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

Maths

Question: In a triangle ABC, side AB has 5 points P_1, P_2,.....P_5 excluding a dnd b, 6 points on side BC and 7 points on side AC then total number of triangle that can be formed without using the points A,B,C

Options:

(a)

(b)

(c)

(d)

Answer: ()

Question: $f(x)\begin{Bmatrix} -2 & x \in (-2,0) \\ x-2 & x \in (0,2) \end{Bmatrix}$ h(x) = f(|x|) + |f(x)|. Find value $\int_{-2}^{2} h(x)dx$

Question: $(\bar{z})^2 + |z| = 0$ Sum of the non zero solutions is α and product is β. Find $4(\alpha^2+\beta^2)$ = ?

Question: Find the number of rational numbers in the expansion of $\left(2^{\frac{1}{5}} + 5^{\frac{1}{3}}\right)^{15}$.

Question: $f(x)\begin{bmatrix} \frac{1-\cos 2x}{x^2} & x<0 \\ \propto & x=0 \\ \frac{\beta\sqrt{1-\cos x}}{x} & x>0 \end{bmatrix}$ Continuous at x = 0, find $\alpha^2 + \beta^2$

Question: Urns A,B,C with 5 red ,7 black; 5 black, 7 red; and 6 red, 6 black respectively. A ball is drawn randomly and is found to be black. Then probability of Black ball drawn from A is

Question: If 2 and 6 are the roots of the equation $ax^2 + bx + 1 = 0$ have roots 2 and 6. Find quadratic whose roots are $\frac{1}{2a+b}$ and $\frac{1}{6a+b}$ is

Options:

(a) $4x^2 + 14x + 12 = 0$

(b) $2x^2 + 11x + 12 = 0$

(c) $x^2 + 10x + 16 = 0$

(d) $x^2 + 8x + 12 = 0$

Answer: ()

Question: $f(x) = \frac{2x^2-3x+8}{2x^2+3x+8}$ if GCD(m.n) = 1 and $\frac{f_{\min}}{f_{\max}} = \frac{m}{n}$ Find (m+n)

Question: $f(x) = x^5 + 2e^{\frac{x}{4}}$ if gof(x) = x for all x, find 8g'(2).

Question: A square is inscribed in the circle $x^2 + y^2 - 10x - 6y + 30 = 0$. One side of this square is parallel to y = x + 3. If $(x_1. y_1)$ are the vertices of the Square, then

$\sum(\mathbf{x}_i^2 + y_i^2)$ is equal to:

Options:

(a) 148

(b) 156

(c) 152

(d) 160

Answer: ()

Question: Let $\alpha, \beta \in R$. Let the mean and the variance of 6 observations -3, 4, 7, -6 α, β be 2 and 23 respectively. The mean deviation about the means of these 6 observations is

Options:

(a) $\frac{11}{3}$

(b) $\frac{16}{3}$

(c) $\frac{13}{3}$

(d) $\frac{14}{3}$

Answer: ()

Question: If the domain of the function $\sin^{-1}\left(\frac{3x-22}{2x-19}\right) + \log\left(\frac{3x^2-8x+5}{x^2-3x-10}\right)$ is $[\alpha, \beta]$ then $3\alpha + 10\beta$ is equal to

Options:

(a) 100

(b) 95

(c) 97

(d) 98

Answer: ()

Question: Find $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\sin^2 x}{1+2^x}\, dx$

Question: The coefficient of x^7 in $(1 - x - x^2 + x^3)^6$

Question: If the length of focal chord of $y^2 = 12x$ is 15 and if the distance of the focal chord from origin is p then $10p^2$ is equal to

Question: If $\lim_{x\to 1} \frac{(5x+1)^{\frac{1}{3}}-(x+5)^{\frac{1}{3}}}{(2x+3)^{\frac{1}{2}}-(x+4)^{\frac{1}{2}}} - \frac{m\sqrt{5}}{n(2n)^{\frac{2}{3}}}$ where gcd(m, n) = 1 then 8m + 12n is equal to

Question: Let a unit vector which makes an angle 60° with $2\hat{i} + 2\hat{j} - \hat{k}$ and an angle of 45° with $\hat{i} - \hat{k}$ be $\vec{c}$.Then $\vec{c} + \left(-\frac{1}{2}\hat{i} + \frac{1}{3\sqrt{2}}\hat{i} - \frac{\sqrt{2}}{3}\hat{k}\right]$

Options:

(a)

$\frac{\sqrt{2}}{3}\hat{i} - \frac{1}{2}\hat{k}$

(b)

$\frac{\sqrt{2}}{3}\hat{i} + \frac{1}{3\sqrt{2}}\hat{j} - \frac{1}{2}\hat{k}$

(c)

$-\frac{c_2}{3}\hat{i} + \frac{\sqrt{2}}{3}\hat{j} + \left(\frac{1}{2} + \frac{2\sqrt{2}}{3}\right)\hat{k}$

(d)
$\left(\frac{1}{\sqrt{3}} + \frac{1}{2}\right)\hat{i} + \left(\frac{1}{\sqrt{3}} - \frac{1}{3\sqrt{2}}\right)\hat{j} + \left(\frac{1}{\sqrt{3}} + \frac{\sqrt{2}}{3}\right]\hat{k}$

Question: In a G.P., $T_1 = 2$, $T_2 = P$, $T_3 = Q$. These are also terms of an A.P. (7^{th}, 8^{th}, & 13^{th} terms). If 5th term of G.P. = n^{th} term of A.P., then find n.