Q1. 21 January Shift 1

The area of the region, inside the ellipse $x^2+4y^2=4$ and outside the region bounded by the curves $y=|x|-1$ and $y=1-|x|$, is :

(1) $2\pi-1$ (2) $3(\pi-1)$ (3) $2\pi-\frac{1}{2}$ (4) $2(\pi-1)$

Q2. 21 January Shift 2

If the area of the region $\{(x,y):1-2x\leqslant y\leqslant 4-x^2, x\geqslant 0, y\geqslant 0\}$ is $\frac{\alpha}{\beta}, \alpha,\beta\in\mathbf{N}, \gcd(\alpha,\beta)=1$, then the value of $(\alpha+\beta)$ is :

(1) 67 (2) 91 (3) 73 (4) 85

Q3. 22 January Shift 1

Let the line $x=-1$ divide the area of the region $\{(x,y):1+x^2\leq y\leq 3-x\}$ in the ratio $m:n, \gcd(m,n)=1$. Then $m+n$ is equal to

(1) 27 (2) 25 (3) 28 (4) 26

Q4. 22 January Shift 2

The area of the region $\mathrm{A}=\{(x,y):4x^2+y^2\leqslant 8 \text{ and } y^2\leqslant 4x\}$ is:

(1) $\pi+4$ (2) $\pi+\frac{2}{3}$ (3) $\frac{\pi}{2}+2$ (4) $\frac{\pi}{2}+\frac{1}{3}$

Q5. 23 January Shift 1

Let the area of the region bounded by the curve $y=\max\{\sin x,\cos x\}$, lines $x=0, x=\frac{3\pi}{2}$, and the x-axis be A. Then, $\mathrm{A}+\mathrm{A}^2$ is equal to ____.

Q6. 23 January Shift 2

The area of the region enclosed between the circles $x^2+y^2=4$ and $x^2+(y-2)^2=4$ is:

(1) $\frac{4}{3}(2\pi-3\sqrt{3})$ (2) $\frac{2}{3}(2\pi-3\sqrt{3})$ (3) $\frac{2}{3}(4\pi-3\sqrt{3})$ (4) $\frac{4}{3}(2\pi-\sqrt{3})$

Q7. 24 January Shift 1

Let A_1 be the bounded area enclosed by the curves $y=x^2+2, x+y=8$ and y-axis that lies in the first quadrant. Let A_2 be the bounded area enclosed by the curves $y=x^2+2, y^2=x, x=2$, and y-axis that lies in the first quadrant. Then $\mathrm{A}_1-\mathrm{A}_2$ is equal to

(1) $\frac{2}{3}(3\sqrt{2}+1)$ (2) $\frac{2}{3}(2\sqrt{2}+1)$ (3) $\frac{2}{3}(\sqrt{2}+1)$ (4) $\frac{2}{3}(4\sqrt{2}+1)$

Q8. 24 January Shift 2

Let $f(\alpha)$ denote the area of the region in the first quadrant bounded by $x=0, x=1, y^2=x$ and $y=|\alpha x-5|-|1-\alpha x|+\alpha x^2$. Then $(f(0)+f(1))$ is equal to

(1) 12 (2) 14 (3) 7 (4) 9

Q9. 28 January Shift 1

The area of the region $\mathrm{R}=\left\{(x, y): xy \leq 8, 1 \leq y \leq x^2, x \geq 0\right\}$ is

(1) $\frac{2}{3}(24\log_e(2)-7)$ (2) $\frac{1}{3}(40\log_e(2)+27)$

(3) $\frac{2}{3}(20\log_e(2)+9)$ (4) $\frac{1}{3}(49\log_e(2)-15)$

Q10. 28 January Shift 2

Let $P_1: y=4x^2$ and $P_2: y=x^2+27$ be two parabolas. If the area of the bounded region enclosed between P_1 and P_2 is six times the area of the bounded region enclosed between the line $y=\alpha x, \alpha>0$ and P_1, then α is equal to :

(1) 12 (2) 6 (3) 15 (4) 8

ANSWER KEYS

1. (4) **2.** (3) **3.** (1) **4.** (2) **5.** 12 **6.** (3) **7.** (2) **8.** (3)

9. (1) **10.** (1)