

Exercise walk-through

4.2.5

Circle Measure

AQA · GCSE · Mathematics

80. Circle parts and geometric definitions · Foundation

Circle parts and geometric definitions · Foundation

For centre O and radius 5 cm, every circumference point is 5 cm from O and the diameter is 10 cm. A chord 3 cm from O has half-length $\sqrt{(5^2-3^2)}=4$ cm, so its whole length is 8 cm. The perpendicular from O meets the chord at its midpoint. Joining the two chord endpoints to O creates a sector; the smaller region between chord and arc is a segment. At the rightmost circumference point, the vertical touching line is tangent and the horizontal radius is perpendicular to it. The circumference is a length, $2\pi r=10\pi$ cm, rather than an area.

118. Tangents, chords and the alternate segment · Higher

Tangents, chords and the alternate segment · Higher

At contact T, the radius OT is perpendicular to the tangent: a non-perpendicular line through T would have a smaller centre-to-line distance than the radius and cut the circle twice. For tangents PA and PB, $OA=OB$, OP is shared and both contact angles are 90° . RHS makes OAP and OBP congruent, so $PA=PB$. For a centre perpendicular OM to chord AB, $OA=OB$ and OM is shared; RHS gives $AM=MB$. If $OA=5$ and $OM=3$, $AM=4$, hence $AB=8$. For a chord AB with minor central angle ϕ , triangle OAB has base angle $(180-\phi)/2$.

152. Arcs, sectors and reverse angle calculations · Foundation

Arcs, sectors and reverse angle calculations · Foundation

At $r=6$ cm and $\theta=120^\circ$, the fraction is $1/3$: arc is 4π cm, area is 12π cm² and perimeter is $4\pi+12$ cm. If another $r=6$ sector has area 9π cm², 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 $(1/6)\times 9\pi=1.5\pi$ cm².

Exercises 2.1·2.3

2.1 (Foundation) Find the coefficient of π in area for radius 4.

2.2 (Foundation) Find the straight-edge contribution to the perimeter of an $r=4$ semi-circle.

2.3 (Foundation) Find the coefficient of π in annulus area for outer radius 5, inner radius 3.

3 Exam-style questions

Exercises 2.1·2.3

2.1 (Foundation) Find the coefficient of π in area for radius 4.

2.1 $r^2=16$.

2.2 (Foundation) Find the straight-edge contribution to the perimeter of an $r=4$ semi-circle.

2.2 Its straight edge is diameter $2r=8$.

2.3 (Foundation) Find the coefficient of π in annulus area for outer radius 5, inner radius 3.

3 Exam-style questions

2.3 Subtract squared radii: $25-9=16$.

Exercise 3.1

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: The complete perimeter of a semicircle is half a circle's circumference.

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3.1 False. Radius 4 gives curved length 4π , but the straight diameter adds 8. The full perimeter is $4\pi+8$.

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