

Inverse Trigonometric Functions — Assignment 1

Class 12 Maths · Topic-wise question bank covering every concept of the chapter · Narayan Gurukul Academy

Instructions: (1) Attempt all questions. This worksheet walks through every concept of the chapter, topic by topic.
(2) The interactive MCQ version of these questions (with instant answer reveal) is available on the notes page.
(3) Universal values: $g = 10 \text{ m/s}^2$ unless stated. Give answers with correct SI units.

Principal Value Branches

MCQ Questions (choose the correct option)

1. The principal value branch of $\sin^{-1} x$ is

- (A) $[-\pi/2, \pi/2]$
- (B) $[0, \pi]$
- (C) $(-\pi/2, \pi/2)$
- (D) $[-\pi, \pi]$

2. The principal value branch of $\cos^{-1} x$ is

- (A) $[0, \pi]$
- (B) $[-\pi/2, \pi/2]$
- (C) $(-\pi/2, \pi/2)$
- (D) $[0, 2\pi]$

3. The principal value branch of $\tan^{-1} x$ is

- (A) $(-\pi/2, \pi/2)$
- (B) $[0, \pi]$
- (C) $[-\pi/2, \pi/2]$
- (D) $[-\pi, \pi]$

4. The domain of $\sin^{-1} x$ is

- (A) $[-1, 1]$
- (B) $\mathbb{R}$
- (C) $[0, 1]$
- (D) $(-1, 1)$

1 Mark Questions

1. Write the principal value branch of $\sin^{-1} x$.
2. Write the domain of $\cos^{-1} x$.
3. Write the principal value branch of $\tan^{-1} x$.

2 Mark Questions

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

3 Mark Questions

1. Find the principal value of $\tan^{-1}(-1)$ and explain why it lies in $(-\pi/2, \pi/2)$.
2. Find the principal value of $\operatorname{cosec}^{-1}(2)$.

Standard Values and Symmetry

MCQ Questions (choose the correct option)

1. $\sin^{-1}(-x)$ equals
 - (A) $-\sin^{-1} x$
 - (B) $\sin^{-1} x$
 - (C) $\pi - \sin^{-1} x$
 - (D) $\pi + \sin^{-1} x$
2. $\cos^{-1}(-x)$ equals
 - (A) $\pi - \cos^{-1} x$
 - (B) $-\cos^{-1} x$
 - (C) $\cos^{-1} x$
 - (D) $\pi + \cos^{-1} x$
3. The value of $\sin^{-1}(1)$ is
 - (A) $\pi/2$
 - (B) π
 - (C) 0
 - (D) $\pi/4$
4. The value of $\cos^{-1}(0)$ is
 - (A) $\pi/2$
 - (B) 0
 - (C) π
 - (D) $\pi/4$

1 Mark Questions

1. Write $\sin^{-1}(-x)$ in terms of $\sin^{-1} x$.
2. Write $\cos^{-1}(-x)$ in terms of $\cos^{-1} x$.
3. Find the value of $\sin^{-1}(1) + \cos^{-1}(1)$.

2 Mark Questions

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

3 Mark Questions

1. Prove that $\sin^{-1} x + \cos^{-1} x = \pi/2$ for $x \in [-1, 1]$.
2. Find the value of $\tan^{-1}(1) + \tan^{-1}(\sqrt{3})$.

Key Identities**MCQ Questions (choose the correct option)**

1. For $x \in [-1, 1]$, $\sin^{-1} x + \cos^{-1} x$ equals
 - (A) $\pi/2$
 - (B) π
 - (C) 0
 - (D) $\pi/4$
2. For $x \in \mathbb{R}$, $\tan^{-1} x + \cot^{-1} x$ equals

- (A) $\pi/2$
 - (B) π
 - (C) 0
 - (D) $\pi/4$
3. For $xy < 1$, $\tan^{-1} x + \tan^{-1} y$ equals
- (A) $\tan^{-1}((x + y)/(1 - xy))$
 - (B) $\tan^{-1}((x - y)/(1 + xy))$
 - (C) $\tan^{-1}(xy)$
 - (D) $\tan^{-1}(x + y)$
4. $2 \tan^{-1} x$ equals
- (A) $\tan^{-1}(2x/(1 - x^2))$
 - (B) $\tan^{-1}(2x)$
 - (C) $\tan^{-1}(x^2)$
 - (D) $\sin^{-1}(2x)$

1 Mark Questions

1. Write $\sin^{-1} x + \cos^{-1} x$ for $x \in [-1, 1]$.
2. Write $\tan^{-1} x + \cot^{-1} x$ for $x \in \mathbb{R}$.
3. Write the formula for $\tan^{-1} x + \tan^{-1} y$ when $xy < 1$.

2 Mark Questions

1. Evaluate $\tan^{-1}(1/2) + \tan^{-1}(1/3)$.
2. Express $2 \tan^{-1} x$ as a single inverse tangent.

3 Mark Questions

1. Prove that $\tan^{-1}(1/2) + \tan^{-1}(2/11) = \tan^{-1}(3/4)$.
2. Write $2 \tan^{-1}(1/2)$ in terms of $\tan^{-1}$ and simplify.

Solving Equations

MCQ Questions (choose the correct option)

1. If $\sin^{-1} x = \pi/6$, then x equals
 - (A) $1/2$
 - (B) $\sqrt{3}/2$
 - (C) 1
 - (D) 0
2. If $\tan^{-1} x = \pi/4$, then x equals
 - (A) 1
 - (B) 0
 - (C) $\sqrt{3}$
 - (D) $1/\sqrt{3}$
3. The solution of $2 \tan^{-1} x = \pi/2$ is
 - (A) $x = 1$
 - (B) $x = 0$
 - (C) $x = -1$

(D) no solution

4. If $\cos^{-1} x = 0$, then x equals

(A) 1

(B) 0

(C) -1

(D) $1/2$

1 Mark Questions

1. Solve $\sin^{-1} x = \pi/6$.

2. Solve $\tan^{-1} x = \pi/4$.

3. Solve $\cos^{-1} x = 0$.

2 Mark Questions

1. Solve $\tan^{-1}(2x) = \pi/4$.

2. Solve $\sin^{-1}(x) = \cos^{-1}(x)$.

3 Mark Questions

1. Solve $\tan^{-1}(x) + \tan^{-1}(2x) = \pi/4$.

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