PRACTICE PAPER

ICSE CLASS 10 – MATHEMATICS

Chapter 17 : Circles

STEP-BY-STEP SOLUTIONS & MARKING SCHEME · Maximum Marks: 40

Results used

Angle at the centre is double the angle at any point of the remaining circumference. Angles in the same segment are equal. Angle in a semicircle = 90°.

Opposite angles of a cyclic quadrilateral are supplementary. Exterior angle of a cyclic quadrilateral = interior opposite angle.

The perpendicular from the centre to a chord bisects the chord. Angle in a major segment is acute; in a minor segment it is obtuse. Angle sum of a triangle = 180°.

SECTION A (20 Marks)

Question 1 [8 × 1 = 8]

Part	Ans.	Working
(i)	**(b)**	Angle at the circumference = ½ × 130° = 65°.
(ii)	**(c)**	Opposite angles are supplementary: ∠C = 180° − 105° = 75°.
(iii)	**(a)**	∠ACB = 90° (semicircle), so ∠ABC = 180° − 90° − 38° = 52°.
(iv)	**(d)**	Half chord = 5 cm, so $r^2 = 5^2 + 12^2 = 169$ and r = 13 cm.
(v)	**(b)**	Exterior angle of a cyclic quadrilateral = interior opposite angle: ∠CBE = ∠ADC = 82°.
(vi)	**(c)**	The angle in a major segment is acute (less than 90°), not obtuse.
(vii)	**(d)**	(A) is true (a minor-segment angle is 180° minus a major-segment angle, which is acute) and (R) is true, but (R) does not explain (A).
(viii)	**(b)**	(A) is false: no circle passes through three collinear points. (R) is true.

Question 2 [4 + 4 + 4 = 12]

(i)

∠A + ∠C = 180°: (2x + 10) + (3x − 20) = 180 ⇒ 5x − 10 = 180 ⇒ **x = 38** [1]

∠B + ∠D = 180°: (y + 50) + (2y − 5) = 180 ⇒ 3y + 45 = 180 ⇒ **y = 45** [1]

∠A = 2(38) + 10 = **86°**, ∠C = 3(38) − 20 = **94°** [1]

∠B = 45 + 50 = **95°**, ∠D = 2(45) − 5 = **85°** (sum = 360° ✓) [1]

(ii)

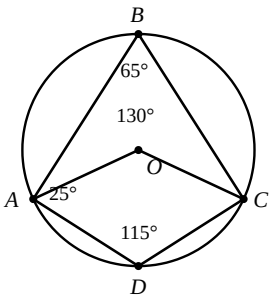
(a) Half of AB = 12 cm. Distance² = 13² − 12² = 25, so distance = **5 cm** [1]

(b) Half of CD = √(13² − 12²) = √25 = 5 cm [1]

CD = 2 × 5 = **10 cm** [1]

(c) Distance between the chords = 5 + 12 = **17 cm** [1]

(iii)



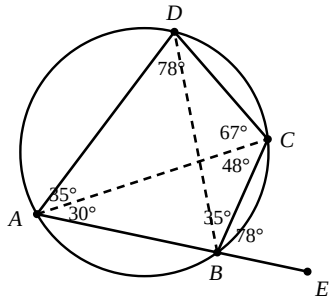
(a) OA = OC, so ∠OCA = ∠OAC = 25°. ∠AOC = 180° − 25° − 25° = **130°** [2]

(b) ∠ABC = ½ ∠AOC = ½ × 130° = **65°** (angle at centre = 2 × angle at circumference) [1]

(c) ABCD is cyclic: ∠ADC = 180° − 65° = **115°** [1]

SECTION B (20 Marks) — any two questions

Question 3 [3 + 3 + 4 = 10]



(i)

The exterior angle of a cyclic quadrilateral equals the interior opposite angle [1]

∠CBE is the exterior angle at B, so ∠ADC is its interior opposite angle [1]

∠ADC = ∠CBE = **78°** [1]

(ii)

∠DAC = ∠DBC = **35°** (angles in the same segment) [1]

In ΔADC: ∠ACD = 180° − ∠ADC − ∠DAC = 180° − 78° − 35° [1]

∠ACD = **67°** [1]

(iii)

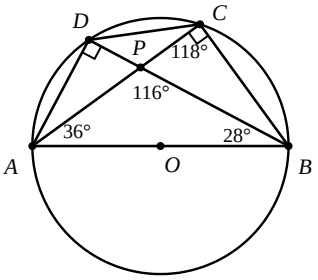
∠ABC = 180° − 78° = 102° (linear pair) [1]

In ΔABC: ∠ACB = 180° − 102° − 30° = **48°** [1]

∠BCD = ∠ACB + ∠ACD = 48° + 67° = **115°** [1]

∠BAD = 180° − ∠BCD = 180° − 115° = **65°** (check: ∠BAC + ∠CAD = 30° + 35° = 65° ✓) [1]

Question 4 [3 + 3 + 4 = 10]



(i)

∠ACB = **90°** (angle in a semicircle, AB being a diameter) [1]

In ΔABC: ∠ABC = 180° − 90° − 36° [1]

∠ABC = **54°** [1]

(ii)

∠ADB = **90°** (angle in a semicircle) [1]

In ΔABD: ∠DAB = 180° − 90° − 28° [1]

∠DAB = **62°** [1]

(iii)

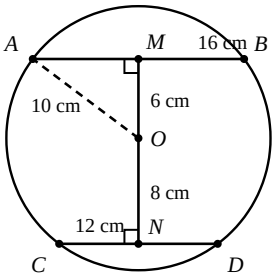
ABCD is cyclic, so ∠BCD + ∠DAB = 180° [1]

∠BCD = 180° − 62° = **118°** [1]

In ΔAPB: ∠APB = 180° − ∠PAB − ∠PBA = 180° − 36° − 28° [1]

∠APB = **116°** [1]

Question 5 [3 + 3 + 4 = 10]



(i)

OM ⊥ AB, so M bisects AB: AM = 8 cm [1]

In right ΔOMA: $OM^2 = OA^2 - AM^2 = 10^2 - 8^2 = 36$ [1]

OM = **6 cm** [1]

(ii)

ON ⊥ CD, so N bisects CD: CN = 6 cm [1]

In right ΔONC: $ON^2 = OC^2 - CN^2 = 10^2 - 6^2 = 64$ [1]

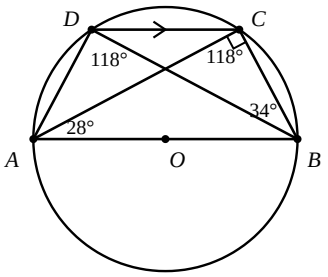
ON = **8 cm** [1]

(iii)

The chords are on opposite sides of O, so MN = OM + ON = 6 + 8 = **14 cm** [2]

Area of trapezium ABDC = $\frac{1}{2}$ × (AB + CD) × MN = $\frac{1}{2}$ × (16 + 12) × 14 = **196 cm²** [2]

Question 6 [3 + 3 + 4 = 10]



(i)

∠ACB = **90°** (angle in a semicircle) [1]

In ΔABC: ∠ABC = 180° − 90° − 28° [1]

∠ABC = **62°** [1]

(ii)

AB ∥ CD, so ∠ACD = ∠CAB = **28°** (alternate angles) [1]

∠BCD = ∠ACB + ∠ACD = 90° + 28° [1]

∠BCD = **118°** [1]

(iii)

ABCD is cyclic: ∠ADC = 180° − ∠ABC = 180° − 62° = **118°** [2]

∠ABD = ∠ACD = 28° (angles in the same segment) [1]

∠DBC = ∠ABC − ∠ABD = 62° − 28° = **34°** [1]

— End of Solutions —