MATHS

BOOKS - NEW JYOTHI MATHS (TAMIL ENGLISH)

APPLICATION OF INTEGRALS

Examples

1. Find the area of the circle $x^2 + y^2 = a^2$ using integration.

Watch Video Solution

2. Consider the curve $\frac{x^2}{16} + \frac{y^2}{9} = 1$

(i)Find the points of intersection with x- axis.

(ii) Find the area of the region bounded by the curve.

Watch Video Solution

3. (1) Draw the rough sketch of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$

Find the area enclosed by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$

Watch Video Solution

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

Watch Video Solution

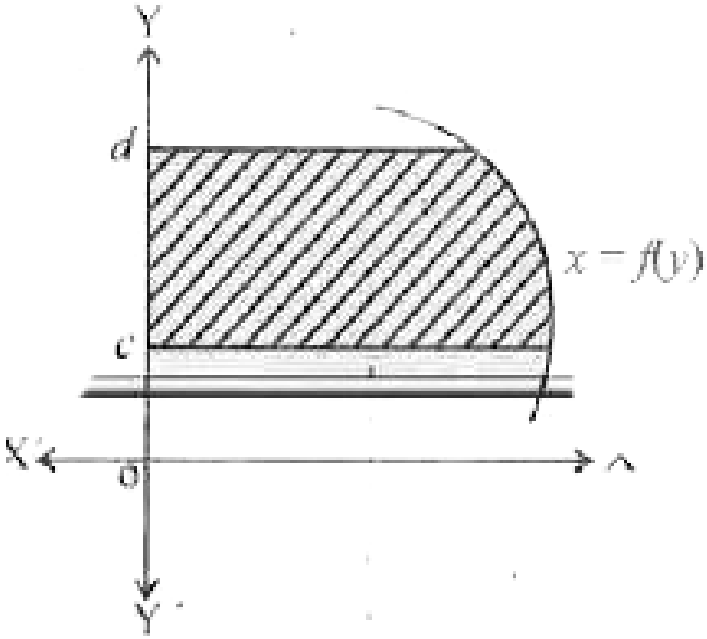
5. Consider the parabola $y^2 = 4ax$

(i) Write the equation of the rectum and

obtain the x co-ordinates of the point of intersection of latus rectum and the parabola.

(ii) Find the area of the parabola bounded by the latus rectum.

 Watch Video Solution



6. (i)

Area of the shaded portion in the figure is equal to

(a) $\int_d^c f(x)dx$ (b) $\int_c^d f(x)dx$

(c) $\int_d^c f(y)dy$ (d) $\int_c^d f(y)dy$

(ii) Consider the curve

$y = x^2, x = 0, y = 1, y = 4$.Draw a rough sketch and shade the region bounded by the these curves. Find the area of the shaded region.

Watch Video Solution

7. Find the area bounded by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and the lines x = 0 and x = ae where$b^2 = a^2(1 - e^2)$ and $e < 1$.

Watch Video Solution

8. Find the area of the region bounded by the parabola $y = x^2 + 2$, x-axis, x = 0 and x = 3.

Watch Video Solution

9. Find the area of the region bounded by the curve $y = |x|$ and the x- axis between x = - 4 and x - 2`.

Watch Video Solution

10. Find the area of the region bounded by x-axis, the curve $y = |\cos x|$, the lines x=0 and $x = \pi$.

Watch Video Solution

11. Find the area bounded by the curvey = sinx between x = 0 and $x = 2\pi$.

Watch Video Solution

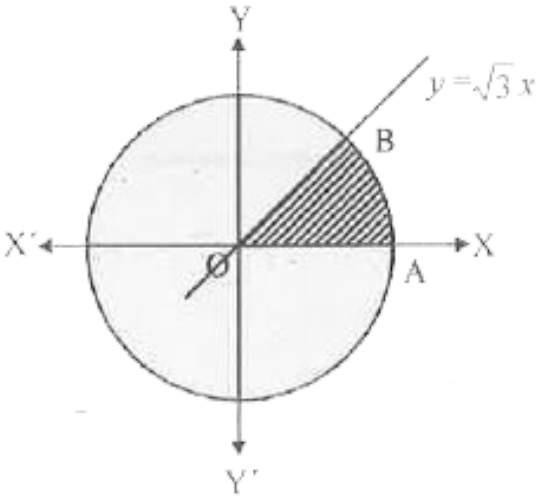
12. (i) Find the point at which the circle $x^2 + y^2 = 32$ intersects the positive x-axis.

(ii) Shade the region in the first quadrant enclosed by the x-axis, the line y = x and the circle $x^2 + y^2 = 32$.

(iii) Using integration, find the area of the shaded region.

Watch Video Solution

13. Consider the circle $x^2 + y^2 = 16$ and the straight line $y = \sqrt{3}x$ as shown in the figure.



(i)Find the points A and B as shown in the figure.

(ii) Find the area of the shaded region in the figure using definite integral.

Watch Video Solution

14. Consider the curve $y = x^2$ and the straight line $y = 2x + 3$.

(i) Find the points of intersection of the given curve and the straight line.

(ii) Find the area of the region bounded by the given curve and the straight line.

Watch Video Solution

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

Watch Video Solution

16. (i) Find the points of intersection of the parabola $y^2 = 8x$ and the line $y = 2x$.

(ii) Find, using integration, the area enclosed between the line and the parabola.

Watch Video Solution

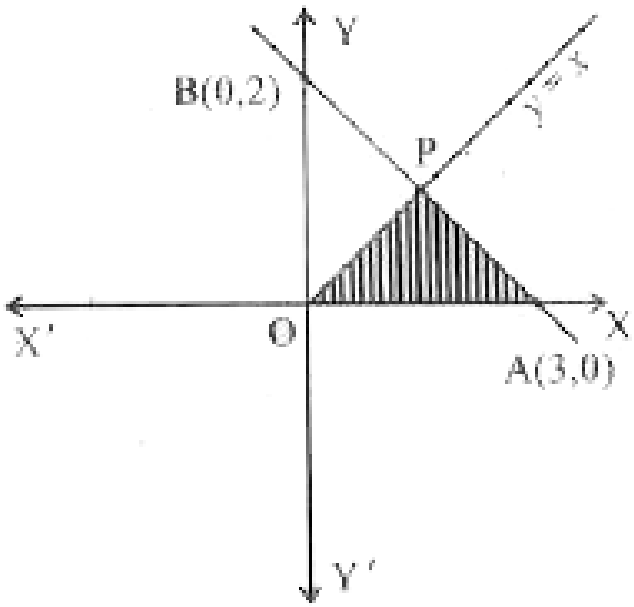
17. Consider the functions, $f(x) = |x| - 1$ and $g(x) = 1 - |x|$ (a) Sketch their graphs and

shade the closed region between them. (b) Find the area of their shaded region.

Watch Video Solution

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

Watch Video Solution



19.

Using the above figure

(a).Find the equation of AB.

(b) Find the point P.

(c) Find the area of the shaded region by integration.

Watch Video Solution

20. Using the method of integration find the area of the region bounded by lines :

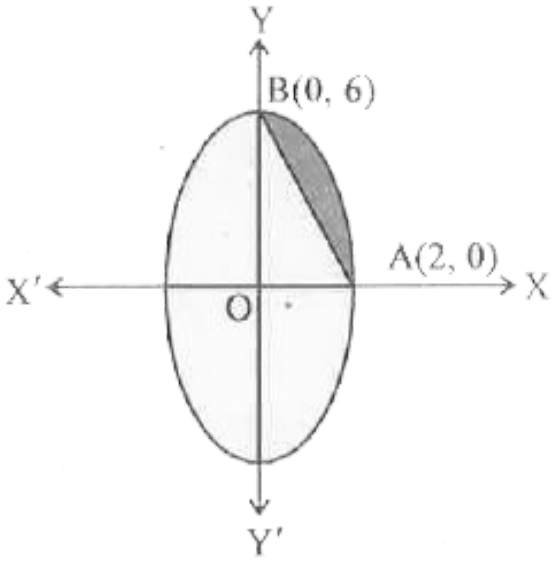
$2x + y = 4, 3x - 2y = 6$ and $x - 3y + 5 = 0$

.

Watch Video Solution

21. In the figure given below, AOBA is the part of the ellipse $9x^2 + y^2 = 36$ in the first quadrant such that OA = 2 and OB = 6. Find the

area between arc AB and the chord AB



Watch Video Solution

22. Consider the curves $y^2 = x$ and $x^2 = y$.

(i) Find the points of intersection of these two

curves.

(ii) Find the area between these two curves.

Watch Video Solution

23. Consider the curves $y = x^2$ and $y^2 = 8x$.

(i) Find the points of intersection of the given two curves.

(ii) Find the area of the region enclosed by the given two curves

View Text Solution

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

Watch Video Solution

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

Watch Video Solution

26. Find the area enclosed between the circles $x^2 + y^2 = 4$ and $(x - 2)^2 + y^2 = 4$.

Watch Video Solution

27. Prove that the curves $y^2 = 4x$ and $x^2 = 4y$ divide the area of the square bounded by x = 0, x = 4 and y = 0 into three equal parts.

Watch Video Solution

28. Let us find the area of the region bounded by the curve $y^2 = 8xatx = 1, x = 3$ and the x- axis in the first quadrant .

Watch Video Solution

Ncert Text Book Exercise 8 1

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

8. 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.

Watch Video Solution

9. Find the area of the region bounded between the parabola $x^2 = y$ and the curve y=|x|.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

12. Area lying in the first quadrant and bounded by the circle $x^2 + y^2 = 4$ and the lines x = 0 and x = 2 is

A. π

B. $\frac{\pi}{2}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{4}$

Answer: A

Watch Video Solution

13. Area of the region bounded by the curve $y^2 = 4x$, y -axis and the line y = 3 is

A. 2

B. $\frac{9}{4}$

C. $\frac{9}{3}$

D. $\frac{9}{2}$

Answer: B

Watch Video Solution

Ncert Text Book Exercise 8 2

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

Watch Video Solution

2. Find the area bounded by the curves $(x-1)^2 + y^2 = 1$ and $x^2 + y^2 = 1$.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

5. Using integration, find the area of the triangle with sides $y = 2x + 1, y = 3x + 1$ and $x = 4$

Watch Video Solution

6. Smaller area enclosed by the circle $x^2 + y^2 = 4$ and the line $x + y = 2$ is

A. $2(\pi - 2)$

B. $\pi - 2$

C. $2\pi - 1$

D. $2(\pi + 2)$

Answer: B

Watch Video Solution

7. Area lying between the curves $y^2 = 4x$ and $y = 2x$ is

A. $\frac{2}{3}$

B. $\frac{1}{3}$

C. $\frac{1}{4}$

D. $\frac{3}{4}$

Answer: B

Watch Video Solution

Additional Questions For Practice 8 1

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

Watch Video Solution

2. The area of the ellips $\frac{x^2}{9} + \frac{y^2}{4} = 1$ is .....

Watch Video Solution

3. Find the area of the region bounded by $x^2 = 16y, y = 1, y = 4$ and the y-axis lying in the first quadrant using integration.

Watch Video Solution

4. Find the are bounded by the curve $x^2y = 36$, x - axis and the line x = 6 and x = 9.

Watch Video Solution

5. (i) Draw a rough sketch of the curve $y^2 = x$ and shade the region bounded by the line x = 1 and the curve.

(ii) Using integration find the area of the shaded region.

Watch Video Solution

6. (i) Make a rough sketch of the function $y = x^2$ and shade the region under the curve, x-axis and the ordinates at x = 1 and x = 3.

(ii) Find the area under the curve $y = x^2$ above.

Watch Video Solution

7. Find the area under the curve $y = x^2$ above x-axis between the lines x = 6 and x = 4.

Watch Video Solution

8. Find the area between x-axis and the curve y = cos x, $\frac{\pi}{2} \leq x \leq \frac{3\pi}{2}$.

Watch Video Solution

9. Find the area of the circle $x^2 + y^2 = 4$ using integration.

Watch Video Solution

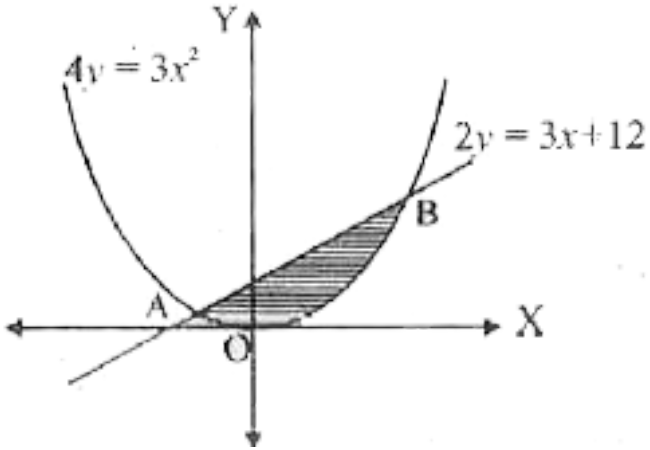
Additional Questions For Practice 8 2

1. Find the area of the region bounded by the parabolas $x^2 = 16y$ and $y^2 = 16x$.

Watch Video Solution

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

Watch Video Solution



3.

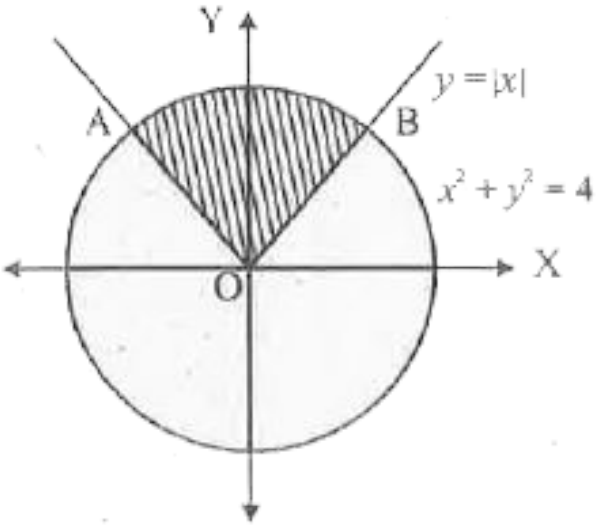
The above figure represents the parabola $4y = 3x^2$ and the ine $2y = 3x + 12$

(i) Find the coordinates of A and B.

(ii) Find the area of the shaded region using integration.

Watch Video Solution

4. The following figure represents the circle $x^2 + y^2 = 4$ and the curve $y = |x|$



Find the area of the shaded region using integration.

Watch Video Solution

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

Watch Video Solution

Solutions To Ncert Miscellaneous Exercise

1. Find the area under the given curves and given lines:

(i) $y = x^2, x = 1, x = 2$ and x -axis

(ii) $y = x^4, x = 1, x = 5$ and x -axis.

Watch Video Solution

2. Find the area between the curves y = x and $y = x^2$.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

5. Find the area bounded by the curve y = sin x between x = 0 and x = 2π.

Watch Video Solution

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

Watch Video Solution

7. Find the area enclosed by the parbola $4y = 3x^2$ and the line $2y = 3x + 12$.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

13. Using the method of integration find the area of the triangle ABC, coordinates of whose vertices are A(2, 0) , B (4, 5) and C(6, 3).

Watch Video Solution

14. Using the method of integration find the area of the region bounded by lines :

$2x + y = 4, 3x - 2y = 6$ and $x - 3y + 5 = 0$

Watch Video Solution

15. Find the area of the region $\{(x, y) : y^2 \leq 4x, 4x^2 + 4y^2 \leq 9\}$.

Watch Video Solution

16. Choose the correct answer in the following

Exercises from 16 to 20

16. Area bounded by the curve $y = x^3$, the x-axis and the ordinates x = -2 and x = 1 is

A. -9

B. $\frac{-15}{4}$

C. $\frac{15}{4}$

D. $\frac{17}{4}$

Answer: D

Watch Video Solution

Watch Video Solution

17. The area bounded by the curve $y = x|x|$, x-axis and the ordinates x = -1 and x = 1 is given by

A. 0

B. $\frac{1}{3}$

C. $\frac{2}{3}$

D. $\frac{4}{3}$

Answer: C

Watch Video Solution

18. The area of the circle $x^2 + y^2 = 16$ exterior to the parabola $y^2 = 6x$ is

A. $\frac{4}{3}(4\pi - \sqrt{3})$

B. $\frac{4}{3}(4\pi + \sqrt{3})$

C. $\frac{4}{3}(8\pi - \sqrt{3})$

D. $\frac{4}{3}(8\pi + \sqrt{3})$

Answer: C

Watch Video Solution

19. The area bounded by the y-axis, y = cos x and y = sin x when $0 \leq x \leq \frac{\pi}{2}$ is

A. $2\left(\sqrt{2-1}\right)$

B. $\sqrt{2}-1$

C. $\sqrt{2}+1$

D. $\sqrt{2}$

Answer: B

Watch Video Solution

Unit Test

1. (i) Sketch the graph of $y = |x + 3|$

(ii) Evaluate $\int_{-6}^{0} |x + 3| dx$

(iii) What does the integral represent?

Watch Video Solution

2. Consider three points A(-1, 1), B(0, 5) and C(3, 2)

(i) Find the equations of AB, BC and AC (ii) Using integration, find the area of ΔABC.

Watch Video Solution

3. Find the area bounded by the curves y = sin x, y = cos x between x axis, x = 0 and $x = \frac{\pi}{2}$

Watch Video Solution

4. Find the area bounded by the lines $y = 2x + 1$ and $y = 3x + 1$, $x = 4$ using integration.

Watch Video Solution

5. Find the area enclosed between the circles $x^2 + y^2 = 1$ and $\left(x - \frac{1}{2}\right)^2 + y^2 = 1$

View Text Solution

Objective Type Questions And Solutions

1. The point of intersection of the curves $y^2 = 4x$ and the line y = x is

A. (0, 4)

B. (2, 2)

C. (-4, -4)

D. (4, 4)

Answer: D

Watch Video Solution

2. The points of intersection of the circle $x^2 + y^2 = a^2$ and the line x + y = a is

A. (a, 0) and (0, a)

B. (-a, 0) and (0, a)

C. (a, 0) and (0 , -a)

D. (-a, 0) and(0, -a)

Answer: A

View Text Solution

3. The point of intersection of the circle $x^2 + y^2 = 8x$ and the parabola $y^2 = 4x$ which lies in the first quadrant is

A. (4, 4)

B. (-4, 4)

C. (4, 0)

D. (-4, -4)

Answer: A

Watch Video Solution

4. $\int \sqrt{a^2 - x^2} dx$ is

A. $\frac{x}{2}\sqrt{a^2 - x^2} + \frac{a^2}{2}\tan^{-1}\left(\frac{x}{a}\right) + C$

B. $\frac{x}{2}\sqrt{a^2-x^2}+\frac{a^2}{2}\sin^{-1}\left(\frac{x}{a}\right)+C$

C. $\frac{x}{2}\sqrt{a^2-x^2}-\frac{a^2}{2}\sin^{-1}\left(\frac{x}{a}\right)+C$

D. $\frac{x}{2}\sqrt{a^2-x^2}-\frac{a^2}{2}\tan^{-1}\left(\frac{x}{a}\right)+C$

Answer: B

Watch Video Solution

5. The area bounded by the curve y = sin x between the ordinates x = 0, $x = \pi$ and the x-axis is

A. 2 sq.units

B. 4 sq.units

C. 3 sq.units

D. 1 sq.units

Answer: A

 Watch Video Solution

6. The area bounded by the curve y = sinx between x = 0 and $x = 2\pi$ is (in square units)

A. 1

B. 2

C. 0

D. 4

Answer: D

Watch Video Solution

7. The area enclosed by the circle $x^2 + y^2 = 2$ is equal to

A. 4π sq.units

B. $2\sqrt{2}\pi$ sq.units

C. $4\pi^2$ sq.units

D. `2pi sq.units

Answer: D

Watch Video Solution

8. The area enclosed by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is equal to

A. π^2ab sq.units

B. $\pi a^2 b$sq.units

C. πab sq.units

D. πab^2 sq.units

Answer: C

Watch Video Solution

Continuous Evaluation Assignment

1. Sketch the curve $y = x^3$ find the area bounded by the above curve, the a-axis between the ordinates x = 02 and x = 1

Watch Video Solution

2. Sketch the parabolas $y^2 = 8x$ and $x^2 = 8y$. find the area bounded between the parabola.

Watch Video Solution

Continuous Evaluation Project

1. Find the Area of the triangle whose vertices are given

(a) . By using integration . (b) by using Heron's formula (c) by using determinants

The result obtained in (a), (b) and (c) are equal . Why ?

Watch Video Solution

Continuous Evaluation Lab Work

1. On a graph paper, draw the graphs of the curves $y = 4x^2$ and $x = 4y^2$. Calculate the area between them from the graph by counting squares.

(ii) Using integration, find the area between the above two curves. (Compare (i) & (ii))

Watch Video Solution