Ch-10 Circles

1. **Tangent to a Circle** – A tangent to a circle is a line that touches the circle at only one point.
2. **Theorem 1** – The tangent at any point of a circle is perpendicular to the radius, through the point of contact.

   Proof – We have the centre O of the given circle and XY is the tangent to the circle at a point P.

   Let us take a point Q on XY other than P. Join OQ.
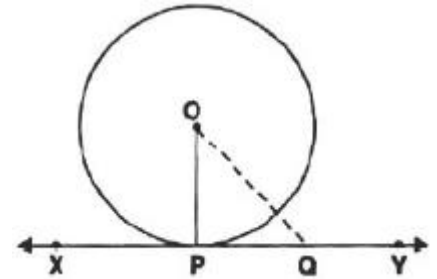
   Obviously, Q lies outside the circle.

   i.e., OQ > OP

   Since, all the points on XY, except P lies outside the circle.

   i.e., OP is smaller than all the distance of the point O from XY.

   i.e., OP is the smallest distance of O from XY.

   i.e., OP ⊥ XY.

3. **Theorem 2** – The lengths of tangents drawn from an external point to a circle are equal.

   Proof – We have the centre O of the given circle and PQ and PR are 2 tangents from the common point P.

   Join OP, OQ, and OR.

   According to Theorem 1, $\angle$OPQ and $\angle$ORP are both right angles

   Now, in ΔOPQ and ΔOPR,

OQ = OR	(radii)
OP = OP	(common)
ΔOPQ ≅ ΔOPR	(RHS)

   This gives,   PQ = PR   (CPCT)