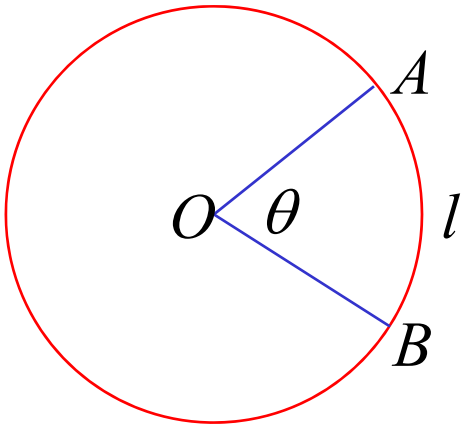
Arcs & Sectors



$C = 2\pi r$

$l = \frac{\theta}{2\pi} \times 2\pi r$

$l = r\theta$

$A = \pi r^2$

$A_{OAB} = \frac{\theta}{2\pi} \times \pi r^2$

$A_{OAB} = \frac{1}{2} r^2 \theta$

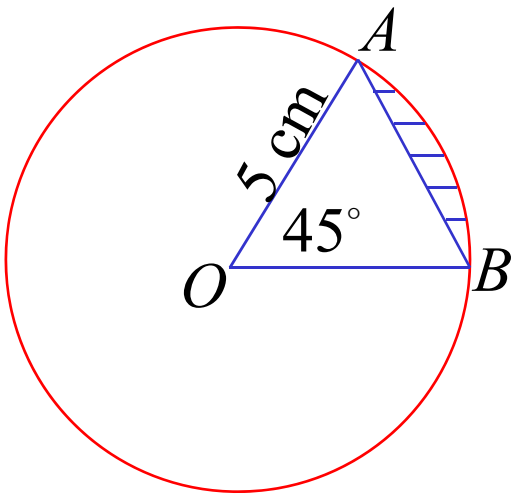
OAB is a sector

AB is an arc

Length of an arc; $l = r\theta$

Area of a sector; $A = \frac{1}{2} r^2 \theta$

e.g.



$$l_{AB} = r\theta$$
$$= 5\left(\frac{\pi}{4}\right)$$
$$= \frac{5\pi}{4}\text{ cm}$$

$$A_{OAB} = \frac{1}{2}r^2\theta$$
$$= \frac{1}{2}(5)^2\left(\frac{\pi}{4}\right)$$
$$= \frac{25\pi}{8}\text{ cm}^2$$

$$\text{Area minor segment}_{AB} = \frac{1}{2}r^2\theta - \frac{1}{2}r^2\sin\theta$$
$$= \frac{1}{2}r^2(\theta - \sin\theta)$$
$$= \frac{1}{2}(5)^2\left(\frac{\pi}{4} - \sin\frac{\pi}{4}\right)$$
$$= \frac{25}{2}\left(\frac{\pi}{4} - \frac{1}{\sqrt{2}}\right)$$
$$= \frac{25\pi\sqrt{2} - 100}{8\sqrt{2}}\text{ cm}^2$$

Exercise 11I; 2 to 18 evens, 19, 20