Arcs and Sectors

Recall from the definition, the formula for a radian, is the arc length divided by the radius. This formula will allow us to solve problems that involve the radius, arc length, and central angle (in radians).

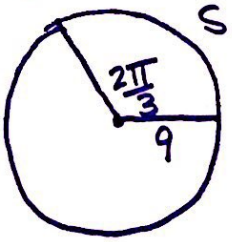
$\theta = \frac{s}{r}$ → multiply by r → $s = \theta r$

↓ divide by θ

$r = \frac{s}{\theta}$

* This formula only works if the angle is in radian measure.

Example 1: On a circle with radius 9 inches, find the length of the arc intercepted by a central angle of $\frac{2\pi}{3}$ radians.

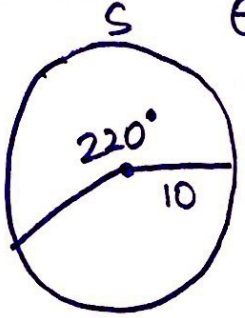


$s = \theta r$

$s = \frac{2\pi}{3}(9)$

$s = 18.8$ in

Example 2: On a circle with radius 10 cm, find the length of the arc intercepted by a central angle of 220°.

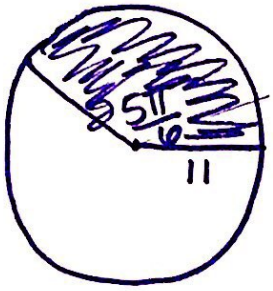


$\theta = 220° \cdot \frac{\pi}{180°} = \frac{11\pi}{9}$

$s = \frac{11\pi}{9}(10)$

$s = 38.4$ Cm

Example 3: For a circle with radius 11 cm, find the area of the sector created by a central angle of $\frac{5\pi}{6}$ radians.



$A = \frac{1}{2}r^2\theta$

$A = \frac{1}{2}(11)^2\left(\frac{5\pi}{6}\right)$

$A = 158.4\ cm^2$

HW: p. 238: 27-33, 43-54