NCERT Solutions Class 9 Maths
Chapter 9: Circles
EXERCISE 9.1

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Quick Summary: In NCERT Solutions Class 9 Maths Chapter 9 Exercise 9.1, students learn fundamental properties of circles and chords through detailed step-by-step solutions. This exercise covers the Equal Chords Theorem and the perpendicular relationship between the center and chords, which are essential concepts for CBSE Class 9 exams and form the foundation for advanced circle geometry in higher classes.

Key Takeaways:

- Equal chords in congruent circles subtend equal angles at their respective centers: if AB = CD, then \angle AOB = \angle COD
- The perpendicular from the center of a circle to a chord bisects the chord and creates two equal segments
- Congruent circles have the same radius, and equal chords in such circles have identical geometric properties
- These theorems are frequently tested in CBSE board exams and help solve complex problems involving circle constructions and proofs

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Question 1

QUESTION

Recall that two circles are congruent if they have the same radii. Prove that equal chords of congruent circles subtend equal angles at their centres.

SOLUTION

This question asks us to prove that if we have congruent circles (circles with the same radius), then equal chords in those circles will subtend equal angles at the center of their respective circles. This is similar to Theorem 10.1, but here we are dealing with congruent circles instead of the same circle.

Step 1: Draw the diagram and state what is given

Let's consider two congruent circles with centers O and O'. Let AB and CD be equal chords in these circles respectively. So, we have:

Circle with center O is congruent to circle with center O'.

AB = CD

We need to prove that .

Step 2: Consider the triangles formed by the radii and chords

Consider triangles and .

Step 3: Show the triangles are congruent using the SSS congruence rule

We have:

OA = O'C (Radii of congruent circles)

OB = O'D (Radii of congruent circles)

AB = CD (Given)

Therefore, by the SSS (Side-Side-Side) congruence rule:

Step 4: Use CPCT (Corresponding Parts of Congruent Triangles)

Since the triangles are congruent, their corresponding parts must be equal. Therefore:

(By CPCT)

Step 5: Conclusion

Hence, we have proven that equal chords of congruent circles subtend equal angles at their centers.

ANSWER

Prove exactly as Theorem 9.1 by considering chords of congruent circles.

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Question 2

QUESTION

Prove that if chords of congruent circles subtend equal angles at their centres, then the chords are equal.

SOLUTION

This question tests our understanding of the relationship between angles subtended by chords at the center of congruent circles and the length of those chords. We need to prove that if these angles are equal, then the chords are also equal.

Step 1: Draw the diagram and state the given information

Let's consider two congruent circles with centers O and O'. Let AB be a chord in the circle with center O, and CD be a chord in the circle with center O'.

Given:

- Circle with center O is congruent to the circle with center O'. This means their radii are equal (OA = O'C and OB = O'D).
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Step 2: Consider triangles AOB and CO'D

We want to prove that . To do this, we will show that using the SAS (Side-Angle-Side) congruence rule.

Step 3: Apply the SAS congruence rule

In and :

- (Radii of congruent circles)
- (Given)
- (Radii of congruent circles)

Therefore, by the SAS congruence rule, .

Step 4: Use CPCT to conclude

Since , their corresponding parts are equal (CPCT - Corresponding Parts of Congruent Triangles). Therefore, .

Final Answer:

Hence, if chords of congruent circles subtend equal angles at their centres, then the chords are equal. (Proved)

Conclusion:

This proof relies on the fundamental congruence rules for triangles. By establishing the congruence of the triangles formed by the radii and the chords, we can directly infer the equality of the chords using CPCT.

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ANSWER

Use SAS axiom of congruence to show the congruence of the two triangles.

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🔢 Key Formulas

Important Formulas for Exercise 9.1

Formula / Concept	Description
Circle Definition	A circle is the collection of all points in a plane that are at a fixed distance (radius) from a fixed point (centre).
Chord	A line segment joining any two points on the circumference of a circle is called a chord. The diameter is the longest chord of a circle.
Congruent Circles	Two circles are congruent if and only if they have the same radii.
Theorem: Perpendicular from Centre to Chord	The perpendicular drawn from the centre of a circle to a chord bisects the chord. If OM \perp AB, then AM = MB.
Converse of Perpendicular from Centre to Chord Theorem	The line drawn through the centre of a circle to bisect a chord is perpendicular to the chord. If AM = MB, then OM \perp AB.
Theorem: Equal Chords and Angle Subtended at the Centre	Equal chords of a circle (or of congruent circles) subtend equal angles at the centre. If AB = CD, then \angle AOB = \angle COD.
Converse of Equal Chords Theorem	If the angles subtended by the chords of a circle (or of congruent circles) at the centre are equal, then the chords are equal. If \angle AOB = \angle COD, then AB = CD.

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Formula / Concept	Description
Theorem: Equal chords and their distance from the centre	Equal chords of a circle (or of congruent circles) are equidistant from the centre (or centres).
Converse of Equal Chords and Distance from Centre Theorem	Chords equidistant from the centre of a circle are equal in length.

Top FAQs

Q1. How many questions are included in NCERT Solutions for Class 9 Maths Chapter 9 Circles Exercise 9.1?

NCERT Solutions for Class 9 Maths Chapter 9 Circles Exercise 9.1 contains exactly 2 questions. These questions focus on fundamental concepts like equal chords theorem and perpendicular from centre to chord, which are essential for CBSE board exam 2025-26 preparation.

Q2. Where can I download free PDF of NCERT Solutions for Class 9 Maths Chapter 9 Circles Exercise 9.1 with step by step solutions?

Free PDF download of NCERT Solutions for Class 9 Maths Chapter 9 Circles Exercise 9.1 is available on official NCERT website and various educational platforms. These PDFs contain detailed step by step solutions for all 2 questions, aligned with CBSE syllabus 2025-26.

Q3. How many marks does Chapter 9 Circles carry in CBSE Class 9 board exam 2025-26 from Exercise 9.1?

Chapter 9 Circles carries 6 marks in CBSE Class 9 Maths board exam 2025-26 under Unit IV - Geometry. Exercise 9.1 covers basic theorems on equal chords and perpendiculars from centre, which form the foundation for solving higher-weightage circle problems.

Q4. Which is the most difficult question in NCERT Solutions Class 9 Maths Chapter 9 Circles Exercise 9.1 for CBSE board exam preparation?

Question 2 of NCERT Solutions Class 9 Maths Chapter 9 Circles Exercise 9.1 is generally considered more challenging as it requires application of perpendicular from centre to chord theorem. With proper step by step solutions and practice, students can master this concept for CBSE board exam 2025-26.

Q5. What is Equal Chords Theorem explained in NCERT Solutions for Class 9 Maths Chapter 9 Circles Exercise 9.1?

The Equal Chords Theorem in NCERT Class 9 Maths Chapter 9 Exercise 9.1 states that equal chords of a circle are equidistant from the centre. This fundamental concept is tested in CBSE board exam 2025-26 and appears in both questions of Exercise 9.1 with step by step solutions provided.

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