

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	$\cos^{-1}(\cos(\pi - \frac{\pi}{7}))$ $\cos^{-1}(\cos(\frac{6\pi}{7}))$ $6\pi / 7$ OR For $\cos^{-1} x$, $-1 \leq x \leq 1$. $\therefore$ 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	1
	OR $\vec{r} = 1\hat{i} + 2\hat{j} - 5\hat{k} + s(3\hat{i} + 3\hat{j} - 5\hat{k}).$	2
24	Diff w.r.t x $\frac{dy}{dx} = x \cos y \frac{dy}{dx} + \sin y$ $\frac{dy}{dx} = \frac{\sin y}{1 - x \cos y}$ $\therefore x \frac{dy}{dx} = \frac{x \sin y}{1 - x \cos y} = \frac{y}{1 - x \cos y}$	1 0.5 0.5
25	$2\hat{i} + 6\hat{j} + 14\hat{k}) \times (\hat{i} + \hat{k} + 7\hat{k}) = \vec{0}$ $\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & 6 & 14 \\ 1 & \hat{k} & 7 \end{vmatrix} = \vec{0}$ $\hat{i}(42 - 14\hat{k}) - \hat{j}(14 + 14) + \hat{k}(2\hat{k} - 6) = \vec{0}$ $K = 3$	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	1/2 1/2 1 1
28	Find $\vec{a} \times \vec{b} = 32\hat{i} - \hat{j} - 14\hat{k}$ Put $\vec{d} = \lambda (32\hat{i} - \hat{j} - 14\hat{k})$ Put values in $\vec{c} \cdot \vec{d} = 15$ Find $\lambda = 2$	1 1/2 1/2 1/2

	Ans $\vec{d} = 2 (3\hat{i} - \hat{j} - 14\hat{k})$ Or Each correct steps Ans $-3/2$	$1/2$ 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 $y \times IF = \int (Q \times IF) dx$ $\frac{y}{\sin^3 x} = \int \frac{\sin 2x}{\sin^3 x} dx \Rightarrow \frac{y}{\sin^3 x} = -2 \operatorname{cosec} x + C$ if $y = 2$ at $x = \frac{\pi}{2} \Rightarrow C = 4$ Therefore $y = 4 \sin^3 x - 2 \sin^2 x$ OR $x dy - y dx = \sqrt{x^2 + y^2} dx$ $\frac{dy}{dx} = \frac{y}{x} + \sqrt{1 + \left(\frac{y}{x}\right)^2}$ now let $\frac{y}{x} = v \Rightarrow \frac{dy}{dx} = v + x \frac{dv}{dx}$ Now $v + x \frac{dv}{dx} = v + \sqrt{1 + v^2}$ $\int \frac{1}{x} dx = \int \frac{1}{\sqrt{1 + v^2}} dv$ $\log x = \log v + \sqrt{1 + v^2} + \log C \Rightarrow Cx^2 = y + \sqrt{x^2 + y^2}$	1 1 1 1 1 $1/2$ $1/2$ 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) $I = \int_0^{2\pi} \frac{1}{1 + e^{\sin(2\pi - x)}} dx$ $\left[\because \int_0^a f(x) dx = \int_0^a (a - x) dx \right]$ $\Rightarrow I = \int_0^{2\pi} \frac{1}{1 + e^{-\sin x}} dx$	1

	$= \int_0^{2\pi} \frac{e^{\sin x}}{e^{\sin x} + 1} dx \text{----- (ii)}$ On adding equation (i) and (ii), we get $\Rightarrow 2I = \int_0^{2\pi} \frac{1 + e^{\sin x}}{1 + e^{\sin x}} dx = \int_0^{2\pi} dx$ $\Rightarrow 2I = [x]_0^{2\pi} = 2\pi$ $\Rightarrow I = \pi.$	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 $A = \int_0^1 \sqrt{x} dx + \int_1^2 (2 - x) dx$ $A = \frac{2}{3} \left[x^{\frac{3}{2}} \right]_0^1 + \left[2x - \frac{x^2}{2} \right]_1^2$ $= \frac{2}{3} + \frac{1}{2} = \frac{7}{6} \text{ unit}$	1 1 1 1 1
33	Since 'f' is differentiable at $x=1$ $\Rightarrow f$ is continuous at $x=1$ LHL $\lim_{x \rightarrow 1^-} f(x) = a + b$ RHL $\lim_{x \rightarrow 1^+} f(x) = 3$ $\Rightarrow a + b = 3$ ----- (1) Again, since f is differentiable $\Rightarrow \text{LHD (at } x=1) = \text{RHD (at } x=1)$ $\Rightarrow 2a = 2$ ----- (2) From (1) and (2) $a = 1, b = 2$ OR Let $u = (\sin x)^x$ And $v = (\cos x)^{\sin x}$ Hence $y = u + v$ $\log u = x \log \sin x$ $\frac{du}{dx} = (\sin x)^x [x \cot x + \log \sin x]$ $\log v = \sin x \cdot \log \cos x$	1 1/2 1/2 1 1 1 1/2 2

	$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = -\frac{1}{17} \begin{bmatrix} -17 \\ -34 \\ -51 \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ 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