

Topics : Inverse Trigonometric Function, Matrices & Determinants, Fundamentals of Mathematics, Trigonometric Ratio, Function, Quadratic Equation

Type of Questions

Single choice Objective (no negative marking) Q.1,2,3,4,5,6 (3 marks, 3 min.)

Subjective Questions (no negative marking) Q.7,8 (4 marks, 5 min.)

M.M., Min.

[18, 18]

[8, 10]

- The set of values of a for which $x^2 + ax + \sin^{-1}(x^2 - 4x + 5) + \cos^{-1}(x^2 - 4x + 5) = 0$ has at least one solution is
 (A) $(-\infty, -\sqrt{2\pi}] \cup [\sqrt{2\pi}, \infty]$ (B) $(-\infty, -\sqrt{2\pi}) \cup (\sqrt{2\pi}, \infty)$
 (C) $\mathbb{R}$ (D) none of these
- If A is a square matrix of order 3 such that $|A| = 2$, then $|\text{adj } A^{-1}|$ is :
 (A) 2 (B) 4 (C) $\frac{1}{2}$ (D) $\frac{1}{4}$
- If $A = \begin{bmatrix} \alpha^2 & \alpha \\ \beta^2 & \beta \end{bmatrix}$, $B = \begin{bmatrix} 6 \\ -5 \end{bmatrix}$, $C = \begin{bmatrix} -1 \\ -1 \end{bmatrix}$ are such that $AB = C$, then absolute value of $|A|$ is
 (A) $\frac{1}{6}$ (B) -30 (C) $\frac{2}{27}$ (D) $\frac{1}{36}$
- If $\sin^2 x + \sin x = 1$, then $\cos^{12} x + 3 \cos^{10} x + 3 \cos^8 x + \cos^6 x - 1$ is equal to
 (A) 1 (B) 0 (C) -1 (D) none of these
- Domain of the function $f(x) = \log(\sin^{-1} \sqrt{x^2 + 3x + 2})$ is
 (A) $(-\infty, -2) \cup (-1, \infty)$ (B) $\left(-\frac{3-\sqrt{5}}{2}, \frac{-3+\sqrt{5}}{2}\right)$
 (C) $\left[\frac{-3-\sqrt{5}}{2}, -2\right) \cup \left(-1, \frac{-3+\sqrt{5}}{2}\right]$ (D) none of these
- If $\tan \alpha$, $\tan \beta$, $\tan \gamma$ are the roots of the equation $x^3 - px^2 - r = 0$, then the value of $(1 + \tan^2 \alpha)(1 + \tan^2 \beta)(1 + \tan^2 \gamma)$ is equal to
 (A) $(p - r)^2$ (B) $1 + (p - r)^2$ (C) $1 - (p - r)^2$ (D) none of these
- Find the domain of the following
 (i) $f(x) = \sqrt{x + \sqrt{x-1}}$ (ii) $f(x) = \frac{\sqrt{\sin x}}{1 + \sec^2 x}$
 (iii) $f(x) = \log_2 \log_{|x+1|}(\sqrt{x-3})$ (iv) $f(x) = \sin^{-1}(x^2 - x - 1) + \tan^{-1}(x^2 - 5x + 6) + \log_{x-2}|x^2 - 9|$
- (i) Find the largest integral value of x which satisfies the inequality $\frac{4x+19}{x+5} < \frac{4x-17}{x-3}$.
 (ii) Solve for x : $\sqrt{\frac{x-2}{1-2x}} > -1$

Answers Key

1. (D) 2. (D) 3. (D) 4. (B)

5. (C) 6. (B)

7. (i) $[1, \infty)$

(ii) $x \in [2n\pi, 2n\pi + \pi] - (2n + 1) \frac{\pi}{2}, n \in \mathbb{I}$

(iii) $(4, \infty)$ (iv) ϕ

8. (i) $x = 2$ (ii) $(1/2, 2]$