

JEE-Main-08-04-2024 (Memory Based)
[MORNING SHIFT]

Maths

Question: Find the range of $\frac{\sin^4\theta + 3\cos^2\theta}{\sin^4\theta + \cos^2\theta}$
Answer: [1, 3]

Question: $A = \begin{bmatrix} 2 & a & 0 \\ 1 & 3 & 1 \\ 0 & 5 & b \end{bmatrix}$, $A^2 = 4A^2 - A - 21I$ Find $2a + 3b =$
Options:

- (a) -10
- (b) 10
- (c) -13
- (d) 13

Answer: (c)

Question: $\lim_{x \rightarrow 0} 2 \left[\frac{1 - \cos x \sqrt{\cos 2x} \cdot \sqrt[3]{\cos 3x} \dots 10 \sqrt{\cos 10x}}{x^2} \right]$
Options:

- (a) 55
- (b) 65
- (c) 56
- (d) 66

Answer: (a)

Question: $\sin \theta = -\frac{3}{5}$ and $\theta \in \left[\pi, \frac{3\pi}{2} \right]$ then find $80 (\tan^2 \theta - \cos \theta)$

Answer: (109)

Question: If $I_n = \int_0^1 (1 - x^k)^n dx$ and if $147I_{20} = 148I_{21}$, find k.
Options:

- (a) 4
- (b) 5
- (c) 6
- (d) 7

Answer: (d)

Question: $\int \frac{6}{\sin^2 x (1 - \cot x)^2} dx$

Question: Find sum of solutions of the equation $8^{2a} - 16 \cdot 8^a + 48 = 0$

Question: $A = \begin{bmatrix} 2 & -1 \\ 1 & 1 \end{bmatrix}$, Sum of diagonal elements of $A^{13} = 3^n$ find n =
Options:

- (a) 7

- (b) 8
- (c) 9
- (d) 10

Answer: (7)

Question:

In a hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$, eccentricity is $\sqrt{3}$ Length of Latus rectum is $4\sqrt{3}$, If $(\alpha, 6)$ Lies

on hyperbola. Product of focal distance from $(\alpha, 6)$ is β , then $\alpha^2 + \beta =$

Options:

- (a) 170
- (b) 171
- (c) 172
- (d) 173

Answer: (b)

Question: $f(x) = 4\cos^3 x + 3\sqrt{3}\cos^2 x - 1$ then find the local maxima at point $[0, 2\pi]$

Question: Let $f(x) = \cos x - x + 1$, $x \in [0, \pi]$. Let M and m be the maximum and minimum values find $(M-m)$

Options:

- (a) π
- (b) $\pi + 1$
- (c) $\pi + 2$
- (d) 2π

Answer: (c)

Question: Let z be a complex number then $|z + 2| = 1$ and

imaginary part of $\frac{z+1}{z+2} = \frac{1}{6}$ then find the value of real part of $z + 2$

Question: $\vec{r}_1 = (5 + \mu)i + (1 - 3\mu)j + (1 + 2\mu)k$
 $\vec{r}_2 = (2 + \lambda)i + (3 - 3\lambda)j + (3 + 4\lambda)k$ SD = ?

Question: Find 3 digit numbers using digits 0,2,4,6 and 7 without repetition and the number cannot be divisible by 3 is ?

Options:

- (a) 20
- (b) 24
- (c) 28
- (d) 30

Answer: (c)