Class 10 CBSE Maths Chapter 10 Notes: Circles

One of the most basic shapes in geometry is a circle. Hence, CBSE Class 10 Math is as fundamental as it could be. This chapter centres on the properties and applications of tangents to a circle. These concepts are crucial to be studied not only for the purpose of board exams but also for higher studies in geometry. In order to help students grasp the material, these notes provide a summary of the chapter, including key ideas, definitions, formulae, and advice, in addition to solved examples.

CBSE Class 10 Maths Notes Chapter-10 Circles - Revision Notes

Important Concepts in Circles

- **Tangent to a Circle**: A line is said to be tangent to a circle if it intersects it at precisely one point.
- **Point of Contact**: The single point at which a tangent touches a circle.

Properties of Tangents:

- A tangent to any circle is perpendicular to the radius (r) drawn to the point of contact.
- From any external point, exactly two tangents can be drawn to a circle, and these tangents are equal in length.

Definitions

- **Circle:** A set of all points in any plane equidistant from a fixed point called the centre.
- **Radius:** The distance between the circle's centre and any fixed point on the circle.
- **Chord:** A line segment that is joining any 2 points on the circle.
- **Diameter:** The diameter of a circle is its longest chord, which is twice its radius and passes through its centre.
- **Secant:** A line that crosses a circle twice is called a secant.
- **Tangent:** A line that touches the circle precisely once without going over it is called a tangent.

Formulas

- **Length of Tangents from an External Point:** If P is an external point, O is the centre of the circle with radius r, and d is the distance between P and O.

$Length\ of\ Tangent = \sqrt{[d^2 - r^2]}$

- **Perpendicularity of Tangent and Radius**: If PT is a tangent and OT is the radius at the point of contact, T:

$OT \perp PT\ (aOTP = 90)$

Solved Examples

Problem: Prove that the tangents drawn at a circle's diameter's ends are parallel to one another.

Solution:

Let there be a circle with a centre at point O and a diameter of AB. At A, CD is the tangent to the circle & at B, EF is the tangent to the circle.
Let's prove that CD || EF.
Now, OA ⊥ CD & OB ⊥ EF
[radius (r) of the circle is perpendicular to the tangent drawn at the point of contact]
Hence, between CD & EF, the alternate interior angles are equal (is of 90 degrees).
⇒ CD || EF [if the alternate angles are equal; then lines are parallel].

Problem: A circle has a radius of 5 cm, and the distance between its centre and an external point is 13 cm. Find the length of the tangent that is drawn from the external point to the circle.

Solution:
Given: Radius (r) = 5 cm,
Distance from centre to external point (d) = 13 cm.
Using the Pythagoras theorem:
Length of Tangent = $\sqrt{d2-r2}$
= $\sqrt{132 - 52} = \sqrt{169-25}$
= $\sqrt{144}$ = 12 cm = Length of the tangent.

Tips & Tricks

- **Remember the Key Property:** Always note that the radius (r) is perpendicular to the tangent at the point of contact. This property simplifies many problems.
- **Use Diagrams:** Draw clear diagrams to visualise the problem and label all known and unknown values for clarity.
- **Check Equal Tangents:** For tangents drawn from an external point, ensure both tangents are equal in length to cross-check your calculations.
- **Practice Proofs:** Practice derivations of tangent properties, as they are commonly asked in exams.

Key Features of CBSE Class 10 Maths Notes Chapter 10 Circles

- **Concept Clarity:** The notes explain tangents, chords, and secants in a clear and organised manner, helping students understand chapter objectives effectively.
- **Comprehensive Coverage of Formulas:** Key formulas, such as tangent length and radius relationships, are clearly outlined for quick revision.
- **Solved Examples with Practical Relevance:** Practical examples demonstrate tangent properties in real-world scenarios and prepare students for exams.
- **Interactive Practice Problems:** Diverse practice questions encourage independent problem-solving and confidence-building.
- **Exam-Friendly Format:** Concepts and formulas are presented clearly for efficient last-minute review.

The CBSE Class 10 Maths Notes for Chapter 10 Circles are a priceless tool for understanding the material and performing well on tests because of their characteristics.