



CIRCLE

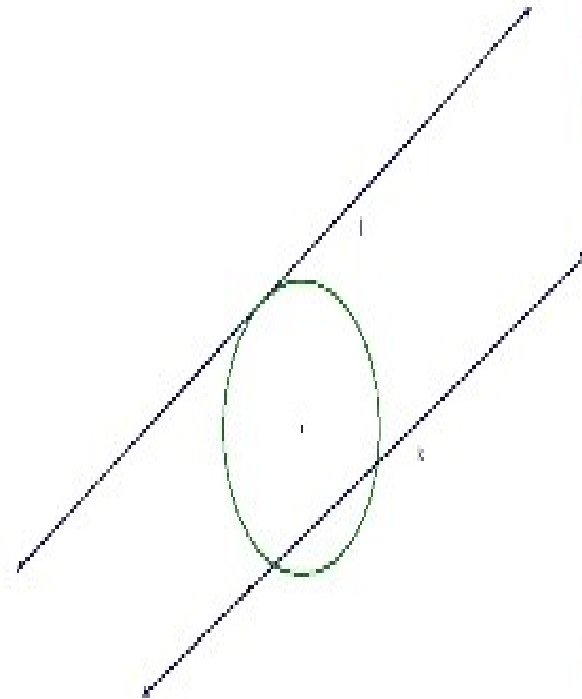
STANDARD - 10TH

SUBJECT - MATHS

CHAPTER - CIRCLE

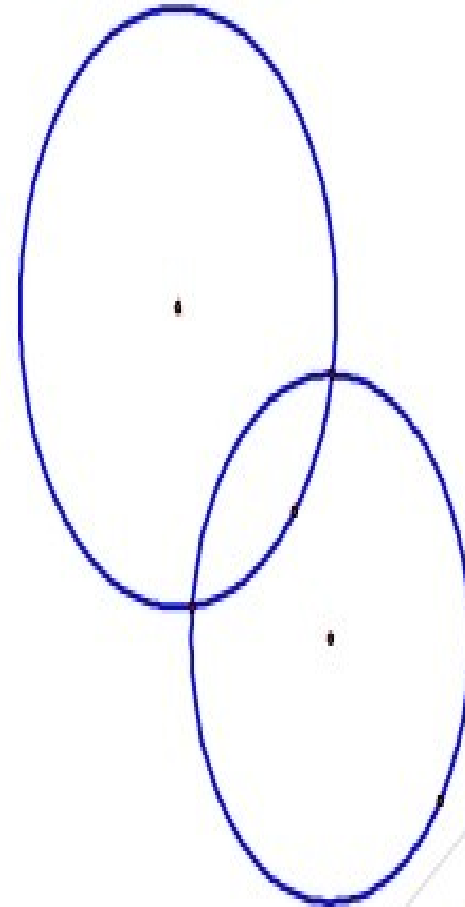
Some definitions :-

- A **secant** is a line that intersects a circle in two points. **Line k** is a secant.
- A **tangent** is a line in the plane of a circle that intersects the circle in exactly one point. **Line j** is a tangent.



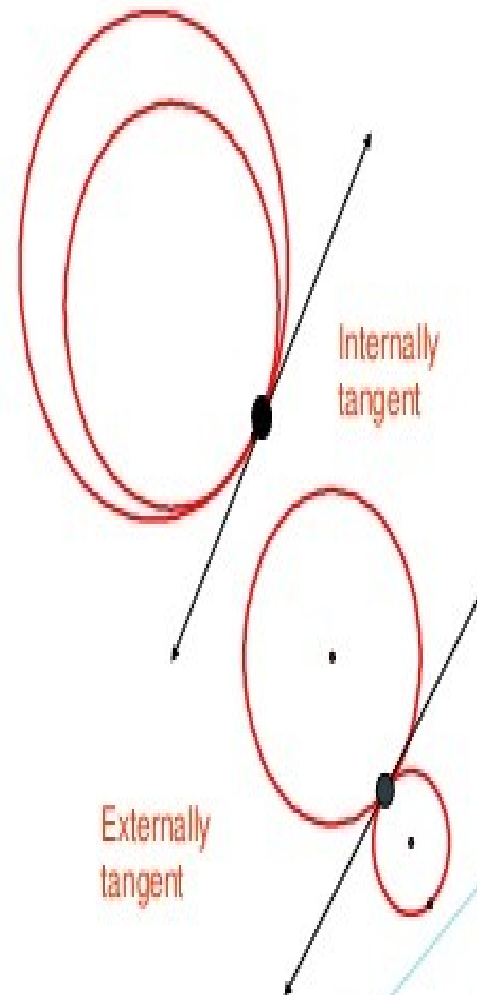
Cocentric circles

- In a plane, two circles can intersect in **two points**, **one point**, or **no points**. Coplanar circles that intersect in one point are called **tangent circles**. Coplanar circles that have a common center are called **concentric**.

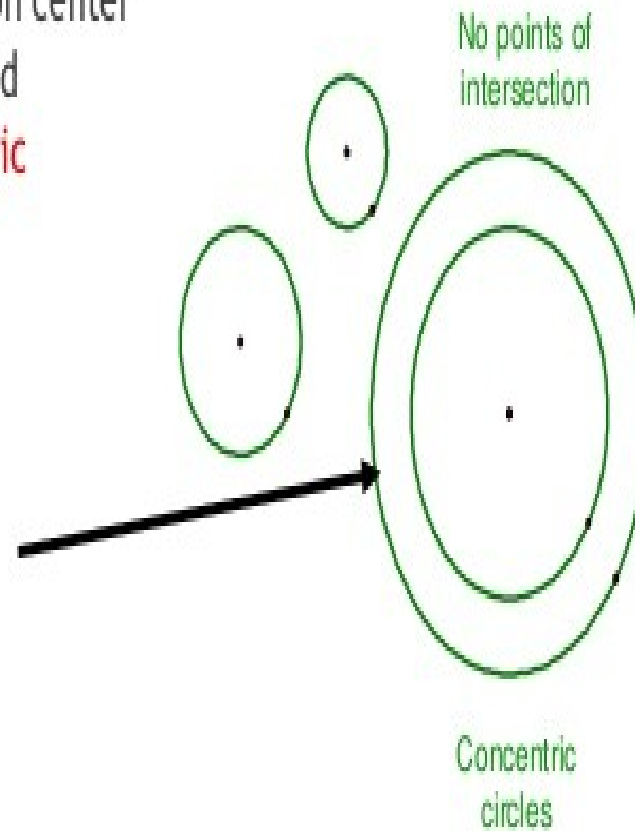


Tangent :-

- A line or segment that is tangent to two coplanar circles is called a common tangent. A common internal tangent intersects the segment that joins the centers of the two circles. A common external tangent does not intersect the segment that joins the center of the two circles.

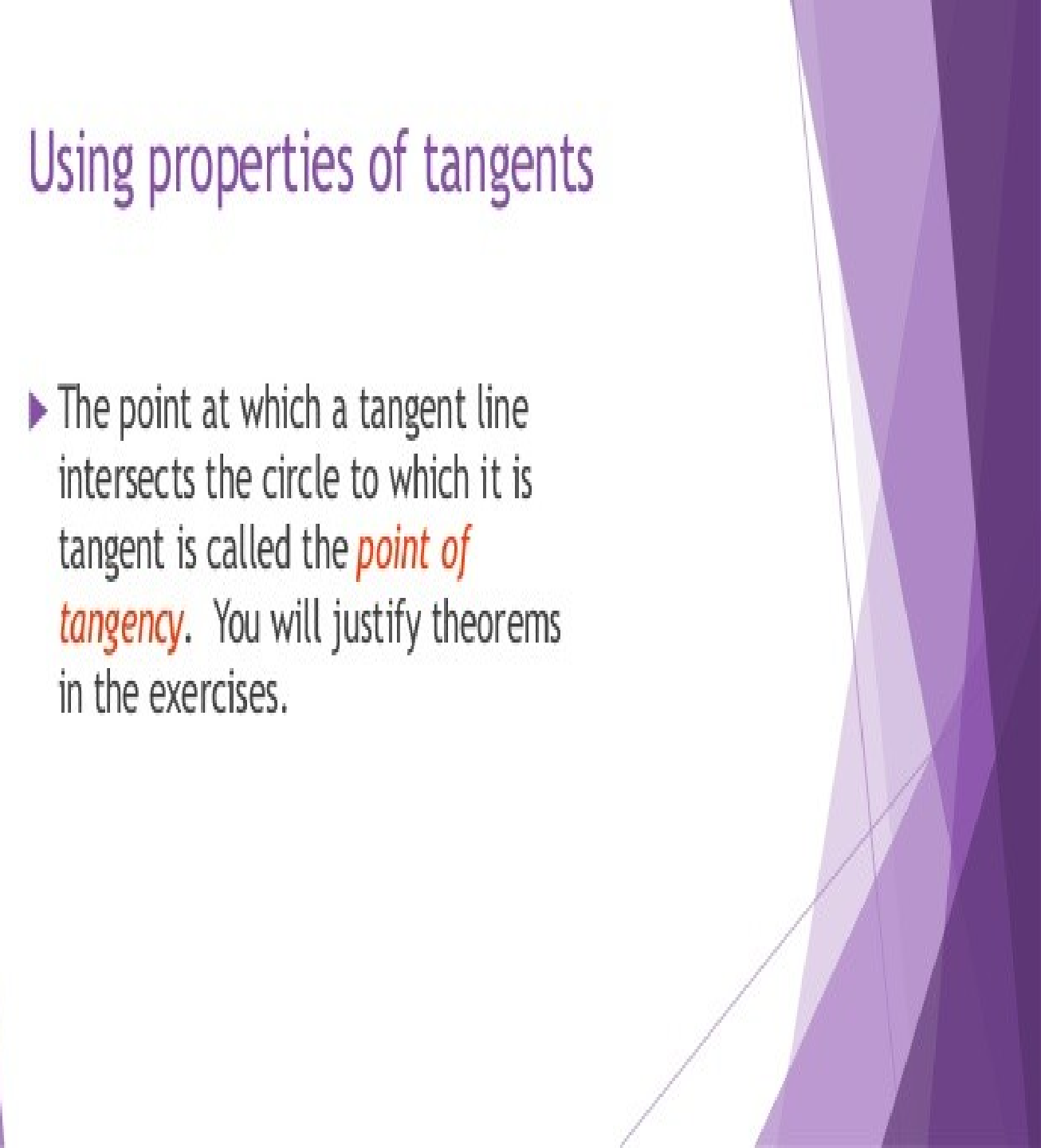


- ▶ Circles that have a common center are called **concentric circles**.



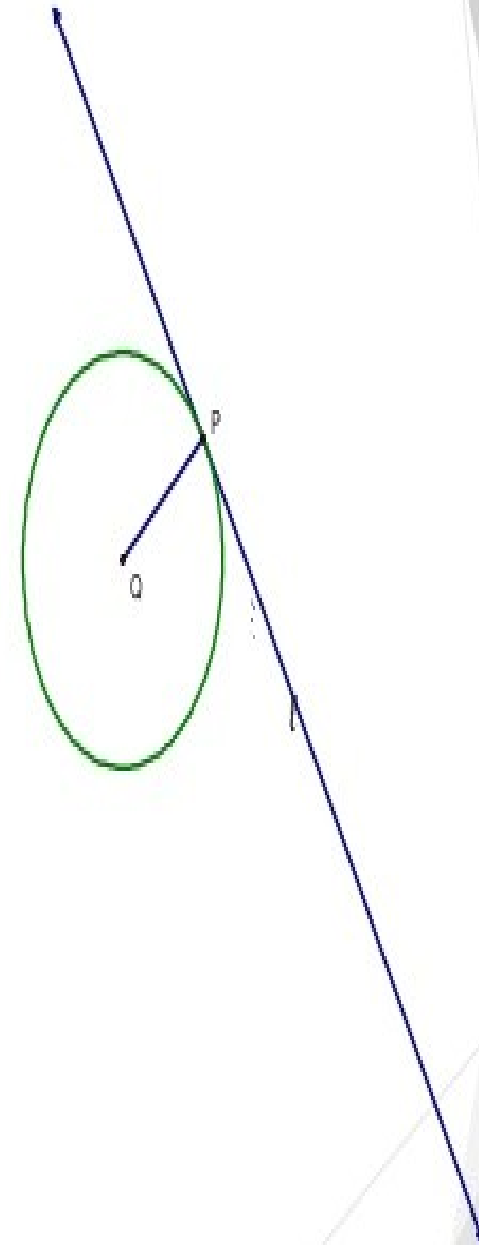
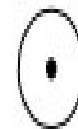


Using properties of tangents

- ▶ The point at which a tangent line intersects the circle to which it is tangent is called the *point of tangency*. You will justify theorems in the exercises.
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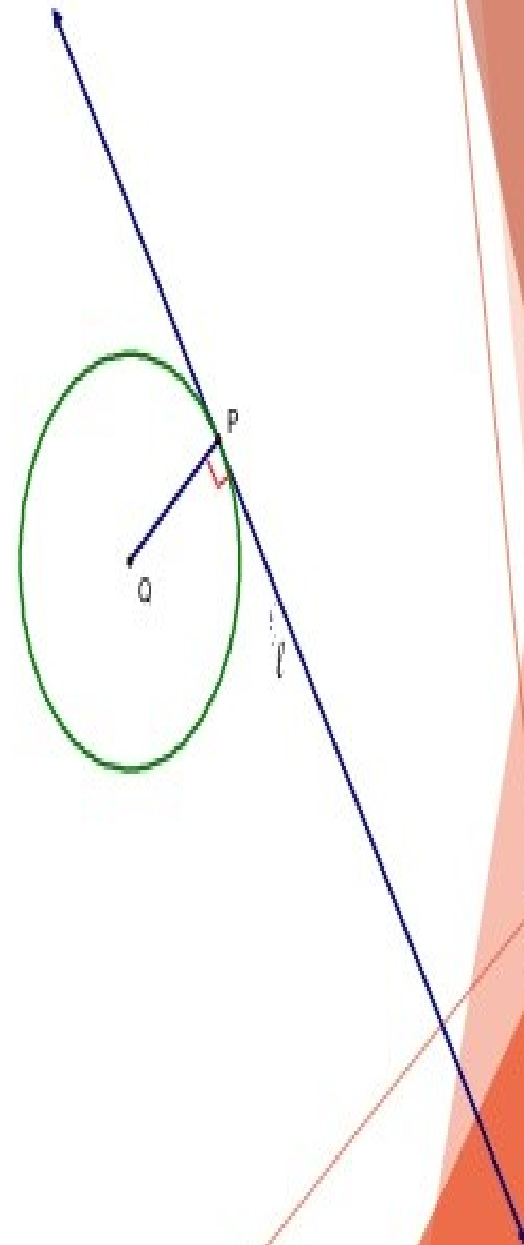
Theorem 10.1

- ▶ If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency.
- ▶ If l is tangent to $\odot Q$ at point P , then $l \perp QP$.



Theorem 10.2

- ▶ In a plane, if a line is perpendicular to a radius of a circle at its endpoint on a circle, then the line is tangent to the circle.
- ▶ If $\ell \perp QP$ at P , then ℓ is tangent to Q .

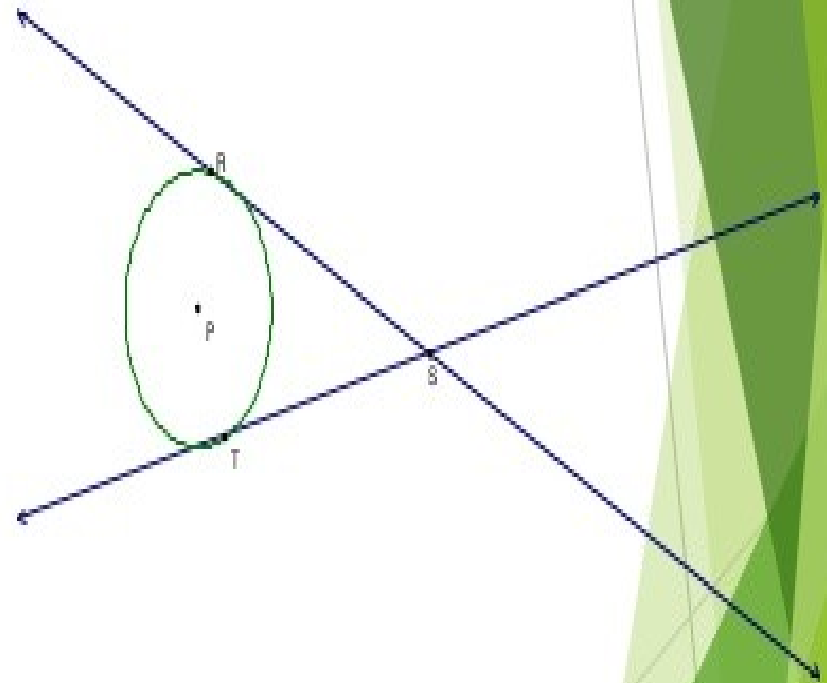


Note:

- ▶ From a point in the circle's exterior, you can draw exactly two different tangents to the circle. The following theorem tells you that the segments joining the external point to the two points of tangency are congruent.

Theorem 10.3

- ▶ If two segments from the same exterior point are tangent to the circle, then they are congruent.
- ▶ IF SR and ST are tangent to $\odot P$, then $SR \cong ST$.



Proof of theorem 10.3

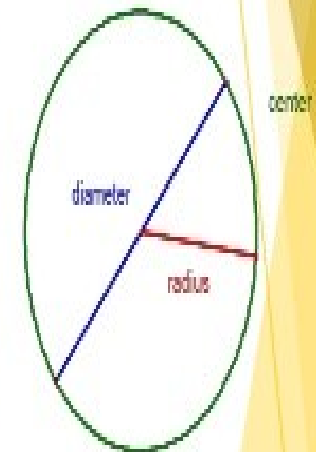
- ▶ Given: SR is tangent to $\odot P$ at R .
- ▶ Given: ST is tangent to $\odot P$ at T .
- ▶ Prove: $SR \cong ST$

Statements:

SR and ST are tangent to $\odot P$	Given
$SR \perp RP, ST \perp TP$	Tangent and radius are \perp .
$RP = TP$	Definition of a circle
$RP \cong TP$	Definition of congruence.
$PS \cong PS$	Reflexive property
$\triangle PRS \cong \triangle PTS$	HL Congruence Theorem
$SR \cong ST$	CPCTC

Points to remember :-

- ▶ **Circle** - set of all points in a plane that are **equidistant** from a given point called a **center** of the circle. A circle with **center P** is called "circle P", or $\odot P$.
- ▶ The distance from the center to a point on the circle is called the **radius** of the circle. Two circles are **congruent** if they have the same radius.
- ▶ The distance across the circle, through its center is the **diameter** of the circle. The diameter is twice the radius.
- ▶ The terms **radius** and **diameter** describe segments as well as measures.



Points to remember :-

- ▶ A **chord** is a segment whose endpoints are points on the circle. PS and PR are **chords**.
- ▶ A **diameter** is a chord that passes through the center of the circle. PR is a **diameter**.
- ▶ In a plane, the **interior of a circle** consists of the points that are **inside** the circle. The **exterior of a circle** consists of the points that are **outside** the circle.
- ▶ A radius is a segment whose endpoints are the center of the circle and a point on the circle.
- ▶ QP, QR, and QS are radii of Q. All radii of a circle are congruent.

