Circle Geometry – Question Set

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1. Centre–Circumference Relationships

Q1 Arc AB subtends $120°$ at the centre O. Find $\angle ACB$ at any point C on the major arc.

Q2 (a) Arc PQ gives $\angle POQ = 70°$. What is $\angle PRQ$?

(b) Arc XY gives $\angle XZY = 48°$. What is $\angle XOY$?

Q3 D lies on a semicircle with diameter AC. What is $\angle ADC$?

2. Cyclic Quadrilaterals

Q4 In cyclic quad $ABCD$, $\angle A = 95°$. Find $\angle C$.

Q5 Opposite angle of $114°$ is shown in a cyclic quadrilateral. Calculate each of the remaining two angles.

Q6 Prove that the exterior angle of a cyclic quadrilateral equals the interior opposite angle.

3. Tangent–Chord Equal Tangents

Q7 A tangent at T meets chord TP making $55°$. Find $\angle TRP$ in the alternate segment.

Q8 From external point E, tangents EA, EB touch a circle. If $EA = 7.2$ cm, find EB.

Q9 (a) Chord CD is perpendicular to tangent at C. What is $\angle CAD$?

(b) Line through centre perpendicular to chord FG meets FG at H. Show $FH = HG$.

4. Power of a Point & Chord Properties

Q10 External point P gives secants PAB and PCD. $PA = 3$ cm, $PB = 9$ cm, $PC = 4$ cm. Find PD.

Q11 Two chords KL and MN intersect inside a circle at X. $KX = 5$ cm, $LX = 7$ cm, $MX = 4$ cm. Calculate NX.

Q12 Radius is 6 cm. A chord is 8 cm from the centre. Find chord length.

5. Arc Length & Sector Area

Q13 Circle radius 9 cm. Find arc length for central angle $40°$.

Q14 Find area of a sector radius 5 cm, angle 225°.

Q15 (a) A wheel (radius 0.35 m) rotates through 150°. How far does a point on the rim travel?

(b) Given $s = 14$ cm and $r = 6$ cm, find sector angle in radians.

6. Mixed Problems

Q16 A triangle ABC is inscribed in a circle, $AB = AC$. $\angle BAC = 34°$. Find $\angle ABC$.

Q17 In the same triangle, find arc length $\widehat{BC}$ if radius = 10 cm.

Q18 A cyclic kite has equal sides $AB = AD$ and $CB = CD$. Prove BD is a diameter.

Challenge Question

Q1 Two circles with radii 5 cm and 8 cm have centres O_1, O_2 such that $O_1O_2 = 13$ cm. Tangent lines are drawn from the external point P to each circle, touching at T_1 and T_2 respectively.

a) Show that $PT_1^2 = PO_1^2 - 25$.

b) Prove $PT_1 = PT_2$.

c) Find the exact length PT_1 and hence PT_2.