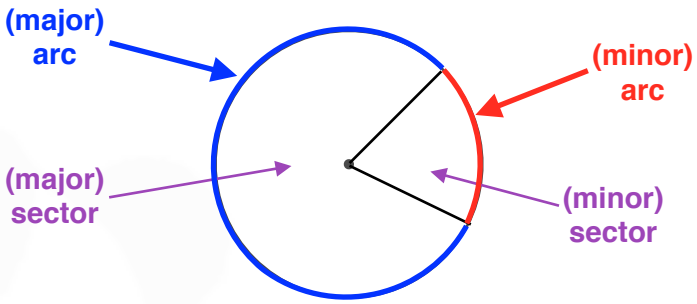
# Area of a Sector

**Starter**

***There is no need to draw this diagram again.***

***N.B.*** A ***sector*** is like a ***pizza slice***

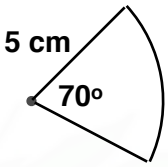



1. Give that:

$$\text{length of arc} = \frac{\theta}{360} \times \text{circumference} \quad \textit{or} \quad \text{length of arc} = \frac{\theta}{360} \times 2\pi r,$$

find similar expressions for the area of a sector.

2. Find the area of the sector. Give your answer in terms of $\pi$.




**Notes**

***Arcs*** are connected to ***circumferences***

so $\times 2\pi r$

$$\text{Length of arc} = \frac{\theta}{360} \times \text{circumference}$$

$$\text{Length of arc} = \frac{\theta}{360} \times 2\pi r$$

***Sectors*** are connected to ***areas of a circle***

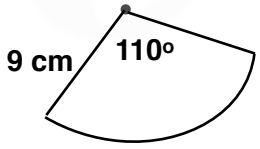
so $\times \pi r^2$

$$\text{Area of sector} = \frac{\theta}{360} \times \text{area of circle}$$

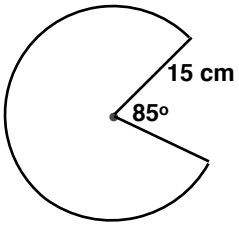
$$\text{Area of sector} = \frac{\theta}{360} \times \pi r^2$$

***E.g. 1*** Find the area of the sector, giving your answer in terms of $\pi$.

(a)




(b)

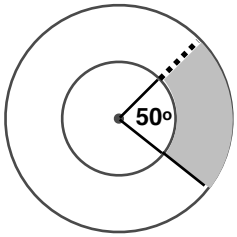



***Working:*** (a) $\text{Area of sector} = \frac{\theta}{360} \times \pi r^2 = \frac{110}{360} \times \pi \times 9^2 = \frac{99\pi}{4}$

***E.g. 2*** A sector has area $\frac{3\pi}{8}$ cm$^2$ and its radius is $3$ cm. Find the angle subtended at the centre.

***E.g. 3*** The angle subtended at the centre of a sector is $300^o$. Given that the area of the sector is $\frac{40\pi}{3}$ cm$^2$, find the radius of the sector.

***E.g. 4*** Find the value of the shaded area.
The radius of the outer circle is 7 cm.
The radius of the inner circle is 3 cm.




Video: Area of a sector

Solutions to Starter and E.g.s

**Exercise**

| | |
|---|---|
| 9-1 class textbook: | p432 M13.3 Qu 1-13 |
| A*-G class textbook: | p387 E13.3 Qu 1-10 |
| 9-1 homework book: | p148 M13.3 Qu 1-6 |
| A*-G homework book: | p108 E13.3 Qu 1-6 |

**Summary**

***Arcs*** are connected to ***circumferences***

Length of arc $= \frac{\theta}{360} \times$ circumference

Length of arc $= \frac{\theta}{360} \times 2\pi r$

***Sectors*** are connected to ***areas of a circle***

Area of sector $= \frac{\theta}{360} \times$ area of circle

Area of sector $= \frac{\theta}{360} \times \pi r^2$

Homework book answers (only available during a lockdown)