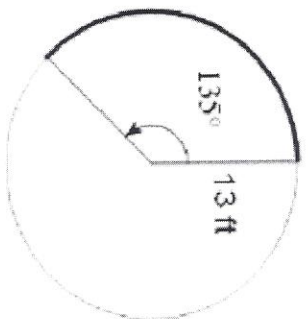


1. What is the arc length for the bold portion of the circle?

$$\frac{x}{2(13)\pi} = \frac{135}{360}$$

$$360x = 3510\pi$$

$$x = \frac{39\pi}{4}$$



A.  $\frac{39}{4}\pi$  ft

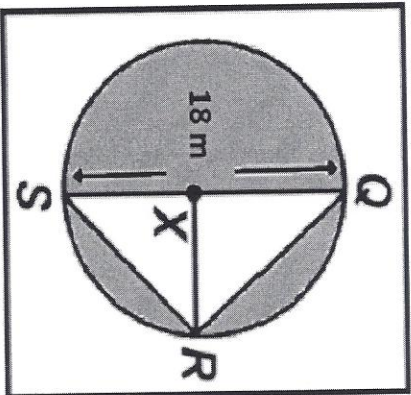
B.  $26\pi$  ft

C.  $\frac{13}{4}\pi$  ft

D.  $\frac{7}{6}\pi$  ft

2. Given:  $\overline{QS}$  is 18 meters.

What is the approximate length of  $\overline{QR}$ ?



$$\frac{x}{2(9)\pi} = \frac{90}{360}$$

$$360x = 1620\pi$$

$$x = \frac{9\pi}{2} \approx 14.13$$

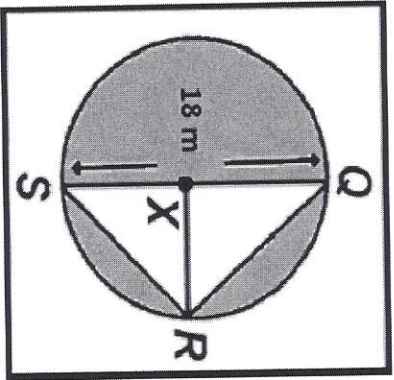
A. 35 m

B. 28 m

C. 14 m

D. 7 m

3. Given:  $\overline{QS}$  is 18 meters.



What is the approximate area of the shaded region of circle X?

$$\text{Area of Triangle: } A = \frac{1}{2}(18)(9) = 81$$

$$\text{Area of Circle: } A = \pi(9^2) = 81\pi$$

$$\text{Shaded Area: } 81\pi - 81 = 173.46$$

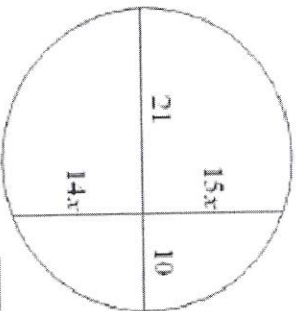
A.  $254 \text{ m}^2$

B.  $173 \text{ m}^2$

C.  $81 \text{ m}^2$

D.  $3.14 \text{ m}^2$

4. What is the value of  $x$ ?



$$(21)(10) = (15x)(14x)$$

$$210 = 210x^2$$

$$1 = x^2$$

$$1 = x$$

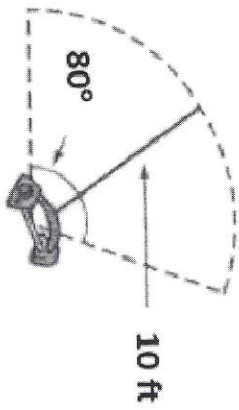
A. 6

B. 9

C. 1

D. 8

5. The sprinkler system shown below has a spray of 10 feet and is set to rotate  $80^\circ$ . What is the approximate area of grass that will be watered by the sprinkler?



A.  $800 \text{ ft}^2$

B.  $196 \text{ ft}^2$

C.  $70 \text{ ft}^2$

D.  $7 \text{ ft}^2$

$$\frac{x}{80} = \frac{360}{\pi(10^2)}$$

$$360x = 8000\pi$$

$$x = 69.8 \approx 70$$

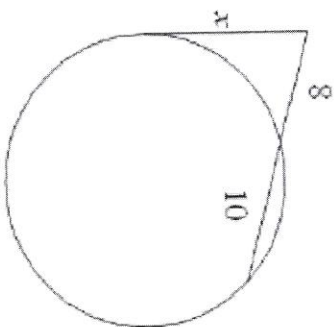
6. What is the approximate length of  $x$ ?

$$(x)(x) = 8(8 + 10)$$

$$x^2 = 8(18)$$

$$x^2 = 144$$

$$x = 12$$



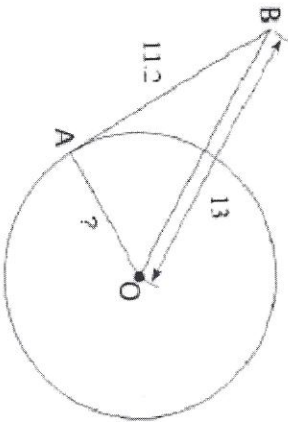
A. 5 units

B. 11 units

C. 9 units

D. 12 units

7. You are standing at point B. Point B is 13 feet from the center of the circular water storage tank and 11.2 feet from point A.  $\overline{AB}$  is tangent to circle O at A. Find the radius of the tank.



$$x^2 + 11.2^2 = 13^2$$

$$x^2 = 43.56$$

$$x = 6.6$$

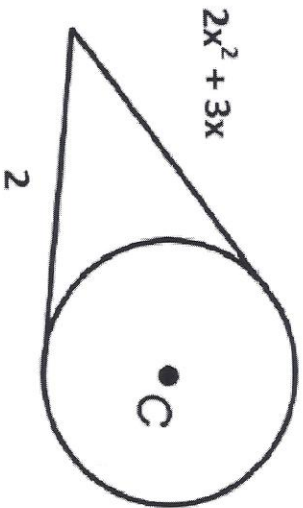
A. 6.4 ft

B. 6.6 ft

C. 8 ft

D. 8.9 ft

8. In the diagram below, the segments are tangent to circle C. What is the value of  $x$ ?



$$2x^2 + 3x = 2$$

$$2x^2 + 3x - 2 = 0$$

$$(2x - 1)(x + 2) = 0$$

$$x = \frac{1}{2}, -2$$

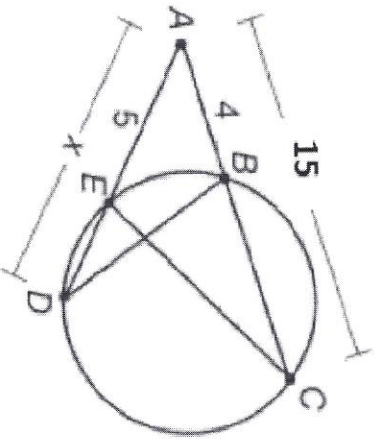
A. -3, 8

B. -2,  $\frac{1}{2}$

C. -2,  $\frac{4}{3}$

D.  $-\frac{1}{2}$ , 2

9. In this diagram,  $\overline{AC}$  and  $\overline{AD}$  are secants drawn to the circle from point A. Points B, C, D, and E lie on the circle. The length of AD is represented by x. What is the value of x?



$$4(15) = 5(x)$$

$$60 = 5x$$

$$12 = x$$

A. 12 units

B. 10 units

C. 8 units

D. 3 units

10. The surface area of a sphere is  $144\pi \text{ m}^2$ . What is the volume of the sphere?

$$SA = 4\pi r^2$$

$$144\pi = 4\pi r^2$$

$$36 = r^2$$

$$6 = r$$

$$V = \frac{4}{3}\pi r^3$$

$$V = \frac{4}{3}\pi(6)^3$$

$$V = 288\pi$$

A.  $288\pi \text{ m}^3$

B.  $432\pi \text{ m}^3$

C.  $972\pi \text{ m}^3$

D.  $1,082\pi \text{ m}^3$

11. A quiche is cut into 16 congruent pieces. The sector area of one piece of cake is  $4\pi \text{ in}^2$ . What is the diameter of the cake?

$$\frac{360}{16} = 22.5$$

$$\frac{4\pi}{\pi r^2} = \frac{22.5}{360}$$

$$r^2 = 64$$

$$r = 8$$

$$d = 2r$$

$$d = 2(8)$$

$$d = 16$$

A. 64 in

B. 16 in

C. 8 in

D. 4 in

12. The surface area of a sphere is  $64\pi$  square meters. What is the radius of the sphere?

$$SA = 4\pi r^2$$

$$64\pi = 4\pi r^2$$

$$16 = r^2$$

$$4 = r$$

A. 16 m

B. 8 m

C. 4 m

D. 2 m

13. A pastry chef uses spherical molds to make solid chocolate candies. Each candy has a diameter of 5 centimeters. If the chef makes 1,500 cubic centimeters of melted chocolate, what is the maximum number of candies she can make?

$$V_{\text{each candy}} = \frac{4}{3}\pi r^3 \quad \# \text{ of candy} = \frac{1500}{65.45}$$
$$V_{\text{each candy}} = \frac{4}{3}\pi(2.5)^3 \quad \# \text{ of candy} = 23.07 \approx 23$$
$$V_{\text{each candy}} = 65.45$$

A. 500

B. 300

C. 23

D. 3

14. What is the approximate volume of a sphere with a diameter of 12 inches.

$$V = \frac{4}{3}\pi r^3$$
$$V = \frac{4}{3}\pi(6)^3$$
$$V = 288\pi \approx 904.77$$

A. 452 in<sup>3</sup>

B. 1810 in<sup>3</sup>

C. 905 in<sup>3</sup>

D. 7238 in<sup>3</sup>

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15. The diameter of a sphere is tripled. What will happen to the volume of the sphere?

A. It will be 27 times the original volume.

$$3^3 = 27$$

B. It will be 9 times the original volume.

C. It will be 3 times the original volume.

D. It will be the same as the original volume.

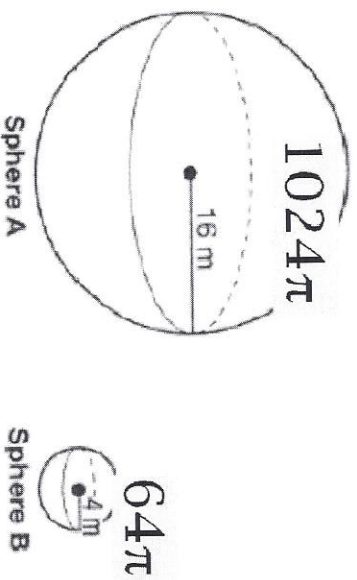
16. How does the surface area of sphere B compare to the surface area of sphere A?

A. It is 4 of the surface area of sphere A.

B. It is  $\frac{1}{4}$  of the surface area of sphere A.

C. It is  $\frac{1}{16}$  of the surface area of sphere A.

D. It is  $\frac{1}{64}$  times the surface area of sphere A.

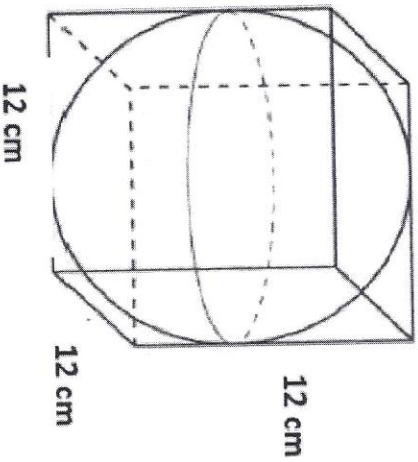


$$\frac{64\pi}{1024\pi} = \frac{1}{16}$$

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17. A spherical ball is placed in a cube-shaped box as pictured below. The sphere touches the edge of the box on all sides. To the nearest cubic centimeter, what is the volume of the empty space in the box?



$$\text{Vol. of box} = l(w)(h)$$

$$\text{Vol. of box} = (12)(12)(12) = 1728$$

$$\text{Vol. of sphere :}$$

$$v = \frac{4}{3}\pi r^3$$

$$v = \frac{4}{3}\pi(6)^3$$

$$v = 288\pi$$

$$\text{Vol. of empty} = 1728 - 288\pi = 823.22$$

A. 1,728 cm<sup>3</sup>

B. 1276 cm<sup>3</sup>

C. 905 cm<sup>3</sup>

D. 823 cm<sup>3</sup>