

**NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.3:** NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.3 focus on practical applications of trigonometry, particularly in solving problems related to heights and distances. This exercise involves using trigonometric ratios like sine, cosine, and tangent to calculate unknown heights or distances based on given angles of elevation or depression.

These solutions are created to guide students step by step, ensuring clarity and reinforcing their understanding of trigonometric concepts. Practicing these problems helps students connect mathematical theory with real-world applications, building both confidence and competence in the subject.

## NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.3 Overview

Exercise 8.3 of Chapter 8 Introduction to Trigonometry focuses on solving practical problems involving heights and distances. It introduces the application of trigonometric ratios, such as sine, cosine, and tangent, to calculate unknown heights, distances, or angles.

Key concepts in this exercise include:

- **Angle of Elevation:** The angle formed when an observer looks upward at an object.
- **Angle of Depression:** The angle formed when an observer looks downward at an object.

The exercise involves:

1. Calculating the height of a building, tower, or tree using the angle of elevation and a given distance.
2. Determining the distance between two objects using angles of elevation or depression and the height of one object.
3. Using a combination of trigonometric ratios and geometry to solve multi-step problems.

Each problem requires students to visualize the situation, often with the help of a diagram, and then apply the appropriate trigonometric ratio to find the solution. The questions are designed to build practical understanding and problem-solving skills, making trigonometry applicable to real-life scenarios like construction, navigation, and surveying.

## NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.3 PDF

You can access the NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.3 PDF by following the link provided below. This PDF includes detailed, step-by-step solutions to all the problems in the exercise, helping students understand how to apply trigonometric concepts.

It covers problems involving heights and distances, angles of elevation and depression, and the use of trigonometric ratios like sine, cosine, and tangent. The solutions are created to clarify concepts and make problem-solving easier, ensuring that students are well-prepared for their exams.

### NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.3 PDF

## NCERT Solutions for Class 10 Maths Chapter 8 Introduction to Trigonometry Exercise 8.3

Below is the NCERT Solutions for Class 10 Maths Chapter 8 Introduction to Trigonometry Exercise 8.3

Solve the followings Questions.

#### 1. Evaluate :

(i)  $\sin 18^\circ / \cos 72^\circ$     (ii)  $\tan 26^\circ / \cot 64^\circ$     (iii)  $\cos 48^\circ - \sin 42^\circ$     (iv)  $\operatorname{cosec} 31^\circ - \sec 59^\circ$

**Answer:**

$$\begin{aligned} \text{(i) } & \sin 18^\circ / \cos 72^\circ \\ &= \sin (90^\circ - 72^\circ) / \cos 72^\circ \\ &= \cos 72^\circ / \cos 72^\circ = 1 \end{aligned}$$

$$\begin{aligned} \text{(ii) } & \tan 26^\circ / \cot 64^\circ \\ &= \tan (90^\circ - 64^\circ) / \cot 64^\circ \\ &= \cot 64^\circ / \cot 64^\circ = 1 \end{aligned}$$

$$\begin{aligned} \text{(iii) } & \cos 48^\circ - \sin 42^\circ \\ &= \cos (90^\circ - 42^\circ) - \sin 42^\circ \\ &= \sin 42^\circ - \sin 42^\circ = 0 \end{aligned}$$

$$\begin{aligned} \text{(iv) } & \operatorname{cosec} 31^\circ - \sec 59^\circ \\ &= \operatorname{cosec} (90^\circ - 59^\circ) - \sec 59^\circ \\ &= \sec 59^\circ - \sec 59^\circ = 0 \end{aligned}$$

#### 2. Show that :

(i)  $\tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ = 1$

(ii)  $\cos 38^\circ \cos 52^\circ - \sin 38^\circ \sin 52^\circ = 0$

**Answer:**

$$\begin{aligned} & \text{(i) } \tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ \\ &= \tan (90^\circ - 42^\circ) \tan (90^\circ - 67^\circ) \tan 42^\circ \tan 67^\circ \\ &= \cot 42^\circ \cot 67^\circ \tan 42^\circ \tan 67^\circ \\ &= (\cot 42^\circ \tan 42^\circ) (\cot 67^\circ \tan 67^\circ) = 1 \times 1 = 1 \end{aligned}$$

$$\begin{aligned} & \text{(ii) } \cos 38^\circ \cos 52^\circ - \sin 38^\circ \sin 52^\circ \\ &= \cos (90^\circ - 52^\circ) \cos (90^\circ - 38^\circ) - \sin 38^\circ \sin 52^\circ \\ &= \sin 52^\circ \sin 38^\circ - \sin 38^\circ \sin 52^\circ = 0 \end{aligned}$$

**3. If  $\tan 2A = \cot (A - 18^\circ)$ , where  $2A$  is an acute angle, find the value of  $A$ .**

**Answer:**

$$\begin{aligned} \tan 2A &= \cot (A - 18^\circ) \\ \Rightarrow \cot (90^\circ - 2A) &= \cot (A - 18^\circ) \\ \text{Equating angles,} \\ \Rightarrow 90^\circ - 2A &= A - 18^\circ \Rightarrow 108^\circ = 3A \\ \Rightarrow A &= 36^\circ \end{aligned}$$

**4. If  $\tan A = \cot B$ , prove that  $A + B = 90^\circ$ .**

**Answer:**

$$\begin{aligned} \tan A &= \cot B \\ \Rightarrow \tan A &= \tan (90^\circ - B) \\ \Rightarrow A &= 90^\circ - B \\ \Rightarrow A + B &= 90^\circ \end{aligned}$$

**5. If  $\sec 4A = \operatorname{cosec} (A - 20^\circ)$ , where  $4A$  is an acute angle, find the value of  $A$ .**

**Answer:**

$$\begin{aligned} \sec 4A &= \operatorname{cosec} (A - 20^\circ) \\ \Rightarrow \operatorname{cosec} (90^\circ - 4A) &= \operatorname{cosec} (A - 20^\circ) \\ \text{Equating angles,} \\ 90^\circ - 4A &= A - 20^\circ \\ \Rightarrow 110^\circ &= 5A \\ \Rightarrow A &= 22^\circ \end{aligned}$$

**6. If  $A$ ,  $B$  and  $C$  are interior angles of a triangle  $ABC$ , then show that  $\sin (B+C/2) = \cos A/2$**

**Answer:**

In a triangle, sum of all the interior angles

$$A + B + C = 180^\circ$$

$$\Rightarrow B + C = 180^\circ - A$$

$$\Rightarrow (B+C)/2 = (180^\circ - A)/2$$

$$\Rightarrow (B+C)/2 = (90^\circ - A/2)$$

$$\Rightarrow \sin (B+C)/2 = \sin (90^\circ - A/2)$$

$$\Rightarrow \sin (B+C)/2 = \cos A/2$$

**7. Express  $\sin 67^\circ + \cos 75^\circ$  in terms of trigonometric ratios of angles between  $0^\circ$  and  $45^\circ$ .**

**Answer:**

$$\begin{aligned} & \sin 67^\circ + \cos 75^\circ \\ &= \sin (90^\circ - 23^\circ) + \cos (90^\circ - 15^\circ) \\ &= \cos 23^\circ + \sin 15^\circ \end{aligned}$$

## Tips and Tricks to Solve NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.3

Here are some tips and tricks to help you solve NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.3 effectively:

**Understand the Problem:** Before jumping into calculations, carefully read the problem to understand what is given and what needs to be calculated. Look for keywords like "height," "distance," "angle of elevation," or "angle of depression" to identify what trigonometric ratios will be used.

**Draw a Diagram:** Visualize the situation by drawing a diagram based on the problem. Label the angles, sides, and distances in the diagram. This makes it easier to apply the correct trigonometric ratios and solve the problem step by step.

**Use the Right Trigonometric Ratios:** In these types of problems, focus on the three main trigonometric ratios:

- **$\sin(\theta) = \text{Opposite}/\text{Hypotenuse}$**
- **$\cos(\theta) = \text{Adjacent}/\text{Hypotenuse}$**

- **Tan( $\theta$ ) = Opposite/Adjacent**

Identify which sides of the triangle you need to work with (opposite, adjacent, or hypotenuse) and apply the appropriate ratio.

**Work Step by Step:** Break down the problem into smaller steps. First, use the known angles and distances to find the unknown side or angle using the appropriate trigonometric ratio. If multiple steps are involved, solve each part carefully.

**Convert Units If Needed:** Sometimes, problems involve different units (meters, kilometers, etc.). Always make sure to convert all the units into a consistent form, typically meters or centimeters, to ensure accurate results.

**Check for Right-Angled Triangles:** Many of these problems involve right-angled triangles. If the triangle is right-angled, use trigonometric ratios to solve for the unknown sides or angles.

**Practice Different Types of Problems:** The more you practice, the better you get at recognizing which trigonometric ratio to use. Try solving a variety of problems, including those involving angles of elevation and depression, to get comfortable with the different scenarios.

**Double-Check Your Calculations:** After solving the problem, always double-check your calculations to avoid mistakes. This includes verifying that you've used the correct ratios and that your units are consistent.