Circles Class 10 Important Questions

10 questions · 27 marks · no calculator · step-marked answers

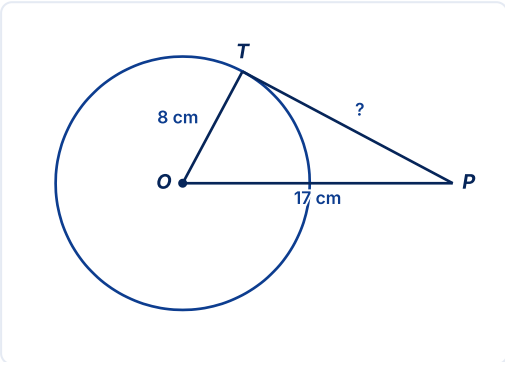
Name _____ Date _____ Score / 27

- Original questions in the board paper's question types, from 1-mark MCQs to a case study. Try every question before you look at the answers.
- No calculator: as in the CBSE board exam, everything works by hand.
- Worked answers with step marks for 5 questions start after the questions. The other 5 open free on the chapter page with a free account (no card): the link is next to each one.
- Online, with more practice: cbsemathrevision.com/class-10/circles

Section A · Multiple choice and assertion–reason (1 mark each)

1. **1 mark · Length of tangent**

A circle has radius 8 cm and a point P is 17 cm from its centre. The length of a tangent from P to the circle is



Radius 8 cm, OP = 17 cm

(a) 15 cm

(b) 9 cm

(c) $\sqrt{353}$ cm

(d) 25 cm

2. **1 mark · Tangents from an external point**

Tangents PA and PB from an external point P touch a circle with centre O at A and B. If $\angle APB = 70°$, then $\angle AOB$ is

(a) $70°$

(b) $110°$

(c) $140°$

(d) $55°$

3. 1 mark · Tangent perpendicular to radius

In the following question, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

Assertion (A): The tangents drawn at the two ends of a diameter of a circle are parallel.

Reason (R): A tangent to 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).

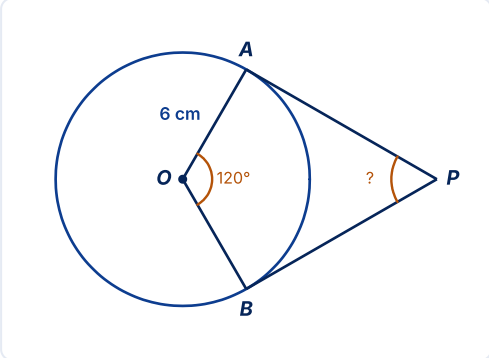
(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true.

Section B · Short answer (2 marks each)

4. 2 marks · Tangents from an external point

From a point P outside a circle with centre O and radius 6 cm, tangents PA and PB are drawn. If $\angle AOB = 120°$, find $\angle APB$ and the length PA.



Tangents PA and PB; angle AOB = 120°

5. 2 marks · Tangents from an external point

A quadrilateral $ABCD$ is drawn so that each of its sides touches a circle. If $AB = 7$ cm, $BC = 9$ cm and $CD = 8$ cm, find AD.

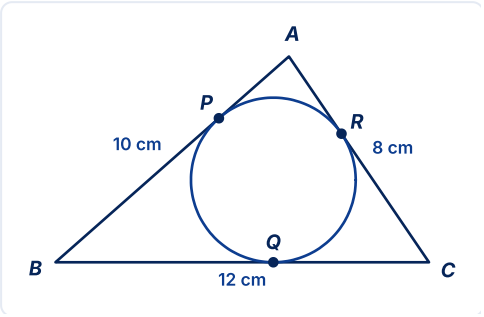
Section C · Short answer (3 marks each)

6. **3 marks · Tangents from an external point**

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

7. **3 marks · Tangents from an external point**

A circle is inscribed in $\triangle ABC$, touching AB, BC and CA at P, Q and R. If $AB = 10$ cm, $BC = 12$ cm and $CA = 8$ cm, find AP, BQ and CR.

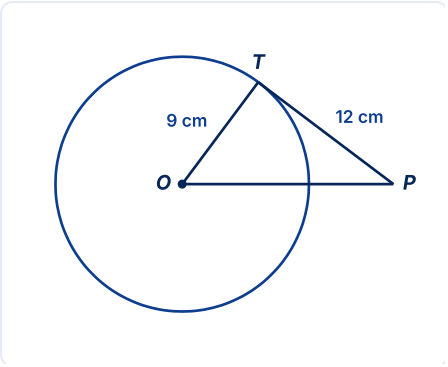


Incircle of triangle ABC: AB = 10 cm, BC = 12 cm, CA = 8 cm

Section D · Long answer (5 marks each)

8. **5 marks · Tangent perpendicular to radius**

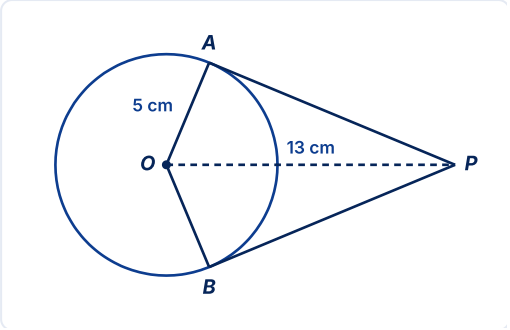
(a) Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact. (b) PT is a tangent at T to a circle with centre O and radius 9 cm. If $PT = 12$ cm, find OP and the shortest distance from P to the circle.



Radius 9 cm, tangent PT = 12 cm

9. **5 marks · Tangents from an external point**

PA and PB are tangents from a point P to a circle with centre O and radius 5 cm, and $OP = 13$ cm. Find (a) the length PA, (b) the area of the quadrilateral $OAPB$, (c) the length of the chord AB.



Radius 5 cm, OP = 13 cm

Section E · Case study (4 marks)

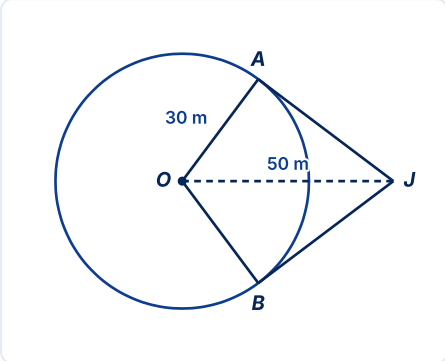
10. **4 marks · Tangents from an external point**

Roads to a circular park. Two straight roads run from a junction J and each just touches the circular boundary of a park, at A and at B. The park has centre O and radius 30 m, and $OJ = 50$ m.

i. Find the length of road from J to A. *[1 mark]*

ii. Explain why JB has the same length as JA. *[1 mark]*

iii. Find the area of the region $OAJB$ enclosed by the two roads and the radii OA and OB. *[2 marks]*



Park of radius 30 m, OJ = 50 m

Answers and worked solutions

Question 1 — 1 mark

The tangent is perpendicular to the radius:

$\sqrt{17^2 - 8^2} = \sqrt{225} = 15$ cm **A1**

Correct option: (a) 15 cm

Question 2 — 1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/circles#iq-2

Question 3 — 1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/circles#iq-3

Question 4 — 2 marks

Answer: $60°$; $6\sqrt{3}$ cm

$\angle OAP = \angle OBP = 90°$, so

$\angle APB = 360° - 180° - 120° = 60°$ **A1**

OP bisects $\angle AOB$, so $\angle AOP = 60°$ and

$PA = OA \tan 60° = 6\sqrt{3}$ cm **A1**

Question 5 — 2 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/circles#iq-5

Question 6 — 3 marks

Answer: Proved

Let PA and PB be tangents from P to a circle with centre O. Join OA, OB and OP **M1**

$\angle OAP = \angle OBP = 90°$ (tangent $\perp$ radius), $OA = OB$ (radii), OP common, so

$\triangle OAP \cong \triangle OBP$ (RHS) **A1**

Hence $PA = PB$ (corresponding parts of congruent triangles) **A1**

Question 7 — 3 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/circles#iq-7

Question 8 — 5 marks

Answer: $OP = 15$ cm; 6 cm

(a) Let the tangent at T be the line XY, and take any point $Q \neq T$ on XY. Q lies outside the circle (a tangent meets the circle only at T) **M1**

So $OQ > OT$ for every such Q: OT is the shortest distance from O to XY **R1**

The shortest segment from a point to a line is the perpendicular, so $OT \perp XY$ **A1**

(b) $\angle OTP = 90°$: $OP = \sqrt{9^2 + 12^2} = 15$ cm **A1**

Shortest distance from P to the circle $= OP - r = 15 - 9 = 6$ cm **A1**

Question 9 — 5 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/circles#iq-9

Question 10 — 4 marks

i. $OA \perp JA$: $JA = \sqrt{50^2 - 30^2} = 40\,m$ **A1**

ii. Tangents drawn from an external point to a circle are equal, so $JB = JA = 40\,m$ **A1**

iii. $\text{ar}(OAJ) = \frac{1}{2} \times 30 \times 40 = 600\ \text{m}^2$ **M1**

$\text{ar}(OAJB) = 2 \times 600 = 1200\ \text{m}^2$ **A1**

More on this chapter, free: revision notes, a Route to 95 and practice with instant feedback at cbsemathrevision.com/class-10/circles

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