MATHS

BOOKS - SAI MATHS (TELUGU ENGLISH)

TRIGONOMETRIC AND INVERSE TRIGONOMETRIC EQUATIONS

Problems

1. The number of solutions of sec x cos 5x + 1 = 0 in the interval $[0, 2\pi]$ is

A. 5

B. 8

C. 10

D. 12

Answer: B

Watch Video Solution

2. If $\cos\left(\cot^{-1}\left(\frac{1}{2}\right)\right) = \cos\left(\cos^{-1} x\right)$ then a vaue of x is

A. $\frac{1}{\sqrt{6}}$

B. $\frac{-1}{\sqrt{12}}$

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

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

Answer: A

View Text Solution

3. If $\tan\theta\tan(120^\circ - \theta)\tan(120^\circ + \theta) = 1/\sqrt{3}$, then $\theta =$

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

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

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

D. $\frac{n\pi}{3} + \frac{\pi}{6}, n \in Z$

Answer: A

Watch Video Solution

4. If

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

and $0 < x < \sqrt{2}$ then x =

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

B. 1

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

D. -1

Answer: B

Watch Video Solution

5. The sum of the solutions in $(0, 2\pi)$ for the equation cosx cos $\left(\frac{\pi}{3} - x\right)\cos\left(\frac{\pi}{3} + x\right) = \frac{1}{4}$ is

A. 4π

B. π

C. 2π

D. 3π

Answer: C

View Text Solution

6. If x > 0 , y > 0 , z > 0 , xy+yz+zx < 1 and if $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \pi$, then x+y+z equals to

A. 0

B. xyz

C. 3xyz

D. $\sqrt{xyz}$

Answer: B

View Text Solution

7. The set of solutions of the system of equations $x + y = \frac{2\pi}{3}$ and cosx + cosy = $\frac{3}{2}$ where x,y are real , is

A. $\left\{(x, y) : \cos\left(\frac{x-y}{2}\right) = \frac{1}{2}\right\}$

B. $\left\{(x, y) : \sin\left(\frac{x-y}{2}\right) = \frac{1}{2}\right\}$

C. $\left\{(x, y) : \cos(x-y) = \frac{1}{2}\right\}$

D. Empty set

Answer: D

View Text Solution

8. If $\cos^{-1}\left(\frac{5}{13}\right)+\cos^{-1}\left(\frac{3}{5}\right)=\cos^{-1}x$, then x is equal to

A. $\frac{3}{65}$

B. $\frac{-36}{65}$

C. $\frac{-33}{65}$

D. -1

Answer: C

View Text Solution

9. If $\tan x+\tan\left(x+\frac{\pi}{3}\right)+\tan\left(x+\frac{2\pi}{3}\right)=3$, then tan 3x is equal to

A. 3

B. 1

C. 2

D. 0

Answer: C

View Text Solution

10. If $\frac{1}{2} \leq x \leq 1$, then $\cos^{-1} x + \cos^{-1}\left(\frac{x}{2} + \frac{1}{2}\sqrt{3 - 3x^2}\right)$ is equal to

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

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

C. π

D. 0

Answer: B

Watch Video Solution

11. The most general value of θ which satisfies both the equations $\tan\theta = -1$ and $\cos\theta = \frac{1}{\sqrt{2}}$ is

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

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

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

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

Answer: B

View Text Solution

12. $\left(\tan^{-1} x\right)^2 + \left(\cot^{-1} x\right)^2 = \frac{5\pi^2}{8} \Rightarrow x =$

A. -1

B. 1

C. 0

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

Answer: A

View Text Solution

13. The set of solutions of the equation, $(\sqrt{3}-1)\sin\theta+(\sqrt{3}+1)\cos\theta=2$ is

A. $\left\{2n\pi\pm\frac{\pi}{4}+\frac{\pi}{12}:n\in Z\right\}$

B. $\left\{2n\pi\pm\frac{\pi}{4}-\frac{\pi}{12}:n\in Z\right\}$

C. $\left\{n\pi+(-1)^n\frac{\pi}{4}+\frac{\pi}{12}:n\in Z\right\}$

D. $\left\{n\pi+(-1)^n\frac{\pi}{4}-\frac{\pi}{12}:n\in Z\right\}$

Answer: A

View Text Solution

14. If $\tan^{-1}x+\tan^{-1}y+\tan^{-1}z=\frac{\pi}{2}$, then 1-xy-yz-zx is equal to

A. 1

B. 0

C. -1

D. 2

Answer: B

View Text Solution

15. If 3 cosx $\neq$ 2 sin x , then the general solution of $\sin^2 x - \cos 2x = 2 - \sin 2x$ is

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

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

C. $(4n \pm 1)\frac{\pi}{2}, n \in Z$

D. $(2n-1)\pi, n \in Z$

Answer: C

View Text Solution

16. $\cos^{-1}\left(\frac{-1}{2}\right) - 2\sin^{-1}\left(\frac{1}{2}\right) + 3\cos^{-1}\left(\frac{-1}{\sqrt{2}}\right) - 4\tan^{-1}(-1)$

equals

A. $\frac{19\pi}{12}$

B. $\frac{35\pi}{12}$

C. $\frac{47\pi}{12}$

D. $\frac{43\pi}{12}$

Answer: D

View Text Solution

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

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

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

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

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

Answer: B

View Text Solution

18. If $\sin^{-1}\left(\frac{3}{x}\right) + \sin^{-1}\left(\frac{4}{x}\right) = \frac{\pi}{2}$, then x is equal to

A. 3

B. 5

C. 7

D. 11

Answer: B

View Text Solution

19. The value of x , where x > 0 and $\tan\left(\sec^{-1}\left(\frac{1}{x}\right)\right) = \sin\left(\tan^{-1}(2)\right)$ is

A. $\sqrt{5}$

B. $\frac{\sqrt{5}}{3}$

C. 1

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

Answer: B

View Text Solution

20. If $\cos 2x = \left(\sqrt{2}+1\right)\left(\cos x - \frac{1}{\sqrt{2}}\right)$, $\cos x \neq \frac{1}{2}$, then x belong to

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

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

C. $\left\{2n\pi \pm \frac{\pi}{2} : n \in I\right\}$

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

Answer: D

View Text Solution

21. $\sin^{-1}\left(\frac{4}{5}\right) + 2\tan^{-1}\left(\frac{1}{3}\right)$ is equal to

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

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

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

D. 0

Answer: C

View Text Solution

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

A. $\{1, 0\}$

B. $\{-1, 1\}$

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

D. $\{2, 0\}$

Answer: C

View Text Solution

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

A. $\left\{\frac{\pi}{3}, \frac{2\pi}{3}\right\}$

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

C. $\left\{\frac{2\pi}{3}, \frac{4\pi}{3}\right\}$

D. $\left\{\frac{2\pi}{3}, \frac{5\pi}{3}\right\}$

Answer: C

View Text Solution

24. $\cos\left[\cos^{-1}\left(-\frac{1}{7}\right)+\sin^{-1}\left(-\frac{1}{7}\right)\right]$ is equal to

A. $-\frac{1}{3}$

B. 0

C. $\frac{1}{3}$

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

Answer: B

View Text Solution

25. If $\sin^{-1}(x)-\cos^{-1}(x)=\frac{\pi}{6}$, then x is equal to

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

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

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

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

Answer: B

View Text Solution

26. The equation $\sqrt{3}\sin x + \cos x = 4$, has

A. Only one solution

B. Two solutions

C. Infinitely many solutions

D. No solution

Answer: D

View Text Solution

27. $\sec^2\left(\tan^{-1}(2)\right) + \text{cosec}^2\left(\cos^{-1}(3)\right)$ is equal to

A. 3

B. 10

C. 15

D. 20

Answer: C

View Text Solution