

Circles

CBSE Class 9 Maths · Knowledge organiser



KEY DEFINITIONS

Chord

A line segment joining two points on a circle.

Arc

A part of the circumference between two points.

Cyclic quadrilateral

A quadrilateral with all four vertices on one circle; its opposite angles add up to 180° .

KEY FORMULAS

Chord $2l$ at distance d from the centre $r^2 = l^2 + d^2$

$\perp$ from centre bisects a chord; equal chords $\Leftrightarrow$ equidistant from centre $\Leftrightarrow$ equal angles at centre

Angle at centre = $2 \times$ angle on the remaining arc; angles in the same segment are equal; angle in a semicircle = 90°

Cyclic quadrilateral $\angle A + \angle C = \angle B + \angle D = 180^\circ$

YOU SHOULD BE ABLE TO...

- Use the chord-distance relation and the basic angle facts: angle in a semicircle, angle at the centre, cyclic quadrilateral.
- Find chords, distances and angles in two- and three-mark questions and give the reason for each step.
- Combine the chord theorems in longer calculations and prove results about cyclic quadrilaterals.
- Handle parallel chords, intersecting circles and proofs such as 'a cyclic parallelogram is a rectangle'.

WORKED EXAMPLE

A chord of a circle of radius 17 cm is 30 cm long. How far is it from the centre?

Half-chord 15, so $d = \sqrt{17^2 - 15^2} = \sqrt{64} = 8$ cm.

COMMON MISTAKES

- ✗ Using the whole chord instead of half of it in $r^2 = l^2 + d^2$.
- ✗ Halving the angle at the centre when the point is on the *same* arc (the minor arc) as the chord: then the angle is 180° minus half.
- ✗ Adding adjacent angles of a cyclic quadrilateral to 180° : only *opposite* angles are supplementary.
- ✗ Two parallel chords: forgetting to check whether they are on the same side of the centre or on opposite sides.