



MATHS

BOOKS - OMEGA PUBLICATION

INVERSE TRIGONOMETRIC FUNCTIONS

Question

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



[Watch Video Solution](#)

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



 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

4. Write the principal value of $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$.

 [Watch Video Solution](#)

5. Find the values of

$$\tan^{-1}(1) + \cos^{-1}\left(-\frac{1}{2}\right) + \sin^{-1}\left(-\frac{1}{2}\right)$$

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

7. prove that $3\sin^{-1}x = \sin^{-1}(3x - 4x^3)$, $x \in \left[-\frac{1}{2}, \frac{1}{2}\right]$

 [Watch Video Solution](#)

8. Prove that $2\tan^{-1}\frac{1}{2} + \tan^{-1}\frac{1}{7} = \tan^{-1}\frac{31}{17}$

 [Watch Video Solution](#)

9. Write the $\tan^{-1}\left(\frac{3a^2x - x^3}{a^3 - 3ax^2}\right)$, $a > 0$, $-\frac{a}{3} \leq x \leq \frac{a}{3}$.

in the simplest form.

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

12. 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](#)

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

 [Watch Video Solution](#)

14. Find the value of $\tan^{-1}\left(\tan \frac{3\pi}{4}\right)$

 [Watch Video Solution](#)

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



Watch Video Solution

16. Solve for x : $\tan^{-1} \frac{1-x}{1+x} = \frac{1}{2} \tan^{-1} x, x > 0.$



Watch Video Solution

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



Watch Video Solution

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



Watch Video Solution

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

 [Watch Video Solution](#)

20. Write the principal value of $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$.

 [Watch Video Solution](#)

21. Find the values of

$$\tan^{-1}(1) + \cos^{-1}\left(-\frac{1}{2}\right) + \sin^{-1}\left(-\frac{1}{2}\right)$$

 [Watch Video Solution](#)

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



Watch Video Solution

23. prove that

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



Watch Video Solution

24. Prove that $2 \tan^{-1} \frac{1}{2} + \tan^{-1} \frac{1}{7} = \tan^{-1} \frac{31}{17}$



Watch Video Solution

25. Write the $\tan^{-1} \left(\frac{3a^2x - x^3}{a^3 - 3ax^2} \right)$, $a > 0$, $-\frac{a}{3} \leq x \leq \frac{a}{3}$.

in the simplest form.



Watch Video Solution

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

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

28. 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](#)

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

 [Watch Video Solution](#)

30. Find the value of $\tan^{-1}\left(\tan \frac{3\pi}{4}\right)$

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

32. Solve for x : $\tan^{-1} \frac{1-x}{1+x} = \frac{1}{2} \tan^{-1} x, x > 0.$

 [Watch Video Solution](#)

Important Questions From Miscellaneous Exercise

1. Find the value of $\cos^{-1}\left(\cos \frac{13\pi}{6}\right)$

 [Watch Video Solution](#)

2. What is the principal value of $\cos^{-1}\left(\cos \frac{2\pi}{3}\right) + \sin^{-1}\left(\sin \frac{2\pi}{3}\right)$?

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

 Watch Video Solution

4. Prove that

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

 Watch Video Solution

5. Prove that $\tan^{-1} \frac{2}{11} + \tan^{-1} \frac{7}{24} = \tan^{-1} \frac{1}{2}$.

 Watch Video Solution

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

 Watch Video Solution

7. Prove that

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

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

9. 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](#)

10. Prove that $\frac{9\pi}{8} - \frac{9}{4}\sin^{-1}\frac{1}{3} = \frac{9}{4}\sin^{-1}\frac{2\sqrt{2}}{3}$.

 [Watch Video Solution](#)

11. Solve $\tan^{-1}(x+1) + \tan^{-1}(x-1) = \tan^{-1}\frac{8}{31}$

 [Watch Video Solution](#)

12. 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](#)

13. Solve the $2\tan^{-1}(\cos x) = \tan^{-1}(2\cos ecx)$.

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

15. Prove that

$$\sin^{-1} \frac{5}{13} + \cos^{-1} \frac{3}{5} = \sin^{-1} \frac{63}{65}$$

 [Watch Video Solution](#)

16. Prove that :

$$\tan\left(\frac{\pi}{4} + \frac{1}{2} \cos^{-1} \frac{a}{b}\right) + \tan\left(\frac{\pi}{4} - \frac{1}{2} \cos^{-1} \frac{a}{b}\right) = \frac{2b}{a}.$$

 [Watch Video Solution](#)

17. Prove that

$$\sin^{-1}\left(2x \cdot \sqrt{1-x^2}\right) = 2 \cos^{-1} x, \quad \frac{1}{\sqrt{2}} \leq x < 1$$

 [Watch Video Solution](#)

18. Write in simplest form : $\tan^{-1}\left(\sqrt{\frac{1-\cos x}{1+\cos x}}\right), x < \pi$.

 [Watch Video Solution](#)

19. Write the $\tan^{-1}\left(\frac{\cos x - \sin x}{\cos x + \sin x}\right), x < \pi$. in the simplest form.

 [Watch Video Solution](#)

20. Prove that

$$\tan^{-1} \frac{1}{2} + \tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{8} = \frac{\pi}{4}$$

 [Watch Video Solution](#)

21. 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](#)

22. Write $\tan^{-1} \left(\frac{x}{\sqrt{a^2 - x^2}} \right)$ in simplest form.

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

24. Find the value of $\cos^{-1}\left(\cos\frac{13\pi}{6}\right)$

 [Watch Video Solution](#)

25. What is the principal value of $\cos^{-1}\left(\cos\frac{2\pi}{3}\right) + \sin^{-1}\left(\sin\frac{2\pi}{3}\right)$?

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

27. Prove that

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

 [Watch Video Solution](#)

28. Prove that $\tan^{-1} \frac{2}{11} + \tan^{-1} \frac{7}{24} = \tan^{-1} \frac{1}{2}$.

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

30. Prove that

$$\tan^{-1}\left(\frac{1}{5}\right) + \tan^{-1}\left(\frac{1}{7}\right) + \tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{1}{8}\right) = \frac{\pi}{4}$$

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

32. 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

33. Prove that $\frac{9\pi}{8} - \frac{9}{4} \sin^{-1} \frac{1}{3} = \frac{9}{4} \sin^{-1} \frac{2\sqrt{2}}{3}$.

 Watch Video Solution

34. Solve $\tan^{-1}(x + 1) + \tan^{-1}(x - 1) = \tan^{-1} \frac{8}{31}$

 Watch Video Solution

35. 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](#)

36. Solve the $2 \tan^{-1}(\cos x) = \tan^{-1}(2 \cos ecx)$.

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

38. Show 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](#)

39. Prove that :

$$\tan^{-1}\left(\frac{x}{4} + \frac{1}{2}\cos^{-1}\frac{a}{b}\right) + \tan\left(\frac{\pi}{4} - \frac{1}{2}\cos^{-1}\frac{a}{b}\right) = \frac{2b}{a}.$$

 Watch Video Solution

40. Prove that :

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

 Watch Video Solution

41. Write in simplest form : $\tan^{-1}\left(\sqrt{\frac{1-\cos x}{1+\cos x}}\right), x < \pi.$

 Watch Video Solution

42. Express $\tan^{-1}\left(\frac{\cos x - \sin x}{\cos x + \sin x}\right)$, $0 < x < \pi$ in the simplest form.

 [Watch Video Solution](#)

43. Prove that :

$$\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{5}\right) + \tan^{-1}\left(\frac{1}{8}\right) = \frac{\pi}{4}.$$

 [Watch Video Solution](#)

44. Prove the following :

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

 [Watch Video Solution](#)

45. Express $\tan^{-1} \frac{x}{\sqrt{a^2 - x^2}}$, $|x| < a$, in the simplest form.

 [Watch Video Solution](#)

46. Express $\tan^{-1} \frac{\sqrt{1+x^2} - 1}{x}$, $x \neq 0$ in simplest form.

 [Watch Video Solution](#)

Multiple Choice Questions

1. The principal value of $\tan^{-1}(-1)$ is

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

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

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

D. None of these

Answer: C



Watch Video Solution

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

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

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

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

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

Answer: A

 Watch Video Solution

3. If $\sin^{-1} x = y$, then

A. $0 \leq y \leq \pi$

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

C. $0 < y < \pi$

D. $-\frac{\pi}{2} < y < \frac{\pi}{2}$

Answer: B

 Watch Video Solution

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

A. π

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

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

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

Answer: B



Watch Video Solution

5. $\sin(\tan^{-1} x), |x| < 1$ 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: D

 [Watch Video Solution](#)

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

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

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

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

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

Answer: C

 [Watch Video Solution](#)

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

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

B. $\frac{-3\pi}{5}$

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

D. None of these

Answer: C



Watch Video Solution

8. The principal value of $\tan^{-1}(-1)$ is

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

B. $\frac{3\pi}{4}$

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

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

Answer: C



Watch Video Solution

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

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

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

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

D. 1

Answer: D



Watch Video Solution

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

A. π

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

C. 0

D. $2\sqrt{3}$

Answer: B



Watch Video Solution

11. The principal value of $\tan^{-1}(-1)$ is

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

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

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

D. None of these

Answer: C



Watch Video Solution

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

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

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

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

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

Answer: A



Watch Video Solution

13. If $\sin^{-1}x = y$, then

A. $0 \leq y \leq \pi$

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

C. $0 < y < \pi$

D. $-\frac{\pi}{2} < y < \frac{\pi}{2}$

Answer: B

 [Watch Video Solution](#)

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

A. π

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

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

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

Answer: B

 [Watch Video Solution](#)

15. $\sin(\tan^{-1}x)$, $|x| < 1$ 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: D

 [Watch Video Solution](#)

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

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

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

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

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

Answer: C

 [Watch Video Solution](#)

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

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

B. $\frac{-3\pi}{5}$

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

D. None of these

Answer: C

 [Watch Video Solution](#)

18. The principal value of $\tan^{-1}(-1)$ is

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

B. $\frac{3\pi}{4}$

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

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

Answer: C

 [Watch Video Solution](#)

19. The value of $\sin\left(\frac{\pi}{3} - \sin^{-1}\left(-\frac{1}{2}\right)\right)$ is equal to

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

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

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

D. 1

Answer: D



Watch Video Solution

20. The value of $\tan^{-1}\sqrt{3} - \cot^{-1}(-\sqrt{3})$ is equal to

A. π

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

C. 0

D. $2\sqrt{3}$

Answer: B



Watch Video Solution