

1. Find the range of $f(x) = \sin^{-1} x + \cos^{-1} x + \tan^{-1} x$
2. Solve for x : $4\sin^{-1} (x - 2) + \cos^{-1} (x - 2) = \pi$
3. Solve for x : $\sin^{-1} (x^2 - 2x + 1) + \cos^{-1} (x^2 - x) = \frac{\pi}{2}$
4. Find the number of real solutions of $\tan^{-1} \sqrt{x(x+1)} + \sin^{-1} \sqrt{x^2 + x + 1} = \frac{\pi}{2}$
5. If $\sin^{-1} \left(x - \frac{x^2}{2} + \frac{x^3}{4} - \dots \dots \right) + \cos^{-1} \left(x^2 - \frac{x^4}{2} + \frac{x^6}{4} - \dots \dots \right) = \frac{\pi}{2}$, for $0 < |x| < \sqrt{2}$, then find x .
6. Solve for x : $\sin^{-1} x > \cos^{-1} x$
7. $(\sin^{-1} x)^2 - 3\sin^{-1} x + 2 = 0$
8. $\sin^{-1} x + \sin^{-1} 2y = \pi$
9. $\cos^{-1} x + \cos^{-1} x^2 = 2\pi$
10. $\cos^{-1} x + \cos^{-1} x^2 = 0$
11. $4\sin^{-1} (x - 1) + \cos^{-1} (x - 1) = \pi$
12. $\cot^{-1} \left(\frac{1}{x^2 - 1} \right) + \tan^{-1} (x^2 - 1) = \frac{\pi}{2}$
13. $\cot^{-1} \left(\frac{x^2 - 1}{2x} \right) + \tan^{-1} \left(\frac{2x}{x^2 - 1} \right) = \frac{2\pi}{3}$
14. $4\sin^{-1} x + \cos^{-1} x = \frac{3\pi}{4}$
15. $5\tan^{-1} x + 3\cot^{-1} x = \frac{7\pi}{4}$
16. $5\tan^{-1} x + 4\cot^{-1} x = 2\pi$
17. $\cot^{-1} x - \cot^{-1} (x + 1) = \frac{\pi}{2}$
18. $[\sin^{-1} x] + [\cos^{-1} x] = 0$
19. $[\tan^{-1} x] + [\cot^{-1} x] = 0$
20. $[\sin^{-1} \cos^{-1} \sin^{-1} \tan^{-1} x] = 0$
21. $[\sin^{-1} \cos^{-1} \sin^{-1} \tan^{-1} x] = 1$
22. $(\tan^{-1} x)^2 + (\cot^{-1} x)^2 = \frac{5\pi^2}{8}$
23. Find the value of $\cos \left(\frac{1}{2} \cos^{-1} \left(\frac{3}{5} \right) \right)$.
24. Find the value of $\sin \left(\frac{\pi}{4} + \sin^{-1} \left(\frac{1}{2} \right) \right)$.
25. If m is a root of $x^2 + 3x + 1 = 0$, then find the value of $\tan^{-1} (m) + \tan^{-1} \left(\frac{1}{m} \right)$.
26. Prove that $\cos \left(\tan^{-1} \left(\sin (\cot^{-1} x) \right) \right) = \sqrt{\frac{x^2 + 1}{x^2 + 2}}$

Questions Solve for x:

27. $6(\sin^{-1} x)^2 - \pi \sin^{-1} x \leq 0$

28. $\frac{2\tan^{-1} x + \pi}{4\tan^{-1} x - \pi} \leq 0$

29. $\sin^{-1} x < \sin^{-1} x^2$

30. $\cos^{-1} x > \cos^{-1} x^2$

31. $\log^2 (\tan^{-1} x) > 1$

32. $(\cot^{-1} x)^2 - 5\cot^{-1} x + 6 > 0$

33. $\sin^{-1} x < \cos^{-1} x$

34. $\sin^{-1} x > \sin^{-1} (1 - x)$

35. $\sin^{-1} 2x > \operatorname{cosec}^{-1} x$

Answer Key

1. $R_f = \left[\frac{\pi}{4}, \frac{3\pi}{4} \right]$
2. $x = \frac{5}{2}$
3. $x = 1$
4. 2
5. $x = 1$
6. $x \in \left(\frac{1}{\sqrt{2}}, 1 \right]$
7. $x = \sin(1)$
8. $x = 1, y = \frac{1}{2}$
9. $x = \varphi$
10. $x = 1$
11. $x = \frac{3}{2}$
12. $x = \{-\sqrt{2}, 0, \sqrt{2}\}$
13. $x = -\frac{1}{\sqrt{3}}$
14. $\frac{\sqrt{3}-1}{2\sqrt{2}}$
15. $(\sqrt{2} - 1)$
16. $x = 0.$
17. $x = \varphi$
18. $x \in [\cos(1), \sin(1)]$
19. $x \in [\cot(1), \tan(1)]$
20. $\tan(\sin(\cos(\sin(1)))) < x \leq \tan(\sin(1))$
22. $x = -1$
23. $\cos \theta = \frac{2}{\sqrt{5}}$
24. $\frac{\sqrt{3}+1}{2\sqrt{2}}$
25. $-\frac{\pi}{2}$
26. $\sqrt{\frac{x^2+1}{x^2+2}}$
27. $0 \leq x \leq \frac{1}{2}$
28. $-\infty < x < 1$
29. $x \in [-1, 0)$
30. $-1 \leq x < 0$
31. $\tan 2, \infty$
32. $x \in (\cot 2, \cot 3)$
33. $x \in \left[-1, \frac{1}{\sqrt{2}} \right)$
34. $x \in \left(\frac{1}{2}, 1 \right]$
35. $x \in \left(-\frac{1}{\sqrt{2}}, 0 \right) \cup \left(\frac{1}{\sqrt{2}}, 1 \right]$