MATHS

BOOKS - ARIHANT PUBLICATION

AREA UNDER PLANE CURVES

Sample Question

1. Find the area of the region bounded by the curve $x^2 + y^2 = 16$ and the ordinates x = 1 and x = 2 in first quadrant.

2. Find the area of the region bounded by the parabola $y^2 = 4ax$, its axis and two ordinates x = 4 and x = 9 in first quadrant.

3. Find the area of the region bounded by the line $2x - y = 2$ and the ordinates $x = \dfrac{1}{4}$ and $x = \dfrac{3}{4}$.

4. Find the area of the region bounded by the line $3x - y = 3$ and the ordinates $x = \dfrac{1}{2}$ and $x = 2$.

5. Using integration, find the area of region bounded by the line $2x + y = 8$, the Y-axis and the lines $y = 2$ and $y = 4$.

6. Find the area of the region bounded by the ellipse $\dfrac{x^2}{9} + \dfrac{y^2}{4} = 1$ in fourth quadrant.

7. Using integration, find the area of enclosed by the circle $x^2 + y^2 = a^2$.

8. Find the area bounded by the curve $x = 4 - y^2$ and the Y-axis.

9. Find the area of region bounded by the curve $y^2 = 4x$ and the line $x = 3$.

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

11. Find the area of region bounded by the curve $(x - 3)^2 + y^2 = 4$ and $y = \sqrt{3}$ between the lines $x = 2$ and $x = 4$.

12. Using integration, find the area enclosed by the parabola $4y = 3x^2$ and the line $2y = 3x + 12$.

13. Show that the area bounded by the parabolas $y^2 = 4x$ and $x^2 = 4y$ is equal to the area bounded by the curve $x^2 = 4y$ and the lines $y = 0$ and $x = 4$.

1. Find the area of the trapezium bounded by the sides $y = x$, $x = 0$, $y = 3$ and $y = 4$.

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2. What is the area bounded by $x = e^y$, $x = 0$, $y = 0$ and $y = 1$?

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3. Find by integration the area bounded by the straight lines $y = 0, y = x$ and $x + 2y = 3$.

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1. Find the area of the region bounded by $y^2 = 9x, x = 2, x = 4$ and the X-axis in the first quadrant.

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2. Find the area bounded by the curve $xy = c^2$

, the X-axis and $x = 2, x = 3$.

3. Find the area of the region bounded by the

curve $y = \sin^3 x$ and the straight lines

$x = -\dfrac{\pi}{4}, x = \dfrac{\pi}{4}$ and $y = 0$.

4. Sketch the region lying in the first quadrant and bounded by $y = 9x^2$, $x = 0$, $y = 1$ and $y = 4$. Find the area of region using integration.

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5. Find the area of circle $(x - 3)^2 + y^2 = 64$.

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6. Find the area of the parabola $y^2 = 4ax$ bounded by its latusrectum.

7. Find the area of the smaller part of the circle $x^2 + y^2 = a^2$ cut-off by the line $x = \dfrac{a}{\sqrt{2}}$.

Question For Practice Part I Area Under Simple Curves Long Answer Type Questions

1. Find the area of the portion of the ellipse $\dfrac{x^2}{12} + \dfrac{y^2}{16} = 1$, bounded by the major axis and the double ordinate $x = 3$.

2. Find the area of the region bounded by the line $y = 3x + 2$, x-axis and the ordinates $x = -1$ and $x = 1$.

3. Find the area of the region bounded by the curve $y = 6x - x^2$, the X-axis and the two ordinates $x = 0$ and $x = 9$.

4. Find the area bounded between the curve $y^2 = 4x$, line $y = 3$ and Y-axis.

5. Find the area of the region in the first quadrant enclosed by X-axis, the line $x = \sqrt{3}y$ and the circle $x^2 + y^2 = 4$.

Question For Practice Part Ii Area Between Two Curves Short Answer Type Questions

1. Find the area enclosed between the parabola $y^2 = 4ax$ and the line $y = mx$.

2. Using integration, find the area of the region bounded by the curves $y = x^2$ and $y = x$.

3. Find the area of the region enclosed by the parabola $x^2 = y$ and the line $y = x + 2$

4. Find the area of the smaller region bounded by the ellipse $\dfrac{x^2}{9} + \dfrac{y^2}{4} = 1$ and the line $\dfrac{x}{3} + \dfrac{y}{2} = 1.$

5. Find the area of the region included between the parabola $y^2 = 2x$ and the straight line $x - y = 4.$

6. Find the area of the region bounded by the parabolas $y^2 = 6x$ and $x^2 = 6y$.

7. If the area enclosed between the curves $y = ax^2$ and $x = ay^2 (a > 0)$ is 1 sq unit, then find the value of a.

8. Using integration, find the area of the region common to the circle $x^2 + y^2 = 8x$ and the parabola $y^2 = 4x$.

9. Find the area of the circle

$x^2 + y^2 = 2ax.$

10. Find the area bounded by the curves $y = x$ and $y = x^3$.

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1. Find the area bounded by

$$y = e^x, y = 0, x = 4, x = 2$$

2. Find the area bounded by

$$y = x^2, y = 0, x = 1$$

3. Find the area bounded by

$$xy = a^2, y = 0, x = \alpha, x = \beta(\beta > \alpha > 0)$$

4. Find the area bounded by

$$y = \sin x, \, y = 0, \, x = \frac{\pi}{2}$$

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5. Find the area enclosed by

$$y = e^x, \, x = 0, \, y = 2, \, y = 3$$

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6. Find the area enclosed by

$$y^2 = x, \ x = 0, \ y = 1$$

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7. Find the area enclosed by

$$xy = a^2, \ x = 0, \ y = \alpha, \ y = \beta (\beta > \alpha > 0)$$

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8. Find the area enclosed by

$$y^2 = x^3, \, x = 0, \, y = 1$$

9. Determine the area within the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

10. Find the area of the circle

$$x^2 + y^2 = 2ax.$$

11. Find the area of the portion of the parabola

$y^2 = 4x$ bounded by the double ordinate

through(3,0).

12. Determine the area of the region bounded by $y^2 = x^3$ and the double ordinate through (2,0).

13. Find the area of the regions into which the circle $x^2 + y^2 = 4$ is divided by the line $x + \sqrt{3}y = 2.$

14. Determine the area of the region between the curves $y = \cos x$ and $y = \sin x$, bounded by $x = 0$.

15. Find the area enclosed bt the two paraboles $y^2 = 4$ ax and $x^2 = 4$ay.

16. Determine the area included between the parabola $y^2 = x$ and the circle $x^2 + y^2 = 2x$.

17. Determine the area included between the parabola $y^2 = x$ and the circle $x^2 + y^2 = 2x$.

Chapter Practice Long Anwer Type Questions

1. Find the area of the region bounded by the ellipse $\dfrac{x^2}{25} + \dfrac{y^2}{16} = 1$.

2. Find the area of the region bounded by the ellipse $\dfrac{x^2}{4} + \dfrac{y^2}{9} = 1$.

3. Find the area of the region bounded by the circle $x^2 + y^2 = 16$.

4. Find the area of the region bounded by the curve $y = 2x + 5$ and the lines $x = 2$ and $x = 3$.

5. Find the area bounded by the curve $y = \cos x$ between $x = 0$ and $x = 2\pi$.

6. Find the area bounded by the curve $y^2 = 4a^2(x-1)$ and the lines $x = 1$ and $y = 4a$.

7. Find the area of the region bounded by $x^2 = 4y$, $y = 2$, $y = 4$ and the Y-axis in the first quadrant.

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8. Find the area bounded by the curve $y = x^3$, the X-axis and the ordinates $x = -2$ and $x = 1$.

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9. The area between $x = y^2$ and $x = 4$ is divided into two equal parts by the line $x = a$. Find the value of a.

10. Find the area of the smaller region bounded by the ellipse $\dfrac{x^2}{9} + \dfrac{y^2}{4} = 1$ and the line $\dfrac{x}{3} + \dfrac{y}{2} = 1$.

11. Find the area bounded by the curve $x^2 = 4y$ and straight line $x = 4y - 2$.

12. Find the area of the region bounded by the curve $y = x^3$, $y = x + 6$ and $x = 0$.

13. Find the area of the circle $4x^2 + 4y^2 = 9$, which is interior to the parabola $y^2 = 4x$.

14. Find the area of the region bounded by the curve $x^2 + y^2 = 4x$ and exterior of curve $y^2 = 2x$.

15. Prove that the curves $y^2 = 4x$ and $x^2 = 4y$ divide the area of the square bounded by

$x = 0, x = 4, y = 4$ and $y = 0$ into three equal parts.