AREA UNDER THE CURVE- EXERCISE

1. The area contained between the x-axis and one arc of the curve y = cos 9x is

(1) $\frac{1}{3}$ (2) $\frac{2}{3}$ (3) $\frac{2}{7}$ (4) $\frac{2}{9}$

2. Area bounded by curve $y = xe^{|x|}$ and lines $|x| = 1$, y = 0 will be

(1) 4 (2) 6 (3) 1 (4) 2

3. Area bounded by x-axis, x = 0, $x=\frac{\pi}{2}$ and f(x)={sinx} is (where{.} is fractional part function):

(1) π (2) 2π (3) 3π (4) None

4. Area of the region bounded by the curves $y = e^x$ $y = e^{-x}$ and the straight line y = 2 is

(1) $\ell n\frac{4}{e}$ (2) $2\ell n\frac{4}{e}$ (3) $4\ell n\frac{4}{e}$ (4) None

5. Area enclosed by the curves $y = \ell nx$; $y = \ell n|x|$; $y = |\ell nx|$ and $y = |\ell n|x||$ is equal to

(1) 2
(2) 4
(3) 8
(4) cannot be determined

6. The area enclosed by |x| + y = 1 and the axis of x is :-

(1) 1 (2) $\frac{1}{2}$ (3) 2 (4) None

7. The area bounded by the curves $y=\sqrt{1-x^2}$; $y=\sqrt{4-x^2}$ and $\sqrt{3}\,(x^2 + y^2) = 4xy$ is equal to :-

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

8. The limit of the area under the curve $y = e^{-x}$ from x = 0 to x = h as $h \to \infty$ is

(1) 2 (2) e (3) 1/e (4) 1

9. Let y = g(x) be the inverse of a bijective mapping f : $R \to R$, $f(x) = 3x^3 + 2x$ the area bounded by the graph of g(x), the x-axis and the ordinate at x = 5 is

(1) $\frac{5}{4}$ (2) $\frac{7}{4}$ (3) $\frac{9}{4}$ (4) $\frac{13}{4}$

10. The area of the shorter region bounded by $|y| = 4 - x^2$ and $|y| = 3x$ is given by $\left(3K+\frac{1}{3}\right)$ sq-unit where K is equal to :-

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

11. Area lying between the curve y = cosx the line y = x + 1 and the x-axis is :-

(1) $\frac{1}{2}$ (2) $\frac{3}{2}$ (3) $\frac{5}{2}$ (4) None

12. Area lying in the first quadrant between the curves $x^2 + y^2 = \pi^2$ and y = sinx is equal to :-

(1) $\frac{(\pi^2-8)}{2}$ (2) $\frac{(\pi^3-8)}{3}$

(3) $\frac{(\pi^2-8)}{4}$ (4) $\frac{(\pi^3-8)}{4}$

13. The area enclosed between the curves $y = \log_e(x + e)$ $x = \log_e\left(\frac{1}{y}\right)$ and the x-axis is equal to :-

(1) 2e (2) 2 (3) $\frac{2}{e}$ (4) None

14. Area bounded by the parabola $y^2 = 2x$ and the ordinates x = 1, x = 4 is-

(1) $\frac{4\sqrt{2}}{3}$ sq. units (2) $\frac{28\sqrt{2}}{3}$ sq. units

(3) $\frac{56}{3}$ sq. units (4) None of these

15. The area bounded by the curve $y = \frac{1}{\cos^2 x}$, coordinates axes and $x = \pi/4$ is-

(1) 1 (2) 2 (3) $\pi/4$ (4) ∞

16. The area of a loop bounded by the curve y = a sin x and x-axis is-

(1) a (2) $2a^2$ (3) 0 (4) 2a

17. The area of the figure bounded by y = sin x, y = cos x & y axis, in the first quadrant is-

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

(3) $2\left(\sqrt{3}-1\right)$ (4) None of these

18. The area bounded by the curve $y = x \sin x^2$, x–axis and x = 0 and $x = \sqrt{\frac{\pi}{2}}$ is

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

19. The area of the smaller portion between the circle $x^2 + y^2 = 9$ and the line x = 1 is-

(1) $9\sec^{-1}3 - \sqrt{8}$ (2) $9\operatorname{cosec}^{-1}3 - \sqrt{8}$

(3) $\sec^{-1}3 - \sqrt{8}$ (4) None of these

20. The area of the region bounded by $x^2 + y^2 - 2x \le 0$, $x + y \le 1$; $y \ge 0$ is-

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

21. The area between the curves $y = x^2$ and $y = \frac{2}{1+x^2}$ is-

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

22. Let f(x) be a continuous function such that the area bounded by the curve y = f(x), the x-axis and the two ordinates x = 0 and x = a is $\frac{a^2}{2} + \frac{a}{2}\sin a + \frac{\pi}{2}\cos a$. Then $f\left(\frac{\pi}{2}\right)$ is-

(1) $\frac{1}{2}$ (2) $\frac{\pi^2}{8} + \frac{\pi}{4}$ (3) $\frac{\pi+1}{2}$ (4) $\frac{\pi}{2}$

23. The area bounded in the first quadrant by the normal at (1 , 2) on the curve $y^2 = 4x$, x-axis & the curve is given by :

(1) $\frac{10}{3}$ (2) $\frac{7}{3}$ (3) $\frac{4}{3}$ (4) $\frac{9}{2}$

24. The area of the region(s) enclosed by the curves $y = x^2$ and $y = \sqrt{|x|}$ is

(1) 1/3 (2) 2/3 (3) 1/6 (4) 1

25. Area enclosed by the graph of the function $y = \ln^2 x - 1$ lying in the 4^{th} quadrant is

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

(3) $2\left(e + \frac{1}{e}\right)$ (4) $4\left(e - \frac{1}{e}\right)$

26. The area bounded by the curve y = f(x) (where $f(x) \ge 0$), the co-ordinate axes & the line $x = x_1$ is given by $x_1 \cdot e^{x_1}$. Therefore f (x) equals:

(1) e^x (2) $x e^x$

(3) $xe^x - e^x$ (4) $x e^x + e^x$

27. The slope of the tangent to a curve y = f (x) at (x , f (x)) is 2x + 1 . If the curve passes through the point (1 , 2) then the area of the region bounded by the curve , the x-axis and the line x = 1 is

(1) $\frac{5}{6}$ (2) $\frac{6}{5}$ (3) $\frac{1}{6}$ (4) 1

28. The area bounded by the curves $y = x(x-3)^2$ and $y = x$ is (in sq. units) :

(1) 28 (2) 32 (3) 4 (4) 8

29. The area bounded by the curve $y = x e^{-x}$; $xy = 0$ and x = c where c is the x-coordinate of the curve's inflection point, is

(1) $1 - 3e^{-2}$ (2) $1 - 2e^{-2}$

(3) $1 - e^{-2}$ (4) 1

30. If the area bounded between x-axis and the graph of $y = 6x - 3x^2$ between the ordinates x = 1 and x = a is 19 square units then 'a' can take the value

(1) 4 or – 2

(2) two values are in (2, 3) and one in (–1, 0)

(3) two values one in (3,4) and one in (–2,–1)

(4) none of these

ANSWER KEY

Exercise-I

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	4	4	4	2	2	1	4	4	4	2
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	2	4	2	2	1	4	1	1	1	1
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	3	1	1	4	2	2	4	1	1	3