JEE ADVANCED-2015

MATHEMATICS

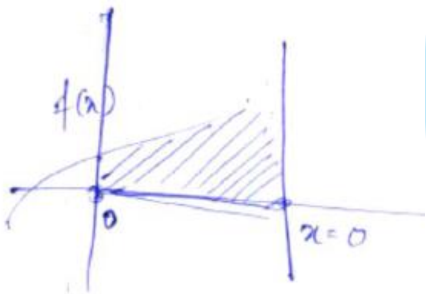
Q.41 Sol. (3)

$$F(x)=\int_{x}^{x^2+\frac{\pi}{6}} 2\cos^2 t\,dt$$

$$F'(x)=2\cos^2\left(x^2+\frac{\pi}{6}\right)(2x)-2\cos^2 x$$

$$\left[\int_{h(x)}^{g(x)} f(t)\,dt=\left\{f(g(x))g'(x)-\mathrm{f}(h(x))h'(x)\right\}\right]$$

$$F'(\alpha)=4\alpha\cos^2\left(a^2+\frac{\pi}{6}\right)-2\cos^2 a$$



Area bounded $=\int_0^{\alpha} f(x)\,dx$

Acc to question

$$\int_0^{\alpha} f(x)\,dx=F'(\alpha)+2$$

$$\int_0^{\alpha} f(x)\,dx = 2\cos^2\left[\alpha^2+\pi/6\right]\times 2\alpha - 2\cos^2\alpha\times 1 + 2$$

Differentiating both the sides

$$f(x) = 4x\cos^2\left[x^2+\pi/6\right] + 4x\times 2\cos\left[x^2+\pi/6\right]\times -\sin\left[x^2+\pi/6\right] + 2\times 2\cos x\times \sin x$$

$$\text{f}(0) = 4\times\frac{3}{4}+0 = 3$$

Q.42 Sol. (4)

Fixed volume $= V$ Let height be h

Let inner radius be r $V = \pi r^2 h$

Outer radius $= r+2$ $h = \dfrac{V}{\pi r^2}$

$(\text{Volume of material} = \text{Outer Volume} - \text{Inner Volume around curved surface area})$

$$= \pi(r+2)^2 h - V$$

Total volume of material (say V_1) $= \pi(r+2)^2 h - V + \pi(r+2)^2\times 2$

$$= \pi\frac{(r+2)^2 V}{\pi r^2} - V + 2\pi(r+2)^2$$

$$V_1 = \left(1+\frac{2}{r}\right)^2 V - V + 2\pi(r+2)^2$$

$$V_1' = 2V\left(1+\frac{2}{r}\right)\left(\frac{-2}{r^2}\right) + 4\pi(r+2)$$

Now V_1 is minimum at $r = 10$

$V_1' = 0$ at $r = 10$

On solving $\dfrac{V}{250\pi} = 4$

Q.43 Sol. (5)

When five girls are standing consecutively let us consider them as 1unit . So now 1unit of girls and 5 boys can be arrange in $6!$ Ways Girls themselves can be arranged in $5!$ Ways

Total ways $n = 6! \times 5!$

When 4 girls are standing consecutively

First select 4 girls out of 5 in ${}^5C_4$ ways and then consider them as 1unit 4 girls and other girl will be arranged in gaps between 5 Boys.

$m = {}^5C_4 5!\, {}^6C_2\, 2! 4!$

So, $\dfrac{m}{n} = 5$

Q.44 Sol. (8)

Let n be the number of times coin is tossed

Using binomial distribution Probability At least two $\text{heads} = \text{Total} - 1\,\text{head} - \text{No head}$

$$P(x \geq 2) = 1 - {}^nC_1 \frac{1}{2}\left(\frac{1}{2}\right)^{n-1} - {}^nC_o\left(\frac{1}{2}\right)^n$$

$$= 1 - n\left(\frac{1}{2}\right)^n - \left(\frac{1}{2}\right)^n$$

Now $P(x \geq 2) \geq 0.96$

$$1 - \frac{(n+1)}{2^n} \geq 0.96$$

$0.04 \geq \frac{(n+1)}{2^n}$

$(0.04)2^n \geq (n+1)$

By hit and trial.

For $n=8(\min.)$

Satisfies above equation

$n=8$

Q 45. Sol. (2)

$y^2 = 4x$

So, $a=1$, so coordinates of $\text{LR}:(1,2)$ and $(1,-2)$.

So, $m_T = \frac{dy}{dx} = \frac{4}{2y} = \frac{2}{y} = \frac{2}{2} = 1$

$m_N = -1$

So, eqn. of normal is,

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

$y+x=3$

Now, solve this line with circle and put $D=0$ as this time is tangent to circle so it will touch at one point only.

$(-y)^2+(y+2)^2 \quad =r^2$

$2y^2+4y+(4-r^2)=0$

$D=16-8(4-r^2)=0$

$2=4-r^2$

Hence, $r^2=2$

Q.46 Sol. (0)

$f(x)=\begin{cases}[x] & x\le 2\\ 0 & x>2\end{cases}$

$I=\int_1^2 \frac{xf(x^2)}{2+f(x+1)}dx$

$f(x^2)=\begin{cases}[x^2] & x^2\le 2\\ 0 & x^2>2\end{cases}$

$=\begin{cases}[x^2] & -\sqrt{2}<x\le\sqrt{2}\\ 0 & x>\sqrt{2}\, x<-\sqrt{2}\end{cases}$

$-1<x<2$

$f(x)^2 \quad =[x^2]-1\le x\le\sqrt{}2$

$\quad 0 \quad x>\sqrt{}2$

$f(x+1)=\begin{cases}[x+1] & x+1 \quad \le 2\\ 0 & x+1>2\end{cases}$

$$f(x+1)=\begin{cases}[x+1] & x\le 1\\ 0 & x>1\end{cases}$$

In $(-1,2)$

$$f(x+1)=\begin{cases}[x+1] & -1\le x\le 1\\ 0 & x>1\end{cases}$$

	$(-1,0)$	$(0,1)$	$(1,\sqrt{2})$	$(\sqrt{2},\sqrt{3})$	$(\sqrt{3},2)$
$f(x^2)$	0	0	1	0	0
$f(x+1)$	0	1	0	0	0

$$I=\int_1^2 \frac{xf\left(x^2\right)y1}{2+f\left(x+1\right)}=\int_1^{\sqrt{2}}\frac{x(1)\,dx}{2+0}$$

$$=\frac{x^2}{4}\Big|_1^{\sqrt{2}}=\frac{1}{2}-\frac{1}{4}=\frac{1}{4}$$

$$4l-1=4\times\frac{1}{4}-1=0$$

Q.47 Sol. (8)

$$\frac{5}{4}\cos^2 2x+\cos^4 x+\sin^4 x+\cos^6 x+\sin^6 x=2$$

$$\Rightarrow \frac{5}{4}\cos^2 2x+\left(\cos^2 x\right)^2+\left(\sin^2 x\right)^2+\left(\cos^2 x\right)^3+\left(\sin^2 x\right)^3=2$$

$$\Rightarrow \frac{5}{4}\cos^2 2x+\left(\cos^2 x+\sin^2 x\right)^2-2\cos^2 x\sin^2 x+\left(\cos^2 x+\sin^2 x\right)^3-3\sin^2 x\cos^2 x=2$$

$$\Rightarrow \frac{5}{4}\cos^2 2x + 1 - 2\cos^2 x \sin^2 x + 1 - 3\cos^2 x \sin^2 x = 2$$

$$\Rightarrow \frac{5}{4}\cos^2 2x = 5\cos^2 x \sin^2 x$$

$$\Rightarrow \cos^2 2x - \sin^2 2x = 0$$

$$\cos 4x = 0$$

x lies in $[0, 2\pi]$

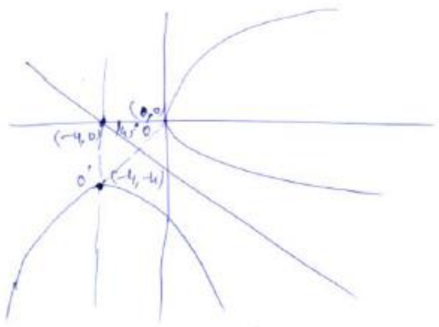
$4x$ lies in $[0, 8\pi]$

In $0, 2\pi$ $\cos t = 0$

At $t = \frac{\pi}{2}, \frac{3\pi}{2}$

In $0, 8\pi$ there will be 8 solutions.

Q.48 Sol. (4)



So equation of image parabola is $(x+4)^2 = -4(y+4)$

Now solve with $y = -5$

$$(x+4)^2 = -4(-5+4)$$

$(x+4)^2 = 4$

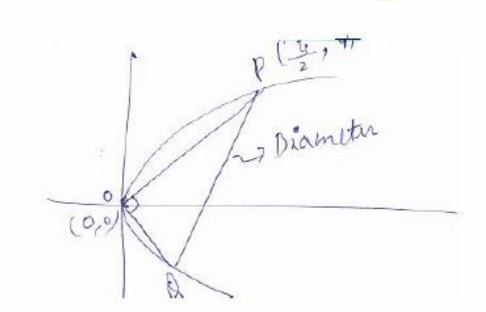
$x+4 = \pm 2$

$x = -4 \pm 2$

$x = -6, -2$

So distance b/w then 4 .

Q.49 Sol. (A, D)



$Y^2 = 2x$

$\therefore a = \frac{1}{2}$

Now, $m_{op}\, m_{\mathrm{od}} = -1$

$$\frac{t_1}{\left(\frac{t_1^2}{2}\right)} \times \frac{t_2}{\left(\frac{t_2^2}{2}\right)} = -1$$

$t_1 t_2 = -4 \quad \ldots\ldots(1)$

$$\text{Area of triangle}(\Delta)=\frac{1}{2}\begin{vmatrix}0 & 0 & 1\\ \frac{t_1^2}{2} & t_1 & 1\\ \frac{t_2^2}{2} & t_2 & 1\end{vmatrix}=3\sqrt{2}\ldots\ldots(2)$$

Solving (1) and (2), we get,

$t_1=2\sqrt{2}$ and $t_2=\sqrt{2}$

Q.50 Sol. (A,C)

$$(1+e^x)y'+e^x y=1$$

$$\frac{d}{dx}\left[(1+e^x)y\right]=1$$

Integrating both sides

$$(1+e^x)Y=x+c$$

$$Y=\frac{x+c}{1+e^x}$$

$$Y(0)=2$$

$$\frac{c}{1+1}=2\Rightarrow C=4$$

$$Y=\frac{x+4}{1+e^x}$$

$$Y(-4)=0$$

$$Y' = \frac{\left(1+e^{x}\right)-\left(x+4\right)e^{x}}{\left(1+e^{x}\right)^{2}}$$

$$Y' = \frac{1+e^{x}\left[x+3\right]}{\left(1+e^{x}\right)^{2}}$$

$$Y'(0) = \frac{1-3}{2^{2}} = \frac{-2}{2^{2}} = \frac{-1}{2}$$

$$Y'(-1) = \frac{1-2e^{-1}}{\left(1+e^{-1}\right)^{2}} > 0$$

So it will have critical point in $(-1,0)$

Q.51 Sol. (B,C)

$$(x-a)^{2}+(y-a)^{2}=r^{2}$$

$$2(x-a)+2(y-a)\frac{dy}{dx}=0$$

$$x-a+(y-a)\frac{dy}{dx}=0 \Rightarrow x-a+yy'-ay'=0$$

$$a=\frac{x+yy'}{1+y'}$$

again differentiating

$$(y-a)y''+y'y'+1=0$$

$$1+\left(y-\frac{x+yy'}{1+y'}\right)y''+y'y'=0$$

$$1+y'+(y-x)y''+y'y'+y'y'y'=0$$

$$y'+y'[1+y'-y'\cdot y']+1=0$$

$$P=Y-X$$

$$P+Q=1+-X+Y+Y'+(Y')^2$$

Q.52 Sol. (A,D)

$$f(x)=\begin{cases} g(x) & x>0 \\ -g(x) & x<0 \\ 0 & x=0 \end{cases}$$

$$h(x)=\begin{cases} e^{x} & x>0 \\ e^{-x} & x<0 \end{cases}$$

$$f(h(x))=\begin{cases} g(e^{x}) & e^{x}>0, \quad x\geq,0 & \\ -g(e^{x}) & e^{x}<0, \quad x\geq,0 & \text{its wrong} \\ 0 & e^{x}>0, \quad x\geq 0x & \text{its wrong} \end{cases}$$

$$=\begin{cases} g(e^{-x}) & e^{-x}>0, \quad x<0 & \text{its correct} \\ -g(e^{-x}) & e^{-x}<0, \quad x<0 & \text{its wrong} \\ 0 & e^{-x}>0, \quad x<0 & \text{its wrong} \end{cases}$$

$$f(h(x))=\begin{cases} g(e^{x}) & x\geq 0 \\ g(e^{-x}) & x<0 \end{cases}$$

$$(\text{foh})' = \begin{cases} g'\left(e^{x}\right)\times e^{x} & x \ge 0 \\ -g'\left(e^{-x}\right)\times e^{-x} & x < 0 \end{cases}$$

$$h\left(f\left(x\right)\right) = \begin{cases} e^{g(x)} & g\left(x\right) > 0, \quad x > 0 \\ e^{-g(x)} & -g\left(x\right) > 0, \quad x < 0 \quad g\left(x\right) < 0 \\ e^{0} & g\left(x\right) > 0, \quad x < 0 \end{cases}$$

$$h\left(f\left(x\right)\right) = \begin{cases} e^{-g(x)} & g\left(x\right) < 0, \quad x > 0 \quad g\left(x\right) < 0 \\ e^{g(x)} & -g\left(x\right) < 0, \quad x < 0 \quad g\left(x\right) > 0, x < 0 \\ e^{-0} & 0 > 0, \quad x = 0 \end{cases}$$

$$h\left(f\left(x\right)\right) = \begin{cases} e^{g(x)} & g\left(x\right) > 0 \\ e^{-g(x)} & g\left(x\right) < 0 \\ 1 & \end{cases}$$

$$h\left(f\left(x\right)\right) = \mathrm{e}^{g(x)} \times g' x$$

$$h\left(f\left(x\right)\right) = \mathrm{e}^{g(x)} \times g'\left(x\right) \times -1$$

Q.53 Sol.

$$f\left(x\right) = \sin\left(\frac{\pi}{6}\sin\left(\frac{\pi}{2}\sin x\right)\right)$$

$$g\left(x\right) = \frac{\pi}{2}\sin x$$

Now, $f\left(x\right) = \sin\left(\frac{\pi}{6}\sin\left(\frac{\pi}{6}\sin x\right)\right)$

$$\theta = \frac{\pi}{6}\sin x \in \left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$$

$$\sin\left(\frac{\pi}{6}\sin\theta\right) \in \left[\frac{-1}{2}, \frac{1}{2}\right] \quad \therefore (A)$$

$$f\left(g\left(x\right)\right) = \sin\left[\frac{\pi}{6}\sin\frac{\pi}{2}\left(\sin\left(\frac{\pi}{2}\sin x\right)\right)\right]$$

$$\frac{\pi}{2}\sin x = \theta \text{ for } x \in R$$

$$\theta \in \left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$$

$$f\left(g\left(x\right) = \sin\frac{\pi}{6}\sin\left(\frac{\pi}{2}\sin\theta\right)\right.$$

$$\frac{\pi}{2}\sin\theta = \propto$$

$$\propto \in \left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$$

$$f\left(g\left(x\right)\right) = \sin\left(\frac{\pi}{6}\sin\propto\right)$$

$$\text{For } \propto \in \left[\frac{-\pi}{2}, \frac{\pi}{2}\right]\frac{\pi}{6}\sin\propto \in \left[\frac{-\pi}{6}, \frac{\pi}{6}\right]$$

$$\Rightarrow \sin\left(\frac{\pi}{6}\sin\propto\right) \in \frac{-1}{2}, \frac{1}{2} \quad \therefore (B)$$

$$\text{Now, } \lim_{x\to 0}\frac{\sin\left(\frac{\pi}{6}\sin\left(\frac{\pi}{2}\sin x\right)\right)}{\frac{\pi}{2}\sin x}$$

$$\lim_{x\to 0}\frac{2}{\pi}\frac{\sin\left(\frac{\pi}{6}\sin\left(\frac{\pi}{2}\sin x\right)\right)}{\frac{\pi}{6}\sin\left(\frac{\pi}{2}\sin x\right)}\times\frac{\frac{\pi}{6}\sin\left(\frac{\pi}{2}\sin x\right)}{\frac{\sin x}{x}xx}$$

$$=\lim_{x\to 0}\frac{2}{\pi}\times\frac{\pi}{6}\times\frac{\sin\left(\frac{\pi}{2}\sin x\right)}{\frac{\pi}{2}\sin x}\times\frac{\frac{\pi}{2}\sin x}{x}$$

$$\frac{1}{3}\times\frac{\pi}{2}\times\frac{\pi}{6}\quad\therefore(C)$$

$$\Rightarrow\frac{\pi}{2}\sin\left(\frac{\pi}{2}\left(\frac{\pi}{2}\sin x\right)\right)=1$$

$$\Rightarrow\quad\sin\left(\frac{\pi}{6}\sin\left(\frac{\pi}{2}\sin x\right)\right)=\frac{2}{\lambda}\cong\frac{2}{3.14}>\frac{1}{2}\quad\therefore(D)$$

Q.54 Sol. (A,C,D)

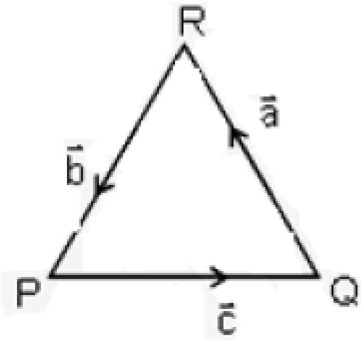
$$\vec{a}+\vec{b}+\vec{c}=0$$

$$\Rightarrow\vec{b}+\vec{c}=-\vec{a}$$

$$\Rightarrow 48+\vec{c}^{\,2}+48=144$$

$$\Rightarrow\vec{c}^{\,2}=48$$

$$\Rightarrow\frac{|\vec{c}|^2}{2}-|\vec{a}|=24-12=12\ \text{ Ans }(A)$$



Further

$\vec{a}+\vec{b}=-\vec{c}$

$\Rightarrow 144+48+2\vec{a}\vec{b}=48$

$\Rightarrow \vec{a}\vec{b}=-72$ Ans (D)

$\because \vec{a}\times\vec{b}\times\vec{a}\times\vec{c}=0$

$\therefore \left|\vec{a}\times\vec{b}+\vec{c}\times\vec{a}\right|=2\left|\vec{a}\times\vec{b}\right|=2.\sqrt{144.48-(72)^2}=48\sqrt{3}$ Sol. (C)

Q.55 Sol. (C, D)

(A) $\left(Y^3Z^4-Z^4Y^3\right)^T=-Y^3Z^4+Z^4Y^3$

$\Rightarrow Y^3Z^4-Z^4Y^3$ is Skew-symmetric

(C) $\left(X^4Z^3-Z^3X^4\right)^T=\left(X^4Z^3\right)^T\left(Z^3X^4\right)^T$

$=Z^3X^4-X^4Z^3$

$=-\left(X^4Z^3-Z^3X^4\right)$

(D) $\left(X^{23}+Y^{23}\right)^T=-X^{23}-Y^{23}\Rightarrow X^{23}-Y^{23}$ is Skew – symmetric

Q.56 Sol. $(\mathrm{B,C})$

$R_3 \to R_3 - R_2$

$R_2 \to R_2 - R_1$

$$\begin{vmatrix} (1+a)^2 & (1+2a)^2 & (1+3a)^2 \\ 3+2a & 3+4a & 3+6a \\ 5+2a & 5+4a & 5+6a \end{vmatrix} = -648a$$

$R_3 \to R_3 \to R_2$

$$\begin{vmatrix} (1+a)^2 & (1+2a)^2 & (1+3a)^2 \\ 3+2a & 3+4a & 3+6a \\ 2 & 2 & 2 \end{vmatrix} = -648a$$

$C_3 \to C_3 \to C_2 \to C_2 - C_1$

$$\begin{vmatrix} (1+a)^2 & a(2+3a) & a(2+5a) \\ 3+2a & 2a & 2a \\ 2 & 0 & 0 \end{vmatrix} = -648a$$

$\Rightarrow 2a^2(2+3a) - 2a^2(2+5a) = -324a$

$\Rightarrow -4a^3 = -324a \quad \Rightarrow a = 0, \pm 9$

Q.57 Sol. $(\mathrm{B,C})$

$y + \lambda[x+z-1] = 0$

$$\left|\frac{1-\lambda}{\sqrt{\lambda^2+\lambda^2+1}}\right| = 1$$

$1+\lambda^2-2\lambda=2\lambda^2+1$

$\lambda^2+2\lambda=0$

$\lambda=0/\lambda=-2$

$2x+2z-y-2=0$

$\left|\dfrac{2a-\beta+2\gamma-2}{\sqrt{2^2+2^2+1}}\right|=2$

$2\alpha+2\gamma-\beta-2=\pm 6$

$2\alpha-\beta+2\gamma=8$

$2\alpha-\beta+2\gamma=-4$

Q.58 Sol. $(A),(B),(C),(D)$

$\dfrac{x}{a}=\dfrac{y}{b}=\dfrac{z}{c}=k$

$a+2b-c=0$

$2a-b+c=0$

$3a+b=0 \quad a=\dfrac{-b}{3}$

$b=-3a$

$2a+4b-2c=0$

$-2a+b-c=0$

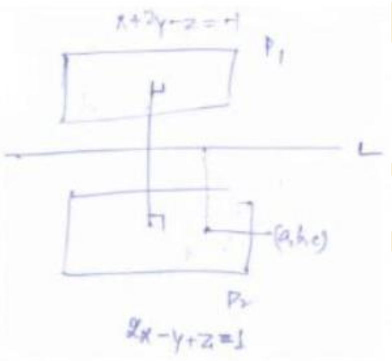
$$5b-3c=0 \quad c=\frac{5b}{3}$$

$$\therefore \frac{x}{\frac{-b}{3}}=\frac{y}{b}=\frac{z}{\frac{5b}{3}}=k$$

$$\frac{x}{\frac{-1}{3}}=\frac{y}{1}=\frac{z}{\frac{5}{3}}=k'$$

$$\frac{x}{-1}=\frac{y}{3}=\frac{z}{5}=k$$

$$2a-b+c=-1$$



Q.59 Sol. (A→ P.Q)

$$\text{(A)} \left|\left(\alpha\hat{i}+\beta\hat{j}\right).\left(\frac{\sqrt{3}i+j}{2}\right)\right|=\surd \quad \Rightarrow \sqrt{3}\alpha+\beta=\pm 2\surd 3$$

$$\surd 3\alpha+\left(\frac{\alpha-2}{\sqrt{3}}\right)-\pm 2\surd$$

$$\Rightarrow 3\alpha+\alpha-2=\pm 6 \quad \Rightarrow 4\alpha=8,-4 \quad \Rightarrow \alpha=2,-1$$

$(B \to P, Q)$

Continuous $\Rightarrow -3a-2=b+a^2$

Differentiable $\Rightarrow -6a=b \Rightarrow \quad 6a=a^2+3a+2$

$(C \to P, Q, S, T)$

Let $a=3-3\omega+2\omega^2$

$a\omega=3\omega-3\omega^2+2$

Now, $a^{4n+3}\left(1+\omega^{4n+3+}\left(\omega^2\right)^{4n+3}\right)=0$

$\Rightarrow n$ should not be a multiple of 3 Hence P, Q, S, T

$(D \to Q, T)$

$\dfrac{2ab}{a+b}=4 \Rightarrow ab=2a+2b$ ....(i)

$q=10-a$ and $2q=5+b$

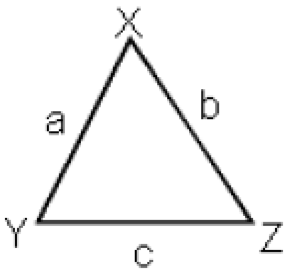
$\Rightarrow 20-2a=5+b \Rightarrow 15=2a+b$ ......(II)

$\Rightarrow 15a-2a^2=-2a+30 \quad \Rightarrow 2a^2-17a+30=0 \quad \Rightarrow a=6, \dfrac{5}{2}$

$\Rightarrow = 4, \dfrac{15}{2} \quad \Rightarrow |q-a|=2, 5$

Q.60 Sol. (A → P,R,S)

(A)



Given $2\left(a^2-b^2\right)=c^2$

$\Rightarrow 2\left(\sin^2 x-\sin^2 y\right)=\sin^2 z$

$\Rightarrow 2\sin\left(x+y\right)\sin\left(x-y\right)=\sin^2 z$

$\Rightarrow 2\sin\left(\pi-z\right)\sin\left(x-y\right)=\sin^2 z$

$Z\Rightarrow \sin\left(x-y\right)=\frac{\sin z}{2}\text{.......}\left(\text{i}\right)$

Also given,

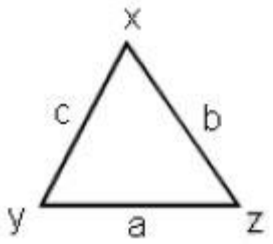
$\lambda=\frac{\sin\left(x-y\right)}{\sin}=\frac{1}{2}$

Now, $\cos\left(n\pi\lambda\right)=0$

$\Rightarrow \cos\left(\frac{n\pi}{2}\right)=0$

$\because n=1,3,5 \quad \therefore\left(A\rightarrow P,R,S\right)$

$\left(B\rightarrow P\right)$



$$1+\cos 2x-2\cos 2y=2\sin x\sin y$$

$$2\cos^2 x-2\cos 2y=2\sin X\sin y$$

$$1-\sin^2 x-1+2\sin^2 y=\sin x\,\mathrm{siny}$$

$$\sin^2 x+\sin x\sin y=2\sin^2 y$$

$$\sin x(\sin x+\sin y)=2\sin^2 y \quad \sin x=ak,\sin y=bk$$

$$a^2+ab-2b^2=0$$

$$\left(\frac{a}{b}\right)^2+\frac{a}{b}-2=0$$

$$\frac{a}{b}=-2,1$$

$$\frac{a}{b}=1 \quad (B\to P)$$

$$(C\to P,Q)$$

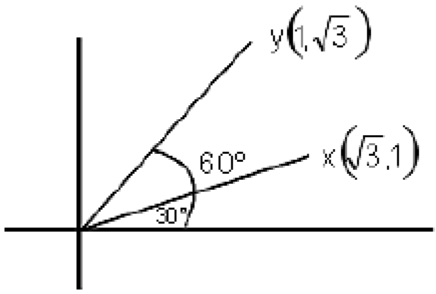
Hence equation of acute angle bisector of OX and OY is $y=x$

Hence $x-y=0$

Now distance of $\beta\hat{i}+(1-\beta)\hat{j}\equiv x(\beta,1-\beta)$ form $x-y$ is $\left|\frac{\beta-(1-\phi)}{\sqrt{2}}\right|=\frac{3}{\sqrt{2}}$

$|2\beta-1|=3$

$2\beta-1=\pm3$



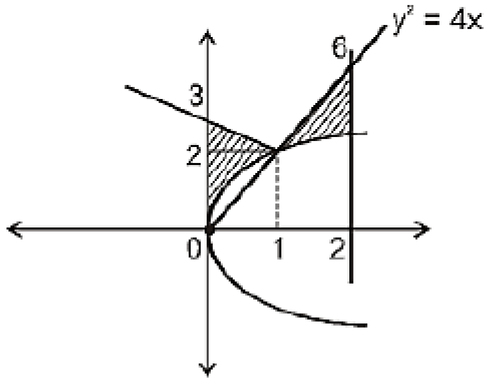
$2\beta=4-2$

$|\beta|=2,1$ Ans. (P,Q)

For $\alpha 1$

$$Y=|x-1|+|x-2|+x=\begin{cases}3-x; x<1\\1+x; 1\le x<2\\3x-3; x\ge 2\end{cases}$$

$A=\frac{1}{2}$

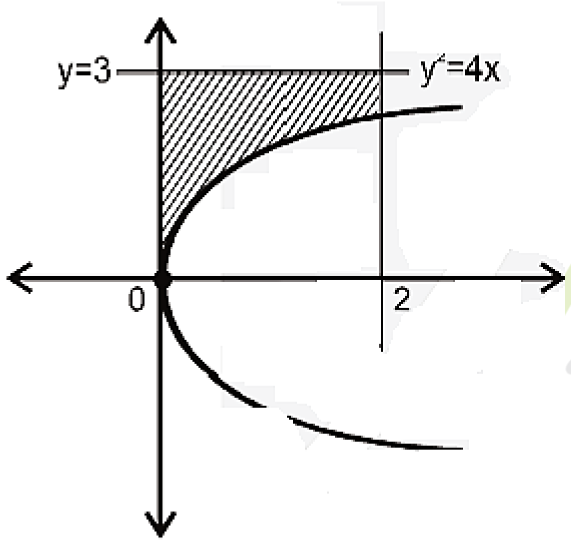


$$(2+3)\times 1+\frac{1}{2}(2+3)\times 1-\int_0^2 2\sqrt{x}dx$$

$$A=5-\frac{8}{3}\sqrt{2}$$

$$\therefore F(1)+\frac{8}{3}\sqrt{2}=5$$

For $\alpha=0, y=|-1|+|-2|=3$



$$A=6-\int_0^2 2\sqrt{x}dx \quad \Rightarrow A=6-\frac{8}{3}\sqrt{2}$$

$$\therefore F(0)+\frac{8}{3}\sqrt{2}=6$$

$$\therefore (D\rightarrow S,T)$$