Q.61

Three rotten apples are mixed accidently with seven good apples and four apples are drawn one by one without replacement. Let the random variable X denote the number of rotten apples. If μ and σ^2 represent mean and variance of X, respectively, then $10(\mu^2+\sigma^2)$ is equal to

Options

1. 25
2. 250
3. 20
4. 30

Question Type : **MCQ**
Question ID : **3666942085**
Option 1 ID : **3666946454**
Option 2 ID : **3666946456**
Option 3 ID : **3666946453**
Option 4 ID : **3666946455**
Status : **Answered**
Chosen Option : **2**

Q.62

Let $x=2$ be a root of the equation $x^2+px+q=0$ and

$$f(x)=\begin{cases}\dfrac{1-\cos(x^2-4px+q^2+8q+16)}{(x-2p)^4}, & x\neq 2p\\ 0, & x=2p\end{cases}$$

Then $\lim\limits_{x\to 2p^+}[f(x)]$,

where $[\cdot]$ denotes greatest integer function, is

Options

1. -1
2. 1
3. 2
4. 0

Question Type : **MCQ**
Question ID : **3666942073**
Option 1 ID : **3666946407**
Option 2 ID : **3666946408**
Option 3 ID : **3666946405**
Option 4 ID : **3666946406**
Status : **Answered**
Chosen Option : **1**

Q.63

Let $A=\left\{(x, y) \in \mathbb{R}^2 : y \geq 0, 2x \leq y \leq \sqrt{4-(x-1)^2}\right\}$ and

$B=\left\{(x, y) \in \mathbb{R} \times \mathbb{R} : 0 \leq y \leq \min\left\{2x, \sqrt{4-(x-1)^2}\right\}\right\}$.

Then the ratio of the area of A to the area of B is

Options

1. $\frac{\pi-1}{\pi+1}$
2. $\frac{\pi}{\pi-1}$
3. $\frac{\pi+1}{\pi-1}$
4. $\frac{\pi}{\pi+1}$

Question Type : **MCQ**
Question ID : **3666942075**
Option 1 ID : **3666946414**
Option 2 ID : **3666946416**
Option 3 ID : **3666946415**
Option 4 ID : **3666946413**
Status : **Not Answered**
Chosen Option : **--**

Q.64

Let Δ be the area of the region $\left\{(x, y) \in \mathbb{R}^2 : x^2+y^2 \leq 21,\ y^2 \leq 4x, x \geq 1\right\}$.

Then $\frac{1}{2}\left(\Delta - 21 \sin^{-1}\frac{2}{\sqrt{7}}\right)$ is equal to

Options

1. $\sqrt{3}-\frac{4}{3}$
2. $\sqrt{3}-\frac{2}{3}$
3. $2\sqrt{3}-\frac{1}{3}$
4. $2\sqrt{3}-\frac{2}{3}$

Question Type : **MCQ**
Question ID : **3666942076**
Option 1 ID : **3666946420**
Option 2 ID : **3666946419**
Option 3 ID : **3666946417**
Option 4 ID : **3666946418**
Status : **Not Answered**
Chosen Option : **--**

Q.65

Let $[x]$ denote the greatest integer $\leq x$. Consider the function $f(x)=\max\left\{x^2, 1+[x]\right\}$. Then the value of the integral $\int_0^2 f(x)\,dx$ is

Options

1. $\frac{8+4\sqrt{2}}{3}$
2. $\frac{1+5\sqrt{2}}{3}$
3. $\frac{5+4\sqrt{2}}{3}$
4. $\frac{4+5\sqrt{2}}{3}$

Question Type : **MCQ**
Question ID : **3666942080**
Option 1 ID : **3666946435**
Option 2 ID : **3666946433**
Option 3 ID : **3666946436**
Option 4 ID : **3666946434**
Status : **Answered**
Chosen Option : **1**

Q.66

If the vectors $\vec{a}=\lambda\hat{i}+\mu\hat{j}+4\hat{k}$, $\vec{b}=-2\hat{i}+4\hat{j}-2\hat{k}$ and $\vec{c}=2\hat{i}+3\hat{j}+\hat{k}$ are coplanar and the projection of $\vec{a}$ on the vector $\vec{b}$ is $\sqrt{54}$ units, then the sum of all possible values of $\lambda+\mu$ is equal to

Options

1. 18
2. 0
3. 24
4. 6

Question Type : **MCQ**
Question ID : **3666942081**
Option 1 ID : **3666946439**
Option 2 ID : **3666946437**
Option 3 ID : **3666946440**
Option 4 ID : **3666946438**
Status : **Answered**
Chosen Option : **4**

Q.67 A light ray emits from the origin making an angle $30°$ with the positive x-axis. After getting reflected by the line $x+y=1$, if this ray intersects x-axis at Q, then the abscissa of Q is

Options

1. $\frac{2}{3-\sqrt{3}}$
2. $\frac{2}{3+\sqrt{3}}$
3. $\frac{\sqrt{3}}{2\left(\sqrt{3}+1\right)}$
4. $\frac{2}{\left(\sqrt{3}-1\right)}$

Question Type : **MCQ**
Question ID : **3666942077**
Option 1 ID : **3666946424**
Option 2 ID : **3666946421**
Option 3 ID : **3666946422**
Option 4 ID : **3666946423**
Status : **Not Answered**
Chosen Option : **--**

Q.68 Let $f:\mathbf{R}\to\mathbf{R}$ be a function such that $f(x)=\frac{x^2+2x+1}{x^2+1}$. Then

Options

1. $f(x)$ is one-one in $[1,\infty)$ but not in $(-\infty,\infty)$
2. $f(x)$ is one-one in $(-\infty,\infty)$
3. $f(x)$ is many-one in $(-\infty,-1)$
4. $f(x)$ is many-one in $(1,\infty)$

Question Type : **MCQ**
Question ID : **3666942068**
Option 1 ID : **3666946385**
Option 2 ID : **3666946386**
Option 3 ID : **3666946388**
Option 4 ID : **3666946387**
Status : **Answered**
Chosen Option : **2**

Q.69

Let $y=f(x)$ be the solution of the differential equation $y(x+1)dx-x^2dy=0,\ y(1)=e$. Then $\lim\limits_{x\to 0^+} f(x)$ is equal to

Options

1. e^2
2. $\frac{1}{e}$
3. $\frac{1}{e^2}$
4. 0

Question Type : **MCQ**
Question ID : **3666942086**
Option 1 ID : **3666946459**
Option 2 ID : **3666946458**
Option 3 ID : **3666946460**
Option 4 ID : **3666946457**
Status : **Marked For Review**
Chosen Option : **2**

Q.70

Consider the following system of equations

$\alpha x+2y+z=1$

$2\alpha x+3y+z=1$

$3x+\alpha y+2z=\beta$

for some $\alpha,\beta\in\mathbb{R}$. Then which of the following is NOT correct.

Options

1. It has no solution if $\alpha=-1$ and $\beta\neq 2$
2. It has a solution for all $\alpha\neq -1$ and $\beta=2$
3. It has no solution for $\alpha=-1$ and for all $\beta\in\mathbb{R}$
4. It has no solution for $\alpha=3$ and for all $\beta\neq 2$

Question Type : **MCQ**
Question ID : **3666942071**
Option 1 ID : **3666946398**
Option 2 ID : **3666946399**
Option 3 ID : **3666946397**
Option 4 ID : **3666946400**
Status : **Not Attempted and Marked For Review**
Chosen Option : **--**

Q.71

Let $f(\theta)=3\left(\sin^4\left(\frac{3\pi}{2}-\theta\right)+\sin^4(3\pi+\theta)\right)-2(1-\sin^2 2\theta)$ and

$S=\left\{\theta\in[0,\pi]: f'(\theta)=-\frac{\sqrt{3}}{2}\right\}$. If $4\beta=\sum_{\theta\in S}\theta$, then $f(\beta)$ is equal to

Options

1. $\frac{5}{4}$
2. $\frac{11}{8}$
3. $\frac{9}{8}$
4. $\frac{3}{2}$

Question Type : **MCQ**
Question ID : **3666942083**
Option 1 ID : **3666946445**
Option 2 ID : **3666946448**
Option 3 ID : **3666946447**
Option 4 ID : **3666946446**
Status : **Not Answered**
Chosen Option : **--**

Q.72

Let the tangents at the points $A(4,-11)$ and $B(8,-5)$ on the circle $x^2+y^2-3x+10y-15=0$, intersect at the point C. Then the radius of the circle, whose centre is C and the line joining A and B is its tangent, is equal to

Options

1. $\frac{3\sqrt{3}}{4}$
2. $\sqrt{13}$
3. $\frac{2\sqrt{13}}{3}$
4. $2\sqrt{13}$

Question Type : **MCQ**
Question ID : **3666942079**
Option 1 ID : **3666946429**
Option 2 ID : **3666946430**
Option 3 ID : **3666946431**
Option 4 ID : **3666946432**
Status : **Answered**
Chosen Option : **1**

Q.73 Let α and β be real numbers. Consider a 3×3 matrix A such that $A^2 = 3A + \alpha I$. If $A^4 = 21A + \beta I$, then

Options

1. $\alpha = 1$
2. $\beta = -8$
3. $\beta = 8$
4. $\alpha = 4$

Question Type : **MCQ**
Question ID : **3666942072**
Option 1 ID : **3666946404**
Option 2 ID : **3666946401**
Option 3 ID : **3666946402**
Option 4 ID : **3666946403**
Status : **Answered**
Chosen Option : **1**

Q.74 If p, q and r are three propositions, then which of the following combination of truth values of p, q and r makes the logical expression $\{(p \vee q) \wedge ((\sim p) \vee r)\} \rightarrow ((\sim q) \vee r)$ false?

Options

1. $p = T,\ q = F,\ r = F$
2. $p = F,\ q = T,\ r = F$
3. $p = T,\ q = F,\ r = T$
4. $p = T,\ q = T,\ r = F$

Question Type : **MCQ**
Question ID : **3666942084**
Option 1 ID : **3666946450**
Option 2 ID : **3666946451**
Option 3 ID : **3666946452**
Option 4 ID : **3666946449**
Status : **Not Answered**
Chosen Option : **--**

Q.75

Fifteen football players of a club-team are given 15 T-shirts with their names written on the backside. If the players pick up the T-shirts randomly, then the probability that at least 3 players pick the correct T-shirt is

Options

1. $\frac{2}{15}$
2. $\frac{1}{6}$
3. $\frac{5}{36}$
4. $\frac{5}{24}$

Question Type : **MCQ**
Question ID : **3666942082**
Option 1 ID : **3666946444**
Option 2 ID : **3666946442**
Option 3 ID : **3666946441**
Option 4 ID : **3666946443**
Status : **Answered**
Chosen Option : **2**

Q.76

Let B and C be the two points on the line $y+x=0$ such that B and C are symmetric with respect to the origin. Suppose A is a point on $y-2x=2$ such that ΔABC is an equilateral triangle. Then, the area of the ΔABC is

Options

1. $\frac{8}{\sqrt{3}}$
2. $2\sqrt{3}$
3. $\frac{10}{\sqrt{3}}$
4. $3\sqrt{3}$

Question Type : **MCQ**
Question ID : **3666942078**
Option 1 ID : **3666946426**
Option 2 ID : **3666946427**
Option 3 ID : **3666946428**
Option 4 ID : **3666946425**
Status : **Marked For Review**
Chosen Option : **1**

Q.77

Let $\lambda \neq 0$ be a real number. Let α, β be the roots of the equation $14x^2 - 31x + 3\lambda = 0$ and α, γ be the roots of the equation $35x^2 - 53x + 4\lambda = 0$. Then $\frac{3\alpha}{\beta}$ and $\frac{4\alpha}{\gamma}$ are the roots of the equation

Options

1. $7x^2 + 245x - 250 = 0$
2. $49x^2 + 245x + 250 = 0$
3. $7x^2 - 245x + 250 = 0$
4. $49x^2 - 245x + 250 = 0$

Question Type : **MCQ**
Question ID : **3666942070**
Option 1 ID : **3666946395**
Option 2 ID : **3666946393**
Option 3 ID : **3666946396**
Option 4 ID : **3666946394**
Status : **Not Answered**
Chosen Option : **--**

Q.78

Let $f(x) = x + \frac{a}{\pi^2 - 4}\sin x + \frac{b}{\pi^2 - 4}\cos x,\ x \in \mathbb{R}$ be a function which satisfies $f(x) = x + \int_0^{\pi/2} \sin(x+y)\, f(y)\, dy$. Then $(a+b)$ is equal to

Options

1. $-2\pi(\pi+2)$
2. $-\pi(\pi-2)$
3. $-2\pi(\pi-2)$
4. $-\pi(\pi+2)$

Question Type : **MCQ**
Question ID : **3666942074**
Option 1 ID : **3666946412**
Option 2 ID : **3666946409**
Option 3 ID : **3666946410**
Option 4 ID : **3666946411**
Status : **Not Answered**
Chosen Option : **--**

Q.79

For two non-zero complex numbers z_1 and z_2, if $\text{Re}(z_1 z_2) = 0$ and $\text{Re}(z_1 + z_2) = 0$, then which of the following are possible?

A. $\text{Im}(z_1) > 0$ and $\text{Im}(z_2) > 0$

B. $\text{Im}(z_1) < 0$ and $\text{Im}(z_2) > 0$

C. $\text{Im}(z_1) > 0$ and $\text{Im}(z_2) < 0$

D. $\text{Im}(z_1) < 0$ and $\text{Im}(z_2) < 0$

Choose the correct answer from the options given below:

Options

1. A and C
2. B and D
3. B and C
4. A and B

Question Type : **MCQ**
Question ID : **3666942069**
Option 1 ID : **3666946392**
Option 2 ID : **3666946390**
Option 3 ID : **3666946389**
Option 4 ID : **3666946391**
Status : **Answered**
Chosen Option : **3**

Q.80

The domain of $f(x) = \dfrac{\log_{(x+1)}(x-2)}{e^{2\log_e x} - (2x+3)}$, $x \in \mathbb{R}$ is

Options

1. $\mathbb{R} - \{-1, 3\}$
2. $(2, \infty) - \{3\}$
3. $\mathbb{R} - \{3\}$
4. $(-1, \infty) - \{3\}$

Question Type : **MCQ**
Question ID : **3666942067**
Option 1 ID : **3666946382**
Option 2 ID : **3666946381**
Option 3 ID : **3666946384**
Option 4 ID : **3666946383**
Status : **Not Answered**
Chosen Option : **--**

Section : **Mathematics Section B**

Q.81

Let the coefficients of three consecutive terms in the binomial expansion of $(1+2x)^n$ be in the ratio 2 : 5 : 8. Then the coefficient of the term, which is in the middle of these three terms, is _____.

Given Answer : **--**

Question Type : **SA**
Question ID : **3666942095**
Status : **Not Answered**

Q.82

If all the six digit numbers $x_1\,x_2\,x_3\,x_4\,x_5\,x_6$ with $0<x_1<x_2<x_3<x_4<x_5<x_6$ are arranged in the increasing order, then the sum of the digits in the 72^{th} number is _____.

Given --
Answer :

Question Type : **SA**
Question ID : **3666942092**
Status : **Not Answered**

Q.83

Suppose f is a function satisfying $f(x+y)=f(x)+f(y)$ for all $x, y\in\mathbb{N}$ and $f(1)=\frac{1}{5}$. If $\sum_{n=1}^{m}\frac{f(n)}{n(n+1)(n+2)}=\frac{1}{12}$, then m is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **3666942089**
Status : **Not Answered**

Q.84

Let $f:\mathbb{R}\to\mathbb{R}$ be a differentiable function that satisfies the relation $f(x+y)=f(x)+f(y)-1, \forall x, y\in\mathbb{R}$. If $f'(0)=2$, then $\left|f(-2)\right|$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **3666942093**
Status : **Not Answered**

Q.85

Let $a_1, a_2, a_3, \ldots$ be a GP of increasing positive numbers. If the product of fourth and sixth terms is 9 and the sum of fifth and seventh terms is 24, then $a_1a_9+a_2a_4a_9+a_5+a_7$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **3666942090**
Status : **Not Answered**

Q.86

Let $\vec{a}$, $\vec{b}$ and $\vec{c}$ be three non-zero non-coplanar vectors. Let the position vectors of four points A, B, C and D be $\vec{a}-\vec{b}+\vec{c}$, $\lambda\vec{a}-3\vec{b}+4\vec{c}$, $-\vec{a}+2\vec{b}-3\vec{c}$ and $2\vec{a}-4\vec{b}+6\vec{c}$ respectively. If $\overrightarrow{AB}$, $\overrightarrow{AC}$ and $\overrightarrow{AD}$ are coplanar, then λ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **3666942091**
Status : **Not Answered**

Q.87

Let the co-ordinates of one vertex of ΔABC be $A(0, 2, \alpha)$ and the other two vertices lie on the line $\frac{x+\alpha}{5} = \frac{y-1}{2} = \frac{z+4}{3}$. For $\alpha \in \mathbb{Z}$, if the area of ΔABC is 21 sq. units and the line segment BC has length $2\sqrt{21}$ units, then α^2 is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **3666942087**
Status : **Not Answered**

Q.88

If the co-efficient of x^9 in $\left(\alpha x^3 + \frac{1}{\beta x}\right)^{11}$ and the co-efficient of x^{-9} in $\left(\alpha x - \frac{1}{\beta x^3}\right)^{11}$ are equal, then $(\alpha\beta)^2$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **3666942094**
Status : **Not Answered**

Q.89

Let the equation of the plane P containing the line $x+10 = \frac{8-y}{2} = z$ be $ax+by+3z = 2(a+b)$ and the distance of the plane P from the point $(1, 27, 7)$ be c. Then $a^2+b^2+c^2$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **3666942088**
Status : **Not Answered**

Q.90

Five digit numbers are formed using the digits 1, 2, 3, 5, 7 with repetitions and are written in descending order with serial numbers. For example, the number 77777 has serial number 1. Then the serial number of 35337 is _____.

Given --
Answer :

Question Type : **SA**
Question ID : **3666942096**
Status : **Not Answered**