DAY 3

1. **Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle, is bisected at the point of contact.** **[Example 1]**

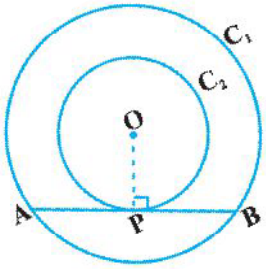
Sol:- To Prove: $AP = PB$

AB is tangent for smaller circle and P is its point of contact.

$\therefore OP \perp AB$

Since AB is chord for larger circle also we know that **perpendicular from the centre bisects the chord.**

$\therefore AP = PB$



2. **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.** **[Ex 10.2, Q7]**

Sol:- In right $\angle$d ΔOAP,

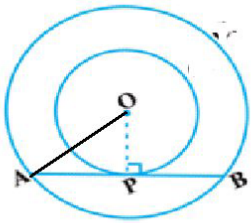
$H^2 = P^2 + B^2$

$\Rightarrow 5^2 = 3^2 + AP^2$

$\Rightarrow 5 \times 5 = 3 \times 3 + AP^2 \quad \Rightarrow 169 = 25 + x^2$

$\Rightarrow AP^2 = 25 - 9 = 16 = 4^2 \quad \Rightarrow AP = 4$

Hence $\mathbf{AB = 2AP = 2 \times 4 = 8\ cm}$



3. **Prove that the angle subtended 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.** **[Ex 10.2, Q10]**

Sol:- To Prove: $\angle AOC + \angle ABC = 180^0$

Since $OA \perp AB \quad \therefore \angle OAB = 90^0$

and $OC \perp BC \quad \therefore \angle OCB = 90^0$

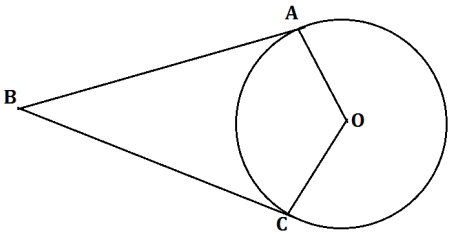
In quadrilateral OABC

$x + \angle OAB + y + \angle OCB = 360^0$

$\Rightarrow x + 90^0 + y + 90^0 = 360^0$

$\Rightarrow x + y = 360^0 - 180^0 = 180^0$

Hence $\angle AOC + \angle ABC = 180^0$



4. **If TP and TQ are the two tangents to a circle with centre O so that $\angle POQ = 110^0$ then find $\angle PTQ$.** **[Ex 10.2, Q 3]**

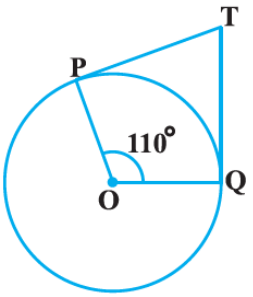
Sol:- In quadrilateral OPTQ

$110^0 + \angle P + \angle PTQ + \angle Q = 360^0$

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

$\Rightarrow \angle PTQ + 290^0 = 360^0$

Hence $\angle PTQ = 360^0 - 290^0 = 70^0$



ALTER METHOD: Students can do it directly as Example 3 can be used as a standard result.

$\Rightarrow \quad \angle PTQ + 110^0 = 180^0$

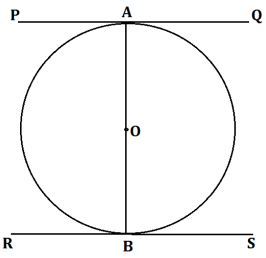
Hence $\angle PTQ = 180^0 - 110^0 = 70^0$

5. Prove that the tangents drawn at the end of a diameter of a circle are parallel.

[Ex 10.2, Q4]

Sol:- Let PQ and RS be tangents at the end of diameter AB.

To Prove: PQ||RS



Since AB is a diameter and it passes through the centre.

$\therefore$ B is a point of contact on tangent XY.

$\Rightarrow$ OB $\perp$ RS and $\angle OBS = 90^0$ ... ... i)

Similarly OA $\perp$ PQ and $\angle OAP = 90^0$ ... ... ii)

From i) and ii), we get

$\angle OBY = \angle OAP$ which are alternate angles for lines PQ and XY.

$\Rightarrow$ PQ||RS