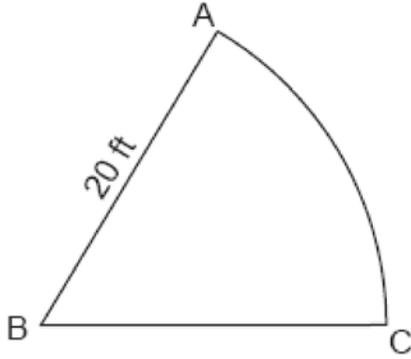


**A2.A.61: Arc Length 1: Determine the length of an arc of a circle, given its radius and the measure of its central angle**

- 1 A sprinkler system is set up to water the sector shown in the accompanying diagram, with angle  $ABC$  measuring 1 radian and radius  $AB = 20$  feet.



What is the length of arc  $AC$ , in feet?

- 1) 63
  - 2) 31
  - 3) 20
  - 4) 10
- 2 A circle has a radius of 4 inches. In inches, what is the length of the arc intercepted by a central angle of 2 radians?
- 1)  $2\pi$
  - 2) 2
  - 3)  $8\pi$
  - 4) 8

- 3 Jack wants to plant a border of flowers in the shape of an arc along the edge of a circular walkway. If the circle has a radius of 5 yards and the angle subtended by the arc measures  $1\frac{1}{2}$  radians, what is the length, in yards, of the border?

- 1) 0.5
- 2) 2
- 3) 5
- 4) 7.5

- 4 A wheel has a radius of 18 inches. Which distance, to the *nearest inch*, does the wheel travel when it rotates through an angle of  $\frac{2\pi}{5}$  radians?

- 1) 45
- 2) 23
- 3) 13
- 4) 11

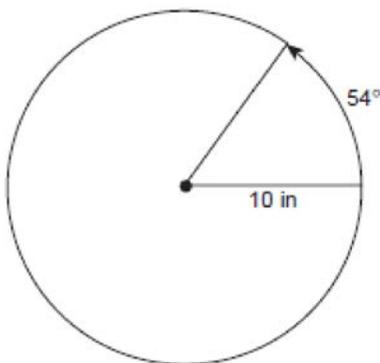
- 5 A circle is drawn to represent a pizza with a 12 inch diameter. The circle is cut into eight congruent pieces. What is the length of the outer edge of any one piece of this circle?

- 1)  $\frac{3\pi}{4}$
- 2)  $\pi$
- 3)  $\frac{3\pi}{2}$
- 4)  $3\pi$

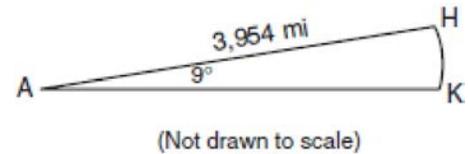
- 6 In a circle with a radius of 3 centimeters, find, in centimeters, the length of an arc intercepted by a central angle of 2 radians.

- 7 In a circle of radius 8, find the length of the arc intercepted by a central angle of 1.5 radians.
- 8 In a circle whose radius is 10, what is the length of the arc intercepted by a central angle of 4 radians?
- 9 Circle  $O$  has a radius of 10. Find the length of an arc subtended by a central angle measuring 1.5 radians.
- 10 Express, in terms of  $\pi$ , the length of the arc intercepted by a central angle of  $\frac{\pi}{6}$  radian in a circle with radius 30.

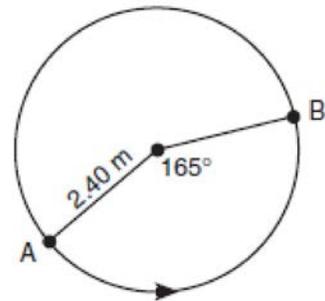
- 11 A ball is rolling in a circular path that has a radius of 10 inches, as shown in the accompanying diagram. What distance has the ball rolled when the subtended arc is  $54^\circ$ ? Express your answer to the *nearest hundredth of an inch*.



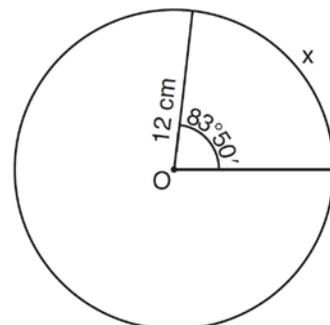
- 12 Cities  $H$  and  $K$  are located on the same line of longitude and the difference in the latitude of these cities is  $9^\circ$ , as shown in the accompanying diagram. If Earth's radius is 3,954 miles, how many miles north of city  $K$  is city  $H$  along arc  $HK$ ? Round your answer to the *nearest tenth of a mile*.



- 13 The accompanying diagram shows the path of a cart traveling on a circular track of radius 2.40 meters. The cart starts at point  $A$  and stops at point  $B$ , moving in a counterclockwise direction. What is the length of minor arc  $AB$ , over which the cart traveled, to the *nearest tenth of a meter*?



- 14 Circle  $O$  shown below has a radius of 12 centimeters. To the *nearest tenth of a centimeter*, determine the length of the arc,  $x$ , subtended by an angle of  $83^\circ 50'$ .



**A2.A.61: Arc Length 1: Determine the length of an arc of a circle, given its radius and the measure of its central angle****Answer Section**

1 ANS: 3

$$s = \theta r = 1 \cdot 20 = 20$$

REF: 060818b

2 ANS: 4

$$s = \theta r = 2 \cdot 4 = 8$$

REF: fall0922a2

3 ANS: 4

$$s = \theta r = 1 \frac{1}{2} \cdot 5 = 7.5.$$

REF: 010806b

4 ANS: 2

$$s = \theta r = \frac{2\pi}{5} \cdot 18 \approx 23$$

REF: 011526a2

5 ANS: 3

$$s = \theta r = \frac{2\pi}{8} \cdot 6 = \frac{3\pi}{2}$$

REF: 061212a2

6 ANS:

6

REF: 068514siii

7 ANS:

12

REF: 068713siii

8 ANS:

40

REF: 010415siii

9 ANS:

15

REF: 069714siii

10 ANS:

 $5\pi$ 

REF: 089313siii

11 ANS:

$$9.42. \quad 54 \cdot \frac{\pi}{180} = \frac{3\pi}{10} \text{ radians. } s = \theta r = \frac{3\pi}{10} \cdot 10 = 3\pi \approx 9.42.$$

REF: 010223b

12 ANS:

$$621.1. \quad 9 \cdot \frac{\pi}{180} = \frac{\pi}{20} \text{ radians. } s = \theta r = \frac{\pi}{20} \cdot 3954 \approx 621.1.$$

REF: 080426b

13 ANS:

$$6.9. \quad 165 \cdot \frac{\pi}{180} = \frac{11\pi}{12} \text{ radians. } s = \theta r = \frac{11\pi}{12} \cdot 2.4 \approx 6.9.$$

REF: 080524b

14 ANS:

$$83^\circ 50' \cdot \frac{\pi}{180} \approx 1.463 \text{ radians } s = \theta r = 1.463 \cdot 12 \approx 17.6$$

REF: 011435a2