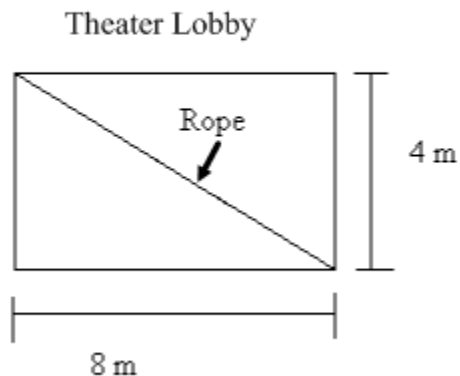




MCAS OLYMPICS

Event: GEOMETRY GYMNASTICS .

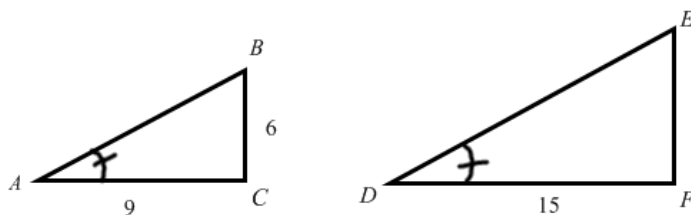
1. The floor of the lobby of a theater is shaped like a rectangle, as shown below.



Before the performance starts, a velvet rope is stretched diagonally across the lobby. Which of the following best describes the diagonal length of the lobby?

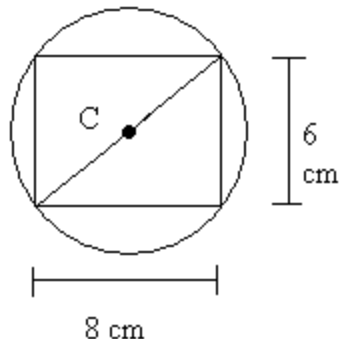
- a. between 8 and 9 meters
- b. between 9 and 10 meters
- c. between 10 and 11 meters
- d. between 11 and 12 meters

2. In the diagram below $\triangle ABC$ and $\triangle DEF$ are similar triangles with the dimensions shown, in units.



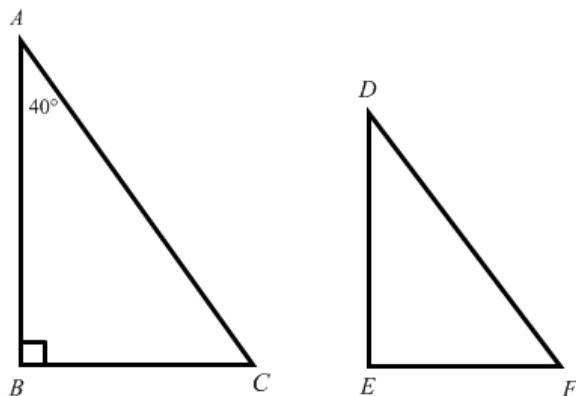
What is the length, in units, of \overline{EF} ?

3. For an art project, Calvin drew a rectangle inscribed in circle C , as shown below. The rectangle is 8 centimeters long and 6 centimeters wide.



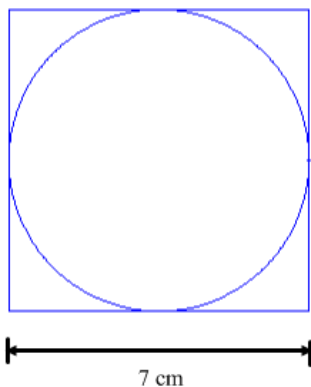
What is the diameter, in centimeters, of circle C ?

4. Triangle DEF is similar to triangle ABC .



What is the measure, in degrees of $\angle F$?

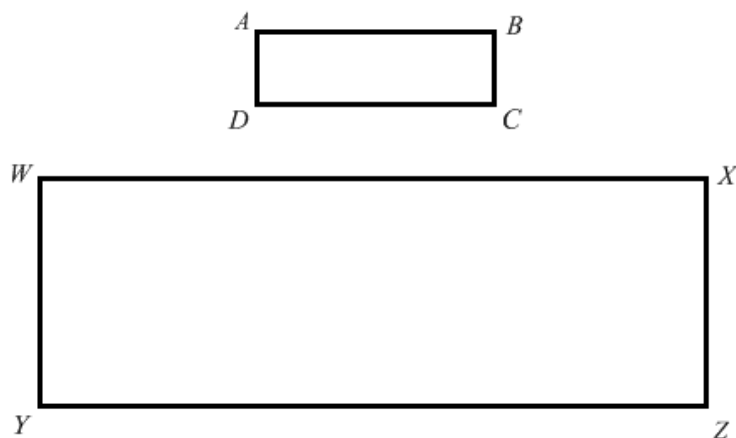
5. The figure below shows a circle inscribed in a square.



Which of the following is closest to the area of the circle?

- a. 38 cm^2 c. 49 cm^2
b. 13 cm^2 d. 154 cm^2

6. Two rectangles, $ABCD$ and $WXYZ$ are shown below. The measure of each side of $WXYZ$ is 5 times the measure of each corresponding side of $ABCD$.

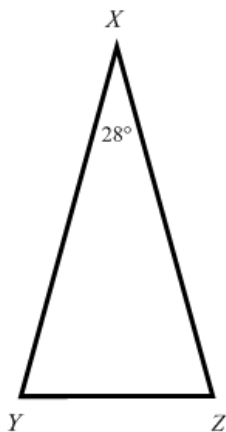


Which statement is true of the areas of these two rectangles?

- a. The area of $WXYZ$ is 5 times the area of $ABCD$
- b. The area of $WXYZ$ is 10 times the area of $ABCD$
- c. The area of $WXYZ$ is 20 times the area of $ABCD$
- d. The area of $WXYZ$ is 25 times the area of $ABCD$

7. Triangle XYZ is isosceles and $XY = XZ$. What is the measure of angle Y ?

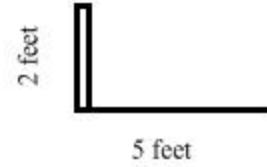
- a. 28°
- b. 36°
- c. 72°
- d. 76°



8. In parallelogram $ABCD$, $\overline{AB} \cong \overline{BC}$. What kind of quadrilateral must $ABCD$ be?

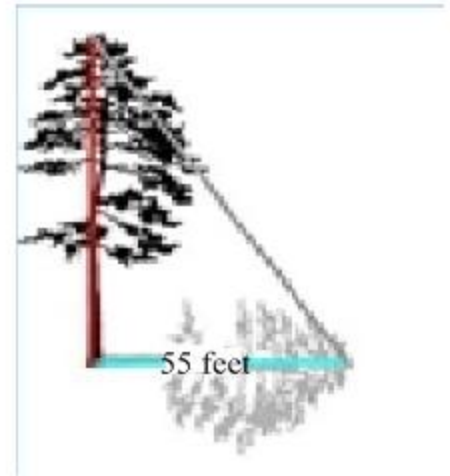
- a. rectangle
- b. rhombus
- c. square
- d. trapezoid

9. At 4:00 P.M. on a sunny day, a stick 2 feet tall casts a shadow 5 feet long. At the same time, a tree nearby casts a shadow 55 feet long.

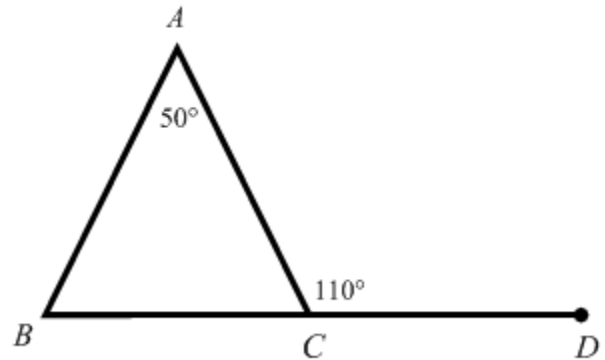


What is the height, in feet, of the tree?

- a. 137.5 feet
- b. 27.5 feet
- c. 22 feet
- d. 10 feet

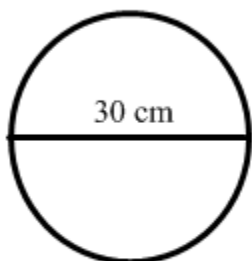


10. Triangle ABC is shown below. Points B , C , and D are collinear.



What is the degree measure of $\angle B$?

11. The circles below represent the gears of a bicycle. The diameter of Gear A is 30 centimeters. The ratio of the diameter of Gear A to the diameter of Gear B is 3:1.



Gear A

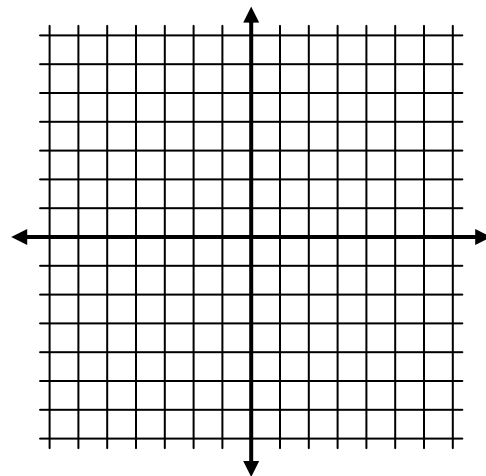


Gear B

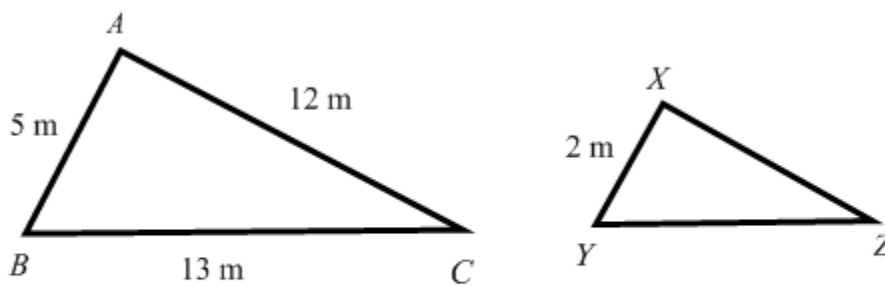
What is the circumference, in centimeters, of Gear B?

- a. 5π cm
- b. 10π cm
- c. 15π cm
- d. 30π cm

12. Parallelogram $ABCD$ has vertices $A(0, 2)$, $B(4, 2)$, and $C(9, 6)$. What are the coordinates of point D ?



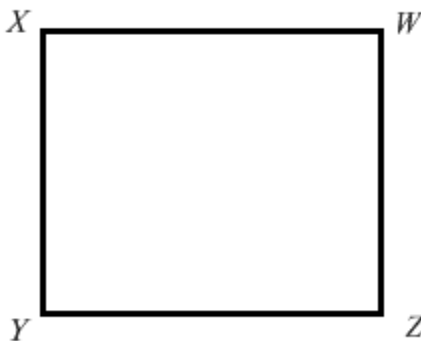
13. Triangle ABC and XYZ are similar.



What is the length of \overline{YZ} ?

- a. 4.8 m b. 5.2 m c. 9 m d. 10 m

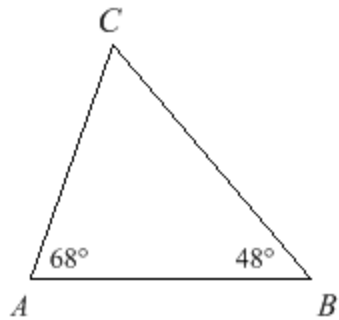
14. In rectangle $XYWZ$, $XY = 20$ cm, $XZ = 29$ cm. Find YZ .



15. The radius of Circle 1 is twice the radius of Circle 2. What is the ratio of the area of Circle 1 to the area of Circle 2?

- a.** 2:1 **b.** 3:1 **c.** 4:1 **d.** 8:1

16. What is the measure of angle C in the triangle below?



17.

R

Flip the figure shown above across a horizontal line. Then rotate its image 90° clockwise. What does the final image look like?

a.

R

b.

R

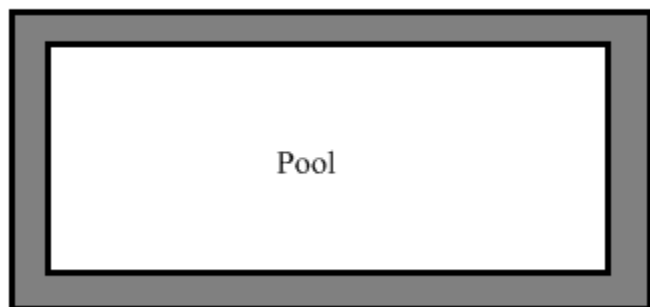
c.

R

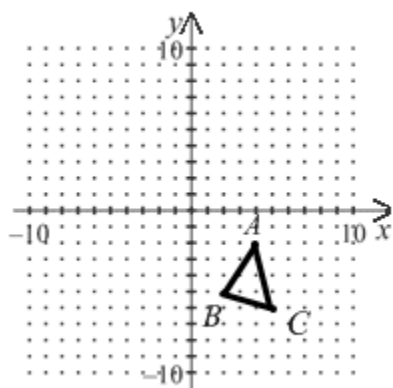
d.

R

18. A swimming pool is 30 feet wide and 80 feet long. The pool is surrounded by a deck that is 5 feet wide on all four sides. Find the area of the deck.

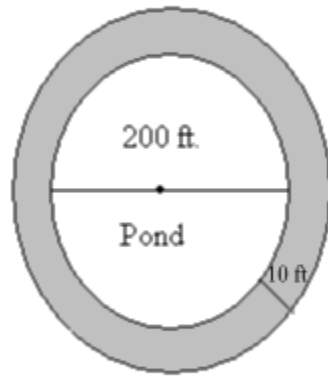


19. Chelsea drew triangle ABC so that the vertices are at points $A(4, -2)$, $B(2, -5)$, and $C(5, -6)$ as shown in the coordinate grid below.



- Draw the reflection of triangle ABC across the x -axis to form triangle $A'B'C'$. List the coordinates for points A' , B' , C' .
- Now draw the reflection of triangle $A'B'C'$ across the y -axis to form triangle $A''B''C''$. List the coordinates for points A'' , B'' , C'' .

20. The diagram below shows the circular surface of a pond being designed for a park and a walkway around the pond. The diameter of the surface of the pond will be approximately 200 feet.



a. Based on the diameter, what will be the circumference, in feet, of the surface of the pond? Show or explain how you got your answer. (Use 3.14 for π)

b. What will be the area, in square feet, of the surface of the pond? Show or explain how you got your answer.

c. As the diagram shows, a walkway 10 feet wide is being designed to go around the pond. What will be the area, in square feet, of the walkway? Show or explain how you got your answer.