FOUNDATION & HIGHER

SAME AT BOTH TIERS

Name ..... Class .....

G18: Arcs and sectors

Reason with arc lengths and sector areas

20 marks · 25 minutes · Calculator allowed

1) Explain why the arc length of a sector is $\frac{\theta}{360} \times 2\pi r$.

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[Question 1: 2 marks]

2) Show that a 90° sector with radius 4 cm has arc length 2π cm.

[Question 2: 2 marks]

3) Kim says the perimeter of a sector is its arc length. Explain her mistake.

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[Question 3: 2 marks]

4) Show that a sector with radius 6 cm and angle 60° has area 6π cm^2.

[Question 4: 2 marks]

5) Explain why a sector with angle 180° is a semicircle.

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[Question 5: 1 marks]

6) Show that a sector with angle 72° is $\frac{1}{5}$ of a circle.

[Question 6: 1 marks]

7) Two sectors have the same radius and angles 40° and 80°. Explain why their areas are in the ratio 1 : 2

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[Question 7: 2 marks]

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8) A 90° sector has radius 2 cm. Show that the segment cut off by the chord has area $(\pi - 2)\,\text{cm}^2$.

[Question 8: 3 marks]

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9) A sector has area $12\pi\,\text{cm}^2$ and radius 6 cm. Show that its angle is 120°.

[Question 9: 2 marks]

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10) The radius of a sector is doubled but the angle stays the same. Explain what happens to its area.

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[Question 10: 2 marks]

11) Explain why an arc length uses the circumference formula and not the area formula.

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[Question 11: 1 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Explanation	Fraction of a full turn (C1); times full circumference (C1).
2	Shown	$\frac{1}{4} \times 8\pi$ (M1); C1.
3	Explanation	She has left out the two radii (C1); add $2r$ (C1).
4	Shown	$\frac{1}{6} \times 36\pi$ (M1); C1.
5	Explanation	Half a full turn (C1).
6	Shown	$\frac{72}{360}$ (C1).
7	Explanation	Area is proportional to angle (C1); $80 = 2 \times 40$ (C1).
8	Shown	Sector π (M1); triangle 2 (M1); C1.
9	Shown	$\frac{\theta}{360} \times 36\pi = 12\pi$ (M1); C1.
10	Multiplied by 4	Area depends on r^2 (C2).
11	Explanation	An arc is a length, part of the circumference (C1).