🟦 Chapter 10: Circles – Class 10 Maths

📌 Key Concepts

1. A **circle** is the set of all points in a plane that are at a **fixed distance (radius)** from a fixed point (center).
2. **Chord** – a line segment joining any two points on the circle.
3. **Secant** – a line that intersects the circle in **two** points.
4. **Tangent** – a line that touches the circle at **only one** point.

📏 Tangent to a Circle

- A **tangent** is a special case of a secant where both endpoints of the chord coincide.
- The **point of contact** is the only common point between the tangent and the circle.

🎯 Important Theorems

📐 Theorem 10.1:

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

If O is the center, P is point of contact, and XY is the tangent, then
OP ⊥ XY

🧠 Theorem 10.2:

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

If tangents PA and PB are drawn from a point P to a circle with centre O, then:
PA = PB

👀 How Many Tangents Can You Draw?

Position of the point	No. of tangents
Inside the circle	0
On the circle	1
Outside the circle	2

✅ Some More Results

- The line through the radius and the point of contact is called the **normal**.
- Tangents drawn at the **ends of a diameter** are always **parallel**.
- A line **perpendicular** to a tangent at the point of contact **passes through the centre**.

🔢 Formula to Find Tangent Length

If a point lies outside the circle:

Length of tangent = $\sqrt{(\text{Distance}^2 \text{ from centre} - \text{Radius}^2)}$

🧪 Important Examples (Quick View)

- **Two tangents drawn from a point are equal.**
- **Tangents at endpoints of a chord bisect it if they touch an inner circle.**
- **Angle between tangents from external point = 2 × angle between radius and tangent.**
- **In a quadrilateral circumscribing a circle:** AB + CD = AD + BC

📊 Previous Year Exam Focus

Type of Question	Frequency
Prove tangent is ⊥ to radius	★★★★★
Equal length tangents from external point	★★★★★
Quadrilateral with circle (AB + CD = AD + BC)	★★★★
Use Pythagoras to find tangent length	★★★★
Tangents from diameter or parallel tangents	★★★

🗒️ Summary

1. **Tangent** touches the circle at one point.
2. Tangent is always **perpendicular to the radius** at the point of contact.
3. **From a point outside a circle**, exactly **two equal tangents** can be drawn.