



COMMON PRE-BOARD EXAMINATION

MATHEMATICS-Code No. 041

Class-XII-(2025-26)

SET: 1

MARKING SCHEME



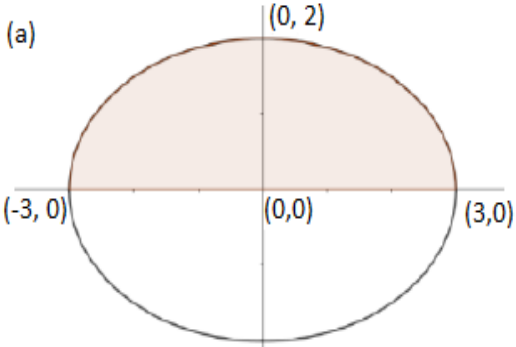
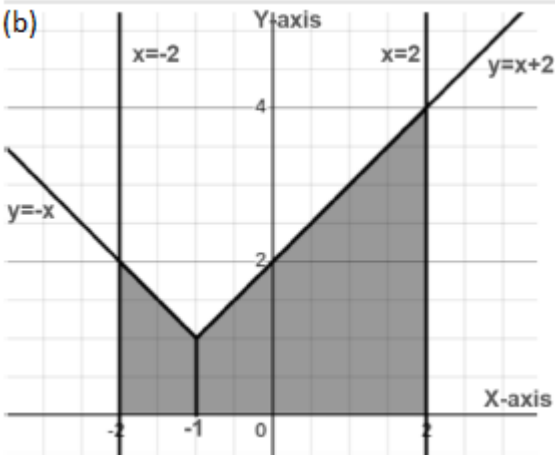
Q. No.	Questions	Marks
1.	(B) Maximum value of Z is at Q (30,20) The maximum value is 180.	1
2.	(C) 2/3 $P(E) = 2/3, P(F) = 3/7 \Rightarrow P(F^I) = 4/7$ Since E and F^I are independent, $P(E F^I) = \frac{P(E)P(F^I)}{P(F^I)} = P(E) = 2/3$	1
3.	(B) 2 sq. units Since $\frac{dV}{dt} = 2 \frac{dr}{dt} \Rightarrow r^2 = \frac{1}{2\pi} \Rightarrow S = 2 \text{ sq. units}$	1
4.	(B) $y = \cos^{-1}x$ The graph represents $y = \cos^{-1}x$ whose domain is $[-1, 1]$ and range is $[0, \pi]$.	1
5.	(C) 3 The given differential equation is $4\left(\frac{dy}{dx}\right)^3 \frac{d^2y}{dx^2} = 0$. Here $m = 2$ and $n = 1$. So $m + n = 3$	1
6.	(B) $\vec{a} \perp \vec{b}$ Since $\vec{a} \cdot \vec{b} = 0 \Rightarrow \vec{a} \perp \vec{b}$	1
7.	(D) Parallel The vectors $2\vec{i} + 3\vec{j} - 6\vec{k}$ and $6\vec{i} + 9\vec{j} - 18\vec{k}$ are parallel.	1
8.	(A) $\frac{-1}{\log 2}$ $\int \frac{1}{x^2} dx = \frac{-1}{\log 2} \cdot 2^{\frac{1}{x}} + C$	1
9.	(B)  , Since every differential functions will be continuous.	1

10.	(A) $\pi/6$ $\vec{a} + \vec{b} + \vec{c} = 0 \Rightarrow \vec{a} = -(\vec{b} + \vec{c}) \Rightarrow \vec{a} ^2 = \vec{b} + \vec{c} ^2$ $\Rightarrow 37 = \vec{b} ^2 + \vec{c} ^2 + 2\vec{b} \cdot \vec{c} \Rightarrow \vec{b} \cdot \vec{c} = 6$ $\vec{b} \cdot \vec{c} = \vec{b} \vec{c} \cos \theta \Rightarrow \cos \theta = \frac{6}{12} = \frac{1}{2} \Rightarrow \theta = 60^\circ$	1
11.	(B) 5^2 $ A = 5, B^{-1}AB ^2 = (B^{-1} A B)^2 = A ^2 = 5^2.$	1
12.	(B) $\begin{bmatrix} \frac{1}{3} & 0 & 0 \\ 0 & \frac{1}{2} & 0 \\ 0 & 0 & \frac{1}{5} \end{bmatrix}$	1
13.	(A) 0 $\begin{vmatrix} \cos 67^\circ & \sin 67^\circ \\ \sin 23^\circ & \cos 23^\circ \end{vmatrix} = \cos 67^\circ \cos 23^\circ - \sin 67^\circ \sin 23^\circ$ $= \cos(67^\circ + 23^\circ)$ $= \cos 90^\circ = 0$	1
14.	(B) $\frac{1}{2} \vec{AB} \times \vec{AC}$ The area of the parallelogram with adjacent sides AB and AC $= \vec{AB} \times \vec{AC}$. Hence, the area of the triangle with vertices A, B, C is $\frac{1}{2} \vec{AB} \times \vec{AC}$.	1
15.	(C) $\frac{1}{2} \log 2$ $\int_2^3 \frac{x}{x^2+1} = \frac{1}{2} [\log(x^2 + 1)]_2^3 = \frac{1}{2} (\log 10 - \log 5) = \frac{1}{2} \log \left(\frac{10}{5}\right) = \frac{1}{2} \log 2$	1
16.	(C) $a_{ij} = 0$, where $i = j$ In a skew-symmetric matrix, the (i, j)th element is negative of the (j, i)th element. Hence, the (i, i)th element = 0	1
17.	(B) ± 3 $\pm 9 = \frac{1}{2} \begin{vmatrix} -3 & 0 & 1 \\ 3 & 0 & 1 \\ 0 & k & 1 \end{vmatrix};$ expanding along C_2, we get $\Rightarrow k = \pm 3$	1
18.	(B) $2x+y \geq 2$	1

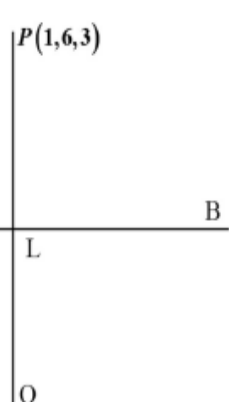
	The points (1,0) and (0,2) satisfy the equation $2x+y=2$ and the shaded region shows that (0,0) doesn't lie in the feasible solution region So, the inequality is $2x+y \geq 2$	
19.	(D) Assertion (A) is false but Reason (R) is true.	1
20.	(C) Assertion (A) is true but Reason (R) is false. $\sec^{-1}x$ is defined if $x \leq -1$ or $x \geq 1$. Hence, $\sec^{-1}2x$ will be defined if $x \leq -\frac{1}{2}$ or $x \geq \frac{1}{2}$. Hence A is true. The range of the function $\sec^{-1}x$ is $[0, \pi] - \{\frac{\pi}{2}\}$. Hence R is false.	1
SECTION B [2 x 5 = 10]		
21.	(a) $\sin^{-1}\left(\cos\left(\frac{33\pi}{5}\right)\right) = \sin^{-1}\cos\left(6\pi + \frac{3\pi}{5}\right)$ $= \sin^{-1}\cos\left(\frac{3\pi}{5}\right)$ $= \sin^{-1}\sin\left(\frac{\pi}{2} - \frac{3\pi}{5}\right)$ $= \frac{\pi}{2} - \frac{3\pi}{5}$ $= -\frac{\pi}{10}$ OR (b) $-1 \leq (x^2 - 4) \leq 1 \Rightarrow 3 \leq x^2 \leq 5$ $\Rightarrow \sqrt{3} \leq x \leq \sqrt{5}$ $\Rightarrow x \in [-\sqrt{5}, -\sqrt{3}] \cup [\sqrt{3}, \sqrt{5}]$ So, required domain is $[-\sqrt{5}, -\sqrt{3}] \cup [\sqrt{3}, \sqrt{5}]$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1
22.	$\frac{QR}{QP} = \frac{3}{2} \Rightarrow R$ divides PQ, externally, in the ratio 1:3. The Position vector of R = $\vec{x} = \frac{\vec{\beta} - 3\vec{\alpha}}{1-3} = \frac{3\vec{\alpha} - \vec{\beta}}{2}$	1 1
23.	(a) Let $f(x) = \log\left(\frac{2-x}{2+x}\right)$ We have, $f(-x) = \log\left(\frac{2+x}{2-x}\right) = -\log\left(\frac{2-x}{2+x}\right) = -f(x)$ So, $f(x)$ is an odd function. $\therefore \int_{-1}^1 \log\left(\frac{2-x}{2+x}\right) dx = 0.$	1 1

	OR (b) $\int \frac{(x-3)e^x}{(x-1)^3} dx = \int \frac{(x-1-2)e^x}{(x-1)^3} dx$ $= \int \left(\frac{1}{(x-1)^2} - \frac{2}{(x-1)^3} \right) e^x dx$ $= \int \left(\frac{1}{(x-1)^2} + \frac{d}{dx} \left(\frac{1}{(x-1)^2} \right) \right) e^x dx$ $= \frac{e^x}{(x-1)^2} + C$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
24.	$e^y (x+1) = 1 \Rightarrow e^y = \frac{1}{x+1}$ $\Rightarrow y = -\log(x+1)$ $\Rightarrow \frac{dy}{dx} = -\frac{1}{x+1}$ $= -e^y \quad \left[\because \frac{1}{x+1} = e^y \right]$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
25.	Let $u = 2^{\cos^2 x} \Rightarrow \frac{du}{dx} = 2^{\cos^2 x} (-2 \cos x \sin x) \log 2$ Let $v = \cos^2 x \Rightarrow \frac{dv}{dx} = -2 \cos x \sin x$ Now $\frac{du}{dv} = \frac{\left(\frac{du}{dx} \right)}{\left(\frac{dv}{dx} \right)} = 2^{\cos^2 x} \log 2$	1 $\frac{1}{2}$ $\frac{1}{2}$
SECTION C [3 x 6 = 18]		
26.		1 $\frac{1}{2}$

	<table><tr><th>Corner point</th><th>Value of the objective function $Z = x + 2y$</th></tr><tr><td>$A(6, 0)$</td><td>6</td></tr><tr><td>$B(0, 3)$</td><td>6</td></tr></table> We observe the region $x + 2y < 6$ have no points in common with the unbounded feasible region. Hence the minimum value of $z = 6$. It can be seen that the value of Z at points A and B is same. If we take any other point on the line $x + 2y = 6$ such as (2,2) on line $x + 2y = 6$, then $Z = 6$. Thus, the minimum value of Z occurs for more than 2 points, and is equal to 6.	Corner point	Value of the objective function $Z = x + 2y$	$A(6, 0)$	6	$B(0, 3)$	6	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
Corner point	Value of the objective function $Z = x + 2y$							
$A(6, 0)$	6							
$B(0, 3)$	6							
27.	$A = \{ (3, 6), (4, 5), (5, 4), (6, 3) \}$ $P(A) = 1/9$, $P(B) = 5/6$ $P(A \cap B) = 1/12$ $P(A \cap B) \neq P(A) P(B)$ Therefore A and B are not Independent. Since $A \cap B \neq \emptyset$, A and B are not mutually Exclusive.	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1						
28.	(a) $\theta = \cos^{-1} \left(\frac{\vec{l_1} \cdot \vec{l_2}}{ \vec{l_1} \cdot \vec{l_2} } \right) = \cos^{-1} \left(\frac{(\hat{i} - 2\hat{j} + 3\hat{k}) \cdot (3\hat{i} - 2\hat{j} + \hat{k})}{ (\hat{i} - 2\hat{j} + 3\hat{k}) (3\hat{i} - 2\hat{j} + \hat{k}) } \right)$ $= \cos^{-1} \left(\frac{3+4+3}{\sqrt{1+4+9}\sqrt{9+4+1}} \right) = \cos^{-1} \left(\frac{10}{14} \right) = \cos^{-1} \left(\frac{5}{7} \right).$ Scalar projection of $\vec{l_1}$ on $\vec{l_2} = \frac{\vec{l_1} \cdot \vec{l_2}}{ \vec{l_2} } = \frac{(\hat{i} - 2\hat{j} + 3\hat{k}) \cdot (3\hat{i} - 2\hat{j} + \hat{k})}{ (3\hat{i} - 2\hat{j} + \hat{k}) }$ $= \frac{3+4+3}{\sqrt{9+4+1}} = \frac{10}{\sqrt{14}}.$ OR (b) Line perpendicular to the lines $\vec{r} = 2\hat{i} + \hat{j} - 3\hat{k} + \lambda(\hat{i} + 2\hat{j} + 5\hat{k})$ and $\vec{r} = 3\hat{i} + 3\hat{j} - 7\hat{k} + \mu(3\hat{i} - 2\hat{j} + 5\hat{k})$ has a vector parallel it is given by $\vec{b} = \vec{b_1} \times \vec{b_2} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 2 & 5 \\ 3 & -2 & 5 \end{vmatrix} = 20\hat{i} + 10\hat{j} - 8\hat{k}$ $\therefore$ equation of line in vector form is $\vec{r} = -\hat{i} + 2\hat{j} + 7\hat{k} + a(10\hat{i} + 5\hat{j} - 4\hat{k})$ And equation of line in cartesian form is $\frac{x+1}{10} = \frac{y-2}{5} = \frac{z-7}{-4}$	1 $\frac{1}{2}$ 1 $\frac{1}{2}$ 1 1 1						

29.	(a) 	$A = 2 \times \frac{2}{3} \int_0^3 \sqrt{9-x^2} dx$ $= \frac{4}{3} \left[\frac{x}{2} \sqrt{9-x^2} + \frac{9}{2} \sin^{-1} \left(\frac{x}{3} \right) \right]_0^3$ $= \frac{4}{3} \left[\left(0 + \frac{9}{2} \sin^{-1} 1 \right) - 0 \right]$ $= 3\pi$	Fig. 1 ½ ½ ½ ½
	OR (b) 	$A = \int_{-2}^{-1} (-x) dx + \int_{-1}^2 (x+2) dx$ $= -\frac{1}{2} [x^2]_{-2}^{-1} + \left[\frac{1}{2} x^2 + 2x \right]_{-1}^2$ $= 9$	Fig.1 1 ½ ½
30.	$f(x) = \frac{3}{2}x^4 - 4x^3 - 45x^2 + 51$ $\Rightarrow f'(x) = 6x^3 - 12x^2 - 90x$ For critical points $f'(x) = 0$ $\Rightarrow 6x^3 - 12x^2 - 90x = 0$ $\Rightarrow 6x(x^2 - 2x - 15) = 0$ $\Rightarrow 6x(x-5)(x+3) = 0 \Rightarrow x = -3, 0, 5$ $\begin{array}{ccccccc} & - & & + & & - & & + \\ \leftarrow & & \bullet & & \bullet & & \bullet & & \rightarrow \\ & -\infty & -3 & 0 & 5 & \infty \end{array}$ $f(x)$ is strictly increasing in $(-3,0)$ and $(5,\infty)$ $f(x)$ is strictly decreasing in $(-\infty,-3)$ and $(0,5)$		1 1 1
31.	(a) $x\sqrt{1+y} + y\sqrt{1+x} = 0 \Rightarrow x\sqrt{1+y} = -y\sqrt{1+x}$ $\Rightarrow x^2(1+y) = y^2(1+x)$ $\Rightarrow (x-y)(x+y) + xy(x-y) = 0$		½ 1

	$\Rightarrow (x - y)(x + y + xy) = 0$ $x \neq y \Rightarrow x + y + xy = 0$ $\Rightarrow y = \frac{-x}{1 + x}$ $\Rightarrow \frac{dy}{dx} = \frac{-1}{(1 + x)^2}$ OR (b) $\frac{dx}{d\theta} = a(1 - \cos \theta), \frac{dy}{d\theta} = a(0 + \sin \theta),$ $\Rightarrow \frac{dy}{dx} = \frac{\frac{dy}{d\theta}}{\frac{dx}{d\theta}} = \frac{a \sin \theta}{a(1 - \cos \theta)}$ $= \frac{2 \sin\left(\frac{\theta}{2}\right) \cos\left(\frac{\theta}{2}\right)}{2 \sin^2\left(\frac{\theta}{2}\right)} = \cot \frac{\theta}{2}$ $\Rightarrow \frac{d^2y}{dx^2} = -\frac{1}{2} \operatorname{cosec}^2\left(\frac{\theta}{2}\right) \frac{d\theta}{dx}$ $= -\frac{1}{2a} \operatorname{cosec}^2\left(\frac{\theta}{2}\right) \frac{1}{2 \sin^2\left(\frac{\theta}{2}\right)}$ $= -\frac{1}{4a} \operatorname{cosec}^4\left(\frac{\theta}{2}\right)$	1/2 1 1/2 1/2 1/2 1/2 1/2
SECTION D [5 x 4 = 20]		
32.	$y = ax^2 + bx + c$ => The required equations are $15 = 4a + 2b + c$ $25 = 16a + 4b + c$ $15 = 196a + 14b + c$ The set of equations can be represented in the matrix form as $AX = B$, $\Rightarrow \begin{bmatrix} 4 & 2 & 1 \\ 16 & 4 & 1 \\ 196 & 14 & 1 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 15 \\ 25 \\ 15 \end{bmatrix}$ where $A = \begin{bmatrix} 4 & 2 & 1 \\ 16 & 4 & 1 \\ 196 & 14 & 1 \end{bmatrix}, X = \begin{bmatrix} a \\ b \\ c \end{bmatrix}$ and $B = \begin{bmatrix} 15 \\ 25 \\ 15 \end{bmatrix}$ $ A = 4(4 - 14) - 2(16 - 196) + (224 - 784)$ $= -240 \neq 0.$ Hence A^{-1} exists. Now, $\operatorname{adj}(A) = \begin{bmatrix} -10 & 12 & -2 \\ 180 & -192 & 12 \\ -560 & 336 & -16 \end{bmatrix}$	1 1/2 1/2 1

	$\begin{bmatrix} a \\ b \\ c \end{bmatrix} = -\frac{1}{240} \begin{bmatrix} -10 & 12 & -2 \\ 180 & -192 & 12 \\ -560 & 336 & -16 \end{bmatrix} \begin{bmatrix} 15 \\ 25 \\ 15 \end{bmatrix}$ $= \begin{bmatrix} -1/2 \\ 8 \\ 1 \end{bmatrix}$ $\therefore a = -\frac{1}{2}, b = 8, c = 1$ So, the equation becomes $y = -\frac{1}{2}x^2 + 8x + 1$	1 1/2 1/2
33.	Let $P(1,6,3)$ be the given point, and let 'L' be the foot of the perpendicular from 'P' to the given line AB (as shown in the figure below). The coordinates of a general point on the given line are given by $\frac{x-0}{1} = \frac{y-1}{2} = \frac{z-2}{3} = \lambda;$ Let the coordinates of L be $(\lambda, 2\lambda+1, 3\lambda+2)$. So, direction ratios of PL are $\lambda-1, 2\lambda-5$ and $3\lambda-1$. Direction ratios of the given line are 1, 2 and 3, which is perpendicular to PL. Therefore, $(\lambda-1)1 + (2\lambda-5)2 + (3\lambda-1)3 = 0 \Rightarrow \lambda = 1$ So, coordinates of L are $(1, 3, 5)$. Let $Q(x_1, y_1, z_1)$ be the image of $P(1,6,3)$ in the given line. Then, L is the mid-point of PQ. Therefore, $\frac{(x_1+1)}{2} = 1, \frac{(y_1+6)}{2} = 3$ and $\frac{(z_1+3)}{2} = 5$ $\Rightarrow x_1 = 1, y_1 = 0 \text{ and } z_1 = 7$ Hence, the image of $P(1,6,3)$ in the given line is $(1, 0, 7)$. Now, the distance of the point $(1, 0, 7)$ from the y-axis is $\sqrt{1^2 + 7^2} = \sqrt{50}$ units. 	1/2 1/2 1/2 1/2 1/2 1/2 1/2 1
34.	(a) $I = \int_0^{3/2} x \cos \pi x dx$ $= \int_0^{1/2} x \cos \pi x dx - \int_{1/2}^{3/2} x \cos \pi x dx \quad \dots (1)$ Consider $\int x \cos \pi x dx$ $= \frac{x \sin \pi x}{\pi} - \int \frac{\sin \pi x}{\pi} dx$	1 1 1

	$= \frac{x \sin \pi x}{\pi} + \frac{\cos \pi x}{\pi^2} \quad \dots(2)$ $\therefore I = \left[\frac{x \sin \pi x}{\pi} + \frac{\cos \pi x}{\pi^2} \right]_0^{1/2} - \left[\frac{x \sin \pi x}{\pi} + \frac{\cos \pi x}{\pi^2} \right]_{1/2}^{3/2} \text{ using (2) in (1),}$ $= \left(\frac{1}{2\pi} - \frac{1}{\pi^2} \right) - \left(-\frac{3}{2\pi} - \frac{1}{2\pi} \right)$ $= \frac{5}{2\pi} - \frac{1}{\pi^2}$ OR (b) $\frac{x^2 + x + 1}{(x+2)(x^2+1)} = \frac{A}{(x+2)} + \frac{Bx+C}{x^2+1}$ Getting $A = \frac{3}{5}, B = \frac{2}{5}, C = \frac{1}{5}$ $\therefore \int \frac{x^2 + x + 1}{(x+2)(x^2+1)} dx = \frac{3}{5} \int \frac{1}{x+2} dx + \frac{1}{5} \int \frac{2x}{x^2+1} dx + \frac{1}{5} \int \frac{1}{x^2+1} dx$ $= \frac{3}{5} \log x+2 + \frac{1}{5} \log(x^2+1) + \frac{1}{5} \tan^{-1}x + C$	1 1/2 1/2 1 1 1 1/2 1 1/2
35.	(a) Given differential equation can be written as $\frac{dy}{dx} = \frac{yx^2}{x^3+y^3}$ Put $y = vx$, so $\frac{dv}{dx} = v + x \frac{dv}{dx}$ Therefore, $v + x \frac{dv}{dx} = \frac{vx^3}{x^3+v^3x^3} = \frac{v}{1+v^3}$ $x \frac{dv}{dx} = \frac{-v^4}{1+v^3}$ $\left(\frac{1}{v^4} + \frac{1}{v} \right) dv = \frac{-dx}{x}$ Integrating we get $\frac{-1}{3v^3} + \log v = -\log x + C$ $\frac{-x^3}{3y^3} + \log y = C$ OR (b) The given differential equation can be written as: $\frac{dy}{dx} + 2y = \cos x$ Taking $P = 2, Q = \cos x$, Integrating factor is given by, $I = e^{\int 2dx} = e^{2x}$ $\therefore$ The solution is, $y \cdot e^{2x} = \int e^{2x} \cos x dx$ Let, $I_1 = \int \cos x \cdot e^{2x} dx$	1/2 1 1/2 1 1/2 1 1/2 1/2 1/2

	$= \cos x \frac{e^{2x}}{2} - \int (-\sin x) \frac{e^{2x}}{2} dx$ $= \frac{e^{2x} \cos x}{2} + \frac{1}{2} \left[\sin x \cdot \frac{e^{2x}}{2} - \int \cos x \cdot \frac{e^{2x}}{2} dx \right]$ $\Rightarrow I_1 = \frac{e^{2x} \cos x}{2} + \frac{e^{2x} \sin x}{4} - \frac{1}{4} I_1$ $\Rightarrow I_1 = \frac{e^{2x}}{5} (2 \cos x + \sin x)$ $\therefore$ The solution of the differential equation is $y \cdot e^{2x} = \frac{e^{2x}}{5} (2 \cos x + \sin x) + C$ $\Rightarrow y = \frac{1}{5} (2 \cos x + \sin x) + C e^{-2x}$	1 ½ 1 ½ ½
SECTION- E [4 x 3 =12]		
36.	(i) Traffic flow is not reflexive as $(A, A) \notin R$ (or no major spot is connected with itself) (ii) Traffic flow is not transitive as $(A, B) \in R$ and $(B, E) \in R$, but $(A, E) \notin R$ (iii) (a). $R = \{(A, B), (A, C), (A, D), (B, C), (B, E), (C, E), (D, E), (D, C)\}$ Domain = $\{A, B, C, D\}$ Range = $\{B, C, D, E\}$ OR (b) No, the traffic flow doesn't represent a function as A has three images.	1 1 1 ½ ½ 2
37.	(i) $2x + 3y = 300$ (ii) $A = xy = \frac{x}{3} (300 - 2x)$ (iii) (a) $A = \frac{x}{3} (300 - 2x) = \frac{1}{3} (300x - 2x^2)$ $\Rightarrow \frac{dA}{dx} = \frac{1}{3} (300 - 4x)$ For critical points, put $\frac{dA}{dx} = 0 \Rightarrow x = 75$ Also, $\frac{d^2 A}{dx^2} = -\frac{4}{3} < 0$. So, A is maximum at $x = 75$ Also, maximum area is $A = \frac{75}{3} (300 - 150) = 3750 \text{ m}^2$ OR (iii) (b) $A = \frac{x}{3} (300 - 2x) = \frac{1}{3} (300x - 2x^2)$	1 1 ½ ½ ½ ½

	$\Rightarrow \frac{dA}{dx} = \frac{1}{3}(300 - 4x)$ For critical points, put $\frac{dA}{dx} = 0 \Rightarrow x = 75$ As $\frac{dA}{dx}$ changes its sign from positive to negative as x passes through $x = 75$ from left to right, which means $x = 75$ is the point of maximum. Also, maximum area is $A = \frac{75}{3}(300 - 150) = 3750 \text{ m}^2$	$\frac{1}{2}$ $\frac{1}{2}$
38.	Let E_1 be the event that one parrot and one owl flew from cage –I E_2 be the event that two parrots flew from Cage-I A be the event that the owl. (i) Probability that the owl is still in cage –I $= P(E_1 \cap A) + P(E_2 \cap A)$ $= \frac{(5_{c_1} \times 1_{c_1})(7_{c_1} \times 1_{c_1}) + (5_{c_2})(8_{c_2})}{(5_{c_1} \times 1_{c_1})(7_{c_1} \times 1_{c_1}) + (5_{c_1} \times 1_{c_1})(7_{c_2}) + (5_{c_2})(8_{c_2})}$ $= \frac{35 + 280}{35 + 105 + 280} = \frac{315}{420} = \frac{3}{4}$ (ii) The probability that one parrot and the owl flew from Cage-I to Cage-II given that the owl is still in cage-I is $P(E_1/A)$ $P(E_1/A) = \frac{P(E_1 \cap A)}{P(E_1 \cap A) + P(E_2 \cap A)} = \frac{\frac{35}{420}}{\frac{315}{420}} = \frac{1}{9}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} + 1$