Guide to:
Sector areas and arc lengths

maths Links

Explanation:

A sector with angle **θ°** at the centre is the fraction $\frac{\theta}{360}$ of a full circle of radius **r**: **Arc Length =** $\frac{\theta}{360} \times$ **2πr** and **Area of Sector =** $\frac{\theta}{360} \times \pi r^2$.

Be careful when asked for the **perimeter of a sector**: the curved arc is only part of the boundary, so you must add the two straight radii as well (**Perimeter = Arc Length + 2r**).

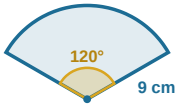
Example 1: Find the area of a sector with radius **9 cm** and angle **120°**. Give your answer in terms of π and to 1 d.p.

Solution:

Area = $\frac{120}{360} \times \pi \times 9^2$

$= \frac{1}{3} \times 81\pi =$ **27π cm^2**

Ans: 27π cm^2 (84.8 cm^2)



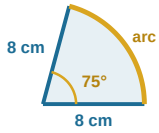
Example 2: Work out the total **perimeter** of a sector with radius **8 cm** and angle **75°** (to 1 d.p.).

Solution:

Arc = $\frac{75}{360} \times 2\pi(8) =$ **10.47 cm**

Add radii: 10.47 + 8 + 8

Answer: 26.5 cm (1 d.p.)



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