AQA · GCSE · MATHEMATICS • EXERCISE SHEET

4.2.7 Sector Measure

Name: _____ Class: _____ Date: _____

KEY WORDS sector

<!– Session 2 native-skill companion –>

Objective

Practise sector measure within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Arcs, sectors and reverse angle calculations · Foundation

For an angle θ in degrees, fraction of a turn is $\theta/360$. Arc length is this fraction of $2\pi r$ and sector area is this fraction of πr^2. Sector perimeter adds the two radii. Rearrange the same fraction to recover an angle from an arc or an area. Keep degree and length units separate.

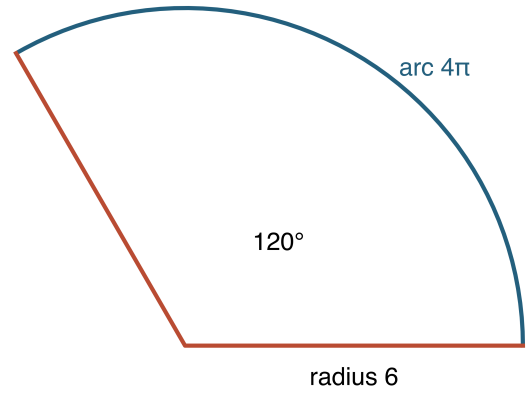
$$s = \frac{\theta}{360^\circ} 2\pi r, \quad A = \frac{\theta}{360^\circ} \pi r^2$$

At r=6 cm and θ=120°, the fraction is 1/3: arc is 4π cm, area is 12π cm^2 and perimeter is 4π+12 cm. If another r=6 sector has area 9π cm^2, its fraction is $9\pi/36\pi$=1/4 and angle is 90°. If its arc instead measures 3π cm, its fraction is $3\pi/12\pi$=1/4, giving the same angle. A full 360° sector has the whole circle area, while the circle boundary has no extra radii. A 60° sector of radius 3 has area (1/6)×9π=1.5π cm^2.

An arc length is not a sector perimeter. Use the angle as a fraction of 360°, not 180°. Radius is squared only for area, not arc length.

AQA G18 includes arc lengths, sector angles and areas in degree-based geometry. Show the full-circle quantity and fraction before multiplying, then check that the result fits the angle.

One third of a turn: sector area 12π



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Foundation) For r=6,θ=120°, find the coefficient of pi in arc length.

2.2 (Foundation) Find the coefficient of pi in its area.

2.3 (Foundation) Find θ for r=6 sector area 9π.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: A sector's arc length and perimeter are always the same.

Solutions

2.1 $(120/360)\times 2\times 6=4$.

2.2 $(120/360)\times 6^2=12$.

2.3 9/36 of a turn: $360\times 1/4=90°$.

3.1 False. A radius-6 sector with angle 120° has arc length 4π. Its perimeter adds two radii and is $4\pi+12$.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.