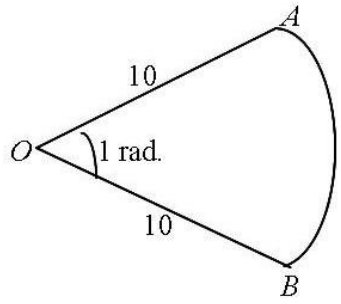
CHAPTER 8 : CIRCULAR MEASURES *(Sukatan Membulat)*

Topic 8 Circular Measures :::::::::: v 8.1 Length Of Arcs *(Panjang Lengkok)*



eg1 :

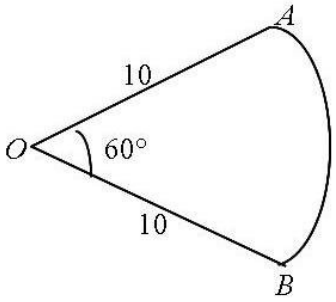
Length Of Arc $AB = r\theta$

$\widehat{AB} = 10 \times 1$ rad.

$\widehat{AB} = 10$ cm #

the value of θ must in radian except the infront of the θ have sign of sine, cosine, tangent

**Note:
Length Of Arc AB can be written as $\widehat{AB}$



eg2 :

$\widehat{AB} = r\theta$

$\widehat{AB} = 10 \times \left(\frac{60°}{180°} \times \pi \text{ rad.} \right)$.

$\widehat{AB} = 10.47$ cm (2d.p.) #

**
π rad. $= 180°$

$\theta = \frac{360}{180} \times \pi$ rad.

$\theta = 2\pi$

Circumference $= r\theta$

$= r(2\pi)$

$= 2\pi r$ #

Note:

(*i*) Convert degrees (°) and minutes(') to radian

$68°27' = \frac{68°27'}{180°} \times \pi$ rad.

$= 1.195$ (3d.p.) #

(*ii*) Convert radian to degrees (°) and minutes(')

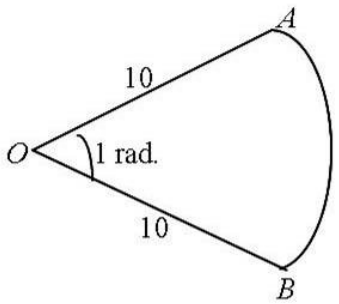
2 rad. $= \frac{2 \text{ rad.}}{\pi \text{ rad.}} \times 180°$

$= 114°35'$ #

**
$180° = \pi$ rad.

$1° = \frac{\pi \text{ rad.}}{180°}$

Topic 8 Circular Measures :::::::::: v 8.2 Area Of Sector *(Luas Sektor)*

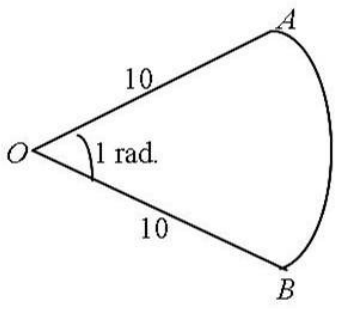


eg1 :

Area Of Sector $= \frac{1}{2} r^2 (\theta \text{ rad.})$

Area Of Sector $= \frac{1}{2}(10)^2 (1 \text{ rad.})$

$= 50 \text{ cm}^2$ #



eg2 :

Radian Method :

$$\text{Area Of Sector} = \frac{1}{2}(10)^2\left(\frac{60^\circ}{180^\circ}\times \pi \text{ rad.}\right)$$
$$= \underline{50 \text{ cm}^2 \#}$$

Degrees Method : use the formula $= \frac{\theta^\circ}{360^\circ}\times \pi r^2$

$$\text{Area Of Sector} = \frac{60^\circ}{360^\circ}\times \pi r^2$$
$$= \frac{1}{6}\times \pi (10)^2$$
$$= 52.35987756$$
$$= \underline{52.36(4s.f.)\#}$$

Proof the $A = \frac{1}{2}r^2(\theta \text{ rad.})$ and $A = \frac{x}{360^\circ}\times \pi r^2$

$A = \frac{x}{360}\times \pi r^2$ .....[1]

Angle in radian, $\theta = \frac{x\times \pi}{180^\circ}$

$x = \frac{\theta\times 180^\circ}{\pi}$ .....[2]

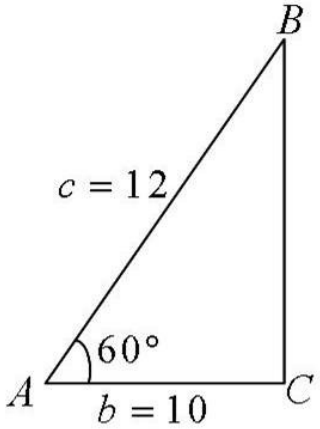
Substitute [2] into [1],

$$A = \frac{\left(\frac{\theta\times 180^\circ}{\pi}\right)}{360^\circ}\times \pi r^2$$

$$A = \frac{\theta\times 180^\circ}{\pi}\times \frac{1}{360^\circ}\times \pi r^2$$

$A = \frac{1}{2}\theta r^2$ [area of sector in radian]

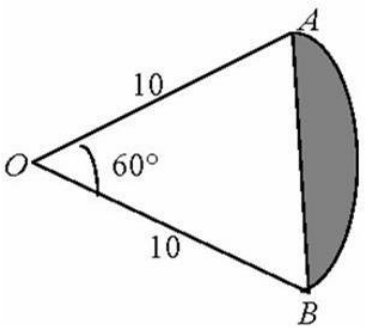
Topic 8 Circular Measures :::::::::: v 8.4 Area Of Triangles & Area Of a Segments *(Luas Segitiga & Luas Tembereng)*



eg :

$\text{Area Of Triangle} = \frac{1}{2}bc\sin A$

$$\text{Area Of Triangle} = \frac{1}{2}(10)(12)\sin(60^\circ)$$
$$= \underline{51.96 \text{ cm}^2 (2d.p.)\#}$$



eg :

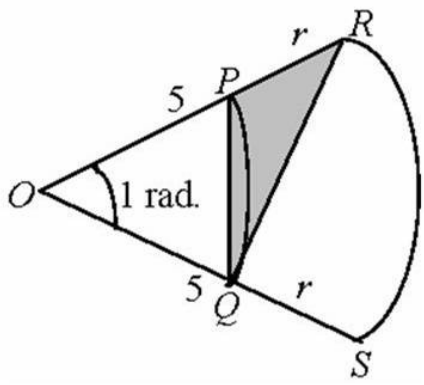
Area Of A Segments = Area Of Sector – Area Of Triangles

$$= \frac{1}{2}r^2(\theta \text{ rad.}) - \frac{1}{2}r^2 \sin\theta°$$

$$\boxed{\text{Area Of A Segments} = \frac{1}{2}r^2[\theta \text{ rad.} - \sin\theta°]}$$

$$\text{Area Of A Segments} = \frac{1}{2}(10)^2\left[\left(\frac{60\times\pi}{180}\right) - \sin 60°\right]$$

$$= \underline{9.06 \text{ cm}^2 (2d.p.)\#}$$



eg :

The diagram shows a arcs PQ and RS for 2 circle with centre O. Given that $OP = OQ = 5$ cm, $PR = QS$ and RQ are perpendicular with the OQ. If the length of arc RS : the length of $PQ = 3:1$ and $\theta = 1$ rad.. Find the length of PR.

Solution :

$$\frac{\widehat{RS}}{\widehat{PQ}} = \frac{3}{1}$$

$$\frac{(5+r)(1)}{(5)(1)} = \frac{3}{1}$$

$$5 + r = 15$$

$$r = 10 \text{ cm}$$

$$PR = QS = 10 \text{ cm}$$

END OF TOPIC 8: CIRCULAR MEASURES