



India's Number 1 Education App

MATHS

BOOKS - OBJECTIVE RD SHARMA ENGLISH

TRIGONOMETRIC EQUATIONS AND INEQUATIONS

Section I Solved Mcqs

1. The general solution of the equation

$$\sin 2x + 2\sin x + 2\cos x + 1 = 0 \text{ is}$$

A. $3n\pi - \frac{\pi}{4}, n \in Z$

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

C. $2n\pi + (-1)^n \sin^{-1} \left(\frac{1}{\sqrt{3}} \right), n \in Z$

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

Answer: D



Watch Video Solution

2. The possible values of $\theta \in (0, \pi)$ such that

$$\sin(\theta) + \sin(4\theta) + \sin(7\theta) = 0 \text{ are } (1) \quad \frac{2\pi}{9}, \frac{i}{4}, \frac{4\pi}{9}, \frac{\pi}{2}, \frac{3\pi}{4}, \frac{8\pi}{9} \quad (2)$$

$$\frac{\pi}{4}, \frac{5\pi}{12}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{8\pi}{9} \quad (3) \quad \frac{2\pi}{9}, \frac{\pi}{4}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{35\pi}{36} \quad (4)$$

$$\frac{2\pi}{9}, \frac{\pi}{4}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{8\pi}{9}$$

A. $\frac{2\pi}{9}, \frac{\pi}{4}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{35\pi}{6}$

B. $\frac{2\pi}{9}, \frac{\pi}{4}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{8\pi}{9}$

C. $\frac{2\pi}{9}, \frac{\pi}{4}, \frac{4\pi}{9}, \frac{\pi}{2}, \frac{3\pi}{4}, \frac{8\pi}{9}$

D. $\frac{\pi}{4}, \frac{5\pi}{2}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{8\pi}{9}$

Answer: C



Watch Video Solution

3. For $x \in (0, \pi)$, the equation

$\sin x + 2\sin 2x - \sin 3x = 3$ has

A. infinitely many solutions

B. three solutions

C. one solution

D. no solution

Answer: D



Watch Video Solution

4. If $0 \leq x \leq 2\pi$, then the number of real values of x , which satisfy the equation $\cos x + \cos 2x + \cos 3x + \cos 4x = 0$, is

A. 3

B. 5

C. 7

D. 9

Answer: C



Watch Video Solution

5. The number of distinct real 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 $-\frac{\pi}{4} \leq x \leq t\frac{\pi}{4}$ is

A. 4

B. 1

C. 2

D. 3

Answer: C



Watch Video Solution

6. The equation $2(\cos^8\theta - \sin^8\theta)\sec 2\theta = a^2$ has real solution if a lies in the interval

- A. $[-\sqrt{2}, \sqrt{2}]$
- B. $[-\sqrt{2}, -1) \cup (1, \sqrt{2}]$
- C. $[-\sqrt{2}, -1] \cup [1, \sqrt{2}]$
- D. none of these

Answer: B



Watch Video Solution

7. If the equation $k \cos x - 3 \sin x = k + 1$ has a solution for x then

- A. $[4, \infty)$
- B. $[-4, 4]$
- C. $(-\infty, 4]$
- D. none of these

Answer: C



Watch Video Solution

8. The equation $a \cos x - \cos 2x = 2a - 7$ possesses a solution if

- A. $a > 6$
- B. $2 \leq a \leq 6$
- C. $a > 2$
- D. $a = -4$

Answer: B



Watch Video Solution

9. If $\cos x + \sqrt{\sin x} = 0$, then $x =$

- A. $\sin^{-1}\left(\frac{\sqrt{5}-1}{2}\right)$

B. $\pi - \sin^{-1}\left(\frac{\sqrt{5} - 1}{2}\right)$

C. $\sin^{-1}\left(\frac{1 - \sqrt{5}}{2}\right)$

D. $\cos^{-1}\left(\sqrt{\frac{\sqrt{5} - 1}{2}}\right)$

Answer: A



Watch Video Solution

10. Find the smallest positive number p for which the equation $\cos(p \sin x) = \sin(p \cos x)$ has a solution $x \in [0, 2\pi]$.

A. 2

B. 1

C. 3

D. none of these

Answer: A



Watch Video Solution

11. the number of solution of the equation $1 + \sin x \cdot \sin^2\left(\frac{x}{2}\right) = 0$, in

$[-\pi, \pi]$, is

A. 0

B. 1

C. 3

D. none of these

Answer: A



Watch Video Solution

12. The number of solution of the equation

$2\sin^3 x + 2\cos^3 x - 3\sin 2x + 2 = 0$ in $[0, 4\pi]$, is

A. 2

B. 3

C. 4

D. 5

Answer: C



Watch Video Solution

13. The number of solution (s) of the equation

$\sin x + \cos x = \min\{\sqrt{3}, a^2 - 4a + 5\}$, $a \in R$, is

A. 1, if $a < 2$

B. 2, if $a > 2$

C. 0, if $a = 2$

D. infinitely many for any $a \in R$.

Answer: D



Watch Video Solution

14. If $\sin^2\theta - 2\sin\theta - 1 = 0$ is to be satisfied for exactly 4 distinct values of $\theta \in [0, n\pi]$, $n \in Z$, then the least values of n, is

A. 2

B. 6

C. 4

D. 1

Answer: D



Watch Video Solution

15. The number of integral values of k for which the equation $7\cos x + 5\sin x = 2k + 1$ has a solution is (1) 4 (2) 8 (3) 10 (4) 12

A. 4

B. 8

C. 10

Answer: B



Watch Video Solution

16. The number of solutions of the equation

$$3\sin^2 x - 7\sin x + 2 = 0$$

in the interval $[0, 5\pi]$, is

A. 0

B. 5

C. 6

D. 10

Answer: C



Watch Video Solution

17. The number of distinct real 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 $-\frac{\pi}{4} \leq x \leq t\frac{\pi}{4}$ is

A. 0

B. 2

C. 1

D. 3

Answer: C



Watch Video Solution

18. If $\cos 2\theta, 1$ and $\sin \theta$ are in GP., then $\theta =$

A. $n\pi + (-1)^2 \frac{\pi}{2}, n \in Z$

B. $n\pi + (-1)^{n-1} \frac{\pi}{2}, n \in Z$

C. $2n\pi, n \in Z$

D. none of these

Answer: B



Watch Video Solution

19. The equation $\sin^4 x - (k + 2)\sin^2 x - (k + 3) = 0$ possesses a solution, if

A. $k > -3$

B. $k < -2$

C. $-3 \leq k \leq -2$

D. $k \in \mathbb{Z}$

Answer: C



Watch Video Solution

20. Let n be a positive integer such that $\frac{\sin \pi}{2n} + \frac{\cos \pi}{2n} = \frac{\sqrt{n}}{2}$. Then

$$6 \leq n \leq 8$$

(b) A. $n \in [6, 8]$

B. $n \in (4, 8]$

C. $n \in [4, 8)$

D. $n \in (4, 8)$

Answer: D



Watch Video Solution

21. The equation $\sin^4 x + \cos^4 x + \sin 2x + k = 0$ must have real solutions if :

A. $[-3/2, 1]$

B. $[0, 1/2]$

C. $[-3/2, 1/2]$

D. none of these

Answer: C



Watch Video Solution

22. If $2\tan^2 x - 5\sec x = 1$ for exactly seven distinct value of $x \in \left[0, \frac{n\pi}{2}\right]$, $n \in N$ then find the greatest value of n .

A. 6, 8

B. 12, 14

C. 13, 15

D. 15, 17

Answer: C



Watch Video Solution

23. The value of p for which the equation $3 \sin^2 x + 12\cos x - 3 = p$ has at least one solution are

- A. $p \leq 12$
- B. $3 \leq p \leq 9$
- C. $-15 \leq p \leq 9$
- D. none of these

Answer: C



Watch Video Solution

24. Find the number of solution(s) of the equation

$$\cos(\pi\sqrt{x})\cos(\pi\sqrt{x-4}) = 1.$$

- A. more than 2
- B. 2
- C. 1

D. 0

Answer: C



Watch Video Solution

25. If m and n ($n > m$) are positive integers, then find the number of solutions of the equation $n|\sin x| = m|\cos x|$ for $x \in [0, 2\pi]$. Also find the solution.

A. m

B. n

C. mn

D. none of these

Answer: D



Watch Video Solution

26. The number of solutions of the equation $\cos^7\theta + \sin^4\theta = 1$ in the interval $(-\pi, \pi)$, is

A. 0

B. 1

C. 2

D. 3

Answer: D



Watch Video Solution

27. The set of values of λ for which the equation $\sin^4x + \cos^4x = \lambda$ has a solution, is

A. $(0, 1)$

B. $(1, 3/2)$

C. $[-1, 1]$

D. $[1/2, 1]$

Answer: D



Watch Video Solution

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

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

B. π

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

D. none of these

Answer: C



Watch Video Solution

29. The number of values of x in $(0, \pi)$ satisfying the equation

$$(\sqrt{3}\sin x + \cos x)^{\sqrt{\sqrt{3}\sin 2x - \cos 2x + 2}} = 4, \text{ is}$$

- A. 0
- B. 1
- C. 2
- D. none of these

Answer: B



Watch Video Solution

30. The set of values of 'a' for which the equation

$$\sqrt{a}\cos x - 2\sin x = \sqrt{2} + \sqrt{2-a} \text{ has a solution is}$$

- A. $(0, 2)$
- B. $[0, 2]$
- C. $(\sqrt{5} - 1, 2)$

D. $[\sqrt{5} - 1, 2]$

Answer: D



Watch Video Solution

31. Number of solutions of x in $[0, 2\pi]$ of $16^{\sin^2 x} + 16^{\cos^2 x} = 10$

A. 2

B. 4

C. 6

D. 8

Answer: D



Watch Video Solution

32. If $\tan(\cot x) = \cot(\tan x)$, prove that : $\sin 2x = \frac{4}{(2n + 1)\pi}$

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

B. $\sin x = \frac{4}{(2n+1)\pi}, n \in Z$

C. $\sin 2x = \frac{4}{(2n+1)\pi}, n \in Z$

D. none of these

Answer: C



Watch Video Solution

33. If the equation $2\cos x + \cos 2\lambda x = 3$ has only one solution , then λ is

A. equal to 1

B. a rational number

C. an irrational number

D. none of these

Answer: C



Watch Video Solution

34. The least positive non integral solution of $\sin\pi(x^2 + x) - \sin\pi x^2 = 0$, is

A. a rational number

B. an irrational number of the form $\sqrt{\lambda}$

C. an irrational number of the form $\frac{\sqrt{\lambda} - 1}{4}$, where λ is an odd integer

D. an irrational number of the form $\frac{\sqrt{\lambda} + 1}{4}$, where λ is an even integer.

Answer: C



Watch Video Solution

35. The equation $1 + \sin^2 ax = \cos x$ has a unique solution then a is

A. equal to 1

B. a rational number

C. an irrational number

D. none of these

Answer: B



Watch Video Solution

36. Statement-1: The general solution of $2^{\sin x} + 2^{\cos x} = 2^{1 - \frac{1}{\sqrt{2}}}$ is $n\pi + \frac{\pi}{4}$ and Statement-2 A.M. \geq G.M.

A. $x = n\pi - \frac{\pi}{4}, n \in Z$

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

C. $x = n\pi + (-1)^n \frac{\pi}{4}, n \in Z$

D. $x = 2n\pi \pm \frac{\pi}{4}, n \in Z$

Answer: B



Watch Video Solution

37. find all the possible triplets (a_1, a_2, a_3) such that
 $a_1 + a_2 \cos(2x) + a_3 \sin^2(x) = 0$ for all real x.

- A. 0
- B. 1
- C. 3
- D. infinite

Answer: D



Watch Video Solution

38. If $x \neq \frac{n\pi}{2}$, $n \in Z$ and $(\cos x)^{\sin^2 x - 3\sin x + 2} = 1$ Then, $x =$

- A. $2n\pi + \frac{\pi}{2}$, $n \in Z$
- B. $(2n + 1)\pi - \frac{\pi}{2}$, $n \in Z$
- C. $n\pi + (-1)^n \frac{\pi}{2}$, $n \in Z$

D. none of these

Answer: D



Watch Video Solution

39. The values of x in $(0, \pi)$ satisfying the equation.

$$\begin{vmatrix} 1 + \sin^2 x & \sin^2 x & \sin^2 x \\ \cos^2 x & 1 + \cos^2 x & \cos^2 x \\ 4\sin 2x & 4\sin 2x & 1 + 4\sin 2x \end{vmatrix} = 0, \text{ are}$$

A. $\frac{\pi}{12}, \frac{7\pi}{12}$

B. $\frac{5\pi}{12}, \frac{7\pi}{12}$

C. $\frac{7\pi}{12}, \frac{11\pi}{12}$

D. $\frac{\pi}{12}, \frac{11\pi}{12}$

Answer: C



Watch Video Solution

40. The set of values of 'a' for which the equation $\sin x(\sin x + \cos x) = a$ has real solutions, is

- A. $[1 - \sqrt{2}, 1 + \sqrt{2}]$
- B. $[2 - \sqrt{3}, 2 + \sqrt{3}]$
- C. $[0, 2 + \sqrt{3}]$
- D. $\left[\frac{1 - \sqrt{2}}{2}, \frac{1 + \sqrt{2}}{2} \right]$

Answer: D



Watch Video Solution

41. The solution set of

$$\sin\left(x - \frac{\pi}{4}\right) - \cos\left(x + \frac{3\pi}{4}\right) = 1 \quad \text{and} \quad \frac{2\cos 7x}{\cos 3 + \sin 3} > 2^{\cos 2x}, \text{ is}$$

- A. $k\pi + (-1)^k \frac{\pi}{4}, k \in Z$
- B. $(8k + 3)\frac{\pi}{4}, k \in Z$
- C. $(8k + 1)\frac{\pi}{4}, k \in Z$

D. none of these

Answer: B



Watch Video Solution

42. The solution set of the equation

$(\sin 13^\circ)^{\cot 3x + \cot x} = \sin^2(4\pi - x) - \cos(3\pi - x)\cos(2\pi + x)$ is given by

A. $x = \frac{n\pi}{4}$, $n \neq 4\lambda$, $\lambda \in Z$

B. $x = \frac{n\pi}{2}$, $n \neq 2\lambda$, $\lambda \in Z$

C. $x = \frac{n\pi}{3}$, $n \in 3\lambda$

D. none of these

Answer: A



Watch Video Solution

43. The number of real solutions of the equation $\sin e^x \cosec x = 2^{x-2} + 2^{-x-2}$, is

- A. 0
- B. 1
- C. 2
- D. infinite

Answer: A



Watch Video Solution

44. If $\sin x = \lambda$ has exactly one solution in $[0, 9\pi/4]$ then the number of values of λ , is

- A. 0
- B. 1
- C. 2

D. 3

Answer: C



Watch Video Solution

45. Number of solution (s) of the equation

$$\left(\frac{2 - \cos^2 x}{\sin x} \right)^3 + \left(\frac{3 - \cos 2x}{\sin x} \right) = 0 \text{ is}$$

A. 0

B. 1

C. 2

D. infinite

Answer: A



Watch Video Solution

46. If the values of x between 0 and 2π which satisfy the equation

$\sin x |\cos x| = \frac{1}{2\sqrt{2}}$ are in A.P, then the common difference of the A.P, is

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

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

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

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

Answer: B



Watch Video Solution

47. The number of solutions of the equation $x^3 + x^2 + 4x + 2 \sin x = 0$

in $0 \leq x \leq 2\pi$ is

A. 0

B. 1

C. 2

D. 4

Answer: B



Watch Video Solution

48. The number of solutions of the equation

$\sin x = [1 + \sin x] + [1 - \cos x]$ in $[0, 2\pi]$ is

A. 0

B. 1

C. 2

D. 6

Answer: A



Watch Video Solution

49. The set of values of x satisfying $[\sin(\cos x)] = -1$ is ([.] denotes the greatest integer function)

- A. $((4n + 1)\pi, (4n + 3)\pi), n \in Z$
- B. $\left[(n + 1)\frac{\pi}{2}, (4n + 3)\frac{\pi}{2}\right], n \in Z$
- C. $\left((4n + 1)\frac{\pi}{2}, (4n + 3)\frac{\pi}{2}\right), n \in Z$
- D. none of these

Answer: C



Watch Video Solution

50. The number of solutions 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

51. The number of solutions of the equation $\sin x = |\cos 3x| \in [0, \pi]$,
is

A. 3

B. 4

C. 5

D. 6

Answer: D



Watch Video Solution

52. The equation $|\sin x| = \sin x + 3$ has in $[0, 2\pi]$

- A. no root
- B. only one root
- C. two roots
- D. more than two roots

Answer: A



Watch Video Solution

53. The most general values of θ satisfying

$2\cos\theta + \sqrt{3} = 0$ and $\sqrt{3}\tan\theta - 1 = 0$ are given by

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

B. $2n\pi \pm \frac{\pi}{6}$, $n \in \mathbb{Z}$

C. $2n\pi, \frac{7\pi}{6}$, $n \in \mathbb{Z}$

D. none of these

Answer: C



Watch Video Solution

54. If $0 \leq x, y \leq \pi$ and $\sin x + \sin y = 2$, then $x + y =$

A. π

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

C. 3π

D. none of these

Answer: A



Watch Video Solution

55. If $0 \leq x, y \leq 2\pi$ and $\cos x + \cos y = -2$, then $\cos(x + y) =$

A. 0

B. 1

C. - 1

D. none of these

Answer: B



Watch Video Solution

56. If $0 \leq x \leq 3\pi$, $0 \leq y \leq 3\pi$ and $\cos x \cdot \sin y = 1$, then find the possible number of values of the ordered pair (x,y) .

A. 6

B. 12

C. 8

D. 15

Answer: A



Watch Video Solution

57. The number of ordered pairs (a,x) satisfying the equation $\sec^2(a+2)x + a^2 - 1 = 0$, $\pi < x < \pi$ is

- A. 2
- B. 1
- C. 3
- D. infinite

Answer: C



Watch Video Solution

58. If $\sin^4 x + \cos^4 y + 2 = 4 \sin x \cdot \cos y$ and $0 \leq x, y \leq \frac{\pi}{2}$ then $\sin x + \cos y$ is equal to

- A. -2
- B. 0

C. 2

D. none of these

Answer: C



Watch Video Solution

59. Find the smallest positive values of x and y satisfying

$$x - y = \frac{\pi}{4} \text{ and } \cot x + \cot y = 2$$

A. $x = \frac{\pi}{6}$, $y = \frac{5\pi}{12}$

B. $x = \frac{5\pi}{12}$, $y = \frac{\pi}{6}$

C. $x = \frac{\pi}{3}$, $y = \frac{7\pi}{12}$

D. none of these

Answer: B



Watch Video Solution

60. 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. $x = \frac{\pi}{3} - n\pi$ and $y = n\pi, n \in Z$

B. $x = n\pi$ and $y = \frac{\pi}{3} - n\pi, n \in Z$

C. $x = n\pi + \frac{2\pi}{3}$ and $y = n\pi, n \in Z$

D. none of these

Answer: D



Watch Video Solution

61. If $x + y = \pi/4$ and $\tan x + \tan y = 1$, then ($n \in Z$)

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

62. If $2\sin x - 1 \leq 0$ and $x \in [0, 2\pi]$, then the solution set for x, is

- A. $[\pi/6, 5\pi/6]$
- B. $[0, \pi/6] \cup [5\pi/6, \pi]$
- C. $[0, \pi/6] \cup [5\pi/6, 2\pi]$
- D. none of these

Answer: C



Watch Video Solution

63. If $\cos x - \sin x \geq 1$ and $0 \leq x \leq 2\pi$, then the solution set for x is __

- A. $[0, \pi/4] \cup [7\pi/4, 2\pi]$

B. $[3\pi/2, 7\pi/4] \cup \{0\}$

C. $[3\pi/2, 2\pi] \cup \{0\}$

D. none of these

Answer: C



Watch Video Solution

64. The number of values of x in $[0, 2\pi]$ satisfying the equation

$|\cos x - \sin x| \geq \sqrt{2}$ is

A. 0

B. 1

C. 2

D. none of these

Answer: C



Watch Video Solution

65. The number of values of x in $[0, 4\pi]$ satisfying the inequation

$$|\sqrt{3}\cos x - \sin x| \geq 2, \text{ is}$$

A. 0

B. 2

C. 4

D. 8

Answer: C



Watch Video Solution

66. Find the solution set for , $4\sin^2 x - 8\sin x + 3 \leq 0$ where

$$x \in [0, 2\pi]$$

A. $[0, \pi/6]$

B. $[0, 5\pi/6]$

C. $[5\pi/6, 2\pi]$

D. $[\pi/6, 5\pi/6]$

Answer: D



Watch Video Solution

67. Find the number of solution of $\tan x + \sec x = 2 \cos x$ in $[0, 2\pi]$

A. 2

B. 3

C. 0

D. 1

Answer: A



Watch Video Solution

68. The value of x for which $\sin(\cot^{-1}(1+x)) = \cos(\tan^{-1}x)$ is $\frac{1}{2}$ (b)

1 (c) 0 (d) $-\frac{1}{2}$

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

B. 1

C. 0

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

Answer: D



Watch Video Solution

69. If $\begin{vmatrix} \cos(A+B) & -\sin(A+B) & \cos 2B \\ \sin A & \cos A & \sin B \\ -\cos A & \sin A & \cos B \end{vmatrix} = 0$ then B =

A. $(2n+1)\pi/2, n \in Z$

B. $n\pi, n \in Z$

C. $(2n+1)\pi, n \in Z$

D. $2n\pi$, $n \in Z$

Answer: A



Watch Video Solution

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

A. 6

B. 1

C. 2

D. 4

Answer: D



Watch Video Solution

71. For $0 < \theta < \frac{\pi}{2}$, the solution (s) of

$$\sum_{m=1}^6 \cos ec\left(\theta + \left((m-1)\frac{\pi}{4}\right)\right) \cos ec\left(\theta + \frac{m\pi}{4}\right) = 4\sqrt{2}is(are)$$

(a) $\frac{\pi}{6}$ (c) $\frac{\pi}{12}$ (d) $\frac{5\pi}{12}$

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

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

C. $\frac{\pi}{12}$

D. $\frac{5\pi}{12}$

Answer: C::D



Watch Video Solution

72. Solve: $2 \sin^2 x + \sin^2 2x = 2$

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

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

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

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

Answer: B::D



Watch Video Solution

73. The set of value of θ satisfying the inequation

$2\sin^2 \theta - 5\sin \theta + 2 > 0$, where $0 < \theta < 2\pi$, is

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

B. $\left[0, \frac{\pi}{6}\right] \cup \left[\frac{5\pi}{6}, 2\pi\right]$

C. $\left[0, \frac{\pi}{3}\right) \cup \left[\frac{2\pi}{3}, 2\pi\right]$

D. none of these

Answer: B



Watch Video Solution

74. The number of solutions of the pair of equations

$$2\sin^2 \theta - \cos 2\theta = 0 \quad 2\cos^2 \theta - 3\sin \theta = 0 \text{ in the interval } [0, 2\pi]$$

A. 0

B. 1

C. 2

D. 4

Answer: C



Watch Video Solution

$$75. \cos 2x = (\sqrt{2} + 1) \left(\cos x - \frac{1}{\sqrt{2}} \right), \cos x \neq \frac{1}{2} \Rightarrow x \in$$

A. $\left\{ 2n\pi \pm \frac{\pi}{3} : n \in \mathbb{Z} \right\}$

B. $\left\{ 2n\pi \pm \frac{\pi}{6} : n \in \mathbb{Z} \right\}$

C. $\left\{ 2n\pi + -\frac{\pi}{2} : n \in \mathbb{Z} \right\}$

$$\text{D. } \left\{ 2n\pi \pm \frac{\pi}{4} : n \in \mathbb{Z} \right\}$$

Answer: D



Watch Video Solution

76. 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 $n = 0, \pm 1, \pm 2$ and $\tan\theta = \cot 5\theta$ as well as $\sin 2\theta = \cos 4\theta$, is

A. 4

B. 5

C. 7

D. 3

Answer: D



Watch Video Solution

77. The number of all possible values of θ , where $0 < \theta < \pi$, for which the system of equations

$$(y + z)\cos 3\theta = (xyz)\sin 3\theta$$

$$x \sin 3\theta = \frac{2 \cos 3\theta}{y} + \frac{2 \sin 3\theta}{z}$$

$$(xyz)\sin 3\theta = (y + 2z)\cos 3\theta + y \sin 3\theta$$

has a solution (x_0, y_0, z_0) with $y_0 z_0 \neq 0$ is _____.

A. 0

B. 2

C. 3

D. 4

Answer: C



Watch Video Solution

78. The values of x satisfying

$$\tan^{-1}(x + 3) - \tan^{-1}(x - 3) = \sin^{-1}\left(\frac{3}{5}\right) \text{ are}$$

A. ± 4

B. 0, 4

C. -4, 0

D. 4, 5

Answer: A



Watch Video Solution

79. The number of solutions of the equation

$\cos^2\left(x + \frac{\pi}{6}\right) + \cos^2 x - 2 \cos\left(x + \frac{\pi}{6}\right) \cos\left(\frac{\pi}{6}\right) = \sin^2\left(\frac{\pi}{6}\right)$ in interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ is _____

A. 0

B. 1

C. 2

D. 3

Answer: C



Watch Video Solution

80. 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

A. 4

B. 6

C. 8

D. 5

Answer: C



Watch Video Solution

81. Let $S = \left\{ x \in (-\pi, \pi) : x \neq 0, +\frac{\pi}{2} \right\}$. The sum of all distinct solutions of the equation $\sqrt{3} \sec x + \cos ex + 2(\tan x - \cot x) = 0$ in the set S is equal to

A. $-\frac{7\pi}{9}$

B. $-\frac{2\pi}{9}$

C. 0

D. $\frac{5\pi}{9}$

Answer: C



Watch Video Solution

82. The number of $x \in [0, 2\pi]$ for which $\left| \sqrt{2\sin^4 x + 18\cos^2 x} - \sqrt{2\cos^4 x + 18\sin^2 x} \right| = 1$, is

A. 6

B. 4

C. 8

D. 2

Answer: B



Watch Video Solution

Section II Assertion Reason Type

1. Statement -1: If

$e^{(\sin^2 x + \sin^4 x + \sin^6 x + \dots) \log_e 2}$ satisfies the equation $x^2 - 9x + 8 = 0$, "then "

$$\frac{\cos x}{\cos x + \sin x} = \frac{\sqrt{3} - 1}{2}, \quad 0 < x < \frac{\pi}{2}.$$

Statement-2: The sum $\sin^2 x + \sin^4 x + \sin^6 x + \dots \infty$ is equal to $\tan^2 x$

A. Statement -1 is true, Statement-2 is true, Statement -2 is a correct

explanation for Statement-1.

B. Statement -1 is True, Statement-2 is True, Statement -2 is not a

correct explanation for Statement -1.

C. Statement-1 is True, Statement-2 is False.

D. Statement -1 is False, Statement-2 is True.

Answer: A



Watch Video Solution

2. Statement I If $2\sin 2x - \cos 2x = 1$, $x \neq (2n + 1)\pi/2$, n is the integer , then $\sin 2x + \cos 2x$ is equal to $1/5$.

Statement II $\sin 2x + \cos 2x = \frac{1 + 2\tan x - \tan^2 x}{1 + \tan^2 x}$

A. Statement -1 is true, Statement-2 is true, Statement -2 is a correct explanation for Statement-1.

B. Statement -1 is True, Statement-2 is True, Statement -2 is not a correct explanation for Statement -1.

C. Statement-1 is True, Statement-2 is False.

D. Statement -1 is False, Statement-2 is True.

Answer: D



Watch Video Solution

3. Statement -1: $\cos^7 x + \sin^4 x = 1$ has only two nonzero solutions in the interval $(-\pi, \pi)$

Statement-2: $\cos^5 x + \cos^2 x - 2 = 0$ is possible only when $\cos x = 1$.

- A. Statement -1 is true, Statement-2 is true, Statement -2 is a correct explanation for Statement-1.
- B. Statement -1 is True, Statement-2 is True, Statement -2 is not a correct explanation for Statement -1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement -1 is False, Statement-2 is True.

Answer: B



Watch Video Solution

4. Statement-1: The number of solutions of the simultaneous system of equations

$$2\sin^2\theta - \cos 2\theta = 0$$

$$2\cos^2\theta - 3\sin\theta = 0 \text{ in the interval } [0, 2\pi] \text{ is two.}$$

Statement-2: If $2\cos^2\theta - 3\sin\theta = 0$, then θ does not lie in III or IV quadrant.

- A. Statement -1 is true, Statement-2 is true, Statement -2 is a correct explanation for Statement-1.
- B. Statement -1 is True, Statement-2 is True, Statement -2 is not a correct explanation for Statement -1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement -1 is False, Statement-2 is True.

Answer: A



Watch Video Solution

Exercise

1. The number of solutions of the equation $\tan\theta + \sec\theta = 2\cos\theta$ lying in the interval $[0, 2\pi]$ is

A. 0

B. 1

C. 2

D. 3

Answer: C



Watch Video Solution

2. In a ΔABC , $\angle B < \angle C$ and the values of B and C satisfy the equation $2\tan x - k(1 + \tan^2 x) = 0$, where $(0 < k < 1)$. Then , the measure of $\angle A$ is

A. $\pi/3$

B. $\pi/2$

C. $2\pi/3$

D. $5\pi/6$

Answer: C



Watch Video Solution

3. Solve $\sin x - 3 \sin 2x + \sin 3x = \cos x - 3 \cos 2x + \cos 3x$.

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

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

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

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

Answer: B



Watch Video Solution

4. The equation $(\cos p - 1)^x + 2 + (\cos p)x + s \in p = 0$ in the variable x has real roots. The p can take any value in the interval (0, 2π) (b) (− π) (c) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ (d) (, π)

A. (0, 2π)

B. (− π , 0)

C. (− $\pi/2$, $\pi/2$)

D. (0, π)

Answer: D



Watch Video Solution

5. A solution of the equation $\cos^2 \theta + \sin \theta + 1 = 0$ lies in the interval

a. (− $\pi/4$, $\pi/4$) b. ($\pi/4$, $3\pi/4$) c. ($3\pi/4$, $5\pi/4$) d. ($5\pi/4$, $7\pi/4$)

A. (− $\pi/4$, $\pi/4$)

B. ($\pi/4$, $3\pi/4$)

C. $(3\pi/4, 5\pi/4)$

D. $(5\pi/4, 7\pi/4)$

Answer: D



Watch Video Solution

6. General solution of $\tan \theta + \tan 4\theta + \tan 7\theta = \tan 4\theta \tan 7\theta$ is
 $\theta = \frac{n\pi}{12}$, where $n \in \mathbb{Z}$ $\theta = \frac{n\pi}{9}$, where $n \in \mathbb{Z}$ $\theta = n\pi + \frac{\pi}{12}$, where $n \in \mathbb{Z}$
none of these

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

B. $\frac{n\pi}{7} + (-1)^n \frac{\pi}{2}$

C. $n\pi + (-1)^n \frac{5\pi}{6}$

D. $n\pi + (-1)^n \frac{7\pi}{6}$

Answer: C



Watch Video Solution

7. The general values of θ satisfying the equation

$$2\sin^2 \theta\pi - 3\sin \theta\pi - 2 = 0 \quad \text{is} \quad (n \in \mathbb{Z}). \quad n\pi + (-1)^n \frac{\pi}{6} \quad (\text{b})$$

$$n\pi + (-1)^n \frac{\pi}{2} \quad n\pi + (-1)^n \frac{5\pi}{6} \quad (\text{d}) \quad n\pi + (-1)^n \frac{7\pi}{6}$$

A. $n\pi + (-1)^n \frac{\pi}{6}$

B. $n\pi + (-1)^n \frac{\pi}{2}$

C. $n\pi + (-1)^n \frac{5\pi}{6}$

D. $n\pi + (-1)^n \frac{7\pi}{6}$

Answer: D



Watch Video Solution

8. Find the general solution of the equation

$$(\sqrt{3} - 1)\cos \theta + (\sqrt{3} + 1)\sin \theta = 2$$

A. $2n\pi \pm \frac{\pi}{4} + \frac{\pi}{12}$

B. $n\pi + (-1)^n \frac{\pi}{4} + \frac{\pi}{12}$

C. $2n\pi \pm \frac{\pi}{4} - \frac{\pi}{12}$

D. $n\pi + (-1)^n \frac{\pi}{4} - \frac{\pi}{12}$

Answer: A



Watch Video Solution

9. The most general value of θ which satisfy both the equation

$$\cos\theta = -\frac{1}{\sqrt{2}} \text{ and } \tan\theta = 1, \text{ is}$$

A. $2n\pi \pm \frac{5\pi}{4}$

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

C. $n\pi + \frac{5\pi}{4}$

D. $(2n+1)\pi + \frac{\pi}{4}$

Answer: D



Watch Video Solution

10. In a right angled triangle the hypotenuse is $2\sqrt{2}$ times the perpendicular drawn from the opposite vertex. Then the other acute angles of the triangle are (a) $\frac{\pi}{3}$ and $\frac{\pi}{6}$ (b) $\frac{\pi}{8}$ and $\frac{3\pi}{8}$ (c) $\frac{\pi}{4}$ and $\frac{\pi}{4}$ (d) $\frac{\pi}{5}$ and $\frac{3\pi}{10}$

A. $\frac{\pi}{3}, \frac{\pi}{6}$

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

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

D. $\frac{\pi}{12}, \frac{5\pi}{12}$

Answer: C



Watch Video Solution

11. Solve $\frac{\tan 3x - \tan 2x}{1 + \tan 3x \tan 2x} = 1$.

A. ϕ

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

C. $\left\{ n\pi + \frac{\pi}{4}, n = 0, 1, 2, 3, \dots \right\}$

D. $\left\{ 2n\pi + \frac{\pi}{4}, n = 1, 2, 3, \dots \right\}$

Answer: C



Watch Video Solution

12. The value of theta lying between 0 and $\frac{\pi}{2}$ and satisfying the equation
 $| (1 + \cos^2 \theta, \sin^2 \theta, 4 \sin 4\theta), (\cos^2 \theta, 1 + \sin^2 \theta, 4 \sin 4\theta) | (\cos^2 \theta, \sin^2 \theta, 1 +$
is (are)

A. $\frac{11\pi}{24}, \frac{7\pi}{24}$

B. $\frac{7\pi}{24}, \frac{5\pi}{24}$

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

D. $\frac{\pi}{24}, \frac{11\pi}{24}$

Answer: A



13. The solution set of $(2\cos x - 1)(3 + 2\cos x) = 0$ in the interval $0 \leq x \leq 2\pi$, is

- A. $\left\{ \frac{\pi}{3} \right\}$
- B. $\left\{ \frac{\pi}{3}, \frac{5\pi}{3} \right\}$
- C. $\left\{ \frac{\pi}{3}, \frac{5\pi}{3}, \cos^{-1}\left(-\frac{3}{2}\right) \right\}$
- D. none of these

Answer: B



14. If $\tan 2\theta \tan \theta = 1$, then $\theta =$

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

C. $2n\pi \pm \frac{\pi}{6}$, $n \in Z$

D. none of these

Answer: B



Watch Video Solution

15. The general solution of the trigonometric equation $\sin x + \cos x = 1$

is given by $x = 2n\pi, n0, \pm 1, \pm 2$ $x = 2n\pi + \frac{\pi}{2}; n = 0, \pm 1, \pm 2,$.

$x = n\pi + (-1)^n \frac{\pi}{4} - \frac{\pi}{4} n = 0, \pm 1, \pm 2$, *none of these*

A. $x = 2n\pi$

B. $x = 2n\pi + \frac{\pi}{2}$

C. $x = n\pi + (-1)^n \frac{\pi}{4} - \frac{\pi}{4}$

D. none of these

Answer: C



Watch Video Solution

16. If $\sin 5x + \sin 3x + \sin x = 0$, then the value of x other than 0 lying between $0 \leq x \leq \frac{\pi}{2}$ is

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

B. $\frac{\pi}{12}$

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

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

Answer: C



Watch Video Solution

17. Find the general values of θ which satisfies the equation

$$\tan \theta = -1 \text{ and } \cos \theta = \frac{1}{\sqrt{2}}$$

A. $n\pi + \frac{7\pi}{4}$

B. $n\pi + (-1)^n \frac{7\pi}{4}$

C. $2n\pi + \frac{7\pi}{4}$

D. none of these

Answer: C



Watch Video Solution

18. The values of θ satisfying $\sin 7\theta = \sin 4\theta - \sin \theta$ and $0 < \theta < \frac{\pi}{2}$ are

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

B. $\frac{\pi}{3}, \frac{\pi}{9}$

C. $\frac{\pi}{6}, \frac{\pi}{9}$

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

Answer: A



Watch Video Solution

19. If α, β are the different values of x satisfying $a \cos x + b \sin x = c$

then $\tan\left(\frac{\alpha + \beta}{2}\right)$ is

A. $a+b$

B. $a-b$

C. b/a

D. a/b

Answer: C



Watch Video Solution

20. The equation $a \sin x + b \cos x = c$, where $|c| > \sqrt{a^2 + b^2}$ has

A. a unique solution

B. infinite no. of solutions

C. no solution

D. none of these

Answer: C



Watch Video Solution

21. If α is a root of $25\cos^2\theta + 5\cos\theta - 12 = 0$, $\frac{\pi}{2} < \alpha < \pi$, then $\sin 2\alpha$

is equal to

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

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

C. $\frac{13}{18}$

D. $-\frac{13}{18}$

Answer: B



Watch Video Solution

22. If $\cos 3x + \sin\left(2x - \frac{7\pi}{6}\right) = -2$, then $x =$

A. $\frac{\pi}{3}(6k + 1)$, $k \in Z$

B. $\frac{\pi}{3}(6k - 1)$, $k \in Z$

C. $\frac{\pi}{3}(2k + 1)$, $k \in Z$

D. none of these

Answer: A



Watch Video Solution

23. The number of solutions of

$$2\cos^2\left(\frac{x}{2}\right)\sin^2x = x^2 + \frac{1}{x^2}, 0 \leq x \leq \frac{\pi}{2}, \text{ is}$$

A. 0

B. 1

C. infinite

D. none of these

Answer: A



Watch Video Solution

24. If A and B are acute positive angles satisfying the equations $3\sin^2 A + 2\sin^2 B = 1$ and $3\sin 2A - 2\sin 3B = 0$, then $A + 2B$ is equal to

A. 0

B. $\pi/2$

C. $\pi/4$

D. $\pi/3$

Answer: B



Watch Video Solution

25. The equation $\sin\theta = x + \frac{p}{x}$ for real values of x is possible when

A. $p > 0$

B. $p \leq 0$

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

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

Answer: C



Watch Video Solution

26. If $\sin A = \sin B$ and $\cos A = \cos B$, then find the value of a in terms of B .

A. $n\pi + 8$

B. $n\pi + (-1)^n B$

C. $2n\pi + B$

D. $2n\pi - B$

Answer: C



Watch Video Solution

27. Solve $5 \cos 2\theta + 2\cos^2 \frac{\theta}{2} + 1 = 0$, $-\pi < \theta < \pi$.

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

B. $\frac{\pi}{3}, \cos^{-1}(3/5)$

C. $\cos^{-1}(3/5)$

D. $\frac{\pi}{3}, \pi - \cos^{-1}(3/5)$

Answer: D



Watch Video Solution

28. If $(1 + \tan \theta)(1 + \tan \phi) = 2$, then $\theta + \phi =$

A. 30°

B. 45°

C. 60°

D. 75°

Answer: B



Watch Video Solution

29. The general solution of $\tan 3x = 1$, is

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

B. $\frac{n\pi}{3} + \frac{\pi}{12}$

C. $n\pi$

D. $n\pi \pm \frac{\pi}{4}$

Answer: B



Watch Video Solution

30. If $1 + \sin \theta + \sin^2 \theta + \sin^3 \theta + \dots \rightarrow \infty = 4 + 2\sqrt{3}$ $0 < \theta < \pi$, $\theta \neq \frac{\pi}{2}$

then

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

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

C. $\frac{\pi}{3}$ or $\frac{\pi}{6}$

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

Answer: D



Watch Video Solution

31. If α and β are the solutions of the equation $a \tan \theta + b \sec \theta = c$, then

show that $\tan(\alpha + \beta) = \frac{2ac}{a^2 - c^2}$

A. $\frac{2ac}{a^2 - c^2}$

B. $\frac{2ac}{c^2 - a^2}$

C. $\frac{2ac}{a^2 + c^2}$

$$\text{D. } \frac{ac}{a^2 + c^2}$$

Answer: A



Watch Video Solution

32. Solve $\sin x + \sin y = \sin(x + y)$ and $|x| + |y| = 1$

A. 2

B. 4

C. 6

D. infinite

Answer: C



Watch Video Solution

33. The expression $(1 + \tan x + \tan^2 x)(1 - \cot x + \cot^2 x)$ has the positive values for x , given by

- A. $0 \leq x \leq \frac{\pi}{2}$
- B. $0 \leq x \leq \pi$
- C. for all $x \in R - \{0, \pi/2\}$
- D. $x \geq 0$

Answer: C



Watch Video Solution

34. If the equation $a \sin x + \cos 2x = 2a - 7$ possesses a solution, then find the values of a .

- A. $k > 6$
- B. $2 \leq k \leq 6$
- C. $k > 2$

D. none of these

Answer: B



Watch Video Solution

35. The equation $\sin^6 x + \cos^6 x = \lambda$, has a solution if

A. $\lambda \in [1/2, 1]$

B. $\lambda \in [1/4, 1]$

C. $\lambda \in [-1, 1]$

D. $\lambda \in [0, 1/2]$

Answer: B



Watch Video Solution

36. If $y + \cos\theta = \sin\theta$ has a real solution, then

A. $-\sqrt{2} \leq y \leq \sqrt{2}$

B. $y > \sqrt{2}$

C. $y \leq -\sqrt{2}$

D. none of these

Answer: A



Watch Video Solution

37. The solution set of the equation

$4 \sin \theta \cdot \cos \theta - 2 \cos \theta - 2\sqrt{3} \sin \theta + \sqrt{3} = 0$ in the interval $(0, 2\pi)$ is :

A. $\left\{ \frac{3\pi}{4}, \frac{7\pi}{4} \right\}$

B. $\left\{ \frac{\pi}{3}, \frac{5\pi}{3} \right\}$

C. $\left\{ \frac{3\pi}{4}, \frac{7\pi}{4}, \frac{\pi}{3}, \frac{5\pi}{3} \right\}$

D. $\left\{ \frac{\pi}{6}, \frac{5\pi}{6}, \frac{11\pi}{6} \right\}$

Answer: D



Watch Video Solution

38. The most general solution of $\tan \theta = -1$ and $\cos \theta = \frac{1}{\sqrt{2}}$ is

- A. $n\pi + \frac{7\pi}{4}, n \in Z$
- B. $n\pi + (-1)^n \frac{7\pi}{4}, n \in Z$
- C. $2n\pi + \frac{7\pi}{4}, n \in Z$
- D. none of these

Answer: C



Watch Video Solution

39. The complex numbers $\sin x + i \cos 2x$ and $\cos x - i \sin 2x$ are conjugate to each other for (i) $x=n\pi$ (ii) $x = \left(n + \frac{1}{2}\right)\frac{\pi}{2}$ (iii) $x=0$ (iv) no value of x

- A. $n\pi$
- B. $\left(n + \frac{1}{2}\right)\pi, n \in Z$

C. 0

D. none of these

Answer: D



Watch Video Solution

40. The smallest positive root of the equation $\tan x - x = 0$ lies in

$(0, \frac{\pi}{2})$ (b) $(\frac{\pi}{2}, \pi)$ (c) $(\pi, \frac{3\pi}{2})$ (d) $(\frac{3\pi}{2}, 2\pi)$

A. $(0, \pi/2)$

B. $(\pi/2, \pi)$

C. $(\pi, 3\pi/2)$

D. $(3\pi/2, 2\pi)$

Answer: C



Watch Video Solution

41. The number of solutions of the equation $\sin x = \cos 3x$ in $[0, \pi]$ is

A. 1

B. 2

C. 3

D. 4

Answer: C



Watch Video Solution

42. Find the general values of θ satisfying $\tan \theta + \tan\left(\frac{3\pi}{4} + \theta\right) = 2$

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

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

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

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

Answer: A



Watch Video Solution

43. If $\sin \theta + \cos \theta = \sqrt{2} \cos \theta$, ($\theta \neq 90^\circ$) then value of $\tan \theta$ is

A. $n\pi + (-1)^n \frac{\pi}{4}$, $n \in Z$

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

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

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

Answer: A



Watch Video Solution

44. The number of solutions of the equation $\tan x + \sec x = 2 \cos x$ lying in the interval $[0, 2\pi]$ is 0 (b) 1 (c) 2 (d) 3

A. 0

B. 1

C. 2

D. 3

Answer: C



Watch Video Solution

45. If $\cot\theta\cot7\theta + \cot\theta\cot4\theta + \cot4\theta\cot7\theta = 1$, then $\theta =$

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

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

C. $n\pi + (-1)^n\frac{\pi}{2}, n \in Z$

D. $\frac{n\pi}{12}, n \in Z$

Answer: D



Watch Video Solution

46. Find the number of value of x in $[0, 5\pi]$ satisfying the equation

$$3\cos^2 x - 10\cos x + 7 = 0$$

A. 5

B. 6

C. 8

D. 10

Answer: C



Watch Video Solution

47. The number of values of $x \in [0, 2\pi]$ that satisfy

$$\cot x - \operatorname{cosec} x = 2\sin x,$$
 is

A. 3

B. 2

C. 1

D. 0

Answer: D



Watch Video Solution

48. $\cot\theta = \sin 2\theta$, $\theta \neq n\pi$, $n \in \mathbb{Z}$, if θ equals

A. 45° or 90°

B. 45° or 60°

C. 90° only

D. 45° only

Answer: A



Watch Video Solution

49. The solution of the equation

$\cos^2 x - 2\cos x = 4\sin x - \sin 2x$ ($0 \leq x \leq \pi$), is

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

B. $\pi - \tan^{-1} 2$

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

D. none of these

Answer: C



Watch Video Solution

50. If $\frac{1}{6}\sin \theta, \cos \theta, \tan \theta$ are in GP; then θ is equal to ($n \in \mathbb{Z}$)

(a) $2n\pi \pm \frac{\pi}{3}$ (b) $2n\pi \pm \frac{\pi}{6}$ (c) $n\pi + (-1)^n \frac{\pi}{3}$ (d) $n\pi + \frac{\pi}{3}$

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

B. $2n\pi \pm \frac{\pi}{6}, n \in \mathbb{Z}$

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

D. $n\pi + \frac{\pi}{3}, n \in \mathbb{Z}$

Answer: A



Watch Video Solution

51. Number of solutions of the equation $\sin 2\theta + 2 = 4\sin\theta + \cos\theta$ lying in the interval $[\pi, 5\pi]$ is

A. 0

B. 2

C. 4

D. 5

Answer: C



Watch Video Solution

52. If $\sin 2x$, $\frac{1}{2}$ and $\cos 2x$ are in A.P., then the general values of x are given by

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

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

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

D. $n\pi, n \in Z$

Answer: B



Watch Video Solution

53. The number of points of intersection of the curves $2y = 1$ and $y = \sin x$, $-2\pi \leq x \leq 2\pi$, is

A. 2

B. 3

C. 4

D. 1

Answer: C



Watch Video Solution

54. For $m \neq n$, if $\tan m\theta = \tan n\theta$, then different values of θ are in

A. A.P

B. H.P

C. G.P

D. no particular sequence

Answer: D



Watch Video Solution

55. If $\cos p\theta + \cos q\theta = 0$, then prove that the different values of θ are in A.P. with common difference $2\pi / (p \pm q)$.

- A. $\theta = 2n\pi, n \in Z$
- B. $\theta = \frac{2n\pi}{p \pm q}, n \in Z$
- C. $\theta = \frac{n\pi}{p + q}, n \in Z$
- D. none of these

Answer: B



Watch Video Solution

56. Solutions of the equations $\cos^2\left(\frac{1}{2}px\right) + \cos^2\left(\frac{1}{2}qx\right) = 1$ form an arithmetic progression with common difference

- A. $\frac{2}{p + q}$
- B. $\frac{2}{p - q}$
- C. $\frac{\pi}{p + q}$

D. none of these

Answer: D



Watch Video Solution

57. Solve $\sec \theta - 1 = (\sqrt{2} - 1)\tan \theta$.

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

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

C. $2n\pi, n \in Z$

D. none of these

Answer: B



Watch Video Solution

58. If $\sec^2 \theta = \sqrt{2}(1 - \tan^2 \theta)$, then $\theta =$

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

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

C. $n\pi \pm \frac{\pi}{8}$, $n \in \mathbb{Z}$

D. none of these

Answer: C



Watch Video Solution

59. The most general solution of the equation

$$8\tan^2 \frac{\theta}{2} = 1 + \sec \theta, \text{ is}$$

A. $\theta = 2n\pi \pm \cos^{-1}\left(\frac{1}{3}\right)$

B. $\theta = 2n\pi \pm \frac{\pi}{6}$

C. $\theta = 2n\pi \pm \cos^{-1}\left(\frac{-1}{3}\right)$

D. none of these

Answer: A



Watch Video Solution

60. Solve $\sin 2x + \cos 4x = 2$.

- A. 0
- B. 1
- C. 2
- D. infinite

Answer: A



Watch Video Solution

61. If $2\sec(2\alpha) = \tan\beta + \cot\beta$, then one of the value of $\alpha + \beta$ is

- A. $\frac{\pi}{4}$
- B. $\frac{\pi}{2}$
- C. π

D. none of these

Answer: A



Watch Video Solution

62. Quadratic equation $8\sec^2\theta - 6\sec\theta + 1 = 0$ has

- A. exactly two roots
- B. exactly four roots
- C. infinitely many roots
- D. no roots

Answer: D



Watch Video Solution

63. The equation $\sin x + \sin y + \sin z = -3$ for $0 \leq x \leq 2\pi$,

$0 \leq y \leq 2\pi$, $0 \leq z \leq 2\pi$, has

- A. one solution
- B. two sets of solution
- C. four sets of solution
- D. no solution

Answer: A



Watch Video Solution

64. The solution set of $(5 + 4\cos\theta)(2\cos\theta + 1) = 0$ in the interval $[0, 2\pi]$

- A. $\{\pi/3, 2\pi/3\}$
- B. $\{\pi/3, \pi\}$
- C. $\{2\pi/3, 4\pi/3\}$
- D. $\{2\pi/3, 5\pi/3\}$

Answer: C



Watch Video Solution

65. The solution of the equation $1 - \cos\theta = \sin\theta\sin\frac{\theta}{2}$ is

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

B. $2n\pi, n \in Z$

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

D. none of these

Answer: B



Watch Video Solution

66. $\{x \in R : \cos 2x + 2\cos^2 x = 2\}$ is equal to

A. $\left\{2n\pi + \frac{\pi}{3} : n \in Z\right\}$

B. $\left\{ n\pi \pm \frac{\pi}{6} : n \in Z \right\}$

C. $\left\{ n\pi + \frac{\pi}{3} : n \in Z \right\}$

D. $\left\{ 2n\pi - \frac{\pi}{3} : n \in Z \right\}$

Answer: B



Watch Video Solution

Chapter Test

1. If $|k| = 5$ and $0^\circ \leq \theta \leq 360^\circ$, then the number of different solution of $3\cos\theta + 4\sin\theta = k$ is

A. zero

B. two

C. one

D. infinite

Answer: B



Watch Video Solution

2. The number of all the 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) 3 (d) infinite

A. zero

B. 1

C. 2

D. infinite

Answer: D



Watch Video Solution

3. The number of all possible 5-tuples $(a_1, a_2, a_3, a_4, a_5)$ such that $a_1 + a_2 \sin x + a_3 \cos x + a_4 \sin 2x + a_5 \cos 2x = 0$ hold for all x is

A. zero

B. 1

C. 2

D. infinite

Answer: B



Watch Video Solution

4. General solution of the equation,

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

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

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

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

D. none of these

Answer: A



Watch Video Solution

5. The values of x satisfying the system of equation

$2^{\sin x - \cos y} = 1, 16^{\sin^2 x + \cos^2 y} = 4$ are given by

- A. $x = n\pi + (-1)^n \frac{\pi}{6}$ and $y = 2n\pi \pm \frac{\pi}{3}, n \in Z$
- B. $x = n\pi + (-1)^{n+1} \frac{\pi}{6}$ and $y = 2n\pi \pm \frac{2\pi}{3}, n \in Z$
- C. $x = n\pi + (-1)^n \frac{\pi}{6}$ and $y = 2n\pi \pm \frac{2\pi}{3}, n \in Z$
- D. $x = n\pi + (-1)^{n+1} \frac{\pi}{6}$ and $y = 2n\pi \pm \frac{\pi}{3}, n \in Z$

Answer: A::C



Watch Video Solution

6. The general solution of the equation $\tan 3x = \tan 5x$, is

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

C. $x = (2n + 1)\pi$, $n \in \mathbb{Z}$

D. none of these

Answer: A



Watch Video Solution

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

A. 0

B. 1

C. infinite

D. none of these

Answer: A



Watch Video Solution

8. If the expression $\frac{\left[s \in \left(\frac{x}{2}\right) + \cos\left(\frac{x}{2}\right) - i\tan(x)\right]}{\left[1 + 2is \in \left(\frac{x}{2}\right)\right]}$ is real, then the

set of all possible values of x is.....

- A. $2n\pi + 2\tan^{-1}k, k \in R, n \in Z$
- B. $2n\pi + 2\tan^{-1}k, \text{ where } k \in (0, 1), n \in Z$
- C. $2n\pi + 2\tan^{-1}k, \text{ where } k \in (1, 2), n \in Z$
- D. $2n\pi + 2\tan^{-1}k, k \in (2, 3), n \in Z$

Answer: C



Watch Video Solution

9. Show that the equation , $\sec\theta + \operatorname{cosec}\theta = c$ has two roots between 0 and 2π , if $c^2 < 8$ and four root if $c^2 > 8$.

- A. $c^2 < 8$
- B. $c^2 > 8$

C. $c^2 = 8$

D. none of these

Answer: A



Watch Video Solution

10. Show that the equation , $\sec \theta + \operatorname{cosec} \theta = c$ has two roots between 0 and 2π , if $c^2 < 8$ and four root if $c^2 > 8$.

A. $c^2 < 8$

B. $c^2 \geq 8$

C. $c^2 = 8$

D. none of these

Answer: B



Watch Video Solution

11. If $\theta_1, \theta_2, \theta_3, \theta_4$ are roots of the equation $\sin(\theta + \alpha) = k\sin 2\theta$ no two of which differ by a multiple of 2π , then $\theta_1 + \theta_2 + \theta_3 + \theta_4$ is equal to

- A. $2n\pi, n \in \mathbb{Z}$
- B. $(2n + 1)\pi, n \in \mathbb{Z}$
- C. $n\pi, n \in \mathbb{Z}$
- D. none of these

Answer: B



Watch Video Solution

12. If $\sin(\pi \cos \theta) = \cos(\pi \sin \theta)$, then the value of $\cos\left(\theta \pm \frac{\pi}{4}\right)$ is

- A. $\cos \frac{\pi}{4}$
- B. $\frac{1}{2} \cos \frac{\pi}{4}$
- C. $\cos \frac{\pi}{8}$
- D. none of these

Answer: B



Watch Video Solution

13. If $\tan(\pi \cos \theta) = \cot(\pi \sin \theta)$, then $\cos^2(\theta - \pi/4)$ is equal to

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

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

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

D. none of these

Answer: C



Watch Video Solution

14. The general solution of $\tan\left(\frac{\pi}{2}\sin\theta\right) = \cot\left(\frac{\pi}{2}\cos\theta\right)$, is

A. $\theta = 2r\pi + \frac{\pi}{2}$

B. $\theta = 2r\pi$

C. $\theta = 2r\pi + \frac{\pi}{2}$ and $\theta = 2r\pi$

D. none of these

Answer: C



Watch Video Solution

15. The most general value of θ which satisfy both the equation

$\cos \theta = -\frac{1}{\sqrt{2}}$ and $\tan \theta = 1$, is

A. $2n\pi + \frac{5\pi}{4}, n \in Z$

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

C. $2n\pi + \frac{3\pi}{4}, n \in Z$

D. none of these

Answer: A



Watch Video Solution

16. The number of solutions of the $x + 2 \tan x = \frac{\pi}{2}$ in $[0, 2\pi]$ is

- A. 1
- B. 2
- C. 3
- D. infinite

Answer: C



Watch Video Solution

17. If $\sin(\pi \cot \theta) = \cos(\pi \tan \theta)$, then $\operatorname{cosec} 2\theta$ is equal to

- A. $n - \frac{1}{2}$
- B. $n + \frac{1}{4}$
- C. $4n+1$
- D. $4n-1$

Answer: B



Watch Video Solution

18. The number of distinct roots of the equation

$A\sin^3 x + B\cos^3 x + C = 0$ no two of which differ by 2π , is

A. 3

B. 4

C. infinite

D. 6

Answer: D



Watch Video Solution

19. Values of x between 0 and 2π which satisfy the equation

$\sin x \sqrt{8 \cos^2 x} = 1$ are in A.P. whose common difference is :

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

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

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

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

Answer: A



Watch Video Solution

20. If $\cos 20^0 = k$ and $\cos x = 2k^2 - 1$, then the possible values of x between 0^0 and 360^0 are

A. 140°

B. 40° and 140°

C. 40° and 320°

D. 50° and 130°

Answer: C



Watch Video Solution

21. The general solution of the trigonometric equation $\sin x + \cos x = 1$ is given by

A. $x = 2n\pi$

B. $x = 2n\pi + \frac{\pi}{2}$

C. $x = n\pi + (-1)^n \frac{\pi}{4} - \frac{\pi}{4}$

D. none of these

Answer: C



Watch Video Solution

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

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

B. $\theta = n\pi$

C. $\theta = n\pi + (-1)^{n+1} \frac{\pi}{3}$

D. $\theta = \frac{n\pi}{2}$

Answer: B



Watch Video Solution

23.

If

$$X = x \cos \theta - y \sin \theta, Y = x \sin \theta + y \cos \theta \text{ and } X^2 + 4XY + Y^2 = Ax^2 -$$

, then :

(where A and B are constants)

A. $\theta = \frac{\pi}{6}, A = 3, B = 1$

B. $\theta = \frac{\pi}{4}, A = 3, B = 1$

C. $A = 3, B = -1, \theta = \frac{\pi}{4}$

D. $A = -3, B = 1, \theta = \frac{\pi}{4}$

Answer: C



Watch Video Solution

24. The equation $3^{\sin 2x + 2 \cos^2 x} + 3^{1 - \sin 2x + 2 \sin^2 x} = 28$ is satisfied for the values of x given by :

A. $\cos x = 0, \tan x = -1$

B. $\tan x = -1, \cos x = 1$

C. $\tan x = 1, \cos x = 0$

D. none of these

Answer: A



Watch Video Solution

25. The value of x , $0 \leq x \leq \frac{\pi}{2}$ which satisfy the equation $81^{\sin^2 x} + 81^{\cos^2 x} = 30$ are

A. $\frac{\pi}{6}, \frac{\pi}{3}$

- B. $\frac{\pi}{3}, \frac{5\pi}{2}$
- C. $\frac{5\pi}{6}, \frac{\pi}{6}$
- D. $\frac{2\pi}{3}, \frac{\pi}{3}$

Answer: A



Watch Video Solution

26. The smallest positive values of x and y which satisfy $\tan(x - y) = 1$, $\sec(x + y) = \frac{2}{\sqrt{3}}$, are

A. $x = \frac{25\pi}{24}, y = \frac{19\pi}{24}$

B. $x = \frac{7\pi}{24}, y = \frac{37\pi}{24}$

C. $x = \frac{\pi}{4}, y = \frac{\pi}{2}$

D. $x = \frac{\pi}{3}, y = \frac{7\pi}{12}$

Answer: A



Watch Video Solution

27. The solution set of the inequality $\cos^2 \theta < \frac{1}{2}$, is

A. $\left\{ \theta : (8n+1)\frac{\pi}{4} < \theta < (8n+3)\frac{\pi}{4}, n \in \mathbb{Z} \right\}$

B. $\left\{ \theta : (8n-3)\frac{\pi}{4} < \theta < (8n-1)\frac{\pi}{4}, n \in \mathbb{Z} \right\}$

C. $\left\{ \theta : (4n+1)\frac{\pi}{4} < \theta < (4n+3)\frac{\pi}{4}, n \in \mathbb{Z} \right\}$

D. none of these

Answer: A,B



Watch Video Solution

28. The equation $\sin^4 x + \cos^4 x + \sin 2x + \alpha = 0$ is solvable for

(a) $-\frac{5}{2} \leq \alpha \leq \frac{1}{2}$ (b) $-3 \leq \alpha < 1$ (c) $-\frac{3}{2} \leq \alpha \leq \frac{1}{2}$ (d) $-1 \leq \alpha \leq 1$

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

B. $-3 \leq \alpha \leq 1$

C. $-\frac{3}{2} \leq \alpha \leq \frac{1}{2}$

D. $-1 \leq \alpha \leq 1$

Answer: C



Watch Video Solution

29. The equation $\sin^4 x - 2\cos^2 x + a^2 = 0$ is solvable if

A. $-\sqrt{3} \leq a \leq \sqrt{3}$

B. $-\sqrt{2} \leq a \leq \sqrt{2}$

C. $-1 \leq a \leq 1$

D. none of these

Answer: B



Watch Video Solution

30. The number of points in interval $\left[-\frac{\pi}{2}, \frac{\pi}{2} \right]$, where the graphs of the curves $y = \cos x$ and $y = \sin 3x$, $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$ intersects is

- A. $\left(\frac{\pi}{4}, \frac{1}{\sqrt{2}} \right)$ and $\left(\frac{\pi}{8}, \cos \frac{\pi}{8} \right)$
- B. $\left(\frac{-\pi}{4}, \frac{1}{\sqrt{2}} \right)$ and $\left(\frac{-\pi}{8}, \cos \frac{\pi}{8} \right)$
- C. $\left(\frac{\pi}{4}, \frac{-1}{\sqrt{2}} \right)$ and $\left(\frac{-\pi}{8}, -\cos \frac{\pi}{8} \right)$
- D. $\left(\frac{-\pi}{4}, \frac{1}{\sqrt{2}} \right)$

Answer: A



[Watch Video Solution](#)

31. If $\frac{1}{6}\sin x, \cos x, \tan x$ are in G.P. then $x =$,

- 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: B



Watch Video Solution

32. Find the minimum value of $2^{\sin x} + 2^{\cos x}$

A. 1

B. 2

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

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

Answer: D



Watch Video Solution

33. From the identity $\sin 3x = 3\sin x - 4\sin^3 x$ it follows that if x is real and $|x| < 1$, then

- A. $(3x - 4x^3) < 1$
- B. $(3x - 4x^3) \leq 1$
- C. $(3x - 4x^3) < -1$
- D. none of these

Answer: B



Watch Video Solution

34. Find the most general solution of

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

- A. $x = n\pi \pm \frac{\pi}{3}, n \in Z$
- B. $x = 2n\pi \pm \frac{\pi}{3}, n \in Z$
- C. $x = 2n\pi + \frac{2\pi}{3}, n \in Z$

D. none of these

Answer: A



Watch Video Solution

35. Let α, β be any two positive values of x for which $2\cos x, |\cos x|$ and $1 - 3\cos^2 x$ are in G.P. The minimum value of $|\alpha - \beta|$, is

A. $\pi/3$

B. $\pi/4$

C. $\pi/2$

D. none of these

Answer: D



Watch Video Solution

36. If $\max \{5 \sin \theta + 3 \sin(\theta - \alpha)\} = 7$, then the set of possible value of α is $\theta \in R$

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

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

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

D. none of these

Answer: A



Watch Video Solution

37. The most general value of θ for which

$\sin \theta - \cos \theta = \min_{x \in R} [1, x^2 - 4x + 6]$ are given by

A. $\theta = n\pi + (-1)^n \frac{\pi}{4} - \frac{\pi}{4}, n \in Z$

B. $\theta = n\pi + (-1)^n \frac{\pi}{4} + \frac{\pi}{4}, n \in Z$

C. $\theta = 2n\pi + \frac{\pi}{4}, n \in Z$

D. none of these

Answer: B



Watch Video Solution

38. The number of points of intersection of two curves

$$y = 2 \sin x \text{ and } y = 5x^2 + 2x + 3 \text{ is}$$

- a. 0 b. 1 c. 2 d. ∞

A. 0

B. 1

C. 2

D. ∞

Answer: A



Watch Video Solution

39. Let $2\sin^2 x + 3\sin x - 2 > 0$ and $x^2 - x - 2 < 0$ (x is measured in radian) . Then 'x' lies in the internal .

A. $(\pi/6, 5\pi/6)$

B. $(-1, 5\pi/6)$

C. $(-1, 2)$

D. $(\pi/6, 2)$

Answer: D



Watch Video Solution

40. The largest positive solution of

$$1 + \sin^4 x = \cos^2 3x \text{ in } [-5\pi/2, 5\pi/2], \text{ is}$$

A. π

B. 2π

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

D. none of these

Answer: B



Watch Video Solution

41. The set of values of x in $(-\pi, \pi)$ satisfying the inequation

$$|4\sin x - 1| < \sqrt{5}, \text{ is}$$

A. $(-\pi/10, 3\pi/10)$

B. $(-\pi/10, \pi)$

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

D. $(-\pi, 3\pi/10)$

Answer: A



Watch Video Solution

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

- A. 6
- B. 8
- C. 10
- D. none of these

Answer: A



Watch Video Solution

43. If $r \sin\theta = 3$, $r = 4(1 + \sin\theta)$ where $0 \leq \theta \leq 2\pi$ then θ equal to

- A. 0
- B. 2
- C. 4
- D. none of these

Answer: B



Watch Video Solution

44. The solution set of the inequation

$\log_{1/2} \sin x > \log_{1/2} \cos x$ in $[0, 2\pi]$, is

A. $(0, \pi/2)$

B. $(-\pi/4, \pi/4)$

C. $(0, \pi/4)$

D. none of these

Answer: C



Watch Video Solution

45. If the equation $\sin\theta(\sin\theta + 2\cos\theta) = a$ has a real solution, then the shortest interval containing 'a', is

- A. $\left[\frac{1 - \sqrt{5}}{2}, \frac{1 + \sqrt{5}}{2} \right]$
- B. $\left(\frac{\sqrt{5} - 1}{2}, \frac{\sqrt{5} + 1}{2} \right)$
- C. $(-1/2, 1/2)$

D. none of these

Answer: A



Watch Video Solution

46. The equation $\sin^4\theta + \cos^4\theta = a$ has a real solution if

A. $a \in [1/2, 1]$

B. $a \in [1/4, 1/2]$

C. $a \in [1/3, 1]$

D. none of these

Answer: A



Watch Video Solution

47.

If

$$32\tan^8\theta = 2\cos^2(\alpha) - 3\cos(\alpha) \quad \text{and} \quad 3\cos(2\theta) = 1, \text{ then } \alpha$$

A. $2n\pi, n \in \mathbb{Z}$

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

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

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

Answer: B



Watch Video Solution

48. The general value of θ satisfying

$$\tan\theta \tan(120^\circ - \theta) \tan(120^\circ + \theta) = \frac{1}{\sqrt{3}}$$

A. $\frac{n\pi}{3} - \frac{\pi}{2}, n \in \mathbb{Z}$

B. $\frac{n\pi}{3} - \frac{\pi}{18}, n \in \mathbb{Z}$

C. $\frac{n\pi}{3} + \frac{\pi}{18}, n \in Z$

D. $\frac{n\pi}{3} + \frac{\pi}{12}, n \in Z$

Answer: C



Watch Video Solution

49. The solution of the equation

$\log_{\cos x} \sin x + \log_{\sin x} \cos x = 2$ is given by

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

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

C. $x = n\pi + \frac{\pi}{8}, n \in Z$

D. $x = 2n\pi + \frac{\pi}{6}, n \in Z$

Answer: A



Watch Video Solution

50. The number of solutions of the equation $\tan x + \sec x = 2 \cos x$ lying in the interval $[0, 2\pi]$ is 0 (b) 1 (c) 2 (d) 3

A. 0

B. 1

C. 2

D. 3

Answer: C



Watch Video Solution

51. One root of the equation $\cos\theta - \theta + \frac{1}{2} = 0$ lies in the interval

A. $(0, \pi/2)$

B. $(-\pi/2, 0)$

C. $(\pi/2, \pi)$

D. $(\pi, 3\pi/2)$

Answer: A



Watch Video Solution

52. If $\sin(\pi\cos\theta) = \cos(\pi\sin\theta)$, then which one fo the following is correct?

A. $\cos\theta = \frac{3}{\sqrt{3}}$

B. $\cos\left(\theta - \frac{\pi}{2}\right) = \frac{1}{\sqrt{2}}$

C. $\cos\left(\theta - \frac{\pi}{4}\right) = \frac{1}{2\sqrt{2}}$

D. $\cos\left(\theta + \frac{\pi}{4}\right) = \frac{1}{2\sqrt{2}}$

Answer: C



Watch Video Solution

53. If $2\sec(2\alpha) = \tan\beta + \cot\beta$, then one of the value of $\alpha + \beta$ is

A. π

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

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

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

Answer: C



Watch Video Solution

54. The values of k for which the equation $\sin^4 x + \cos^4 x + \sin 2x + k = 0$ possess solution

A. $-\frac{3}{2} \leq \alpha \leq 1$

B. $0 \leq \alpha \leq \frac{1}{2}$

C. $-\frac{3}{2} \leq \alpha \leq \frac{1}{2}$

D. none of these

Answer: C



Watch Video Solution

55. $\tan|x| = |\tan x|$, if

- A. $x \in \left(-k\pi, (2k-1)\frac{\pi}{2} \right), k \in Z$
- B. $x \in \left((2k-1)\frac{\pi}{2}, k\pi \right), k \in Z$
- C. $x \in \left(-(2k+1)\frac{\pi}{2}, -k\pi \right) \cup \left(k\pi, (2k+1)\frac{\pi}{2} \right), k \in Z$
- D. none of these

Answer: C



Watch Video Solution

56. The number of solution of the equation $|\sin x| = |\cos 3x|$ in $[-2\pi, 2\pi]$ is

A. 1

B. 2

C. 3

D. 4

Answer: D



Watch Video Solution

57. If $\sin x \cos x \cos 2x = \lambda$ has a solution, then λ lies in the interval

A. $[-1/4, 1/4]$

B. $[-1/2, 1/2]$

C. $(-\infty, -1/4] \cup [1/4, \infty)$

D. $(-\infty, -1/2] \cup [1/2, \infty)$

Answer: A



Watch Video Solution

58. If $\sin 3\theta = 4\sin\theta(\sin^2 x - \sin^2\theta)$, $\theta \neq n\pi$, $n \in Z$. Then, the set of values of x , is

- A. $\left\{ n\pi \pm \frac{\pi}{3} : n \in Z \right\}$
- B. $\left\{ n\pi \pm \frac{2\pi}{3} : n \in Z \right\}$
- C. $\left\{ n\pi \pm \frac{\pi}{2} : n \in Z \right\}$
- D. $\left\{ n\pi \pm \frac{\pi}{4} : n \in Z \right\}$

Answer: A



Watch Video Solution

59. If $\sin 2x \cos 2x \cos 4x = \lambda$ has a solution then λ lies in the interval

- A. $[-1/2, 1/2]$
- B. $[-1/4, 1/4]$
- C. $[-1/3, 1/3]$
- D. none of these

Answer: B



Watch Video Solution

60. If the equation $\cos(\lambda \sin \theta) = \sin(\lambda \cos \theta)$ has a solution in $[0, 2\pi]$, then the smallest value of λ , is

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

B. $\sqrt{2}\pi$

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

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

Answer: D



Watch Video Solution