KENDRIYA VIDYALAYA , MUMBAI REGION
PREBOARD- 1(2025-2026)
ANSWER KEY set1

1	C	1
2	D	1
3	C	1
4	C	1
5	C	1
6	C	1
7	B	1
8	B	1
9	D	1
10	A	1
11	D	1
12	D	1
13	C	1
14	D	1
15	C	1
16	B	1
17	D	1
18	C	1
19	**A**	1
20	A	1
21	$\cos^{-1}(\cos(\pi - \frac{\pi}{7})$ $\cos^{-1}(\cos(\frac{6\pi}{7})$ 6Π /7 OR For $\cos^{-1} x$, $-1 \leq x \leq 1$. ∴ for $\cos^{-1}(3x - 2)$ $-1 \leq (3x - 2) \leq 1$ $\Rightarrow 1 \leq 3x \leq 3$ $\Rightarrow \frac{1}{3} \leq x \leq 1$	1 1/2 1/2 1 1
22	$A = 4\pi r^2$ $dA/dr = 8\pi r$ at $r = 6$ $dA/dr = 48\pi$	0.5 0.5 1
23	$\frac{-2}{a} = -\frac{3}{6} = \frac{4}{-8}$	1

	a= 4 OR $\vec{r} = 1\hat{i} + 2\hat{j} - 5\hat{k} + s(3\hat{i} + 3\hat{j} - 5\hat{k}.)$	1 2
24	Diff w.r.t x $\frac{dy}{dx} = x\cos y\frac{dy}{dx} + siny$ $\frac{dy}{dx} = \frac{siny}{1-xcosy}$ $\therefore x\frac{dy}{dx} = \frac{xsiny}{1-xcosy} = \frac{y}{1-xcosy}$-	1 0.5 0.5
25	$2\hat{i} + 6\hat{j} + 14\hat{k}) \times (\hat{i} + k\hat{j} + 7\hat{k}) = \vec{0}$ $\begin{vmatrix} i & j & k \\ 2 & 6 & 14 \\ 1 & k & 7 \end{vmatrix} = \vec{0}$ $\hat{i}(42 - 14k)\widehat{-j}(14 + 14) + k(\widehat{2k - 6}) = \vec{0}$ K = 3	 1 0.5 0.5
26	Put x^2 = t and 2x dx = dt Using partial fraction Correct answer **(OR)** $\int \frac{dx}{\sqrt{3-2x-x^2}}$ $= \int \frac{dx}{\sqrt{-(x^2+2x-3)}}$ $= \int \frac{dx}{\sqrt{4-(x+1)^2}}$ $= \sin^{-1}\left(\frac{x+1}{2}\right) + C, \quad \left[\because \int \frac{dx}{\sqrt{a^2-x^2}} = \sin^{-1}\left(\frac{x}{a}\right) + C\right]$	0.5 1 1.5 1 1 1
27	Correct assumption of events For correct probability For correct formula For correct answer 16/31	½ ½ 1 1
28	Find $\vec{a} \times \vec{b} = \widehat{32\imath} - \hat{\jmath} - 14\hat{k}$ Put $\vec{d} = \lambda\ (\widehat{32\imath} - \hat{\jmath} - 14\hat{k})$ Put values in $\vec{c}.\vec{d} = 15$ Find $\lambda = 2$	1 ½ ½ ½

	Ans $\vec{d} = 2\ (\widehat{32\imath} - \hat{\jmath} - 14\hat{k})$ Or Each correct steps Ans -3/2	½ 1 1 1
29	$\frac{dy}{dx} - 3y\cot x = \sin 2x,$ $P = -3\cot x\ \ Q = \sin 2x\ \ and\ \ IF = e^{\int -3\cot x\, dx} = \frac{1}{sin^3 x}$ Solution is $y \times IF = \int (Q \times IF) dx$ $\frac{y}{sin^3 x} = \int \frac{\sin 2x}{sin^3 x} dx \Rightarrow \frac{y}{sin^3 x} = -2cosec\ x + C$ $if\ y = 2\ at\ x = \frac{\pi}{2} \Rightarrow C = 4$ Therefore $y = 4sin^3 x - 2sin^2 x$ **OR** $xdy - ydx = \sqrt{x^2 + y^2}dx$ $\frac{dy}{dx} = \frac{y}{x} + \sqrt{1 + \left(\frac{y}{x}\right)^2}\ now\ let\ \frac{y}{x} = v \Rightarrow \frac{dy}{dx} = v + x\frac{dv}{dx}$ Now $v + x\frac{dv}{dx} = v + \sqrt{1 + v^2}$ $\int \frac{1}{x} dx = \int \frac{1}{\sqrt{1 + v^2}} dv$ $\log x = log\left\|v + \sqrt{1 + v^2}\right\| + \log C \Rightarrow Cx^2 = y + \sqrt{x^2 + y^2}$	 1 1 1 1 ½ ½ 1
30	Correct graph CORRECT TABLE Correct answer	1.5 1 0.5
31	$Let\ I = \int_0^{2\pi} \frac{1}{1 + e^{\sin x}} dx$ -----------------------(i) $I = \int_0^{2\pi} \frac{1}{1 + e^{\sin(2\pi - x)}} dx$ $\left[\because \int_0^a f(x)\,dx = \int_0^a (a - x)\,dx\right]$ $\Longrightarrow I = \int_0^{2\pi} \frac{1}{1 + e^{-\sin x}} dx$	 1

	$= \int_0^{2\pi} \frac{e^{\sin x}}{e^{\sin x} + 1} dx - - - - - - - - - - (ii)$ On adding equation (i) and (ii), we get $\Rightarrow \quad 2I = \int_0^{2\pi} \frac{1 + e^{\sin x}}{1 + e^{\sin x}} dx = \int_0^{2\pi} dx$ $\Rightarrow \quad 2I = [x]_0^{2\pi} = 2\pi$ $\Rightarrow \quad I = \pi.$	1 1
32	Drawing correct figure Solution: Solving x + y = 2 and y 2 = x simultaneously, we get the points of intersection as (1, 1) and (4, -2) The required area=area of shaded region $A = \int_0^1 \sqrt{x}\, dx + \int_1^2 (2 - x) dx$ A=$\frac{2}{3}\left[x^{\frac{3}{2}}\right]_0^1 + \left[2x - \frac{x^2}{2}\right]_1^2$ =$\frac{2}{3} + \frac{1}{2} = \frac{7}{6} unit$	1 1 1 1 1
33	Since 'f' is differentiable at x=1 ⇒ f is continuous at x= 1 LHL $\lim_{X\to 1^-} f(x) = a + b$ RHL $\lim_{X\to 1^+} f(x) = 3$ ⇒a + b = 3 -------- (1) Again , since f is differentiable ⇒LHD (at x=1) = RHD (at x = 1) ⇒ 2a = 2 ----------- (2) From (1) and (2) a = 1 , b= 2 **OR** Let u = $(\sin x)^x$ And v = $(\cos x)^{\sin x}$ Hence y = u + v log u = x log sinx $\frac{du}{dx} = (\sin x)^x[\, x\, cotx + \log sinx]$ log v = sinx.log cos x	1 ½ 1/2 1 1 1 ½ 2

	$\frac{dv}{dx} = (\cos x)^{1+\sin x}[\log(\cos x) - \tan^2 x]$ $\frac{dy}{dx} = (\sin x)^x[\, x\, cotx + \log sinx]$ $+ (\cos x)^{1+\sin x}[\log(\cos x) - \tan^2 x]$	2 ½
34	$\vec{r}$ = ($\hat{\imath}$ +$\hat{\jmath}$ -$\hat{k}$) + λ(3$\hat{\imath}$ -$\hat{\jmath}$) and $\vec{r}$ = (4$\hat{\imath}$ -$\hat{k}$) + μ(2$\hat{\imath}$ +3$\hat{k}$) $\overrightarrow{b_1} \times \overrightarrow{b_2} = -3\hat{\imath} - 9\hat{\jmath} + 2\hat{k}$ $\overrightarrow{a_2} - \overrightarrow{a_1} = 3\hat{\imath} - \hat{\jmath}$ $SD = \frac{\lvert(\overrightarrow{a_2} - \overrightarrow{a_1}).(\overrightarrow{b_1} \times \overrightarrow{b_2})\rvert}{\lvert\overrightarrow{b_1} \times \overrightarrow{b_2}\rvert}$ For substituting values For correct answer =0 They meet an accident if drive with higher speed. **OR** $\frac{x-0}{1} = \frac{y-1}{2} = \frac{z-2}{3} = \lambda$ $x = \lambda, y = 2\lambda + 1, z = 3\lambda + 2$ direction ratios of perpendicular drawn from (1,6,3) are $(1-\lambda, 5 - 2\lambda, 1 - 3\lambda)$ $(1-\lambda)1 + (5-2\lambda)2 + (1-3\lambda)3 = 0$ $\lambda = 1$ The foot of perpendicular from (1,6,3) is (1,3,5) Image is (1,0,7)	1 1 1 1 1 1 1 1 1 1
35	AX=B Where A=$\begin{bmatrix} 3 & -2 & 3 \\ 2 & 1 & -1 \\ 4 & -3 & 2 \end{bmatrix}$, X=$\begin{bmatrix} x \\ y \\ z \end{bmatrix}$, and B=$\begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$ |A|= -17≠0 $A^{-1} = -\frac{1}{17}\begin{bmatrix} -1 & -5 & -1 \\ -8 & -6 & 9 \\ -10 & 1 & 7 \end{bmatrix}$ X=A^{-1}B =$-\frac{1}{17}\begin{bmatrix} -1 & -5 & -1 \\ -8 & -6 & 9 \\ -10 & 1 & 7 \end{bmatrix}\begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$	1 2 1

	$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = -\frac{1}{17}\begin{bmatrix} -17 \\ -34 \\ -51 \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ Hence x=1, y=2 and z=3	1
36	**(i) (500-x)(300+x)** **(ii) 200-2x** **(iii) 160,000 or -2**	1 1 2
37	(i) Number of relations is equal to the number of subsets of the set $B\times G$ $=2^{n(B\times G)}=2^{n(B)\times n(G)}=2^{3\times 2}=2^{6}$ (i) 0 (ii) Surjective and correct proof OR (iv) for showing f is one one function. For showing f is onto function.	1 1 1+1 1 1
38	Let $E_1 = The\ policy\ holder\ is\ accident\ prone$ $E_2 = The\ policy\ holder\ is\ not\ accident\ prone$ A= The new policy holder has an accident within a year of purchasing a policy (iii) $P(A) = P(E_1)P\left(\frac{A}{E_1}\right) + P(E_2)P\left(\frac{A}{E_2}\right)$ $= \frac{20}{100}\times\frac{6}{10}+\frac{80}{100}\times\frac{2}{10}=\frac{7}{25}$ (ii) using Bayes, theorem $P\left(\frac{E_1}{A}\right) = \frac{P(E_1)P\left(\frac{A}{E_1}\right)}{P(E_1)P\left(\frac{A}{E_1}\right) + P(E_2)P\left(\frac{A}{E_2}\right)}$ $= \frac{\frac{20}{100}\times\frac{6}{10}}{\frac{7}{25}}$ $=\frac{3}{7}$	1 1 1 1