MATHS

BOOKS - NCERT MATHS (HINGLISH)

INVERSE TRIGONOMETRIC FUNCTIONS

Inverse Trigonometric Functions

1. Evaluate: $\tan^{-1}\left(\frac{\tan(5\pi)}{6}\right)+\cos^{-1}\left\{\cos\left(\frac{13\pi}{6}\right)\right\}$

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2. $\cos\left\{\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right)+\frac{\pi}{6}\right\}$

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3. Prove that $\cot\left(\frac{\pi}{4} - 2\cot^{-1}3\right) = 7$

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4. Find the value of $\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right) + \cot^{-1}\left(\frac{1}{\sqrt{3}}\right) + \tan^{-1}\left[\sin'\left(\frac{-\pi}{2}\right)\right]$.

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5. Find the value of $\tan^{-1}\left(\tan'\frac{2\pi}{3}\right)$.

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6. Show that $2\tan^{-1}(-3) = -\frac{\pi}{2} + \tan^{-1}\left(-\frac{4}{3}\right)$

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7. The number of real solutions of $\tan^{-1}\sqrt{x(x+1)}+\sin^{-1}\sqrt{x^2+x+1}=\frac{\pi}{2}$ is (a) zero b. one c. two d. infinite

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8. Find the value of expression: $\sin\left(2\tan^{-1}\left(\frac{1}{3}\right)\right)+\cos\left(\tan^{-1}2\sqrt{2}\right)$

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9. If $2\tan^{-1}(\cos\theta)=\tan^{-1}(2\cos ec\theta)$, then show that $\theta=\frac{\pi}{4}$, when n is an y integer.

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10. Show that: $\cos\left(2\frac{\tan^{-1}1}{7}\right)=\sin\left(4^{-1}\frac{1}{3}\right)$

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11. Solve the equation $\cos\left(\tan^{-1}x\right) = \sin\left(\cot^{-1}, \frac{3}{4}\right)$.

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12. Prove that $\tan^{-1}\left[\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right] = \frac{\pi}{4} + \frac{1}{2}\cos^{-1}x^2$

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13. Simplify each of the following: $\cos^{-1}\left(\frac{3}{5}\cos x + \frac{4}{5}\sin x\right)$, where $-\frac{3\pi}{4} \leq x \leq \frac{\pi}{4}$ $\sin^{-1}\left(\frac{5}{13}\cos x + \frac{12}{13}\sin x\right)$

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14. Prove that $\sin^{-1}\left(\frac{8}{17}\right) + \sin^{-1}\left(\frac{3}{5}\right) = \sin^{-1}\left(\frac{77}{85}\right)$

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15. Show that $\sin^{-1}\frac{5}{13}+\cos^{-1}\frac{3}{5}=\tan^{-1}\frac{63}{16}$.

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16. Prove: $\tan^{-1}\left(\frac{1}{4}\right)+\tan^{-1}\left(\frac{2}{9}\right)=\sin^{-1}\left(\frac{1}{\sqrt{5}}\right)$

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17. Find the value of $4\tan^{-1}\left(\frac{1}{5}\right)-\tan^{-1}\left(\frac{1}{239}\right)$

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18. Show that: $\tan\left(\frac{1}{2}\sin^{-1}\frac{3}{4}\right)=\frac{4\sqrt{-7}}{3}$

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19. If $a_1, a_2, a_3, , a_n$ is an A.P. with common difference d, then prove that $\tan\left[\tan^{-1}\left(\frac{d}{1+a_1a_2}\right)+\tan^{-1}\left(\frac{d}{1+a_2a_3}\right)+\tan^{-1}\left(\frac{d}{11+a_{n-1}a_n}\right)\right]=$

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20. Which of the following of the principal value branch of $\cos^{-1}x$?

A. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

B. $(0, \pi)$

C. $[0, \pi]$

D. $(0, \pi)-\left\{\frac{\pi}{2}\right\}$

Answer: C

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21. Which of the following is the principal value branch of $\cos ec^{-1}x$?

A. $\left(\frac{-\pi}{2}, \frac{\pi}{2}\right)$

B. $[0, \pi] - \left\{\frac{\pi}{2}\right\}$

C. $\left[\frac{\pi}{2}, \frac{\pi}{2}\right]$

D. $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right] - [0]$

Answer: D

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22. If $3\tan^{-1} x + \cot^{-1} x = \pi$, then x equals to

A. 0

B. 1

C. -1

D. $\frac{1}{2}$

Answer: B

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23. The value of $\sin^{-1}\left(\frac{\cos(33\pi)}{5}\right)$ is $\frac{3\pi}{5}$ (b) $\frac{\pi}{10}$ (c) $\frac{\pi}{10}$ (d) $\frac{7\pi}{5}$

A. $\frac{3\pi}{5}$

B. $\frac{-7\pi}{5}$

C. $\frac{\pi}{10}$

D. $\frac{-\pi}{10}$

Answer: D

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24. The domin of the function $\cos^{-1}(2x-1)$ is

A. $[0, 1]$

B. $[-1, 1]$

C. $(-1, 1)$

D. $[0, \pi]$

Answer: A

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25. The domain of the function defined by $f(x) = \sin^{-1}\sqrt{x-1}$ is

A. $[1, 2]$

B. $[-1, 1]$

C. $[0, 1]$

D. None of these

Answer: A

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26. If $\cos\left(\sin^{-1}, \frac{2}{5} + \cos^{-1} x\right) = 0$, then x is equal to

A. $\frac{1}{5}$

B. $\frac{2}{5}$

C. 0

D. 1

Answer: B

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27. The value of $\sin\left[2\tan^{-1}(0.75)\right]$ is

A. 0.75

B. 1.5

C. 0.96

D. $\sin 1.5$

Answer: C

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28. The value of $\cos^{-1}\left(\cos\left(\frac{3\pi}{2}\right)\right)$ is

A. $\frac{\pi}{2}$

B. $\frac{3\pi}{2}$

C. $\frac{5\pi}{2}$

D. $\frac{7\pi}{2}$

Answer: A

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29. The value of $2\sec^{-1} + 2\sin^{-1}\left(\frac{1}{2}\right)$ is

A. $\frac{\pi}{6}$

B. $\frac{5\pi}{6}$

C. $\frac{7\pi}{6}$

D. 1

Answer: B

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30. If $\tan^{-1} x + \tan^{-1} y = \frac{4\pi}{5}$, then $\cot^{-1} x + \cot^{-1} y$ equal to

A. $\frac{\pi}{5}$

B. $\frac{2\pi}{5}$

C. $\frac{3\pi}{5}$

D. π

Answer: A

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31. If $\sin^{-1}\left(\frac{2a}{1+a^2}\right)+\cos^{-1}\left(\frac{1-a^2}{1+a^2}\right)=\tan^{-1}\left(\frac{2x}{1-x^2}\right)$, where $a, x \in]0, 1[$, then the value of x is

A. 0

B. $\frac{a}{2}$

C. a

D. $\frac{2a}{1-a^2}$

Answer: D

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32. The value of $\cot\left[\cos^{-1}\left(\frac{7}{25}\right)\right]$ is

A. $\frac{25}{24}$

B. $\frac{25}{7}$

C. $\frac{24}{25}$

D. $\frac{7}{24}$

Answer: D

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33. The value of $\tan\left(\frac{1}{2}\cos^{-1}, \frac{2}{\sqrt{5}}\right)$ is

A. $2+\sqrt{5}$

B. $\sqrt{5}-2$

C. $\frac{\sqrt{5}+2}{2}$

D. $5+\sqrt{2}$

Answer: B

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34. If $|x| \leq 1$, then $2\tan^{-1}x + \sin^{-1}\left(\frac{2x}{1+x^2}\right)$ is equal to

A. $4\tan^{-1}x$

B. 0

C. $\frac{\pi}{2}$

D. π

Answer: A

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35. If $\cos^{-1}\alpha + \cos^{-1}\beta + \cos^{-1}\gamma = 3\pi,$ then $\alpha(\beta+\gamma) + \beta(\gamma+\alpha) + \gamma(\alpha+\beta)$ equal to

A. 0

B. 1

C. 6

D. 12

Answer: C

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36. The number of real solutions of the equation

$\sqrt{1+\cos 2x} = \sqrt{2}\cos^{-1}(\cos x)$ in $\left[\frac{\pi}{2}, \pi\right]$ is

A. 0

B. 1

C. 2

D. ∞

Answer: A

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37. If $\cos^{-1} x > \sin^{-1} x$, then

A. $\frac{1}{\sqrt{2}} < x \leq 1$

B. $0 \leq x \leq \frac{1}{\sqrt{2}}$

C. $-1 \leq x < \frac{1}{\sqrt{2}}$

D. $x > 0$

Answer: C

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38. The principal value of $\cos^{-1}\left(-\frac{1}{2}\right)$ is

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39. The value of $\sin^{-1}\left(\sin, \frac{3\pi}{5}\right)$ is .....

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40. If $\cos\left(\tan^{-1} x + \cot^{-1}\sqrt{3}\right) = 0$, find the value of x.

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41. The set of values of $\sec^{-1}\left(\frac{1}{2}\right)$ is â€¦â€¦..

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42. The principal value of $\tan^{-1}\sqrt{3}$ is .....

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43. The value of $\cos^{-1}\left(\cos' \frac{14\pi}{3}\right)$ is .....

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44. The value of $\cos\left(\sin^{-1}x + \cos^{-1}x\right)$, where $|x| \leq 1$, is

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45. The value of $\tan\left(\frac{\sin^{-1}x + \cos^{-1}x}{2}\right)$, when $x = \frac{\sqrt{3}}{2}$, is .....

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46. If $y = 2\tan^{-1} x + \sin^{-1}\left(\frac{2x}{1+x^2}\right)$, then $\ldots\ldots\ldots < y < \ldots\ldots\ldots$

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47. The result $\tan^{-1} x - \tan^{-1} y = \tan^{-1}\left(\frac{x-y}{1+xy}\right)$ is true when the value of xy is $\ldots\ldots\ldots$

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48. The value of $\cot^{-1}(-x) x \in R$ in terms of $\cot^{-1} x$ is $\ldots\ldots\ldots$

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49. All trigonometric functions have inverse over their respective domains.

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50. The value of the expression $\left(\cos^{-1} x\right)^2$ is equal to $\sec^2 x$.

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51. The domain of trigonometric functions can be restricted to any one of their branch (not necessary principal value) in order to obtain their inverse function s.

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52. The least numerical value, either positive or negative of angle θ is called principal value of the inverse trigonometric function.

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53. The graph of inverse trigonometric function can be obtained from the graph of their corresponding function by interchanging X and Y-axes.

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54. The minimum value of n for which $\tan^{-1}, \frac{n}{\pi} > \frac{\pi}{4}, n \in N$, is valid is

5.

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55. The principal value of $\sin^{-1}\left[\cos\left(\sin^{-1}, \frac{1}{2}\right)\right]$ is $\frac{\pi}{3}$.

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