

NCERT Solutions Class 10 Maths

Chapter 10: Circles

Exercise 10.1

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Quick Summary: In NCERT Solutions Class 10 Maths Chapter 10 Exercise 10.1, students learn fundamental concepts about tangents to a circle through 4 comprehensive problems. This exercise covers tangent properties, secant-tangent relationships, and length calculations which are essential for CBSE board exams and form the foundation for advanced circle geometry.

Key Takeaways:

- A tangent touches a circle at exactly one point and is perpendicular to the radius at that point
- Length of tangent from external point: $PT = \sqrt{OP^2 - r^2}$ where OP is distance from center to external point
- Two tangents drawn from an external point to a circle are equal in length
- Understanding difference between tangent, secant, and chord properties for solving circle problems

Complete Solutions

Question 1

QUESTION

How many tangents can a circle have?

SOLUTION

The question asks about the number of tangents a circle can have. A tangent is a line that touches the circle at only one point.

Step 1: Define a tangent

A tangent to a circle is a line that intersects the circle at exactly one point. This point is called the point of tangency.

Step 2: Visualize tangents on a circle

Imagine a circle. You can draw a line that touches the circle at any point on its circumference. Since there are infinitely many points on the circumference of a circle, we can draw a tangent at each of these points.

Step 3: Consider different points on the circumference

For every distinct point on the circle's circumference, we can draw a unique tangent. No two tangents will be the same unless they touch the circle at the exact same point.

Step 4: Relate points to tangents

Since a circle is a continuous curve, it has an infinite number of points on its circumference. Each of these points can serve as a point of tangency.

Step 5: Conclude the number of tangents

Because there are infinitely many points on the circumference of a circle, and each point can have a tangent, a circle can have infinitely many tangents.

Final Answer: Infinitely many

ANSWER

Infinitely many

Question 2

QUESTION

Fill in the blanks:

1. A tangent to a circle intersects it in _____ point(s).
2. A line intersecting a circle in two points is called a _____.
3. A circle can have _____ parallel tangents at the most.
4. The common point of a tangent to a circle and the circle is called _____.

SOLUTION

This question tests our understanding of the basic definitions and properties related to tangents and secants of a circle.

(i) A tangent to a circle intersects it in _____ point(s).

Step 1: Recall the definition of a tangent.

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

Step 2: Apply the definition.

Therefore, a tangent intersects the circle at only one point.

Answer: One

(ii) A line intersecting a circle in two points is called a _____.

Step 1: Recall the definition of a secant.

A secant is a line that intersects a circle at two distinct points.

Step 2: Apply the definition.

Therefore, a line intersecting a circle in two points is called a secant.

Answer: Secant

(iii) A circle can have _____ parallel tangents at the most.

Step 1: Visualize parallel tangents.

Imagine a circle. We can draw a tangent at one point. A parallel tangent can be drawn at the diametrically opposite point.

Step 2: Consider more than two parallel tangents.

It's impossible to draw more than two tangents that are parallel to each other on the same circle. Any other tangent will intersect the existing parallel tangents.

Answer: Two

(iv) The common point of a tangent to a circle and the circle is called _____.

Step 1: Recall the definition of the point of contact.

The point where the tangent touches the circle is called the point of contact.

Step 2: Apply the definition.

Therefore, the common point of a tangent to a circle and the circle is called the point of contact.

Answer: Point of contact

ANSWER

(i) One

(ii) Secant

(iii) Two

(iv) Point of contact

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Question 3

QUESTION

A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Length PQ is:

- (A) 12 cm (B) 13 cm (C) 8.5 cm (D) $\sqrt{119}$ cm

SOLUTION

This question tests our understanding of tangents to a circle and the Pythagorean theorem.

Step 1: Visualize the problem

Imagine a circle with center O and radius 5 cm. A tangent PQ touches the circle at point P. A line is drawn from the center O to point Q on the tangent, such that OQ = 12 cm. We need to find the length of PQ.

Step 2: Recall the tangent property

The tangent at any point of a circle is perpendicular to the radius through the point of contact. Therefore, OP is perpendicular to PQ, making triangle OPQ a right-angled triangle at P.

Step 3: Apply the Pythagorean theorem

In right-angled triangle OPQ, we have:

We are given OP = 5 cm (radius) and OQ = 12 cm. We need to find PQ.

Substituting the given values:

Step 4: Solve for PQ

Rearranging the equation:

Taking the square root of both sides:

Step 5: State the final answer

The length of PQ is cm.

Therefore, the correct answer is option (D).

ANSWER

Option D, $\sqrt{119}$ cm

Question 4

QUESTION

Draw a circle and two lines parallel to a given line such that one is a tangent and the other, a secant to the circle.

SOLUTION

This question tests our understanding of the definitions of tangents and secants to a circle, and how they relate to a given line.

Step 1: Draw a circle

Draw a circle with any convenient radius and center O . This will be our reference circle.

Step 2: Draw the given line

Draw a line outside the circle. This is the line to which we will draw parallel lines.

Step 3: Draw a tangent parallel to the given line

A tangent is a line that touches the circle at exactly one point. To draw a tangent parallel to line l , first visualize where such a tangent would be. It should be on the "edge" of the circle, parallel to l .

Draw a line that touches the circle at only one point and is parallel to line l . You can use a ruler and set square to ensure parallelism. The line is the tangent.

Step 4: Draw a secant parallel to the given line

A secant is a line that intersects the circle at two points. To draw a secant parallel to line l , visualize a line that cuts through the circle, also parallel to l .

Draw a line that intersects the circle at two distinct points and is parallel to line l . Again, use a ruler and set square to ensure parallelism. The line is the secant.

Step 5: Final Result

We now have a circle, a line l , a tangent parallel to l , and a secant parallel to l .

The lines t and s are parallel to the given line l , with t being a tangent and s being a secant to the circle.

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Key Formulas

Important Formulas for Exercise 10.1

Formula / Concept	Description
Tangent to a Circle	A line that intersects the circle at exactly one point.
Point of Contact	The common point of the tangent and the circle.
Secant of a Circle	A line that intersects a circle in two distinct points.
Theorem 10.1: Tangent-Radius Perpendicularity	The tangent at any point of a circle is perpendicular to the radius through the point of contact.
Mathematical Representation of Theorem 10.1	If O is the center, P is the point of contact, and XY is the tangent, then the radius OP is perpendicular to the tangent XY. $OP \perp XY$ This implies that the angle between the radius and the tangent at the point of contact is 90° . $\angle OPX = 90^\circ$
Pythagorean Theorem in Tangent Problems	In a right-angled triangle formed by the radius, the tangent, and the line segment from the center to the external point, the Pythagorean theorem can be applied. If OT is the radius, PT is the tangent, and OP is the distance from the center to the external point P, then: $OT^2 + PT^2 = OP^2$
Number of Tangents to a Circle	A circle can have an infinite number of tangents. There can be at most two parallel tangents on a given circle.
Theorem 10.2: Length of Tangents from an External Point	The lengths of tangents drawn from an external point to a circle are equal. If PA and PB are two tangents from an external point P to a circle, then $PA = PB$.

Top FAQs

Q1. How many questions are in NCERT Solutions Class 10 Maths Chapter 10 Circles Exercise 10.1 for CBSE board exam 2025-26?

NCERT Solutions Class 10 Maths Chapter 10 Circles Exercise 10.1 contains exactly 4 questions. These questions focus on the fundamental concepts of tangent to a circle and provide step by step solutions for CBSE board exam 2025-26 preparation. All 4 questions are important for understanding the Tangent to a Circle Theorem.

Q2. Where can I download free PDF of NCERT Solutions for Class 10 Maths Chapter 10 Circles Exercise 10.1 with step by step solutions?

You can download the free PDF of NCERT Solutions for Class 10 Maths Chapter 10 Circles Exercise 10.1 from various educational websites offering CBSE board exam 2025-26 study materials. These PDFs include detailed step by step solutions for all 4 questions covering tangent to a circle concepts. The solutions are prepared according to the latest CBSE syllabus for session 2025-26.

Q3. How many marks does Chapter 10 Circles carry in CBSE Class 10 Maths board exam 2025-26 and what is the weightage of Exercise 10.1?

Chapter 10 Circles carries approximately 5 marks in CBSE Class 10 Maths board exam 2025-26 under Unit V - Geometry. Exercise 10.1 covers fundamental concepts like Tangent to a Circle Theorem which form the foundation for solving higher-level problems. These concepts are crucial for scoring full marks in circle-related questions in the board examination.

Q4. Which is the most difficult question in NCERT Solutions Exercise 10.1 of Class 10 Maths Chapter 10 Circles for CBSE board exam preparation?

Question 4 in NCERT Solutions Exercise 10.1 of Class 10 Maths Chapter 10 Circles is generally considered the most challenging as it requires application of both Tangent to a Circle Theorem and properties of tangents. The step by step solutions help students understand the logical reasoning needed for CBSE board exam 2025-26. Practicing this question thoroughly ensures better conceptual clarity.

Q5. What is the Tangent to a Circle Theorem explained in NCERT Solutions Class 10 Maths Chapter 10 Circles Exercise 10.1?

The Tangent to a Circle Theorem in NCERT Solutions Class 10 Maths Chapter 10 states that a tangent to a circle is perpendicular to the radius at the point of contact. Exercise 10.1 provides step by step solutions demonstrating this fundamental theorem which is essential for CBSE board exam 2025-26. This theorem is the foundation for solving all problems related to tangents in Class 10 Maths.

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