1. The area bounded by the curve $y = |x| - 1$ and $y = -|x| + 1$ is -

(1) 1 (2) 2

(3) $2\sqrt{2}$ (4) $4\sqrt{2}$

2. Consider $f(x) = \text{minimum}\left(x+2, \sqrt{4-x}\right)$, $\forall x \leq 4$. If the area bounded by $y = f(x)$ and the x-axis is $\frac{22}{k}$ square units, then the value of k is

3. The area (in sq. units) of the region $\{(x, y) \in R^2 : x^2 \leq y \leq 3 - 2x\}$, is.

(1) $\frac{32}{3}$ (2) $\frac{34}{3}$

(3) $\frac{29}{3}$ (4) $\frac{31}{3}$

4. The area bounded by the curves $y = x^2$ and $y = \frac{2}{(1+x^2)}$ is

(1) $\left(\pi - \frac{1}{3}\right)$ sq. units (2) $\left(\pi - \frac{2}{3}\right)$ sq. units

(3) $\frac{(2\pi-1)}{3}$ sq. units (4) None of these

5. If the area bounded by f(x) = max(sin x, cos x); $0 \leq x \leq \frac{\pi}{2}$, $x = \frac{\pi}{2}$ and the coordinates axes is equal to k, then [k + 3] is equal to (where, [.] denotes the greatest integer function

(1) 2 (2) 8

(3) 4 (4) 6

6. Let the straight line x = b divide the area enclosed by $y = (1 - x)^2$, y = 0 and x = 0 into two parts $R_1(0 \leq x \leq b)$ and $R_2(b \leq x \leq 1)$ such that $R_1 - R_2 = \frac{1}{4}$. Then, b equals

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

(3) $\frac{1}{3}$ (4) $\frac{1}{4}$

7. The area bounded by the circle $x^2 + y^2 = 4$, line $x = \sqrt{3}y$ and x-axis lying in the first quadrant, is

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

(3) $\frac{\pi}{3}$ (4) π

8. The area of the region (in sq. units), enclosed by the circle $x^2 + y^2 = 2$ which is not common to the region bounded by the parabola $y^2 = x$ and the straight line $y = x$, is

(1) $\frac{1}{6}(24\pi - 1)$ (2) $\frac{1}{3}(6\pi - 1)$

(3) $\frac{1}{3}(12\pi - 1)$ (4) $\frac{1}{6}(12\pi - 1)$

9. The area of the region bounded by the straight lines $x = 0$, $x = 2$ and the curves $y = 2^x$, $y = 2x - x^2$ is

(1) $\left(\frac{3}{\log 2} - \frac{4}{3}\right)$ sq. units (2) $\left(\frac{3}{\log 2} + \frac{4}{3}\right)$ sq. units

(3) $\left(\frac{3}{\log 2} - \frac{2}{3}\right)$ sq. units (4) $\left(\frac{3}{\log 2} - \frac{1}{2}\right)$ sq. units

10. Let $f : [-3, 1] \to R$ be given as $f(x) = \begin{cases} \min\{(x+6), x^2\}, & -3 \leq x \leq 0 \\ \max\{\sqrt{x}, x^2\}, & 0 \leq x \leq 1 \end{cases}$ If the area bounded by $y = f(x)$ and x-axis is A, then the value of 6 A is equal to