MATHS

BOOKS - PATHFINDER MATHS (BENGALI ENGLISH)

TRIGONOMETRIC EQUATION AND INVERSE

Question Bank

1. Find the solution of $\sin x = -\frac{\sqrt{3}}{2}$.

Watch Video Solution

2. Solve $\sin 2x - \sin 4x + \sin 6x = 0$.

Watch Video Solution

3. Solve $2\cos^2 x + 3\sin x = 0$

Watch Video Solution

4. Find the set of values of x for which $\frac{\tan 3x - \tan 2x}{1 + \tan 3x \cdot \tan 2x} = 1$

Watch Video Solution

5. Solve $\tan\theta + \tan 2\theta + \tan\theta.\ \tan 2\theta = 1$

Watch Video Solution

6. Find number of solurions of tan x + sec x = 2 cosx in $[0, 2\pi]$

Watch Video Solution

7. Find the solution set for , $4\sin^2 x - 8\sin x + 3 \leq 0$ when $x \in [0, 2\pi]$

Watch Video Solution

8. Find the number of distinct solutions of sec x + tan x $=\sqrt{3}$, where $0 \leq x \leq 3\pi$.

Watch Video Solution

9. Prove that the equation p cos x - q sin x = r admits solution for x if and only if $-\sqrt{p^2+q^2} < r < \sqrt{p^2+q^2}$

Watch Video Solution

10. let [] denotes the greatest integer less than or equal to x and f(x) = sin x + cos x . Then find the most general solution of $f(x) = \left[f\left(\frac{\pi}{10}\right)\right]$.

Watch Video Solution

11. sin x = 0 and $\frac{\sin x}{\frac{\cos x}{2}\frac{\cos(3x)}{2}} = 0$ and show their solution are different.

Watch Video Solution

12. Solve the equation $(\sin x + \cos x)^{1+\sin 2x} = 2$, when $-\pi \leq x \leq \pi$.

Watch Video Solution

13. Find the most general solutions for $2^{\sin x} + 2^{\cos x} = 2^{1-\frac{1}{\sqrt{2}}}$.

Watch Video Solution

14. Solve $3\cos^2\theta - 2\sqrt{3}\sin\theta\cos\theta - 3\sin^2\theta = 0$

Watch Video Solution

15. Find the number of solution for $\sin 5\theta \cdot \cos 3\theta = \sin 9\theta \cos 7\theta$ in $\left[0, \frac{\pi}{2}\right]$

Watch Video Solution

16. Find the general solution of the equation $\sin 3\alpha = 4\sin\alpha \sin(x+\alpha)\sin(x-\alpha)$, given $\sin\alpha \neq 0$.

Watch Video Solution

17. A triangle ABC is such that sin (2A + B) = 1/2 . If A,B,C are in A.P., then find the value of A,B and C.

Watch Video Solution

18. If $\frac{\cos^{-1} x}{a} + \frac{\cos^{-1} y}{b} = \alpha$, then show $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{2xy}{a} b\cos\alpha = \sin^2\alpha$

Watch Video Solution

19. If $\cos^{-1}\lambda + \cos^{-1}\mu + \cos^{-1}\gamma = 3\pi$, then find the value of $\lambda\mu + \mu\gamma + \gamma\lambda$

Watch Video Solution

20. If $\sum_{i=1}^{2n} \sin^{-1} x_i = n\pi$ then find the value of $\sum_{i=1}^{2n} x_i$

Watch Video Solution

21. If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \pi$, prove that $x^4 + y^4 + z^4 + 4x^2y^2z^2 = 2\left(x^2y^2 + y^2z^2 + z^2x^2\right)$

Watch Video Solution

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

Watch Video Solution

23. If $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\frac{3\pi}{2}$, then find the value of $\sum\frac{\left(x^{101}+y^{101}\right)\left(x^{202}+y^{202}\right)}{\left(x^{303}+y^{303}\right)\left(x^{404}+y^{404}\right)}$

Watch Video Solution

24. Solve for x :

If $\left[\sin^{-1}\left(\cos^{-1}\left(\sin^{-1}\left(\tan^{-1}x\right)\right)\right)\right]=1$, where $[\cdot]$ denotes the greatest integer function.

Watch Video Solution

25. If x_γ is given by, $x_{\gamma+1}=\sqrt{\frac{1}{2}\left(1+x_\gamma\right)}$

Then show : $\cos^{-1}x_0=\frac{\sqrt{1-x_0^2}}{x_1x_2x_3\ldots\ldots x_n}$

Watch Video Solution

26. Solve $\sin x + \sqrt{3}\cos x = \sqrt{2}$

Watch Video Solution

27. Solve $\tan\theta + \tan 2\theta + \tan 3\theta = 0$

Watch Video Solution

28. The number of all possible triplets (a_1, a_2, a_3) such that : $a_1 + a_2\cos 2x + a_3\sin^2 x = 0$ for all x is :

A. 0

B. 1

C. 2

D. infinite

Answer:

Watch Video Solution

Watch Video Solution

29. Find the general solutions of:

$2^{1+|\cos x|+|\cos x|^2+|\cos x|^3+\ldots\ldots\to\infty}=4$

Watch Video Solution

30. $\tan\left(\frac{\pi p}{4}\right)=\cot\left(\frac{q\pi}{4}\right)$ if :

A. p + q = 0

B. p + q = 2n + 1

C. p + q = 2n

D. p + q = 2(2n + 1)

Answer:

Watch Video Solution

31. The general solution of the equation :

$\cos x \cdot \cos 6x = -1$ is :

A. $x = (2n+1)\pi$

B. $x = 2n\pi$

C. $x = (2n-1)\pi$

D. none of these

Answer:

Watch Video Solution

32. Find the interval in which , $\cos^{-1} x > \sin^{-1} x$.

Watch Video Solution

33. Solve the equation $\sin^{-1} 6x + \sin^{-1} 6\sqrt{3}x = -\frac{\pi}{2}$

Watch Video Solution

34. Evaluate : $\sum_{n=1}^{\infty} \tan^{-1}\left(\frac{1}{n^2+n+1}\right)$

Watch Video Solution

35. If $\tan^{-1} x + \tan^{-1} 2x + \tan^{-1} 3x = \pi$, then:

A. x = 0

B. x = -1

C. x = 1

D. $x \in \phi$

Answer:

Watch Video Solution

36. The number of value of 'x' in the interval $[0, 3\pi]$ satisfying the equation $2\sin^2 x + 5\sin x - 3 = 0$ is

A. 1

B. 2

C. 4

D. 6

Answer: C

Watch Video Solution

37. The most general solution , satisfying the equation $\cos\theta = \frac{1}{\sqrt{2}}, \tan\theta = -1$ is

A. $n\pi + \frac{\pi}{4}, n \in Z$

B. $2n\pi + \frac{\pi}{4}, n \in Z$

C. $2n\pi - \frac{\pi}{4}, n \in Z$

D. $n\pi - \frac{\pi}{4}, n \in Z$

Answer: C

Watch Video Solution

38. The number of solution of $16^{\sin^2 x} + 16^{\cos^2 x} = 10 : 0 \leq x \leq 2\pi$, is

A. 8

B. 6

C. 4

D. 2

Answer: A

Watch Video Solution

39. The equation $\sin^6 x + \cos^6 x = k$ possesses solution if

A. $k \geq 1$

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

C. $\frac{1}{4} \leq k < 1$

D. $\frac{1}{4} \leq k \leq 1$

Answer: D

Watch Video Solution

40. If $3^{\sin 2x + 2\cos^2 x} + 3^{1 - \sin 2x + 2\sin^2 x} = 28$, then tan x is

A. -1

B. -0.5

C. 1

D. 44198

Answer: A

Watch Video Solution

41. If $\sin^{-1} x - \cos^{-1} x = \frac{\pi}{6}$ then x is

A. 44198

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

C. -0.5

D. none of these

Answer: B

Watch Video Solution

42. The value of 'a' for which $ax^2 + \sin^{-1}(x^2 - 2x + 2) + \cos^{-1}(x^2 - 2x + 2) = 0$ has a real solution is

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

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

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

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

Answer: C

Watch Video Solution

43. The value of $\tan\left(\frac{\pi}{4}+\frac{1}{2}\cos^{-1}\left(\frac{2}{3}\right)\right)+\tan\left(\frac{\pi}{4}-\frac{1}{2}\cos^{-1}\left(\frac{2}{3}\right)\right)$ is

A. 0

B. 1

C. 44202

D. none of these

Answer: A

Watch Video Solution

44. The principal value of

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

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

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

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

D. none of these

Answer: B

Watch Video Solution

45. The value of $\tan\left(\frac{\pi}{4}+\frac{1}{2}\cos^{-1}\left(\frac{2}{3}\right)\right)+\tan\left(\frac{\pi}{4}-\frac{1}{2}\cos^{-1}\left(\frac{2}{3}\right)\right)$ is

A. 1

B. 2

C. 3

D. none of these

Answer: C

Watch Video Solution

46. The value of $\cos^{-1} x + \cos^{-1}\left\{\frac{x}{2} + \frac{\sqrt{3}}{2} \cdot \sqrt{1-x^2}\right\}, x > \frac{1}{2}$ is

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

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

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

D. $-2\cos^{-1} x$

Answer: C

Watch Video Solution

47. Value of $\cos^{-1}\sqrt{\frac{1+\sqrt{1+x^2}}{2\sqrt{1+x^2}}}, x \geq 0$ is

A. $\tan^{-1} x$

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

C. $\cot^{-1} x$

D. $\frac{1}{2}\cot^{-1} x$

Answer: B

Watch Video Solution

48. The value of $\tan^2\left(\sec^{-1} 2\right) + \cot^2\left(\cos ec^{-1} 3\right)$ is

A. 13

B. 15

C. 11

D. none of these

Answer: C

Watch Video Solution

49. $2\cos^{-1}x = \sin^{-1}\left(2x\sqrt{1-x^2}\right)$ is valid for

A. $-1 \leq x \leq 1$

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

C. $-1 \leq x \leq 1$

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

Answer: D

Watch Video Solution

50. If $0 \leq x \leq 3\pi, 0 \leq y \leq 3\pi$ and $\cos x \cdot \sin y = 1$, then the possible number of ordered pairs (x , y) is

A. 6

B. 12

C. 8

D. 15

Answer: A

Watch Video Solution

51. The number of solution of the equation $x^3 + x^2 + 4x + 2\sin x = 0, 0 \leq x \leq 2\pi$, is

A. zero

B. one

C. two

D. four

Answer: B

Watch Video Solution

52. The number of values of $x \in [0, 4\pi]$ satisfying $\left|\sqrt{3}\cos x - \sin x\right| \geq 2$, is

A. 2

B. 0

C. 4

D. 8

Answer: C

Watch Video Solution

53. The number of solution (s) of the equation $\sin^4 x + \cos^4 x = \sin x \cos x$ in $[0, 2\pi]$

A. 2

B. 3

C. 0

D. 4

Answer: D

Watch Video Solution

54. Number of solution of $\frac{\sin 4\theta}{\sin 2\theta} = \frac{y+1}{y-1}$ if $\frac{1}{3} < y < 3$

A. no solution

B. one solution

C. two solution

D. none of these

Answer: A

Watch Video Solution

55. The number of values of x satisfying the equation $\sqrt{\sin x} - \frac{1}{\sqrt{\sin x}} = \cos x$ is

A. 0

B. 1

C. 2

D. Infinite solutions.

Answer: D

Watch Video Solution

56. The equation $e^{\sin x} - e^{-\sin x} - 4 = 0$ has

A. 1

B. 2

C. 0

D. none of these

Answer: C

Watch Video Solution

57. The number of solution of 2 sin x = $5x^2 + 2x + 3$ is

A. 0

B. 2

C. 16

D. none of these

Answer: A

Watch Video Solution

58. In $0 < x < 2\pi$, the no of solution (s) of the equation $\sin^3 x + \cos^3 x = 0$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

59. The no. of solution(s) of the equation $\log_{\cos x} \sin x + \log_{\sin x} \cos x = 2$ in $[0, 2\pi]$ is

A. 0

B. 1

C. 2

D. infinite

Answer: B

Watch Video Solution

60. The set of real values of k for which $x^2 - kx + \sin^{-1}(\sin 4) > 0 \forall x \in R$ is

A. ϕ

B. (-2,2)

C. R

D. none of these

Answer: A

Watch Video Solution

61. If $'\alpha'$ satisfies the equation $x^2 - x - 2 > 0$, then which of the following does exist ?

A. $\sin^{-1}\alpha$

B. $\sec^{-1}\alpha$

C. $\cos^{-1}\alpha$

D. none of these

Answer: B

Watch Video Solution

62. The general solution of the equation :

$$\sum_{r=1}^{n} \cos\left(r^2 x\right)\sin(rx) = \frac{1}{2} \text{ is}$$

A. $2m\pi + \frac{\pi}{6}, m \in I$

B. $\frac{4m+1}{n(n+1)}\frac{\pi}{2}, m \in I$

C. $\frac{4m-1}{n(n+1)}\frac{\pi}{2}, m \in I$

D. none of these

Answer: B

Watch Video Solution

63. The value of x between 0 and 2π which satisfy the equation $\sin x\sqrt{8\cos^2 x} = 1$ are in AP with common difference

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

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

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

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

Answer: B

Watch Video Solution

64. The solution set of inequality $\log_{\frac{1}{2}} \sin^{-1} x > \log_{\frac{1}{2}} \cos^{-1} x$

A. (0 , 1)

B. $\left(\frac{1}{\sqrt{2}}, 1\right)$

C. $\left(0, \frac{1}{\sqrt{2}}\right)$

D. [0 , 1)

Answer: C

Watch Video Solution

65. Evaluate

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

where {.} denotes the fractional part function

A. 44260

B. 14/15

C. 16/15

D. -1

Answer: B

Watch Video Solution

66. The number of real solutions of $\sin e^x \cdot \cos e^x = 2^{x-2} + 2^{-x-2}$ is

A. zero

B. one

C. two

D. infinite

Answer: A

Watch Video Solution

67. If $\theta \in [0, 5\pi]$ and $r \in R$ such that $2\sin\theta = r^4 - 2r^2 + 3$, then the number of pairs(r, θ) is

A. 8

B. 10

C. 6

D. none of these

Answer: C

Watch Video Solution

68. The integer k for which the equation 7cosx+5sinx=2k+1 has a solution is

A. 4

B. 10

C. 7

D. 12

Answer: C

Watch Video Solution

69. If 1/6 sin x , cos x , tan x are in G.P. then x is equal to

A. $n\pi \pm \frac{\pi}{3}, n \in Z$

B. $2n\pi \pm \frac{\pi}{3}, n \in Z$

C. $n\pi + (-1)^n \frac{\pi}{3}, n \in Z$

D. none of these

Answer:

Watch Video Solution

70. The equation $\sin x = x^2 + x + 1$ has

A. one solution

B. infinite solutions

C. more than one but finite solutions

D. no solution

Answer: D

Watch Video Solution

71. In a triangle ABC, angle A is greater than angle B. If the measures of angles A and B satisfy the equation $3\sin x - 4\sin^3 x - k = 0, 0 < k < 1$, then thje measure of angle C is

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

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

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

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

Answer: C

Watch Video Solution

72. If $k_1 \leq \sin^{-1} x + \cos^{-1} x + \tan^{-1} x \leq k_2$ then

A. $k_1 = 0, k_2 = \pi$

B. $k_1 = 0, k_2 = \frac{\pi}{2}$

C. $k_1 = \frac{\pi}{4}, k_2 = \frac{3\pi}{4}$

D. none of these

Answer: D

Watch Video Solution

73. If

$$\sin^{-1}\left(x - \frac{x^2}{2} + \frac{x^3}{4} - \ldots . \infty\right) + \cos^{-1}\left(x^2 - \frac{x^4}{2} + \frac{x^6}{4} - \ldots . . \infty\right) =$$

$0 < |x| < \frac{\pi}{2}$, then x is

A. 44198

B. 1

C. -0.5

D. -1

Answer: B

Watch Video Solution

74. $\cot^{-1}\left(\frac{9}{2}\right) + \cot^{-1}\left(\frac{25}{2}\right) + \cot^{-1}\left(\frac{49}{2}\right) + \ldots\ldots$ to n terms is equal to

A. $\tan^{-1}\left(2\frac{n}{4n+5}\right)$

B. $\cot^{-1}\left(2\frac{n}{4n+5}\right)$

C. $\tan^{-1}\left(2\frac{n}{4n+3}\right)$

D. $\cot^{-1}\left(2\frac{n}{4n+3}\right)$

Answer: A

Watch Video Solution

75. The interval on which $\cos^{-1} x > \sin^{-1} x > \tan^{-1} x$ is

A. $\left(0, \frac{1}{\sqrt{2}}\right)$

B. [-1 , 1]

C. (0 , 1]

D. None of these

Answer: A

Watch Video Solution

76. If $\left(\cos^2 x + \frac{1}{\cos^2 x}\right)(1 + \tan^2 2y)(3 + \sin 3z) = 4$,then

A. x may be a multiple of π

B. x cannot be an even multiple of π

C. z can be a multiple of π

D. y can be a multiple of $\frac{\pi}{2}$

Answer: A::D

Watch Video Solution

77. $2\sin^2\left(\frac{\pi}{2}\cos^2 x\right) = 1 - \cos(\pi \sin 2x)$. if

A. $x = (2n+1)\frac{\pi}{2}, n \in I$

B. tan x = 1/2

C. tan x = -1/2

D. $x = \frac{n\pi}{2}, n \in I$

Answer: A::B::C

Watch Video Solution

78. $\sqrt{\cos 2x} + \sqrt{1 + \sin 2x} = 2\sqrt{\sin x + \cos x}$ if

A. sin x + cos x = 0

B. $x = 2n\pi, n \in I$

C. $x = n\pi - \frac{\pi}{4}, n \in I$

D. $x = 2n\pi \pm \cos^{-1}\left(-\frac{1}{5}\right), n \in I$

Answer: A::B::C

Watch Video Solution

79. If $\tan^{-1} y = 4\tan^{-1} x$, then y is infinite , if

A. $x^2 = 3 + 2\sqrt{2}$

B. $x^2 = 3 - 2\sqrt{2}$

C. $x^4 = 6x - 1$

D. $x^4 = 6x^2 + 1$

Answer: A::B

Watch Video Solution

80. The solution of the equation $\sin\left[2\cos^{-1}\left\{\cot\left(2\tan^{-1}x\right)\right\}\right]=0$ are

A. ± 1

B. $1\pm\sqrt{2}$

C. $-1\pm\sqrt{2}$

D. 0

Answer: A::B::C

Watch Video Solution

81. If the numerical value of $\tan\left\{\cos^{-1}\left(\frac{4}{5}\right)+\tan^{-1}\left(\frac{2}{3}\right)\right\}$ is $\frac{a}{b}$, then

A. a + b = 23

B. a - b = 11

C. 3b = a + 1

D. 2a = 3b

Answer: A::B::C

Watch Video Solution

82. If $x > 0$, then $\tan^{-1} x =$

A. $\cot^{-1} x$

B. $\cot^{-1}\left(\frac{1}{x}\right)$

C. $-\cot^{-1} x$

D. $\frac{\pi}{2} - \cot^{-1} x$

Answer: B::D

Watch Video Solution

83. α, β and γ are the angles gives by $\alpha = 2\tan^{-1}(\sqrt{2}-1), \beta = 3\sin^{-1}\left(\frac{1}{\sqrt{2}}\right) + \sin^{-1}\left(-\frac{1}{2}\right)$ and $\gamma = \cos^{-1}\left(\frac{1}{3}\right)$, then

A. $\alpha > \beta$

B. $\beta > \gamma$

C. $\gamma > \alpha$

D. none of these

Answer: B::C

Watch Video Solution

84. $x = n\pi - \tan^{-1} 3$ is a solution of the equation $12\tan 2x + \frac{\sqrt{10}}{\cos x} + 1 = 0$ if

A. n is any integer

B. n is an even integer

C. n is a positive integer

D. n is an odd integer

Answer: D

Watch Video Solution

85. Let A be the area of an n-sided regular convex polygon of each side a, n being a positive integer.

Radius of the circumcircle of the polygon is

A. a cosec pi/n

B. a cosec (2pi)/n

C. $\frac{a}{2}\cos ec\frac{\pi}{n}$

D. $\frac{a}{2}\cos ec\frac{2\pi}{n}$

Answer: C

Watch Video Solution

86. Let A be the area of an n-sided regular convex polygon of each side a, n being a positive integer.

The radius of the circle that can be inscribed in the polygon is

A. $\frac{a}{2}\cot\left(\frac{\pi}{n}\right)$

B. $\frac{a}{2}\tan\left(\frac{\pi}{n}\right)$

C. $\frac{a}{2}\frac{\tan(2\pi)}{n}$

D. $\frac{a}{2}\frac{\cot(2\pi)}{n}$

Answer: A

Watch Video Solution

87. Let x , y , z be non - zero real numbers lying in the interval [-1,1] such that

$\cos^{-1}x + \cos^{-1}y + \cos^{-1}z = \pi$

The value of $x\sqrt{1-x^2} + y\sqrt{1-y^2} + z\sqrt{1-z^2}$ is equal to

A. $4\sqrt{1-x^2}\sqrt{1-y^2}\sqrt{1-z^2}$

B. $2\sqrt{1-x^2}\sqrt{1-y^2}\sqrt{1-z^2}$

C. $\sqrt{1-x^2}\sqrt{1-y^2}\sqrt{1-z^2}$

D. none of these

Answer: B

Watch Video Solution

88. Let x , y , z be non - zero real numbers lying in the interval [-1,1] such that

$\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi$

The value of $x^2 + y^2 + z^2$ is equal to

A. 1 + 2xyz

B. -1 + 2xyz

C. 1 - 2xyz

D. none of these

Answer: C

Watch Video Solution

89. Two balls are drawn at random with replacement from a box containing 10 black and 8 red balls. Find the probability that

(i) both balls are red.

(ii) first ball is black and second is red.

(iii) one of them is black and other is red.

Watch Video Solution

90. Match Column-I with Column- II

Column-I		Column-II	
(A)	Colemanite	(P)	$B_3N_3H_6$
(B)	Bauxite	(Q)	$Ca_2B_6O_{11}.5H_2O$
(C)	Borax	(R)	$Al_2O_3.2H_2O$
(D)	Inorganic Benzene	(S)	$Na_2B_4O_7.10H_2O$

Watch Video Solution

91. Distinguish between mitotic and meiotic cell divisions in animals on the basis of following feature: -

Number of cells produced

list the changes in sence organs and bones ocurred during the senescence phase of human development.

Watch Video Solution

92. Determine the smallest positive value of n for which x = $\frac{\pi}{n}$ is a solution of $\tan(x+100^\circ) = \tan(x+50^\circ)\tan x.\tan(x-50^\circ)$

Watch Video Solution

93. Find the number of real solutions of the equation $\sqrt{1+\cos 2x} = \sqrt{2}\cos^{-1}(\cos x)$, where $x \in \left[\frac{\pi}{2}, \pi\right]$

Watch Video Solution

94. Find the values of θ in the interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ satisfying the equation, $(1-\tan\theta)(1+\tan\theta)\sec^2\theta + 2^{\tan^2\theta} = 0$

Watch Video Solution

95. Find the number of solution of the equation $|\sin x| = \sin x + 3$ if $x \in [0, 2\pi]$

Watch Video Solution

96. The number of solution of the equation $\tan^{-1}\sqrt{x(x+1)}+\sin^{-1}\sqrt{x^2+x+1}=\frac{\pi}{2}$

Watch Video Solution

97. Find the solution set of x satisfying the in equation $\cos x \geq -\frac{1}{2}$

Watch Video Solution

98. Solve for x, y and z :

$\sin^2 x+\cos^2 y=2\sec^2 z$

Watch Video Solution

99. Show that $\tan^{-1}\left(\frac{\cos x}{1+\sin x}\right)=\frac{\pi}{4}-\frac{x}{2}$, where $x \in \left(-\frac{\pi}{2},\frac{\pi}{2}\right)$

Watch Video Solution

100. Determine all possible values of 'a' for which the equation $\cos^4 x - (a+2)\cos^2 x - (a+3) = 0$ will have real solution

Watch Video Solution

101. Find the coordinates of the points of intersection of the curves y = cos x , y = sin 3x : if $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$

Watch Video Solution

102. Solve : $3\tan^2\theta - 4\sqrt{3}\tan\theta + 3 = 0$, find the acute angle

Watch Video Solution

103. Solve for x : $8^{1+|\cos x|+|\cos^2 x|+|\cos^3 x|+\ldots\ldots\infty} = 4^3$, where `x in (-pi , pi)

Watch Video Solution

104. Solve the equation, $(\tan x)^{\cos^2 x} = (\cot x)^{\sin x}$

Watch Video Solution

105. Find the sum of infinite series :

$$S = \sin^{-1}\left(\frac{1}{\sqrt{2}}\right) + \sin^{-1}\left(\frac{\sqrt{2}-1}{\sqrt{6}}\right) + \sin^{-1}\left(\frac{\sqrt{3}-\sqrt{2}}{\sqrt{12}}\right) + ...\infty$$

Watch Video Solution

106. Find the number of solutions of (x , y),which satisfy $|y|$ = sin x and y = $\cos^{-1}(\cos x)$, where $-2\pi \leq x \leq 2\pi$

Watch Video Solution

107. If $0 < \theta < 2\pi$, then the intervals of values of θ for which $2\sin^2\theta - 5\sin\theta + 2 > 0$ is

A. $\left(0, \frac{\pi}{6}\right) \cup \left(\frac{5\pi}{6}, 2\pi\right)$

B. $\left(\frac{\pi}{8}, \frac{5\pi}{6}\right)$

C. $\left(0, \frac{\pi}{8}\right) \cup \left(\frac{\pi}{6}, \frac{5\pi}{6}\right)$

D. $\left(\frac{41\pi}{48}, \pi\right)$

Answer: A

Watch Video Solution

108. The no. of solution(s) of the equation $3(\sin x + \cos x) - 2\left(\sin^3 x + \cos^3 x\right) = 8$ is

A. 0

B. 1

C. 2

D. none of these

Answer: A

Watch Video Solution

109. The number of all possible ordered pairs $(x, y), x, y \in R$ satisfying the system of equations $x + y = \frac{2\pi}{3}, \cos x + \cos y = \frac{3}{2}$ is

A. 2

B. 1

C. infinite

D. none of these

Answer: A

Watch Video Solution

110. Find the general solution of the equation $\sin 3\alpha = 4\sin\alpha\sin(x+\alpha)\sin(x-\alpha)$, given $\sin\alpha \neq 0$.

A. $n\pi \pm \frac{\pi}{6}, n \in Z$

B. $n\pi \pm \frac{\pi}{3}, n \in Z$

C. $n\pi \pm \frac{\pi}{4}, n \in Z$

D. $n\pi \pm \frac{\pi}{2}, n \in Z$

Answer: B

Watch Video Solution

111. The general solution of the equation $7\cos^2 x + \sin x \cos x - 3 = 0$ is given by

A. $n\pi + \frac{\pi}{2}, n \in I$

B. $n\pi - \frac{\pi}{4}, n \in I$

C. $n\pi + \tan^{-1}\left(\frac{4}{3}\right), n \in I$

D. $n\pi + \frac{3\pi}{4}, k\pi + \tan^{-1}\left(\frac{4}{3}\right), n, k \in I$

Answer: D

Watch Video Solution

112. The value of $\tan^{-1} 1 + \tan^{-1} 2 + \tan^{-1} 3$ is

A. 0

B. 1

C. π

D. $-\pi$

Answer: C

Watch Video Solution

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

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

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

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

D. π

Answer: B

Watch Video Solution

114. $\sin\cot^{-1}\cos\tan^{-1}2=$

A. $\sqrt{\frac{1}{5}}$

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

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

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

Answer: B

Watch Video Solution

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

A. 0

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

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

D. π

Answer: B

Watch Video Solution

116. If $\sin^{-1}(\sin 5)>x^2-4x$, then find number of all possible integer values of x

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

117. If $\tan\left(\frac{\alpha\pi}{4}\right) = \cot\left(\frac{\beta\pi}{4}\right)$ then

A. $\alpha + \beta = 0$

B. $\alpha + \beta = 2n$

C. $\alpha + \beta = 2n + 1$

D. $\alpha + \beta = 2(2n + 1)$, $\forall n \in Z$ is an integer

Answer: D

Watch Video Solution

118. The general solution of the equation $\sin^{100} x - \cos^{100} x = 1$

A. $2n\pi + \frac{\pi}{3}, n \in I$

B. $n\pi + \frac{\pi}{2}, n \in I$

C. $n\pi + \frac{\pi}{4}, n \in I$

D. $2n\pi - \frac{\pi}{3}, n \in I$

Answer: B

Watch Video Solution

119. The number of roots of the equation $x + 2\tan x = \frac{\pi}{2}$ in the interval $[0, 2\pi]$ is

A. 1

B. 2

C. 3

D. infinite

Answer: C

Watch Video Solution

120. The number of solutions of the equation $\sin\left(\frac{\pi x}{2\sqrt{3}}\right) = x^2 - 2\sqrt{3}x + 4$ is

A. 0

B. 2

C. 1

D. > 2

Answer: C

Watch Video Solution

121. One root of the equation cosx-x+1/2=0 lies in the interval

A. $\left[0, \frac{\pi}{2}\right]$

B. $\left[-\frac{\pi}{2}, 0\right]$

C. $\left[\frac{\pi}{2}, \pi\right]$

D. $\left[\pi, \frac{3\pi}{2}\right]$

Answer: A

Watch Video Solution

122. The nunmber of solution of `2cos^2(x/2)sin^2x=x^2+1/x^2, 0 le x le pi/2, is

A. 0

B. 1

C. infinite

D. none of these

Answer: A

Watch Video Solution

123. The general solution of $\sin^2\theta\sec\theta+\sqrt{3}\tan\theta=0$ is

A. $\theta=n\pi+(-1)^{n+1}\frac{\pi}{3},\theta=n\pi,n\in I$

B. $\theta=n\pi,n\in I$

C. $\theta=\frac{n\pi}{2},n\in I$

D. $\theta=n\pi+(-1)^{n+1}\frac{\pi}{3},n\in I$

Answer: B

Watch Video Solution

124. The number of solutions of the equation $\sin^3 x\cos x+\sin^2 x\cos^2 x+\sin x\cos^3 x+1=0$ in the interval $[0,2\pi]$ is

A. 0

B. 2

C. 3

D. infinite

Answer: A

Watch Video Solution

125. Number of values of $x \in R$ which satisfy the equation $\cos\left(\pi\sqrt{x-4}\right)\cos\left(\pi\sqrt{x}\right) = 1$ is

A. 1

B. 0

C. 2

D. none of these

Answer: A

Watch Video Solution

126. The number of real values of θ lying in the interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ and satisfying the equation $\left(\sqrt{3}\right)^{\sec^2\theta} = \tan^4\theta + 2\tan^2\theta$ is

A. 1

B. 2

C. 3

D. none of these

Answer: B

Watch Video Solution

127. If $\left(\tan^{-1}x\right)^2 + \left(\cot^{-1}x\right)^2 = \frac{5\pi^2}{8}$, then x equals

A. -1

B. 1

C. 0

D. none of these

Answer: A

Watch Video Solution

128. The value of x for which $\sin\left(\cot^{-1}(1+x)\right) = \cos\left(\tan^{-1}x\right)$ is

A. 44198

B. 1

C. 0

D. -0.5

Answer: D

Watch Video Solution

129. The sum of the infinite series $\cot^{-1} 2 + \cot^{-1} 8 + \cot^{-1} 18 + \cot^{-1} 32 + \ldots\ldots$ is equal to

A. π

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

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

D. none of these

Answer: C

Watch Video Solution

130. If $\sin^{-1}\sqrt{(x^2+2x+1)} + \sec^{-1}\sqrt{(x^2+2x+1)} = \frac{\pi}{2}, \ x \neq 0,$ then the value of $2\sec^{-1}\left(\frac{x}{2}\right) + \sin^{-1}\left(\frac{x}{2}\right)$ is equal to

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

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

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

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

Answer: B

Watch Video Solution

131. The number of real solutions of the equation $2\sin^{-1}\sqrt{(x^2-x+1)}+\cos^{-1}\sqrt{(x^2-x)}=\frac{3\pi}{2}$

A. 1

B. 2

C. 3

D. infinite

Answer: B

Watch Video Solution

132. The most general solution of the equation $\tan^{-1}\left(\frac{1}{2}\sec x\right) + \cot^{-1}(2\cos x) = \frac{\pi}{3}$ is

A. $n\pi + \frac{\pi}{6}, n \in Z$

B. $n\pi \pm \frac{\pi}{3}, n \in Z$

C. $2n\pi \pm \frac{\pi}{3}, n \in Z$

D. none of these

Answer: C

Watch Video Solution

133. The greatest of $\tan 1, \tan^{-1} 1, \sin^{-1} 1, \sin 1, \cos 1$, is

A. $\sin^{-1} 1$

B. tan1

C. $\tan^{-1} 1$

D. none of these

Answer: A

Watch Video Solution

134. If $0 < x < 1$, then $\sqrt{1+x^2}\left[\left\{x\cos\left(\cos^{-1}x\right)+\sin\left(\cot^{-1}x\right)\right\}^2-1\right]^{1/2}$ =

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

B. x

C. $x\sqrt{1+x^2}$

D. $\sqrt{1+x^2}$

Answer: C

Watch Video Solution

135. The range of values of a for which the equation $\sin^2 x - \sqrt{3}\sin x \cos x = 2a - 1$ has real solution(s).

A. $1 \leq a \leq 2$

B. $\frac{1}{4} < a < \frac{5}{4}$

C. $\frac{1}{4} \leq a \leq \frac{5}{4}$

D. none of these

Answer: C

Watch Video Solution

136. The number of points inside or on the circle $x^2 + y^2 = 4$ satisfying $\tan^4 x + \cot^4 x + 1 = 3\sin^2 y$ is

A. one

B. two

C. four

D. infinite

Answer: C

Watch Video Solution

137. The least difference between the roots in the first quadrant in $\left[0, \frac{\pi}{2}\right]$ of the equation sin7x+cos2x=-2 is

A. 0

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

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

D. $\frac{4\pi}{7}$

Answer: C

Watch Video Solution

138. The general solution of the equation sinx-3sin2x+sin3x=cosx-3cos2x+cos3x is

A. $n\pi + \frac{\pi}{8}, n \in I$

B. $\frac{n\pi}{2} + \frac{\pi}{8}, n \in I$

C. $(-1)^n\left(\frac{n\pi}{2}\right) + \frac{\pi}{8}, n \in I$

D. $2n\pi + \cos^{-1}\left(\frac{3}{2}\right), n \in I$

Answer: B

Watch Video Solution

139. General solution of θ satisfying the equation $\tan^2\theta + \sec 2\theta = 1$ is

A. $2n\pi, n \in I$

B. $n\pi \pm \frac{\pi}{4}, n \in I$

C. $n\pi \pm \frac{\pi}{3}, n \in I$

D. none of these

Answer: C

Watch Video Solution

140. The solution of the inequality $\log_{1/2} \sin x > \log_{1/2} \cos x$ in $[0, 2\pi]$ is

A. $x \in \left(0, \frac{\pi}{2}\right)$

B. $x \in \left(0, \frac{\pi}{8}\right)$

C. $x \in \left(0, \frac{\pi}{4}\right)$

D. none of these

Answer: C

Watch Video Solution

141. If $\left[\cot^{-1} x\right] + \left[\cos^{-1} x\right] = 0$, where x is a non-negative real number and [ ] denotes the greatest integer function, then complete set of value of x is

A. (cos1, 1)

B. (cot1, 1)

C. (cos1, cot1)

D. none of these

Answer: B

Watch Video Solution

142. The set of values of x satisfying $\left|\sin^{-1} x\right| < \left|\cos^{-1} x\right|$, is

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

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

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

D. none of these

Answer: A

Watch Video Solution

Watch Video Solution

143. The number of real solutions of $\tan(5\pi\cos\alpha) = \cot(5\pi\sin\alpha), \alpha \in (0, 2\pi)$, is

A. 7

B. 14

C. 21

D. 28

Answer: B

Watch Video Solution

144. If $x + y = \frac{\pi}{4}$ and tanx+tany=1, then

A. $x = \frac{\pi}{2} - n\pi$ and $y = n\pi, n \in Z$

B. $x = \frac{\pi}{4} - n\pi$ and $y = n\pi, n \in Z$

C. $x = \frac{\pi}{4} - n\pi$ and $y = 2n\pi, n \in Z$

D. none of these

Answer: B

Watch Video Solution

145. The number of solution of the equation $2\tan x + x = \frac{12\pi}{5}$ in the interval $[0, 2\pi]$ is

A. 1

B. 2

C. 3

D. infinite

Answer: B

Watch Video Solution

146. The value of $\cos^{-1}(\cos 5)$ is

A. 5

B. $5 - 2\pi$

C. $2\pi - 5$

D. none of these

Answer: C

Watch Video Solution

147. If x_1, x_2, x_3, x_4 are roots of the equation $x^4 - x^3 \sin 2\beta + x^2 \cos 2\beta - x \cos \beta - \sin \beta = 0$, then $\sum_{i=1}^{4} \tan^{-1} x_i$ is equal to

A. β

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

C. $\pi - \beta$

D. $-\beta$

Answer: B

Watch Video Solution

148. If x+1/x=2, the principle value ot $\sin^{-1} x$ is

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

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

C. π

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

Answer: B

Watch Video Solution

149. If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = 3\pi$, then xy+yz+zx is equal to

A. -3

B. 0

C. 3

D. -1

Answer: C

Watch Video Solution

150. If 1-tanx/1+tanx=tany and $x - y = \frac{\pi}{6}$, then x, y are respectively

A. $\frac{5\pi}{24}, \frac{\pi}{24}$

B. $-\frac{7\pi}{24}, -\frac{11\pi}{24}$

C. $-\frac{115\pi}{24}, -\frac{119\pi}{24}$

D. none of these

Answer: A::B::C

Watch Video Solution

151. If $\cos^4 x + 4\sin^4 x = 1$, then general value of x equals to

A. $n\pi, n \in I$

B. $n\pi \pm \sin^{-1}\sqrt{\frac{2}{5}}, n \in I$

C. $\frac{2n\pi}{3}, n \in I$

D. $2n\pi \pm \frac{\pi}{4}, n \in I$

Answer: A::B

Watch Video Solution

152. The equation sinx=[1+sinx]+[1-cosx] has [where [.] is greatest integer function]

A. no solution in $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

B. no solution in $\left[\frac{\pi}{2}, \pi\right]$

C. no solution in $\left[\pi, \frac{3\pi}{2}\right]$

D. no solution for $x \in -\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$

Answer: A::B::C::D

Watch Video Solution

153. The equation $8x^3 - 6x + \sqrt{3} = 0$ is satisfied by

A. $\cos\left(\frac{5\pi}{18}\right)$

B. $\cos\left(\frac{7\pi}{18}\right)$

C. $\cos\left(\frac{11\pi}{18}\right)$

D. $\cos\left(\frac{17\pi}{18}\right)$

Answer: A::B::D

Watch Video Solution

154. Number of values of θ which satisfy $\sin^2\theta - 2\sin^2\theta - 1 = 0$ is

A. 0

B. infinite

C. equal to the number of values of θ satisfying

$$8\sec^2\theta - 6\sec\theta + 1 = 0$$

D. none of these

Answer: A::C

Watch Video Solution

155. Which of the following is true?

A. $\sin^2\left(2\tan^{-1}\sqrt{\frac{1+x}{1-x}}\right) = 1 - x^2,\ -1 \leq x < 1$

B. $\sin\left(2\tan^{-1}\sqrt{\frac{1+x}{1-x}}\right) = 1 - x^2,\ -1 \leq x < 1$

C. $\sin^2\left(2\tan^{-1}\sqrt{\frac{1+x}{1-x}}\right) = \frac{1+x}{2},\ -1 \leq x < 1$

D. none of these

Answer: A::B::C

Watch Video Solution

156. $\theta = \tan^{-1}\left(2\tan^2\theta\right) - \tan^{-1}\left\{\left(\frac{1}{3}\right)\tan\theta\right\}$, if

A. $\tan\theta = -2$

B. $\tan\theta = 0$

C. $\tan\theta = 1$

D. $\tan\theta = 2$

Answer: A::B::C

Watch Video Solution

157. $\sec\left(\cos ec^{-1}x\right)$ is equal to

A. $\cos ec\left(\sec^{-1}x\right)$ for all $x \in R$

B. $\cos ec\left(\sec^{-1}x\right)$ for $|x| > 1$

C. $\frac{|x|}{\sqrt{x^2-1}}$ for $|x|>1$

D. cotx

Answer: B::C

Watch Video Solution

158. The solution of the equation $\sin\left[2\cos^{-1}\left\{\cot\left(2\tan^{-1}x\right)\right\}\right]=0$ are

A. ± 1

B. $1\pm\sqrt{2}$

C. $-1\pm\sqrt{2}$

D. none of these

Answer: A::B::C

Watch Video Solution

159. Let $f(x) = e^{\cos^{-1}\sin\left(x+\frac{\pi}{3}\right)}$, then

A. $f\left(\frac{8\pi}{9}\right) = e^{\frac{5\pi}{18}}$

B. $f\left(\frac{8\pi}{9}\right) = e^{\frac{13\pi}{18}}$

C. $f\left(-\frac{7\pi}{4}\right) = e^{\frac{\pi}{12}}$

D. $f\left(-\frac{7\pi}{4}\right) = e^{\frac{11\pi}{12}}$

Answer: B::C

Watch Video Solution

160. The greatest and least values of $\left(\sin^{-1}x\right)^3 + \left(\cos^{-1}x\right)^3$ are

A. $\frac{\pi^3}{32}$

B. $-\frac{\pi^3}{8}$

C. $\frac{7\pi^3}{8}$

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

Answer: A::C

Watch Video Solution

161. α is a root of the equation $(2\sin x - \cos x)(1 + \cos x) = \sin^2 x$

β is a root of the equation $3\cos^2 x - 10\cos x + 3 = 0$ and γ is a root of the equation 1-sin2x=cosx-sinx where $0 \leq \alpha, \beta, \gamma \leq \pi/2$

Answer the following question on above passage:

$\sin(\alpha - \beta)$

A. 1

B. 0

C. $\frac{1 - 2\sqrt{6}}{6}$

D. $\frac{\sqrt{3} - 2\sqrt{2}}{6}$

Answer: C

Watch Video Solution

162. α is a root of the equation $(2\sin x - \cos x)(1 + \cos x) = \sin^2 x$

β is a root of the equation $3\cos^2 x - 10\cos x + 3 = 0$ and γ is a root of the equation 1-sin2x=cosx-sinx where $0 \leq \alpha, \beta, \gamma \leq \pi/2$

Answer the following question on above passage:

$\sin\alpha + \sin\beta + \sin\gamma$ can be equal

A. $\frac{14 + 3\sqrt{2}}{6\sqrt{2}}$

B. 44322

C. $\frac{3 + 4\sqrt{2}}{6}$

D. $\frac{1 + \sqrt{2}}{6}$

Answer: A

Watch Video Solution

163. $f(x) = \sin\{\cot^{-1}(x+1)\} - \cos\left(\tan^{-1} x\right)$

$a = \cos\tan^{-1}\sin\cot^{-1} x$

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

Answer the following question on above passage:

The value of x for which f(x)=0 is

A. -0.5

B. 0

C. 44198

D. 1

Answer: A

Watch Video Solution

164. $f(x) = \sin\left\{\cot^{-1}(x+1)\right\} - \cos\left(\tan^{-1}x\right)$

$a = \cos\tan^{-1}\sin\cot^{-1}x$

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

Answer the following question on above passage:

The value of x for which f(x)=0 is

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

B. $\frac{5}{9}$

C. 44325

D. None of these

Answer: C

Watch Video Solution

165.

$$\sum_{r=1}^{n} \tan^{-1}\left(\frac{x_r - x_{r-1}}{1 + x_{r-1}x_r}\right) = \sum_{r=1}^{n} \left(\tan^{-1} x_r - \tan^{-1} x_{r-1}\right) = \tan^{-1} x_n -$$

Answer the following question on above passage:

The sum to infinite terms of the series $\cot^{-1}\left(2^2 + \frac{1}{2}\right) + \cot^{-1}\left(2^3 + \frac{1}{2^2}\right) + \cot^{-1}\left(2^4 + \frac{1}{2^3}\right) +$ ..... is

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

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

C. π

D. none of these

Answer: A

Watch Video Solution

166.

$$\sum_{r=1}^{n} \tan^{-1}\left(\frac{x_r - x_{r-1}}{1 + x_{r-1}x_r}\right) = \sum_{r=1}^{n} \left(\tan^{-1} x_r - \tan^{-1} x_{r-1}\right) = \tan^{-1} x_n -$$

Answer the following question on above passage:

The sum to infinite terms of the series $\cot^{-1}\left(2^2 + \frac{1}{2}\right) + \cot^{-1}\left(2^3 + \frac{1}{2^2}\right) + \cot^{-1}\left(2^4 + \frac{1}{2^3}\right) + \ldots\ldots$ is

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

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

C. $\cot^{-1} 2$

D. $-\cot^{-1} 2$

Answer: C

Watch Video Solution

167. Arrange the followig radicals in increasing order of -I effect. 1,Br,Cl,F

Watch Video Solution

168. Match Column-I with Column-II

	Column-I		Column-II
(A)	Sheet silicate	(P)	$(SiO_3)_n^{2n-}$
(B)	Pyroxene chain	(Q)	$(Si_4O_{11})_n^{6n-}$
(C)	Pyrosilicate	(R)	3 – corner oxygen atom are shared
(D)	Amphibole chain	(S)	Non-plannar

Watch Video Solution

169. The number of values of θ in the interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ such that $\theta \neq \frac{n\pi}{5}$ for $n \neq 0, \pm 1, \pm 2$ and $\tan\theta = \cot 5\theta$ as well as $\sin 2\theta = \cos 4\theta$ is

Watch Video Solution

170. If $a, b, c, d \in (0, \pi)$ and $b + c \neq \frac{\pi}{2}$ such that 2cosa+6cosb+7cosc+9cosd=0 and 2sina-6sinb+7sinc-9sind=0, then the value of $\frac{3\cos(a+d)}{\cos(b+c)}$ is

Watch Video Solution

171. The value of $\frac{1}{2}\left\{\sec^2\left(\tan^{-1}2\right) + \cos ec^2\left(\cot^{-1}3\right) + \tan^2\left(\frac{\pi}{3}\right)\right\}$ is equal to

Watch Video Solution

172. If $x > 0$, then the value of $\sin\left\{\tan^{-1}\left(\frac{1-x^2}{2x}\right) + \cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\right\}$ is equal to

Watch Video Solution

173. If $\cos^{-1}\left(\frac{x}{2}\right)+\sin^{-1}\left(\frac{x}{4}\right)=\frac{\pi}{6}$, then the value of x is

Watch Video Solution

174. Solve: $\cos^4\left(\frac{x}{5}\right)+\sin^2\left(\frac{x}{5}\right)=1$

Watch Video Solution

175. Solve: $\left|\cot\left(2x-\frac{\pi}{2}\right)\right|=\frac{1}{\cos^2 2x}-1$

Watch Video Solution

176. Solve: $2\cos^2 x+5\cos x+2\geq 0$

Watch Video Solution

177. Find the points of intersection of the curves y=cosx and y=sin3x if $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$

Watch Video Solution

178. Solve for x and y : $2^{\frac{1}{\cos^2 x}} \sqrt{y^2 - y + 1/2} \leq 1$

Watch Video Solution

179. Find the value of $\tan^{-1}\left(\frac{1}{2}\tan 2A\right) + \tan^{-1}(\cot A) + \tan^{-1}\left(\cot^3 A\right)$, for $0 < A < \pi/4$

Watch Video Solution

180. Solve: $\sin^{-1} x + \sin^{-1}(1 - x) = \cos^{-1} x$

Watch Video Solution

181. Prove that:

$$\tan^{-1}\left(\frac{c_1x-y}{c_1y+x}\right)+\tan^{-1}\left(\frac{c_2-c_1}{1+c_2c_1}\right)+\tan^{-1}\left(\frac{c_3-c_2}{1+c_3c_2}\right)+$$
$$\ldots\ldots+\tan^{-1}\left(\frac{c_n-c_{n-1}}{1+c_nc_{n-1}}\right)+\tan^{-1}\left(\frac{1}{c_n}\right)=\tan^{-1}\left(\frac{x}{y}\right)$$

Watch Video Solution

182. The value of 'a' for which $ax^2+\sin^{-1}\left(x^2-2x+2\right)+\cos^{-1}\left(x^2-2x+2\right)=0$ has a real solution is

Watch Video Solution

183. The number of distinct solutions of the equation $\frac{5}{4}\cos^2 2x+\cos^4 x+\sin^4 x+\cos^6 x+\sin^6 x=2$ in the interval $[0,2\pi]$ is

Watch Video Solution

184. If $\alpha = 3\sin^{-1}\left(\frac{6}{11}\right)$ and $\beta = 3\cos^{-1}\left(\frac{4}{9}\right)$, where the inverse trigonometric functions take only the principal values, then the correct option(s) is(are)

A. $\cos\beta > 0$

B. $\sin\beta < 0$

C. $\cos(\alpha+\beta) > 0$

D. $\cos\alpha < 0$

Answer: B::C::D

Watch Video Solution

185. Let, $\tan^{-1} y = \tan^{-1} x + \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, where $|x| < \frac{1}{\sqrt{3}}$. Then a value of y is:

A. $\frac{3x+x^3}{1-3x^2}$

B. $\frac{3x-x^3}{1+3x^2}$

C. $\frac{3x + x^3}{1 + 3x^2}$

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

Answer: D

Watch Video Solution

186. The number of real solutions of the equation $(\sin x - x)\left(\cos x - x^2\right) = 0$ is

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

187. The values of $2\cot^{-1}\left(\frac{1}{2}\right) - \cot^{-1}\left(\frac{4}{3}\right)$ is

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

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

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

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

Answer: D

Watch Video Solution

188. The number of distinct roots of $\begin{vmatrix} \sin x & \cos x & \cos x \\ \cos x & \sin x & \cos x \\ \cos x & \cos x & \sin x \end{vmatrix} = 0$ in the interval $-\frac{\pi}{4} \leq x \leq \frac{\pi}{4}$ is

A. 0(zero)

B. 2

C. 1

D. > 2

Answer: C

Watch Video Solution

189. The trigonometric equation $\sin^{-1} x = 2\sin^{-1} 2a$ has a real solution if

A. $|a| \leq \frac{1}{\sqrt{2}}$

B. $\frac{1}{2\sqrt{2}} < |a| < \frac{1}{\sqrt{2}}$

C. $|a| > \frac{1}{2\sqrt{2}}$

D. $|a| \leq \frac{1}{2\sqrt{2}}$

Answer: D

Watch Video Solution

190. Let α, β be two distinct roots of $a\cos\theta + b\sin\theta = c$, where a, b and c are three real constants and $\theta \in$ [0, 2pi]. $Then$alpha+beta` is also a root of the same equation if

A. a+b=c

B. b+c=a

C. c+a=b

D. c=a

Answer: D

Watch Video Solution

191. If $\sin^{-1}\left(\frac{x}{13}\right) + \cos ec^{-1}\left(\frac{13}{12}\right) = \frac{\pi}{2}$, then the value of x is

A. 5

B. 4

C. 12

D. 11

Answer: A

Watch Video Solution

192. The value of $\cot\left(\sum_{n=1}^{23}\cot^{-1}\left(1+\sum_{k=1}^{n}2k\right)\right)$ is

A. 23/25

B. 25/23

C. 23/24

D. 24/23

Answer: B

Watch Video Solution

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

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

194. Number of solutions of the equation $\tan x + \sec x = 2\cos x, x \in [0, \pi]$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

195. The solutions set of inequation $\cos^{-1} x < \sin^{-1} x$ is

A. [-1, 1]

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

C. [0, 1]

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

Answer: D

Watch Video Solution