INVERSE TRIGONOMETRICE FUNCTIONS 1Q

41. $4\tan^{-1}\frac{1}{5}-\tan^{-1}\frac{1}{239}$is equal to

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

42. $\tan^{-1}\sqrt{\frac{a(a+b+c)}{bc}}+\tan^{-1}\sqrt{\frac{b(a+b+c)}{ca}}+\tan^{-1}\sqrt{\frac{c(a+b+c)}{a\,b}}$, is

a) $\pi/4$ b) $\pi/2$ c) π d) 0

43. If $\sec^{-1}\sqrt{1+x^2}+\text{cosec}^{-1}\frac{\sqrt{1+y^2}}{y}+\cot^{-1}\frac{1}{z}=\pi$, then $x+y+z$ is equal to

a) xyz b) $2xyz$ c) xyz^2 d) x^2yz

44. If $\tan^{-1}(x-1)+\tan^{-1}x+\tan^{-1}(x+1)=\tan^{-1}3x$, then x is

a) $\pm\frac{1}{2}$ b) $0,\frac{1}{2}$ c) $0,-\frac{1}{2}$ d) $0,\pm\frac{1}{2}$

45. If $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\frac{3\pi}{2}$, then the value of $x^{100}+y^{100}+z^{100}-\frac{9}{x^{101}+y^{101}+z^{101}}$is

a) 0 b) 1 c) 2 d) 3

46. $\sin^{-1}x+\sin^{-1}\frac{1}{x}+\cos^{-1}x+\cos^{-1}\frac{1}{x}$ is equal to

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

47. $\sum_{m=1}^{n}\tan^{-1}\left(\frac{2m}{m^4+m^2+2}\right)$ is equal to

a) $\tan^{-1}\left(\frac{n^2+n}{n^4+n^2+2}\right)$ b) $\tan^{-1}\left(\frac{n^2-n}{n^2-n+2}\right)$ c) $\tan^{-1}(n^2+n+2)$ d) None of these

48. If $\sin^{-1}a+\sin^{-1}b+\sin^{-1}c=\pi$, then the value of $a\sqrt{(1-a^2)}+b\sqrt{(1-b^2)}+c\sqrt{1-c^2)}$will be

a) $2abc$ b) abc c) $\frac{1}{2}abc$ d) $\frac{1}{3}abc$

49. Which one of the following is correct?

a) $\tan 1>\tan^{-1}1$ b) $\tan 1<\tan^{-1}1$ c) $\tan 1=\tan^{-1}1$ d) None of these

50. The value of $\cos(2\cos^{-1}0.8)$ is

a) 0.48 b) 0.96 c) 0.6 d) None of these

51. The solution of $\tan^{-1}2x+\tan^{-1}3x=\frac{\pi}{4}$ is

a) $\frac{1}{6}$ b) -1 c) $\left(\frac{1}{6},-1\right)$ d) None of these

52. The value of $\cos\left[\frac{1}{2}\cos^{-1}\left\{\cos\left(\sin^{-1}\frac{\sqrt{63}}{8}\right)\right\}\right]$, is

a) $\frac{3}{16}$ b) $\frac{3}{8}$ c) $\frac{3}{4}$ d) $\frac{3}{2}$

53. If $0\le x\le 1$, then $\cos^{-1}(2x^2-1)$ equals

a) $2\cos^{-1}x$ b) $\pi-2\cos^{-1}x$ c) $2\pi-2\cos^{-1}x$ d) None of these

54. The value of $\sin(\cot^{-1}x)$ is

a) $\sqrt{1+x^2}$ b) x c) $(1+x^2)^{-3/2}$ d) $(1+x^2)^{-1/2}$

55. Value of $\tan^{-1}\left(\frac{\sin 2-1}{\cos 2}\right)$ is

a) $\frac{\pi}{2}-1$ b) $1-\frac{\pi}{4}$ c) $2-\frac{\pi}{2}$ d) $\frac{\pi}{4}-1$

56. If $\angle A = 90°$in the triangle ABC, then $\tan^{-1}\left(\frac{c}{a+b}\right)+\tan^{-1}\left(\frac{b}{a+c}\right)$ is equal to

a) 0 b) 1 c) $\frac{\pi}{4}$ d) $\frac{\pi}{6}$

57. If $-\frac{1}{2}\le x\le\frac{1}{2}$, then $\cos^{-1}(4x^3-3x)$ equals

a) $3\cos^{-1}x$ b) $2\pi-3\cos^{-1}x$ c) $-2\pi-3\cos^{-1}x$ d) None of these

58. If $\sin^{-1}a+\sin^{-1}b+\sin^{-1}c=\pi$, then the value of $a\sqrt{(1-a^2)}+b\sqrt{(1-b^2)}+c\sqrt{1-c^2)}$will be

a) $2abc$ b) abc c) $\frac{1}{2}abc$ d) $\frac{1}{3}abc$

59. If $\sin^{-1}x+\sin^{-1}(1-x)=\cos^{-1}x$, then x belongs to

a) {1, 0} b) {-1, 1} c) $\left\{0,\frac{1}{2}\right\}$ d) {2, 0}

60. If $\tan^{-1}a+\tan^{-1}b=\sin^{-1}1-\tan^{-1}c$, then

a) $a+b+c=abc$ b) $ab+bc+ca=abc$

c) $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}-\frac{1}{abc}=0$ d) $ab+bc+ca=a+b+c$

61. The value of x for which $\cos^{-1}(\cos 4)>3x^2-4x$is

a) $\left(0,\frac{2+\sqrt{6\pi-8}}{3}\right)$ b) $\left(\frac{2-\sqrt{6\pi-8}}{3},0\right)$

c) $(-2,2)$ d) $\left(\frac{2-\sqrt{6\pi-8}}{3},\frac{2+\sqrt{6\pi-8}}{3}\right)$

62. If x takes negative permissible value, then $\sin^{-1}x$ is equal to

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

63. The value of $\tan^{-1}\frac{1}{2}+\tan^{-1}\frac{1}{3}+\tan^{-1}\frac{7}{8}$ is

a) $\tan^{-1}\frac{7}{8}$ b) $\cot^{-1}15$ c) $\tan^{-1}15$ d) $\tan^{-1}\frac{25}{24}$

64. The smallest and the largest values of $\tan^{-1}\left(\frac{1-x}{1+x}\right), 0\le x\le 1$ are

a) $0,\pi$ b) $0,\frac{\pi}{4}$ c) $-\frac{\pi}{4},\frac{\pi}{4}$ d) $\frac{\pi}{4},\frac{\pi}{2}$

65. If $\sin^{-1}\frac{2a}{1+a^2}-\cos^{-1}\frac{1-b^2}{1+b^2}=\tan^{-1}\frac{2x}{1-x^2}$, then the value of x is

a) a b) b c) $\frac{a+b}{1-ab}$ d) $\frac{a-b}{1+ab}$

66. Number of solutions of the equation $\tan^{-1}\left(\frac{1}{2x+1}\right)+\tan^{-1}\left(\frac{1}{4x+1}\right)=\tan^{-1}\left(\frac{2}{x^2}\right)$ is

a) 1 b) 2 c) 3 d) 4

67. If $-\frac{1}{2}\le x\le\frac{1}{2}$, then $\sin^{-1}(3x-4x^3)$ equals

a) $3\sin^{-1}x$ b) $\pi-3\sin^{-1}x$ c) $-\pi-3\sin^{-1}x$ d) None of these

68. If $x \in (-\infty, -1)$, then $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ equals

a) $2\tan^{-1} x$ b) $\pi - 2\tan^{-1} x$ c) $-\pi - 2\tan^{-1} x$ d) None of these

69. The sum of the infinite series

$$\sin^{-1}\left(\frac{1}{\sqrt{2}}\right) + \sin^{-1}\left(\frac{\sqrt{2}-1}{\sqrt{6}}\right) + \sin^{-1}\left(\frac{\sqrt{3}-\sqrt{2}}{\sqrt{12}}\right) + \ldots$$

$+\ldots + \sin^{-1}\left(\frac{\sqrt{n}-\sqrt{(n-1)}}{\sqrt{\{n(n+1)\}}}\right) + \ldots$ is

a) $\frac{\pi}{8}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{2}$ d) π

70. If $\cos^{-1} x = \alpha, (0 < x < 1)$ and $\sin^{-1}\left(2x\sqrt{1-x^2}\right) + \sec^{-1}\left(\frac{1}{2x^2-1}\right) = \frac{2\pi}{3}$, then $\tan^{-1}(2x)$ equals

a) $\pi/6$ b) $\pi/4$ c) $\pi/3$ d) $\pi/2$

71. If $\alpha = \sin^{-1}\frac{4}{5} + \sin^{-1}\frac{1}{3}$ and $\beta = \cos^{-1}\frac{4}{5} + \cos^{-1}\frac{1}{3}$, then

a) $\alpha < \beta$ b) $\alpha = \beta$ c) $\alpha > \beta$ d) None of these

72. If $\theta = \tan^{-1} a, \phi = \tan^{-1} b$ and $ab = -1$, then $(\theta - \phi)$ is equal to

a) 0 b) $\frac{\pi}{4}$ c) $\frac{\pi}{2}$ d) None of these

73. If $\tan\theta + \tan\left(\frac{\pi}{3} + \theta\right) + \tan\left(-\frac{\pi}{3} + \theta\right) = a\tan 3\theta$, then a is equal to

a) $1/3$ b) 1 c) 3 d) None of these

74. If the $(\cos^{-1} x) = \sin\left(\cot^{-1}\frac{1}{2}\right)$, then x is equal to

a) $\pm\frac{5}{3}$ b) $\pm\frac{\sqrt{5}}{3}$ c) $\pm\frac{5}{\sqrt{3}}$ d) None of these

75. If $\sin^{-1} = \frac{\pi}{5}$, for some $x \in (-1, 1)$, then the value of $\cos^{-1} x$ is

a) $\frac{3\pi}{10}$ b) $\frac{5\pi}{10}$ c) $\frac{7\pi}{10}$ d) $\frac{9\pi}{10}$

76. If $\frac{1}{2} \le x \le 1$, then $\sin^{-1}(3x - 4x^3)$ equals

a) $3\sin^{-1} x$ b) $\pi - 3\sin^{-1} x$ c) $-\pi - 3\sin^{-1} x$ d) None of these

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

a) $\frac{\pi}{3}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{2}$ d) 0

78. If x, y, z are in AP and $\tan^{-1} x, \tan^{-1} y$ and $\tan^{-1} z$ are also in AP, then

a) $x = y = z$ b) $x = y = -z$ c) $x = 1, y = 2, z = 3$ d) $x = 2, y = 4, z = 6$

79. If $a_1, a_2, a_3, \ldots a_n$ are in AP with common difference 5 and if $a_i a_j \neq -1$ for $i, j = 1, 2, \ldots, n$ then $\tan^{-1}\left(\frac{5}{1+a_1a_2}\right) + \tan^{-1}\left(\frac{5}{1+a_2a_3}\right) + \ldots + \tan^{-1}\left(\frac{5}{1+a_{n-1}a_n}\right)$ is equal to

a) $\tan^{-1}\left(\frac{5}{1+a_na_{n-1}}\right)$ b) $\tan^{-1}\left(\frac{5a_1}{1+a_na_1}\right)$ c) $\tan^{-1}\left(\frac{5n-5}{1+a_na_1}\right)$ d) $\tan^{-1}\left(\frac{5n-5}{1+a_1a_{n+1}}\right)$

80. The relation $\tan^{-1}\left(\frac{1+x}{1-x}\right) = \frac{\pi}{4} + \tan^{-1} x$ holds true for all

a) $x \in R$ b) $x \in (-\infty, 1)$ c) $x \in (-1, \infty)$ d) $x \in (-\infty, -1)$