PAPER SOLUTION

From Meerut

JEE MAIN

2025

JAN	SHIFT
23	2nd

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JEE MAIN 2025 LIVE PAPER DISCUSSION

#Q. The distance of the line $\frac{x-2}{2}=\frac{y-6}{3}=\frac{z-3}{4}$ from the point $(1,4,0)$ along the line $\frac{x}{1}=\frac{y-2}{2}=\frac{z+3}{3}$ is

A $\sqrt{14}$

B $\sqrt{17}$

C $\sqrt{13}$

D $\sqrt{15}$

Ans. (A)

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#Q. If $y = \left(x - y\frac{dx}{dy}\right) sin\left(\frac{x}{y}\right)$ *if* $x(1) = \frac{\pi}{2}$ then find $cos(x(2))$

A ln2

B –ln2

C 2ln2

D –2ln2

Ans. (B)

#Q. If $A\begin{bmatrix}0\\1\\0\end{bmatrix}=\begin{bmatrix}0\\0\\1\end{bmatrix}, A\begin{bmatrix}4\\1\\3\end{bmatrix}=\begin{bmatrix}0\\1\\0\end{bmatrix}, A\begin{bmatrix}2\\1\\2\end{bmatrix}=\begin{bmatrix}1\\0\\0\end{bmatrix}$. Then a_{23} equals to

A 3

B -1

C 2

D -2

Ans. (B)

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#Q. If 10th and 12th terms of an arithmetic progression are roots of equation $3x^2 - px + q = 0$ and common difference of the arithmetic progression is $\frac{3}{2}$, also, the sum of first 11 terms of the arithmetic progression is 88 then $q - 2p$ is

A 625

B 528

C 789

D 476

Ans. (B)

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#Q. Let $\int x^3 \ sin\, x \, dx = g(x) + C$, where $g(0) = 0$. If $8\left(g\left(\frac{\pi}{2}\right) + g'\left(\frac{\pi}{2}\right)\right) = \alpha\pi^3 + \beta\pi^2 + \gamma$, where $\alpha, \beta, \gamma \epsilon Z$, then $\alpha + \beta - \gamma$ is =

A

B

C

D

Ans. (55)

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#Q. Let $(a, 0)$ be a point such that its shortest distance from the parabola $y^2 = 4x$ is 4. Then the equation of circle passing through $(a, 0)$ and focus of the parabola having centre on the axis of parabola is

A $x^2 + y^2 - 6x + 8 = 0$

B $x^2 + y^2 + 6x + 5 = 0$

C $x^2 + y^2 - 6x + 5 = 0$

D $x^2 + y^2 - 9x + 5 = 0$

Ans. (C)

#Q. Evaluate $\lim_{x\to\infty}\left(\frac{2x^2-3x+10}{3x^2+4x-2}\right)\frac{(3x-1)^{\frac{x}{2}}}{(\sqrt{3x+2})^x}=$

$$\lim_{x\to a}(f(x))^{g(x)}$$

$$=e^{\lim_{x\to a}(f(x)-1)g(x)}$$

A

B

C

D

$$\frac{2}{3}\cdot\lim_{x\to\infty}\left(\frac{3x-1}{3x+2}\right)^{\frac{x}{2}}$$

$$\frac{2}{3}e^{\lim_{x\to\infty}\left[\frac{3x-1}{3x+2}-1\right]\cdot\frac{x}{2}}$$

$$\frac{2}{3}e^{\lim_{x\to\infty}\left[\frac{-3x}{(3x+2)^2}\right]}=\frac{2}{3}e^{-\frac{1}{2}}=\frac{2}{3\sqrt{e}}$$

Ans. $\left(\frac{2}{3\sqrt{e}}\right)$

#Q. In the expansion of $(1+x)^p(1-x)^q$ coefficient of x and x^2 is 1 and –2 then p^2+q^2

9+4

A 13

B

C

D

$$\left(1+px+\frac{p(p-1)}{2}x^2\right)\left(1-qx+\frac{q(q-1)}{2}x^2\right)$$

$$1+(p-q)x+\left(\frac{p(p-1)}{2}-pq+\frac{q(q-1)}{2}\right)x^2$$

$p-q=1$, $\frac{p^2-p-2pq+q^2-q}{2}=-4$

$p=3, q=2$

$(p-q)^2-(p+q)=-4$

$1-(p+q)=-4 \Rightarrow p+q=5$

Ans. (13)

#Q. If system of linear equations

$$x + y + z = 6$$
$$x + 2y + 5z = 9$$
$$x + 5y + \lambda z = \mu$$

has no solutions. Then value of λ and μ

A

B

C

D

$3 \times [y + 4z = 3]$ (12, 9)

$3y + (\lambda - 5)z = \mu - 9$

$(\lambda - 17)z = \mu - 18$

$\lambda - 17 = 0, \mu - 18 \neq 0$

$\lambda = 17, \mu \neq 18$

Ans. (17)

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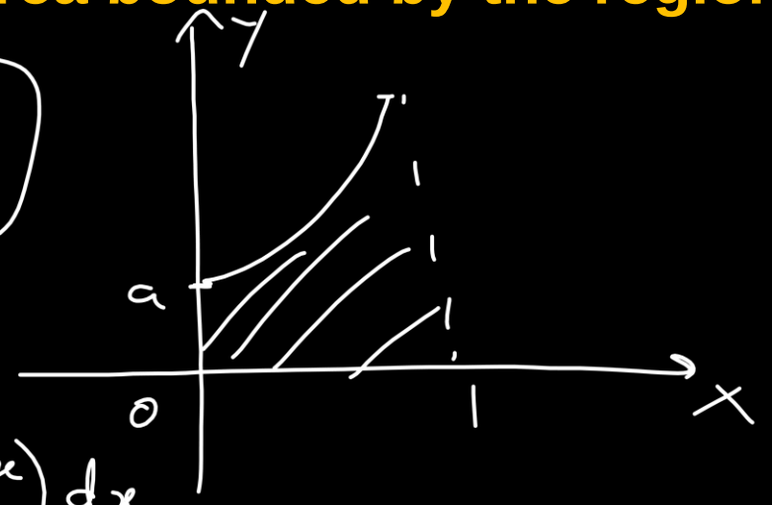
#Q. Let S be the region consisting of points (x, y) such that $-1 \le x \le 1$ & $0 \le y \le a + e^{|x|} - e^{-|x|}$. If area bounded by the region is $2\left(\frac{e^2+8e+1}{e}\right)$ find '' a''

A $a+e^{x}-e^{-x}$.

B

C $2\int_0^1 (a+e^{x}-e^{-x})\,dx$

D



$= 2\left(ax+e^{x}+e^{-x}\right)_0^1 = 2\left(a+e+e^{-1}-2\right)$

$= 2\left[a+e+\frac{1}{e}-2\right]$

$2\left[\frac{(a+e)e+1-2e}{e}\right]$

$e^2+8e+1 = ae+e^2+1-2e$

$10e = ae$

$a = 10$

Ans. (10)

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$z = x+iy$ $\quad z^2 = x^2 - y^2 + 2ixy$

#Q. If z is a complex number such that $|z| = 1$ and $\left|\frac{z}{\bar{z}} + \frac{\bar{z}}{z}\right| = 1$, then the number of complex number z is

A. 8

B. 4

C. 2

D. zero

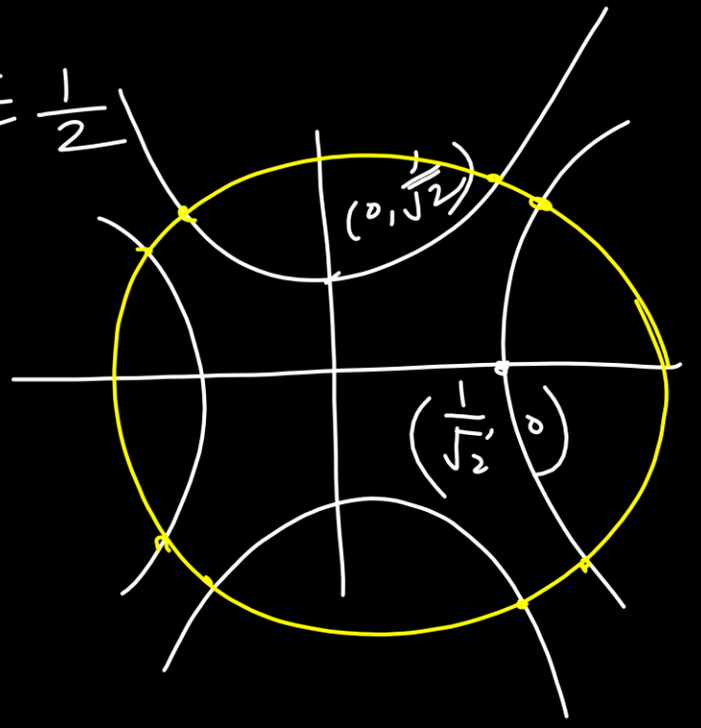
$$\left|\frac{z^2 + (\bar{z})^2}{|z|^2}\right| = 1$$

$$\left|z^2 + (\bar{z})^2\right| = 1$$

$$\left|2(x^2 - y^2)\right| = 1$$

$$x^2 - y^2 = \frac{1}{2}, -\frac{1}{2}$$

$x^2 - y^2 = \frac{1}{2}$



Ans. (A)

#Q. Let $M\left(\frac{1}{2}, 1\right)$ be the mid point of a chord to the Ellipse $\frac{x^2}{2}+\frac{y^2}{4}=1$, then the length of chord is

A $\frac{2}{3}\sqrt{5}$

B $\frac{\sqrt{5}}{3}$

C $2\sqrt{\frac{5}{3}}$

D $\frac{\sqrt{5}}{2}$

Ans. (C)

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#Q. If the square of the shortest distance between the lines $\frac{x-2}{1}=\frac{y-1}{2}=\frac{z+3}{-3}$ and $\frac{x+1}{2}=\frac{y+3}{4}=\frac{z+5}{-5}$ is $\frac{m}{n}$ (where m, n are coprime number) then $m+n$ equals to

A 6

B 9

C 21

D 14

Ans. (B)

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#Q. If $I = \int_0^{\frac{\pi}{2}} \frac{\sin^{\frac{3}{2}} x dx}{\sin^{\frac{3}{2}} x + \cos^{\frac{3}{2}} x}$, then the value of definite integration $\int_0^{2I} \frac{x \sin x \cos x}{\sin^4 x + \cos^4 x} dx$ is

A $\frac{\pi}{16}$

B $\frac{\pi^2}{16}$

C $\frac{\pi}{8}$

D $\frac{\pi^2}{8}$

Ans. (B)

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#Q. Consider the terms 8, 21, 34, 47,… 320. The variance of the given data set is

A 8788

B 8614

C 720

D 9402

Ans. (A)

#Q. Let $M\left(\frac{1}{2}, 1\right)$ be the mid point of a chord to the Ellipse $\frac{x^2}{2}+\frac{y^2}{4}=1$, then the length of chord is

A $\frac{2}{3}\sqrt{5}$

B $\frac{\sqrt{5}}{3}$

C $2\sqrt{\frac{5}{3}}$

D $\frac{\sqrt{5}}{2}$

Ans. (C)

#Q. $A = \{(x, y): |x + y| \geq 3\}$;
$B = \{(x, y): |x| + |y| \leq 3\}$
Let C = $A \cap B$. Find the sum of $x + y \; \forall \; x, y \in C$.

A

B

C

D

Ans. (0)

$4\cos x \cos\left(\frac{\pi}{3}-x\right)\cos\left(\frac{\pi}{3}+x\right) = \cos 3x$

#Q. Let $f(x) = 6 + 16\cos\left(\frac{\pi}{3}-x\right)\cos\left(\frac{\pi}{3}+x\right)\cos x \sin 3x \cos 6x$ if range of $f(x)$ is $[\alpha, \beta]$ then distance of (α, β) from $3x + 4y + 12 = 0$ is

(4×4)

A

B

C

D

$$f(x) = 6 + 4(\cos 3x \sin 3x)\cos 6x$$

(2×2)

$$= 6 + 2\sin 6x \cos 6x$$

$$f(x) = 6 + \sin 12x$$

$1, -1$

Range $[5, 7]$

$$\left|\frac{ax_1 + by_1 + c}{\sqrt{a^2+b^2}}\right|$$

$$= \frac{3\times 5 + 4\times 7 + 12}{\sqrt{3^2+4^2}}$$

$$= \frac{55}{5} = 11.$$

Ans. (11)

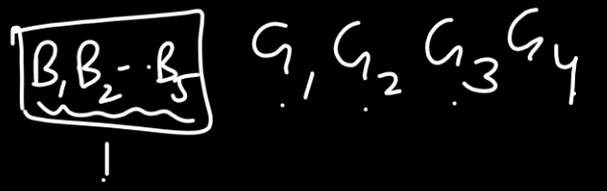
#Q. There are 5 boys and 4 girls. The sum of number of ways to sit them such that all boys sit together and number of ways such that no two boys sit together is equal to

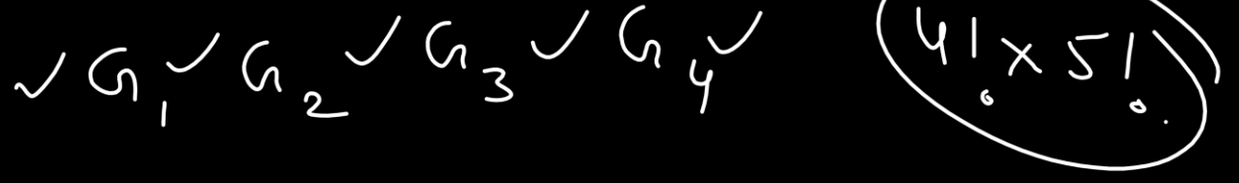
A

B

C

D





$$\text{Sum} = 5!(5! + 4!) = 17280$$

Ans. (17280)

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#Q. If a square is divided in 4×4 squares. If two squares are chosen randomly then the probability that the squares doesn't share common side is

A. 3/5

B. 4/5

C. 3/20

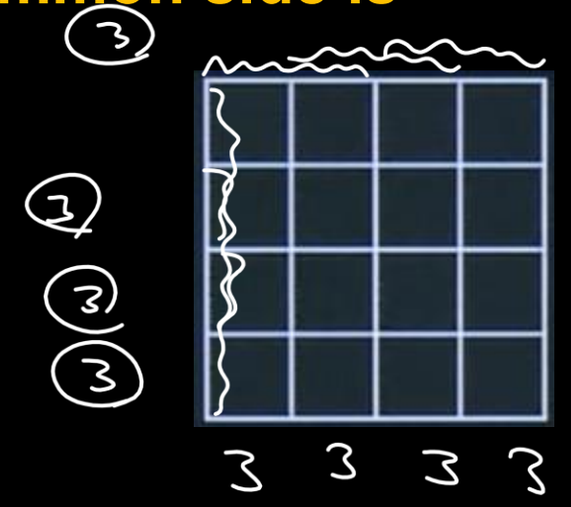
D. 7/10

Total ways $= {}^{16}C_2 = \frac{16 \times 15}{2} = 120.$

Fav. ways $= 120 - 24$

Prob $= \frac{120 - 24}{120} = 1 - \frac{1}{5}$

$= \frac{4}{5}$



Ans. (B)