

Exercise walk-through

4.2.1

Circle Parts

AQA · GCSE · Mathematics

78. Circle parts and geometric definitions · Foundation

Circle parts and geometric definitions · Foundation

A circle consists of points a fixed radius from its centre. A diameter is a chord through the centre and has length $2r$. A chord joins two circumference points; an arc is part of the circumference. A sector lies between two radii and an arc. A segment lies between a chord and an arc. A tangent touches at one point and is perpendicular to the radius there.

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 $(180-\phi)/2$.

Exercises 2.1·2.3

2.1 (Foundation) Find the diameter when radius is 5 cm.

2.2 (Foundation) Find the half-chord for radius 5 and perpendicular centre distance 3.

2.3 (Foundation) Find the whole chord length in that example.

3 Exam-style questions

Exercises 2.1·2.3

2.1 (Foundation) Find the diameter when radius is 5 cm.

2.1 Diameter = $2 \times 5 = 10$ cm.

2.2 (Foundation) Find the half-chord for radius 5 and perpendicular centre distance 3.

2.2 Use $\sqrt{(25-9)} = 4$ cm.

2.3 (Foundation) Find the whole chord length in that example.

3 Exam-style questions

2.3 The perpendicular bisects the chord: $2 \times 4 = 8$ cm.

Exercise 3.1

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: A sector is bounded by a chord and an arc.

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3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: A sector is bounded by a chord and an arc.

3.1 False. A sector uses two radii and an arc. A chord and its arc bound a segment; a quarter-circle sector illustrates the two radii meeting at the centre.

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