MATHS WITHOUT GUESSWORK · BOARD BOOSTER

Circles

LOCK THE SURE MARKS.
STRETCH FOR THE TOP.
PRACTISE THE BOARD WAY.

A board-exam practice companion for **CBSE Class 10 Mathematics**
Syllabus session 2026–27 · Standard (041)

🛡️ Secure Track | 🚀 Stretch Track | ~88 questions + 3 mini-mocks

Built around just two theorems

⊥ Radius
tangent is perpendicular to the radius

Equal
tangents from an external point are equal

Apply
lengths, angles, circumscribed figures

Original questions and solutions. Answers kept separate. Not a substitute for the NCERT textbook or your teacher.

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Circles in the board paper

Know exactly how many marks are really at stake here — so you spend your effort where the paper pays.

◆ UNDERSTAND THE OFFICIAL NUMBER This chapter sits inside **Unit IV — Geometry, worth 15 marks**, shared with Triangles. Circles is a **reliable 4–6 marks** — nearly always a **5-mark proof** (one of the two theorems, or a circumscribed-figure result) plus a 1–2 mark tangent-length or angle question. CBSE publishes weightage per unit, not per chapter.

Where those marks usually fall (PYQ trend — based on past papers, not official)

Form it takes	Typical marks	What it tests
1–2 MCQ / Assertion-Reason	1–2	Number of tangents, the right angle, equal tangents
A VSA or SA	2–3	Tangent length via $\sqrt{(OP^2-r^2)}$; an angle between tangents
A 5-mark LA	5	Prove a theorem, or a quadrilateral/triangle circumscribing a circle
A case study	4	A wheel, a park path, a circular plot — tangents in life

★ SPOT THE CLUE WHAT'S IN THE 2026–27 SCOPE The whole chapter is in scope — the **tangent at the point of contact**, the **two theorems and their proofs**, and **applications to triangles and quadrilaterals circumscribing circles**. There are no deletions. Pythagoras is used as a tool for the tangent-length right triangle.

Q6 The lengths of two tangents from an external point to a circle are: A. equal B. unequal C. perpendicular D. parallel

1 GUIDED ★

Q7 A line that intersects a circle at two points is called a: A. tangent B. secant C. chord D. radius

1 GUIDED

Q8 If a tangent PT = 8 cm and the radius OT = 6 cm, then OP = A. 10 cm B. 14 cm C. 2 cm D. 48 cm

1 PART-GUIDED ★

Q9 From a point 13 cm from the centre of a circle of radius 5 cm, the tangent length is: A. 8 cm B. 12 cm C. 18 cm D. 169 cm

1 PART-GUIDED ★

Q10 The angle between a tangent and the radius at the point of contact is: A. 0° B. 45° C. 60° D. 90°

1 GUIDED ★

Q11 At most how many parallel tangents can a circle have? A. 1 B. 2 C. 3 D. infinite

1 PART-GUIDED ★

Q12 A tangent PT = 12 cm, radius 5 cm. The distance of the external point from the centre is: A. 7 cm B. 13 cm C. 17 cm D. 169 cm

1 PART-GUIDED ★

Q13 In a quadrilateral ABCD circumscribing a circle, AB + CD = A. AC + BD B. BC + AD C. AB + BC D. 2 AB

1 PART-GUIDED ★

Q14 The tangent length from a point 10 cm from the centre of a 6 cm circle is: A. 4 cm B. 8 cm C. 16 cm D. 60 cm

1 PART-GUIDED

Q15 If two tangents from an external point are inclined at 60°, the angle they subtend at the centre is: A. 60° B. 90° C. 120° D. 30°

1 INDEPENDENT ★

Q16 A parallelogram circumscribing a circle is always a: A. rectangle B. square C. rhombus D. trapezium

1 INDEPENDENT ★

Q17 PA and PB are tangents from P with ∠APB = 80°. Then ∠AOB (O the centre) = A. 80° B. 100° C. 120° D. 160°

1 INDEPENDENT ★

Q18 The point where a tangent touches a circle is called the: A. centre B. point of contact C. focus D. vertex

1 GUIDED

Q19 Two concentric circles have radii 5 cm and 3 cm. A chord of the larger circle touching the smaller has length: A. 4 cm B. 8 cm C. 16 cm D. 2 cm

1 INDEPENDENT ★

Q20 A tangent drawn at the end of a diameter is ___ to the diameter: A. parallel B. perpendicular C. equal D. at 60°

1 GUIDED

Q21 The two tangents at the ends of a diameter of a circle are: A. perpendicular B. parallel C. intersecting D. equal to the diameter

1 PART-GUIDED ★

Circles · Board Booster — Secure Track

1 2 3 4 5 6 Secure

Very Short Answer (2-mark) set

16 two-mark questions. Spot the right angle at the point of contact, then use $\sqrt{(OP^2-r^2)}$ or the equal-tangent fact. Worked solutions in the Answer Key.

Q1 From a point 10 cm from the centre of a circle of radius 6 cm, find the length of the tangent.

2 GUIDED ★

Q2 The length of a tangent from a point 13 cm from the centre is 12 cm. Find the radius.

2 PART-GUIDED ★

Q3 A tangent PT = 24 cm touches a circle of radius 7 cm at T. Find OP.

2 PART-GUIDED

Q4 Two tangents PA and PB are drawn from an external point P. If PA = 9 cm, find PB.

2 GUIDED ★

Q5 The tangents from an external point are inclined at 70°. Find the angle they subtend at the centre.

2 PART-GUIDED ★

Q6 In a quadrilateral ABCD circumscribing a circle, AB = 6 cm, BC = 7 cm, CD = 4 cm. Find AD.

2 PART-GUIDED ★

Q7 State the theorem about the tangent and the radius at the point of contact.

2 GUIDED

Case studies (4-mark)

8 source-based cases, each 1 + 1 + 2 marks. Spot the right angle at the point of contact, then compute. Solutions in the Answer Key.

Case 1 — The park walkway

4 marks

A straight walkway runs tangent to a circular park of radius 7 m. A lamp post stands 25 m from the centre of the park, on the walkway.

(i) At how many points does the walkway touch the park?

1

(ii) What is the angle between the walkway and the radius at the point of contact?

1

(iii) Find the distance from the lamp post to the point of contact.

2

Answer Key

Kept at the back on purpose — so a parent needn't teach. The recurring proofs are written out in full once; the drills get the key step, the answer and the likely slip.

The model proofs (learn these once)

Theorem 1 — tangent ⊥ radius. *Given:* circle centre O, tangent XY touching at P. *To prove:* OP ⊥ XY. *Proof (contradiction):* take any other point Q on XY and join OQ. Since Q lies on the tangent, Q is outside the circle, so OQ > OP. This holds for every point of XY except P, so OP is the *shortest* distance from O to XY. The shortest distance from a point to a line is the perpendicular. Hence OP ⊥ XY. **The "shortest distance = perpendicular" step is the key mark.**

Theorem 2 — equal tangents. *Given:* external point P, tangents PA and PB to a circle centre O. *To prove:* PA = PB. *Construction:* join OA, OB, OP. *Proof:* in △OAP and △OBP, ∠OAP = ∠OBP = 90° (tangent ⊥ radius), OA = OB (radii), OP = OP (common). So △OAP ≅ △OBP by **RHS**, and PA = PB by **CPCT**. (Also ∠OPA = ∠OPB, so OP bisects ∠APB.)

Quadrilateral circumscribing a circle. Let ABCD touch the circle at P (on AB), Q (BC), R (CD), S (DA). Equal tangents from each vertex: AP = AS, BP = BQ, CQ = CR, DR = DS. Add: (AP+BP) + (CR+DR) = (AS+DS) + (BQ+CQ), i.e. AB + CD = AD + BC.

Parallelogram ⇒ rhombus. A parallelogram ABCD circumscribing a circle has AB + CD = AD + BC. But AB = CD and AD = BC (parallelogram), so 2AB = 2AD ⇒ AB = AD. All sides equal ⇒ rhombus.

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- **Very Short Answer.** 16 two-mark questions
- **Short Answer.** 14 three-mark questions
- **Long Answer.** 10 five-mark questions
- **Case studies.** 8 four-mark source-based cases
- **HOTS and trickiest variations.** 10 questions
- **Timed mini-mocks and Answer Key.** 3 single-chapter mini-mocks; every question has its answer, kept at the back

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