



## MATHS

### BOOKS - PSEB

## INVERSE TRIGONOMETRIC FUNCTIONS

### Example

1. Find the principal value of  $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$

 [Watch Video Solution](#)

2. Find the principal value of  $\cot^{-1}\left(-\frac{1}{\sqrt{3}}\right)$

 [Watch Video Solution](#)

3. Show that :  $\sin^{-1}\left(2x\sqrt{1-x^2}\right) = 2\sin^{-1}x$ ,  $-\frac{1}{\sqrt{2}} \leq x \leq \frac{1}{\sqrt{2}}$

 [Watch Video Solution](#)

4. Show that :  $\sin^{-1}\left(2x\sqrt{1-x^2}\right) = 2\cos^{-1}x$ ,  $\frac{1}{\sqrt{2}} \leq x \leq 1$

 [Watch Video Solution](#)

5.  $\tan^{-1}\frac{1}{2} + \tan^{-1}\frac{2}{11} = \tan^{-1}\frac{3}{4}$

 [Watch Video Solution](#)

6. Express  $\tan^{-1}\left(\frac{\cos x}{1} - \sin x\right)$ ,  $-3\pi/2 < x < \pi/2$  in the simplest form.

 [Watch Video Solution](#)

7. Write the  $\cot^{-1}\left(\frac{1}{\sqrt{x^2-1}}\right)$ ,  $|x| > 1$ , in the simplest form.

 [Watch Video Solution](#)

8. Prove that :

$$\tan^{-1} x + \tan^{-1} 2\frac{x}{1-x^2} = \tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right), |x| < \frac{1}{\sqrt{3}}$$

 [Watch Video Solution](#)

9. The value of  $\cos \operatorname{ec}(\sec^{-1} x + \operatorname{cosec}^{-1} x)$  is equal to :

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

11. Show that  $\sin^{-1} \frac{3}{5} - \sin^{-1} \frac{8}{17} = \cos^{-1} \frac{84}{85}$

 [Watch Video Solution](#)

12. Show that  $\sin^{-1} \left( \frac{12}{13} \right) + \cos^{-1} \left( \frac{4}{5} \right) + \tan^{-1} \left( \frac{63}{16} \right) = \pi$

 [Watch Video Solution](#)

13. Simplify  $\tan^{-1} \left[ \frac{a \cos x - b \sin x}{b \cos x + a \sin x} \right]$  if  $\frac{a}{b} \tan x > 1$

 [Watch Video Solution](#)

14. Solve:  $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$

 [Watch Video Solution](#)

1. Principal value of  $\sin^{-1}(-1/2)$  is :

 [Watch Video Solution](#)

2. Find the principal value of  $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

 [Watch Video Solution](#)

3. Principal value of  $\operatorname{cosec}^{-1}(2)$  is :

 [Watch Video Solution](#)

4. Find the principal value of  $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$

 [Watch Video Solution](#)

5. Principal value of  $\cos^{-1}(-1/2)$  is :



[Watch Video Solution](#)

6. Range of  $\tan^{-1}x$  =



[Watch Video Solution](#)

7. Principal value of  $\sec^{-1}(2/\sqrt{3})$  is :



[Watch Video Solution](#)

8. Find the principal value of  $\cot^{-1}(\sqrt{3})$



[Watch Video Solution](#)

9. Find the principal value of  $\cos^{-1}\left(-\frac{1}{\sqrt{2}}\right)$

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

11. Find the values of  $\tan^{-1}(1) + \cos^{-1}\left(-\frac{1}{2}\right) + \sin^{-1}\left(-\frac{1}{2}\right)$

 [Watch Video Solution](#)

12. Select the correct answer :  $\cos^{-1}\left(\frac{1}{2}\right) + 2\sin^{-1}\left(\frac{1}{2}\right)$

 [Watch Video Solution](#)

13. If  $\sin^{-1} x = y$ , then :  $0 \leq y \leq \pi$ , is it true or false?



Watch Video Solution

14. If  $\sin^{-1} x = y$ , then :  $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$ , is it true or false?



Watch Video Solution

15. If  $\sin^{-1} x = y$ , then  $-\frac{\pi}{2} < y < \frac{\pi}{2}$ , is it true or false?



Watch Video Solution

16.  $\tan^{-1} \sqrt{3} - \sec^{-1}(-2)$  is equal to :

A.  $\pi$

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

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



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

**Answer:**

 [Watch Video Solution](#)

17. Prove the following:  $3 \sin^{-1} x = \sin^{-1}(3x - 4x^3)$ ,  $x \in \left[-\frac{1}{2}, \frac{1}{2}\right]$

 [Watch Video Solution](#)

18. Prove the following:  $3 \cos^{-1} x = \cos^{-1}(4x^3 - 3x)$ ,  $x \in \left[\frac{1}{2}, 1\right]$

 [Watch Video Solution](#)

19. Prove the following:  $\tan^{-1}\left(\frac{2}{11}\right) + \tan^{-1}\left(\frac{7}{24}\right) = \tan^{-1}\left(\frac{1}{2}\right)$

 [Watch Video Solution](#)

20. Prove that :  $2 \tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{7}\right) = \tan^{-1}\left(\frac{31}{17}\right)$

 [Watch Video Solution](#)

21. Write the following function in the simplest form:  $\tan^{-1}\left(\left(\frac{\sqrt{1+\cos x}}{\sqrt{1-\cos x}}\right)\right)$

 [Watch Video Solution](#)

22. Write the following function in the simplest form:

$$\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right), x \neq 0$$

 [Watch Video Solution](#)

23. Write the following function in the simplest form :

$$\tan^{-1}\left(\frac{1}{\sqrt{x^2-1}}\right), |x| > 1$$

 [Watch Video Solution](#)

24. Write the following function in the simplest form:  $\tan^{-1} \left( \frac{\cos x - \sin x}{\cos x + \sin x} \right), -\pi/4$

 [Watch Video Solution](#)

25. Write the following function in the simplest form:  $\tan^{-1} \left( \frac{x}{\sqrt{a^2 - x^2}} \right), |x|$

 [Watch Video Solution](#)

26. Write the following function in the simplest form :  $\tan^{-1} \left( \frac{3a^2 x - x^3}{a^3 - 3ax^2} \right), a > 0, -a/\sqrt{3}$

 [Watch Video Solution](#)

27. Find the value of the following:  $\tan^{-1} \left[ 2 \cos \left( 2 \sin^{-1} \left( \frac{1}{2} \right) \right) \right]$



Watch Video Solution

28. Find the value of the following:  $\cot(\tan^{-1} a + \cot^{-1} a)$



Watch Video Solution

29. Find the value of the following:

$$\frac{\tan 1}{2} \left[ \sin^{-1} \left( 2 \frac{x}{1+x^2} \right) + \frac{\cos^{-1}(1-y^2)}{1+y^2} \right], |x| < 1, y > 0 \quad xy < 1$$



Watch Video Solution

30. If  $\sin \left( \sin^{-1} \left( \frac{1}{5} \right) + \cos^{-1} 1x \right) = 1$ , then find the value of  $x$ .



Watch Video Solution

31. If  $\tan^{-1} \left( \frac{x-1}{x-2} \right) + \tan^{-1} \left( \frac{x+1}{x+2} \right) = \frac{\pi}{4}$ , then find the value of  $x$



 Watch Video Solution

32. The value of  $\sin^{-1}(\sin(2\pi/3))$  is :

 Watch Video Solution

33. The value of  $\tan^{-1}(\tan(3\pi/4))$  is :

 Watch Video Solution

34. Find the value of  $\tan\left(\sin^{-1}\frac{3}{5} + \cot^{-1}\frac{3}{2}\right)$ .

 Watch Video Solution

35.  $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$  is equal to :

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

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

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

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

**Answer:**



**Watch Video Solution**

36.  $\sin\left(\frac{\pi}{3} - \sin^{-1}\left(-\frac{1}{2}\right)\right)$  is equal to:

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

B.  $\frac{1}{3}$

C.  $\frac{1}{4}$

D. 1

**Answer:**



**Watch Video Solution**

37.  $\tan^{-1}(\sqrt{3}) - \cot^{-1}(-\sqrt{3})$  is equal to :

A.  $\pi$

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

C. 0

D.  $2\sqrt{3}$

**Answer:**

 [Watch Video Solution](#)

38.  $\cos^{-1}\left(\cos 13\frac{\pi}{6}\right)$  is :

 [Watch Video Solution](#)

39. Find the value of the following:  $\tan^{-1}\left(\tan\left(7\frac{\pi}{6}\right)\right)$

 [Watch Video Solution](#)

40. Prove that :  $2 \sin^{-1}\left(\frac{3}{5}\right) = \tan^{-1}\left(\frac{24}{7}\right)$

 [Watch Video Solution](#)

41. Prove that :  $\sin^{-1}\left(\frac{8}{17}\right) + \sin^{-1}\left(\frac{3}{5}\right) = \tan^{-1}\left(\frac{77}{36}\right)$

 [Watch Video Solution](#)

42. Prove that :  $\cos^{-1}\left(\frac{4}{5}\right) + \cos^{-1}\left(\frac{12}{13}\right) = \cos^{-1}\left(\frac{33}{65}\right)$

 [Watch Video Solution](#)

43. Show that  $\cos^{-1} \frac{12}{13} + \sin^{-1} \frac{3}{5} = \sin^{-1} \frac{56}{65}$

 [Watch Video Solution](#)



44. Prove that :  $\sin^{-1}\left(\frac{5}{13}\right) + \cos^{-1}\left(\frac{3}{5}\right) = \tan^{-1}\left(\frac{63}{16}\right)$

 [Watch Video Solution](#)

45.  $\tan^{-1}\frac{1}{5} + \tan^{-1}\frac{1}{7} + \tan^{-1}\frac{1}{3} + \tan^{-1}\frac{1}{8} = \frac{\pi}{4}$

 [Watch Video Solution](#)

46. Prove that  $\tan^{-1}\sqrt{x} = \frac{1}{2}\cos^{-1}\left(\frac{1-x}{1+x}\right)$ ,  $x \in [0, 1]$

 [Watch Video Solution](#)

47. Prove that :  $\cot^{-1}\left[\frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} + \sqrt{1-\sin x}}\right] = \frac{x}{2}$ ,  $x \in \left(0, \frac{\pi}{4}\right)$

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

49. Prove that:  $\left(9\frac{\pi}{8}\right) - \left(\frac{9}{4}\right) \sin^{-1} \left(\frac{1}{3}\right) = \left(\frac{9}{4}\right) \sin^{-1} \left(2\frac{\sqrt{2}}{3}\right)$

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

51. Solve the following equation :

$$\tan^{-1} \left( \frac{1-x}{1+x} \right) = \left( \frac{1}{2} \right) \tan^{-1} x, (x > 0)$$

 [Watch Video Solution](#)

52.  $\sin(\tan^{-1} x)$ ,  $|x| < 1$  is equal to :

A.  $\frac{x}{\sqrt{1-x^2}}$

B.  $\frac{1}{\sqrt{1-x^2}}$

C.  $\frac{1}{\sqrt{1+x^2}}$

D.  $\frac{x}{\sqrt{1+x^2}}$

**Answer:**



**Watch Video Solution**

53. If  $\sin^{-1}(1-x) - 2\sin^{-1}x = \frac{\pi}{2}$ , then  $x$  is equal to :

A.  $0, \frac{1}{2}$

B.  $1, \frac{1}{2}$

C.  $0$

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

**Answer:**



**Watch Video Solution**

54.  $\tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\left(\frac{x-y}{x+y}\right)$  is equal to :

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

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

C.  $\frac{\pi}{4}$

D.  $-3\frac{\pi}{4}$

**Answer:**



**Watch Video Solution**