MATHS

BOOKS - BETTER CHOICE PUBLICATION

APPLICATION OF INTEGRALS

Solved Example Section I

1. Find the area of region bounded by the curve $y^2 = x$ and the lines $x = 1, x = 4$ and the x-axis.

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2. Find the area under the curve $y = x^4$ and the lines x=1,x=5 and the x-axis.

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

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4. Find the area of the region bounded by $x^3 = y - 3, y = 4, y = 6$ and y-axis in the first quadrant.

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Solved Example Sectionii

1. Using integration find the area of region bounded by the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$

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

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3. Find the area enclosed by the circle $x^2 + y^2 = r^2$

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Solved Example Section Iii

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

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

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3. 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.

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4. Find the area of the region bounded by the parabola $y = x^2$ and $y = |x|$.

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

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6. Find the area of the region bounded by the curve $y = x^2 + 2, y = x, x = 0$ and $x = 3$

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7. Find the area of the smaller region bounded by the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and the straight line $\frac{x}{a}+\frac{y}{b}=1$ (using integration)

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Solved Example Section Iv

1. Using integration find the area of regeion bounded by the triangle whose vertices are (-1,0), (1,3) and (3,2)

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

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3. Using definite integrals, find the area of the triangle whose sides are $5x - 2y = 10, x + y = 9$ and $3x - 4y = 6$

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Solved Example Section V

1. Find the area included between the curves $y^2 = 4ax$ and $x^2 = 4ay, a > 0.$

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2. Evaluate $\int \frac{\left(\sin^2 x - \cos^2 x\right) dx}{\sin^2 x \cos^2 x}$

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

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4. Find the area bounded by the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$

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Solved Example Section Vi

1. Find the area bounded by the curve $y = \sin x$ between x=0 and $x = 2i$

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2. Sketch the graph of $y = |x + 3|$ and evaluate $\int_{-6}^{0} |x + 3| dx$

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3. Using the method of integration find the area bounded by the curve $|x| + |y| = 1$

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Assignment Most Important Question For Practice Section I

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

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2. 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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3. Sketch the graph of the curve $y^2 = x$ and the line $x = 4$ and find the area of the curve.

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

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5. Find the area of region bounded by $y^2 = x, x = 4, x = 6$ and x-axis in the first quadrant.

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Assignment Most Important Question For Practice Section Ii

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

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2. Find the area of the region bounded by the elipse $\frac{x^2}{9} + \frac{y^2}{16} = 1$

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3. Sketch the region of the ellipse and find its area using integration $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

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4. Find the area of the region bounded by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and the ordinate x=ae and x=0

where $b^2 = a^2\left(1 - e^2\right)$ and $e < 1$

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5. Find the area of the region bounded by the curve $y = 2\sqrt{1 - x^2}$ and x-axis.

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Assignment Most Important Question For Practice Section Iii

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

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

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3. Find the area enclosed by the straight line $y = x + 2$ and the curve $x^2 = y$

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4. Calculate the area enclosed by the parabola $y = x^2 + 1$ and the line $y = x, x = 0$ and x=2.

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5. Find thearea of region given by $\{(x, y), x^2 \leq |x|\}$.

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

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Assignment Most Important Question For Practice Section Iv

1. Using integration find the area of region bounded by the triangle where vertices are : (-1,2), (1,5) and (3,4)

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2. Using integration find the area of region bounded by the triangle where vertices are : (1,3),(2,5) and (3,4)

3. Using integration find the area of region bounded by the triangle where vertices are : (4,1),(6,6) and (8,4)

4. Using integration find the area of region bounded by the triangle where vertices are : (2,5),(4,7) and (6,2)

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Assignment Most Important Question For Practice Section V

1. Find the area of region bounded by the curve $y^2 = x$ and the lines x = 1,x = 4 and the x - axis

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2. Using integration find the area of region bounded by the triangle whose sides are :

$3x - 2y + 1 = 0, 2x + 3y - 21 = 0$ and $x - 5y + 9 = 0$

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3. 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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4. Find the area of region founded by two parabolas :

$y^2 = ax$ and $x^2 = ay$

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5. Find the area of region founded by two parabolas :

$y^2 = \frac{9}{4}x$ and $x^2 = \frac{16}{3}y$

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6. Find the area of the region bounded by the circle $x^2 + y^2 = 4$ and the lines x = 0, x = 2 and the x-axis lies in first quadrant .

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7. Find the area of region bounded by the curve $y^2 = 4x$, y = 3 and the y-axis is in the first quadrant .

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8. 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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9. Find the area under the curve $y = x^2$ and given line x = 1,x = 2 and x-axis in the first quadrant .

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10. Find the area under the curve $y = x^4$,x = 1,x = 5 and x-axis in the first quadrant .

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11.

find the area of region founded by the circle $x^2 + y^2 = 1$ and line $x + y = 1$

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Assignment Most Important Question For Practice Section Vi

1. Draw a rough sketch of the curves $y = \sin x$ and $y = \cos x$ as x varies from 0 to $\frac{\pi}{2}$ and find the area enclosed by them find x-axis.

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

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Previous Years Board S Question For Practice

1. Find the area of region bounded by the parabola $y = \frac{3}{4}x^2$ and the line $3x - 2y + 12 = 0$

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2. Find the area of region bounded by the parabola $4y = 3x^2$ and the line $3x - 2y + 12 = 0$

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

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4. Use integration, find the area of triangle whose sides are :

$3x - 2y + 3 = 0, x + 2y - y = 0, x - 2y + 1 = 0$

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5. Use integration, find the area of triangle whose sides are :

$4x - y + 5 = 0, x + y - 5 = 0, x - 4y + 5 = 0$

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6. Draw a rought sketch of $y^2 = x + 1$ and $y^2 = -x + 1$ and determine the are enclosed by the two curves.

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7. Using integration, find the area of the triangle ABC, co ordinate of whose vertics are A(2,0),B(4,5) and C(6,3).

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8. Using integration find the area of triangle whose vertices are

(-1,1),(0,5) and (3,2)

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9. Using integration find the area of triangle whose vertices are ,

(1,0),(2,2) and (3,1)

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10. Find the area of region bounded by the parabola $y = x^2$ and the line $y = x$.

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11. Find the area of region included between the parabola $x^2 = y$ and the line $y = x + 2$

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12. 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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13. Find the area of the region founded by $x^2 = 16y, y = 1, y = 4$ and the y-axis in the first quadrant.

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14. Using definite integral find the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

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

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

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17. Using integration, find the area of the circle

$x^2 + y^2 = 4$

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18. Find the area between the curves y = x and

$y = x^2$

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19. Calculate the area enclosed in the regin

$\{(x, y) : y^2 \leq 4x, 4x^2 + 4y^2 \leq 9\},$

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20. Find the area bounded by curves $\{(x, y) : y \geq x^2 \text{ and } y = |x|\}$

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21. Find the area bounded between the curve $y^2 = x$ and the line x=3.

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22. Find the area bounded between the curve $y^2 = 4x$ and the lines x=3

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23. Calculate the area of the region enclosed between the circles : $x^2 + y^2 = 4$ and $(x-2)^2 + y^2 = 4$ (using integration)

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24. Find the area of the smaller region bounded by the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and the line $\frac{x}{a}+\frac{y}{b}=1$

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25. 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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26. Find the area lying above x-axis and included between the circle $x^2 + y^2 = 8x$ and the parabola $y^2 = 4x$.

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27. Using integration, find the area of region of triangle whose vertices are (1,0),(4,0) and (4,4)

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28. Using integration, find the area of region of triangle whose vertices are

(3,0),(4,5) and (5,1)

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29. Upsing integration, find the area of region of triangle whose vertices are

(2,0),(4,5) and (6,3)

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30. Using integration find the area of the region bounded by the triangle, whose sides are $2x + y = 4, 3x - 2y = 6$ and $x - 3y + 5 = 0$

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31. Find the area of region bounded by

The parabola $y^2 = 4ax$ and its chord y=mx

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32. Find the area of region bounded by

The parabola $y^2 = 4ax$ and its latus rectum

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33. Draw the rough sketch and find the area of region bounded between the parabolas, $y^2 = 4x$ and $x^2 = 4y$ by using integration.

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34. Draw the rough sketch and find the area of region bounded between the parabolas, $y^2 = 9x$ and $x^2 = 9y$ by using integration.

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35. Draw the rough sketch and find the area of region bounded between the parabolas, $y^2 = 16x$ and $x^2 = 16y$ by using integration.

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36. Find the particular solution of the following equation ; $x\frac{dy}{dx} + 2y = x^2$, given that x = 2, y = 1.

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