PAPER SOLUTION

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Aryan Agarwal

Founder and CEO

CVPS INTEGRATED STAR COURSE

#Q. Let $|z_i| = 1 \forall i = 1, 2, 3$ satisfying $|\overline{z_1} z_2 + \overline{z_2} z_3 + \overline{z_3} z_1|^2 = a + b\sqrt{2}$, where a, b are rational numbers such that $arg(z_1) = \frac{\pi}{4}, arg\,(z_2) = 0\; and\; arg(z_3) = -\frac{\pi}{4}$, then ordered pair (a, b) is

A (5, 2)

B (-5,-2)

C (5, -2)

D (-5, 2)

Ans. (C)

#Q. Let $g(x) = 3f\left(\frac{x}{3}\right) + f(3-x) \forall x \in (0.3)\ and\ f''(x) > 0 \forall x \in (0,3)$, then g(x) decreases in interval $(0, \alpha)$ then α is

(A) $\frac{7}{4}$

(B) $\frac{2}{3}$

(C) $\frac{9}{4}$

(D) $\frac{7}{3}$

Ans. (C)

#Q. Let $\vec{b} = \lambda\hat{i} + 4\hat{k}, \lambda > 0$ and the projection vector of $\vec{b}$ on $\vec{a} = 2\hat{i} + 2\hat{j} - \hat{k}$ is $\vec{c}$. If $|\vec{a} + \vec{c}| = 7$, then the area of the parallelogram formed by vectors $\vec{b}$ and $\vec{c}$ is (in square units)

A 8

B 16

C 32

D 64

Ans. (C)

#Q. Let the parabola $y = x^2 + Px - 3$ cuts the coordinate axes at P, Q and R. A circle with centre $(-1, -1)$ passes through P, Q and R, then the area of triangle PQR is (in square units)

A. $\frac{5}{2}$

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

C. 6

D. 5

Ans. (C)

#Q. If the circle $\left(x-2\sqrt{3}\right)^2+y^2=12$ and parabola $y^2=2\sqrt{3}$x intersects at P, Q and R. Then the area of triangle PQR is

(A) 10 sq. units

(B) 12 sq. units

(C) 14 sq. units

(D) 16 sq. units

Ans. (B)

#Q. If $8 = 3 + \frac{1}{4}(3 + p) + \frac{1}{4^2}\left(3 + p^2\right) + \cdots \infty$ then the value of p is

(A) $\frac{16}{5}$

(B)

(C)

(D)

Ans. (A)

#Q. The shortest distance between the lines $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-1}{4}$ and $\frac{x+2}{7}=\frac{y-2}{8}=\frac{z+1}{2}$

(A) $\frac{78}{\sqrt{1277}}$

(B) $\frac{88}{\sqrt{1277}}$

(C) $\frac{85}{\sqrt{1277}}$

(D) $\frac{66}{\sqrt{1277}}$

Ans. (B)

#Q. Let f(x) be a real differentiable function such that f(0)=1 and f(x + y) = f(x)f' (y) + f(y)f'(x) for all $x, y \in R$. Then $\sum_{n=1}^{100} log_e\ f(n) =$

(A) 2525

(B) 5050

(C) 2500

(D) 10100

Ans. (A)

#Q. If $f(x) = 16\left(sec^{-1}x\right)^2 + \left(cosec^{-1}x\right)^2$. Then the maximum and minimum value of f(x) is respectively

(A) $\frac{1001\pi^2}{33}$ and $\frac{2\pi^2}{9}$

(B) $\frac{1105\pi^2}{68}$ and $\frac{4\pi^2}{17}$

(C) $\frac{1117\pi^2}{59}$ and $\frac{6\pi^2}{19}$

(D) $\frac{1268\pi^2}{27}$ and $\frac{3\pi^2}{16}$

Ans. (B)

#Q. If $\frac{dx}{dy}+\frac{x}{y^2}=\frac{1}{y^3}$ and x(1) = 1. Then x $\left(\frac{1}{2}\right)$ is equal to

A $2-e$

B $3-e$

C $5-e$

D $7-e$

Ans. (B)

#Q. Coefficient of x^{2012} in the expansion of $(1-x)^{2008}\left(1+x+x^2\right)^{2007}$

(A) 0

(B) 1

(C) 2

(D) 3

Ans. (A)

#Q. If $A = \{1, 2, 3, \ldots, 10\}$ and B $= \left\{\frac{m}{n}, m,\ n \in A, m < n \text{ and gcd of } (m, n) = 1\right\}$. Then number of elements in set B is

(A) 30

(B) 31

(C) 28

(D) 29

Ans. (B)

#Q. A 5 Letter word is to be made using any 5 distinct alphabets such that middle alphabet is M and Letter Should be in increasing order.

(A) 5148

(B) 5138

(C) 5128

(D) 5158

Ans. (A)

#Q. $S_n = \sum_{r=1}^{n} T_r = \frac{(2n-1)(2n+1)(2n+3)(2n+5)}{64}$ $find$ $\sum_{r=1}^{\infty} \frac{1}{T_r} =$

(A) $\frac{2}{3}$

(B)

(C)

(D)

Ans. (A)

#Q. In a bag there are 6 white and 4 black balls two balls are drawn at random without replacement then the probability that both ball are white is

A $\frac{1}{2}$

B $\frac{1}{3}$

C $\frac{2}{3}$

D $\frac{1}{4}$

Ans. (B)

#Q. If A be a 3×3 square matrix such that det (A)= –2. If det $\left(3\,adj\left(-6\,adj(3A)\right)\right) = 2^n \times 3^m$, where $m \geq n$, then 4m +2n is equal to

A

B

C

D

Ans. (104)

#Q. $e^{5(Inx)^2+3} = x^8$ Product of all real values of x ?

(A) $e^{\frac{8}{5}}$

(B) $\frac{3}{5}$

(C) $e^{\frac{3}{5}}$

(D) $\frac{8}{5}$

Ans. (A)

#Q. $\sum_{r=0}^{5} \frac{{}^{11}C_{2r-1}}{2r+2} = ?$

(A) $\frac{2047}{12}$

(B)

(C)

(D)

Ans. (A)

#Q. If A = {1,2,3}, find number of non empty equivalence relation on set A.

(A) 4

(B) 5

(C) 6

(D) 7

Ans. (B)

#Q. Given. $a_1, a_2, a_3 \ldots.$ are in increasing G.P. such that $a_1 a_5 = 28$ and $a_2 + a_4 = 29$. Find a_6 ?

A 784

B

C

D

Ans. (784)

#Q. $f(x) = 7\tan^8 x + 7\tan^6 x - 3\tan^4 x - 3\tan^2 x$

$I_1 = \int_0^{\frac{\pi}{4}} f(x)dx$

$I_2 = \int_0^{\frac{\pi}{4}} xf(x)dx$

then find value of $7I_1 + 12I_2$.

(A) $\frac{1}{12}$

(B)

(C)

(D)

Ans. (A)

#Q. Let the foci of the hyperbola be (1,14) and (1,-12). It passes through the point (1,6) then length of its latus rectum is ?

A $\frac{288}{5}$

B

C

D

Ans. (A)

#Q. Let the triangle PQR be the image of the triangle with vertices (1,3), (3,1) (2,4) in the line $x = 2y = 2$. If the centroid of Δ PQR is the point (α, β) then 15 $(\alpha - \beta)$ is equation

(A) 22

(B)

(C)

(D)

Ans. (22)