

CIRCLES (Tangents to a Circle)

Worksheet 3 — Challenge Round

Name: _____	Roll No.: _____	Date: _____
Class: X Subject: Mathematics	Time: 90 minutes	Max. Marks: 50

General Instructions: All questions are compulsory. Section A: 10 MCQs (1 mark each, Q9–10 are Assertion–Reason). Section B: 6 questions of 1 mark. Section C: 4 questions of 2 marks. Section D: 4 questions of 3 marks. Section E: 2 questions of 5 marks. Section F: one case study (4 marks) with an internal choice. Figures are not drawn to scale.

SECTION A — Multiple Choice Questions

1 mark each

Assertion–Reason (Q9–10): (a) Both A and R are true and R is the correct explanation of A. (b) Both A and R are true but R is not the correct explanation of A. (c) A is true but R is false. (d) A is false but R is true.

- The length of the tangent drawn from a point 6.5 cm from the centre of a circle of radius 2.5 cm is **[1]**
(a) 4 cm (b) 6 cm (c) 7.5 cm (d) 9 cm
- If a chord AB subtends 100° at the centre O and tangents at A and B meet at P, then $\angle APB =$ **[1]**
(a) 100° (b) 90° (c) 80° (d) 50°
- PT is a tangent at T to a circle with centre O. If $\angle OPT = 30^\circ$ and $OP = 10$ cm, then $OT =$ **[1]**
(a) 5 cm (b) $5\sqrt{3}$ cm (c) 10 cm (d) $10\sqrt{3}$ cm
- PQ is a chord of a circle with centre O and PT is the tangent at P. If $\angle QPT = 40^\circ$, then $\angle POQ =$ **[1]**
(a) 100° (b) 80° (c) 40° (d) 50°
- Two concentric circles have radii 20 cm and 12 cm. A chord of the larger circle touches the smaller. Its length is **[1]**
(a) 16 cm (b) 24 cm (c) 32 cm (d) 40 cm
- ABCD circumscribes a circle touching AB, BC, CD, DA at P, Q, R, S. If $AP = 5$ cm, $BP = 4$ cm, $CR = 7$ cm and $DR = 3$ cm, the perimeter of ABCD is **[1]**
(a) 19 cm (b) 76 cm (c) 28 cm (d) 38 cm
- The radius of the circle inscribed in a right triangle with sides 20 cm, 21 cm and 29 cm is **[1]**
(a) 6 cm (b) 5 cm (c) 7 cm (d) 4 cm
- Tangents PA and PB are drawn from P to a circle of radius r with centre O such that $OP = 2r$. Then $\angle APB =$ **[1]**
(a) 30° (b) 45° (c) 90° (d) 60°
- Assertion (A): The distance between two parallel tangents of a circle of radius 6 cm is 12 cm. **[1]**
Reason (R): A tangent to a circle is parallel to the radius through the point of contact.
- Assertion (A): A quadrilateral ABCD with $AB = 5$ cm, $BC = 7$ cm, $CD = 6$ cm and $DA = 8$ cm can circumscribe a circle. **[1]**
Reason (R): In a quadrilateral circumscribing a circle, the sums of opposite sides are equal.

SECTION B — Very Short Answer Questions

1 mark each

- Fill in the blank: The tangent at any point of a circle is _____ to the radius through the point of contact. **[1]**
- True or False: The tangents drawn at the ends of a diameter of a circle are parallel. **[1]**
- A point P is 10 cm from the centre of a circle of radius 8 cm. Find the length of the tangent from P. **[1]**
- If the angle between two tangents PA and PB from P to a circle with centre O is 120° , find $\angle AOB$. **[1]**
- PA and PB are tangents from P to a circle with centre O. If $\angle OPA = 35^\circ$, find $\angle AOP$. **[1]**

16. True or False: A circle can have infinitely many tangents.

[1]

SECTION C — Short Answer Questions I

2 marks each

17. AB is a diameter of a circle and AT is the tangent at A. The line BT meets the circle at Q. If $\angle ABQ = 32^\circ$, find $\angle ATQ$.

[2]

18. TP and TQ are tangents from T to a circle and $\angle PTQ = 40^\circ$. Find $\angle PQT$.

[2]

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

[2]

20. PQ is a chord of length 12 cm of a circle of radius 10 cm. The tangents at P and Q meet at T. Find TP.

[2]

SECTION D — Short Answer Questions II

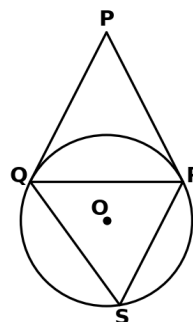
3 marks each

21. Prove that the line segment joining the points of contact of two parallel tangents of a circle passes through the centre.

[3]

22. In the figure, PQ and PR are tangents from P to a circle with centre O, $\angle QPR = 50^\circ$, and chord RS $\parallel$ PQ. Find $\angle RQS$.

[3]



23. A circle is inscribed in $\triangle ABC$, touching BC, CA and AB at P, Q and R. If AB = 12 cm, AQ = 8 cm and CQ = 6 cm, find BC and the perimeter of $\triangle ABC$.

[3]

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

[3]

SECTION E — Long Answer Questions

5 marks each

25. PA and PB are tangents from an external point P to a circle with centre O, and $\angle APB = 120^\circ$. Prove that $OP = 2AP$. **[5]**
26. Two circles with centres O and O' and radii 15 cm and 20 cm intersect at P and Q, such that OP and O'P are tangents to the two circles respectively. Find the length of the common chord PQ. **[5]**

SECTION F — Case Study Based Question

4 marks

27. A quadrilateral plot ABCD has a circular pond inside it that touches the boundaries AB, BC, CD and DA at P, Q, R and S respectively. The boundary lengths are $AB = 14$ m, $BC = 12$ m and $CD = 10$ m. **[4]**

(i) Find the length AD. **[1]**

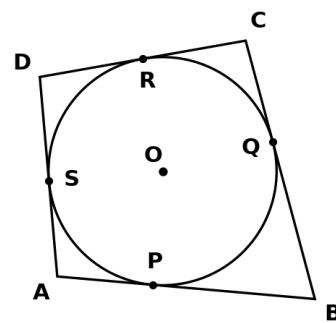
(ii) If $\angle COD = 70^\circ$, find $\angle AOB$, where O is the centre of the pond.

[1]

(iii) If $AP = 8$ m, find BP, CR and DS. **[2]**

OR

(iii) Prove that $AB + CD = AD + BC$. **[2]**



— End of Worksheet —