

Find the degree measure of each angle expressed in radians and find the radian measure of each angle expressed in degrees. (Express radian measures in terms of π .)

1. 110°

2. $\frac{\pi}{3}$ radians

3. -90°

4. $\frac{4\pi}{3}$ radians

5. 315°

6. $-\frac{3\pi}{2}$ radians

7. Find the arc length if the radius of a circle is 10 feet and the central angle is $\frac{13\pi}{30}$. Write the answer in terms of π and give a decimal approximation to the nearest thousandth.

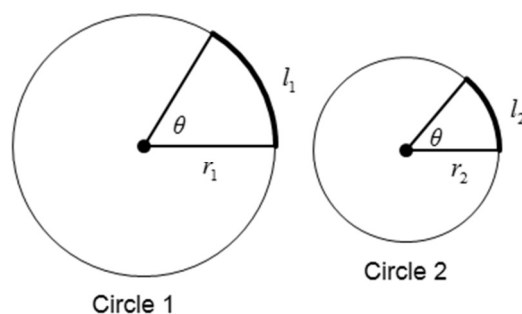
8. Find the arc length if the radius of a circle is 10 feet and the central angle is 78° . Write the answer in terms of π and give a decimal approximation to the nearest thousandth.

9. Explain why the arc lengths in #7 and #8 are the same.

10. Find the arc length if the radius of a circle is 8 meters and the central angle is 60° . Write the answer in terms of π and give a decimal approximation to the nearest thousandth.

11. Find the arc length if the diameter of a circle is 24 cm and the central angle is $\frac{8\pi}{6}$. Write the answer in terms of π and give a decimal approximation to the nearest thousandth.

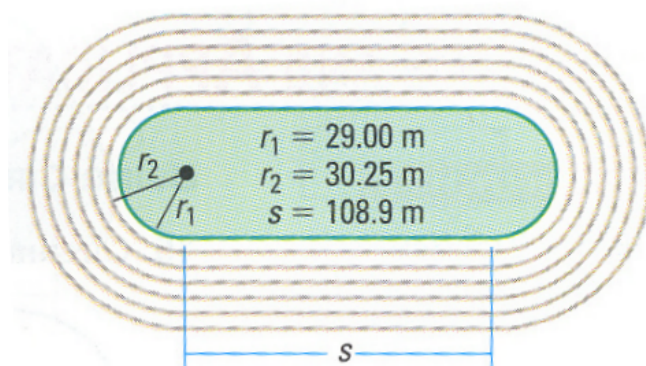
12. In the diagram on the right, θ is the same in Circle 1 as it is in Circle 2. Given that the radius of Circle 1 is 20 cm, the radius of Circle 2 is 15 cm, and l_1 is 30 cm, find l_2 to the nearest tenth.



13. The track shown has six lanes. Each lane is 1.25 meters wide. There is a 180° arc at each end of the track. The radii for the arcs in the first two lanes are given.

a. Find the distance around Lane 1.

b. Find the distance around Lane 2.



Challenge: Find the distance around Lane 6.

Given the radius and the central angle, find the area of the sector of the circle. Express your answer in terms of π and give a decimal approximation to the nearest thousandth.

14. A radius of 3 feet and a central angle of 135° .

15. A diameter of 10 meters and a central angle of 270° .

16. A radius of 4 centimeters and a central angle of $\frac{3\pi}{2}$.

17. A radius of 23 millimeters and a central angle of $\frac{7}{8}\pi$.

18. A lighthouse projects a beam of light that can be seen from up to 4 miles away and covers an angle of 35° . What is the area of the region from which a ship can see the light from the lighthouse?