

Board – CBSE

Class – 12

Topic – Application of Integration

(i) Area under Simple Curves

LEVEL I

1. Sketch the region of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ and find its area, using integration,
2. Sketch the region $\{(x, y): 4x^2 + 9y^2 = 36\}$ and find its area, using integration.

(ii) Area of the region enclosed between Parabola and line

LEVEL II

3. Find the area of the region included between the parabola $y^2 = x$ and the line $x + y = 2$.
4. Find the area of the region bounded by $x^2 = 4y$, $y = 2$, $y = 4$ and the y- axis in the first quadrant.

LEVEL III

5. Find the area of the region: $\{(x, y): y \leq x^2 + 1, y \leq x + 1, 0 \leq x \leq 2\}$

(iii) Area of the region enclosed between Ellipse and line

LEVEL II

6. Find the area of smaller region bounded by the ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$ and straight line $\frac{x}{4} + \frac{y}{5} = 1$

(iv) Area of the region enclosed between Circle and line

LEVEL II

7. Find the area of the region in the first quadrant enclosed by the x-axis, the line $y = x$ and the circle $x^2 + y^2 = 32$.

LEVEL III

8. Find the area of the region : $\{(x, y): x^2 + y^2 \leq 1 \leq x + y\}$

(v) Area of the region enclosed between Circle and parabola

LEVEL III

9. Draw the rough sketch of the region $\{(x, y): x^2 \leq 6y, x^2 + y^2 \leq 16\}$ and find the area enclosed by the region using the method of integration.
10. Find the area lying above the x-axis and including between the circle $x^2 + y^2 = 8x$ and the parabola $y^2 = 4x$

(vi) Area of the region enclosed between Two Circles

LEVEL III

11. Find the area bounded by the curves $x^2 + y^2 = 4$ and $(x + 2)^2 + y^2 = 4$ using integration.

(vii) Area of the region enclosed between Two parabolas

LEVEL II

12. Draw the rough sketch and find the area of the region bounded by two parabolas $4y^2 = 9x$ and $3x^2 = 16y$ by using method of integration.

(viii) Area of triangle when vertices are given

LEVEL III

13. Using integration compute the area of the region bounded by the triangle whose vertices are (2, 1), (3, 4), and (5, 2).

14. Using integration compute the area of the region bounded by the triangle whose vertices are (-1, 1), (0, 5), and (3, 2).

(ix) Area of triangle when sides are given

LEVEL III

15. Using integration find the area of the region bounded by the triangle whose sides are $y = 2x + 1$, $y = 3x + 1$, $x = 4$

16. Using integration compute the area of the region bounded by the lines $x + 2y = 2$, $y - x = 1$ and $2x + y = 7$

(x) Miscellaneous Questions

LEVEL III

17. Find the area of the region bounded by the curves $y = |x - 1|$ and $y = -|x - 1| + 1$.

18. Find the area bounded by the curve $y = x$ and $y = x^3$.

19. Draw a rough sketch of the curve $y = \sin x$ and $y = \cos x$ as x varies from $x=0$ to $X = \frac{\pi}{2}$

And find the area of the enclosed by them and x - axis

20. Sketch the graph of $y = |x + 1|$. Evaluate $\int_{-3}^1 |x + 1| dx$. What does this value represent on The graph.

21. Find the area bounded by the curves $y = 6x - x^2$ and $y = x^2 - 2x$

22. Sketch the graph of $y = |x + 3|$ and evaluate the area under the curve $y = |x + 3|$ above x -axis and between $x = -6$ to $x = 0$

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Questions for self-evaluation

23. Find the area bounded by the curve $x^2 = 4y$ and the line $x = 4y - 2$
24. Find the bounded by the parabola $y = x^2$ and $y = |x|$
25. Find the area of the region : $\{(x, y): 0 \leq y \leq x^2 + 1, 0 \leq y \leq x + 1, 0 \leq x \leq 2\}$