MATHS

BOOKS - KUMAR PRAKASHAN KENDRA MATHS (GUJRATI ENGLISH)

INVERSE TRIGONOMETRIC FUNCTIONS

Exercise 2 1

1. Find the principal values of the following :

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

Watch Video Solution

2. Find the principal values of the following :

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

Watch Video Solution

3. Find the principal values of the following :

$\cos ec^{-1}(2)$

Watch Video Solution

4. Find the principal values of the following :

$\tan^{-1}(-\sqrt{3})$

Watch Video Solution

5. Find the principal values of the following :

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

Watch Video Solution

6. Find the principal values of the following :

$\tan^{-1}(-1)$

Watch Video Solution

7. Find the principal values of the following :

$\sec^{-1}\left(\frac{2}{\sqrt{3}}\right)$

Watch Video Solution

8. Find the principal values of the following :

$\cot^{-1}(\sqrt{3})$

Watch Video Solution

9. Find the principal values of the following :

$\cos^{-1}\left(\frac{-1}{\sqrt{2}}\right)$

Watch Video Solution

10. Find the principal values of the following :

$\cos ec^{-1}(-\sqrt{2})$

Watch Video Solution

11. Find the values of the following :

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

Watch Video Solution

12. Find the values of the following :

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

Watch Video Solution

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

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

A. π

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

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

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

Answer: B

Watch Video Solution

Exercise 2 2

1. Prove :

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

Watch Video Solution

2. Prove :

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

Watch Video Solution

3. Prove :

$$\tan^{-1}\frac{2}{11}+\tan^{-1}\frac{7}{24}=\tan^{-1}\frac{1}{2}$$

Watch Video Solution

4. Prove :

$$2\tan^{-1}\frac{1}{2}+\tan^{-1}\frac{1}{7}=\tan^{-1}\frac{31}{17}$$

Watch Video Solution

5. Write the following functions in the simplest form :

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

Watch Video Solution

6. Write the following functions in the simplest form :

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

Watch Video Solution

7. Write the following functions in the simplest form :

$$\tan^{-1}\left(\sqrt{\frac{1-\cos x}{1+\cos x}}\right), 0 < x < \pi$$

Watch Video Solution

8. Write the following functions in the simplest form :

$$\tan^{-1}\left(\frac{\cos x - \sin x}{\cos x + \sin x}\right), 0 < x < \pi$$

Watch Video Solution

9. Write the following functions in the simplest form :

$$\tan^{-1}\frac{x}{\sqrt{a^2 - x^2}}, |x| < a$$

Watch Video Solution

10. Write the following functions in the simplest form :

$$\tan^{-1}\left(\frac{3a^2x - x^3}{a^3 - 3ax^2}\right), a > 0, \frac{-a}{\sqrt{3}} < x < \frac{a}{\sqrt{3}}$$

Watch Video Solution

11. Find the values of each of the following :

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

Watch Video Solution

12. Find the values of each of the following :

$$\cot\left[\tan^{-1}a + \cot^{-1}a\right]$$

Watch Video Solution

13. Find the values of each of the following :

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

Watch Video Solution

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

Watch Video Solution

15. If $\tan^{-1}\frac{x-1}{x-2}+\tan^{-1}\frac{x+1}{x+2}=\frac{\pi}{4}$, then find the value of x

Watch Video Solution

16. Find the value of each of the expressions in

$\sin^{-1}\left(\sin\frac{2\pi}{3}\right)$

Watch Video Solution

17. Find the value of each of the expressions in

$\tan^{-1}\left(\tan\frac{3\pi}{4}\right)$

Watch Video Solution

18. Find the value of each of the expressions in

$$\tan\left(\sin^{-1}\frac{3}{5}+\cot^{-1}\frac{3}{2}\right)$$

Watch Video Solution

19. Select the proper option so that statement becomes true.

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

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

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

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

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

Answer: B

Watch Video Solution

20. Select the proper option so that statement becomes true.

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

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

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

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

D. 1

Answer: D

Watch Video Solution

21. Select the proper option so that statement becomes true.

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

A. π

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

C. 0

D. $2\sqrt{3}$

Answer: B

Watch Video Solution

Miscellaneous Exercise 2

1. Find the value of the following :

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

Watch Video Solution

2. Find the value of the following :

$$\tan^{-1}\left(\tan\frac{7\pi}{6}\right)$$

Watch Video Solution

3. Prove that :

$$2\sin^{-1}\frac{3}{5} = \tan^{-1}\frac{24}{7}$$

Watch Video Solution

4. Prove that :

$$\sin^{-1}\frac{8}{17} + \sin^{-1}\frac{3}{5} = \tan^{-1}\frac{77}{36}$$

Watch Video Solution

5. Prove that :

$$\cos^{-1}\frac{4}{5} + \cos^{-1}\frac{12}{13} = \cos^{-1}\frac{33}{65}$$

Watch Video Solution

6. Prove that :

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

Watch Video Solution

7. Prove that :

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

Watch Video Solution

8. 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

9. 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

10. 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

11. Prove that :

$$\tan^{-1}\left(\frac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right)=\frac{\pi}{4}-\frac{1}{2}\cos^{-1}x, -\frac{1}{\sqrt{2}} \leq x \leq 1$$

Watch Video Solution

12. 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

13. Solve the following equations :

$2\tan^{-1}(\cos x) = \tan^{-1}(2\cos ecx)$

Watch Video Solution

14. Solve the following equations :

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

Watch Video Solution

15. $\sin\left(\tan^{-1}x\right), |x| < 1$ 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. $\sin^{-1}(1-x) - 2\sin^{-1} x = \frac{\pi}{2}$, then x is equal to

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

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

C. 0

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

Answer: C

Watch Video Solution

17. $\tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\frac{x-y}{x+y}$ 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

Textbook Based Mcqs

1. $\tan^{-1}(\cot x) + \cot^{-1}(\tan x) =$ _____ $\left(0 < x < \frac{\pi}{2}\right)$

A. $\pi - x$

B. 2x

C. $\pi - 2x$

D. $-2x$

Answer: C

Watch Video Solution

2. $\sec^2\left(\tan^{-1}4\right) + \cos ec^2\left(\cot^{-1}5\right)$ = _____

A. 41

B. 43

C. 45

D. 47

Answer: B

Watch Video Solution

3. If $\cot^{-1}x - \cot^{-1}y = 0$ and $\cos^{-1}x + \cos^{-1}y = \frac{\pi}{2}$ then x + y = _____

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

B. 1

C. 0

D. $\sqrt{2}$

Answer: D

Watch Video Solution

4.

$\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{3\pi}{2}$ and $f(1) = 2, f(p+q) = f(p) \cdot f(q),$

= _____

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

5. If $x = \sin\left(2\tan^{-1}2\right)$ and $y = \sin\left(\frac{1}{2}\tan^{-1}\frac{4}{3}\right)$ then _____

A. x = 1 - y

B. $y^2 = 1 - x$

C. $x^2 = 1 + y$

D. $x = 4y^2$

Answer: D

Watch Video Solution

6. $\cos ec\left[\tan^{-1}\left(\cos\left(\cot^{-1}\left(\sec\left(\sin^{-1}a\right)\right)\right)\right)\right]$ = _____

A. $\frac{1}{\sqrt{3-a^2}}$

B. $-\sqrt{3-a^2}$

C. $\sqrt{3-a^2}$

D. $\frac{-1}{\sqrt{3-a^2}}$

Answer: C

Watch Video Solution

7. If $\cos\left(2\sin^{-1}x\right) = \frac{1}{9}$ then x = _____

A. $\frac{3}{2}$

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

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

D. 1

Answer: B

Watch Video Solution

8. $\sin^2\left(\cos^{-1}x\right) + \cos^2\left(\sin^{-1}\left(\sqrt{1-x^2}\right)\right)$ = _____ $(0 < x < 1)$

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

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

C. 1

D. $= 0$

Answer: C

Watch Video Solution

9. $\cot^2\left(\frac{1}{2}\cos^{-1}\frac{2}{3}\right)$ = _____

A. 1

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

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

D. 5

Answer: D

Watch Video Solution

10. If $4\sin^{-1}x + 3\cos^{-1}x = 2\pi$ then x = _____

A. 0

B. 1

C. $-\frac{1}{2}$

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

Answer: B

Watch Video Solution

11. If $\pi \leq x \leq 2\pi$ then $\cos^{-1}(\cos x)$ = _____

A. x

B. $-x$

C. $2\pi + x$

D. $2\pi - x$

Answer: D

Watch Video Solution

12. The solution set of $\sin^{-1} x \leq \cos^{-1} x$ is _____

A. $\left[\frac{1}{\sqrt{2}}, 1\right]$

B. $\left[-\frac{1}{\sqrt{2}}, 1\right]$

C. $\left[-1, \frac{1}{\sqrt{2}}\right]$

D. $\left[-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right]$

Answer: C

Watch Video Solution

13. $\tan^{-1}(1) + \tan^{-1}(2) + \tan^{-1}(3)$ = _____

A. π

B. $\frac{5\pi}{4}$

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

D. None of these

Answer: A

Watch Video Solution

14. $f(x) = \sin^{-1} x + \tan^{-1} x + \sec^{-1} x$ then range of f(x) is _____

A. $\left(\frac{\pi}{4}, \frac{3\pi}{4}\right)$

B. $\left[\frac{\pi}{4}, \frac{3\pi}{4}\right]$

C. $\left\{\frac{\pi}{4}, \frac{3\pi}{4}\right\}$

D. None of these

Answer: C

Watch Video Solution

15. The solution set of $\sin^{-1}(\sin 5) > x^2 - 4x$ is _____

A. $|x-2| < \sqrt{9-2\pi}$

B. $|x-2| > \sqrt{9-2\pi}$

C. $|x| < \sqrt{9-2\pi}$

D. $|x| > \sqrt{9-2\pi}$

Answer: A

Watch Video Solution

16. The number of real solution of (x, y), where $y = \sin^{-1}(\sin x)$ and $|y| = \cos x, |x| < 3\pi$ is _____

A. (a) 0

B. (b) 4

C. (c) 6

D. (d) 8

Answer: C

Watch Video Solution

17. The principle value of

$$\cos^{-1}\left\{\frac{1}{\sqrt{2}}\left(\cos\frac{9\pi}{10}-\sin\frac{9\pi}{10}\right)\right\} \text{ is } \_\_\_\_\_$$

A. $\frac{3\pi}{20}$

B. $\frac{17\pi}{20}$

C. $\frac{7\pi}{10}$

D. None of these

Answer: B

Watch Video Solution

18. The roots of the equation $8x^2+22x+5=0$ are θ and ϕ. Then

A. (a) $\sin^{-1}\theta$ and $\sin^{-1}\phi$, both the real

B. (b) $\sec^{-1}\theta$ and $\sec^{-1}\phi$, both the real

C. (c) $\tan^{-1}\theta$ and $\tan^{-1}\phi$, both the real

D. (d) None of these

Answer: C

Watch Video Solution

19. The solution set of the equation $\tan^{-1}x - \cot^{-1}x = \cos^{-1}(2-x)$ is _____

A. [0, 1]

B. [-1, 1]

C. [1, 3]

D. None of these

Answer: C

Watch Video Solution

20. $\sin^{-1}\left(\cos\left(\sin^{-1}x\right)\right)+\cos^{-1}\left(\sin\left(\cos^{-1}x\right)\right)$ = _____

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

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

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

D. 0

Answer: B

Watch Video Solution

21. $\cos\left(2\cos^{-1}x+\sin^{-1}x\right)$ = _____ where $x=\frac{1}{5}$.

A. $\frac{2\sqrt{6}}{5}$

B. $-\frac{2\sqrt{6}}{5}$

C. $\frac{3\sqrt{6}}{5}$

D. None of these

Answer: B

Watch Video Solution

22. $f(x) = \sin^{-1}\left\{\frac{\sqrt{3}}{2}x - \frac{1}{2}\sqrt{1-x^2}\right\}, -\frac{1}{2} \leq x \leq 1$ then f(x) = _____

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

B. $\sin^{-1}x - \frac{\pi}{6}$

C. $\sin^{-1}x + \frac{\pi}{6}$

D. None of these

Answer: B

Watch Video Solution

23. $\sin\left(4\tan^{-1}\frac{1}{3}\right) =$ _____

A. $\frac{12}{25}$

B. $\frac{13}{25}$

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

D. $-\frac{24}{25}$

Answer: C

Watch Video Solution

24. If $\sin^{-1}x + \sin^{-1}y = \frac{2\pi}{3}$ then $\cos^{-1}x + \cos^{-1}y =$ ____

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

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

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

D. π

Answer: B

Watch Video Solution

25. $\sin\left(3\sin^{-1}\frac{1}{3}\right)$ = _____

A. $\frac{23}{27}$

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

C. $\frac{27}{23}$

D. $\frac{2\sqrt{3}}{9}$

Answer: A

Watch Video Solution

26. The range of $\tan^{-1}$ is _____

A. $(-\pi, \pi)$

B. R

C. $(0, \pi)$

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

Answer: D

Watch Video Solution

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

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

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

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

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

Answer: A

Watch Video Solution

28. $\cos\left[\cos^{-1}\left(-\frac{1}{5}\right)+\sin^{-1}\left(-\frac{1}{5}\right)\right]$ is

A. $\frac{4}{9}$

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

C. 0

D. $-\frac{1}{3}$

Answer: C

Watch Video Solution

29. $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)+2\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$ is _____

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

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

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

D. $\frac{4\pi}{6}$

Answer: A

Watch Video Solution

30. $\sin\left\{\frac{\pi}{3} - \sin^{-1}\left(-\frac{1}{2}\right)\right\}$ is _____

A. 0

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

C. $\frac{\sqrt{3}}{2}$

D. 1

Answer: D

Watch Video Solution

31. Value of $\sin\left(\cos^{-1}\frac{4}{5}\right)$ is _____

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

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

C. $\frac{2}{3}$

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

Answer: B

Watch Video Solution

32. Value of $\cos\left(\tan^{-1}\frac{4}{3}\right)$ is _____

A. $\frac{2}{3}$

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

C. $\frac{3}{4}$

D. $\frac{3}{5}$

Answer: D

Watch Video Solution

33. If $4\sin^{-1}x + \cos^{-1}x = \pi$, then x = _____

A. $-\frac{1}{4}$

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

C. $-\frac{1}{2}$

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

Answer: D

Watch Video Solution

34. $\sin\left[\tan^{-1}\left(\tan\frac{7\pi}{6}\right)\right] + \cos\left[\cos^{-1}\left(\cos\frac{7\pi}{3}\right)\right]$ = ____

A. -1

B. 0

C. 1

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

Answer: C

Watch Video Solution

35. The value of $\sin\left[2\sin^{-1}(\cos A)\right]$ is _____

A. sinA

B. cosA

C. cos2A

D. sin2A

Answer: D

Watch Video Solution

36. Value of $\cos\left[\frac{\pi}{6}+\cos^{-1}\left(-\frac{1}{2}\right)\right]$ is _____

A. $-\frac{\sqrt{3}}{2}$

B. $\frac{\sqrt{3}-1}{2\sqrt{2}}$

C. $\frac{\sqrt{5}-1}{4}$

D. $\frac{\sqrt{3}+1}{2\sqrt{2}}$

Answer: A

Watch Video Solution

37. The value of $\sin\left[\tan^{-1}(-\sqrt{3})+\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right]$ is = _____

A. -1

B. 0

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

D. 1

Answer: D

Watch Video Solution

38. $\sin^{-1}\left(\frac{3}{5}\right)+\tan^{-1}\left(\frac{1}{7}\right)$ is _____

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

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

C. π

D. $\sin^{-1}\frac{4}{5}$

Answer: A

Watch Video Solution

39. The value of $\tan\left[\cos^{-1}\left(\frac{3}{4}\right)+\sin^{-1}\left(\frac{3}{4}\right)-\sec^{-1}3\right]$ is ____

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

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

C. $\frac{1}{2\sqrt{3}}$

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

Answer: D

Watch Video Solution

40. The value of $\sec\left[\tan^{-1}\left(\frac{b+a}{b-a}\right)-\tan^{-1}\left(\frac{a}{b}\right)\right]$ is ____

A. 1

B. $\sqrt{2}$

C. 2

D. 4

Answer: B

Watch Video Solution

41. The value of $\cot\left[\frac{\pi}{4}-2\cot^{-1}3\right]$ is _____

A. 3

B. 7

C. 9

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

Answer: B

Watch Video Solution

42. If $x = \frac{1}{3}$, then the value of $\cos\left(2\cos^{-1}x + \sin^{-1}x\right)$ = ____

A. $-\sqrt{\frac{8}{9}}$

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

C. $\frac{\sqrt{3}}{2}$

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

Answer: A

Watch Video Solution

43. $\tan\left(2\cos^{-1}\frac{3}{5}\right)$ is _____

A. $\frac{8}{3}$

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

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

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

Answer: D

Watch Video Solution

44. If $0 < x < 1$, then $\tan^{-1}\left(\frac{\sqrt{1-x^2}}{1+x}\right)$ is ____

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

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

C. $\frac{1}{2}\cot^{-1}\left(\frac{1-x}{1+x}\right)$

D. $\frac{1}{2}\tan^{-1}\left(\frac{x}{2}\right)$

Answer: B

Watch Video Solution

45. If $\cos\left(2\tan^{-1}x\right) = \frac{1}{2}$, then the value of x is ___

A. $\frac{1}{\sqrt{3}}$

B. $1-\sqrt{3}$

C. $1-\frac{1}{\sqrt{3}}$

D. $\sqrt{3}$

Answer: A

Watch Video Solution

46. The value of $\tan\left\{\sin^{-1}\left(\frac{3}{5}\right)+\cos^{-1}\left(\frac{5}{13}\right)\right\}$ is _____

A. $-\frac{24}{5}$

B. $-\frac{22}{15}$

C. $-\frac{63}{16}$

D. $-\frac{47}{12}$

Answer: C

Watch Video Solution

47. $\cot^{-1}\left(\frac{\sqrt{1-\sin x}+\sqrt{1+\sin x}}{\sqrt{1-\sin x}-\sqrt{1+\sin x}}\right)=\ldots\left(0<x<\frac{\pi}{2}\right)$

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

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

C. $2\pi-x$

D. $\pi-\frac{x}{2}$

Answer: D

Watch Video Solution

48. If $\sin^{-1}\frac{1}{x} = 2\tan^{-1}\left(\frac{1}{7}\right) + \cos^{-1}\left(\frac{3}{5}\right)$, then x = _____

A. $\frac{24}{117}$

B. $\frac{7}{3}$

C. $\frac{125}{117}$

D. $-\frac{117}{44}$

Answer: C

Watch Video Solution

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

A. $\frac{14}{33}$

B. $\frac{-7}{17}$

C. $\frac{17}{7}$

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

Answer: B

Watch Video Solution

50. If $\sin^{-1}(1-x) - 2\sin^{-1} x = \frac{\pi}{2}$, then x is ____

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

B. 0

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

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

Answer: B

Watch Video Solution

51. The number of values of x satisfying the equation $\tan^{-1}(x+1) + \tan^{-1} x + \tan^{-1}(x-1) = \tan^{-1} 3x$ is ____

A. 2

B. 3

C. 4

D. infinite

Answer: B

Watch Video Solution

52. If $\cot^{-1} x + \cot^{-1} y + \cot^{-1} z = \frac{\pi}{2}$, then x + y + z = _____

A. xy + yz + zx

B. xyz

C. $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$

D. $\frac{xy + yz + zx}{3}$

Answer: B

Watch Video Solution

53. If $\sin^{-1}\left(\frac{2a}{1+a^2}\right)+\sin^{-1}\left(\frac{2b}{1+b^2}\right)=2\tan^{-1}x$, then, x = ____

A. $\frac{a-b}{1+ab}$

B. $\frac{a+b}{1-ab}$

C. $\frac{b}{1-ab}$

D. $\frac{b}{1+ab}$

Answer: B

Watch Video Solution

54. Domain of $\sin^{-1}$ is ____

A. [0, 1]

B. $(-\infty,\infty)$

C. $[0,\pi]$

D. $[-1, 1]$

Answer: D

Watch Video Solution

55. $\cos\left(\cos^{-1}\left(-\frac{1}{4}\right)+\sin^{-1}\left(-\frac{1}{4}\right)\right)$ = _____

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

B. $\frac{4}{9}$

C. 0

D. $-\frac{1}{3}$

Answer: C

Watch Video Solution

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

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

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

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

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

Answer: A

Watch Video Solution

57. $\sec^2\left(\tan^{-1}3\right)+\cos ec^2\left(\cot^{-1}3\right)$ = ____

A. 20

B. 15

C. 13

D. 25

Answer: A

Watch Video Solution

Ncert Examplar Problems Short Answer Type Questions

1. Find the value of

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

4. Find the value of

$$\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right)+\cot^{-1}\left(\frac{1}{\sqrt{3}}\right)+\tan^{-1}\left[\sin\left(\frac{-\pi}{2}\right)\right]$$

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

7. Find the real solutions of

$$\tan^{-1}\left(\sqrt{x(x+1)}\right)+\sin^{-1}\left(\sqrt{x^2+x+1}\right)=\frac{\pi}{2}$$

Watch Video Solution

8. Find the value of

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

11. Solve the equation

$$\cos\left(\tan^{-1}x\right)=\sin\left(\cot^{-1}\frac{3}{4}\right)$$

Watch Video Solution

Ncert Examplar Problems Long Answer Type Questions

1. Prove that :

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

Watch Video Solution

2. Find the simplified form of

$$\cos^{-1}\left(\frac{3}{5}\cos x+\frac{4}{5}\sin x\right), \text{ where } x\in\left[\frac{-3\pi}{4},\frac{\pi}{4}\right].$$

Watch Video Solution

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

Watch Video Solution

4. 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

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

Watch Video Solution

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

Watch Video Solution

7. Show that $\tan\left(\frac{1}{2}\sin^{-1}\frac{3}{4}\right)=\frac{4-\sqrt{7}}{3}$ and justify why the other value $\frac{4+\sqrt{7}}{3}$ is ignored ?

Watch Video Solution

8. If $a_1, a_2, a_3, ..., a_n$ is an arithmetic progression with common difference d, then evaluate the following expression.

$$\tan\left[\tan^{-1}\left(\frac{d}{1+a_1a_2}\right)+\tan^{-1}\left(\frac{d}{1+a_2a_3}\right)+...+\tan^{-1}\left(\frac{d}{1+a_{n-1}\cdot a\right.\right.$$

Watch Video Solution

Ncert Examplar Problems Objective Type Questions

1. Which of the following is the principle 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

Watch Video Solution

2. Which of the following is the principle 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

Watch Video Solution

3. 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

Watch Video Solution

4. The value of $\sin^{-1}\left[\cos\left(\frac{33\pi}{5}\right)\right]$ is _____

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

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

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

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

Answer: D

Watch Video Solution

5. The domain of the function $\cos^{-1}(2x-1)$ is _____

A. [0, 1]

B. [-1, 1]

C. [-1, 1]

D. $[0, \pi]$

Answer: A

Watch Video Solution

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

A. [1, 2]

B. [-1, 1]

C. [0, 1]

D. None of these

Answer: A

Watch Video Solution

7. 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

Watch Video Solution

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

A. 0.75

B. 1.5

C. 0.96

D. $\sin(15^\circ)$

Answer: C

Watch Video Solution

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

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

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

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

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

Answer: A

Watch Video Solution

10. 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

Watch Video Solution

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

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

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

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

D. π

Answer: A

Watch Video Solution

12. 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

Watch Video Solution

13. 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

Watch Video Solution

14. 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

Watch Video Solution

15. 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

Watch Video Solution

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

A. 0

B. 1

C. 6

D. 12

Answer: C

Watch Video Solution

17. 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

Watch Video Solution

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

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

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

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

D. $x > 0$

Answer: C

Watch Video Solution

Ncert Examplar Problems Fillers

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

4. The set of values of $\sec^{-1}\left(\frac{1}{2}\right)$ is ____

Watch Video Solution

5. The principle value of $\tan^{-1}\left(\sqrt{3}\right)$ is ____

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

8. The value of

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

11. The value of $\cot^{-1}(-x)$ for all $x\in R$ in terms of $\cot^{-1}x$ is _____

Watch Video Solution

Ncert Examplar Problems True False

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

Watch Video Solution

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

Watch Video Solution

3. The domain of trigonometric functions can be restricted to any one of their branch (not necessarily principle value) in order to obtain their inverse functions.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

6. The minimum value of n for which $\tan^{-1}\left(\frac{n}{\pi}\right) > \frac{\pi}{4}, n \in N$, is valid is 5.

Watch Video Solution

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

Watch Video Solution

Practice Work

1. Find the principal values of the following :

$\sin^{-1}(-1)$

Watch Video Solution

2. Find the principal values of the following :

$\sec^{-1}(\sqrt{2})$

Watch Video Solution

3. Find the principal values of the following :

$\tan^{-1}(\sqrt{3})$

Watch Video Solution

4. Find the principal values of the following :

$\cos ec^{-1}(-1)$

Watch Video Solution

5. Find the principal values of the following :

$\cos^{-1} 0$

Watch Video Solution

6. Find the principal values of the following :

$\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right)$

Watch Video Solution

7. Find the principal values of the following :

$\cot^{-1}\left(-\frac{1}{\sqrt{3}}\right)$

Watch Video Solution

8. Find the principal values of the following :

$\cos^{-1}(-1)$

Watch Video Solution

9. Find the principal values of the following :

$\tan^{-1}\left(\tan\frac{3\pi}{4}\right)$

Watch Video Solution

10. Find the principal values of the following :

$\sin^{-1}\left[\sin\frac{2\pi}{3}\right]$

Watch Video Solution

11. Find the values of the followings :

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

Watch Video Solution

12. Find the values of the followings :

$$\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)-3\sin^{-1}\frac{\sqrt{3}}{2}$$

Watch Video Solution

13. Find the values of the followings :

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

Watch Video Solution

14. Prove the following :

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

Watch Video Solution

15. Prove the following :

$$\tan^{-1}\frac{2}{11} + \tan^{-1}\frac{7}{24} = \tan^{-1}\frac{1}{2}$$

Watch Video Solution

16. Prove the following :

$$\tan^{-1}\frac{1}{4} + \tan^{-1}\frac{2}{9} = \tan^{-1}\frac{1}{2}$$

Watch Video Solution

17. Write the following functions in the simplest from :

$$\tan^{-1}\left(\frac{\cos x}{1-\sin x}\right), -\frac{\pi}{2} < x < \frac{\pi}{2}$$

Watch Video Solution

18. Write the following functions in the simplest from :

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

Watch Video Solution

19. Write the following functions in the simplest from :

$\sin^{-1}\left(x^2\sqrt{1-x^2}+x\sqrt{1-x^4}\right)$

Watch Video Solution

20. Write the following functions in the simplest from :

$\cot^{-1}\left(\sqrt{1+x^2}-x\right)$

Watch Video Solution

21. Write the following functions in the simplest from :

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

Watch Video Solution

22. Find the values of each of the following :

$$\sin\left(2\cos^{-1}\frac{4}{5}\right)$$

Watch Video Solution

23. Find the values of each of the following :

$$\tan^2\left(\frac{1}{2}\cos^{-1}\frac{3}{4}\right)$$

Watch Video Solution

24. Find the values of each of the following :

$$\sin\left(\frac{\pi}{2}-\cos^{-1}\frac{3}{7}\right)+\cos\left(\frac{3\pi}{2}-\sin^{-1}\frac{2}{7}\right)+\cot\left(\tan^{-1}\frac{7}{6}\right)$$

Watch Video Solution

25. Find the values of each of the following :

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

Watch Video Solution

26. Find the values of each of the following :

$\sin\left(\cos^{-1}\sqrt{3}x + \cos^{-1} x\right) = 1$ then find x.

Watch Video Solution

27. Find the values of each of the following :

$\tan\left[\sin^{-1}\left(\frac{3}{5}\right) + \cos^{-1}\left(\frac{5}{13}\right)\right]$

Watch Video Solution

28. Find the value of $\sin^{-1}\left(\cos\frac{\pi}{8}\right)$.

Watch Video Solution

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

Watch Video Solution

30. Find the value of $\sin\left(2\tan^{-1}\frac{4}{3}\right)$.

Watch Video Solution

31. Find the value of

$$\sin\left[\tan^{-1}\left(\tan\frac{7\pi}{6}\right)\right]+\cos\left[\cos^{-1}\left(\cos\frac{7\pi}{3}\right)\right].$$

Watch Video Solution

32. If $4\sin^{-1}x + \cos^{-1}x = \pi$ then find the value of x.

Watch Video Solution

33. Find the value of the following :

$$\sin^{-1}\left(\sin\left(\frac{7\pi}{3}\right)\right)$$

Watch Video Solution

34. Find the value of the following :

$$\cos^{-1}\left(\cos\frac{5\pi}{3}\right)$$

Watch Video Solution

35. Find the value of the following :

$$\cot^{-1}\left(\cot\frac{7\pi}{6}\right)$$

Watch Video Solution

36. Find the value of the following :

$$\sin^{-1}\left(\sin\frac{3\pi}{2}\right)$$

Watch Video Solution

37. Prove the following :

$$2\tan^{-1}\frac{1}{5}+\tan^{-1}\frac{1}{4}=\tan^{-1}\frac{32}{43}$$

Watch Video Solution

38. Prove the following :

$$\sin^{-1}\frac{4}{5}+\sin^{-1}\frac{5}{13}=\cos^{-1}\frac{16}{65}$$

Watch Video Solution

39. Prove the following :

$$\tan^{-1}\left(\frac{1}{3}\right)+\frac{1}{2}\left(\tan^{-1}\frac{1}{7}\right)=\frac{\pi}{8}$$

Watch Video Solution

40. Prove the following :

$$2\cot^{-1}(2)+\cos ec^{-1}\left(\frac{5}{3}\right)=\frac{\pi}{2}$$

Watch Video Solution

41. Prove the following :

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

Watch Video Solution

42. Prove the following :

$$2\sin^{-1}\left(\frac{5}{13}\right)=\cos^{-1}\left(\frac{119}{169}\right)$$

Watch Video Solution

43. Prove the following :

$$\sin^{-1}\frac{3}{5}+\cos^{-1}\frac{4}{5}=\cot^{-1}\left(\frac{7}{24}\right)$$

Watch Video Solution

44. Prove the followings :

$$\cot^{-1}\frac{ab+1}{a-b}+\cot^{-1}\frac{bc+1}{b-c}+\cos^{-1}\frac{ca+1}{c-a}=\pi(a>b>c)$$

Watch Video Solution

45. Prove the followings :

If $\cos^{-1}a+\cos^{-1}b+\cos^{-1}c=\pi$ then $a^2+b^2+c^2+2abc=1.$

Watch Video Solution

46. Prove the followings :

If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \pi$ then $x + y + z = xyz$.

Watch Video Solution

47. Prove the followings :

If $\cos^{-1} \frac{x}{2} + \cos^{-1} \frac{y}{3} = \theta$ then $9x^2 - 12xy \cos\theta + 4y^2 = 36 \sin^2 \theta$.

Watch Video Solution

48. about to only mathematics

Watch Video Solution

49. Prove the followings :

$$\cot^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right) = \frac{\pi}{2} - \frac{1}{2}\tan^{-1} x$$

Watch Video Solution

50. Prove the followings :

If $\tan^{-1}\left(\frac{yz}{xr}\right)+\tan^{-1}\left(\frac{zx}{yr}\right)+\tan^{-1}\left(\frac{xy}{zr}\right)=\frac{\pi}{2}$

then $x^2+y^2+z^2=r^2$.

Watch Video Solution

51. Prove the followings :

If $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\pi$ then

$x\sqrt{1-x^2}+y\sqrt{1-y^2}+z\sqrt{1-z^2}=2xyz.$

Watch Video Solution

52. Prove the followings :

If $0<x<1$ and $\tan^{-1}(1-x), \tan^{-1}x$ and $\tan^{-1}(1+x)$ are in A.P.

then prove that $x^3+x^2=1$.

Watch Video Solution

53. Prove the followings :

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

Watch Video Solution

54. Solve the following equations :

$$\tan^{-1}(2x)+\tan^{-1}(3x)=\frac{\pi}{4}$$

Watch Video Solution

55. Solve the following equations :

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

Watch Video Solution

56. Solve the following equations :

$$\sin^{-1}\left(\frac{5}{x}\right)+\sin^{-1}\left(\frac{12}{x}\right)=\frac{\pi}{2}$$

Watch Video Solution

57. Solve the following equations :

$$\sin^{-1}x+\cos^{-1}(2x)=\frac{\pi}{6}$$

Watch Video Solution

58. Solve the following equations :

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

Watch Video Solution

Textbook Illustrations For Practice Work

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

8. Prove that,

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

Watch Video Solution

9. Find the value of $\cos\left(\sec^{-1}x+\cos ec^{-1}x\right),\ |x|\geq 1$

Watch Video Solution

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

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. Prove that : $\sin^{-1}\frac{12}{13}+\cos^{-1}\frac{4}{5}+\tan^{-1}\frac{63}{16}=\pi.$

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 the following equations :

$\tan^{-1}(2x) + \tan^{-1}(3x) = \frac{\pi}{4}$

Watch Video Solution

Practice Paper 2 Section A

1. $\sin\left\{\frac{\pi}{3} - \sin^{-1}\left(-\frac{1}{2}\right)\right\}$ is _____

A. (a) 0

B. (b) $\frac{1}{2}$

C. $\frac{\sqrt{3}}{2}$

D. 1

Answer:

Watch Video Solution

Watch Video Solution

2. If for any $x \in (-1, 1)$, $\sin^{-1} x = \frac{\pi}{7}$ then $\cos^{-1} x$ = _____

A. $\frac{3\pi}{14}$

B. $\frac{5\pi}{14}$

C. $\frac{\pi}{14}$

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

Answer:

Watch Video Solution

3. $\sec^{-1}\left(\text{cosec}\frac{\pi}{8}\right)$ = _____

A. $\frac{3\pi}{8}$

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

C. $\frac{\pi}{8}$

D. $\frac{5\pi}{8}$

Answer:

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:

Watch Video Solution

5. $\sin\left(2\tan^{-1}\frac{2}{5}\right)$ = _____

A. $\frac{20}{29}$

B. $\frac{29}{20}$

C. $\frac{4}{29}$

D. $\frac{100}{29}$

Answer:

Watch Video Solution

Practice Paper 2 Section B

1. Prove that : $2\cot^{-1}\frac{1}{3}+\tan^{-1}\frac{3}{4}=\pi.$

Watch Video Solution

2. Find the values of each of the following :

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

Watch Video Solution

3. Prove that :

$$2\sin^{-1}\frac{3}{5} = \tan^{-1}\frac{24}{7}$$

Watch Video Solution

4. If $\cos\left(2\tan^{-1}x\right) = \frac{1}{2}$, then the value of x is ___

Watch Video Solution

Practice Paper 2 Section C

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

Watch Video Solution

2. Prove that : $\sin^{-1}\frac{12}{13}+\cos^{-1}\frac{4}{5}+\tan^{-1}\frac{63}{16}=\pi.$

Watch Video Solution

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

Watch Video Solution

4. Write in the following expression in simplest form : $\tan^{-1}\left(\frac{\cos x}{1-\sin x}\right),\frac{-3\pi}{2}<x<\frac{\pi}{2}.$

Watch Video Solution

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

Watch Video Solution

Practice Paper 2 Section D

1. 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

2. If $\sin^{-1}\frac{1}{x}=2\tan^{-1}\left(\frac{1}{7}\right)+\cos^{-1}\left(\frac{3}{5}\right)$, then x = _____

Watch Video Solution