Master Testing Agency
Practice papers, exam-standard · www.mastertestingagency.com

Circles — CBSE Class 10 Mathematics Chapter Test

FREE CHAPTER TEST · CLASS X · MATHEMATICS (041) · PATTERN OF THE CBSE SAMPLE QUESTION PAPER 2026-27

TIME ALLOWED	MAXIMUM MARKS	QUESTIONS	NAME / ROLL NO.
1½ hours	40	19 (A 10 · B 3 · C 2 · D 2 · E 2)	

GENERAL INSTRUCTIONS

Read the following instructions very carefully and strictly follow them:

1. This question paper contains 19 questions. All questions are compulsory.
2. This question paper is divided into five sections: A, B, C, D and E.
3. In Section A, Questions 1 to 8 are multiple choice questions (MCQs) and Questions 9 and 10 are assertion-reason based questions of 1 mark each.
4. In Section B, Q11–13 are very short answer (VSA) type questions, carrying 2 marks each.
5. In Section C, Q14–15 are short answer (SA) type questions, carrying 3 marks each.
6. In Section D, Q16–17 are long answer (LA) type questions, carrying 5 marks each.
7. In Section E, Q18–19 are case study based questions, carrying 4 marks each, with sub-parts of the values of 1, 1 and 2 marks.
8. There is no overall choice. However, an internal choice has been provided in 1 question of Section B, 1 question of Section C, 1 question of Section D and in the 2-mark sub-part of each question of Section E.
9. Use of calculators is not allowed.
10. This chapter test follows the section structure, question types and marks per question of the CBSE Class X Mathematics (Standard, 041) Sample Question Paper 2026-27, at half the length of the 80-mark board paper: 40 marks in 1½ hours.
11. The answer key and the marking scheme are at the end of this booklet. Attempt the paper in 1½ hours before you look at them.

All questions are original and © Master Testing Agency. Free to download and use for personal practice; not for resale. Master Testing Agency is an independent test-prep publisher, not affiliated with, endorsed by or connected to the Central Board of Secondary Education (CBSE) or any other exam-conducting body.

Chapter: Circles · **Topics:** Tangent and radius · Lengths of tangents from an external point · Angles with tangents · Quadrilaterals circumscribing a circle · Concentric circles

SECTION A

This section comprises 10 questions of 1 mark each: 8 multiple choice questions (MCQs) and 2 assertion-reason based questions.

1. The length of the tangent from a point 13 cm from the centre of a circle of radius 5 cm is 1

(A) 12 cm (B) 8 cm

(C) 18 cm (D) $\sqrt{194}$ cm

2. The number of tangents that can be drawn to a circle from a point outside it is 1

(A) 1 (B) 2

(C) infinitely many (D) 0

3. The angle between a tangent to a circle and the radius through the point of contact is 1

(A) 45° (B) 60°

(C) 90° (D) 180°

4. PA and PB are tangents from P to a circle with centre O. If $\angle APB = 80°$, then $\angle AOB$ is 1

(A) 80° (B) 50°

(C) 90° (D) 100°

5. The number of tangents to a circle parallel to a given tangent is 1

(A) 0 (B) 1

(C) 2 (D) infinitely many

6. A quadrilateral ABCD is drawn to circumscribe a circle. If AB = 6 cm, BC = 7 cm and CD = 4 cm, then AD is 1

(A) 5 cm (B) 4 cm

(C) 3 cm (D) 2 cm

7. The length of a tangent from a point Q is 15 cm, and Q is 17 cm from the centre. The radius of the circle is 1

(A) 8 cm (B) 2 cm

(C) 64 cm (D) 15 cm

8. Two concentric circles have radii 10 cm and 6 cm. The length of the chord of the larger circle that touches the smaller circle is 1

(A) 8 cm (B) 12 cm

(C) 20 cm (D) 16 cm

9. **Assertion (A):** The tangents drawn at the ends of a diameter of a circle are parallel. 1
Reason (R): The tangent at any point of a circle is perpendicular to the radius through the point of contact.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

10. **Assertion (A):** From a point inside a circle, two tangents can be drawn to the circle. 1
Reason (R): From a point outside a circle, exactly two tangents can be drawn to the circle.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

SECTION B

This section comprises 3 very short answer (VSA) type questions of 2 marks each.

11. (a) Prove that the tangents drawn at the ends of a diameter of a circle are parallel. 2

OR

(b) Two concentric circles have radii 13 cm and 5 cm. Find the length of the chord of the larger circle that touches the smaller circle.

12. PA and PB are tangents from P to a circle with centre O and radius 5 cm. If $\angle APB = 60°$, find OP. 2

13. A circle touches all four sides of a quadrilateral ABCD. Prove that $AB + CD = BC + DA$. 2

SECTION C

This section comprises 2 short answer (SA) type questions of 3 marks each.

14. (a) Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact. 3

OR

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

15. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$. 3

SECTION D

This section comprises 2 long answer (LA) type questions of 5 marks each.

16. (a) A circle touches the side BC of ΔABC at P, and touches AB and AC produced at Q and R. Prove that AQ = ½ (perimeter of ΔABC). 5

OR

(b) XY and X′Y′ are two parallel tangents to a circle with centre O, and another tangent AB, touching the circle at C, meets XY at A and X′Y′ at B. Prove that ∠AOB = 90°.

17. From an external point P, two tangents PA and PB, each 12 cm long, are drawn to a circle of radius 5 cm with centre O. Find OP and the length of the chord AB. 5

SECTION E

This section comprises 2 case study based questions of 4 marks each, with sub-parts of 1, 1 and 2 marks.

18. A circular park has radius 8 m. From a gate P, 17 m from the centre O of the park, two straight paths touch the park's boundary at A and B.

(i) What is the angle between OA and the path PA? [1]

(ii) Find the length of each path. [1]

(iii) Find the total length of the two paths. [2]

OR

(iii) Find the distance between the points A and B. [2]

19. A garden ABCD is laid out so that its four straight sides touch a circular pond. AB = 8 m, BC = 10 m and CD = 12 m.

(i) State the property of the sides of a quadrilateral circumscribing a circle. [1]

(ii) Find AD. [1]

(iii) Find the perimeter of the garden. [2]

OR

(iii) Prove that if a parallelogram circumscribes a circle, it must be a rhombus. [2]

END OF THE QUESTION PAPER

ANSWER KEY — SECTION A

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
(A)	(B)	(C)	(D)	(B)	(C)	(A)	(D)	(A)	(D)

MARKING SCHEME AND WORKED SOLUTIONS

Marks for each step are shown in brackets, as in the CBSE marking scheme. Any correct alternative method earns full marks.

Q1. Answer (A). $\sqrt{(13^2 - 5^2)} = 12$.

Q2. Answer (B). Exactly two.

Q3. Answer (C). The tangent is perpendicular to the radius.

Q4. Answer (D). $\angle OAP = \angle OBP = 90°$, so $\angle AOB = 360° - 180° - 80° = 100°$.

Q5. Answer (B). Only the tangent at the other end of the diameter.

Q6. Answer (C). AB + CD = BC + AD: 10 = 7 + AD.

Q7. Answer (A). $\sqrt{(289 - 225)} = 8$.

Q8. Answer (D). Half-chord = $\sqrt{(100 - 36)} = 8$, chord = 16 cm.

Q9. Answer (A). Both tangents are perpendicular to the same diameter, hence parallel: R explains A. Answer (A).

Q10. Answer (D). No tangent passes through a point inside a circle: A is false, R is true. Answer (D).

Q11. (2 marks) Answer: (a) proof; (b) 24 cm.
(a) Let AB be a diameter, with tangents l at A and m at B. Then OA $\perp$ l and OB $\perp$ m (tangent $\perp$ radius), so l $\perp$ AB and m $\perp$ AB. [1] Lines perpendicular to the same line are parallel: l $\parallel$ m. [1]
OR (b) The chord touches the smaller circle at P, so OP $\perp$ chord and P is its mid-point. [1] Half-chord = $\sqrt{(13^2 - 5^2)} = 12$ cm; chord = 24 cm. [1]

Q12. (2 marks) Answer: 10 cm.
OP bisects $\angle APB$, so $\angle APO = 30°$, and $\angle OAP = 90°$. [1] $\sin 30° = OA/OP$, OP = 5/(1/2) = 10 cm. [1]

Q13. (2 marks) Answer: proof.
Let the sides AB, BC, CD, DA touch the circle at P, Q, R, S. Tangents from a point are equal: AP = AS, BP = BQ, CR = CQ, DR = DS. [1] AB + CD = AP + BP + CR + DR = AS + BQ + CQ + DS = (BQ + CQ) + (AS + DS) = BC + DA. [1]

Q14. (3 marks) Answer: proofs.
(a) Let XY be the tangent at P to the circle with centre O. Take any point Q on XY other than P; Q lies outside the circle, so OQ > OP. [1] This holds for every point of XY except P, so OP is the shortest distance from O to XY. [1] The shortest segment from a point to a line is perpendicular to it: OP $\perp$ XY. [1]
OR (b) Let PQ and PR be tangents from P to the circle with centre O. In right triangles OQP and ORP ($\angle OQP = \angle ORP = 90°$, tangent $\perp$ radius): OQ = OR (radii), OP is common. [2] So $\Delta OQP \cong \Delta ORP$ (RHS), giving PQ = PR. [1]

Q15. (3 marks) Answer: proof.
Let $\angle PTQ = \theta$. TP = TQ, so $\angle TPQ = \angle TQP = (180° - \theta)/2 = 90° - \theta/2$. [1] $\angle OPT = 90°$ (tangent $\perp$ radius). [1] $\angle OPQ = \angle OPT - \angle TPQ = 90° - (90° - \theta/2) = \theta/2$. Hence $\angle PTQ = 2\angle OPQ$. [1]

Q16. (5 marks) Answer: proofs.

(a) Tangents from a point are equal: AQ = AR, BQ = BP, CP = CR. [2] Perimeter = AB + BC + CA = AB + BP + PC + CA = (AB + BQ) + (CR + CA) = AQ + AR = 2AQ. [2] So AQ = ½ perimeter. [1]

OR (b) Let the tangent at C meet XY at A (touching at P) and X′Y′ at B (touching at Q). OA bisects ∠PAC and OB bisects ∠QBC, since the two tangents from each point are equal (ΔOPA ≅ ΔOCA, ΔOQB ≅ ΔOCB). [2] XY ∥ X′Y′, so ∠PAB + ∠QBA = 180° (co-interior angles). [1] Hence ∠OAB + ∠OBA = 90°, and ∠AOB = 180° − 90° = 90°. [2]

Q17. (5 marks) Answer: 13 cm; 120/13 cm.

OP = √(12² + 5²) = 13 cm (∠OAP = 90°). [2] OP is the perpendicular bisector of AB; let it meet AB at M. Area of ΔOAP: ½ × OA × AP = ½ × OP × AM, so AM = 5 × 12/13 = 60/13 cm. [2] AB = 2AM = 120/13 cm. [1]

Q18. (4 marks) Answer: (i) 90°; (ii) 15 m; (iii) 30 m, or 240/17 m.

(i) 90° (tangent ⊥ radius). [1]

(ii) √(17² − 8²) = 15 m. [1]

(iii)(a) PA = PB (tangents from a point) [1], so 30 m. [1]

OR (iii)(b) AB = 2 × (OA × PA/OP) [1] = 2 × 120/17 = 240/17 m. [1]

Q19. (4 marks) Answer: (i) AB + CD = AD + BC; (ii) 10 m; (iii) 40 m, or proof.

(i) AB + CD = AD + BC. [1]

(ii) 8 + 12 = AD + 10, AD = 10 m. [1]

(iii)(a) 8 + 10 + 12 + 10 [1] = 40 m. [1]

OR (iii)(b) AB + CD = BC + AD, with AB = CD and BC = AD, gives 2AB = 2BC [1], so all sides are equal: a rhombus. [1]

All questions are original and © Master Testing Agency. Free to download and use for personal practice; not for resale. Every answer in this paper was checked independently by computer: tangents constructed with coordinates and their lengths and angles measured, and every proof tested on many random circles and points.