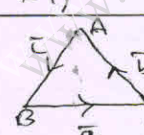
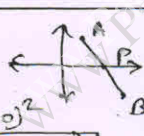


A TYPE			B TYPE			2 MARKS	
S	OP	ANS	S	OP	ANS	S	ANS
1	b	$(1, -1)$	1	d	$\frac{1}{2} ab \sin C$	21	$A = \begin{pmatrix} 1 & 0 & 2 \\ -1 & 5 & 3 \\ 2 & -1 & 1 \end{pmatrix}$ $-A = \begin{pmatrix} -1 & 0 & -2 \\ 1 & -5 & -3 \\ -2 & 1 & -1 \end{pmatrix}$
2	a	7	2	b	$\{1, -1\}$	22	$\vec{AB} + \vec{BC} = \vec{AC}$ $\vec{a} - \vec{c} = \vec{a}$ $\Rightarrow \vec{a} + \vec{b} + \vec{c} = \vec{0}$ 
3	a	$P(A \cup B) = P(A) + P(B)$	3	d	$x + 2y = 3$	23	$\begin{vmatrix} 1 & 5 & 5 & 1 \end{vmatrix}$ No. of ways = $1 \times 5 \times 5 \times 1$ $= 25$ ways.
4	b	$-\frac{\pi}{6}$	4	c	$(-\frac{\pi}{2}, \frac{\pi}{2})$	24	$T_7 = C^{-1})^8 (\frac{7+1}{7})$ $T_7 = \frac{8}{7}$
5	c	$2/5$	5	a	$-1 < x \leq 1$	25	$PA^2 = PB^2$ $(x-3)^2 + (y-4)^2 = (x-7)^2 + (y-6)^2$ $x = 7.5 \rightarrow (7.5, 0)$ 
6	a	$\begin{cases} x < 2 \\ \sqrt{x}, x \geq 1 \end{cases}$	6	b	x	26	$(x, y) = (-1, -1)$ $1r \text{ eq } 5x - 3y + k = 0$ $\boxed{k=2}$ Required eq is $5x - 3y + 2 = 0$
7	d	160, 640	7	a	$\begin{cases} x < 1 \\ \sqrt{x}, x \geq 1 \end{cases}$	27	$= x(-e^{-x}) + e^{-x}$ $= -e^{-x}(x-1) + e^{-x}$
8	a	$(-\infty, 0)$	8	a	$(x+1)^2 + (y+1)^2 = 1$	28	$t = \sin^{-1} x \quad dt = \frac{dx}{\sqrt{1-x^2}}$ $I = \int e^t dt = e^t + c$ $= e^{\sin^{-1} x} + c$
9	a	$x - 2 \log(x+1) + c$	9	c	$f(x) = \cot x$ in $(-\frac{\pi}{2}, \frac{\pi}{2})$	29	$P(A) + P(B) + P(C)$ $= 0.90 \neq 1$ Not permissible.
10	a	$24C_{12}$	10	d	$\tan^{-1}(e^x) + c$	30	$f(x) = \begin{cases} -\sin x, x < 0 \\ \sin x, x \geq 0 \end{cases}$ $f'(x) = \begin{cases} -\cos x, x < 0 \\ \cos x, x \geq 0 \end{cases}$
11	c	$(-\frac{\pi}{2}, \frac{\pi}{2})$	11	a	$P(A \cup B) = P(A) + P(B)$		
12	d	$\frac{1}{2} ab \sin C$	12	c	$\pm \frac{1}{ a }$		
13	d	$x + 2y = 3$	13	a	$24C_{12}$		
14	a	20	14	a	$(-\infty, 0)$		
15	c	$f(x) = \cot x$ in $(-\frac{\pi}{2}, \frac{\pi}{2})$	15	d	160, 640		
16	c	$\pm \frac{1}{ a }$	16	c	$\frac{2}{5}$		
17	a	$(x+1)^2 + (y+1)^2 = 1$	17	a	$x - 2 \log(x+1) + c$		
18	b	x	18	a	7		
19	a	$-1 < x \leq 1$	19	a	20		
20	d	$\tan^{-1}(e^x) + c$	20	b	$-\frac{\pi}{6}$		

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3 MARKS		5 MARKS	
S	ANS	S	ANS
31	$= 2 \begin{vmatrix} x & x & y \\ y & y & z \\ z & z & x \end{vmatrix} + \begin{vmatrix} y & x & y \\ z & y & z \\ z & z & x \end{vmatrix}$ $= 0$	41	<p>Put $a=0$ $b=0$ $c=0$ $a+b+c=0$ $m=1$</p> $\begin{vmatrix} (abc)^2 & a^2 & a^2 \\ b^2 & c^2 & a^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = kabc(a+b+c)^3$ $k=2$ $= 2abc(a+b+c)^3$
32	$\pm 5\hat{a} = \pm \frac{5(2\hat{i}-\hat{j})}{\sqrt{5}} = \pm \sqrt{5}(2\hat{i}-\hat{j})$	42	$\vec{AB} = -4\hat{i} - 6\hat{j} - 2\hat{k}$ $\vec{BC} = 3\hat{i} + 10\hat{j} + 5\hat{k}$ $\vec{CD} = -7\hat{i} - 5\hat{j}$ $[\vec{AB} \vec{BC} \vec{CD}] = 0 \Rightarrow \text{lying in same plane}$
33	$= 6P_1 + 6P_2 + 6P_3 + 6P_4 + 6P_5 + 6P_6$ $= 6 + 30 + 120 + 360 + 720 + 720$ $= 1956$	43	$P(1) = 64 \div \text{by } 64 \quad P(1) = \text{True}$ <p>Assume $7^{2k} + 16k - 1 = 64t$</p> $7^{2(k+1)} + 16(k+1) - 1 = 64(4t+1)$ <p>(*) by 64.</p>
34	$a=1 \quad b=-1 \quad c=2-\frac{9}{4}+\frac{1}{4}=0$ <p>$a+b=0$ $\theta = \frac{\pi}{2}$ vert. a</p> <p>$h=0, g=\frac{1}{2}, f=-\frac{3}{2}, c=-2$ pair of str. lines</p>	44	$11^7 = (1+10)^7$ $= 1 + 70 + 2100 + 35000 + 350000$ $+ 2100000 + 7000000 + 10000000$ $= 1,99,87,171$
35	$\sqrt{pq} = \sin\theta \tan\theta$ $p^2 - q^2 = (\tan\theta + \sin\theta)^2 - (\tan\theta - \sin\theta)^2$ $= 4 \sin\theta \tan\theta = 4\sqrt{pq}$	45	$= x \left(1 + \frac{b}{x^2}\right)^3 - x \left(1 + \frac{3}{x^2}\right)^3$ $= \frac{2}{x^2} - \frac{1}{x^2} \approx \frac{1}{x^2}$
36	$\sec^2(x+y)(1+y) + \sec^2(x-y)(1-y) = 0$ $y_1 + \frac{\sec^2(x+y)}{\sec^2(x-y)} + \frac{\sec^2(x-y)}{\sec^2(x+y)} = 0$	46	$2 \tan^2\theta - \frac{1}{\tan\theta} = -1$ $(2 \tan\theta - 1)(\tan\theta + 1) = 0$ $\theta = n\pi + \tan^{-1} \frac{1}{2} \quad \theta = n\pi - \frac{\pi}{4}, n \in \mathbb{Z}$
37	$= \sqrt{(x-2)^2 + (y^2)^2}$ $= \frac{(x-2)}{2} \sqrt{2+x+6} + \log \left[\frac{(x-2)+\sqrt{x^2-4y^2+6}}{\sqrt{x^2-4y^2+6}} \right] + C$	47	$= 2R \sin A - 2R \sin B \cot \frac{C}{2}$ $\frac{2R \sin A + 2R \sin B}{2R \sin A + 2R \sin B} \cot \frac{C}{2} = \tan \frac{A-B}{2}$
38	$= \frac{1}{\log_e 3} \int \log_e x \, dx$ $= \frac{x}{\log_e 3} [\log x - 1] + C.$	48	<p>Put $f(x) = t$</p> $t^2 + 2t + 1 = 4x^2 - 12x + 9$ $t(t+2) = (2x-4)(2x-4+2)$ $\Rightarrow t = f(x) = 2x - 4.$
39	$P(A) = \frac{3}{5} \quad P(\bar{A}) = \frac{1}{5} \quad \uparrow = P(A \cap B) + P(A \cap \bar{B})$ $P(B) = \frac{3}{4} \quad P(\bar{B}) = \frac{1}{4} \quad \downarrow = \frac{13}{80}$ $P(C) = \frac{2}{3} \quad P(\bar{C}) = \frac{1}{3}$	49	$C_1 = (1, -3) \quad r_1 = 2$ $C_2 = \left(\frac{5}{2}, -3\right) \quad r_2 = \frac{1}{2}$ <p>Circles touch internally.</p> $C_1, C_2 = \frac{3}{2} = 2 - \frac{1}{2} = r_1 - r_2$
40	$f(0) = 2$ $\lim_{x \rightarrow 0} \frac{3 \sin 3x}{3x} + 1 = 3 + 4 = 7 \neq 2$ <p>\therefore discontinuous at $x=0$</p>	50	$\lim_{x \rightarrow 0} \frac{-(x-1) - (x-2) - 3}{-2(x-1) + (x-2)} = \lim_{x \rightarrow 0} \frac{(x-1) + (x-2) - 3}{2x-2-x+2}$ $= \frac{2}{2} = 2$
41	<p>40) b) $\int \alpha \beta x^{\alpha-1} e^{-\beta x} \, dx$</p> <p>Put $t = -\beta x^\alpha$ $dt = -\alpha \beta x^{\alpha-1} dx$</p> $= - \int e^t \, dt = -e^t + C = -e^{-\beta x^\alpha} + C$	51	$L f(x) = R f(x) = 2 \Rightarrow \text{continuous}$ $L f'(x) \neq R f'(x) = 2 \neq 1 \Rightarrow \text{Differentiable}$
42	$\lim_{h \rightarrow 0} \frac{2(1+h) - 2}{-h} = \lim_{h \rightarrow 0} \frac{(1+h) - 2}{-h}$ $= \frac{1}{1} = 1$	52	$\int_1^3 x^2 \, dx = \lim_{n \rightarrow \infty} \sum_{r=1}^n \frac{2}{n} \left(1 + \frac{4r}{n} + \frac{4r^2}{n^2}\right)$ $= 26/3 \text{ Sq units.}$
43	$P(A) = \frac{1}{2} \quad P(W/A) = 5/11$ $P(A) = \frac{1}{2} \quad P(W/A) = 4/9$	53	$P(W) = \left(\frac{1}{2} \times \frac{5}{11}\right) + \left(\frac{1}{2} \times \frac{4}{9}\right) = \frac{89}{198}$