CBSE Class 12 Maths Notes Chapter 2: Chapter 2 of CBSE Class 12 Maths is about Inverse Trigonometric Functions. This chapter talks about the inverse of basic trigonometric functions like sine, cosine, and tangent. Essentially, it is about reversing these functions to find angles when you know the trigonometric values.

The chapter explains the range and domain of these inverse functions, showing what values are valid and how to use them. You'll learn how to solve problems where you need to find angles from given trigonometric expressions. The notes include simple steps and examples to help you understand and practice these concepts making it easier to solve related problems in exams.

CBSE Class 12 Maths Notes Chapter 2 Inverse Trigonometric Functions

Chapter 2 on Inverse Trigonometric Functions Notes are prepared by subject experts of Physics Wallah provides a clear and detailed explanation of the topic. This chapter focuses on understanding how to find the inverse of trigonometric functions such as sine, cosine, and tangent.

The notes cover the principal values, domains, and ranges of these inverse functions providing a structured approach to solving problems involving inverse trigonometric expressions. With step-by-step methods and practical examples these solutions make complex concepts more accessible. The expert preparation ensures that the content is accurate and aligns well with the CBSE curriculum helping students to grasp the topic thoroughly and apply it effectively in their exams.

CBSE Class 12 Maths Notes Chapter 2 Inverse Trigonometric Functions PDF

The PDF link for Chapter 2 of CBSE Class 12 Maths is available below. It provides clear explanations, step-by-step solutions and practical examples to help students understand and solve problems related to this topic.

By accessing the PDF students can conveniently study and review the chapter's content, reinforcing their knowledge and improving their preparation for exams.

CBSE Class 12 Maths Notes Chapter 2 Inverse Trigonometric Functions PDF

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Here we have provided CBSE Class 12 Maths Notes Chapter 2 Inverse Trigonometric Functions-

Introduction

Inverse trigonometric functions are a set of functions that reverse the action of the basic trigonometric functions sine, cosine, tangent, cosecant, secant, and cotangent. While trigonometric functions take angles as inputs and give ratios as outputs, inverse trigonometric functions do the opposite: they take ratios as inputs and provide angles as outputs. This concept is crucial in solving equations where the angle is unknown, given the trigonometric ratio.

In mathematics, understanding inverse trigonometric functions is essential for calculus, where they are used to evaluate integrals and solve complex problems involving rates of change. These functions also play a significant role in various applications across science and engineering. The chapter on Inverse Trigonometric Functions explores their domains, ranges, and key properties, providing students with the tools needed to analyze and solve trigonometric equations. By learning how to apply these functions, students can enhance their problem-solving skills and achieve a deeper understanding of mathematical concepts.

Basics Concepts of Inverse Trigonometric Functions

Let's recall the domain and range of trigonometric functions.

sine function, i.e., sine : $R \to [-1, 1]$

cosine function, i.e., cos : $R \to [-1, 1]$

tangent function, i.e., tan : $R - \{ x : x = (2n + 1)\pi/2, n \in Z\} \to R$

cotangent function, i.e., cot : $R - \{ x : x = n\pi, n \in Z\} \to R$

secant function, i.e., sec : $R - \{ x : x = (2n + 1)\pi/2, n \in Z\} \to R - (-1, 1)$

cosecant function, i.e., cosec : $R - \{ x : x = n\pi, n \in Z\} \to R - (-1, 1)$

The below table gives the inverse trigonometric function (principal value branches) along with their domains and ranges.

Function Name	Notation	Definition	Domain of x	Range
Arcsine or inverse sine	$y = \sin^{-1}(x)$	$x = \sin y$	$-1 \le x \le 1$	• $-\pi/2 \le y \le \pi/2$

			i.e. [-1, 1]	• -90°≤ y ≤ 90°
Arccosine or inverse cosine	$y = \cos^{-1}(x)$	$x = \cos y$	$-1 \le x \le 1$ i.e. [-1, 1]	• $0 \le y \le \pi$ • $0° \le y \le 180°$
Arctangent or Inverse tangent	$y = \tan^{-1}(x)$	$x = \tan y$	For all real numbers	• $-\pi/2 < y < \pi/2$ • $-90° < y < 90°$
Arccotangent or Inverse Cot	$y = \cot^{-1}(x)$	$x = \cot y$	For all real numbers	• $0 < y < \pi$ • $0° < y < 180°$
Arcsecant or Inverse Secant	$y = \sec^{-1}(x)$	$x = \sec y$	$x \le -1$ or $1 \le x$ R – (-1, 1)	• $0 \le y < \pi/2$or $\pi/2 < y \le \pi$ • $0° \le y < 90°$or $90° < y \le 180°$
Arccosecant	$y = \csc^{-1}(x)$	$x = \csc y$	$x \le -1$ or $1 \le x$ R – (-1, 1)	• $-\pi/2 \le y < 0$or $0 < y \le \pi/2$ • $-90° \le y < 0°$or $0° < y \le 90°$

Properties of Inverse Trigonometric Functions

Some properties of inverse trigonometric functions are listed below:

Set 1:

$\sin^{-1}(1/x) = \operatorname{cosec}^{-1}x$, $x \geq 1$ or $x \leq -1$

$\cos^{-1}(1/x) = \sec^{-1}x$, $x \geq 1$ or $x \leq -1$

$\tan^{-1}(1/x) = \cot^{-1}x$, $x > 0$

Set 2:

(i) $\sin^{-1}(-x) = -\sin^{-1} x$, $x \in [-1, 1]$

(ii) $\tan^{-1}(-x) = -\tan^{-1} x$, $x \in R$

(iii) $\operatorname{cosec}^{-1}(-x) = -\operatorname{cosec}^{-1} x$, $|x| \geq 1$

Set 3:

(i) $\cos^{-1}(-x) = \pi - \cos^{-1} x$, $x \in [-1, 1]$

(ii) $\sec^{-1}(-x) = \pi - \sec^{-1} x$, $|x| \geq 1$

(iii) $\cot^{-1}(-x) = \pi - \cot^{-1} x$, $x \in R$

Set 4:

(i) $\sin^{-1} x + \cos^{-1} x = \pi/2$, $x \in [-1, 1]$

(ii) $\tan^{-1} x + \cot^{-1} x = \pi/2$, $x \in R$

(iii) $\operatorname{cosec}^{-1} x + \sec^{-1} x = \pi/2$, $|x| \geq 1$

Set 5:

$$\textbf{(i)}\ \tan^{-1}x + \tan^{-1} y = \tan^{-1}\frac{x+y}{1-xy},\ xy < 1$$

$$\textbf{(ii)}\ \tan^{-1}x - \tan^{-1} y = \tan^{-1}\frac{x-y}{1+xy},\ xy > -1$$

$$\textbf{(iii)}\ \tan^{-1}x + \tan^{-1} y = \pi + \tan^{-1}\left(\frac{x+y}{1-xy}\right),\ xy > 1;\ x,\ y > 0$$

Set 6:

(i) $2\tan^{-1} x = \sin^{-1} \frac{2x}{1+x^2}, |x| \leq 1$

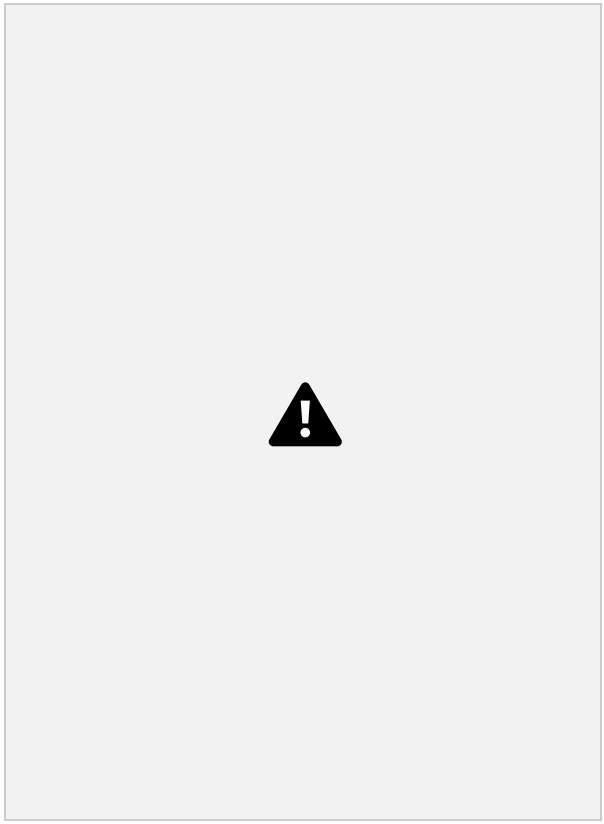
(ii) $2\tan^{-1} x = \cos^{-1} \frac{1-x^2}{1+x^2}, x \geq 0$

(iii) $2\tan^{-1} x = \tan^{-1} \frac{2x}{1-x^2}, -1 < x < 1$

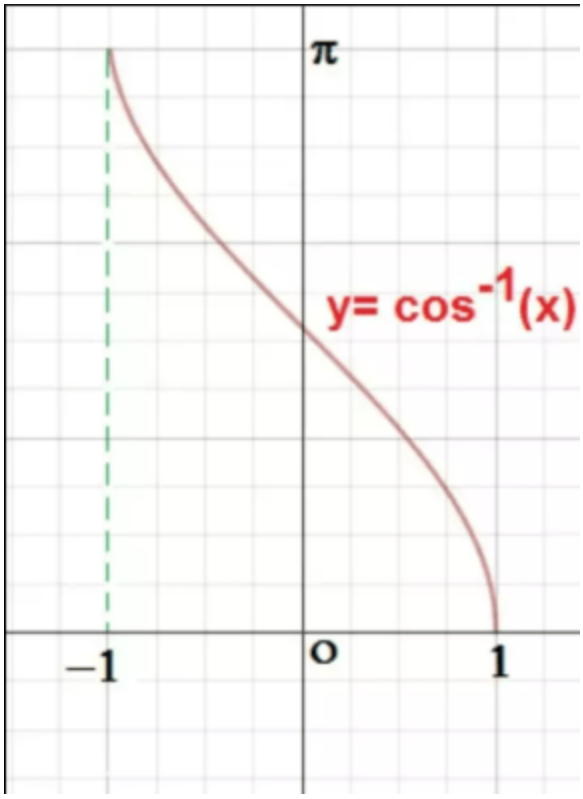
Graphs of Inverse Trigonometric functions

1. y= sin-1(x)

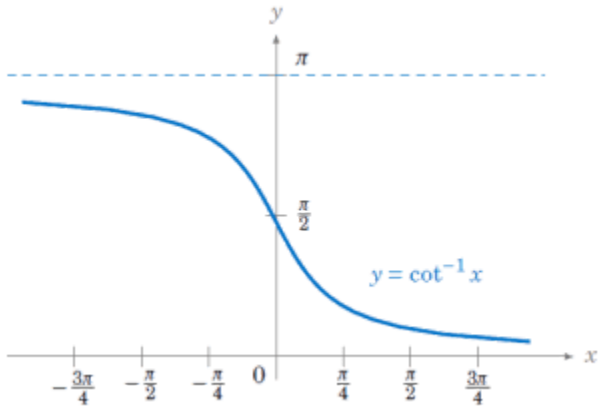
y= cos-1(x)



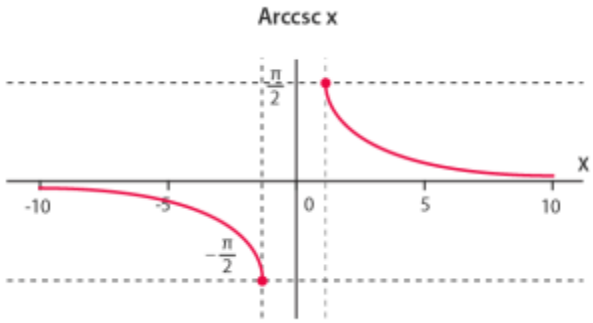
2. y = tan-1(x)



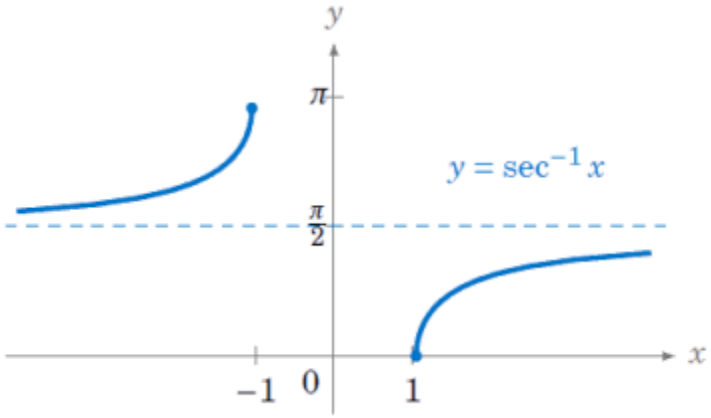
3. y= cot-1(x)



4. y = cosec-1(x)



5. y= sec-1(x)



NOTE:

sin-1(x) and tan-1(x) are increasing functions, whereas cos-1(x) and cot-1(x) are decreasing functions over their domain.

sin-1(x) and (sin (x))-1 are different and should not be confused.

Inverse Trigonometric Functions Class 12 Questions

1. Find the principal value of $\tan^{-1}(-\sqrt{3})$.

2. Find the value of $\cos^{-1}(1/2) + 2\sin^{-1}(1/2)$.

3. Prove that $\tan^{-1}(2/11) + \tan^{-1}(7/24) = \tan^{-1}(1/2)$.

4. Find the value of the expression $\tan[\sin^{-1}(3/5) + \cot^{-1}(3/2)]$

5. Solve the equation: $2\tan^{-1}(\cos x) = \tan^{-1}(2 \operatorname{cosec} x)$

Benefits of CBSE Class 12 Maths Notes Chapter 2

- **Comprehensive Understanding**: The notes provide a detailed explanation of inverse trigonometric functions, helping students grasp the fundamental concepts and their applications in solving trigonometric equations.
- **Clarity on Domains and Ranges**: Students will gain a clear understanding of the domains and ranges of inverse trigonometric functions, which is important for correctly determining and applying these functions in various problems.
- **Enhanced Problem-Solving Skills**: With step-by-step solutions and practice problems, the notes help students develop their problem-solving skills, enabling them to tackle complex trigonometric questions with confidence.
- **Application in Calculus**: The notes cover how inverse trigonometric functions are used in calculus, particularly in integration. This knowledge is important for performing well in higher-level mathematics and related fields.
- **Graphical Representation**: The notes include graphical representations that help in visualizing the behavior of inverse trigonometric functions, making it easier to understand their properties and relationships.
- **Convenient Review**: The notes are a valuable resource for revision, allowing students to quickly review and reinforce their understanding of key concepts before exams.