1. The area bounded by the lines $y = ||x-1|-2|$ is _____.

2. The area of the region enclosed by the curve $f(x) = \max\{\sin x, \cos x\}, -\pi \le x \le \pi$ and the $x-$axis is

(1) $2\sqrt{2}\left(\sqrt{2}+1\right)$ (2) 4

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

3. The area of the region $\{(x,y):\ x^2 \le y \le 8-x^2, y \le 7\}$ is

(1) 27 (2) 18

(3) 20 (4) 21

4. The area of the region bounded by $y^2 = 8x$ and $y^2 = 16(3-x)$ is equal to

(1) $\frac{32}{3}$ (2) $\frac{40}{3}$

(3) 16 (4) 9

5. If A is the area in the first quadrant enclosed by the curve $C: 2x^2 - y + 1 = 0$, the tangent to C at the point $(1,\ 3)$ and the line $x + y = 1$, then the value of $60A$ is.....

6. The area of the region enclosed by $y \le 4x^2, x^2 \le 9y$ and $y \le 4$, is equal to

(1) $\frac{40}{3}$ (2) $\frac{56}{3}$

(3) $\frac{112}{3}$ (4) $\frac{80}{3}$

7. The area (in sq. units) of the region bounded by the curves $y = 2^x$ and $y = |x+1|$, in the first quadrant is

(1) $\frac{3}{2} - \frac{1}{\log_e 2}$ (2) $\frac{1}{2}$

(3) $\log_e 2 + \frac{3}{2}$ (4) $\frac{3}{2}$

8. Let A be the area bounded by the curve $y = x|x-3|$, the x-axis and the ordinates $x = -1$ and $x = 2$. Then $12\ A$ is equal to _____.

9. The area enclosed between the curves $y^2 + 4x = 4$ and $y - 2x = 2$ is

(1) $\frac{25}{3}$ (2) $\frac{22}{3}$

(3) 9 (4) $\frac{23}{3}$

10. The area of the region $\left\{(x,y): |x-1| \le y \le \sqrt{5-x^2}\right\}$ is equal to

(1) $\frac{5}{2}\sin^{-1}\left(\frac{3}{5}\right) - \frac{1}{2}$ (2) $\frac{5\pi}{4} - \frac{3}{2}$

(3) $\frac{3\pi}{4} + \frac{3}{2}$ (4) $\frac{5\pi}{4} - \frac{1}{2}$

11. The area of the region given by $A = \{(x,y): x^2 \le y \le \min\{x+2, 4-3x\}\}$ is

(1) $\frac{31}{8}$ (2) $\frac{17}{6}$

(3) $\frac{19}{6}$ (4) $\frac{27}{8}$

12. Let A_1 be the area of the region bounded by the curves $y = \sin x, y = \cos x$ and y-axis in the first quadrant. Also, let A_2 be the area of the region bounded by the curves $y = \sin x, y = \cos x$, x-axis and $x = \frac{\pi}{2}$ in the first quadrant. Then,

(1) $2A_1 = A_2$ and $A_1 + A_2 = 1 + \sqrt{2}$ (2) $A_1 : A_2 = 1 : \sqrt{2}$ and $A_1 + A_2 = 1$

(3) $A_1 : A_2 = 1 : 2$ and $A_1 + A_2 = 1$ (4) $A_1 = A_2$ and $A_1 + A_2 = \sqrt{2}$

13. The area (in sq. units) of the region $\left\{(x,\ y): 0 \le y \le x^2 + 1,\ 0 \le y \le x + 1,\ \frac{1}{2} \le x \le 2\right\}$ is

(1) $\frac{23}{16}$ (2) $\frac{79}{24}$

(3) $\frac{79}{16}$ (4) $\frac{23}{6}$

14. Let the area enclosed by the lines $x + y = 2,\ y = 0,\ x = 0$ and the curve $f\left(x\right) = \min\left\{x^2 + \frac{3}{4}, 1 + \left[x\right]\right\}$ where $[x]$ denotes the greatest integer $\le x$, be A. Then the value of $12A$ is

15. Let A be the area of the region $\left\{(x,y) : y \ge x^2,\ y \ge (1-x)^2,\ y \le 2x(1-x)\right\}$. Then $540A$ is equal to

16. Let for $x \in R$, $f(x) = \frac{x+|x|}{2}$ and $g(x) = \begin{cases} x, & x < 0 \\ x^2, & x \ge 0 \end{cases}$. Then area bounded by the curve $y = (fog)(x)$ and the lines $y = 0, 2y - x = 15$ is equal to _____.

17. Let S be the region bounded by the curves $y = x^3$ and $y^2 = x$. The curve $y = 2|x|$ divides S into two regions of areas R_1 and R_2. If $\max|R_1, R_2| = R_2$, then $\frac{R_2}{R_1}$ is equal to _____

18. Let $A_1 = \{(x,y): |x| \le y^2, |x| + 2y \le 8\}$ and $A_2 = \{(x,y): |x| + |y| \le k\}$. If 27 (Area A_1) = 5(Area A_2), then k is equal to

19. The area (in sq. units) of the region $A = \{(x,y) : |x| + |y| \le 1, 2y^2 \ge |x|\}$

(1) $\frac{1}{3}$ (2) $\frac{7}{6}$

(3) $\frac{1}{6}$ (4) $\frac{5}{6}$

20. The area (in sq. units) of the region $A = \{(x,y) : (x-1)[x] \le y \le 2\sqrt{x}, 0 \le x \le 2\}$, where $[t]$ denotes the greatest integer function, is :

(1) $\frac{8}{3}\sqrt{2} - \frac{1}{2}$ (2) $\frac{4}{3}\sqrt{2} + 1$

(3) $\frac{8}{3}\sqrt{2} - 1$ (4) $\frac{4}{3}\sqrt{2} - \frac{1}{2}$