LIVE

JEE MAIN 2024

ATTEMPT – 01 , 29TH JAN 2024 , SHIFT - 02

PAPER DISCUSSION

Mathematics

Given set {1, 2, 3, ..., 50}, one number is selected randomly from set. Find probability that number is multiple of 4 or 6 or 7.

(A) $\frac{21}{50}$

(B) $\frac{18}{50}$

(C) $\frac{8}{25}$

(D) $\frac{21}{25}$

$\boxed{4 \& 6}$ & 7

12

$12+8+7-4-1-1+0$

$= 20+7-6$

$= 21 \Rightarrow P = 21/50.$

$n(4 \cup 6 \cup 7) =$

$n(4) = \left[\frac{50}{4}\right] = 12$

$n(6) = \left[\frac{50}{6}\right] = 8$

$n(7) = \left[\frac{50}{7}\right] = 7$

$n(4 \cap 6) = \left[\frac{50}{12}\right] = 4$

$n(6 \cap 7) = \left[\frac{50}{42}\right] = 1$

$n(4 \cap 7) = \left[\frac{50}{28}\right] = 1$

$n(4 \cap 7 \cap 6) = 0$

Area bounded by $0 \le x \le 3$, $0 \le y \le$ minimum $(2x + 2, x^2 + 2)$ is A, then $12A$ is

(A) 164 ✓

(B) 134

(C) 155

(D) 162

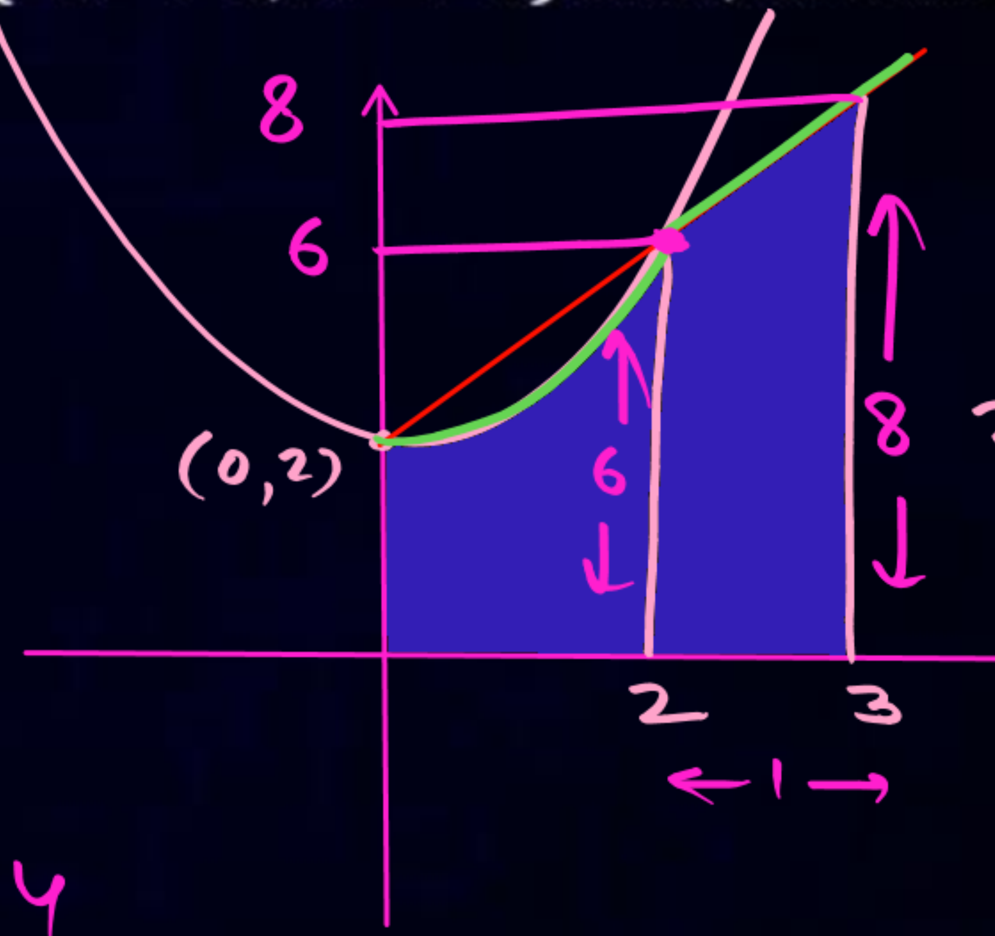
$$\int_0^2 (x^2+2)\,dx + \frac{1}{2}(8+6)\times 1$$

$$\frac{x^3}{3} + 2x \Big|_0^2 + 7$$

$$8/3 + 4 + 7$$

$$A = 8/3 + 11$$

$$A = \frac{41}{3} \Rightarrow 12A = 41 \times 4 = 164.$$



$y = 2x + 2$

$2x + 2 = x^2 + 2$

$2 = x$

The value of $\int_{\pi/6}^{\pi/3} \sqrt{1 - \sin 2x}\, dx$ is ______.

(A) $\sqrt{2} - \sqrt{3} + 1$

(B) $2\sqrt{2} - \sqrt{3} - 1$ ✓

(C) $2\sqrt{2} + \sqrt{3} - 1$

(D) $\sqrt{2} + \sqrt{3} - 1$

$$\int_{\pi/6}^{\pi/3} \sqrt{(\cos x - \sin x)^2}\, dx$$

$$\int_{\pi/6}^{\pi/3} |\cos x - \sin x| . dx$$

$$\int_{\pi/6}^{\pi/4} (\cos x - \sin x) dx + \int_{\pi/4}^{\pi/3} (\sin x - \cos x) dx$$

$$\sin x + \cos x \Big|_{\pi/6}^{\pi/4} + \ + (\cos x + \sin x) \Big|_{\pi/3}^{\pi/4}$$

$$\sqrt{2} - \left[\tfrac{1}{2} + \tfrac{\sqrt{3}}{2}\right] + \sqrt{2} - \left[\tfrac{1}{2} + \tfrac{\sqrt{3}}{2}\right]$$

$$2\sqrt{2} - (1 + \sqrt{3})$$

$$2\sqrt{2} - 1 - \sqrt{3}$$

JEE MAIN 2024 LIVE ((•)) PAPER DISCUSSION

Remainder when $\left((64)^{32}\right)^{32}$ divided by 9 is ______.

(A) 1 ✓

(B) 2

(C) 3

(D) 4

$$\left[\left(1+\underbrace{63}\right)^{32}\right]^{32}$$

$$(1+63I)^{32}$$

$$1 + 63I'$$

$$9$$

JEE MAIN 2024 LIVE PAPER DISCUSSION

Let $\boxed{cos\,(2\sin^{-1}x) = \frac{1}{9}}, x > 0$ holds true for $\boxed{x = \frac{m}{n}}$, where m & n are coprime further α & β are roots of quadratic equation $\boxed{mx^2 - nx - m + n = 0}$ $(\alpha > \beta)$ then *point* (α, β) *lies* on the line

(A) $5x - 8y = 9$

(B) $\boxed{5x + 8y = 9}$

(C) $8x + 5y = 9$

(D) $8x - 5y = 3$

Let $\sin^{-1}x = \theta \Rightarrow \sin\theta = x$

$\cos 2\theta = 1/9$

$1 - 2\sin^2\theta = 1/9$

$1 - 2x^2 = 1/9$

$2x^2 = 8/9$

$x^2 = 4/9$

$\boxed{x = 2/3}$

$m = 2$

$n = 3$

$2x^2 - 3x + 1 = 0$

$2x^2 - 2x - x + 1 = 0$

$(2x - 1)(x - 1) = 0$

$x = 1/2$ or 1

$\alpha = 1$

$\beta = 1/2$

$P(1, 1/2)$

If α & β are roots of the equation $\boxed{x^2 - \sqrt{6}x + 3 = 0}$ and where $\boxed{\mathrm{Im}(\beta) < 0}$. If $\frac{\alpha^{99}}{\beta} + \beta^{98} = 3^n(a + ib)$, then a, b, n.

$$x = \frac{\sqrt{6} \pm \sqrt{6-12}}{2}$$

$$= \frac{\sqrt{6} \pm \sqrt{6}i}{2} = \frac{\sqrt{6}}{2}(1 \pm i) = \sqrt{3/2}(1 \pm i)$$

$$\frac{\alpha^{99}}{\beta} + \beta^{98} = \frac{\alpha^{99} + \beta^{99}}{\beta} = \frac{2(\sqrt{3})^{99}\left(-\frac{1}{\cancel{\sqrt{2}}}\right)}{\frac{\sqrt{3}}{\cancel{\sqrt{2}}}(1-i)} = \frac{2(\sqrt{3})^{98}(-1)}{1-i}$$

$\alpha = \sqrt{3/2}\,(1+i)$

$= \sqrt{3}\left(\frac{1}{\sqrt{2}} + \frac{i}{\sqrt{2}}\right)$

$\alpha = \sqrt{3}\left(\cos \pi/4 + i \sin \pi/4\right)$

$\alpha^{99} = (\sqrt{3})^{99}\,\text{Cis}\left(\frac{99\pi}{4}\right)$

$\beta = \sqrt{3/2}\,(1-i)$

$\beta = \sqrt{3}\left(\cos \pi/4 - i \sin \pi/4\right)$

$\beta^{99} = (\sqrt{3})^{99}\left(\cos \frac{99\pi}{4} - i \sin \frac{99\pi}{4}\right)$

$\alpha^{99} = (\sqrt{3})^{99}\left[-\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}i\right]$ & $\beta^{99} = (\sqrt{3})^{99}\left[-\frac{1}{\sqrt{2}} - \frac{i}{\sqrt{2}}\right]$

$\alpha^{99} + \beta^{99} = 2(\sqrt{3})^{99}\left(-\frac{1}{\sqrt{2}}\right)$

Distance of (2, 4) from the line 2x + y + 2 = 0 measured parallel to the line $\sqrt{3}x + y + 2 = 0$:

(A) $\dfrac{10}{2-\sqrt{3}}$

(B) $\dfrac{10}{2+\sqrt{3}}$

(C) $\dfrac{10}{2+\sqrt{5}}$

(D) None of these

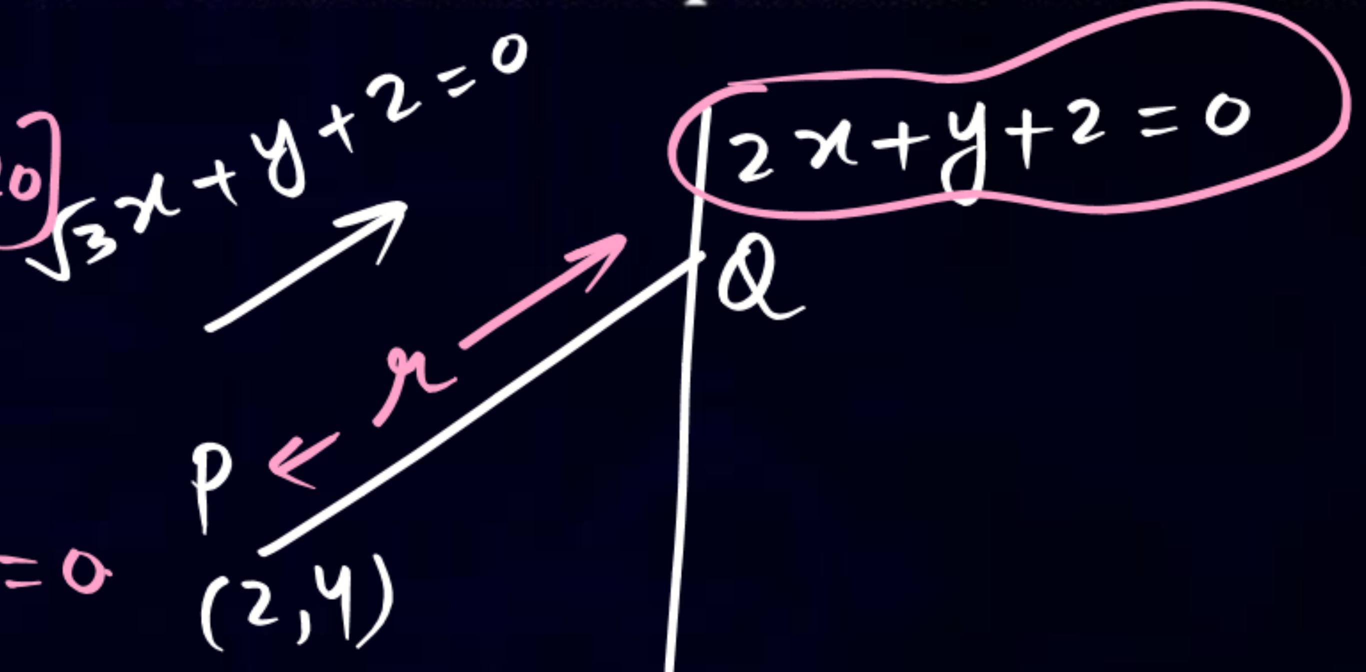
$Q[2 + r\cos 120°, 4 + r\sin 120°]$

$Q\left[2 - \frac{r}{2}, 4 + \frac{\sqrt{3}r}{2}\right]$

$2\left(2 - \frac{r}{2}\right) + \left(4 + \frac{\sqrt{3}r}{2}\right) + 2 = 0$

$10 - r + \frac{\sqrt{3}r}{2} = 0$

$10 = r\left(1 - \frac{\sqrt{3}}{2}\right)$



$\tan\theta = -\sqrt{3}$

$\boxed{\theta = 120°}$

$\Rightarrow r = \frac{20}{2-\sqrt{3}}$

$r \neq 1$ $\qquad T_{18} = \dfrac{T_{19}+T_{20}}{2}$

$a_1, a_2, \ldots\ldots$ are in G.P. such that $a_1 = \frac{1}{8}$, $\boxed{a_1 \neq a_2}$ and every term is equal to arithmetic mean of it's two successive terms. Find $S_{20} - S_{18}$.

(A) -2^{15} ✓

(B) -2^{10}

(C) -2^{20}

(D) -2^{5}

$a = 1/8$, $r = -2$

$a, \underline{ar, ar^2}, \ldots$

$\cancel{a} = \dfrac{\cancel{a}r + \cancel{a}r^2}{2}$

$r^2 + r = 2$

$\boxed{r^2 + r - 2 = 0}$ $\nearrow 1$, $\searrow -2$

$\boxed{r = -2}$

$S_{20} - S_{18} = T_{19} + T_{20}$

$= 2T_{18}$

$= 2ar^{17} = \cancel{2} \times \frac{1}{\cancel{8}_4} (-2)^{17}$

$= -2^{15}$

If P(3, 2, 3) Q(4, 6, 2) R(7, 3, 2) are the vertices of ΔPQR, then find $\angle QPR =$

(A) $\cos^{-1}\frac{1}{18}$

(B) $\frac{\pi}{6}$

(C) $\frac{\pi}{3}$ ✓

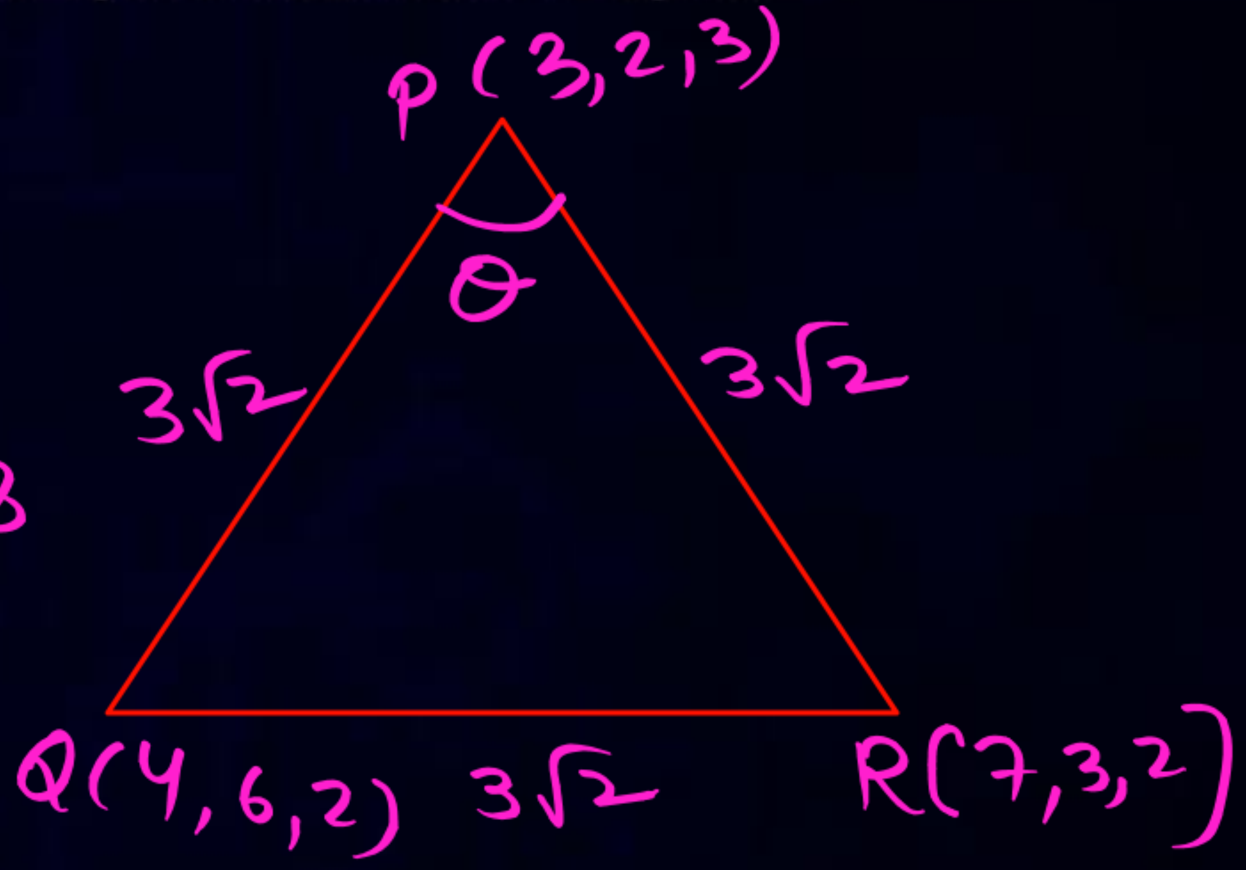
(D) $\cos^{-1}\frac{7}{18}$

$(PQ)^2 = 1^2 + 4^2 + 1^2 = 18$

$PQ = 3\sqrt{2}$

$PR = \sqrt{4^2 + 1^2 + 1^2} = \sqrt{18}$

$QR = \sqrt{3^2 + 3^2} = \sqrt{18}$



8 identical books are to kept in 4 shelfs. Find the number of different ways This can be done.

(A) [redacted]

(B) [redacted]

(C) [redacted]

(D) [redacted]

distinct shelfs →

$$x_1 + x_2 + x_3 + x_4 = 8$$

$^{11}C_3$

Identical shelf

0	0	0	8
0	0	1	7
0	0	2	6
0	0	3	5
0	0	4	4
0	1	2	5

15

1

JEE MAIN 2024 LIVE PAPER DISCUSSION

If ln a, ln b, ln c are in A.P. and ln a – ln 2b, ln 2b – ln 3c, ln 3c – ln a are in A.P. then a : b : c is ______ .

(A) 1 : 2 : 3

(B) 7 : 7 : 4

(C) 9 : 6 : 4

(D) 4 : 6 : 9

$$2\ln b = \ln a + \ln c$$

$$\boxed{\ln\left(\frac{a}{2b}\right), \ln\left(\frac{2b}{3c}\right), \ln\left(\frac{3c}{a}\right)}$$

$$b^2 = ac \Rightarrow b/a = c/b$$

$$2\ln\left(\frac{2b}{3c}\right) = \ln\frac{a}{2b} + \ln\left(\frac{3c}{a}\right)$$

$$\left(\frac{2b}{3c}\right)^2 = \frac{\cancel{a}}{2b}\cdot\frac{3c}{\cancel{a}} \Rightarrow \frac{4b^2}{9c^2} = \frac{3c}{2b} \Rightarrow \frac{8b^3}{27} = c^3$$

$$\boxed{\frac{2b}{3} = c}$$

$\frac{2b}{3} = c$

$\boxed{b/c = 3/2}$

$c/b = 2/3 = b/a$

$c/b = b/a$

$a/b = 3/2 \times 3/3 = 9/6$

$b/c = 3/2 \times 2/2 = 6/4$

$9 : 6 : 4$

If $r = |z|$, $\theta = \arg(z)$ and $z = 2 - 2i\tan\left(\frac{5\pi}{8}\right)$, then find (r, θ).

(A) $\left(2\sec\frac{5\pi}{8}, \frac{3\pi}{8}\right)$

(B) $\left(2\sec\frac{3\pi}{8}, \frac{3\pi}{8}\right)$ ✓

(C) $\left(2\tan\frac{3\pi}{8}, \frac{5\pi}{8}\right)$

(D) $\left(2\tan\frac{3\pi}{8}, \frac{3\pi}{8}\right)$

$\frac{4\pi}{8} = 90^\circ$

$5\pi/8 > 90^\circ$

$$|z| = \sqrt{2^2 + 4\tan^2 5\pi/8}$$
$$= 2\sqrt{1 + \tan^2 5\pi/8}$$
$$= 2\sqrt{\sec^2 5\pi/8}$$
$$r = 2|\sec 5\pi/8| = 2\sec 3\pi/8.$$

$$z = 2 + 2i\tan\frac{3\pi}{8}$$
$$\arg z = \tan^{-1}(\tan 3\pi/8)$$
$$\theta = 3\pi/8$$

In which interval the function $f(x)=\frac{x}{x^2-6x-16}$ is increasing:

$\boxed{f'(x)>0}$

(A) ϕ ✓

(B) $\left[1,\frac{3}{7}\right)\cup\left(\frac{5}{4},\infty\right)$

(C) $\left(\frac{5}{4},\infty\right)$

(D) $\left[\frac{3}{4},\frac{5}{4}\right]$

$$f'(x)=\frac{1.(x^2-6x-16)-x(2x-6)}{(x^2-6x-16)^2}$$

$$\frac{x^2-\cancel{6x}-16-2x^2+\cancel{6x}}{(\quad)^2}$$

$$\frac{-x^2-16}{(\quad)^2}=-\frac{(x^2+16)}{(\quad)^2}\rightarrow -ve$$

(α, β) lies on the $y^2 = 4x$ and (α, β) also lie on chord with mid-point $\left(1, \frac{5}{4}\right)$ of another parabola $x^2 = 8y$, then value $|(8-\beta)(\alpha-28)|$ is ________.

(A) 192

(B) 92

(C) 64

(D) 128

$\alpha = t^2 \quad \beta = 2t$

$\boxed{x + 4 = 4y}$

$t^2 + 4 = 8t$

$\boxed{t^2 - 8t + 4 = 0}$

$(t-4)^2 = -4 + 16$

$x^2 = 8y$

$T = S_1$

$xx_1 - 4(y + y_1) = x_1^2 - 8y_1$

$x \times 1 - 4(y + 5/4) = 1 - 8 \cdot 5/4$

$x - 4y - 5 = 1 - 10$

$x - 4y + 4 = 0$

$\boxed{x + 4 = 4y}$

$$\left|(8-2t)(t^2-28)\right|$$

$$\left|(8-2t)(8t-4-28)\right|$$

$$\left|(8-2t)(8t-32)\right|$$

$$16\left|(4-t)(t-4)\right|$$

$$16\left|\underbrace{(t-4)^2}\right|$$

$$16\times12=\boxed{192}$$

$$\begin{array}{r} 160 \\ 32 \\ \hline 192 \end{array}$$

Unit vector $\hat{u} = x\hat{i} + y\hat{j} + z\hat{k}$ makes angles $\frac{\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3}$ with $\vec{a} = \left(\frac{1}{\sqrt{2}}\hat{i} + \frac{1}{\sqrt{2}}\hat{k}\right), \left(\frac{1}{\sqrt{2}}\hat{j} + \frac{1}{\sqrt{2}}\hat{k}\right), \left(\frac{1}{\sqrt{2}}\hat{i} + \frac{1}{\sqrt{2}}\hat{j}\right)$ respectively and $\vec{v} = \frac{1}{\sqrt{2}}\hat{i} + \frac{1}{\sqrt{2}}\hat{j} + \frac{1}{\sqrt{2}}\hat{k}$. Find $|\vec{u} - \vec{v}|$.

(A) $\sqrt{\frac{5}{2}}$

(B) $\sqrt{\frac{7}{2}}$

(C) $\sqrt{\frac{2}{5}}$

(D) $\sqrt{\frac{2}{7}}$

$\vec{u}\cdot\vec{a} = \cos\theta$

$\vec{u}\cdot\vec{a} = 0, \quad \vec{u}\cdot\vec{b} = \frac{1}{2}$

$\vec{u}\cdot\vec{c} = -\frac{1}{2}$

$\frac{x}{\sqrt{2}} + \frac{z}{\sqrt{2}} = 0 \Rightarrow \boxed{x + z = 0} \rightarrow (1)$

$\frac{y}{\sqrt{2}} + \frac{z}{\sqrt{2}} = \frac{1}{2} \Rightarrow \boxed{y + z = \frac{1}{\sqrt{2}}} \rightarrow (2)$

$\frac{x}{\sqrt{2}} + \frac{y}{\sqrt{2}} = -\frac{1}{2} \Rightarrow \boxed{x + y = -\frac{1}{\sqrt{2}}} \rightarrow (3)$

$(2) + (3)$

$2y = 0 \Rightarrow \boxed{y = 0}$

$y = 0$

$x = -\frac{1}{\sqrt{2}}$

$z = \frac{1}{\sqrt{2}}$

$\vec{u} = -\frac{1}{\sqrt{2}}\hat{i} + \frac{1}{\sqrt{2}}\hat{k}$

$\vec{v} = \frac{\hat{i}}{\sqrt{2}} + \frac{\hat{j}}{\sqrt{2}} + \frac{\hat{k}}{\sqrt{2}}$

$$\vec{u}-\vec{v} = -\sqrt{2}\,\hat{i} - \frac{1}{\sqrt{2}}\,\hat{j}$$

$$|\vec{u}-\vec{v}| = \sqrt{2+\frac{1}{2}} = \sqrt{5/2}$$

JEE MAIN 2024 LIVE PAPER DISCUSSION

The mean of 5 observations is $\frac{24}{5}$ and variance is $\frac{194}{25}$. If the mean of first four observations is $\frac{7}{2}$, then the variance of first four observations is ______.

$$\frac{x_1+x_2+\cdots+x_5}{\cancel{5}} = \frac{24}{\cancel{5}}$$

$$\frac{x_1+x_2+\cdots x_4}{\cancel{4}\,2} = 7/\cancel{2}$$

$$x_1+\cdots x_4 = 14$$

$$14 + x_5 = 24$$

$$\Rightarrow \boxed{x_5 = 10}$$

$$\frac{194}{25} = \frac{\Sigma x_i^2}{5} - \left(\frac{24}{5}\right)^2 \Rightarrow \frac{194}{25} + \frac{576}{25} = \frac{\Sigma x_i^2}{5}$$

$$\frac{770}{5} = \Sigma x_i^2 \Rightarrow \Sigma x_i^2 = 154$$

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

(B) $\frac{5}{2}$

(C) $\frac{5}{4}$ ✓

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

$$\sum^{4} x_i^2 + 10^2 = 154$$

$$\sum^{4} x_i^2 = 154 - 100$$

$$= 54$$

$$\text{Var} = \frac{54}{4} - \left(7/2\right)^2$$

$$= \frac{54-49}{4} = 5/4.$$

JEE MAIN 2024 LIVE PAPER DISCUSSION

If $f(x) = \ln\left(\frac{1-x^2}{1+x^2}\right)$, then value of $225(f'(x) - f''(x))$ at $x = \frac{1}{2}$ is ______.

$$f(x) = \ln(1-x^2) - \ln(1+x^2)$$

$$f'(x) = \frac{1}{1-x^2}(-2x) - \frac{1}{1+x^2}(2x) = -2x\left[\frac{1}{1-x^2} + \frac{1}{1+x^2}\right]$$

$$= -2x\frac{2}{1-x^4} = -\frac{4x}{1-x^4}$$

$$f'(1/2) = \frac{-4\times 1/2}{1-\frac{1}{16}} = \frac{-2}{15/16} = \frac{-32}{15}$$

$$\boxed{225 f'(1/2) = -32\times 15}$$

$$f'(x) = -\frac{4x}{1-x^4} = \frac{4x}{x^4-1}$$

$$f''(x) = \frac{(x^4-1)4 - 4x(4x^3)}{(x^4-1)^2} = \frac{4\left[x^4-1-4x^4\right]}{(x^4-1)^2}$$

$$f''(x) = -4\frac{\left[1+3x^4\right]}{(x^4-1)^2}$$

$$f''(1/2) = -4\frac{\left[1+3/16\right]}{\left(\frac{15}{16}\right)^2} = -\frac{4\times19\times16}{225}$$

$$\boxed{225 f''(1/2) = -4\times19\times16}$$

$$\text{Ans} = 4\times19\times16 - 32\times15$$
$$= 32\left[38-15\right] = \boxed{32\times23}$$

A function f(x) satisfies the differential Equation

$\boxed{\cancel{x}\left(\cos\left(\frac{y}{x}\right)\right)\frac{dy}{dx} = \frac{y}{x}\cos\left(\frac{y}{x}\right) + \frac{x}{x}}$ also given that $f(1) = \frac{\pi}{3}$,

Then find f (x)

$y = vx \Rightarrow y/x = v$

$\cos v\left(v + x\frac{dv}{dx}\right) = v\cos v + 1$

$\cancel{v\cos v} + x\cos v\frac{dv}{dx} = \cancel{v\cos v} + 1$

$\int \cos v\, dv = \int \frac{dx}{x}$

$\boxed{\sin v = \ln x + c}$

$\sin(y/x) = \ln x + c$

$\sin(\pi/3) = \ln 1 + c$

$\boxed{c = \sqrt{3}/2}$ ✓

JEE MAIN 2024 LIVE PAPER DISCUSSION

If $x^2 = 2^y + 2023$ & $\underbrace{x, y \in N}$. Find $x + y$.

Even

odd

$x^2 = 2^y + 2023$

$\boxed{y = 1}$

odd $= x^2$

$\boxed{x = 45}$

$(40)^2 = 1600$

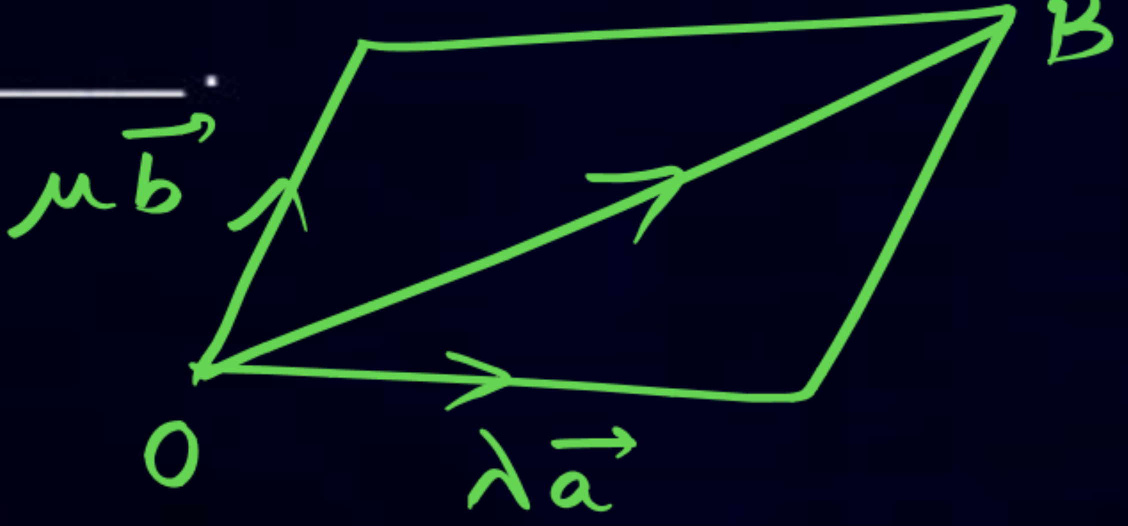
$(50)^2 = 2500$

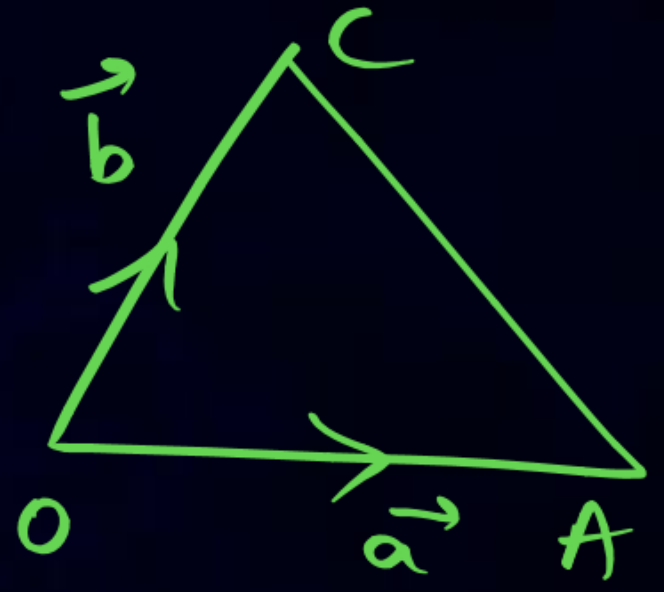
45^2

$$\begin{array}{r} 45 \\ \times\ 45 \\ \hline 225 \\ 180 \\ \hline 2025 \\ \hline \end{array}$$

If $\overrightarrow{OA} = \vec{a}, \overrightarrow{OC} = \vec{b}$ and area of ΔOAC is S and a parallelogram with sides parallel to $\overrightarrow{OA}$ & $\overrightarrow{OC}$ and diagonal $\overrightarrow{OB} = 12\vec{a} + 4\vec{b}$, has area equal to B, then $\frac{B}{S}$ is equal to ________.

$\frac{48}{1/2}$





$\overrightarrow{OB} = \lambda\vec{a} + \mu\vec{b} = 12\vec{a} + 4\vec{b}$

$12\vec{a}$ & $4\vec{b}$ $\quad \lambda = 12, \ \mu = 4.$

$S = \frac{1}{2}|\vec{a} \times \vec{b}|$

$B = |12\vec{a} \times 4\vec{b}| = 48|\vec{a} \times \vec{b}|$

$\frac{3\cos 2x+\cos^3 2x}{\cos^6 x-\sin^6 x} = x^3 - x^2 + 6$, then find the sum of roots.

LHS: $\frac{\cancel{\cos 2x}\,(3+\cos^2 2x)}{\cancel{(\cos^2 x-\sin^2 x)}\,(\underbrace{\cos^4 x+\sin^4 x}+\cos^2 x\sin^2 x)}$

$\frac{3+\cos^2 2x}{1-\frac{4\sin^2 x\cos^2 x}{4}} = \frac{3+\cos^2 2x}{1-\frac{\sin^2 2x}{4}}$

$= 4\frac{(\cancel{3+\cos^2 2x})}{\cancel{3+1-\sin^2 2x}} = 4$

$x^3 - x^2 + 6 = 4$

$\boxed{x^3 - x^2 + 2 = 0}$

$\boxed{\text{Sum} = 1}$ ✓

Consider function $f(x) = 2x + 3x^{2/3}$

(A) Exactly 1 local minima and no local maxima

(B) Exactly 1 local minima and 1 local maxima

(C) No local minima and 1 local maxima

(D) No local maxima and 1 local minima

$f'(x) = 2 + \cancel{3} \cdot \frac{2}{\cancel{3}} x^{-1/3}$

$2\left[1 + \frac{1}{x^{1/3}}\right] = 0$

$f'(x) = \frac{x^{1/3} + 1}{x^{1/3}} = 0$

+ve

−ve

$+ \quad -$

-1

$x > -1$

$x^{1/3} > (-1)^{1/3}$

$x^{1/3} > -1$

JEE MAIN 2024 LIVE PAPER DISCUSSION

Lines $x + 2y - 10 = 0$ and $3x - y - 2 = 0$ intersect at A and lines $2x - 3y + 2 = 0$ and $4x + 3y - 5 = 0$ intersect at B. Find perpendicular distance of $(-5, 2)$ from the line AB.

$x + 2y = 10$

$3x - 2 = y$

$x + 2(3x - 2) = 10$

$7x = 14$

$\boxed{x = 2}$

$y = 4$

$A(2, 4)$

Eqn of AB

$y = 2x$

$2x - \cancel{3y} + 2 = 0$

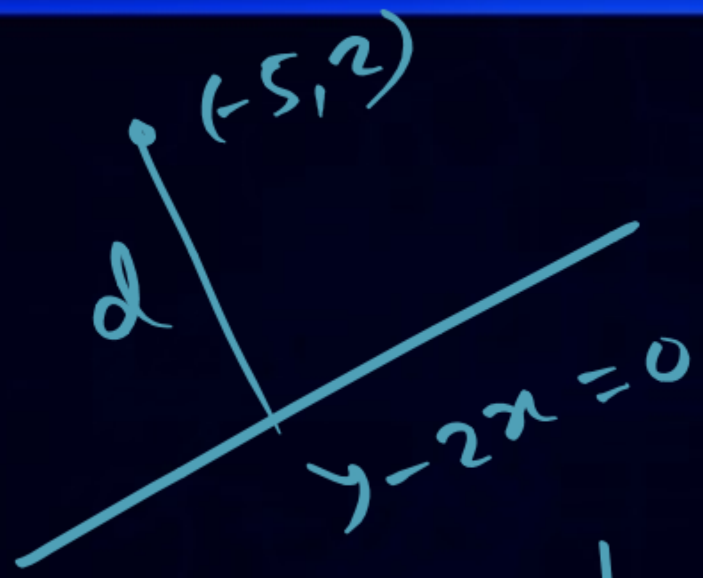
$4x + \cancel{3y} - 5 = 0$

$6x - 3 = 0$

$\boxed{x = 1/2}$

$1 - 3y + 2 = 0$ $\boxed{y = 1}$

$B\left(\frac{1}{2}, 1\right)$



$$d = \left|\frac{2+10}{\sqrt{5}}\right| = 12/\sqrt{5}$$

THANK YOU