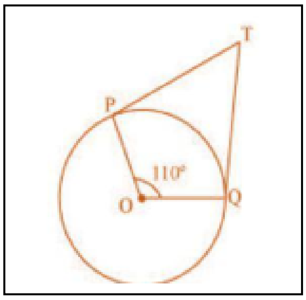
ATOMIC ENERGY CENTRAL SCHOOL- KAKRAPAR

CLASS-10

CHAPTER-10, CIRCLE

MODULE-3

Question No.1 in figure, it TP and TQ are the two tangents to a circle with centre O so that $\angle POQ = 110^0$, then find $\angle PTQ$.



Sol- given that TP and TQ are two tangents of the circle.

We know tha the radius is perpendicular to tangent. Therefore

$\angle OPT = 90^0$ and $\angle OQT = 90^0$

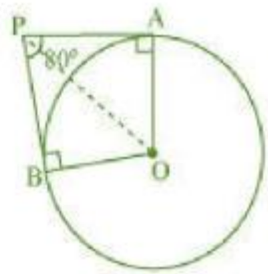
In quadrilateral POQT, $\angle OPT + \angle POQ + \angle OQT + \angle PTQ = 360^0$

Or $90^0 + 110^0 + 90^0 + \angle PTQ = 360^0$

Or $\angle PTQ = 70^0$

Question No.2 if tangents PA and PB from a point p to a circle with centre O are inclined to each other at angle of 80^0 than find $\angle POA$.

Given: PA and PB are two tangents of the circle.
We know that the radius is perpendicular to tangent. Therefore, $OA \perp PA$ and $OB \perp PB$.
$\Rightarrow \angle OBP = 90°$ and $\angle OAP = 90°$
In quadrilateral AOBP, $\angle OAP + \angle APB + \angle PBO + \angle BOA = 360°$
$\Rightarrow 90° + 80° + 90° + \angle BOA = 360°$
$\Rightarrow \angle BOA = 360° - 260° = 100°$
In ΔOPB and ΔOPA,



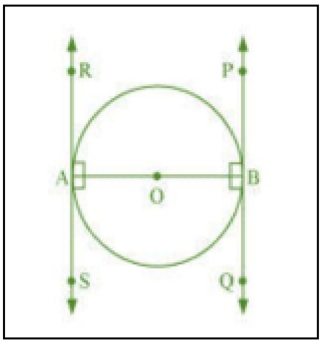
AP = BP	[Tangents drawn from same external point]
OA = OB	[Radii]
OP = OP	[Common]
Therefore, $\Delta OPB \cong \Delta OPA$	[SSS Congruency rule]

Hence, $\angle POB = \angle POA$

$\angle POA$ -= ½ $\angle AOB$ = ½$(100^0) = 50^0$

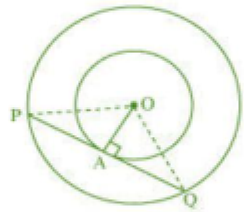
<u>Question No.3</u> Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

Let AB is diameter, PQ and RS are tangents drawn at ends of diameter.
We know that the radius is perpendicular to tangent. Therefore, OA ⊥ RS and OB ⊥ PQ.
$\angle OAR = 90°$ and $\angle OAS = 90°$
$\angle OBP = 90°$ and $\angle OBQ = 90°$
From the above, we have
$\angle OAR = \angle OBQ$ [Alternate angles]
$\angle OAS = \angle OBP$ [Alternate angles]
Since, alternate angles are equal. Hence, PQ is parallel to PS.

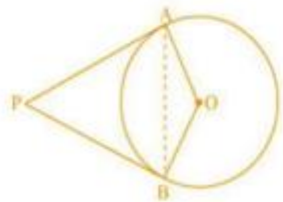


Question No.4 Two concentric circle are radii 5cm and 3cm. find the length of the chord of the larger circle which touches the smaller circle.

Let O be the centre of two concentric circles with radius 5 cm (OP) and 3 cm (OA). PQ is chord of larger circle which is a tangent to inner circle.
We know that the radius is perpendicular to tangent. Therefore, in ΔPQO, OA ⊥ PQ.
In ΔAPO, by Pythagoras theorem,
$OA^2 + AP^2 = OP^2$
$\Rightarrow 3^2 + AP^2 = 5^2$
$\Rightarrow 9 + AP^2 = 25 \Rightarrow AP^2 = 16 \Rightarrow AP = 4$
In ΔOPQ, OA ⊥ PQ,
AP = AQ [Perpendicular from the centre bisects the chord]
So, PQ = 2AP = 2 × 4 = 8
Hence, the length of chord of larger circle is 8 cm.



Question No.5 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 segments joining the points of contact at the centre.



Let PA and PB are two tangents of circle with centre O. Join OA and OB.
We know that the radius is perpendicular to tangent. Therefore
$\angle OAP = 90°$ and $\angle OBP = 90°$.
In quadrilateral OAPB, $\angle OAP + \angle APB + \angle PBO + \angle BOA = 360°$
$\Rightarrow 90° + \angle APB + 90° + \angle BOA = 360° \Rightarrow \angle APB + \angle BOA = 180°$
Hence, it is proved 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.