

INVERSE TRIANGLE ASSIGNMENT

1. If $\cos^{-1} x > \sin^{-1} x$, then
- (a) $x < 0$ (b) $-1 < x < 0$ (c) $0 \leq x < \frac{1}{\sqrt{2}}$ (d) $-1 \leq x < \frac{1}{\sqrt{2}}$
2. If $(\cos^{-1} x)^2 - (\sin^{-1} x)^2 > 0$, then
- (a) $x < \frac{1}{2}$ (b) $-1 < x < \sqrt{2}$ (c) $0 \leq x < \frac{1}{\sqrt{2}}$ (d) $-1 \leq x < \frac{1}{\sqrt{2}}$
3. The greatest and the least values of $(\sin^{-1} x)^3 + (\cos^{-1} x)^3$ are
- (a) $\frac{-\pi}{2}, \frac{\pi}{2}$ (b) $\frac{-\pi^3}{8}, \frac{\pi^3}{8}$ (c) $\frac{\pi^3}{32}, \frac{7\pi^3}{8}$ (d) None of these
4. If x satisfies the equation $t^2 - t - 2 > 0$, then there exists a value for
- (a) $\sin^{-1} x$ (b) $\cos^{-1} x$ (c) $\sec^{-1} x$ (d) None of these
5. If $f(x) = \sec^{-1} x + \tan^{-1} x$, then $f(x)$ is real for
- (a) $x \in [-1, 1]$ (b) $x \in R$ (c) $x \in (-\infty, 1] \cup [1, +\infty)$ (d) None of these
6. If $\sum_{r=1}^{2n} \sin^{-1} x_r = n\pi$, then $\sum_{r=1}^{2n} x_r =$
- (a) n (b) $2n$ (c) $\frac{n(n+1)}{2}$ (d) None of these
7. $\frac{-2\pi}{5}$ is the principal value of
- (a) $\cos^{-1}(\cos \frac{7\pi}{5})$ (b) $\sin^{-1}(\sin \frac{7\pi}{5})$ (c) $\sec^{-1}(\sec \frac{7\pi}{5})$ (d) None of these
8. The number of real solutions of (x, y) ; where $|y| = \sin x, y = \cos^{-1}(\cos x), -2\pi \leq x \leq 2\pi$ is
- (a) 2 (b) 1 (c) 3 (d) 4
9. The set of values of k for which $x^2 - kx + \sin^{-1}(\sin 4) > 0$ for all real x is
- (a) \emptyset (b) $(-2, 2)$ (c) R (d) None of these
10. $\cos^{-1} \left\{ \frac{1}{2} x^2 + \sqrt{1-x^2} \cdot \sqrt{1-\frac{x^2}{4}} \right\} = \cos^{-1} \frac{x}{2} - \cos^{-1} x$ holds for
- (a) $|x| \leq 1$ (b) $x \in R$ (c) $0 \leq x \leq 1$ (d) $-1 \leq x \leq 0$
11. If we consider only the principal values of the inverse trigonometric functions, then the value of $\tan \left(\cos^{-1} \frac{1}{5\sqrt{2}} - \sin^{-1} \frac{4}{\sqrt{17}} \right)$ is
- (a) $\sqrt{\frac{29}{3}}$ (b) $\frac{29}{3}$ (c) $\sqrt{\frac{3}{29}}$ (d) $\frac{3}{29}$
12. The sum of first 10 terms of the series $\cot^{-1} 3 + \cot^{-1} 7 + \cot^{-1} 13 + \cot^{-1} 21 + \dots$ is
- (a) $\tan^{-1} \left(\frac{5}{6} \right)$ (b) $\tan^{-1}(100)$ (c) $\tan^{-1} \left(\frac{6}{5} \right)$ (d) $\tan^{-1} \left(\frac{1}{100} \right)$
13. Sum of infinite terms of the series $\cot^{-1} \left[1^2 + \frac{3}{4} \right] + \cot^{-1} \left[2^2 + \frac{3}{4} \right] + \cot^{-1} \left[3^2 + \frac{3}{4} \right] + \dots$ is
- (a) $\frac{\pi}{4}$ (b) $\tan^{-1} 2$ (c) $\tan^{-1} 3$ (d) None of these

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14. $\tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{7} + \tan^{-1} \frac{1}{18} + \dots + \tan^{-1} \left(\frac{1}{n^2 + n + 1} \right) + \dots$ to ∞ is equal
- (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$ (c) $\frac{2\pi}{3}$ (d) 0
15. If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \pi$, then $x^4 + y^4 + z^4 + 4x^2y^2z^2 = K(x^2y^2 + y^2z^2 + z^2x^2)$, where $K =$
- (a) 1 (b) 2 (c) 4 (d) None of these
16. The sum of the infinite series $\sin^{-1} \frac{1}{\sqrt{2}} + \sin^{-1} \left(\frac{\sqrt{2}-1}{\sqrt{6}} \right) + \sin^{-1} \left(\frac{\sqrt{3}-\sqrt{2}}{\sqrt{12}} \right) + \dots + \sin^{-1} \left(\frac{\sqrt{n}-\sqrt{n-1}}{\sqrt{n(n+1)}} \right)$ is
- (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{2}$ (d) π
17. If sum of the infinite series $\cot^{-1}(2.1^2) + \cot^{-1}(2.2^2) + \cot^{-1}(2.2^3) + \cot^{-1}(2.2^4) + \dots$ is equal to
- (a) $\frac{\pi}{5}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$
18. If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{3\pi}{2}$, then the value of $x^{100} + y^{100} + z^{100} - \frac{9}{x^{101} + y^{101} + z^{101}}$ is equal to
- (a) 0 (b) 3 (c) -3 (d) 9
19. If x_1, x_2, x_3, x_4 are roots of the equation $x^4 - x^3 \sin 2\beta + x^2 \cos 2\beta - x \cos \beta - \sin \beta = 0$, then $\tan^{-1} x_1 + \tan^{-1} x_2 + \tan^{-1} x_3 + \tan^{-1} x_4 =$
- (a) β (b) $\frac{\pi}{2} - \beta$ (c) $\pi - \beta$ (d) $-\beta$
20. If $a_1, a_2, a_3, \dots, a_n$ is an A.P. with common difference d , then $\tan \left[\tan^{-1} \left(\frac{d}{1+a_1a_2} \right) + \tan^{-1} \left(\frac{d}{1+a_2a_3} \right) + \dots + \tan^{-1} \left(\frac{d}{1+a_{n-1}a_n} \right) \right] =$
- (a) $\frac{(n-1)d}{a_1 + a_n}$ (b) $\frac{(n-1)d}{1 + a_1a_n}$ (c) $\frac{nd}{1 + a_1a_n}$ (d) $\frac{a_n - a_1}{a_n + a_1}$
21. $2 \tan^{-1} \left[\sqrt{\frac{a-b}{a+b}} \tan \frac{\theta}{2} \right] =$
- (a) $\cos^{-1} \left(\frac{a \cos \theta + b}{a + b \cos \theta} \right)$ (b) $\cos^{-1} \left(\frac{a + b \cos \theta}{a \cos \theta + b} \right)$ (c) $\cos^{-1} \left(\frac{a \cos \theta}{a + b \cos \theta} \right)$ (d) $\cos^{-1} \left(\frac{b \cos \theta}{a \cos \theta + b} \right)$
22. If $\cot^{-1}[(\cos \alpha)^{1/2}] - \tan^{-1}[(\cos \alpha)^{1/2}] = x$. Then $\sin x =$
- (a) $\tan^2 \left(\frac{\alpha}{2} \right)$ (b) $\cot^2 \left(\frac{\alpha}{2} \right)$ (c) $\tan \alpha$ (d) $\cot \left(\frac{\alpha}{2} \right)$
23. The value of $\sin^{-1} \left\{ \left(\sin \frac{\pi}{3} \right) \frac{x}{\sqrt{x^2 + k^2 - kx}} \right\} - \cos^{-1} \left\{ \cos \frac{\pi}{6} \frac{x}{\sqrt{x^2 + k^2 - kx}} \right\}$, (where $\frac{k}{2} < x < 2k, k > 0$) is
- (a) $\tan^{-1} \left(\frac{2x^2 + xk - k^2}{x^2 - 2xk + k^2} \right)$ (b) $\tan^{-1} \left(\frac{x^2 + 2xk - k^2}{x^2 - 2xk + k^2} \right)$ (c) $\tan^{-1} \left(\frac{x^2 + 2xk - 2k^2}{2x^2 - 2xk + 2k^2} \right)$ (d) None of these
24. Solution of equation $\sin[2 \cos^{-1} \{ \cot(2 \tan^{-1} x) \}] = 0$ is
- (a) $x = \pm 1$ only (b) $x = 1 \pm \sqrt{2}$ only (c) $x = (-1 \pm \sqrt{2})$ only (d) All of these
25. The greater of the two angles $A = 2 \tan^{-1}(2\sqrt{2}-1)$ and $B = 3 \sin^{-1} \left(\frac{1}{3} \right) + \sin^{-1} \left(\frac{3}{5} \right)$ is
- (a) B (b) A (c) C (d) None of these

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26. $\tan \left[\frac{1}{2} \cos^{-1} \left(\frac{\sqrt{5}}{3} \right) \right] =$
- (a) $\frac{3-\sqrt{5}}{2}$ (b) $\frac{3+\sqrt{5}}{2}$ (c) $\frac{2}{3-\sqrt{5}}$ (d) $\frac{2}{3+\sqrt{5}}$
27. $\sin^{-1} x + \cos^{-1} x$ is equal to
- (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2}$ (c) -1 (d) 1
28. $\sin \left\{ \sin^{-1} \frac{1}{2} + \cos^{-1} \frac{1}{2} \right\} =$
- (a) 0 (b) -1 (c) 2 (d) 1
29. The value of $\cos^{-1} \left(\cos \frac{5\pi}{3} \right) + \sin^{-1} \left(\cos \frac{5\pi}{3} \right)$ is
- (a) $\frac{\pi}{2}$ (b) $\frac{5\pi}{3}$ (c) $\frac{10\pi}{3}$ (d) 0
30. $\cos \left[\cos^{-1} \left(\frac{-1}{7} \right) + \sin^{-1} \left(\frac{-1}{7} \right) \right] =$
- (a) $-\frac{1}{3}$ (b) 0 (c) $\frac{1}{3}$ (d) $\frac{4}{9}$
31. The value of $\tan^{-1} x + 2 \cot^{-1} x$ is
- (a) $\frac{\pi}{3}$ (b) $\frac{\pi}{6}$ (c) $\frac{2\pi}{3}$ (d) 2π
32. If $\tan^{-1} x + 2 \cot^{-1} x = \frac{2\pi}{3}$, then $x =$
- (a) $\sqrt{2}$ (b) 3 (c) $\sqrt{3}$ (d) $\frac{\sqrt{3}-1}{\sqrt{3}+1}$
33. If $4 \sin^{-1} x + \cos^{-1} x = \pi$, then x is equal to
- (a) 0 (b) $\frac{1}{2}$ (c) $-\frac{\sqrt{3}}{2}$ (d) $\frac{1}{\sqrt{2}}$
34. $\cos \left[2 \cos^{-1} \frac{1}{5} + \sin^{-1} \frac{1}{5} \right] =$
- (a) $\frac{2\sqrt{6}}{5}$ (b) $-\frac{2\sqrt{6}}{5}$ (c) $\frac{1}{5}$ (d) $-\frac{1}{5}$
27. The value of $\tan \left(\tan^{-1} \frac{1}{2} - \tan^{-1} \frac{1}{3} \right)$ is
- (a) $\frac{5}{6}$ (b) $\frac{7}{6}$ (c) $\frac{1}{6}$ (d) $\frac{1}{7}$
28. $\tan^{-1} \left(\frac{1}{11} \right) + \tan^{-1} \left(\frac{2}{12} \right) =$
- (a) $\tan^{-1} \left(\frac{33}{132} \right)$ (b) $\tan^{-1} \left(\frac{1}{2} \right)$ (c) $\tan^{-1} \left(\frac{132}{33} \right)$ (d) None of these
29. If $\sin^{-1} a + \sin^{-1} b + \sin^{-1} c = \pi$, then the value of $a\sqrt{1-a^2} + b\sqrt{1-b^2} + c\sqrt{1-c^2}$ will be
- (a) $2abc$ (b) abc (c) $\frac{1}{2}abc$ (d) $\frac{1}{3}abc$
30. If $\tan^{-1} x - \tan^{-1} y = \tan^{-1} A$, then $A =$

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- (a) $x - y$ (b) $x + y$ (c) $\frac{x - y}{1 + xy}$ (d) $\frac{x + y}{1 - xy}$
31. If $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$ then $x =$
 (a) -1 (b) $\frac{1}{6}$ (c) $-1, \frac{1}{6}$ (d) None of these
32. If $\cos^{-1} \frac{3}{5} - \sin^{-1} \frac{4}{5} = \cos^{-1} x$, then $x =$
 (a) 0 (b) 1 (c) -1 (d) 2
33. If $\cot^{-1} \alpha + \cot^{-1} \beta = \cot^{-1} x$, then $x =$
 (a) $\alpha + \beta$ (b) $\alpha - \beta$ (c) $\frac{1 + \alpha\beta}{\alpha + \beta}$ (d) $\frac{\alpha\beta - 1}{\alpha + \beta}$
34. $\tan^{-1} \frac{3}{4} + \tan^{-1} \frac{3}{5} - \tan^{-1} \frac{8}{19} =$
 (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) None of these
35. $\cos \left[\tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{2} \right] =$
 (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{2}$ (d) $\frac{\pi}{4}$
36. $\tan^{-1} \frac{x}{y} - \tan^{-1} \frac{x - y}{x + y} =$ (where $x > y > 0$)
 (a) $-\frac{\pi}{4}$ (b) $\frac{\pi}{4}$ (c) $\frac{3\pi}{4}$ (d) None of these
37. $\tan \left[\cos^{-1} \frac{4}{5} + \tan^{-1} \frac{2}{3} \right] =$
 (a) $\frac{6}{17}$ (b) $\frac{17}{6}$ (c) $\frac{7}{16}$ (d) $\frac{16}{7}$
38. $\tan^{-1} \left(\frac{1}{4} \right) + \tan^{-1} \left(\frac{2}{9} \right) =$
 (a) $\frac{1}{2} \cos^{-1} \left(\frac{3}{5} \right)$ (b) $\frac{1}{2} \sin^{-1} \left(\frac{3}{5} \right)$ (c) $\tan^{-1} \left(\frac{1}{2} \right)$ (d) Both (a) and (c)
39. $\sin^{-1} \frac{1}{\sqrt{5}} + \cot^{-1} 3$ is equal to
 [Karnataka CET 1995; MP PET 1993]
 (a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$
40. If $\sin \left(\sin^{-1} \frac{1}{5} + \cos^{-1} x \right) = 1$, then $x =$
 (a) 1 (b) 0 (c) $\frac{4}{5}$ (d) $\frac{1}{5}$
41. A solution of the equation $\tan^{-1}(1 + x) + \tan^{-1}(1 - x) = \frac{\pi}{2}$ is
 (a) $x = 1$ (b) $x = -1$ (c) $x = 0$ (d) $x = \pi$
42. If $\tan^{-1} \frac{x - 1}{x + 1} + \tan^{-1} \frac{2x - 1}{2x + 1} = \tan^{-1} \frac{23}{36}$, then $x =$
 (a) $\frac{3}{4}, \frac{-3}{8}$ (b) $\frac{3}{4}, \frac{3}{8}$ (c) $\frac{4}{3}, \frac{3}{8}$ (d) None of these

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43. If $\sin^{-1} \frac{x}{5} + \operatorname{cosec}^{-1} \left(\frac{5}{4} \right) = \frac{\pi}{2}$, then $x =$
- (a) 4 (b) 5 (c) 1 (d) 3
44. $\sin^{-1} \left(\frac{3}{5} \right) + \tan^{-1} \left(\frac{1}{7} \right) =$
- (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2}$ (c) $\cos^{-1} \left(\frac{4}{5} \right)$ (d) π
45. If $\tan^{-1} 2, \tan^{-1} 3$ are two angles of a triangle, then the third angle is
- (a) $\frac{\pi}{4}$ (b) $\frac{3\pi}{4}$ (c) $\frac{\pi}{4}$ (d) None of these
46. If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi$ then
- (a) $x^2 + y^2 + z^2 + xyz = 0$ (b) $x^2 + y^2 + z^2 + 2xyz = 0$ (c) $x^2 + y^2 + z^2 + xyz = 1$ (d) $x^2 + y^2 + z^2 + 2xyz = 1$
47. If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \frac{\pi}{2}$, then
- (a) $x + y + z - xyz = 0$ (b) $x + y + z + xyz = 0$ (c) $xy + yz + zx + 1 = 0$ (d) $xy + yz + zx - 1 = 0$
48. If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \pi$, then $\frac{1}{xy} + \frac{1}{yz} + \frac{1}{zx} =$
- (a) 0 (b) 1 (c) $\frac{1}{xyz}$ (d) xyz
49. If $3 \tan^{-1} \left(\frac{1}{2 + \sqrt{3}} \right) - \tan^{-1} \frac{1}{x} = \tan^{-1} \frac{1}{3}$, then x equals
- (a) 1 (b) 2 (c) 3 (d) $\sqrt{3}$
50. $\cot^{-1} \left[\frac{\sqrt{1 - \sin x} + \sqrt{1 + \sin x}}{\sqrt{1 - \sin x} - \sqrt{1 + \sin x}} \right] =$
- (a) $\pi - x$ (b) $2\pi - x$ (c) $\frac{\pi}{2}$ (d) $\pi - \frac{x}{2}$