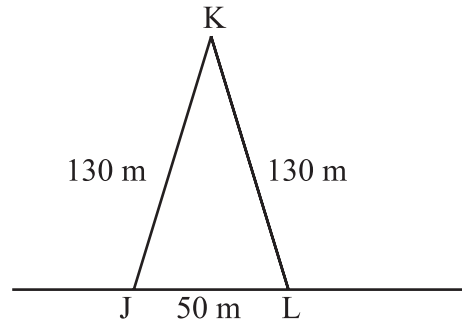
2. What is the distance between the points with coordinates (10, 3) and (2, -1)?

A.  $\sqrt{68}$  grid units  
\*B.  $\sqrt{80}$  grid units  
C.  $\sqrt{82}$  grid units  
D.  $\sqrt{122}$  grid units

3. One angle of a parallelogram measures 50°. What are the measures of the other three angles?

A. 40°, 40°, 50°  
B. 50°, 50°, 50°  
C. 80°, 90°, 90°  
\*D. 50°, 130°, 130°

4. The figure below shows the profile of a proposed tower.

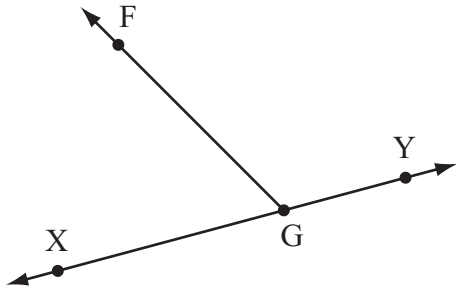


The architectural plans include a midsegment connecting JK and LK. What will be the length of the midsegment?

- \*A. 25 m  
B. 50 m  
C. 65 m  
D. 80 m
5. Helen needs to mail supplies to her daughter. She has two boxes that she can use to pack the supplies. One box has a length of 9.0 inches, a width of 5.5 inches, and a height of 4.0 inches. The second box has the same length, twice the width, and its height is one inch less than the height of the first box. How much more space does she have if she uses the second box instead of the first box?
- \*A. 99.0 cubic inches  
B. 103.0 cubic inches  
C. 198.0 cubic inches  
D. 297.0 cubic inches

PART II MID-YEAR RELEASED GEOMETRY ITEMS

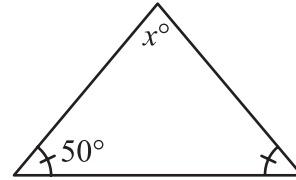
6.  $\overleftrightarrow{XY}$  passes through the endpoint of  $\overline{GF}$ .



How many angles measuring less than  $180^\circ$  are shown?

- A. 1
- \*B. 2
- C. 3
- D. 4

7. In the figure below, what is the value of  $x$ ?

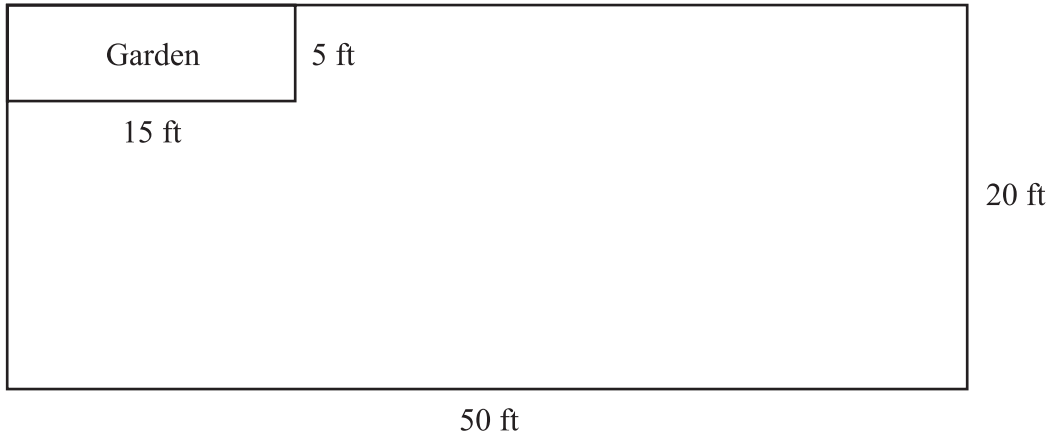


- A. 40
- B. 45
- C. 65
- \*D. 80

## PART II MID-YEAR RELEASED GEOMETRY ITEMS

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8. Hank delivers the newspaper to Mrs. Fredericks. She has a rectangular front yard with a rectangular garden, as shown below.



Hank throws the newspaper from his bicycle to Mrs. Fredericks' front yard. Assuming the newspaper is equally likely to land anywhere in Mrs. Fredericks' front yard, what is the probability that it does **not** land in her garden?

- A. 7.5%
- B. 13.3%
- C. 71.4%
- \*D. 92.5%
- 
9. Which equation represents the line that passes through the point  $(0, 0)$  and is perpendicular to the line  $y = -3x$ ?

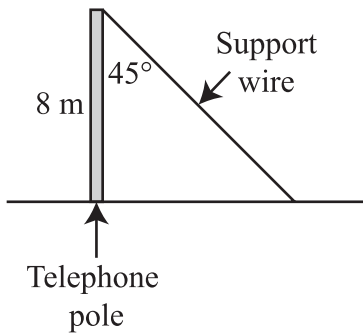
- A.  $y = -3x$
- B.  $y = -\frac{x}{3}$
- \*C.  $y = \frac{x}{3}$
- D.  $y = -\frac{3}{x}$

## PART II MID-YEAR RELEASED GEOMETRY ITEMS

10. Which Platonic solid has regular pentagons as faces?

- \*A. dodecahedron
- B. icosahedron
- C. tetrahedron
- D. octahedron

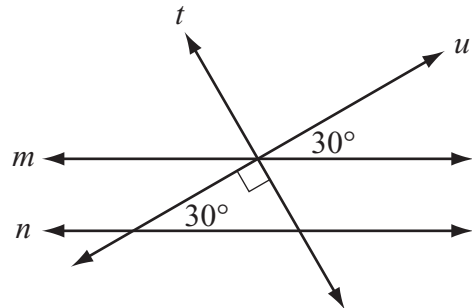
11. A support wire for a telephone pole will be dropped from the top of the pole to the ground at an angle of  $45^\circ$ .



How long must the wire be? Round your answer to the nearest tenth.

- A. 6.9 m
- \*B. 11.3 m
- C. 13.9 m
- D. 16.0 m

12. Which **best** describes the relationship between lines  $m$  and  $n$ ?

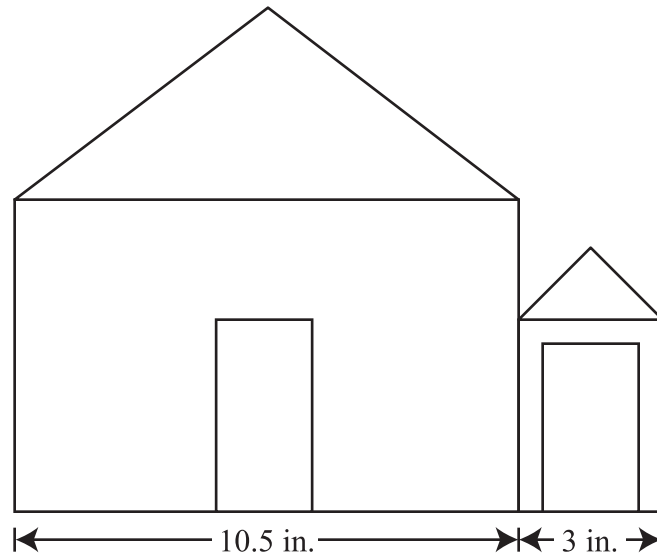


- A. They are skew.
- \*B. They are parallel.
- C. They are transversal.
- D. They are perpendicular.

## PART II MID-YEAR RELEASED GEOMETRY ITEMS

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13. Tim is designing his house. His outline of the front of the house and garage is shown below.

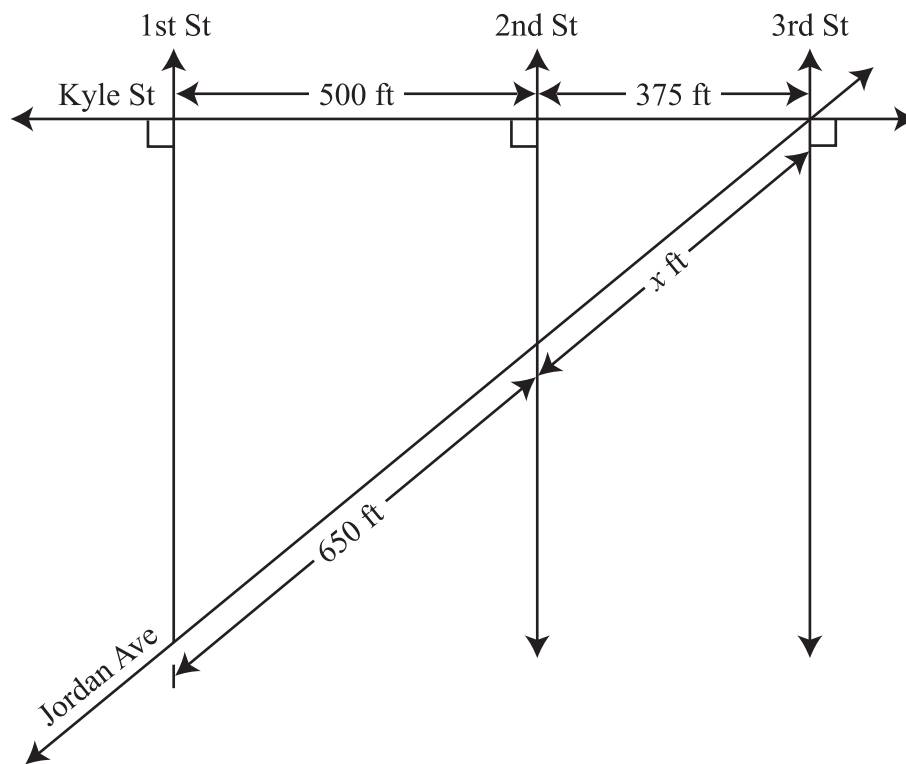


If he uses a scale of 1.5 in. = 14 ft, what would be the actual length of this side of the house and garage?

- A. 98 ft
- \*B. 126 ft
- C. 147 ft
- D. 189 ft

## PART II MID-YEAR RELEASED GEOMETRY ITEMS

14. A portion of a city map is shown below.



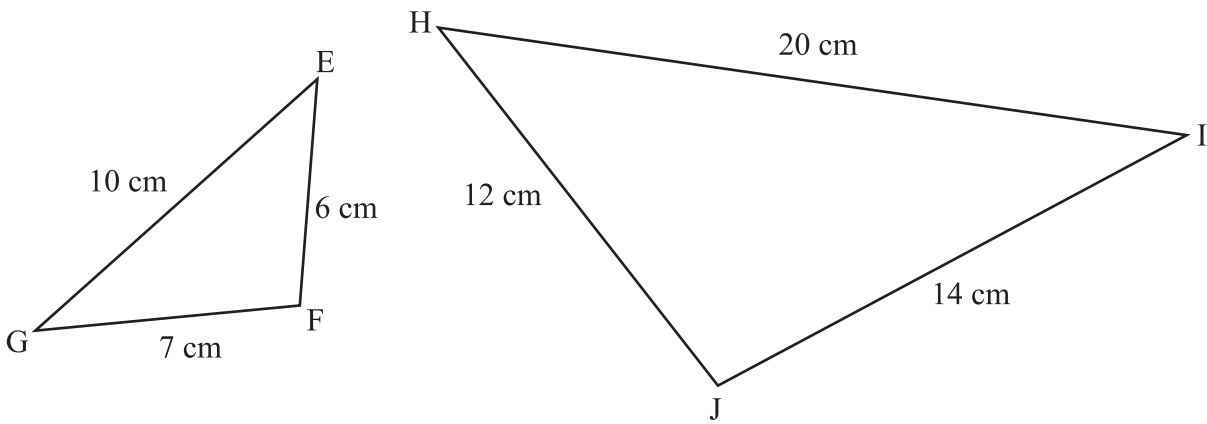
What is the value of  $x$ , rounded to the nearest foot?

- A. 375
- \*B. 488
- C. 525
- D. 867

**PART II MID-YEAR RELEASED GEOMETRY ITEMS**

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15. Given the two triangles below, which angle is congruent to  $\angle F$ ?



- A.  $\angle E$
- B.  $\angle H$
- C.  $\angle I$
- \*D.  $\angle J$



## PART II MID-YEAR RELEASED GEOMETRY ITEMS

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16. Mr. Smith, Mr. Jones, Ms. Brown, Ms. Rodriguez, and Mr. Patel each own a car. Their cars are each of a different color—red, yellow, green, blue, and white. The following information is known.

- Neither Ms. Rodriguez nor Mr. Patel owns the red car.
- Mr. Jones and Mr. Smith sometimes go on a camping trip with the owner of the yellow car.
- The white car belongs to the person whose name is the name of a color.
- Mr. Smith's car is blue.

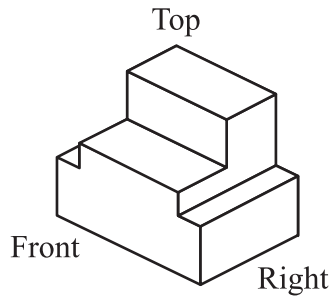
Who owns the red car?

- \*A. Mr. Jones
- B. Mr. Smith
- C. Ms. Brown
- D. Ms. Rodriguez



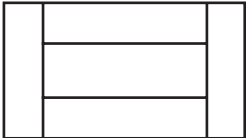
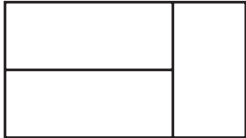
## PART II MID-YEAR RELEASED GEOMETRY ITEMS

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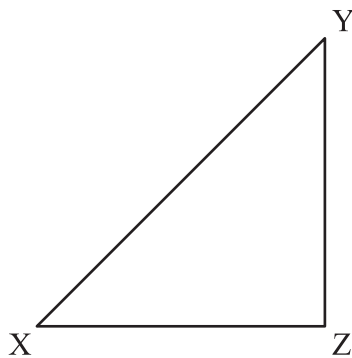
17. A three-dimensional object is shown below.



Which could be the top view of the object?

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

18. Which statement would be sufficient to prove that  $\triangle XYZ$  is a right triangle?

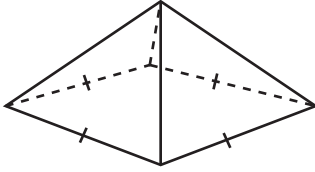


- A.  $XZ = ZY$
- B.  $m\angle X = 45^\circ$
- C.  $XZ + YZ \geq XY$
- \*D.  $m\angle X + m\angle Y = 90^\circ$

## PART II MID-YEAR RELEASED GEOMETRY ITEMS

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19. The pyramid shown below is cut by a plane parallel to its base.

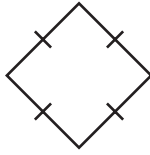


What is the cross section of the cut?

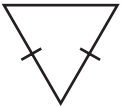
A.



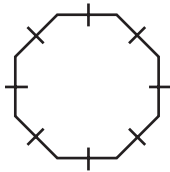
\*B.



C.



D.



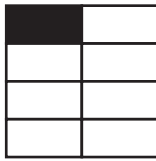
## PART II MID-YEAR RELEASED GEOMETRY ITEMS

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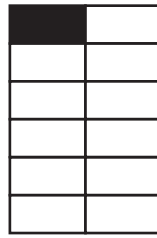
20. If the pattern below continues, what fractional part of the figure will be unshaded in Stage 7?



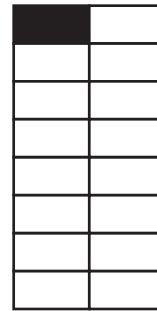
Stage 1



Stage 2



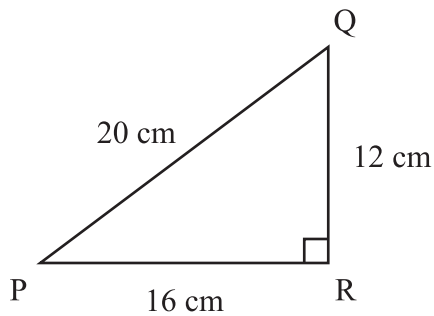
Stage 3



Stage 4

- A.  $\frac{19}{20}$
- B.  $\frac{23}{24}$
- \*C.  $\frac{27}{28}$
- D.  $\frac{31}{32}$

21. The figure below shows  $\triangle PQR$ .



What is the value of  $\sin(P)$ ?

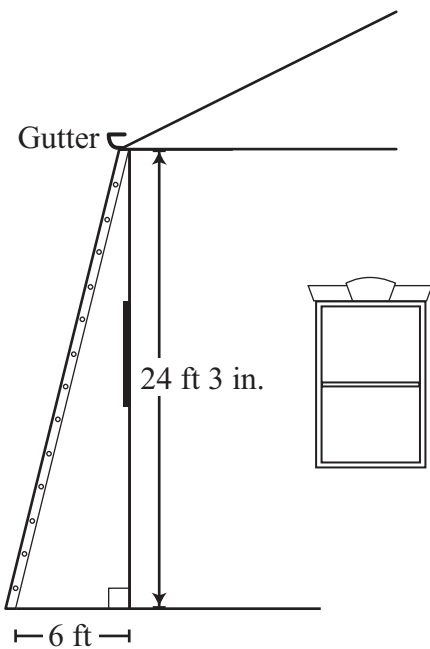
- \*A.  $\frac{3}{5}$
- B.  $\frac{3}{4}$
- C.  $\frac{4}{5}$
- D.  $\frac{4}{3}$

**PART II MID-YEAR RELEASED GEOMETRY ITEMS**

22. What is the equation of the circle with center point (4, 5) and a radius of 3 units?

- A.  $(x - 4)^2 + (y - 5)^2 = 3$
- B.  $(x - 5)^2 + (y - 4)^2 = 3$
- \*C.  $(x - 4)^2 + (y - 5)^2 = 9$
- D.  $(x - 5)^2 + (y - 4)^2 = 9$

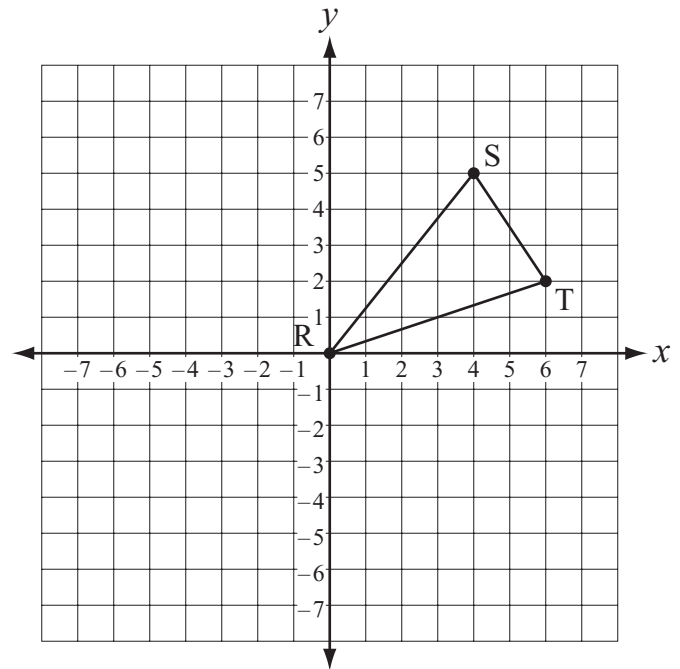
23. Carl is preparing to clean out the gutters on his house. The gutters are 24 feet, 3 inches from the ground. He plans to place the bottom of his ladder 6 feet away from the house and the top of the ladder at the base of the gutter.



What is the length of the ladder that Carl needs? Round your answer to the nearest tenth.

- A. 4.3 feet
- B. 23.4 feet
- \*C. 25.0 feet
- D. 30.4 feet

24.  $\triangle RST$  is shown below.



If  $\triangle RST$  is rotated  $180^\circ$  clockwise about the origin, what will be the coordinates of the image of point T?

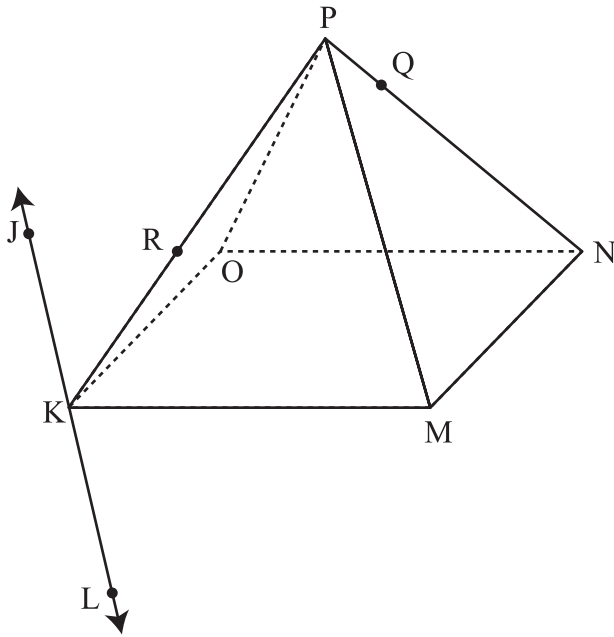
- A. (6, 2)
- B. (-6, 2)
- C. (6, -2)
- \*D. (-6, -2)

25. Which collection of segment lengths could **not** be the lengths of the sides of a triangle?

- \*A. 1 cm, 2 cm, 3 cm
- B. 1 cm, 3 cm, 3 cm
- C. 2 cm, 3 cm, 3 cm
- D. 2 cm, 3 cm, 4 cm

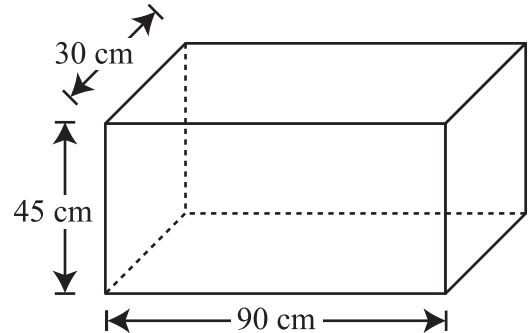
PART II MID-YEAR RELEASED GEOMETRY ITEMS

26. In the figure below, which group of 3 points does **not** form a plane?



- \*A. Points P, Q, and N  
 B. Points K, O, and P  
 C. Points L, K, and R  
 D. Points J, K, and M
27. Which is the correct classification for a figure with vertices P (2, 4), Q (6, 4), R (2, 0), and S (8, 0)?
- A. Parallelogram  
 B. Rectangle  
 C. Square  
 \*D. Trapezoid

28. What is the volume of the rectangular prism shown below?



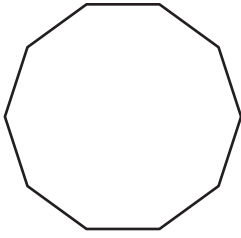
- A. 729000 cm<sup>3</sup>  
 \*B. 121500 cm<sup>3</sup>  
 C. 24300 cm<sup>3</sup>  
 D. 16200 cm<sup>3</sup>
29. A line has the equation  $y = 3x - 2$ . What is the equation of the line parallel to this line and passing through the point (5, 4)?
- \*A.  $y = 3x - 11$   
 B.  $y = -\frac{1}{3}x - \frac{17}{3}$   
 C.  $y = 15x - 8$   
 D.  $y = \frac{6}{5}x - 2$

**PART II MID-YEAR RELEASED GEOMETRY ITEMS**

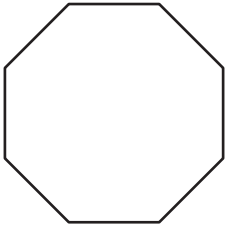
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30. Which shape will tessellate?

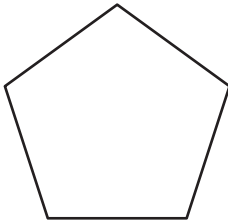
A.



B.



C.

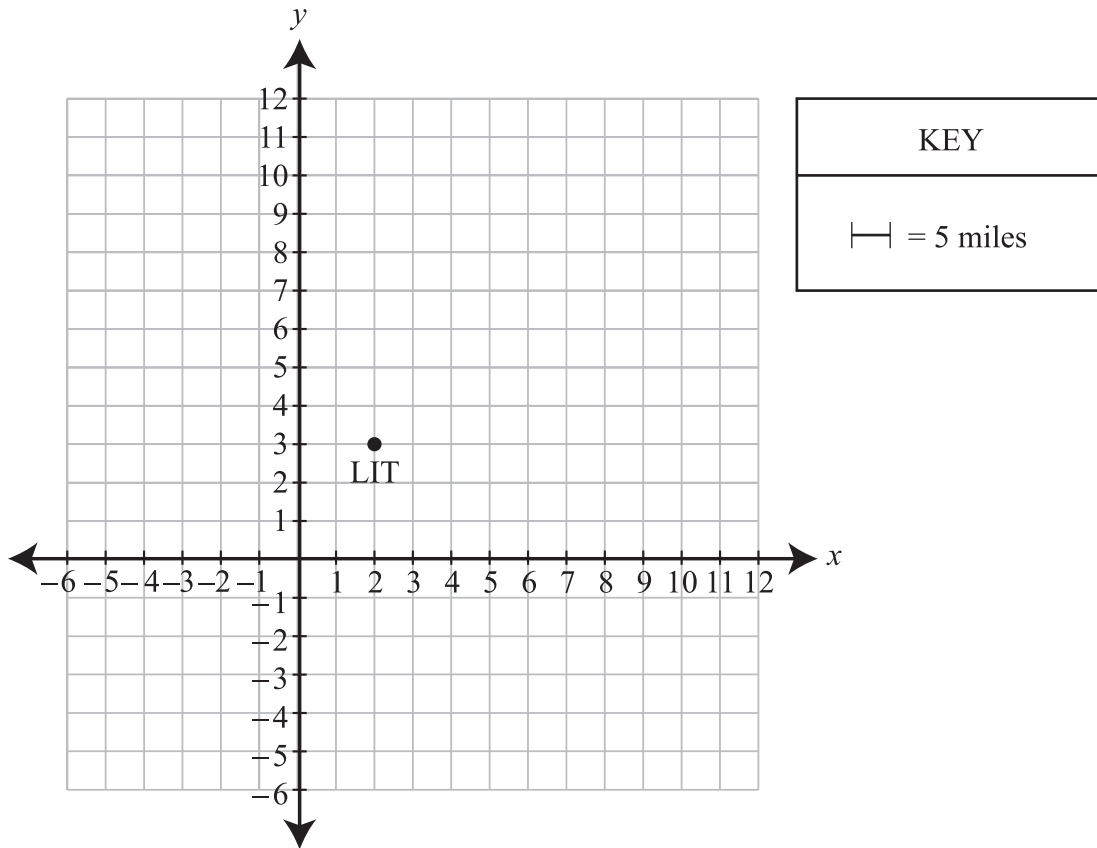


\*D.



## PART II MID-YEAR RELEASED GEOMETRY ITEMS

- A. An air traffic control system at Little Rock National (LIT) airport, located at  $(2, 3)$  on the grid below, uses a radar system that sends out signals to determine the locations of airplanes. This system can detect planes within a circular region having a radius of 35 miles from LIT. Each grid unit represents 5 miles.



An airplane is heading directly toward LIT from the location represented by coordinates  $(-4, 7)$  on the grid.

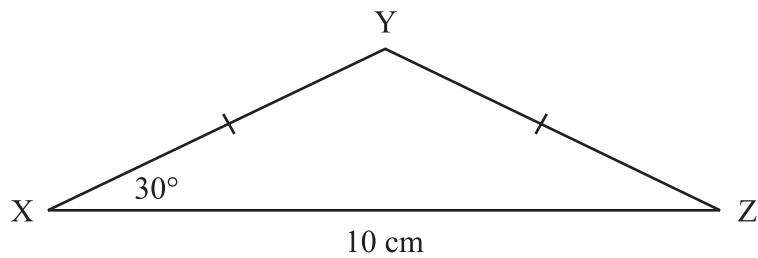
1. Can the plane be detected by the radar? Support your answer with mathematical evidence.
2. The air traffic controller instructs the pilot to begin circling the airport halfway between the airport and her current location. What will be the coordinates of the plane's location when the pilot begins to circle the airport? Show your work or explain your answer.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.



## PART II MID-YEAR RELEASED GEOMETRY ITEMS

B.  $\triangle XYZ$  is shown below.



1. Determine  $m\angle Y$ . Show your work or explain how you found your answer.
2. An altitude is drawn from point Y to  $\overline{XZ}$ , and the point where the altitude intersects  $\overline{XZ}$  is labeled W. What is YW? Give your answer in simplest radical form or round your answer to the nearest hundredth. Show your work or explain how you found your answer.
3. Determine the area of  $\triangle XYZ$ . Give your answer in simplest radical form or round your answer to the nearest hundredth. Show your work or explain how you found your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

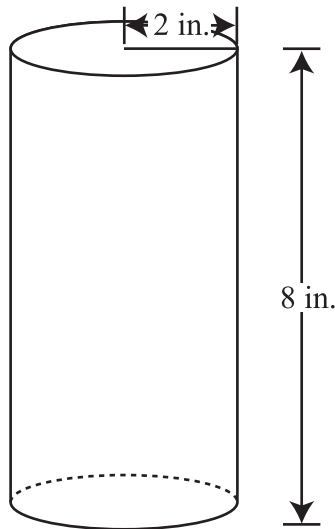
<b>Item B Scoring Rubric—2011 Geometry</b>
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Score	Description
<b>4</b>	The student earns 4 points. The response contains no incorrect work. The response contains: Correct label of “degrees” or “°” in Part 1 Correct label of “cm” in Part 2 Correct label of “sq. cm” in Part 3
<b>3</b>	The student earns 3–3½ points.
<b>2</b>	The student earns 2–2½ points.
<b>1</b>	The student earns ½–1½ points or some minimal understanding is shown.
<b>0</b>	The student earns 0 points. No understanding is shown.
<b>B</b>	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” assigned for the item.)

## PART II MID-YEAR RELEASED GEOMETRY ITEMS

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- C. Double Gold Food Company currently packages its oatmeal in cardboard cylinders with the dimensions shown below.



Double Gold Food plans to increase the volume of the containers 25%.

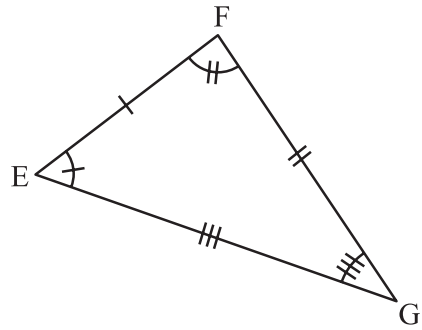
1. If Double Gold Food decides to change the height of the current container but keep the radius the same, what will be the height of the new container? Show your work or explain how you found your answer.
2. If Double Gold Food decides to change the radius of the current container but keep the height the same, what will be the radius of the new container? Round your answer to the nearest hundredth of an inch. Show your work or explain how you found your answer.
3. The amount of materials needed to create the container depends on its surface area. Determine which option, increasing the height only or increasing the radius only, results in a cylindrical container with the **least** surface area? Show your work or explain how you found your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

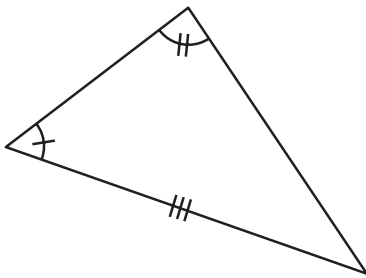
## PART II SPRING RELEASED GEOMETRY ITEMS

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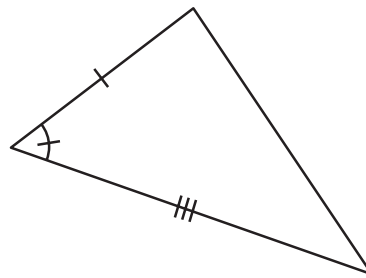
1. Which choice shows a triangle that is congruent to  $\triangle EFG$  by applying the AAS Congruence Theorem only?



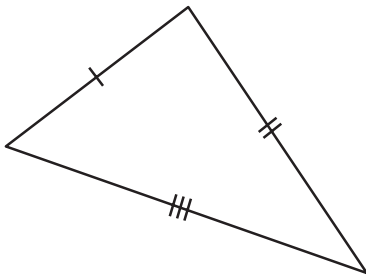
\*A.



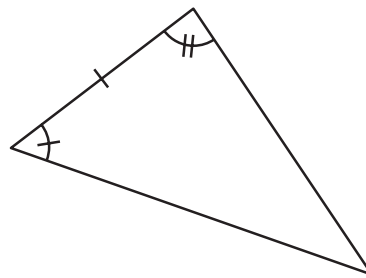
B.



C.

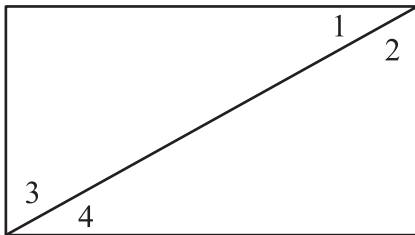


D.



**PART II SPRING RELEASED GEOMETRY ITEMS**

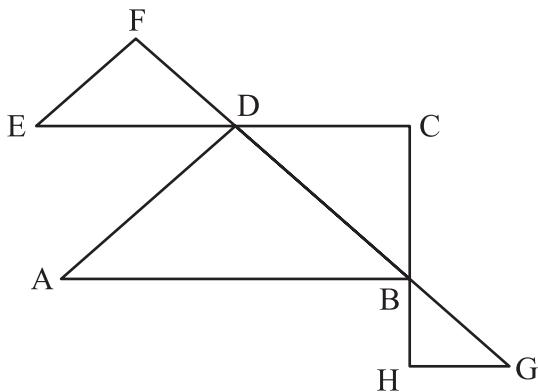
2. The rectangle below is divided by one of the rectangle's diagonals, forming the angles shown.



Which of the following statements is true based on this information?

- A.  $m\angle 1 = m\angle 2$
- B.  $m\angle 1 = m\angle 3$
- \*C.  $m\angle 2 = m\angle 3$
- D.  $m\angle 2 = m\angle 4$

Use the following diagram to answer question 3.



3. Which of the following is a quadrilateral?

- \*A. ADCB
- B. ADBC
- C. BFED
- D. CBGH

4. Circle O has its center at (9, 3), and point (3, -2) lies on circle O. What is the diameter of circle O? Round your answer to the nearest tenth of a unit.

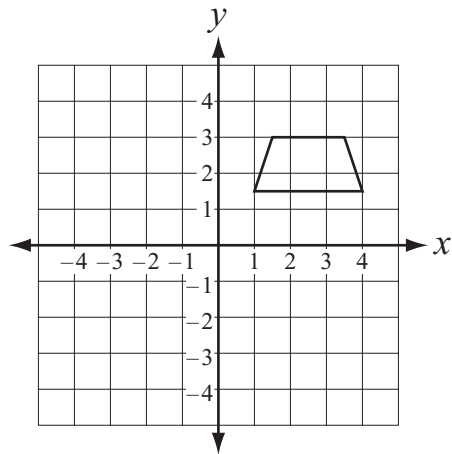
- A. 6.6 units
- B. 11.8 units
- \*C. 15.6 units
- D. 24.1 units

5. A catalog shows a picture of a photo album. In the picture, the photo album measures 2.5 inches by 3.5 inches. The picture is at a scale of 1 inch = 3.2 inches. What are the dimensions of the actual photo album? Round your answers to the nearest tenth of an inch.

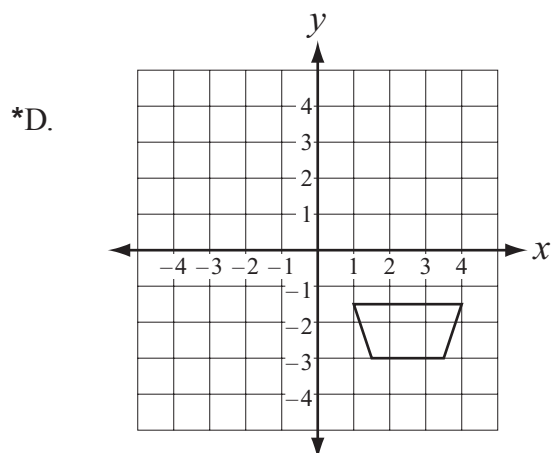
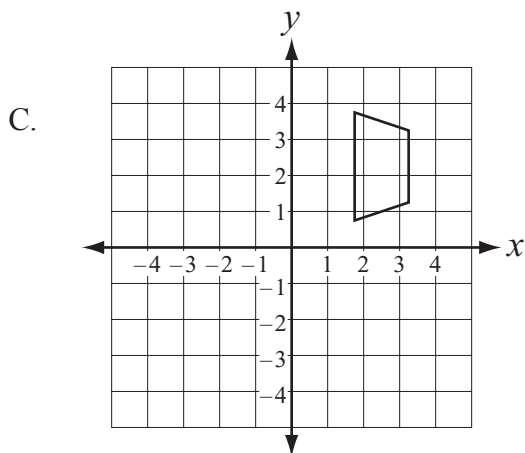
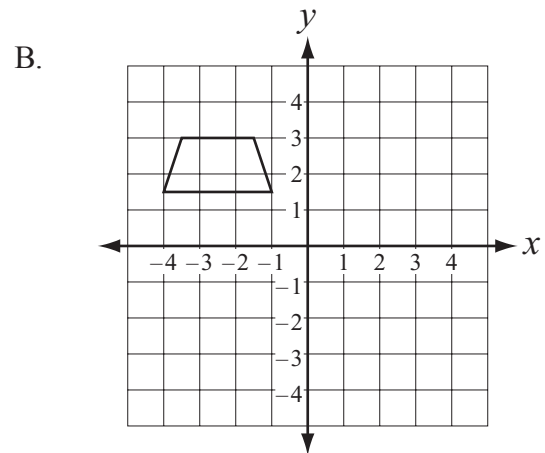
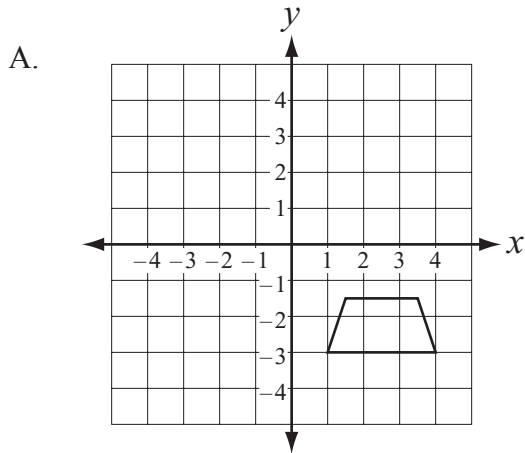
- A. 0.8 inches by 1.1 inches
- B. 1.3 inches by 1.1 inches
- \*C. 8.0 inches by 11.2 inches
- D. 8.8 inches by 11.2 inches

## PART II SPRING RELEASED GEOMETRY ITEMS

Use the graph below to answer question 6.

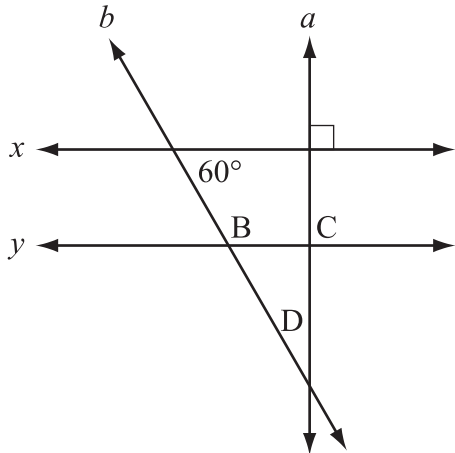


6. Which graph shows a reflection across the  $x$ -axis of the image above?



**PART II SPRING RELEASED GEOMETRY ITEMS**

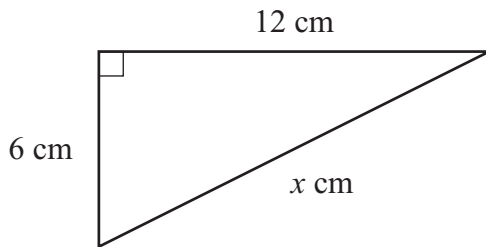
7. Lines  $x$  and  $y$  are parallel,  $a$  is a transversal that is perpendicular to  $x$ , and  $b$  is another transversal.



What is the measure of  $\angle D$ ?

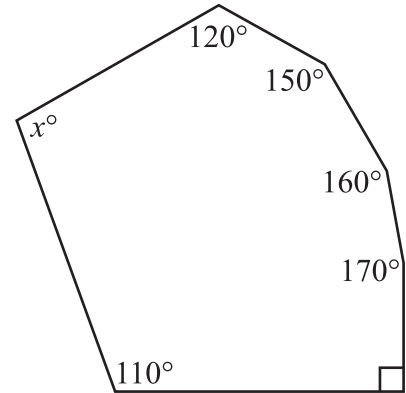
- \*A.  $30^\circ$
- B.  $60^\circ$
- C.  $90^\circ$
- D.  $120^\circ$

Use the diagram below to answer question 8.



8. What is the value of  $x$  to the nearest tenth?
- A. 4.2
  - B. 10.4
  - C. 13.0
  - \*D. 13.4

9. The cross section of a building is shown below.



What is the value of  $x$ ?

- A. 90
- \*B. 100
- C. 110
- D. 120

10. How many non-overlapping rectangles make up the 7th figure in the series below?

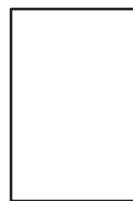


Figure 1



Figure 2



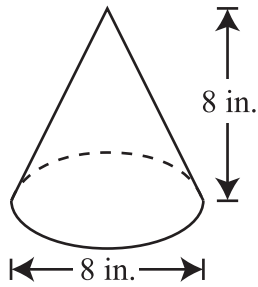
Figure 3

- A. 14
- B. 32
- C. 49
- \*D. 64

PART II SPRING RELEASED GEOMETRY ITEMS

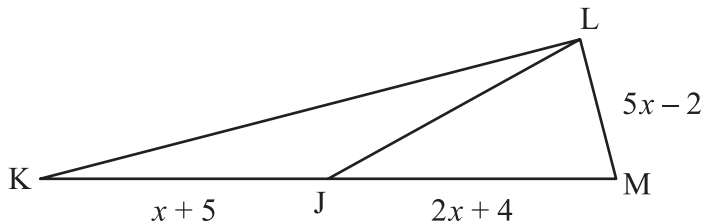
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11. If the height of the cone below were increased to 16 inches and the diameter stayed the same, by **approximately** how much would its volume increase?



- \*A.  $134 \text{ in.}^3$
  - B.  $268 \text{ in.}^3$
  - C.  $402 \text{ in.}^3$
  - D.  $938 \text{ in.}^3$
- 

12.  $\overline{LJ}$  is a median of  $\triangle KLM$ .



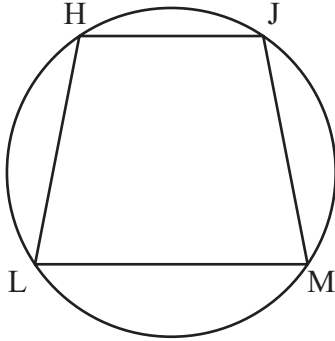
What is  $LM$ ?

- A. 1
- \*B. 3
- C. 6
- D. 7

**PART II SPRING RELEASED GEOMETRY ITEMS**

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13. Quadrilateral HJML is inscribed in the circle below. Arc JML measures  $230^\circ$ .



What is the measure of  $\widehat{LHJ}$ ?

- A.  $50^\circ$
  - B.  $90^\circ$
  - C.  $100^\circ$
  - \*D.  $130^\circ$
- 
14. A pattern of shapes is shown below. Each shape is made using cubes with an edge length of 1 cm.

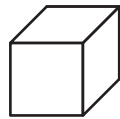


Figure 1  
SA =  $6 \text{ cm}^2$

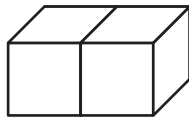


Figure 2  
SA =  $10 \text{ cm}^2$

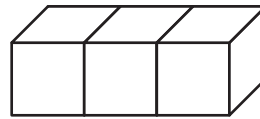


Figure 3  
SA =  $14 \text{ cm}^2$

If the pattern continues, what will be the surface area of Figure 5?

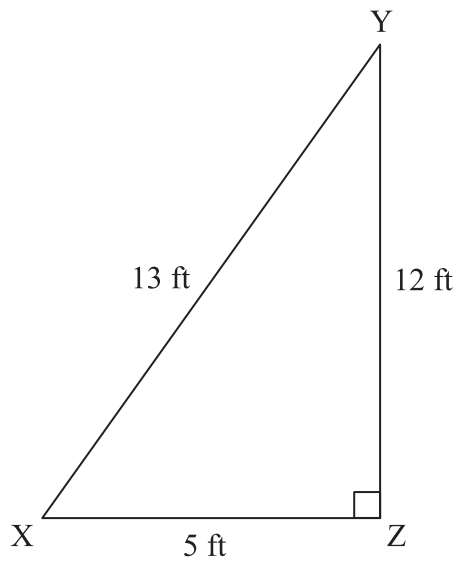
- A.  $18 \text{ cm}^2$
- \*B.  $22 \text{ cm}^2$
- C.  $24 \text{ cm}^2$
- D.  $26 \text{ cm}^2$



**PART II SPRING RELEASED GEOMETRY ITEMS**

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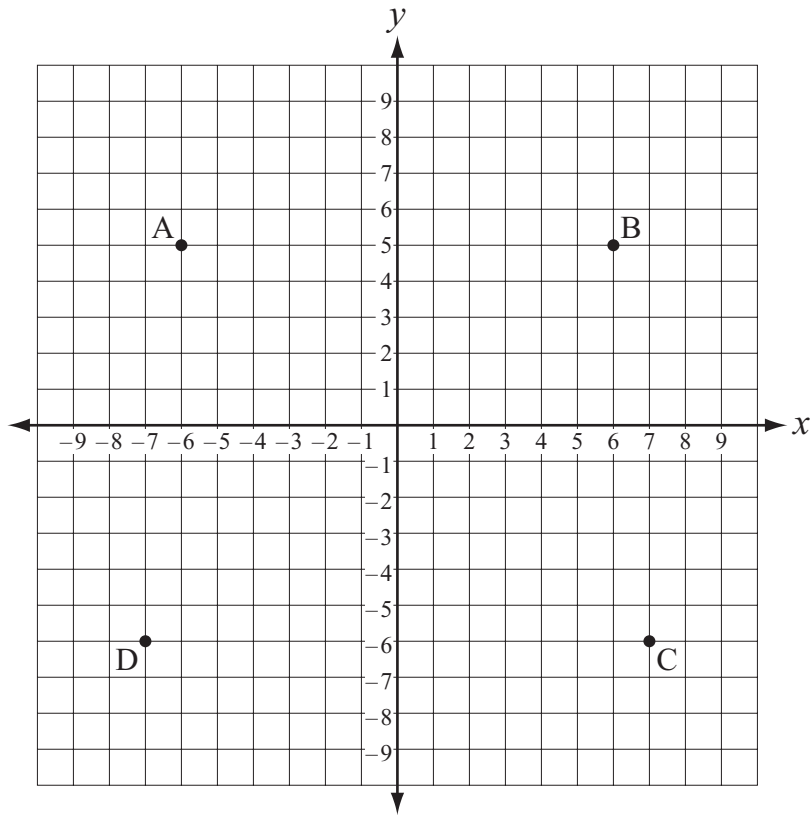
15. In  $\triangle XYZ$ , what is  $\sin X$ ?



- A.  $\frac{5}{13}$
- B.  $\frac{5}{12}$
- \*C.  $\frac{12}{13}$
- D.  $\frac{12}{5}$

PART II SPRING RELEASED GEOMETRY ITEMS

16. Four points, A, B, C, and D are plotted on the coordinate plane below to form a quadrilateral.



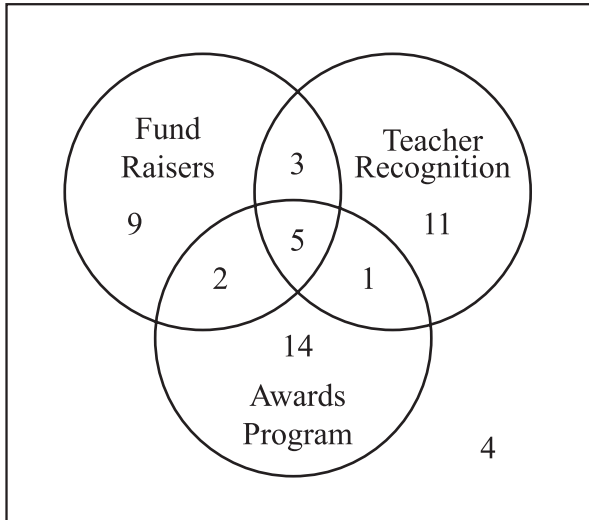
What type of quadrilateral is formed by connecting points A, B, C, and D?

- A. Parallelogram
- B. Rectangle
- C. Rhombus
- \*D. Trapezoid

## PART II SPRING RELEASED GEOMETRY ITEMS

17. Thomas created a Venn diagram to help him organize committees for the student council.

**Student Council Committees**



How many of the students are on two or more committees?

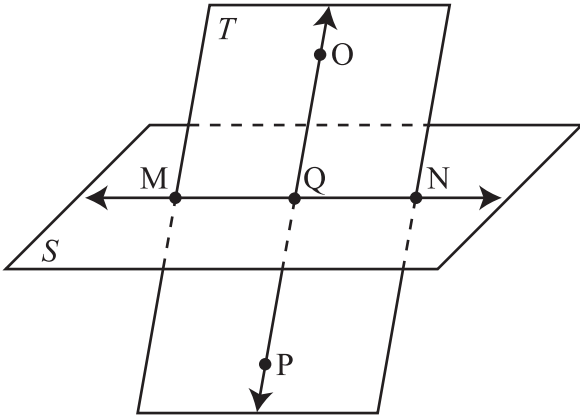
- A. 6
- B. 8
- \*C. 11
- D. 17

18. Jimmy is remodeling his kitchen. He drew a scale drawing that shows the new locations for his appliances. The opening where the oven will be placed has a length of 4 inches on his drawing. He used a scale of 1.5 inches = 12 inches. What will be the length of the actual oven in his kitchen?

- A. 18 inches
- B. 20 inches
- \*C. 32 inches
- D. 48 inches

PART II SPRING RELEASED GEOMETRY ITEMS

19. In the diagram below, line  $OP$  lies on plane  $T$  and line  $MN$  lies on plane  $S$ .



What is the intersection of planes  $S$  and  $T$ ?

- \*A. line  $MN$   
 B. point  $Q$   
 C. line  $OP$   
 D. point  $M$
20. The slope of  $\overline{RS}$  is  $\frac{5}{4}$  and its midpoint has coordinates  $(-20, -5)$ . What is the equation of the perpendicular bisector of  $\overline{RS}$ ?

- A.  $y = -\frac{5}{4}x - 30$   
 \*B.  $y = -\frac{4}{5}x - 21$   
 C.  $y = \frac{4}{5}x + 11$   
 D.  $y = \frac{5}{4}x + 20$

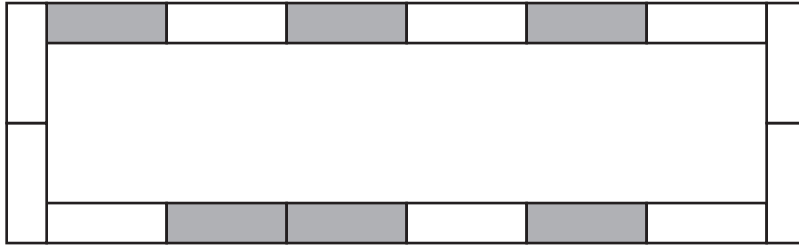
21. How many faces does an octahedron have?

- A. 4  
 B. 6  
 \*C. 8  
 D. 12

## PART II SPRING RELEASED GEOMETRY ITEMS

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22. In a game called “Prize Walk,” a player walks along a rectangular path while music plays. If a player is standing in a shaded section when the music stops, the player wins a prize.



Each rectangular section of the path is the same size. If a player is equally likely to be on any section of the path, what is the probability of winning a prize?

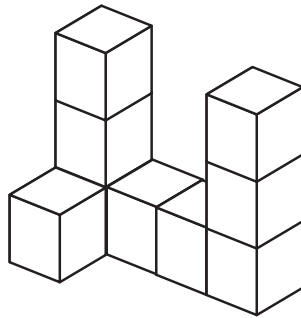
- \*A. 37.5%
  - B. 50%
  - C. 60%
  - D. 62.5%
- 
23. Which of the following is the equation for a circle with a radius of 5 and a center at  $(-2, 4)$ ?

- A.  $(x - 2)^2 + (y + 4)^2 = 25$
- B.  $(x - 4)^2 + (y + 2)^2 = 25$
- \*C.  $(x + 2)^2 + (y - 4)^2 = 25$
- D.  $(x + 4)^2 + (y - 2)^2 = 25$

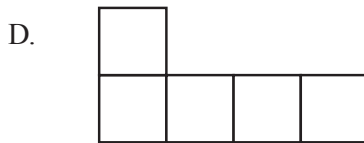
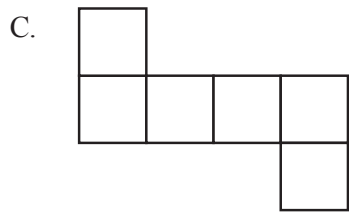
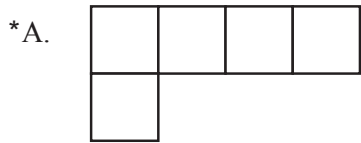
## PART II SPRING RELEASED GEOMETRY ITEMS

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24. Robbie made a model of a building using cubes, as shown below.

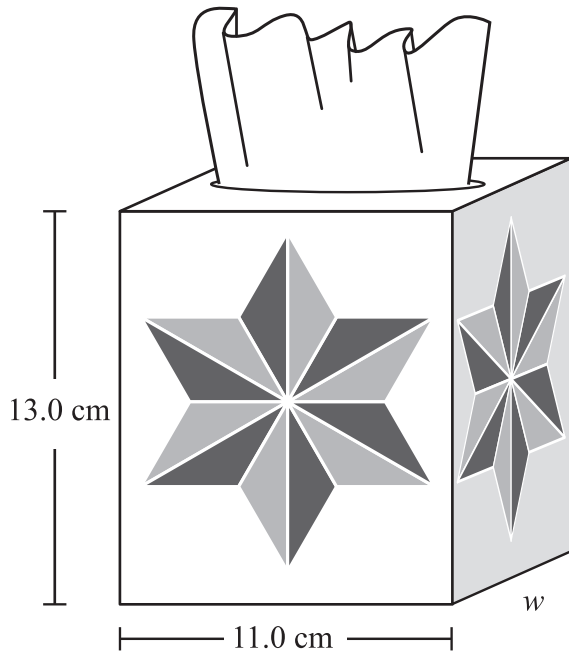


What would be the top view of Robbie's model?



**PART II SPRING RELEASED GEOMETRY ITEMS**

25. A box of tissues is 13.0 cm in height and 11.0 cm in length. Its volume is 1501.5 cubic cm.



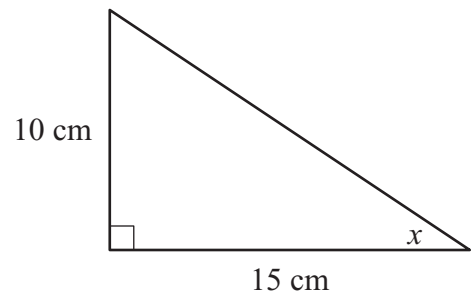
What is the width,  $w$ , of the box of tissues?

- \*A. 10.5 cm
- B. 11.5 cm
- C. 25.3 cm
- D. 31.2 cm

26. What is the equation of the line perpendicular to the line with equation  $y = \frac{5}{4}x + 8$  that passes through point  $(-4, 3)$ ?

- A.  $y = -\frac{5}{4}x - 2$
- B.  $y = \frac{4}{5}x + \frac{31}{5}$
- C.  $y = \frac{4}{5}x + \frac{1}{5}$
- \*D.  $y = -\frac{4}{5}x - \frac{1}{5}$

Use the diagram below to answer question 27.

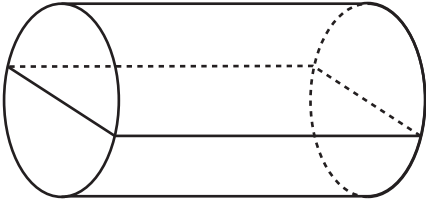


27. What is the measurement of angle  $x$ , rounded to the nearest tenth?

- \*A.  $33.7^\circ$
- B.  $41.8^\circ$
- C.  $48.2^\circ$
- D.  $56.3^\circ$

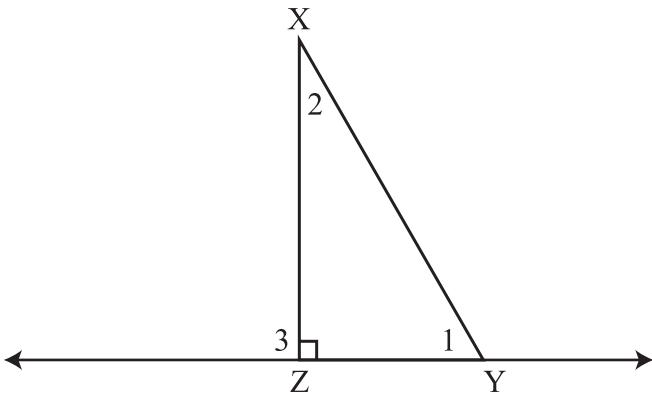
PART II SPRING RELEASED GEOMETRY ITEMS

28. The cylinder shown below will be cut by a plane along a diameter of both circular bases.



What shape **most** specifically describes the cross-section?

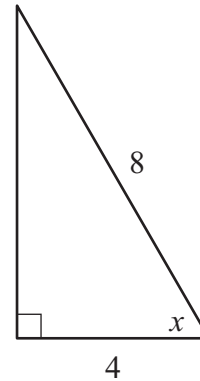
- A. oval
  - B. circle
  - \*C. rectangle
  - D. parallelogram
29. In the figure below,  $\overline{XZ} \perp \overline{ZY}$ .



Which is true?

- A.  $\angle 3$  and  $\angle 1$  are complementary.
- B.  $\angle 1$  and  $\angle 2$  are supplementary.
- C.  $m\angle 3 > m\angle 2 + m\angle 1$
- \*D.  $m\angle 3 = m\angle 1 + m\angle 2$

Use the diagram below to answer question 30.



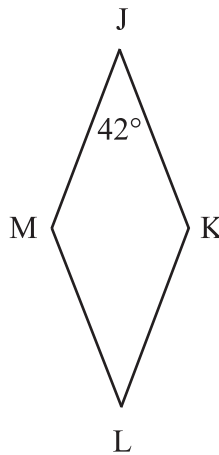
30. What is the value of  $x$ ?

- A.  $26.6^\circ$
- B.  $30^\circ$
- C.  $45^\circ$
- \*D.  $60^\circ$



## PART II SPRING RELEASED GEOMETRY ITEMS

- A. Quadrilateral JKLM has four congruent sides.



1. What is the **most** specific name for quadrilateral JKLM? Explain your reasoning.
2. Determine  $m\angle K$ . Show your work or explain how you found your answer.
3.  $MK = 7.6$  cm and  $JL = 19.8$  cm. What is the perimeter of JKLM? Round your answer to the nearest tenth of a centimeter. Show your work or explain how you found your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

<b>Item A Scoring Rubric—2011 Geometry</b>
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Score	Description
<b>4</b>	The student earns 4 points. The response contains no incorrect work. The correct label of “degrees” is included in Part 2.
<b>3</b>	The student earns $2\frac{1}{2}$ – $3\frac{1}{2}$ points and credit is earned in all 3 parts.
<b>2</b>	The student earns $2$ – $2\frac{1}{2}$ points and credit is earned in only 2 parts.
<b>1</b>	The student earns $\frac{1}{2}$ – $1\frac{1}{2}$ points or some minimal understanding is shown. Ex: Name in Part 1 is incorrect – Correct explanation to prove that the quadrilateral is a rhombus is included (with no other credit)
<b>0</b>	The student earns 0 points. No understanding is shown.
<b>B</b>	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” assigned for the item.)

## PART II SPRING RELEASED GEOMETRY ITEMS

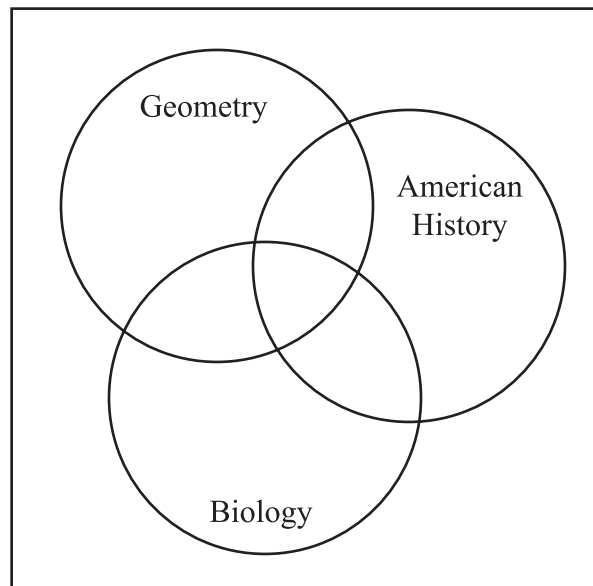
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B. A middle school has the following information on its 75 seventh-grade students:

- 33 students are taking Biology
- 39 students are taking American History
- 43 students are taking Geometry
- 12 students take Biology and American History
- 21 students take Geometry and Biology
- 17 students take Geometry and American History
- 7 students are taking Biology, Geometry, and American History

Copy the Venn diagram below into your Student Answer Document.

**Seventh Grade Students**



1. Complete the Venn diagram based on the information given. Be sure to include those students who take none of these classes.
2. How many students are taking **fewer than 2** of these courses? Show your work or explain how you found your answer.
3. How many students are taking **exactly 2** of these courses? Show your work or explain how you found your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.