

Short Notes: Properties of Tangents

1. Tangent Definition

A tangent to a circle is a line that touches the circle at exactly one point.

This point is called the point of contact.

Key Properties (Most Important for Boards)

1. A tangent is perpendicular to the radius at the point of contact

If a line touches a circle at point P, and O is the center, then:
 $OP \perp$ tangent at P

This is the most used property for numerical questions.

2. Lengths of tangents drawn from an external point are equal

If PA and PB are tangents drawn from an external point P to a circle, then:

$PA = PB$ and $\angle OPA = \angle OPB$

This is heavily used in board exam questions.

3. Tangent touches circle at only one point

Meaning it cannot intersect the circle at two points; if it does, it becomes a secant.

4. Tangent does not cross inside the circle

It just touches and moves away.

A line crossing inside the circle is *not* a tangent.

5. Angle between tangent and radius is always 90°

This property is used to form right triangles in exam-based problems.

Important Theorem (CBSE Must-Know)

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

This theorem is almost guaranteed in exams — either direct proof or application.

Number of Tangents From a Point & Important Results Related to Tangents

1. Number of Tangents From a Point to a Circle

A tangent is a line that touches the circle at exactly one point.

The number of tangents you can draw depends on where the point lies.

(a) Point Outside the Circle – Two Tangents

If a point lies outside the circle, exactly two tangents can be drawn from that point to the circle.

Key Result:

If PA and PB are tangents from an external point P, then $PA = PB$

This is the most important theorem for Class 10.

(b) Point On the Circle – One Tangent

If the point lies on the circle itself, you can draw exactly one tangent at that point.

Key Property:

The tangent at that point is perpendicular to the radius.

(c) Point Inside the Circle – No Tangent

If the point lies strictly inside the circle, no tangent can be drawn.

Reason:

A tangent must touch the circle at only one point, but a point inside the circle cannot form such a line.