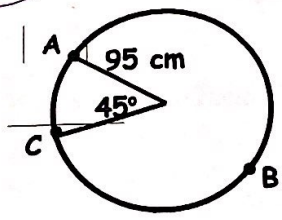
Name Key

Arc length and sector area applications

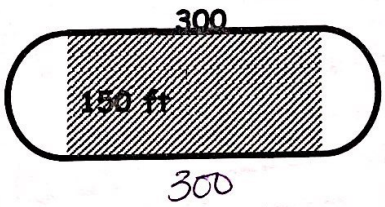
1. The path traced by a golfer's club when he hits the ball is the arc of a circle. If the golf club is 95 cm long, calculate the distance travelled by the head of the club when the golfer swings his club, $\overset{\frown}{CBA}$.



$\theta = 315°$ $AL = \frac{2\pi(95)(315°)}{360}$

$AL \approx 522.3$ cm

2. The diagram below shows a running track composed of a rectangle and semi-circular ends. The shaded portion measures 150 ft by 300 ft. Find the total perimeter of the track.

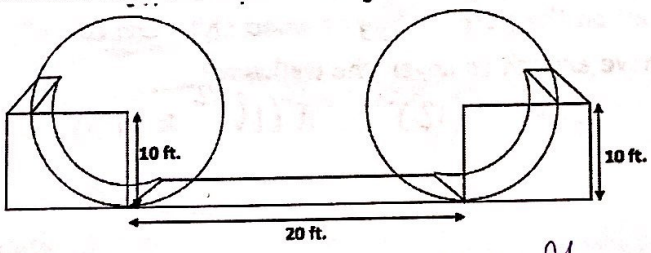


$d = 150$
$r = 75$

$C = \pi(150)\pi$

$300 + 300 + 150\pi \approx 1071.2$ ft

3. The parks department is constructing a skateboarding half-pipe ramp formed by two quarter circle ramps, each of which is 10 feet high, plus a flat space 20 feet long between the centers. Find the distance a skater travels from the top of one ramp to the top of the other.

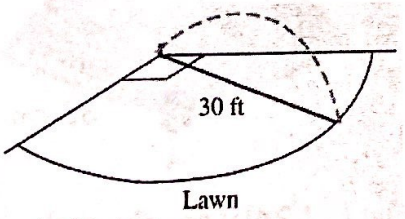


$20 + \frac{1}{4}$ circle $+ \frac{1}{4}$ circle

$20 + \frac{2\pi(10)180}{360} \approx 51.4$ ft

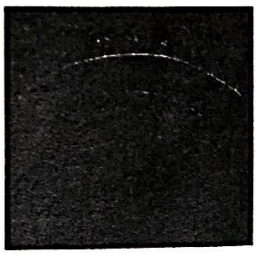
$r = 10$ ft

4. A lawn sprinkler located at the corner of a yard is set to rotate through 90° and project water out 30 feet. What area of the lawn is watered by the sprinkler?



$SA = \frac{\pi 30^2(90)}{360} \approx 706.9$ ft^2

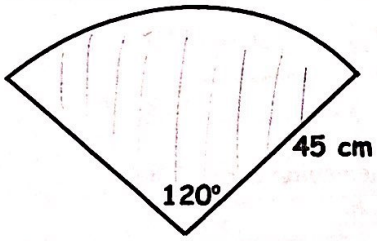
5. An aircraft weather radar scans a 60° sector with a radius of 76 miles. How much of the sky can the pilot see when he looks at the radar?



$SA = \frac{\pi(76)^2(60)}{360}$

$\approx 3024.3 \text{ mi}^2$

6. A windshield wiper is 45 cm long. In one sweep, it turns through an angle of 120°. Calculate the area it covers in one sweep.



$SA = \frac{\pi(45)^2(120)}{360}$

$\approx 2120.6 \text{ cm}^2$

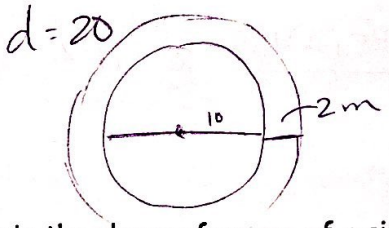
7. A windshield wiper wipes through angle of 120° and clears an area of 368 square inches. How long is the windshield wiper?

$368 = \frac{\pi r^2(120)}{360}$

$351.4 = r^2$

$r = 18.7$ inches

8. A circular pool with a diameter of 20 meters has circular walkway around it with a width of two meters. Wood chips are going to be purchased to spread out on the path. A bag of wood chips can cover 5 square meters. How many bags should be purchased to have enough to cover the walkway?



$r = 12$ m $\quad A = \pi(12)^2 - \pi(10)^2 \approx 138.2 \text{ m}^2$

$\div 5$

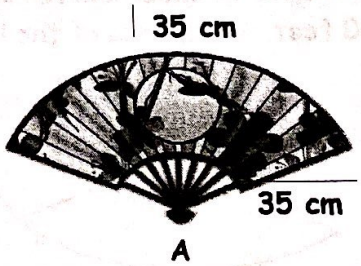
27.6 bags

28 bags

9. A fan is in the shape of an arc of a circle with radius 35 cm. If the arc length is 35 cm, find the measure of angle A.

$35 = \frac{2\pi 35(\theta)}{360}$

$\theta \approx 57.3°$



A

NOTE: You have just found the approximate number of degrees corresponding to 1 RADIAN, the angle created when the arc length = radius. You will learn much more about radians in Advanced Algebra.