

JEE MAIN INVERSE TRIGONOMETRIC FUNCTIONS — PYQS

Max. Marks: 72

Questions: 18

Section A (MCQ) — 13 questions

Q.1 Let $\alpha = 3\sin^{-1}\left(\frac{6}{11}\right)$ and $\beta = 3\cos^{-1}\left(\frac{4}{9}\right)$, where inverse trigonometric functions take only the principal values.

Given below are two statements :

Statement-I: $\cos(\alpha + \beta) > 0$.

Statement-II: $\cos(\alpha) < 0$.

In the light of the above statements, choose the correct answer from the options given below :

[JEE Main 2026 (Online) 8th April Evening Shift]

- (1) Both Statement-I and Statement-II are true
- (2) Both Statement-I and Statement-II are false
- (3) Statement-I is true but Statement-II is false
- (4) Statement-I is false but Statement-II is true

Scan or tap for the full solution



Q.2 Let $0 < \alpha < 1$, $\beta = \frac{1}{3\alpha}$ and $\tan^{-1}(1 - \alpha) + \tan^{-1}(1 - \beta) = \frac{\pi}{4}$. Then $6(\alpha + \beta)$ is equal to :

[JEE Main 2026 (Online) 6th April Morning Shift]

- (1) 6
- (2) 7
- (3) 8
- (4) 9

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Q.3 If $\sin(\tan^{-1}(x\sqrt{2})) = \cot(\sin^{-1}\sqrt{1-x^2})$, $x \in (0, 1)$, then the value of x is :

[JEE Main 2026 (Online) 6th April Evening Shift]

- (1) $\frac{1}{2}$
- (2) $\frac{1}{3}$
- (3) $\frac{2}{3}$
- (4) $\frac{5}{8}$

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Q.4 Let $[\cdot]$ denote the greatest integer function. If the domain of the function $f(x) = \cos^{-1}\left(\frac{4x + 2[x]}{3}\right)$ is $[\alpha, \beta]$, then $12(\alpha + \beta)$ is equal to :

[JEE Main 2026 (Online) 4th April Morning Shift]

- (1) 6
- (2) 8
- (3) 9
- (4) 4

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Q.5 Considering the principal values of inverse trigonometric functions, the value of the expression $\tan\left(2\sin^{-1}\left(\frac{2}{\sqrt{13}}\right) - 2\cos^{-1}\left(\frac{3}{\sqrt{10}}\right)\right)$ is equal to :

[JEE Main 2026 (Online) 28th January Evening Shift]

- (1) $\frac{33}{56}$
- (2) $-\frac{33}{56}$
- (3) $-\frac{16}{63}$
- (4) $\frac{16}{63}$

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Q.6 If the domain of the function $f(x) = \sin^{-1}\left(\frac{1}{x^2 - 2x - 2}\right)$ is $(-\infty, \alpha] \cup [\beta, \gamma] \cup [\delta, \infty)$, then $\alpha + \beta + \gamma + \delta$ is equal to

[JEE Main 2026 (Online) 24th January Evening Shift]

- (1) 4
- (2) 2
- (3) 5
- (4) 3

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Q.7 The number of solutions of $\tan^{-1}4x + \tan^{-1}6x = \frac{\pi}{6}$, where $-\frac{1}{2\sqrt{6}} < x < \frac{1}{2\sqrt{6}}$, is equal to :

[JEE Main 2026 (Online) 22nd January Morning Shift]

- (1) 2
- (2) 0
- (3) 3
- (4) 1

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Q.8 If the domain of the function $f(x) = \cos^{-1}\left(\frac{2x-5}{11-3x}\right) + \sin^{-1}(2x^2 - 3x + 1)$ is the interval $[\alpha, \beta]$, then $\alpha + 2\beta$ is equal to :

[JEE Main 2026 (Online) 21st January Morning Shift]

- (1) 5
- (2) 2
- (3) 3
- (4) 1

Scan or tap for the full solution



Q.9 The value of $\cot^{-1}\left(\frac{\sqrt{1+\tan^2(2)}-1}{\tan(2)}\right) - \cot^{-1}\left(\frac{\sqrt{1+\tan^2\left(\frac{1}{2}\right)}+1}{\tan\left(\frac{1}{2}\right)}\right)$ is equal to

[JEE Main 2025 (Online) 8th April Evening Shift]

(1) $\pi - \frac{3}{2}$ (2) $\pi + \frac{5}{2}$ (3) $\pi - \frac{5}{4}$ (4) $\pi + \frac{3}{2}$

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Q.10 Considering the principal values of the inverse trigonometric functions,

$$\sin^{-1}\left(\frac{\sqrt{3}}{2}x + \frac{1}{2}\sqrt{1-x^2}\right), \quad -\frac{1}{2} < x < \frac{1}{\sqrt{2}}, \text{ is}$$

equal to [JEE Main 2025 (Online) 4th April Morning Shift]

(1) $\frac{-5\pi}{6} - \sin^{-1}x$

(2) $\frac{5\pi}{6} - \sin^{-1}x$

(3) $\frac{\pi}{6} + \sin^{-1}x$

(4) $\frac{\pi}{4} + \sin^{-1}x$

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Q.11 The sum of the infinite series

$$\cot^{-1}\left(\frac{7}{4}\right) + \cot^{-1}\left(\frac{19}{4}\right) + \cot^{-1}\left(\frac{39}{4}\right) + \cot^{-1}\left(\frac{67}{4}\right) + \dots$$

is : [JEE Main 2025 (Online) 4th April Evening Shift]

(1) $\frac{\pi}{2} + \cot^{-1}\left(\frac{1}{2}\right)$

(2) $\frac{\pi}{2} - \cot^{-1}\left(\frac{1}{2}\right)$

(3) $\frac{\pi}{2} - \tan^{-1}\left(\frac{1}{2}\right)$

(4) $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{2}\right)$

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Q.12 $\cos\left(\sin^{-1}\frac{3}{5} + \sin^{-1}\frac{5}{13} + \sin^{-1}\frac{33}{65}\right)$ is equal to:

[JEE Main 2025 (Online) 28th January Morning Shift]

(1) $\frac{33}{65}$

(2) 1

(3) $\frac{32}{65}$

(4) 0

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Q.13 Let $[x]$ denote the greatest integer less than or equal to x . Then the domain of $f(x) = \sec^{-1}(2[x] + 1)$ is:

[JEE Main 2025 (Online) 28th January Evening Shift]

(1) $(-\infty, \infty)$

(2) $(-\infty, \infty) - \{0\}$

(3) $(-\infty, -1] \cup [0, \infty)$

(4) $(-\infty, -1] \cup [1, \infty)$

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Section B (Numerical) — 5 questions

Q.14 If $\frac{\pi}{4} + \sum_{p=1}^{11} \tan^{-1}\left(\frac{2^{p-1}}{1+2^{2p-1}}\right) = \alpha$, then $\tan \alpha$ is equal to _____.

[JEE Main 2026 (Online) 5th April Morning Shift]

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Q.15 If $k = \tan\left(\frac{\pi}{4} + \frac{1}{2}\cos^{-1}\left(\frac{2}{3}\right)\right) + \tan\left(\frac{1}{2}\sin^{-1}\left(\frac{2}{3}\right)\right)$,

then

the number of solutions of the equation

$$\sin^{-1}(kx - 1) = \sin^{-1}x - \cos^{-1}x \text{ is } \underline{\hspace{2cm}}.$$

[JEE Main 2026 (Online) 28th January Morning Shift]

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Q.16 Let the maximum value of $(\sin^{-1}x)^2 + (\cos^{-1}x)^2$ for

$$x \in \left[-\frac{\sqrt{3}}{2}, \frac{1}{\sqrt{2}}\right] \text{ be } \frac{m}{n}\pi^2, \text{ where } \gcd(m, n) = 1.$$

Then $m + n$ is equal to _____.

[JEE Main 2026 (Online) 21st January Evening Shift]

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Q.17 If $y = \cos\left(\frac{\pi}{3} + \cos^{-1}\frac{x}{2}\right)$, then $(x - y)^2 + 3y^2$ is equal to _____.

[JEE Main 2025 (Online) 2nd April Evening Shift]

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Q.18 Let $S = \{x : \cos^{-1}x = \pi + \sin^{-1}x + \sin^{-1}(2x + 1)\}$.

Then $\sum_{x \in S} (2x - 1)^2$ is equal to _____.

[JEE Main 2025 (Online) 29th January Morning Shift]

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ANSWER KEY

Section A (MCQ) — 13 questions

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	1	2	1	1	1	1	4	3	3	3	3
Ques.	12	13									
Ans.	4	1									

Section B (Numerical) — 5 questions

Ques.	14	15	16	17	18		
Ans.	2048	1	65	3	5		