

Finding the Area of a Segment

Formula for the area of a segment:-

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

or $A = \frac{1}{2} r^2 (\theta - \sin \theta)$

where r = radius, θ = angle at centre

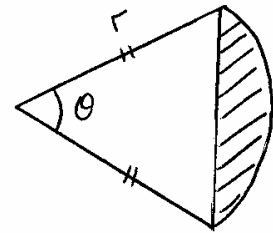
Why?

Area of segment = Area of sector – area of a triangle

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

as a and $b = r \quad \therefore ab = r^2$

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



Example 1.

Find the area of the shaded segment.

$$A = \frac{1}{2} r^2 (\theta - \sin \theta) \quad \text{where } r = 9\text{cm and } \theta = \frac{\pi}{6}$$

$$A = \frac{1}{2} \times 9^2 \times \left(\frac{\pi}{6} - \sin \frac{\pi}{6} \right)$$

$$A = 40.5 \times (0.023598775)$$

$$A = 0.95575 \text{ (5sf)}$$

