DPP–01

CALCULATING AREA BY USING HORIZONTAL STRIP

1. The area between the curve $y = e^x$ and x-axis which lies between x $= -1$ and x $= 1$ is-

(A) $e^2 - 1$ (B) $\frac{(e^2-1)}{e}$ (C) $\frac{(1-e)}{c}$ (D) $\frac{(e-l)}{e^2}$

2. The area bounded by the curve $y = 1 + \frac{8}{x^2}$, x-axis, $x = 2$ and $x = 4$ is-

(A) 2 (B) 3 (C) 4 (D) 5

3. The area bounded by curves $y = \tan x$, x-axis and $x = \frac{\pi}{3}$ is

(A) 2log2 (B) log2 (C) $\log\left(\frac{2}{\sqrt{3}}\right)$ (D) 0

4. The value of a for which the area of the region bounded by the curve $y = \sin 2x$, the straight lines $x = \frac{\pi}{6}, x = a$ and x-axis is equal to $\frac{1}{2}$ is-

(A) $\frac{\pi}{2}$ (B) $\frac{\pi}{3}$ (C) $\frac{4}{3}$ (D) $\frac{\pi}{6}$

5. The area between the curves $y = 6 - x - x^2$ and x-axis is -

(A) $\frac{125}{6}$ (B) $\frac{125}{2}$ (C) $\frac{25}{6}$ (D) $\frac{25}{2}$

6. The area of the region bounded by the curves $y = |x - 2|, x = 1, x = 3$ and the x-axis is

(A) 3 (B) 2 (C) 1 (D) 4

7. The area bounded by the parabola $x^2 = 4y$, the x-axis and the line x $= 4$ is divided into two equal area by the line $x = \alpha$, then the value of α is-

(A) $2^{1/3}$ (B) $2^{2/3}$ (C) $2^{4/3}$ (D) $2^{5/3}$

CALCULATING AREA BY USING VERTICAL STRIP

8. The area enclosed by the curve $y^2 + x^4 = x^2$ is

(A) $\frac{2}{3}$ (B) $\frac{4}{3}$ (C) $\frac{8}{3}$ (D) $\frac{10}{3}$

9. If $(a, 0); a > 0$ is the point where the curve $y = \sin 2x - \sqrt{3}\sin x$ cuts the x-axis first, A is the area bounded by this part of the curve, the origin and the positive $x = axis$, then

(A) $4A + 8\cos a = 7$ (B) $4A + 8\sin a = 7$

(C) $4A - 8\sin a = 7$ (D) $4A - 8\cos a = 7$

$\Rightarrow 4A + 8\cos a = 7$

10. The area of the region for which $0 < y < 3 - 2x - x^2$ & $x > 0$ is

(A) $\int_1^3 (3 - 2x - x^2)dx$ (B) $\int_0^3 (3 - 2x - x^2)dx$

(C) $\int_0^1 (3 - 2x - x^2)dx$ (D) $\int_1^3 (3 - 2x - x^2)dx$

11. The area between the curve $y^2 = 4x$, y-axis, and $y = -1$ and $y = 3$ is-

(A) $\frac{7}{3}$ (B) $\frac{9}{4}$ (C) $\frac{1}{12}$ (D) $\frac{1}{4}$

12. The area bounded by the curve $y = \sin 2x$, y-axis and the line $y = 1$ is-

(A) 1 (B) $\frac{1}{4}$ (C) $\frac{\pi}{4}$ (D) $\left(\frac{\pi}{4}\right) - \left(\frac{1}{2}\right)$

13. The area between the curve $y = \sec x$ and y-axis when $I \leq y \leq 2$ is-

(A) $\frac{2\pi}{3} - \log(2 + \sqrt{3})$ (B) $\frac{2\pi}{3} + \log(2 + \sqrt{3})$

(C) $\frac{\pi}{3} - \frac{1}{2}\log(2 + \sqrt{3})$ (D) $\frac{\pi}{3} + \log(2 + \sqrt{3})$

14. If the area bounded by the x-axis, curve $y = f(x)$ and the lines $x = 1, x = b$ is equal to $\sqrt{b^2 + 1} - \sqrt{2}$ for all $b > 1$, then $f(x)$ is-

(A) $\sqrt{(x - 1)}$ (B) $\sqrt{(x + 1)}$ (C) $\sqrt{(x^2 + 1)}$ (D) $\frac{x}{\sqrt{1+x^2}}$

AREA BETWEEN TWO CURVES AND CURVE SKETCH

15. The area of the figure bounded by the curves $y = \ln x$ & $y = (\ln x)^2$ is

(A) $e + 1$ (B) $e - 1$ (C) $3 - e$ (D) 1

16. The area enclosed by the curves $y = \cos x$, $y = 1 + \sin 2x$ and $x = \frac{3\pi}{2}$ as x varies from 0 to $\frac{3\pi}{2}$, is

(A) $\frac{3\pi}{2} - 2$ (B) $\frac{3\pi}{2}$ (C) $2 + \frac{3\pi}{2}$ (D) $1 + \frac{3\pi}{2}$

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

(A) 1/3 (B) 2/3 (C) 1/6 (D) 1

18. The area bounded by the curves $y = -\sqrt{-x}$ and $x = -\sqrt{-y}$ where $x, y \leq 0$

(A) cannot be determined

(B) is 1/3

(C) is 2/3

(D) is same as that of the figure bounded by the curves $y = \sqrt{-x}; x \leq 0$ and $x = \sqrt{-y}; y \leq 0$

19. The area of the region bounded by the curves $y = |x - 1|$ and $y = 3 - |x|$ is-

(A) 6 s units (B) 2 s units (C) 3 s units (D) 4 s units

20. Area of the region enclosed between the curves $x = y^2 - 1$ and $x = |y|\sqrt{1 - y^2}$ is

(A) 1 (B) $\frac{4}{3}$ (C) $\frac{2}{3}$ (D) 2

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

(A) 2 (B) 4 (C) 8 (D) 6

AREA BOUNDED BY INVERSE OF A FUNCTION WITH Y - AXIS

22. The parabolas $y^2 = 4x$ and $x^2 = 4y$ divide the square region bounded by the lines $x = 4, y = 4$ and the coordinate axes. If S_1, S_2, S_3 are respectively the areas of these parts numbered from top to bottom; then $S_1 : S_2 : S_3$ is-

(A) 1: 2: 1 (B) 1: 2: 3 (C) 2: 1: 2 (D) 1: 1: 1

MIXED PROBLEM

23. The area of the closed figure bounded by $y = x, y = -x$ & the tangent to the curve $y = \sqrt{x^2 - 5}$ at the point (3,2) is

(A) 5 (B) $2\sqrt{5}$ (C) 10 (D) $\frac{5}{2}$

24. The area bounded by the curve $y = f(x)$, the x-axis & the ordinates $x = 1$ & $x = b$ is $(b - 1)\sin(3b + 4)$. Then $f(x)$ is

(A) $(x - 1)\cos(3x + 4)$ (B) $\sin(3x + 4)$

(C) $\sin(3x + 4) + 3(x - 1) \cdot \cos(3x + 4)$ (D) none

25. Let $f(x)$ be a non-negative continuous function such that the area bounded by the curve $y = f(x)$, x-axis and the ordinates $x = \frac{\pi}{4}$ and $x = \beta > \frac{\pi}{4}$ is $\left(\beta\sin\beta + \frac{\pi}{4}\cos\beta + \sqrt{2}\beta\right)$. Then $f\left(\frac{\pi}{2}\right)$ is

(A) $\left(\frac{\pi}{4} + \sqrt{2} - 1\right)$ (B) $\left(\frac{\pi}{4} - \sqrt{2} + 1\right)$

(C) $\left(1 - \frac{\pi}{4} - \sqrt{2}\right)$ (D) $\left(1 - \frac{\pi}{4} + \sqrt{2}\right)$

26. $y = f(x)$ is a function which satisfies

(i) $f(0) = 0$

(ii) $f''(x) = f'(x)$ and

(iii) $f(0) = 1$

then the area bounded by the graph of $y = f(x)$, the lines $x = 0, x - 1 = 0$ and $y + 1 = 0$, is

(A) e (B) $e - 2$ (C) $e - 1$ (D) $e + 1$

SUBJECTIVE PROBLEM

27. Find the area bounded by the curves $y = x^2, x + y = 2, x \geq 0, y \geq 0$.

28. Find the value of c for which the area of the figure bounded by the curves $y = \sin 2x$, the straight lines $x = \frac{\pi}{6}, x = c$ and the abscissa axis is equal to $\frac{1}{2}$.

29. Find the value of ' c ' for which the area of the figure bounded by the curve, $y = 8x^2 - x^5$, the straight lines $x = I$ and $x = c$ and the abscissa axis is equal to $\frac{16}{3}$.

30. Compute the area of the loop of the curve

$$y^2 = x^2\left[\frac{(1+x)}{(1-x)}\right]$$

31. Compute the area of the region bounded by the curves $y = ex.\ln x$ and $y = \frac{\ell n x}{e.x}$ where $\ell ne = 1$.

32. Find the area of the region bounded by the curves, $y = \log_e x, y = \sin^4 \pi x$ and $x = 0$

33. Find the area bounded by the curves $y = \sqrt{1 - x^2}$ and $y = x^3 - x$. Also find the ratio in which the y-axis divided this area.

34. If the area enclosed by the parabolas $y = a - x^2$ and $y = x^2$ is $18\sqrt{2}$ sq. units. Find the value of 'a'.

35. Find the area of the region enclosed by the curve $y = x^4 - 2x^2$ and $y = 2x^2$.

36. Find the area enclosed between the curves $y = \log_e(x + e), x = \log_e(1/y)$ and the x-axis.

37. For what value of ' a ' is the area of the figure bounded by the lines, $y = \frac{1}{x}, y = \frac{1}{2x-1}, x = 2$ and $x = a$ equal to $\ln\frac{4}{\sqrt{5}}$?

38. For the curve $f(x) = \frac{1}{1+x^2}$, let two points on it are $A(\alpha, f(\alpha)), B\left(-\frac{1}{\alpha}, f\left(-\frac{1}{\alpha}\right)\right)(\alpha > 0)$. Find the minimum area bounded by the line segments OA, OB and $f(x)$, where $'O'$ is the origin.

PREVIOUS YEAR QUESTION

39. The area enclosed between the curves $y^2 = x$ and $y = |x|$ is

(A) $\frac{2}{3}$ (B) 1 (C) $\frac{1}{6}$ (D) $\frac{1}{3}$

40. The area of the plane region bounded by the curves $x + 2y^2 = 0$ and $x + 3y^2 = 1$ is equal to

(A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{4}{3}$ (D) $\frac{5}{3}$

41. The area of the region bounded by the parabola $(y - 2)^2 = x - 1$, the tangent to the parabola at the point (2,3) and the x-axis is

(A) 3 (B) 6 (C) 9 (D) 12

42. The area bounded by the curves $y = \cos x$ and $y = \sin x$ between the ordinates $x = 0$ and $x = \frac{3\pi}{2}$ is

(A) $4\sqrt{2} - 2$ (B) $4\sqrt{2} + 2$ (C) $4\sqrt{2} - 1$ (D) $4\sqrt{2} + 1$

43. The area of the region enclosed by the curves $y = x, x = e, y = \frac{1}{x}$ and the positive x-axis is:

(A) $\frac{1}{2}$ square units (B)1 square unit

(C) $\frac{3}{2}$ square units (D) $\frac{5}{2}$ square units

44. The area bounded between the parabola $x^2 = \frac{y}{4}$ and $x^2 = 9y$ and the straight line $y = 2$ is:

(A) $\frac{20\sqrt{2}}{3}$ (B) $10\sqrt{2}$ (C) $20\sqrt{2}$ (D) $\frac{10\sqrt{2}}{3}$

45. The area (in square units) bounded by the curves $y = \sqrt{x}$, $2y - x + 3 = 0$, x-axis, and lying in the first quadrant is:

(A) 18 (B) $\frac{27}{4}$ (C) 9 (D) 36

46. The area of the region described by $A = \{(x, y): x^2 + y^2 \leq 1 \text{ and } y^2 \leq 1 - x\}$ is :

(A) $\frac{\pi}{2} + \frac{4}{3}$ (B) $\frac{\pi}{2} - \frac{4}{3}$ (C) $\frac{\pi}{2} - \frac{2}{3}$ (D) $\frac{\pi}{2} + \frac{2}{3}$

47. The area (in sq. units) of the region described by $\{(x, y): y^2 \leq 2x \text{ and } y \geq 4x - 1\}$ is

(A) $\frac{15}{64}$ (B) $\frac{9}{32}$ (C) $\frac{7}{32}$ (D) $\frac{5}{64}$

48. The area (in sq. units) of the region $\{(x, y): y^2 \geq 2x \text{ and } x^2 + y^2 \leq 4x, x \geq 0, y \geq 0\}$ is :

(A) $\pi - \frac{8}{3}$ (B) $\pi - \frac{4\sqrt{2}}{3}$ (C) $\frac{\pi}{2} - \frac{2\sqrt{2}}{3}$ (D) $\pi - \frac{4}{3}$

49. The area (in sq, units) of the region $\{(x, y): x \geq 0, x + y \leq 3, x^2 \leq 4y \text{ and } \}$ is :

(A) $\frac{59}{12}$ (B) $\frac{3}{2}$ (C) $\frac{7}{3}$ (D) $\frac{5}{2}$

50. Let $g(x) = \cos x^2, f(x) = \sqrt{x}$, and $\alpha, \beta (\alpha < \beta)$ be the roots of the quadratic equation $18x^2 - 9\pi x + \pi^2 = 0$. Then the area (is sq. units) bounded by the curve $y = (g \circ f)(x)$ and the lines $x = \alpha, x = \beta$ and $y = 0$, is:

(A) $\frac{1}{2}(\sqrt{2} - 1)$ (B) $\frac{1}{2}(\sqrt{3} - 1)$ (C) $\frac{1}{2}(\sqrt{3} + 1)$ (D) $\frac{1}{2}(\sqrt{3} - \sqrt{2})$

ANSWER KEY

1.	(B)	**2.**	(C)	**3.**	(B)	**4.**	(B)	**5.**	(A)	**6.**	(C)	**7.**	(D)
8.	(B)	**9.**	(A)	**10.**	(C)	**11.**	(A)	**12.**	(D)	**13.**	(A)	**14.**	(D)
15.	(C)	**16.**	(C)	**17.**	(B)	**18.**	(B)	**19.**	(D)	**20.**	(D)	**21.**	(B)
22.	(D)	**23.**	(A)	**24.**	(C)	**25.**	(D)	**26.**	(C)				

27. $\frac{5}{6}$ **28.** $-\frac{\pi}{6}$ or $\frac{\pi}{3}$ **29.** – 1

30. $2-\frac{\pi}{2}$ **31.** $\frac{e^2-5}{4e}$ sq. units **32.** $\frac{11}{8}$

33. Required area $=\frac{\pi}{2}$ sq. units and required ratio $=\frac{A_1}{A_2}=\frac{\pi-1}{\pi+1}$

34. 9 **35.** $\frac{128}{15}$ **36.** 2

37. $a=8$ on $\frac{2}{5}(6-\sqrt{2})$ **38.** $\frac{\pi}{2}-\frac{1}{2}$

39.	(C)	**40.**	(C)	**41.**	(C)	**42.**	(A)	**43.**	(C)	**44.**	(A)	**45.**	(C)
46.	(A)	**47.**	(B)	**48.**	(A)	**49.**	(D)	**50.**	(B)				