Circles
1. Lines related to a Circle
2. Tangents and Secants
3. Number of Tangents
4. Theorems related to a Tangent
5. Important Corollaries
Circles

Lines related to Circle

- Line outside the circle
- Tangent
- Chord
- Secant
- Diameter
- Centre
For any point on the circumference of a circle, No. of tangents = 1

No. of Tangents

For any point on the circumference of a circle, No. of tangents = 1

No. of tangents from an external point to circle = 2

Tangents and Secants

- Does not touch the circle
- No point of intersection

- 2 points of intersection
- PQ is the secant

- Touches only at 1 point
- PQ is called tangent
Theorems related to Tangent

1: Tangents and Radius

**Theorem 1:**

The tangent at any point of the circle is perpendicular to the radius through the point of contact.

Hence, $PQ \perp OA$

**Theorem 2:**

Tangents from external point

Theorem:- The tangent at any point of the circle is perpendicular to the radius through the point of contact.

Hence, $PQ \perp OA$
2: Tangents from external point

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

Hence, $PT = QT$

Can be proved in two ways:

- Congruence of $\triangle TOP$ & $\triangle TOQ$
- Pythagoras’ theorem
For $C_1$ and $C_2$ being concentric circles,

- OP is perpendicular bisector of AB
- $AP = PB$

PA and PB are 2 tangents drawn from an external point P to a circle with centre at O,

- $\angle APB = 2 \angle BAO$
- $\angle PAB = \angle PBA = (90^\circ - \frac{x}{2})$

$x$ and $y$ are supplementary
i.e. $x + y = 180^\circ$
**Circles**

- **Line and a circle**
- **Tangents and secants**
- **Tangents**
  - Number of tangents
  - Theorems related to tangents
  - Tangent and radius
  - Tangents from external point
- **Important corollaries**

**Mind Map**