MODEL EXAMINATION - MARCH 2021

Mathematics (Science)

1 to 10 carry 3 scores each.

1.
$$2x^2 - 24 = 2 - 20$$
$$2x^2 - 24 = -18$$
$$2x^2 = 6$$
$$x^2 = 3$$
$$x = \pm\sqrt{3}$$

2.

i) $\text{adj } A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$

ii) $A(\text{adj} A) = \begin{bmatrix} 3 & 1 \\ -2 & 1 \end{bmatrix}\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$
$$= \begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$$
$$= 5\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$
$$= 5I$$

3. $LHL = \lim_{x \to 2^-} f(x)$
$$= \lim_{x \to 2^-} kx^2$$
$$= 4k$$
$RHL = \lim_{x \to 2^+} f(x)$
$$= \lim_{x \to 2^+} 3$$
$$= 3.$$

$f(x)$ is continuous at $x=2$

$LHL = RHL = f(2).$

$\therefore \quad 4k = 3$

$k = 3/4$

4. The function $f(x) = x^2 - 4x - 3$ is continuous on $[1,4]$ and differentiable on $(1,4)$

$f(a) = f(1) = -6$

$f(b) = f(4) = -3$

$\therefore f'(c) = \dfrac{f(b) - f(a)}{b-a}$
$$= \frac{-3 - -6}{4-1}$$
$$= 1$$

Theorem states that there is a point $c \in (1,4)$ such that $f'(c) = 1$.

But $f'(x) = 2x - 4$

$f'(c) = 1 \Rightarrow 2c - 4 = 1$
$$2c = 5$$
$$c = 5/2 \in (1,4)$$

5. Given that $\dfrac{dr}{dt} = 5$ cm/s

Area of a circle,
$$A = \pi r^2$$
$$\frac{dA}{dt} = 2\pi r \frac{dr}{dt}$$
$$= 2\pi \times 8 \times 5$$
$$= 80\pi \text{ cm}^2/\text{s}$$

6. unit vector, $\hat{a} = \dfrac{\vec{a}}{|\vec{a}|}$

$\vec{PQ}$ = P.V. of Q − P.V. of P
$$= 3\hat{i} + 3\hat{j} + 3\hat{k}$$
$|\vec{PQ}| = \sqrt{27}$

unit vector is $\dfrac{3}{\sqrt{27}}\hat{i} + \dfrac{3}{\sqrt{27}}\hat{j} + \dfrac{3}{\sqrt{27}}\hat{k}$

7. Point is $(1,4,6)$.

normal vector is $\vec{i}-2\vec{j}+\vec{k}$.

Vector equation is,

$$(\vec{r}-\vec{a})\cdot\vec{N}=0.$$

$$[\vec{r}-(\vec{i}+4\vec{j}+6\vec{k})]\cdot(\vec{i}-2\vec{j}+\vec{k})=0$$

Cartesian equation is,

$$A(x-x_1)+B(y-y_1)+C(z-z_1)=0$$

$$1(x-1)-2(y-4)+1(z-6)=0$$

$$x-1-2y+8+z-6=0$$

$$x-2y+z+1=0.$$

$$x-2y+z=-1$$

8. i) $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)=\frac{\pi}{4}$

ii) $\tan^{-1}(1)=\frac{\pi}{4}$

$$\cos^{-1}\left(-\tfrac{1}{2}\right)=\pi-\frac{\pi}{3}=\frac{2\pi}{3}$$

$$\sin^{-1}\left(-\tfrac{1}{2}\right)=-\frac{\pi}{6}$$

$$\therefore \tan^{-1}(1)+\cos^{-1}\left(-\tfrac{1}{2}\right)+\sin^{-1}\left(-\tfrac{1}{2}\right)$$

$$=\frac{\pi}{4}+\frac{2\pi}{3}-\frac{\pi}{6}$$

$$=\frac{3\pi}{4}$$

9. Equation of line joining two points

$$\begin{vmatrix} x & y & 1 \\ 1 & 2 & 1 \\ 3 & 6 & 1 \end{vmatrix}=0$$

$$x(2-6)-y(1-3)+k(6-6)=0$$

$$-4x+2y=0$$

$$y=2x$$

10. $\frac{dy}{dx}+\frac{y}{x}=x^2$

$$P=\frac{1}{x}\qquad Q=x^2$$

$$\text{I.F}=e^{\int P dx}=e^{\int \frac{1}{x} dx}$$

$$=e^{\log x}$$

$$=x.$$

general solution is.

$$y\cdot e^{\int P dx}=\int\left(Q\cdot e^{\int P dx}\right)dx$$

$$\therefore yx=\int x^2\cdot x\,dx$$

$$=\int x^3\,dx$$

$$xy=\frac{x^4}{4}+c$$

$$y=\frac{x^3}{4}+cx^{-1}$$

11 to 22 carry 4 scores each.

11. $A=\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22}\end{bmatrix}$

$$a_{ij}=\frac{(i+j)^2}{2}$$

$$a_{11}=\frac{(1+1)^2}{2}=2$$

$$a_{12}=\frac{(1+2)^2}{2}=\frac{9}{2}$$

$$a_{21}=\frac{(2+1)^2}{2}=\frac{9}{2}$$

$$a_{22}=\frac{(2+2)^2}{2}=8$$

$$\therefore A=\begin{bmatrix} 2 & \frac{9}{2} \\ \frac{9}{2} & 8\end{bmatrix}$$

ii) $a-b=-1$

$2a-b=0$

$d=4$

$c=5$

$$\begin{aligned} a-b &= -1 \\ -\ 2a-b &= 0 \\ \hline -a &= -1 \\ a &= 1 \end{aligned}$$

$\therefore\ a-b=-1$

$b=a+1$

$=1+1$

$=\underline{\underline{2}}$

$\underline{\underline{a=1,\ b=2,\ c=5,\ d=4}}$

12. i) $3A=\begin{bmatrix}6 & 12\\ 9 & 6\end{bmatrix}$

$3A-C=\underline{\underline{\begin{bmatrix}8 & 7\\ 6 & 2\end{bmatrix}}}$

ii) $AB=\begin{bmatrix}2 & 4\\ 3 & 2\end{bmatrix}\begin{bmatrix}1 & 3\\ -2 & 5\end{bmatrix}$

$=\underline{\underline{\begin{bmatrix}-6 & 26\\ -1 & 19\end{bmatrix}}}$

13. i) $\tan^{-1}x+\tan^{-1}y=\tan^{-1}\left(\frac{x+y}{1-xy}\right)$

ii) $\tan^{-1}\frac{2}{11}+\tan^{-1}\frac{7}{24}$

$=\tan^{-1}\left(\dfrac{\frac{2}{11}+\frac{7}{24}}{1-\frac{2}{11}\times\frac{7}{24}}\right)$

$=\tan^{-1}\left(\dfrac{\frac{125}{264}}{\frac{250}{264}}\right)$

$=\tan^{-1}\left(\frac{125}{250}\right)=\underline{\underline{\tan^{-1}\left(\frac{1}{2}\right)}}$

14.

i) $y=\sin(\cos(x^2))$

$\frac{dy}{dx}=\cos(\cos(x^2))\times-\sin(x^2)\times 2x$

$=\underline{\underline{-2x\sin x^2\cos(\cos x^2)}}$

ii) $x^2+xy+y^2=100$

differentiating w.r.t. x.

$2x+x\frac{dy}{dx}+y+2y\frac{dy}{dx}=0.$

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

$\underline{\underline{\frac{dy}{dx}=\frac{-2x-y}{x+2y}}}$

15.

i)

$x=0,\ f(x)=\sin 0+\cos 0=1$

$x=\pi/6,\ f(x)=\sin\frac{\pi}{6}+\cos\frac{\pi}{6}$

$=\frac{1}{2}+\frac{\sqrt{3}}{2}$

$=\frac{1+\sqrt{3}}{2}\approx 1.366$

$x=\pi/4,\ f(x)=\sin\frac{\pi}{4}+\cos\frac{\pi}{4}$

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

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

$=\sqrt{2}\approx 1.414$

$x=\pi/3,\ f(x)=\sin\frac{\pi}{3}+\cos\frac{\pi}{3}$

$=\frac{\sqrt{3}}{2}+\frac{1}{2}$

$=\frac{1+\sqrt{3}}{2}$

$x=\pi/2,\ f(x)=\sin\frac{\pi}{2}+\cos\frac{\pi}{2}=1$

$\therefore$ Maximum value of $f(x)$ in $[0,\pi/2]$ is $\sqrt{2}$

OR

$(\sin x+\cos x)^2$

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

$= 1 + \sin 2x$

Maximum value of $\sin 2x$ is 1

$\therefore (\sin x+\cos x)^2 = 1+1$
$= 2$

$\sin x + \cos x = \sqrt{2}$

maximum value is $\sqrt{2}$

ii) $f(x) = x^2+2x-5$

$f'(x) = 2x+2$

$f'(x)=0 \Rightarrow 2x+2=0$
$x=-1$

There are two intervals $(-\infty,-1)$ and $(-1,\infty)$

$f'(0) = 2 > 0$

$f(x)$ is increasing in $(-1,\infty)$

$f'(-2) = -2 < 0$

$f(x)$ is decreasing in $(-\infty,-1)$.

16. i) Order = 2

ii) $\sec^2 x \tan y\, dx + \sec^2 y \tan x\, dy = 0$

$\sec^2 x \tan y\, dx = -\sec^2 y \tan x\, dy$

$\frac{\sec^2 x}{\tan x} dx = -\frac{\sec^2 y}{\tan y} dy.$

$\int \frac{\sec^2 x}{\tan x} dx = -\int \frac{\sec^2 y}{\tan y} dy.$

Put $U = \tan x$ $\quad V = \tan y$

$du = \sec^2 x\, dx$ $\quad dv = \sec^2 y\, dy$

$\therefore \int \frac{1}{U} du = -\int \frac{1}{V} dv$

$\log|U| = -\log|V| + C$

$\log|U| + \log|V| = C$

$\log|UV| = \log c$

$\log|\tan x \tan y| = \log c$

$\tan x \tan y = c$

17. $\vec{a}+\vec{b} = 4\hat{i}+4\hat{j}$

$\vec{a}-\vec{b} = 2\hat{i}+4\hat{k}$

Vector $\perp^r$ to both $\vec{a}+\vec{b}$ & $\vec{a}-\vec{b}$ is $(\vec{a}+\vec{b})\times(\vec{a}-\vec{b})$.

$(\vec{a}+\vec{b})\times(\vec{a}-\vec{b})$

$= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 4 & 4 & 0 \\ 2 & 0 & 4 \end{vmatrix}$

$= \hat{i}(16-0) - \hat{j}(16-0) + \hat{k}(0-8)$

$= 16\hat{i} - 16\hat{j} - 8\hat{k}$

$|(\vec{a}+\vec{b})\times(\vec{a}-\vec{b})| = \sqrt{256+256+64}$

$= \sqrt{576}$

$= 24$

Unit vector $\perp^r$ to $\vec{a}+\vec{b}$ and $\vec{a}-\vec{b}$ is $\frac{(\vec{a}+\vec{b})\times(\vec{a}-\vec{b})}{|(\vec{a}+\vec{b})\times(\vec{a}-\vec{b})|}$

$= \frac{16}{24}\hat{i} - \frac{16}{24}\hat{j} - \frac{8}{24}\hat{k}$

$= \frac{2}{3}\hat{i} - \frac{2}{3}\hat{j} - \frac{1}{3}\hat{k}$

18.

$\vec{a}_1 = \hat{i} + 2\hat{j} + 3\hat{k}$

$\vec{a}_2 = 4\hat{i} + 5\hat{j} + 6\hat{k}$

$\vec{b}_1 = \hat{i} - 3\hat{j} + 2\hat{k}$

$\vec{b}_2 = 2\hat{i} + 3\hat{j} + \hat{k}$

Shortest distance between lines

$$d = \left| \frac{(\vec{b}_1 \times \vec{b}_2) \cdot (\vec{a}_2 - \vec{a}_1)}{|\vec{b}_1 \times \vec{b}_2|} \right|$$

$\vec{a}_2 - \vec{a}_1 = 3\hat{i} + 3\hat{j} + 3\hat{k}$

$$\vec{b}_1 \times \vec{b}_2 = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & -3 & 2 \\ 2 & 3 & 1 \end{vmatrix}$$

$= \hat{i}(-3-6) - \hat{j}(1-4) + \hat{k}(3-6)$

$= -9\hat{i} + 3\hat{j} + 9\hat{k}$

$|\vec{b}_1 \times \vec{b}_2| = \sqrt{81 + 9 + 81} = \sqrt{171}$

$(\vec{b}_1 \times \vec{b}_2) \cdot (\vec{a}_2 - \vec{a}_1) = -27 + 9 + 27$

$= 9.$

$\therefore d = \left| \frac{9}{\sqrt{171}} \right|$

$= \frac{9}{\sqrt{171}}$

$= \frac{9}{3\sqrt{19}}$

$= \frac{3}{\sqrt{19}}$

19. i) $P(A \cap B) = P(A) \cdot P(B)$

$= \frac{1}{7} \times \frac{1}{5}$

$= \frac{1}{35}$

ii) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

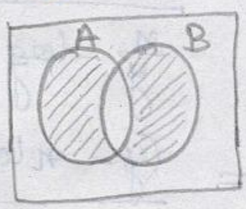
$= \frac{1}{7} + \frac{1}{5} - \frac{1}{35}$

$= \frac{11}{35}$

iii) $P[(A \cap B') \cap (B \cap A')]$

$A \cap B'$ and $B \cap A'$ are mutually exclusive events

So. $P[(A \cap B') \cap (B \cap A')] = 0.$



20.

$R = \{(a, b) : |a-b| \text{ is even}\}$

$A = \{1, 2, 3, 4, 5\}.$

$|a-a| = 0$ is even.

$\therefore R$ is reflexive

$(a, b) \in R \Rightarrow |a-b|$ is even

$\Rightarrow |b-a|$ is even

$\Rightarrow (b, a) \in R$

$\therefore R$ is symmetric

$(a, b) \in R$ and $(b, c) \in R$

$\Rightarrow |a-b|$ is a multiple of 2 and $|b-c|$ is a multiple of 2

$\Rightarrow |a-c|$ is a multiple of 2

$\Rightarrow (a, c) \in R$

$\therefore R$ is transitive

$\therefore R$ is an equivalence relation.

21. $y^x = x^y$

taking logarithm on both sides

$\log y^x = \log x^y$

$x \log y = y \log x$.

differentiating w.r.t x

$$x \frac{1}{y}\frac{dy}{dx} + \log y = y\frac{1}{x} + \log x \frac{dy}{dx}.$$

$$\frac{x}{y}\frac{dy}{dx} - \log x \frac{dy}{dx} = \frac{y}{x} - \log y$$

$$\left(\frac{x}{y} - \log x\right)\frac{dy}{dx} = \frac{y}{x} - \log y$$

$$\frac{dy}{dx} = \frac{\frac{y}{x} - \log y}{\frac{x}{y} - \log x}$$

$$\frac{dy}{dx} = \frac{(y - x\log y)\, y}{(x - y\log x)\, x}$$

22.

i) $\int x \log x \, dx$

$$= \log x \int x\,dx - \int\left[\frac{d}{dx}(\log x)\int x\,dx\right]dx$$

$$= \log x \frac{x^2}{2} - \int \frac{1}{x}\frac{x^2}{2}\,dx$$

$$= \frac{x^2 \log x}{2} - \frac{1}{2}\int x\,dx$$

$$= \frac{x^2 \log x}{2} - \frac{1}{2}\frac{x^2}{2} + C$$

$$= \frac{x^2 \log x}{2} - \frac{x^2}{4} + C$$

ii) $\int x^2 \sin x \, dx$

$$= x^2 \int \sin x\,dx - \int\left[\frac{d}{dx}(x^2)\int \sin x\,dx\right]dx$$

$$= x^2(-\cos x) - \int 2x(-\cos x)\,dx$$

$$= -x^2\cos x + 2\int x\cos x\,dx$$

$$= -x^2\cos x + 2\left[x\int \cos x\,dx - \int\left(\frac{d}{dx}(x)\int \cos x\,dx\right)dx\right]$$

$$= -x^2\cos x + 2\left[x \sin x - \int \sin x\,dx\right]$$

$$= -x^2\cos x + 2\left[x\sin x - -\cos x\right] + C$$

$$= -x^2\cos x + 2x\sin x + 2\cos x + C$$

23 to 29 carry 6 scores each

23. $A = \frac{1}{2}(A + A^T) + \frac{1}{2}(A - A^T)$

$$A^T = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$

$$A + A^T = \begin{bmatrix} 12 & -4 & 4 \\ -4 & 6 & -2 \\ 4 & -2 & 6 \end{bmatrix}$$

$$A - A^T = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$\frac{1}{2}(A + A^T) + \frac{1}{2}(A - A^T)$

$$= \frac{1}{2}\begin{bmatrix} 12 & -4 & 4 \\ -4 & 6 & -2 \\ 4 & -2 & 6 \end{bmatrix} + \frac{1}{2}\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$= A$

24. $Ax = B$

$$\begin{bmatrix} 3 & -2 & 3 \\ 2 & 1 & -1 \\ 4 & -3 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$$

$$|A| = \begin{vmatrix} 3 & -2 & 3 \\ 2 & 1 & -1 \\ 4 & -3 & 2 \end{vmatrix}$$

$$= -17 \neq 0$$

$$\text{Adj } A = \begin{bmatrix} -1 & -5 & -1 \\ -8 & -6 & 9 \\ -10 & 1 & 7 \end{bmatrix}$$

$$A^{-1} = \frac{\text{adj } A}{|A|}$$

$$= \frac{-1}{17} \begin{bmatrix} -1 & -5 & -1 \\ -8 & -6 & 9 \\ -10 & 1 & 7 \end{bmatrix}$$

$$X = A^{-1} B$$

$$= \frac{-1}{17} \begin{bmatrix} -1 & -5 & -1 \\ -8 & -6 & 9 \\ -10 & 1 & 7 \end{bmatrix} \begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$$

$$= \frac{-1}{17} \begin{bmatrix} -17 \\ -34 \\ -51 \end{bmatrix}$$

$$= \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$$

$x = 1, \ y = 2, \ z = 3$

25. i) $f(x) = 3 - 4x$

Let $f(x_1) = 3 - 4x_1$

$f(x_2) = 3 - 4x_2$

$f(x_1) = f(x_2) \Rightarrow 3 - 4x_1 = 3 - 4x_2$

$4x_1 = 4x_2$

$x_1 = x_2$

$\therefore f(x)$ is one - one.

Let $y \in R$, and $f(x) = y$

ie $3 - 4x = y$

$\Rightarrow 4x = 3 - y$

$x = \frac{3-y}{4} \in R$

Every y has a pre-image under f. f is onto

$\therefore f$ is bijective

ii) $f(x) = 2x+1, \ g(x) = x^2$

$gof(x) = g(f(x))$

$= g(2x+1)$

$= \underline{\underline{(2x+1)^2}}$

$fog(x) = f(g(x))$

$= f(x^2)$

$= \underline{\underline{2x^2+1}}$

26. curve is $y = x^2 - 2x + 7$

Slope of tangent, $\frac{dy}{dx} = 2x - 2$

1) slope of the lines are same since they are parallel

$2x - y + 9 = 0$

$y = 2x + 9$

Slop $= 2$.

$\therefore 2x - 2 = 2$

$2x = 4$

$x = 2$

But $y = x^2 - 2x + 7$

$= 4 - 4 + 7$

$= 7.$

Point is $(2, 7)$.

$\therefore$ Equation of the tangent line is $y - y_0 = m(x - x_0)$

$y - 7 = 2(x - 2)$

$y - 7 = 2x - 4$

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

ii) Lines are $\perp$r then $m_1 m_2 = -1$.

$5y - 15x = 13$

$5y = 15x + 13$

$y = 3x + \frac{13}{5}$

$\therefore$ slope $= 3$.

$\therefore (2x - 2)3 = -1$

$6x - 6 = -1$

$6x = 5$

$x = \frac{5}{6}.$

$\therefore y = x^2 - 2x + 7$

$= \frac{25}{36} - \frac{10}{6} + 7$

$= \frac{217}{36}$

$\therefore$ Point is $\left(\frac{5}{6}, \frac{217}{36}\right)$.

Equation of tangent line is

$y - \frac{217}{36} = 3\left(x - \frac{5}{6}\right)$

$x + 3y - \frac{227}{12} = 0$

$\underline{12x + 36y - 227 = 0.}$

27.

i) $\int \frac{1}{1+x^2}\,dx = \tan^{-1}x + C$

ii) $\int \frac{dx}{x^2 - 6x + 13}$

$x^2 - 6x + 13 = x^2 - 6x + 9 + 13 - 9$

$= (x-3)^2 + 4$

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

$\therefore \int \frac{dx}{x^2 - 6x + 13} = \int \frac{dx}{(x-3)^2 + 2^2}$

put $t = x - 3$

$dt = dx$

$= \int \frac{dt}{t^2 + 2^2}$

$= \frac{1}{2}\tan^{-1}\left(\frac{t}{2}\right) + C$

$= \underline{\frac{1}{2}\tan^{-1}\left(\frac{x-3}{2}\right) + C}$

iii) $\int \frac{\tan^{-1}x}{1+x^2}\,dx$

put $\tan^{-1}x = t$

$dt = \frac{1}{1+x^2}\,dx$

$\therefore \int \frac{\tan^{-1}x}{1+x^2}\,dx = \int t\,dt$

$= \frac{t^2}{2} + C$

$= \frac{(\tan^{-1}x)^2}{2}$

$\int_0^1 \frac{\tan^{-1}x}{1+x^2}\,dx = \left[\frac{(\tan^{-1}x)^2}{2}\right]_0^1$

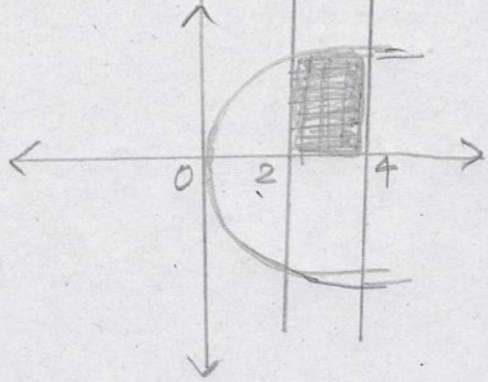
$= \frac{(\tan^{-1}1)^2}{2}$

$= \frac{\left(\frac{\pi}{4}\right)^2}{2}$

$= \pi^2/32$

28.

i)



The required area

$= \int_2^4 y\,dx$ $\qquad y^2 = 9x$, $y = 3\sqrt{x}$

$= \int_2^4 3\sqrt{x}\,dx$

$= 3\int_2^4 x^{1/2}\,dx$

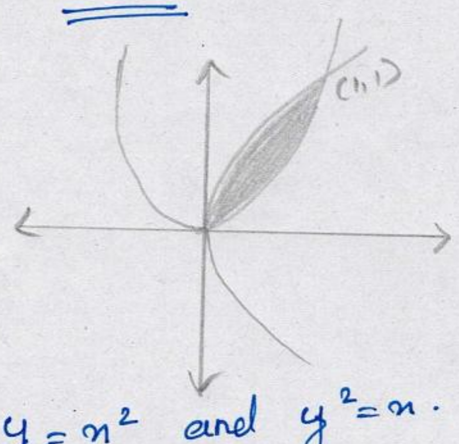
$= 3\left[\dfrac{x^{3/2}}{3/2}\right]_2^4$

$= 2\left[4^{3/2} - 2^{3/2}\right]$

$= 2\left[2^3 - 2\sqrt{2}\right]$

$= 16 - 4\sqrt{2}$ sq. units

ii)



$y = x^2$ and $y^2 = x$.
we get (1,1).

Required Area

$= \int_0^1 [f(x) - g(x)]\,dx$

$= \int_0^1 (\sqrt{x} - x^2)\,dx$

$= \int_0^1 (x^{1/2} - x^2)\,dx$

$= \left[\dfrac{x^{3/2}}{3/2} - \dfrac{x^3}{3}\right]_0^1$

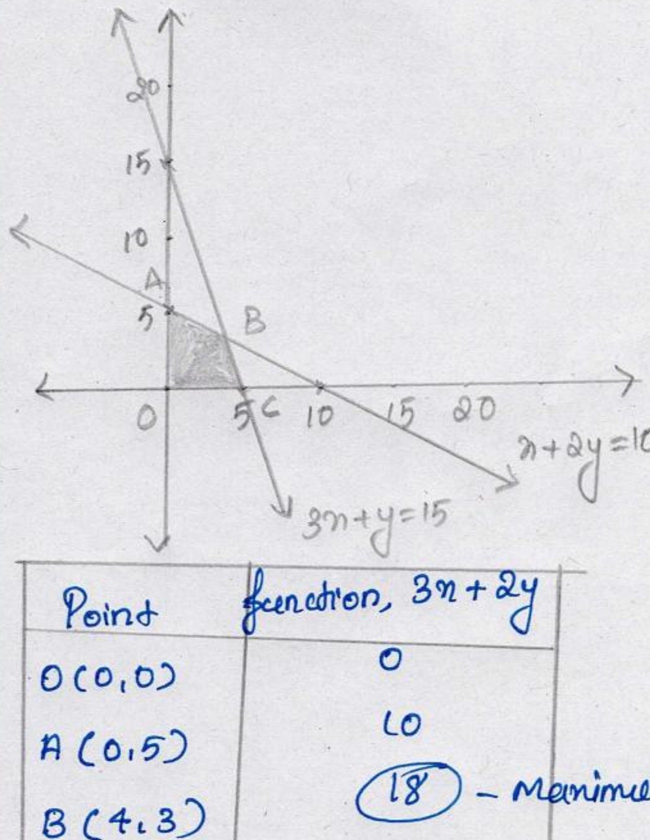
$= \dfrac{2}{3} - \dfrac{1}{3} = \dfrac{1}{3}$ sq. units

29. $x + 2y = 10$

x	y
0	5
10	0

$3x + y = 15$

x	y
0	15
5	0



Point	function, $3x + 2y$
O (0,0)	0
A (0,5)	10
B (4,3)	18 – Maximum.
C (5,0)	15

Maximum value is 18 at (4,3)