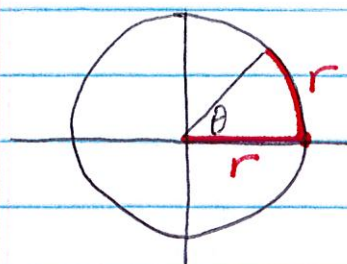


Trigonometry

Radian measure - another way to measure angles



$$\theta = 1 \text{ radian}$$

$$180^\circ = \pi \text{ radians}$$

Conversions

Radians to degrees \rightarrow multiply by $\frac{180^\circ}{\pi}$

Degrees to radians \rightarrow multiply by $\frac{\pi}{180^\circ}$

Ex: ① Convert 135° to radians.

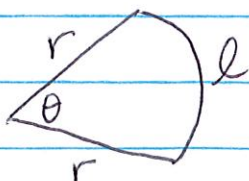
$$\frac{135^\circ \times \pi}{180^\circ} = \frac{135\pi}{180} = \frac{3\pi}{4}$$

② Convert $\frac{\pi}{8}$ to degrees.

$$\frac{\pi}{8} \cdot \frac{180^\circ}{\pi} = \frac{180^\circ}{8} = \frac{45^\circ}{2}$$

Arc Length

- the fraction of the circle's circumference ($C = 2\pi r$)



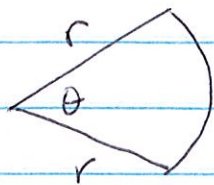
$$l = \frac{\theta}{180} \cdot 2\pi r = \frac{\theta}{180} \pi r \text{ (degrees)}$$

$$l = \frac{\theta}{2\pi} \cdot 2\pi r = \boxed{\theta r} \text{ (radians)}$$

on formula sheet

Area of a Sector

- fraction of the circle's area



$$A = \frac{\theta}{360} \cdot \pi r^2 \quad (\theta \text{ in degrees})$$

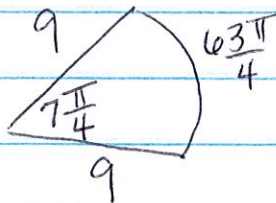
$$A = \frac{\theta}{2\pi} \cdot \pi r^2 = \frac{1}{2} \theta r^2 \quad (\text{in radians})$$

on formula sheet

1. a) $r = 9 \text{ cm}$
 $\theta = \frac{7\pi}{4}$

$$l = \theta r = \frac{7\pi}{4} \cdot 9 = \frac{63\pi}{4} \text{ cm}$$

$$A = \frac{1}{2} \theta r^2 = \frac{1}{2} \cdot \frac{7\pi}{4} (9)^2 = \frac{567\pi}{8} \text{ cm}^2$$



$$\text{Perimeter: } 9 + 9 + \frac{63\pi}{4}$$
$$= 18 + \frac{63\pi}{4}$$