ABHINAV ACADEMY

UDUPI

CET25M2 INVERSE TRIGONOMETRIC FUNCTIONS

Class 12 - Mathematics

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 75**

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

   a) $\frac{4\pi}{3}$ b) $\frac{2\pi}{3}$

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

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

   a) 0 b) $\frac{\pi}{2}$

   c) π d) 2π

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

   a) π b) $\frac{2\pi}{3}$

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

4. If $f(x) = \sin^{-1}x$, then domain of f(x) is **[1]**

   a) $x \geq 1$ or $x \leq -1$ b) $x \geq 1$

   c) $0 \leq x \leq 1$ d) $-1 \leq x \leq 1$

5. $\sin^{-1}\left(\frac{1}{\sqrt{5}}\right) + \cot^{-1}(3) =$ **[1]**

   a) $\frac{\pi}{4}$ b) $\frac{\pi}{2}$

   c) $\frac{\pi}{3}$ d) $\frac{\pi}{6}$

6. 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) $\frac{-\pi}{4}$

7. The domain of the function $y = \sin^{-1}(-x^2)$ is **[1]**

   a) [0, 1] b) ϕ

   c) (0, 1) d) [–1, 1]

8. 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) $\frac{3\pi}{5}$

9. The value of $\tan^{-1}(\sqrt{3}) + \cos^{-1}\left(-\frac{1}{2}\right)$ corresponding to principal branches is **[1]**

   a) $-\frac{\pi}{12}$ b) π

c) 0

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

10. The value of sin (2 $\tan^{-1}$ (0.75)) is equal to **[1]**

a) 1.5

b) sin (1.5)

c) 0.75

d) 0.96

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

a) $\frac{-\pi}{4}$

b) $\frac{5\pi}{2}$

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

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

12. If $\theta \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$, the solution of the equation $\log_{\sin\theta}$ ($\cos^2\theta$ - $\sin^2\theta$) = 2 is given by **[1]**

a) $\theta = \sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$

b) $\theta = n\pi$

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

d) $\theta = \sin^{-1}\left(-\frac{1}{\sqrt{3}}\right)$

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

a) $x \in [-1, 1]$

b) $x \in [0, \pi]$

c) $x \in [0, -1]$

d) $x \in [0, 1]$

14. If θ = $\sin^{-1}$ (sin 600°) then the value of θ is **[1]**

a) 0

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

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

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

15. $\cos^{-1}\left(\cos\left(-\frac{\pi}{3}\right)\right)$ is equal to **[1]**

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

b) $\frac{-\pi}{3}$

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

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

16. if $\theta = cos^{-1}\left(\frac{1}{x}\right)$, then tan θ is equal to **[1]**

a) $\frac{\sqrt{x^2-1}}{x}$

b) $2\sqrt{x^2+1}$

c) $\frac{x\sqrt{1-x^2}}{|x|}$

d) $\sqrt{x^2-1}$

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

a) $\frac{5\pi}{6}$

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

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

d) $\frac{-\pi}{6}$

18. The set of values of $\sec^{-1}\frac{1}{2}$ is _____. **[1]**

a) R - {0}

b) {0, 1}

c) R

d) ϕ

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

a) [0, π]

b) [–1, 1]

c) [0, 1]

d) (–1, 0)

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

a) $\frac{3\pi}{2}$ b) π

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

21. 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) $\frac{25}{7}$

22. 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) $\frac{4\pi}{6}$

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

a) $\frac{8\pi}{6}$ b) $\frac{\pi}{6}$

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

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

a) $\frac{4\pi}{3}$ b) $\frac{-2\pi}{3}$

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

25. The principal value of $\sin^{-1}\frac{1}{2}$ is **[1]**

a) Both $\frac{\pi}{6}$ and $\frac{5\pi}{6}$ b) $\frac{\pi}{6}$

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

26. The value of sin (2 $\sin^{-1}$ (0.8)) is **[1]**

a) 4.8 b) 0.96

c) 1.6 d) sin 1.6

27. $\tan^{-1}(-2) + \tan^{-1}(-3)$ is equal to **[1]**

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

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

28. 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, π) d) [0, π]

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

a) 0.96 b) 0.48

c) sin 1.2 d) 1.2

30. $\sin^{-1}$ (sin 5) > x^2 - 4x, if **[1]**

a) x $\in$ (2 - $\sqrt{9-2\pi}$, 2 + $\sqrt{9-2\pi}$) b) x = 2 + $\sqrt{9-2\pi}$

c) x > 2 + $\sqrt{9-2\pi}$ d) x = 2 - $\sqrt{9-2\pi}$

31. One branch of $\cos^{-1}$ other than the principal value branch corresponds to **[1]**

a) $[2\pi, 3\pi]$

b) $[\pi, 2\pi] - \left\{\frac{3\pi}{2}\right\}$

c) $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$

d) $(0, \pi)$

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

a) $\frac{5\pi}{4}$

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

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

d) $\frac{\pi}{4}$

33. Range of $\text{coses}^{-1}x$ is **[1]**

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

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

c) $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$ - {1}

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

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

a) 0

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

c) $\frac{\pi}{2}$

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

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

a) $\left[0, \frac{\pi}{4}\right]$

b) $[0, \pi]$

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

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

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

a) $\frac{1}{4}$

b) $\frac{1}{2}$

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

d) 1

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

a) π

b) $\frac{\pi}{6}$

c) $\frac{\pi}{12}$

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

38. The domain of $\sin^{-1}$ [x] is given by **[1]**

a) [-1, 2)

b) [-1, 1]

c) {-1, 0, 1}

d) {1, 0, -1}

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

a) $-\frac{7}{25}$

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

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

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

40. The value of $\sin^{-1}\left(\cos\left(\frac{43\pi}{5}\right)\right)$ is **[1]**

a) $-\frac{\pi}{10}$

b) $\frac{-7\pi}{5}$

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

d) $\frac{\pi}{10}$

41. 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]

[1]

42. Let $\theta = \sin^{-1}(\sin(-600°))$, then value of θ is

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

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

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

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

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

44. The value of $\sin^{-1}\left[-\left(\frac{1}{2}\right)\right] + \cos^{-1}\left[-\left(\frac{1}{2}\right)\right] + \cot^{-1}\left(-\sqrt{3}\right) + \text{cosec}^{-1}\left(\sqrt{2}\right) + \tan^{-1}(-1) + \sec^{-1}\left(\sqrt{2}\right)$ equals **[1]**

a) $\frac{9\pi}{4}$ b) $\frac{3\pi}{2}$

c) $\frac{\pi}{2}$ d) $\frac{19\pi}{12}$

45. The value of $\cos^{-1}(2x^2 - 1)$, $0 \leq x \leq 1$ is equal to **[1]**

a) $2\cos^{-1} x$ b) $\pi - 2\cos^{-1} x$

c) $\pi + 2\cos^{-1} x$ d) $2\sin^{-1} x$

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

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

c) $-\frac{\pi}{3}$ d) $\frac{\pi}{6}$

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

a) $\sqrt{1-x^2}$ b) x

c) 1 d) x^2

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

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

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

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

a) [1, 2] b) [2, 1]

c) [–1, 1] d) [0, 1]

50. The value of $\tan^{-1}(\sqrt{3}) + \cot^{-1}(-1) + \sec^{-1}\left(\frac{-2}{\sqrt{3}}\right)$ is **[1]**

a) $\frac{23\pi}{12}$ b) $\frac{11\pi}{12}$

c) $\frac{-\pi}{12}$ d) $\frac{5\pi}{4}$

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

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

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

52. If $\sin^{-1}(x^2 - 7x + 12) = n\pi$, $\forall\ n \in Z$, then x equals **[1]**

a) 4 b) 3

c) -3 d) -4

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

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

c) $\frac{-7\pi}{5}$ d) $\frac{3\pi}{5}$

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

a) (1, 1) b) [-1, 2)

c) (-1, 1) d) [-2, 1]

55. The value of $\sin^{-1}(\cos\frac{\pi}{9})$ is **[1]**

a) $\frac{7\pi}{18}$ b) $\frac{-5\pi}{9}$

c) $\frac{5\pi}{9}$ d) $\frac{\pi}{9}$

56. $3 \sin x + 4 \cos x = y^2 - 2y + 6$. If x, y are its solutions then which of the following is true? **[1]**

a) $xy = \frac{\pi}{2} - \tan^{-1}(\frac{4}{3})$ b) All of these

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

57. $\cos^{-1}[\cos\left(\left(-\frac{17}{15}\right)\pi\right)]$ is equal to **[1]**

a) $\frac{13\pi}{15}$ b) $\frac{3\pi}{15}$

c) $\frac{17\pi}{15}$ d) $-\frac{17\pi}{15}$

58. What is the domain of the function $\cos^{-1}(2x - 3)$? **[1]**

a) [1, 2] b) [-1, 1]

c) (-1, 1) d) [1, 2]

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

a) π b) 0

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

60. 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 $\frac{-\pi^2}{4}$

61. 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

62. The principal value of $\cot^{-1}(-1)$ is **[1]**

a) $\frac{5\pi}{4}$ b) $\frac{3\pi}{4}$

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

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

a) { 0, -1} b) { 0, 1}

c) { -1 ,1}

d) 0 or 1

64. If sin (π cos x) = cos (π sin x) then x equals **[1]**

a) $\frac{1}{2}$ sin^{-1} $\frac{3}{4}$

b) $\frac{1}{2}$ cos^{-1} $\frac{3}{4}$

c) $-\frac{1}{2}$ cos^{-1} $\frac{3}{4}$

d) $-\frac{1}{4}$ sin^{-1} $\frac{3}{4}$

65. 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) $\frac{2\pi}{9}$

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

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

b) $\frac{5\pi}{6}$

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

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

67. $\cos\left(\cos^{-1}\left(\frac{7}{25}\right)\right) =$ **[1]**

a) $\frac{25}{7}$

b) None of these

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

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

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

a) $\cot^{-1}26$

b) π

c) 0

d) 2π

69. Which of the following corresponds to the principal value branch of $\tan^{-1}$? **[1]**

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

b) (0, π)

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

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

70. The principal value branch of $\sec^{-1}$ is **[1]**

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

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

c) (0, π)

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

71. The value of sec^{-1} (sec $\frac{4\pi}{3}$) is **[1]**

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

b) $\frac{-\pi}{3}$

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

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

72. The value of x satisfies the inequality [tan^{-1}x]^2 - 2 [tan^{-1}x] - 3 $\leq$ 0, where [$\cdot$] represent greatest integer function, then x lies between **[1]**

a) [-tan 1, tan 3]

b) [-tan 1, ∞)

c) $[-\frac{\pi}{4}$, tan^{-1} 3]

d) $[-\frac{\pi}{2}$, tan 1]

73. The value of cot $[\frac{1}{2}$ sin$^{-1}\frac{\sqrt{3}}{2}]$ is **[1]**

a) $\frac{1}{\sqrt{3}}$

b) $\sqrt{3}$

c) 0

d) 1

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

75. If $\sin^{-1}x + \sin^{-1}y + \sin^{-1}z = \frac{3\pi}{2}$ and f(1) = 1, f(p + q) = f(p)·f(q), $\forall$ p, q $\in$ R, then $x^{f(1)} + y^{f(2)} + z^{f(3)} - \frac{x+y+z}{x^{f(1)}+y^{f(2)}+z^{f(3)}}$ equals **[1]**

a) 2

b) 3

c) 1

d) 0