INVERSE TRIGONOMETRY FUNCTIONS QUESTION BANK

Class 12 - Mathematics

1. Domain of f(x) = $\sin^{-1}x - sec^{-1}x$ is **[1]**

   a) None of these
   b) { 0, 1}
   c) { -1 ,1}
   d) 0 or 1

2. The value of cot ($\sin^{-1}$x) is **[1]**

   a) $\frac{\sqrt{1-x^2}}{x}$
   b) $\frac{x}{\sqrt{1+x^2}}$
   c) $\frac{1}{x}$
   d) $\frac{\sqrt{1+x^2}}{x}$

3. The principal value of $\tan^{-1}\left(-\sqrt{3}\right)$ is **[1]**

   a) $\frac{4\pi}{3}$
   b) None of these
   c) $\frac{2\pi}{3}$
   d) $\frac{-\pi}{3}$

4. $\sin(\cot^{-1}x)$ is equal to **[1]**

   a) None of these
   b) $\frac{x}{\sqrt{1+x^2}}$
   c) $\frac{1}{\sqrt{1+x^2}}$
   d) $\sqrt{1+x^2}$

5. The greatest and least values of $(\sin^{-1}x)^2 + (\cos^{-1}x)^2$ are respectively **[1]**

   a) $\frac{5\pi^2}{4}$ and $\frac{\pi^2}{8}$
   b) $\frac{\pi}{2}$ and $\frac{-\pi}{2}$
   c) $\frac{\pi^2}{4}$ and 0
   d) $\frac{\pi^2}{4}$ and $\frac{-\pi^2}{4}$

6. Range of coses^{-1}x is **[1]**

   a) $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$
   b) $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$ - {0}
   c) None of these
   d) $\left(\frac{-\pi}{2}, \frac{\pi}{2}\right)$

7. The principal value of $\text{sec}^{-1}\left(\frac{-2}{\sqrt{3}}\right)$ is **[1]**

   a) $\frac{5\pi}{6}$
   b) $\frac{7\pi}{6}$
   c) $\frac{\pi}{6}$
   d) $\frac{-\pi}{6}$

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

   a) None of these
   b) $\frac{5\pi}{3}$
   c) $\frac{\pi}{3}$
   d) $\frac{2\pi}{3}$

9. The principal value of cosec^{-1} (2) is **[1]**

   a) $\frac{2\pi}{3}$
   b) $\frac{\pi}{3}$

c) $\frac{5\pi}{6}$ d) $\frac{\pi}{6}$

10. The value of $\sin\left(2\cos^{-1}\left(-\frac{3}{5}\right)\right)$ is **[1]**

a) None of these b) $-\frac{24}{25}$

c) $\frac{7}{25}$ d) $\frac{24}{25}$

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

a) π b) $\frac{2\pi}{3}$

c) $-\frac{\pi}{3}$ d) $\frac{\pi}{3}$

12. Domain of $\sec^{-1}x$ is **[1]**

a) [-1, 1] b) R - (-1, 1)

c) R - {0} d) R - [-1, 0]

13. The value of the expression $\sin[\cot^{-1}(\cos(\tan^{-1}1))]$ is **[1]**

a) $\sqrt{\frac{2}{3}}$ b) 0

c) $\frac{1}{\sqrt{3}}$ d) 1

14. Domain of $\cos^{-1}x$ is **[1]**

a) [-1, 0] b) [0, 1]

c) None of these d) [-1, 1]

15. Which of the following is the principal value branch of $\cos^{-1}x$? **[1]**

a) $(0,\pi) - \left\{\frac{\pi}{2}\right\}$ b) $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$

c) $(0, \pi)$ d) $[0, \pi]$

16. The value of $\sin(2\sin^{-1}(0.6))$ is **[1]**

a) 0.96 b) 0.48

c) sin 1.2 d) 1.2

17. The value of $\cos^{-1}(-1) - \sin^{-1}(1)$ is **[1]**

a) $\frac{3\pi}{2}$ b) π

c) $-\frac{3\pi}{2}$ d) $\frac{\pi}{2}$

18. The value of $\cot\left[\cos^{-1}\left(\frac{7}{25}\right)\right]$ is **[1]**

a) $\frac{25}{24}$ b) $\frac{24}{25}$

c) $\frac{7}{24}$ d) $\frac{25}{7}$

19. Range of $\sec^{-1}x$ is **[1]**

a) $[0, \pi]$ b) $[0,\pi] - \left\{\frac{\pi}{2}\right\}$

c) None of these d) $\left[0, \frac{\pi}{2}\right]$

20. The principal value of $\text{cosec}^{-1}(-\sqrt{2})$ is **[1]**

a) $\frac{-\pi}{4}$ b) None of these

c) $\frac{5\pi}{4}$ d) $\frac{3\pi}{4}$

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

a) $\frac{-\pi}{6}$ b) $\frac{7\pi}{6}$

c) $\frac{5\pi}{6}$ d) None of these

22. Range of $\sin^{-1}x$ is **[1]**

a) None of these b) $[0, \pi]$

c) $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$ d) $\left[0, \frac{\pi}{2}\right]$

23. The principal value of $\sin^{-1}(\sin\ \frac{3\pi}{4}\ ) = \ldots\ldots$ **[1]**

a) $\frac{\pi}{4}$ b) $\frac{3\pi}{4}$

c) $\frac{5\pi}{4}$ d) $\frac{-\pi}{4}$

24. The domain of the function defined by f (x) = $\sin^{-1}$x + cosx is **[1]**

a) [–1, 1] b) ϕ

c) $(-\infty, \infty)$ d) [–1, π + 1]

25. $\cos^{-1}(\cos x) = x$ is satisfied by, **[1]**

a) $x \in [-1, 1]$ b) $x \in [0, \pi]$

c) None of these d) $x \in [0, 1]$

26. The domain of the function $\cos^{-1}$ (2x – 1) is **[1]**

a) [0, π] b) [–1, 1]

c) [0, 1] d) (–1, 0)

27. The value of $\sin^{-1}\left(\cos\frac{3\pi}{5}\right)$ is: **[1]**

a) $\frac{-3\pi}{5}$ b) $\frac{-\pi}{10}$

c) $\frac{\pi}{10}$ d) $\frac{3\pi}{5}$

28. $cot^{-1}(21) + cot^{-1}(13) + cot^{-1}(-8)$ is equal to **[1]**

a) $\cot^{-1}26$ b) π

c) 0 d) None of these

29. If $\sin^{-1}$ x = y, then **[1]**

a) $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$ b) $-\frac{\pi}{2} < y < \frac{\pi}{2}$

c) $0 \leq y \leq \pi$ d) $0 < y < \pi$

30. The principal value of the expression $\cos^{-1}$ [cos (– 680°)] is **[1]**

a) $\frac{\pi}{9}$ b) $\frac{-2\pi}{9}$

c) $\frac{34\pi}{9}$ d) $\frac{2\pi}{9}$

31. Write the principal value of $\tan^{-1}\left[\sin\left(\frac{-\pi}{2}\right)\right]$.. **[1]**

32. Write the value of $\sin\left[\frac{\pi}{3} - \sin^{-1}\left(-\frac{1}{2}\right)\right]$. **[1]**

33. $\tan^{-1}\left(\tan\frac{3\pi}{4}\right) =$ **[1]**

34. Evaluate $\cos^{-1}(\cos 12)$ **[1]**

35. Find the principal value of $\text{cosec}^{-1}(2)$ **[1]**

36. Find the principal value of $\cos^{-1}\left(-\frac{1}{2}\right)$. **[1]**

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

38. Write the range of $\tan^{-1} x$. **[1]**

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

40. Evaluate: $\cos^{-1}\left(\cos\frac{5\pi}{4}\right)$ **[1]**

41. Write the principal value of $\tan^{-1}(1) + \cos^{-1}\left(-\frac{1}{2}\right)$. **[1]**

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

43. Evaluate: $\sin^{-1}\left(\sin\frac{\pi}{6}\right)$ **[1]**

44. Find the domain of $f(x) = \sin^{-1} x + \cos x$. **[1]**

45. Evaluate $\cos^{-1}(\cos 5)$ **[1]**

46. $\sin^{-1}\left(\frac{-1}{2}\right)$ **[2]**

47. $\cos^{-1}\left(\frac{-1}{\sqrt{2}}\right)$ **[2]**

48. Find the value of $\tan^{-1}\left(\tan\frac{9\pi}{8}\right)$ **[2]**

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

50. Write the value of $\sin^{-1}\left(\frac{1}{3}\right) - \cos^{-1}\left(-\frac{1}{3}\right)$ **[2]**

51. Evaluate: $\sin^{-1}(\sin(-600°))$ **[2]**

52. Write the interval for the principal value of function and draw its graph: $\cot^{-1} x$. **[2]**

53. Write the interval for the principal value of function and draw its graph: $\sec^{-1} x$. **[2]**

54. $\cot^{-1}\left(\sqrt{3}\right)$ **[2]**

55. $\tan^{-1}\left(\tan\frac{3\pi}{4}\right) = ?$ **[2]**

56. Find the principal value of $\cos^{-1}\left(\frac{1}{2}\right)$. **[2]**

57. For the principal values, evaluate $\sin^{-1}\left[\cos\left\{2cosec^{-1}(-2)\right\}\right]$ **[2]**

58. $\sec^{-1}\left(\frac{2}{\sqrt{3}}\right)$ **[2]**

59. Which is greater, tan 1 or $\tan^{-1} 1$? **[2]**

60. Write the interval for the principal value of function and draw its graph: $\text{cosec}^{-1} x$. **[2]**

61. Write the interval for the principal value of function and draw its graph: $\tan^{-1} x$. **[2]**

62. Find the principal value of $\text{cosec}^{-1}(-2)$. **[2]**

63. $\tan^{-1}(-1)$ **[2]**

64. Find the principal value of $\tan^{-1}\left(\sqrt{3}\right)$. **[2]**

65. Find the value of $\sin\left[2\cot^{-1}\left(\frac{-5}{12}\right)\right]$ **[2]**

66. **Assertion (A):** We can write $\sin^{-1}x = (\sin x^{-1})$. **[1]**

Reason (R): Any value in the range of principal value branch is called principal value of that inverse trigonometric function.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

67. **Assertion (A):** Principal value of $\tan^{-1}\left(-\sqrt{3}\right)$ is $-\frac{\pi}{3}$. **[1]**

Reason (R): $\tan^{-1}$: R $\rightarrow \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ so for any x $\in$ R, $\tan^{-1}$(x) represent an angle in $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

68. **Assertion (A):** Domain of f(x) = $\sin^{-1}$x + cos x is [-1, 1]. **[1]**

Reason (R): Domain of a function is the set of all possible values for which function will be defined.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

69. **Assertion (A):** Function f : R $\rightarrow$ R given by f(x) = sin x is not a bijection. **[1]**

Reason (R): A function f : A $\rightarrow$ B is said to be bijection if it is one-one and onto.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

70. State true or false: **[1]**

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

71. State true or false: **[1]**

The domain of the function defined by f(x) = $\sin^{-1}$x + cosx is [-1, 1]

72. State true or false: **[1]**

All trigonometric functions have inverse over their respective domains.

73. State true or false: **[1]**

The domain of $\sin^{-1}$ 2x is [0, 1]

74. State true or false: **[1]**

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

75. State true or false: **[1]**

The graph of inverse trigonometric function can be obtained from the graph of their corresponding trigonometric function by interchanging x and y axes.