

CIRCLES

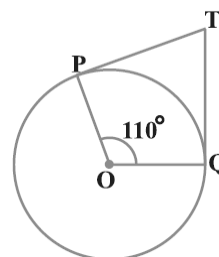
MAIN CONCEPTS AND RESULTS

- ** The meaning of a tangent and its point of contact on a circle.
- ** Tangent is perpendicular to the radius through the point of contact.
- ** Only two tangents can be drawn to a circle from an external point.
- ** Lengths of tangents from an external point to a circle are equal.

QUESTIONS FROM NCERT BOOKS

1. From a point Q, the length of the tangent to a circle is 24 cm and the distance of Q from the centre is 25 cm. Find the radius of the circle.

2. In the given figure, if TP and TQ are the two tangents to a circle with centre O so that $\angle POQ = 110^\circ$, then find $\angle PTQ$.



3. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of 80° , then find $\angle POA$.

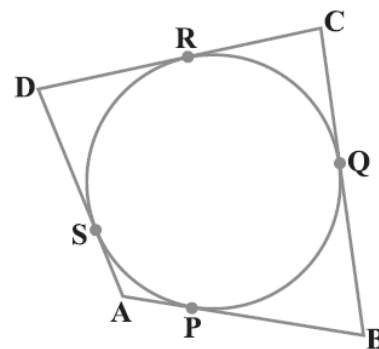
4. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

5. Prove that the perpendicular at the point of contact to the tangent to a circle passes through the centre.

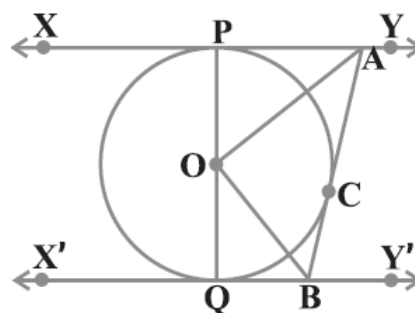
6. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle.

7. 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.

8. In the given figure, a quadrilateral ABCD is drawn to circumscribe a circle. Prove that $AB + CD = AD + BC$



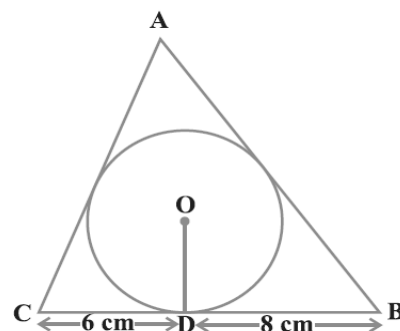
9. In the given figure, XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B. Prove that $\angle AOB = 90^\circ$.



10. 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.

11. Prove that the parallelogram circumscribing a circle is a rhombus.

12. In the given figure, triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively. Find the sides AB and AC.



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

ANSWERS

1. 7 cm

2. 70°

3. 50°

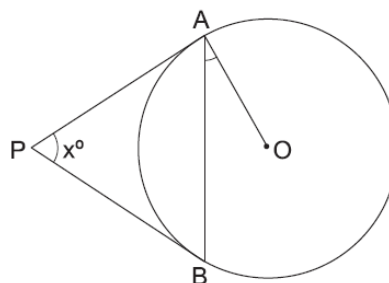
ADDITIONAL QUESTIONS

1. From a point P outside a circle with centre O, tangents PA and PB are drawn to the circle. Prove that OP is the right bisector of the line segment AB.

2. Prove that the tangents at the extremities of any chord of a circle, make equal angles with the chord.

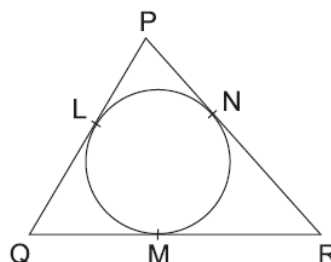
3. Prove that the tangent drawn at the midpoint of an arc of a circle is parallel to the chord joining the end points of the arc.

4. Two tangents PA and PB are drawn to a circle with centre O from an external point P. Prove that $\angle APB = 2\angle OAB$.

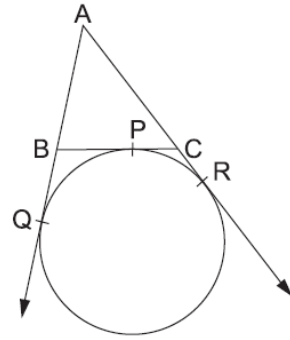


5. In the given figure, a circle is inscribed in a triangle PQR.

If PQ = 10 cm, QR = 8 cm and PR = 12 cm, find the lengths of QM, RN and PL.



6. A circle is touching the side BC of $\triangle ABC$ at P and touching AB and AC produced at Q and R respectively. Prove that $AQ = \frac{1}{2}$ (perimeter of $\triangle ABC$).



ANSWERS

5. $QM = 3$ cm, $RN = 5$ cm, $PL = 7$ cm.