NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.2: The NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.2 focus on applying trigonometric ratios to solve problems related to right-angled triangles. This exercise requires students to find the values of sine, cosine, tangent, and other trigonometric functions for given angles.

By practicing these problems, students will strengthen their understanding of how trigonometric ratios are used in various practical scenarios. These solutions provide clear explanations and step-by-step methods to help students grasp the concepts effectively and build confidence in solving trigonometric problems.

NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.2 Overview

NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.2 focuses on applying the concepts of trigonometric ratios to solve problems involving right-angled triangles. This exercise involves using the basic trigonometric ratios sine, cosine, tangent, cosecant, secant, and cotangent to find the unknown sides or angles of a right-angled triangle when certain information is provided.

In this exercise, students will be provided with real-life scenarios and diagrams, where they need to identify the right-angled triangle and then apply the relevant trigonometric ratios to solve for unknown values. It enhances the students' ability to relate trigonometry to geometry and real-world problems. The solutions guide students step-by-step to arrive at the correct answers, providing clear explanations and methods for finding the missing sides or angles. This exercise is essential for building a strong foundation in trigonometry.

NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.2 PDF

The NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.2 provide detailed step-by-step solutions to the questions in the exercise. These solutions will help students understand how to apply trigonometric ratios in various problems involving right-angled triangles. You can access the PDF of the solutions below to aid your preparation and improve your understanding of trigonometry.

NCERT Solutions for Class 10 Maths Chapter 8 Exercise 8.2 PDF

NCERT Solutions for Class 10 Maths Chapter 8 Introduction to Trigonometry Exercise 8.2

Below is the NCERT Solutions for Class 10 Maths Chapter 8 - Introduction to Trigonometry Exercise 8.2

Solve the followings Questions.

1. Evaluate the following :
(i) sin 60° cos 30° + sin 30° cos 60°
(ii) 2 $\tan^2 45° + \cos^2 30° - \sin^2 60°$
(iii) cos 45°/(sec 30° + cosec 30°)
(iv) (sin 30° + tan 45° – cosec 60°)/(sec 30° + cos 60° + cot 45°)
(v) $(5\cos^2 60° + 4\sec^2 30° - \tan^2 45°)/(\sin^2 30° + \cos^2 30°)$

Answer:

(i) sin 60° cos 30° + sin 30° cos 60°

cos 60° = 1/2, cos 30° = √3/2, sin 60° = √3/2, sin 30° = 1/2

Substituting all the values in the given expression,

(1/2 × √3/2) + (√3/2 × 1/2)

= √3/4 + √3/4

= 2√3/4

= √3/2

As we know that:

cos 60° = 1/2, cos 30° = √3/2, sin 60° = √3/2, sin 30° = 1/2

Substituting all the values in the given expression,

(1/2 × √3/2) + (√3/2 × 1/2)

= √3/4 + √3/4

= 2√3/4

= √3/2

(ii) 2 $\tan^2 45° + \cos^2 30° - \sin^2 60°$

2 tan45*tan45 + cos30*cos30 - sin60*sin60
= 2(1)(1) + cos(90-60)*cos(90-60) - sin60*sin60
= 2 + sin60*sin60 - sin60*sin60
= 2

Solution : 2

(iii) cos 45°/(sec 30° + cosec 30°)

(cos 45°)/(sec 30° + cosec 30°)

$$= \frac{\frac{1}{\sqrt{2}}}{\frac{2}{\sqrt{3}} + 2} = \frac{\frac{1}{\sqrt{2}}}{\frac{2+2\sqrt{3}}{\sqrt{3}}}$$

$$= \frac{\sqrt{3}}{\sqrt{2}\left(2 + 2\sqrt{3}\right)} = \frac{\sqrt{3}}{2\sqrt{2} + 2\sqrt{6}}$$

$$= \frac{\sqrt{3}\left(2\sqrt{6} - 2\sqrt{2}\right)}{\left(\left(2\sqrt{6}\right) + 2\sqrt{2}\right)\left(2\sqrt{6} - 2\sqrt{2}\right)}$$

$$= \frac{2\sqrt{3}\left(\sqrt{6} - \sqrt{2}\right)}{\left(2\sqrt{6}\right)^2 - \left(2\sqrt{2}\right)^2} = \frac{2\sqrt{3}\left(\sqrt{6} - \sqrt{2}\right)}{24 - 8} = \frac{2\sqrt{3}\left(\sqrt{6} - \sqrt{2}\right)}{16}$$

$$= \frac{\sqrt{18} - \sqrt{6}}{8} = \frac{3\sqrt{2} - \sqrt{6}}{8}$$

(iv) (sin 30° + tan 45° – cosec 60°)/(sec 30° + cos 60° + cot 45°)

$$\frac{\sin 30° + \tan 45° - \operatorname{cosec} 60°}{\sec 30° + \cos 60° + \cot 45°}$$

$$= \frac{\frac{1}{2} + 1 - \frac{2}{\sqrt{3}}}{\frac{2}{\sqrt{3}} + \frac{1}{2} + 1}$$

$$= \frac{\sqrt{3} + 2\sqrt{3} - 4}{4 + \sqrt{3} + 2\sqrt{3}}$$

$$= \frac{3\sqrt{3} - 4}{3\sqrt{3} + 4} \times \frac{3\sqrt{3} - 4}{3\sqrt{3} - 4}$$

$$= \frac{27 - 12\sqrt{3} - 12\sqrt{3} + 16}{27 - 16}$$

$$= \frac{43 - 24\sqrt{3}}{11}$$

(v) $(5\cos^2 60° + 4\sec^2 30° - \tan^2 45°)/(\sin^2 30° + \cos^2 30°)$

$$\frac{5\cos^2 60° + 4\sec^2 30° - \tan^2 45°}{\sin^2 30° + \cos^2 30°}$$

$$\frac{5\left(\frac{1}{2}\right)^2 + 4\left(\frac{2}{\sqrt{3}}\right)^2 - (1)^2}{\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2}$$

$$= \frac{5\left(\frac{1}{4}\right) + \left(\frac{16}{3}\right) - 1}{\frac{1}{4} + \frac{3}{4}}$$

$$= \frac{\frac{15+64-12}{12}}{\frac{4}{4}} = \frac{67}{12}$$

2. Choose the correct option and justify your choice :

(i) $2\tan 30°/1+\tan^2 30°$ =

(A) sin 60° (B) cos 60° (C) tan 60° (D) sin 30°

(ii) $1-\tan^2 45°/1+\tan^2 45°$ =

(A) tan 90° (B) 1 (C) sin 45° (D) 0

(iii) $\sin^2 A = 2 \sin A$ is true when A =

(A) 0° (B) 30° (C) 45° (D) 60°

(iv) $2\tan 30°/1-\tan^2 30°$ =
(A) cos 60° (B) sin 60° (C) tan 60° (D) sin 30°

Answer:

(i) $2\tan 30°/1+\tan^2 30°$ =
(A) sin 60° (B) cos 60° (C) tan 60° (D) sin 30°

By substituting the values of given trigonometric ratios in the above equation, we get

$= 2 \times (1/\sqrt{3})/1 + (1/\sqrt{3})^2$

$= 2 \times (1/\sqrt{3})/(1 + 1/3)$

$= (2/\sqrt{3}) / (4/3)$

$= 6/4\sqrt{3}$

= $= \sqrt{3}/2$

(ii) $1-\tan^2 45°/1+\tan^2 45°$ =

(A) tan 90° (B) 1 (C) sin 45° (D) 0

By substituting the values of given trigonometric ratios for tan 45°.

$= 1 - (1)^2/1 + (1)^2$

$= (1 - 1)/(1 + 1)$

$= 0/2$

$= 0$

(iii) $\sin^2 A = 2 \sin A$ is true when A =

(A) 0° (B) 30° (C) 45° (D) 60°

0^0

Sin 0° = 0 and Sin 2 x 0° = Sin 0° = 0

Sin 30° = ½ But Sin 2 x 30° = Sin 60° is not equal to Sin 30°. The same holds true for sin 45°.

(iv) $2\tan 30°/1-\tan^2 30°$ =

(A) cos 60° (B) sin 60° (C) tan 60° (D) sin 30°

By substituting the values of given trigonometric ratios for tan 30°, we get

$= 2 \times (1/\sqrt{3}) / 1 - (1/\sqrt{3})^2$

$= (2/\sqrt{3}) / (1 - 1/3)$

$= (2/\sqrt{3}) / (2/3)$

$= \sqrt{3}$

Out of the given option only tan 60° = √3.

3. If tan (A + B) = √3 and tan (A – B) = 1/√3; 0° < A + B ≤ 90°; A > B, find A and B.

Answer:

⇒ tan (A + B) = tan 60°

⇒ (A + B) = 60° ... (i)

tan (A – B) = 1/√3

⇒ tan (A - B) = tan 30°
⇒ (A - B) = 30° ... (ii)

Adding (i) and (ii), we get

$A + B + A - B = 60° + 30°$

$2A = 90°$

$A = 45°$

Putting the value of A in equation (i)

$45° + B = 60°$

$\Rightarrow B = 60° - 45°$

$\Rightarrow B = 15°$

Thus, A = 45° and B = 15° ……….(i)

4. State whether the following are true or false. Justify your answer.

(i) sin (A + B) = sin A + sin B.
(ii) The value of sin θ increases as θ increases.
(iii) The value of cos θ increases as θ increases.
(iv) sin θ = cos θ for all values of θ.
(v) cot A is not defined for A = 0°.

Answer:

(i) False.
Let A = 30° and B = 60°, then
sin (A + B) = sin (30° + 60°) = sin 90° = 1 and,
sin A + sin B = sin 30° + sin 60°
= 1/2 + √3/2 = 1+√3/2

(ii) True.
sin 0° = 0
sin 30° = 1/2
sin 45° = 1/√2
sin 60° = √3/2
sin 90° = 1
Thus the value of sin θ increases as θ increases.

(iii) False.
cos 0° = 1
cos 30° = √3/2
cos 45° = 1/√2

cos 60° = 1/2
cos 90° = 0
Thus the value of cos θ decreases as θ increases.

(iv) True.
cot A = cos A/sin A
cot 0° = cos 0°/sin 0° = 1/0 = undefined.

Benefits of Solving NCERT Solutions for Class 10 Maths Chapter 8 Introduction to Trigonometry Exercise 8.2

Concept Clarity: By solving the exercise, students reinforce their understanding of trigonometric ratios and their application to right-angled triangles.

Improved Problem-Solving Skills: The solutions guide students through each step, helping them develop a systematic approach to solving problems and improving their problem-solving skills.

Boost Confidence: Regular practice with detailed solutions boosts students' confidence in tackling different types of trigonometry problems during exams.

Mastering Trigonometric Ratios: Exercise 8.2 focuses on applying trigonometric ratios in real-life contexts, helping students master the use of these ratios in various mathematical problems.

Better Exam Preparation: As the exercise includes a wide range of questions, it helps students prepare thoroughly for exams and improves their accuracy and speed.

Clear Understanding of Formulas: The exercise aids in memorizing key trigonometric formulas by applying them repeatedly in different contexts, leading to better retention.