COMMON PRE-BOARD EXAMINATION

MATHEMATICS - Code No. 041

Class: XII (2025-26) -SET - 1

Time Allowed: 3 hours **ANSWER KEY** **Maximum Marks: 80**

NO	SECTION A	MARKS

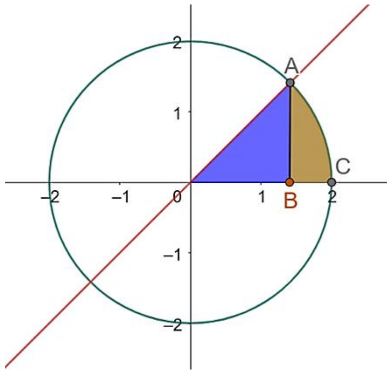
1	(d) $\left[0, \frac{2}{3}\right]$	1
2	(a) Skew symmetric matrix	1
3	(b) 3	1
4	(c) 1/8	1
5	(d) 40	1
6	(d) $\lvert A \rvert \in [2, 4]$	1
7	(b) 2	1
8	(c) $\sec^2 y \tan y$	1
9	(c) 12 cm^2/sec	1
10	(b) $\sec x$	1

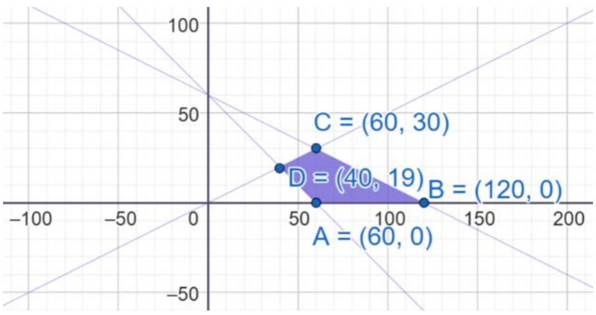
11	(c) $-\cos x + C$	1
12	(c) $\sqrt{2}$	1
13	(a) $\frac{-2}{3}$	1
14	(c) -4	1
15	(a) $\sqrt{507}$	1
16	(b) The open half plane not containing origin.	1
17	(b) (0, 8)	1
18	(c) not defined	1
19	(c) A is true and R is false.	1
20	(d) A is false but R is true.	1

	SECTION B	
21	A) $3\sin^{-1}\left(\frac{1}{\sqrt{2}}\right) + 2\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) + \cos^{-1}(0)$ $\Rightarrow 3\times \pi/4 + 2 \times \pi/6 + \pi/2$ $\Rightarrow \frac{19\pi}{12}$ **OR** B) $\tan^{-1}\left(\frac{\cos x}{1-\sin x}\right), -\frac{3\pi}{2} < x < \frac{\pi}{2}$ $\Rightarrow \frac{\cos x}{1-\sin x} = \frac{\cos^2\frac{x}{2} - \sin^2\frac{x}{2}}{\sin^2\frac{x}{2} + \cos^2\frac{x}{2} - 2\sin\frac{x}{2}.\cos\frac{x}{2}} = \frac{\cos\frac{x}{2} + \sin\frac{x}{2}}{\cos\frac{x}{2} - \sin\frac{x}{2}} = \frac{1+\tan\frac{x}{2}}{1-\tan\frac{x}{2}}$ $= \tan\left(\frac{\pi}{4} + \frac{x}{2}\right)$	1.5 0.5 1 0.5

	$\tan^{-1}\left(\tan\left(\frac{\pi}{4}+\frac{x}{2}\right)\right) = \frac{\pi}{4}+\frac{x}{2}$	0.5
22	$f(0) = 3$ LHL = $\lim_{x\to 0^-}\frac{kx}{-x} = -k$ RHL = $\lim_{x\to 0^+} 3 = 3$ Since f is continuous at x = 0, LHL = RHL − f(0) $\Rightarrow -k = 3 \Rightarrow k = -3$	0.5 0.5 0.5 0.5
23	$y = 5e^{7x} + 6e^{-7x}$ $\frac{dy}{dx} = 35e^{7x} - 42e^{-7x}$ $\frac{d^2y}{dx^2} = 35.7e^{7x} - 42.(-7)e^{-7x} = 49(5e^{7x} + 6e^{-7x}) = 49y$ $\frac{d^2y}{dx^2} = 49y$	0.5 1 0.5
24	$A)\ \int \frac{2^{x+1}-5^{x-1}}{10^x}$ dx $\frac{2^{x+1}}{10^x} = 2.5^{-x};\ \frac{5^{x-1}}{10^x} = \frac{1}{5}.2^{-x}$ $\int\left(2.5^{-x} - \frac{1}{5}.2^{-x}\right)dx = (-2).\frac{5^{-x}}{\log 5} - (-1).\frac{1}{5}.\frac{2^{-x}}{\log 2} + C$ $= -\frac{2}{5^x.\log 5} + \frac{1}{5.2^x.\log 2} + C$ **OR** $B)\ y = \sin x, [0, 2\pi]$ Required Area = $\int_0^{\pi} \sin x\, dx + \left\|\int_{\pi}^{2\pi} \sin x\right\| dx$ $= (-\cos x)_0^{\pi} + \|(-\cos x)_{\pi}^{2\pi}\|$ $= -(\cos\pi - \cos 0) + \|-(\cos 2\pi - \cos\pi)\|$ $= -(-1-1) + \|-(1+1)\| = 2 + 2 = 4$sq. unit	0.5 1 0.5 0.5 0.5 0.5 0.5
25	$\vec{a} = 2\hat{\imath} - 2\hat{\jmath} + \hat{k}$, $\vec{b} = \hat{\imath} + 2\hat{\jmath} - 2\hat{k}$, $\vec{c} = 2\hat{\imath} - \hat{\jmath} + 4\hat{k}$. $\vec{b} + \vec{c} = 3\hat{\imath} + \hat{\jmath} + 2\hat{k}$ $(\vec{b}+\vec{c}).\vec{a} = 6 - 2 + 2 = 6,\ \|\vec{a}\| = \sqrt{4+4+2} = 3$ Projection of $(\vec{b}+\vec{c})$ on $\vec{a} = \frac{(\vec{b}+\vec{c}).\vec{a}}{\|\vec{a}\|} = \frac{6}{3} = 2$	0.5 0.5 + 0.5 0.5

	SECTION C	
26	$A)\ x=\cos t(3-2\cos^2 t)\Rightarrow x=\cos 3t\Rightarrow \frac{dx}{dt}=-3\sin 3t$ $y=\sin t(3-2\sin^2 t)\Rightarrow y=\sin 3t\Rightarrow \frac{dy}{dt}=3\cos 3t$ $\frac{dy}{dx}=\frac{dy/dt}{dx/dt}=\frac{3\cos 3t}{-3\sin 3t}=-\cot 3t$ $t=\frac{\pi}{4}\Rightarrow \frac{dy}{dx}=-cot\frac{3\pi}{4}=-(-1)=1$ **OR** $B)\ y=(\sin x)^x+\sin^{-1}\sqrt{x}\ ;\ u=(\sin x)^x\ ;\ v=\sin^{-1}\sqrt{x}$ $u=(\sin x)^x\Rightarrow \log u=x\log(\sin x)$ $\frac{du}{dx}=(\sin x)^x(\log(\sin x)+x\cot x)$ $v=\sin^{-1}\sqrt{x}\Rightarrow \frac{dv}{dx}=\frac{1}{\sqrt{1-x}}\times\frac{1}{2\sqrt{x}}=\frac{1}{2\sqrt{x-x^2}}$ $\frac{dy}{dx}=(\sin x)^x(\log(\sin x)+x\cot x)+\frac{1}{2\sqrt{x-x^2}}$	1 1 0.5 0.5 0.5 1 1 0.5
27	$f(x)=\sin^2 x-\cos x\ ,x\in[0,\pi]$ $f'(x)=2\sin x.\cos x+\sin x$ $f'(x)=0\Rightarrow 2\sin x.\cos x+\sin x=0\Rightarrow \sin x(2\cos x+1)=0$ $\sin x=0\Rightarrow x=0,\pi$ $\cos x=-1/2\Rightarrow x=2\pi/3$ $f(0)=-1\ ,f(2\pi/3)=5/4\ ,f(\pi)=1$ Absolute maximum = 5/4 at $x=2\pi/3$ Absolute minimum = -1 at $x=0$	1 1 0.5 0.5
28	$A)\ I=\int\frac{dx}{\sqrt{\sin^3 x\cos(x-a)}}=\int\frac{dx}{\sqrt{\sin^3 x(\cos x.\cos a+\sin x.\sin a)}}$ $\int\frac{dx}{\sin^2 x\sqrt{\cot x.\cos a+\sin a}}=\int\frac{\mathrm{cosec}^2 x.dx}{\sqrt{\cot x.\cos a+\sin a}}$ Put, $t=\cot x.\cos a+\sin a\Rightarrow \frac{dt}{dx}=-\mathrm{cosec}^2 x.\cos a$ $\frac{-dt}{\cos a}=\mathrm{cosec}^2 x dx$	0.5 1 0.5

	$I = \frac{-1}{\text{cos}a}\int\frac{dt}{\sqrt{t}} = -\frac{1}{\text{cos}a} \times 2\sqrt{t} \Rightarrow I = -\frac{2\sqrt{\text{cot}x.\text{cos}a+\text{sin}a}}{cosa} + \text{C}$	1
	B) **OR** $x^2 + y^2 = 4, x = \sqrt{3}y$ $x^2 + y^2 = 4 \Rightarrow y = \sqrt{4 - x^2}$ $\Rightarrow x = \pm\sqrt{3}$  Required area of the shaded region = $\int_0^{\sqrt{3}}\frac{x}{\sqrt{3}}dx + \int_{\sqrt{3}}^{2}\sqrt{4 - x^2}\, dx$ $= \frac{\sqrt{3}}{2} + \left(\frac{x}{2}\sqrt{4 - x^2} + \frac{4}{2}sin^{1}\frac{x}{2}\right)_{\sqrt{3}}^{2}$ $= \frac{\sqrt{3}}{2} + (0 + 2sin^{-1}1) - \left(\frac{\sqrt{3}}{2} \times 1 + 2sin^{-1}\frac{\sqrt{3}}{2}\right) = \pi - \frac{2\pi}{3} = \frac{\pi}{3}$	0.5 1 1 0.5
29	$A)\ 5x - 25 = 14 - 7y = 35z \Rightarrow \frac{x-5}{1/5} = \frac{y-2}{-1/7} = \frac{z-0}{1/35}$ $\Rightarrow \frac{x-5}{7} = \frac{y-2}{-5} = \frac{z-0}{1}$ …………..(1) $\vec{a} = \hat{\imath} + 2\hat{\jmath} - \hat{k}\ ,\ \vec{b} = 7\hat{\imath} - 5\hat{\jmath} + \hat{k}$ Required Vector equation: $\vec{r} = \vec{a} + \lambda\vec{b} \Rightarrow \vec{r} = (\hat{\imath} + 2\hat{\jmath} - \hat{k}) + \lambda(7\hat{\imath} - 5\hat{\jmath} + \hat{k})$ Required Cartesian equation: $\frac{x-1}{7} = \frac{y-2}{-5} = \frac{z+1}{1}$ B) **OR** $\overrightarrow{a_1} = \hat{\imath} + \hat{\jmath}\ ,\ \overrightarrow{b_1} = 2\hat{\imath} - \hat{\jmath} + \hat{k}$ $\overrightarrow{a_2} = 2\hat{\imath} + \hat{\jmath} - \hat{k}\ ,\overrightarrow{b_2} = 3\hat{\imath} - 5\hat{\jmath} + 2\hat{k}$ $\overrightarrow{a_2} - \overrightarrow{a_1} = \hat{\imath} - \hat{k}$ $\overrightarrow{b_1} \times \overrightarrow{b_2} = \begin{vmatrix} \hat{\imath} & \hat{\jmath} & \hat{k} \\ 2 & -1 & 1 \\ 3 & -5 & 2 \end{vmatrix} = 3\hat{\imath} - \hat{\jmath} - 7\hat{k}$ $\lvert\overrightarrow{b_1} \times \overrightarrow{b_2}\rvert = \sqrt{9 + 1 + 49} = \sqrt{59}$ $(\overrightarrow{a_2} - \overrightarrow{a_1}).(\overrightarrow{b_1} \times \overrightarrow{b_2}) = 10$ $d = \left\lvert\frac{(\overrightarrow{a_2}-\overrightarrow{a_1}).(\overrightarrow{b_1}\times\overrightarrow{b_2})}{\lvert\overrightarrow{b_1}\times\overrightarrow{b_2}\rvert}\right\rvert = \frac{10}{\sqrt{59}}$	0.5 0.5 1 1 0.5 1 0.5 0.5 0.5

30	Minimize: $z = 5x + 10y$ $x + 2y \leq 120$ ….(1) $x + y \geq 60$ ……(2) $x - 2y \geq 0$…..(3) $x, y \geq 0$  A = (60,0) , B = (120, 0) Solving (1) & (3) ⇒ C = (60,30) Solving (2) & (3) ⇒ D = (40,20) A = (60,0) ⇒ Z = 300 B = (120, 0) ⇒ Z = 600 C = (60,30) ⇒ Z = 600 D = (40,20 ⇒ Z = 400 Minimum Value = 300, when x = 60 & y = 0	Graph-1.5 1 0.5
31	$S = \{bb, bg, gb, gg\}$ **a)** A : A be that both children are girls $\Rightarrow A = \{gg\} \Rightarrow P(A) = 1/4$ B: youngest child is a girl $\Rightarrow B = \{gg, bg\} \Rightarrow P(B) = \frac{2}{4} = \frac{1}{2}$ $A \cap B = \{gg\} \Rightarrow P(A \cap B) = \frac{1}{4}$ $P(A/B) = \frac{P(A \cap B)}{P(B)} = \frac{1/4}{1/2} = \frac{1}{2}$ ***b*)** C : at least one child is a girl $C = \{bg, gb, gg\} \Rightarrow P(C) = 3/4$ $A \cap C = \{gg\} \Rightarrow P(A \cap C) = 1/4$ $P(A/C) = \frac{P(A \cap C)}{P(C)} = \frac{1/4}{3/4} = 1/3$	0.5 0.5 0.5 0.5 0.5 0.5
	SECTION D	
32	$A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$ $BA = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix} \times \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix} = \begin{bmatrix} 6 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & 6 \end{bmatrix} = 6I$	1

	$\Rightarrow A^{-1} = \frac{B}{6}$ Given that $x - y = 3$, $2x + 3y + 4z = 17$, $y + 2z = 7$. $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}, X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}, D = \begin{bmatrix} 3 \\ 17 \\ 7 \end{bmatrix}$ $A.X = D \Rightarrow X = A^{-1}.D$ $X = \frac{1}{6}\begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}\begin{bmatrix} 3 \\ 17 \\ 7 \end{bmatrix} = \frac{1}{6}\begin{bmatrix} 12 \\ -6 \\ 24 \end{bmatrix} = \begin{bmatrix} 2 \\ -1 \\ 4 \end{bmatrix}$ $x = 2; y = -1; z = 4$	0.5 1 1 1.5
33	A) $I = \int_0^{\pi} \frac{x \sin x}{1+\cos^2 x}$ dx……………(1) $I = \int_0^{\pi} \frac{(\pi-x)\sin(\pi-x)}{1+\cos^2(\pi-x)}$ dx $= \int_0^{\pi} \frac{(\pi-x)\sin x}{1+\cos^2 x}$ dx………………(2) $(1) + (2) \Rightarrow$ $2I = \int_0^{\pi} \frac{\pi \sin x}{1+\cos^2 x}$ Put $t = \cos x \Rightarrow dt = -\sin x\, dx$ $x = 0 \Rightarrow t = 1; x = \pi \Rightarrow t = -1$ $2I = \int_{-1}^{1} \frac{\pi dx}{1+t^2} \Rightarrow 2I = \pi(tan^{-1}t)_{-1}^{1}$ $= \pi(\tan^{-1}(1) - \tan^{-1}(-1))$ $2I = \pi\left(\frac{\pi}{4} + \frac{\pi}{4}\right) = \frac{\pi^2}{2} \Rightarrow I = \frac{\pi^2}{4}$ **OR** B) $I = \int_{\pi/6}^{\pi/3} \frac{\sin x + \cos x}{\sqrt{\sin 2x}}$ dx Put $t = \sin x - \cos x \Rightarrow dt = (\cos x + \sin x)dx$ And $\sin 2x = 1 - (\sin x - \cos x)^2$ $x = \frac{\pi}{6} \Rightarrow t = \frac{1-\sqrt{3}}{2}; x = \frac{\pi}{3} \Rightarrow t = \frac{\sqrt{3}-1}{2}$ $I = \int_{-(\sqrt{3}-1)/2}^{(\sqrt{3}-1)/2} \frac{dt}{\sqrt{1-t^2}}$	0.5 0.5 1 0.5 1 0.5 1 0.5 1 0.5 1

	$\Rightarrow I = 2\int_0^{(\sqrt{3}-1)/2} \frac{dt}{\sqrt{1-t^2}} = 2(\sin^{-1}t)_0^{(\sqrt{3}-1)/2}$	1
	$\Rightarrow I = 2\left(\sin^{-1}\left((\sqrt{3}-1)/2\right) - 0\right) = 2\sin^{-1}\left(\frac{(\sqrt{3}-1)}{2}\right)$	1
34	A) $(x\,dy - y\,dx)y\sin\left(\frac{y}{x}\right) = (y\,dx + x\,dy)x\cos\left(\frac{y}{x}\right)$	
	$\frac{dy}{dx} = \frac{y^2\sin(y/x) + xy\cos(y/x)}{xy\sin(y/x) - x^2\cos(y/x)}$	1
	This is a homogeneous differential equation.	
	Put $y = vx$	
	$\Rightarrow \frac{dy}{dx} = v + x\frac{dv}{dx}$	0.5
	$v + x\frac{dv}{dx} = \frac{v^2\sin v + v\cos v}{v\sin v - \cos v} \Rightarrow x\frac{dv}{dx} = \frac{2v\cos v}{v\sin v - \cos v}$	1
	$\Rightarrow \int \frac{v\sin v - \cos v}{2v\cos v}\, dv = \int \frac{dx}{x}$	0.5
	$\Rightarrow \frac{1}{2}\int \tan v\, dv - \frac{1}{2}\int \frac{1}{v}\, dv = \int \frac{dx}{x}$	0.5
	$\Rightarrow \frac{1}{2}(\log\lvert sec v\rvert - \log\lvert v\rvert) = \log\lvert x\rvert + \log C_1$	0.5
	$\Rightarrow \log\left\lvert\frac{sec v}{v}\right\rvert = \log\lvert 2x^2C_1\rvert \Rightarrow \frac{sec v}{v} = 2x^2C_1$	0.5
	$\Rightarrow \frac{sec(y/x)}{y/x} = Cx^2 \Rightarrow sec(y/x) = Cxy$	0.5
	OR	
	B) $\frac{dy}{dx} + \frac{y^2+y+1}{x^2+x+1} = 0 \Rightarrow \frac{dy}{dx} = -\frac{(y^2+y+1)}{x^2+x+1}$	0.5
	$\Rightarrow \frac{dy}{y^2+y+1} = -\frac{dx}{x^2+x+1}$	0.5
	$\Rightarrow \frac{dy}{\left(y+\frac{1}{2}\right)^2+\frac{3}{4}} = -\frac{dx}{\left(x+\frac{1}{2}\right)^2+\frac{3}{4}}$	0.5
	$\Rightarrow \int \frac{dy}{\left(y+\frac{1}{2}\right)^2+\left(\frac{\sqrt{3}}{2}\right)^2} = -\int \frac{dx}{\left(x+\frac{1}{2}\right)^2+\left(\frac{\sqrt{3}}{2}\right)^2}$	
	$\Rightarrow \frac{2}{\sqrt{3}}\tan^{-1}\left(\frac{y+\frac{1}{2}}{\frac{\sqrt{3}}{2}}\right) + \frac{2}{\sqrt{3}}\tan^{-1}\left(\frac{x+\frac{1}{2}}{\frac{\sqrt{3}}{2}}\right) = C$	1

	$\Rightarrow \tan^{-1}\left(\frac{2y+1}{\sqrt{3}}\right) + \tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right) = \frac{\sqrt{3}}{2}C$ $\Rightarrow \tan^{-1}\left(\frac{\frac{2y+1}{\sqrt{3}}+\frac{2x+1}{\sqrt{3}}}{1-\frac{2y+1}{\sqrt{3}}\cdot\frac{2x+1}{\sqrt{3}}}\right) = \frac{\sqrt{3}}{2}C \Rightarrow \frac{\frac{2y+1}{\sqrt{3}}+\frac{2x+1}{\sqrt{3}}}{1-\frac{2y+1}{\sqrt{3}}\cdot\frac{2x+1}{\sqrt{3}}} = \tan\left(\frac{\sqrt{3}}{2}C\right)$ $\Rightarrow \frac{3/\sqrt{3}\,(2y+2x+2)}{3-4xy-2y-2x-1} = \tan\left(\frac{\sqrt{3}}{2}C\right)$ $\frac{(y+x+1)}{(1-x-y-2xy)} = \frac{\sqrt{3}}{3}\tan\left(\frac{\sqrt{3}}{2}C\right)$ $\Rightarrow \frac{(y+x+1)}{(1-x-y-2xy)} = A$, where $A = \frac{\sqrt{3}}{3}\tan\left(\frac{\sqrt{3}}{2}C\right)$ $\Rightarrow y+x+1 = A(1-x-y-2xy)$	1 0.5 0.5 0.5
35	$l_1: \frac{1-x}{3} = \frac{7y-14}{p} = \frac{z-3}{2} \Rightarrow l_1: \frac{x-1}{-3} = \frac{y-2}{p/7} = \frac{z-3}{2}$ $l_2: \frac{7-7x}{3p} = \frac{y-5}{1} = \frac{6-z}{5} \Rightarrow l_2: \frac{x-1}{3p/-7} = \frac{y-5}{1} = \frac{z-6}{-5}$ d.r's of $l_1 = (-3, p/7, 2)$, d.r's of $l_2 = \left(-\frac{3p}{7},\ 1, -5\right)$ $l_1 \perp l_2 \Rightarrow (-3)\left(-\frac{3p}{7}\right) + \left(\frac{p}{7}\right)(1) + (2)(-5) = 0$ $\Rightarrow p = 7$ $\therefore$ d.r's of $l_1 = (-3,1,2)$ $\vec{a} = 3\hat{i} + 2\hat{j} - 4\hat{k}$, $\vec{b} = -3\hat{i} + \hat{j} + 2\hat{k}$ Required vector in Vector form: $\vec{r} = \vec{a} + \lambda\vec{b}$ $\Rightarrow \vec{r} = (3\hat{i} + 2\hat{j} - 4\hat{k}) + \lambda(-3\hat{i} + \hat{j} + 2\hat{k})$ Required vector in Cartesian form: $\frac{x-3}{-3} = \frac{y-2}{1} = \frac{z+4}{2}$	0.5 0.5 0.5 1 0.5 1 1
	SECTION E	
36	(a) $f_1(x) = x^2 + 1$ is not one-one, because $f(1) = f(-1) = 2$, even though $1 \neq -1$. Hence, different elements of domain give the same image. (b) For $f_2(x) = 4x^2 - 3$, the range is $[-3, \infty)$. Hence, if the function is onto, Codomain $Y = [-3, \infty)$. (c) For $f_3(x) = 2x - 5$:	0.5 0.5 0.5 0.5

	One-one: If $f(x_1) = f(x_2)$, then $2x_1 - 5 = 2x_2 - 5 \Rightarrow x_1 = x_2$. Hence, it is one-one. Onto: For any $y \in \mathbb{R}$, there exists $x = \frac{y+5}{2} \in \mathbb{R}$. Hence, it is onto. Therefore, $f_3(x) = 2x - 5$ is bijective. **OR** (c) For $f_1(x) = x^2 + 1$: • Range: $[1, \infty)$ • Codomain: $\mathbb{R}$ Since not every real number is an image (e.g., 0 not in range), $f_1(x)$ is not onto when codomain is $\mathbb{R}$.	1 1 1 1
37	(a) $\frac{dy}{dx} = \frac{d}{dx}\left(10x - \frac{1}{2}x^2\right) = 10 - x$ (b) At the point of maximum height $\frac{dy}{dx} = 0 \Rightarrow 10 - x = 0 \Rightarrow x = 10$ days (c) $\frac{d^2y}{dx^2} = -1 < 0$ for $x = 10$ $\therefore$ Maximum height y (at $x = 10$) $= 100 - 50 = 50$ cm **OR** (c) Height after 2 days y (at $x = 2$) = $10 \times 2 - \frac{1}{2} \times 4 = 18$ cm	1 1 1 1 1+1
38	(a) Required Probability = $P(D/A)P(A) + P(D/B)P(B) + P(D/C)P(C) = 0.047$ (b) The probability = 1−probability that the form has a mistake and is processed by Ram $=1 - (30/47) = 17/47$	 1+1 1+1

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