Class: **X**	Subject: **Mathematics**	Session: **2025-26**
Chapter: **Ch 10: Circles (PYQ)**		

PREVIOUS YEAR QUESTIONS (PYQ)

Chapter 10: Circles

CBSE Board Exam 2019–2025 | With Direct Answers

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This document contains chapter-wise Previous Year Questions from CBSE Class X Board Examinations (2019–2025) for **Chapter 10: Circles**. Each question includes the year of examination, marks allotted, and direct answer for quick revision.

⚠ NOTE: As per CBSE 2025–26 Syllabus. Topics: Tangent to a circle at point of contact, (Prove) Tangent ⊥ Radius, (Prove) Equal tangents from external point. No deletions.

SECTION A: Multiple Choice Questions (1 Mark Each)

[CBSE 2024 | 1 Mark]

Q1. The maximum number of common tangents that can be drawn to two circles intersecting at two distinct points is:

(a) 4
(b) 3
(c) 2
(d) 1

Ans: (c) 2. Two circles intersecting at two points have exactly 2 common tangents.

[CBSE 2024 | 1 Mark]

Q2. In the figure, PT is tangent to a circle with centre O and ∠TPO = 35°. The measure of ∠x (exterior angle at O) is:

(a) 110°
(b) 115°
(c) 120°
(d) 125°

Ans: (d) 125°. ∠OTP = 90° (tangent ⊥ radius). ∠x = ∠TPO + ∠OTP = 35° + 90° = 125° (exterior angle).

[CBSE 2024 | 1 Mark]

Q3. O is the centre of the circle. MN is a chord and tangent ML at point M makes an angle of 70° with MN. The measure of ∠MON is:

(a) 120°
(b) 130°
(c) 140°
(d) 150°

Ans: (c) 140°. ∠OML = 90° ⇒ ∠OMN = 90°−70° = 20°. OM = ON (radii) ⇒ ∠ONM = 20°. ∠MON = 180°−40° = 140°.

[CBSE 2023 | 1 Mark]

Q4. PT is a tangent at T to the circle with centre O. If ∠TPO = 25°, then ∠x (angle at O in △OTP extended) is:

(a) 25°
(b) 65°
(c) 90°
(d) 115°

Ans: (d) 115°. ∠PTO = 90°. By exterior angle: x = 90° + 25° = 115°.

[CBSE 2023 | 1 Mark]

Q5. PQ is tangent to circle centred at O. If ∠AOB = 95°, the measure of ∠ABQ is:

(a) 47.5°
(b) 42.5°
(c) 85°
(d) 95°

Ans: (a) 47.5°. OA = OB (radii). ∠OAB = ∠OBA = (180°−95°)/2 = 42.5°. ∠OBQ = 90° ⇒ ∠ABQ = 90°−42.5° = 47.5°.

[CBSE 2022 | 1 Mark]

Q6. From an external point Q, the length of tangent to a circle is 24 cm and distance of Q from the centre is 25 cm. The radius of the circle is:

(a) 5 cm
(b) 7 cm
(c) 12 cm
(d) 15 cm

Ans: (b) 7 cm. r = √(25²−24²) = √(625−576) = √49 = 7 cm.

[CBSE 2021 | 1 Mark]

Q7. If two tangents inclined at an angle of 60° are drawn to a circle of radius 3 cm, then the length of each tangent is:

(a) 3 cm
(b) 3√3 cm
(c) 6 cm
(d) 3√3/2 cm

Ans: (b) 3√3 cm. Half angle = 30°. tan 30° = r/tangent ⇒ 1/√3 = 3/T ⇒ T = 3√3 cm.

[CBSE 2020 | 1 Mark]

Q8. In the figure, PA and PB are tangents from P to circle with centre O. If ∠APB = 60°, then ∠AOB is:

(a) 60°
(b) 90°
(c) 120°
(d) 150°

Ans: (c) 120°. ∠APB + ∠AOB = 180° (supplementary in quad OAPB). ∠AOB = 180°−60° = 120°.

[CBSE 2019 | 1 Mark]

Q9. AP, AQ and BC are tangents to a circle with centre O. If AB = 5 cm, AC = 6 cm and BC = 4 cm, then the length of AP is:

(a) 15 cm
(b) 10 cm
(c) 9 cm
(d) 7.5 cm

Ans: (d) 7.5 cm. AP = AQ. Let BP = x, then CQ = BC−x. AP = AB+BP = 5+x. AQ = AC+CQ = 6+(4−x). AP = AQ ⇒ 5+x = 10−x ⇒ 2x = 5 ⇒ x = 2.5. AP = 7.5 cm.

[CBSE 2019 | 1 Mark]

Q10. A circle can have _____ parallel tangents at the most.

(a) 0
(b) 1
(c) 2
(d) Infinite

Ans: (c) 2. Only at the ends of a diameter can parallel tangents be drawn.

SECTION B: Assertion-Reason Questions (1 Mark Each)

[CBSE 2024 | 1 Mark]

Q11. Assertion (A): The tangent at any point of a circle is perpendicular to the radius through the point of contact.
Reason (R): The shortest distance from a point to a line is the perpendicular distance.

(a) Both true, R explains A
(b) Both true, R does not explain A
(c) A true, R false
(d) A false, R true

Ans: (a) Both true and R explains A. The radius is the shortest distance from centre to tangent, hence perpendicular.

[CBSE 2023 | 1 Mark]

Q12. Assertion (A): Two tangents drawn from an external point to a circle are equal in length.
Reason (R): In two right triangles, if the hypotenuse and one side are equal, the triangles are congruent (RHS).

(a) Both true, R explains A
(b) Both true, R does not explain A
(c) A true, R false
(d) A false, R true

Ans: (a) Both true and R explains A. The proof uses RHS congruence of △OPA ≅ △OPB.

SECTION C: Short Answer Questions (2 Marks Each)

[CBSE 2022 | 2 Marks]

Q13. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

Ans: Let AB be diameter. Tangent PQ at A: ∠OAP = 90°. Tangent RS at B: ∠OBR = 90°. Since ∠OAP = ∠OBR = 90° (alternate interior angles with transversal AB), PQ ∥ RS.

[CBSE 2023 | 2 Marks]

Q14. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

Ans: AB is chord of larger circle, tangent to smaller at P. OP ⊥ AB, OP = 3, OA = 5. AP = √(25−9) = 4 cm. AB = 2×AP = 8 cm.

[CBSE 2021 | 2 Marks]

Q15. In the figure, O is the centre of a circle, PQ is a chord and PT is the tangent at P. If ∠POQ = 70°, find ∠TPQ.

Ans: ∠OPQ = ∠OQP = (180°−70°)/2 = 55° (isosceles △, OP = OQ). ∠OPT = 90° (tangent ⊥ radius). ∠TPQ = 90° − 55° = 35°.

[CBSE 2020 | 2 Marks]

Q16. Find the perimeter of a square circumscribing a circle of radius a cm.

Ans: Side of square = diameter = 2a cm. Perimeter = 4 × 2a = 8a cm.

SECTION D: Short Answer Questions (3 Marks Each)

[CBSE 2024 | 3 Marks]

Q17. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segment joining the points of contact at the centre.

Ans: Let PA, PB be tangents from P. ∠OAP = ∠OBP = 90° (tangent ⊥ radius). In quadrilateral OAPB: ∠OAP + ∠APB + ∠OBP + ∠AOB = 360°. 90° + ∠APB + 90° + ∠AOB = 360°. ∠APB + ∠AOB = 180°. Hence supplementary.

[CBSE 2023 | 3 Marks]

Q18. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠PTQ = 2∠OPQ.

Ans: Let ∠PTQ = θ. TP = TQ (tangents). △TPQ is isosceles. ∠TPQ = ∠TQP = (180°−θ)/2 = 90°−θ/2. ∠OPT = 90° (tangent ⊥ radius). ∠OPQ = ∠OPT − ∠TPQ = 90° − (90°−θ/2) = θ/2. So ∠PTQ = 2∠OPQ. Hence proved.

[CBSE 2022 | 3 Marks]

Q19. A circle is inscribed in a △ABC with sides AB = 8 cm, BC = 6 cm and AC = 10 cm. The circle touches AB, BC and CA at P, Q and R respectively. If ∠B = 90°, find the radius of the incircle.

Ans: OPBQ is a square (since ∠B = 90° and OP ⊥ AB, OQ ⊥ BC). Let r = radius. BP = BQ = r. AP = AR = 8−r. CQ = CR = 6−r. AC = AR + CR ⇒ 10 = (8−r) + (6−r) = 14−2r ⇒ 2r = 4 ⇒ r = 2 cm.

[CBSE 2021 | 3 Marks]

Q20. Two concentric circles are of radii 7 cm and r cm (r > 7). A chord of the larger circle of length 48 cm touches the smaller circle. Find the value of r.

Ans: OC = 7 cm (radius of smaller). AB = 48 cm (chord). OC ⊥ AB (tangent). AC = 24 cm. In rt. △OCA: $r^2 = 7^2 + 24^2 = 49 + 576 = 625 \Rightarrow r = 25$ cm.

SECTION E: Long Answer Questions (4–5 Marks Each)

[CBSE 2024 | 5 Marks]

Q21. Prove that the lengths of tangents drawn from an external point to a circle are equal.

Ans: Given: Circle with centre O, external point P, tangents PA and PB. To prove: PA = PB. Proof: In △OPA and △OPB: OA = OB (radii), OP = OP (common), ∠OAP = ∠OBP = 90° (tangent ⊥ radius). By RHS: △OPA ≅ △OPB. Therefore PA = PB (CPCT). Hence proved.

[CBSE 2023 | 5 Marks]

Q22. Prove that a parallelogram circumscribing a circle is a rhombus.

Ans: Let ABCD be a parallelogram circumscribing a circle. Tangent lengths from each vertex: AP = AS, BP = BQ, CQ = CR, DR = DS. AB + CD = (AP+BP) + (CR+CQ) = (AS+DS) + (BQ+CQ) = AD + BC. But AB = CD, AD = BC (parallelogram). So AB + AB = AD + AD ⇒ AB = AD. All sides equal ⇒ ABCD is a rhombus.

[CBSE 2021 | 5 Marks]

Q23. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre.

Ans: Let ABCD circumscribe circle with centre O touching at P, Q, R, S. Join OP, OQ, OR, OS. In △OAP and △OAS: AP = AS, OP = OS, OA = OA ⇒ △OAP ≅ △OAS. So ∠1 = ∠2. Similarly pair all 8 angles at centre. Sum = 2(∠1+∠3+∠5+∠7) = 360° ⇒ ∠1+∠3+∠5+∠7 = 180°. ∠AOB + ∠COD = 180° and ∠BOC + ∠AOD = 180°. Hence proved.

[CBSE 2020 | 5 Marks]

Q24. In the figure, PQ is a chord of length 16 cm of a circle of radius 10 cm. The tangents at P and Q intersect at T. Find the length of TP.

Ans: Let TR ⊥ PQ at R (perpendicular bisector). PR = 8 cm. In rt. △PRO: OR = $\sqrt{(10^2-8^2)}$ = 6 cm. Let TP = x, TR = y. OT = y+6. In rt. △PRT: $x^2 = y^2 + 64$ ...(i). In rt. △OPT: $(y+6)^2 = x^2 + 100 \Rightarrow y^2+12y+36 = y^2+64+100 \Rightarrow 12y = 128 \Rightarrow y = 32/3$. $x^2 = (32/3)^2 + 64 = 1024/9 + 576/9 = 1600/9 \Rightarrow x = 40/3$ cm.

SECTION F: Case Study Based Questions (4 Marks Each)

[CBSE 2025 | 4 Marks]

Q25. Case Study: A circle is inscribed in a △PQR with PQ = 10 cm, QR = 8 cm, PR = 12 cm. The circle touches PQ at A, QR at B and PR at C.
(i) If PA = x, find QA in terms of x.
(ii) Find QB in terms of x.
(iii) Find the value of x.
(iv) Find the lengths PA, QB and RC.

Ans: PA = PC = x (tangents from P). QA = PQ − PA = 10−x. QB = QA = 10−x (tangents from Q). RB = QR − QB = 8−(10−x) = x−2. RC = RB = x−2 (tangents from R). PR = PC + RC ⇒ 12 = x + (x−2) ⇒ 12 = 2x−2 ⇒ x = 7. PA = 7 cm, QB = 3 cm, RC = 5 cm.

[CBSE 2024 | 4 Marks]

Q26. Case Study: Two tangents PA and PB are drawn from external point P to a circle with centre O and radius 5 cm. The distance OP = 13 cm.
(i) Find the length of tangent PA.
(ii) Find ∠OAP.
(iii) If ∠APB = 60°, find ∠AOB.
(iv) Find the area of △OPA.

Ans: (i) PA = √(13²−5²) = √(169−25) = √144 = 12 cm. (ii) ∠OAP = 90° (tangent ⊥ radius). (iii) ∠AOB = 180° − ∠APB = 180°−60° = 120° (supplementary). (iv) Area △OPA = (1/2)×OA×PA = (1/2)×5×12 = 30 cm².

★ PYQ SUMMARY & ANALYSIS

Topic	Years Asked	Frequency	Marks
Tangent ⊥ Radius (angle problems)	2019–2025	Every Year	1–3
Equal tangents from external point (Proof)	2019–2025	Every Year	3–5
∠APB + ∠AOB = 180° (supplementary)	2019–2025	Every Year	1–3
Length of tangent (√ formula)	2019–2024	5 times	1–2
Incircle of triangle (find radius)	2019–2024	4 times	3–5
Parallelogram circumscribing = Rhombus	2019–2024	4 times	5
Concentric circles (chord touches inner)	2019–2023	3 times	2–3
Case Study (tangent properties)	2024–2025	2 times	4

Key Observations for Students:

✔ THEOREM 1: Tangent ⊥ Radius at point of contact — used in EVERY tangent problem.

✔ THEOREM 2: Tangents from external point are equal (PA = PB) — MUST know proof (RHS congruence).

✔ ∠APB + ∠AOB = 180° — very frequent MCQ/short answer.

✔ Length of tangent from external point: $T = \sqrt{(d^2 - r^2)}$ where d = distance from centre.

✔ Incircle problems: Use tangent lengths from vertices. AP = AS, BP = BQ, etc.

✔ "Prove parallelogram circumscribing a circle is rhombus" — asked almost every year (5 marks).

✔ This is a PROOF-heavy chapter. Memorize both theorem proofs thoroughly.

✔ Expected marks: 5–8 marks in Board Exam.

"Practice makes perfect. Solve PYQs to master your Board Exam!"

Best Wishes for Your Board Exam!

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