Circle Theorems

Geometry and measures · 6 questions · step-by-step answers at the end

Name: Date: Score: / 6

USEFUL EQUATIONS

angle at centre = 2 × angle at circumference angle in a semicircle = 90°

opposite angles of a cyclic quadrilateral = 180° tangent ⊥ radius

Questions

Show your working in the space under each question.

1. EASY A triangle is drawn in a semicircle with the diameter as one side. One of its other angles is 28°. Find the third angle.

2. EASY Two angles at the circumference stand on the same chord, in the same segment. One is 40°. Find the other.

3. MEDIUM A chord is 3 cm from the centre of a circle of radius 5 cm. Find its length.

4. MEDIUM Opposite angles of a cyclic quadrilateral are x and 3x. Find them.

5. HARD A point is 13 cm from the centre of a circle of radius 5 cm. Find the length of the tangent from the point to the circle.

6. HARD A tangent at A makes an angle of 55° with chord AB. O is the centre. Find the angle in the alternate segment, angle AOB and angle OAB.

Step-by-step answers

Circle Theorems

1. The angle in a semicircle is 90°. 180 − 90 − 28 = **62°**.
2. Angles in the same segment are equal: **40°**.
3. The perpendicular from the centre bisects the chord. Half-chord = √(25 − 9) = 4, so the chord is **8 cm**.
4. x + 3x = 180, so x = 45. Angles **45° and 135°**.
5. Tangent ⊥ radius, so tangent = √(169 − 25) = **12 cm**.
6. Alternate segment theorem: **55°**. Angle at centre: **110°**. Triangle OAB is isosceles: (180 − 110)/2 = **35°** (which is also 90 − 55).