



MATHS

NCERT - NCERT MATHEMATICS(HINGLISH)

APPLICATION OF INTEGRALS

Exercise 81

1. Find the area of the smaller part of the circle $x^2 + y^2 = a^2$ cut off by the line $x = \frac{a}{\sqrt{2}}$ A. $a^4 \left[\frac{\pi}{5} - \frac{1}{3} \right]$

$$B. a^{2} \left[\frac{\pi}{4} - \frac{1}{2} \right]$$
$$C. a^{2} \left[\frac{\pi}{3} - \frac{1}{4} \right]$$
$$D. a^{3} \left[\frac{\pi}{3} - \frac{1}{2} \right]$$

Answer: B



2. 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.

A.
$$a = 7^{\frac{2}{3}}$$

B.
$$a = 2^{rac{2}{3}}$$

C. $a = 5^{rac{2}{3}}$

D.
$$a = 4^{\frac{2}{3}}$$

Answer: D



3. Find the area of the region bounded by the

parabola $y = x^2$ and y = |x|.

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

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

A. $16-4\sqrt{2}$ B. $15-4\sqrt{5}$

C.
$$17 - 4\sqrt{3}$$

D.
$$18 - 4\sqrt{7}$$

Answer: A



6. Find the area of the region bounded by $x^2 = 4y$,

y=2, y=4and the y-axis in the first quadrant.



7. 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) $\frac{9}{2}$
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8. Find the area of the region bounded by the curve $y^2 = x$ and the lines x = 1, x = 4 and the x-axis.

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

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

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

the line x = 4y - 2.

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12. Find the area of the region bounded by the

ellipse
$$\displaystyle rac{x^2}{16} + \displaystyle rac{y^2}{9} = 1.$$

A. 10π

B. 11π

 $\mathsf{C}.\,12\pi$

D. 13π

Answer: C



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

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Miscellaneous Exercise

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

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2. Using the method of integration find the area bounded by the curve |x| + |y| = 1.[Hint: The required region is bounded by lines x + y = 1, x - y = 1, -x + y = 1and -x - y = 1].

3. Find the area bounded by the curve $y = \sin x$

between x = 0 and $x = 2\pi$.

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4. 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).



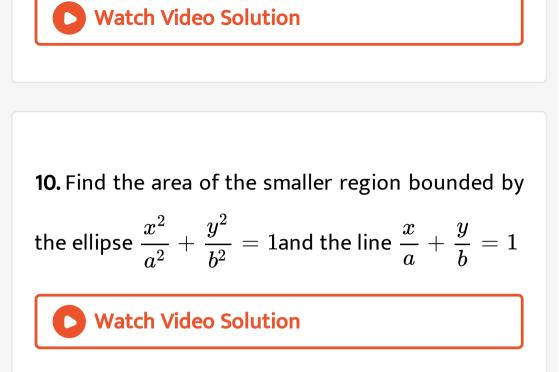
5. Area bounded by the curve $y = x^3$, the x-axis and the ordinates x = 2 and x = 1 is(A) -9 (B) $\frac{-15}{4}$ (C) $\frac{15}{4}$ (D) $\frac{17}{4}$ Watch Video Solution

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

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

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

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



11. Sketch the graph of y=ert x+3ert and evaluate

$$\int_{-6}^0 |x+3| dx.$$

12. Find the area enclosed between the parabola

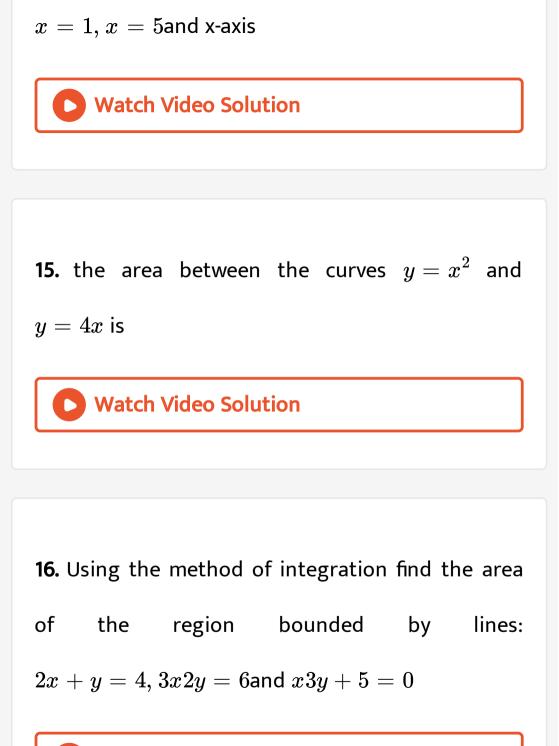
$$y^2=4ax$$
and the line $y=mx$.

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- **13.** Find the area enclosed by the parabola
- $4y = 3x^2$ and the line 2y = 3x + 12.

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14. Find the area under the given curves and given lines:(i) $y = x^2, x = 1, x = 2$ and x-axis(ii) $y = x^4$,



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

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

B. $\frac{7}{2}$
C. $\frac{9}{2}$
D. $\frac{5}{2}$

Answer: C

18. The area bounded by the curve y = x|x|, x-axis and the ordinates x = -1 and x = 1 is given by(A) O (B) $\frac{1}{3}$ (C) $\frac{2}{3}$ (D) $\frac{4}{3}$ [Hint : $y = x^2$ if x > 0and $y = -x^2$ if x < 0].

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19. The area bounded by the y-axis, $y=\cos x$ and $y=s\in x$ when $0\leq x\leq rac{\pi}{2}$ is(A) $2ig(\sqrt{2-1}ig)$ (B) $\sqrt{2}-1$ (C) $\sqrt{2}+1$ (D) $\sqrt{2}$

1. Find the area bounded by the ellipse $rac{x^2}{a^2}+rac{y^2}{b^2}=1$ and the ordinates x=0 and x=ae, where, $b^2=a^2ig(1-e^2ig)$ and e<1.

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

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

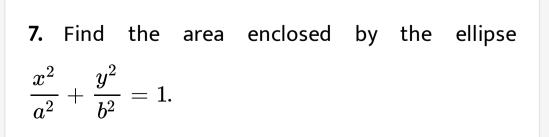
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4. Find the area of the region bounded by the two parabolas $y = x^2$ and $y^2 = x$.

5. Find the area enclosed by the circle
$$x^2 + y^2 = a^2$$
.
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6. Find the area of the region bounded by the

curve $y = x^2$ and the line y = 4.





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

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9. In Figure, AOBA is the part of the ellipse $9x^2 + y^2 = 36$ in the first quadrant such that OA = 2andOB = 6. Find the area between the arc AB and the chord AB.



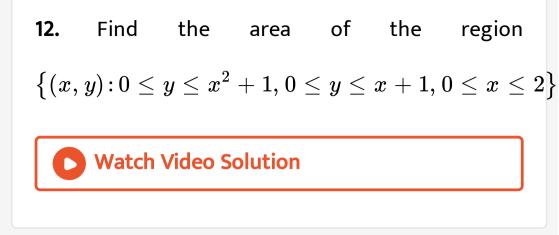


10. Find the area bounded by the curve $y = \cos x$

between x = 0 and $x = 2\pi$.

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11. 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.



13. Find the area of the region bounded by the line

y=3x+2, the x-axis and the ordinates

$$x = 1 and x = 1.$$

14. Using integration, find the area of the region enclosed between the two circles $x^2 + y^2 = 4$ and $(x-2)^2 + y^2 = 4.$

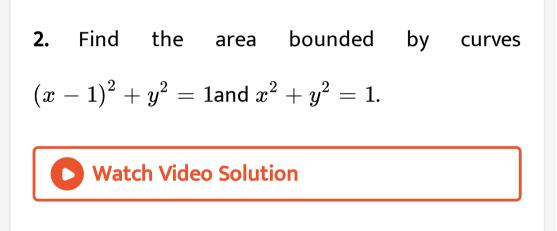
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15. Find the area of the parabola $y^2 = 4ax$ bounded by its latus rectum.



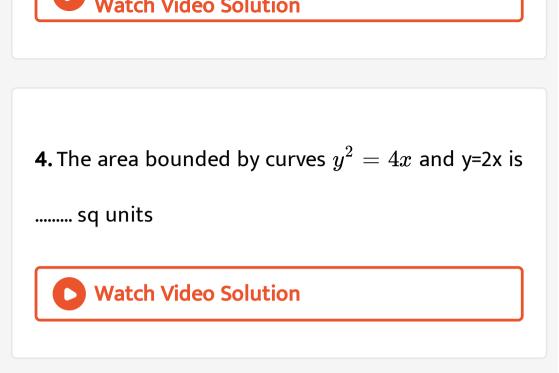


1. Find the area of the region bounded by the curves $y = x^2 + 2$, y = x, x = 0 and x = 3. Watch Video Solution



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

is interior to the parabola $x^2 = 4y$.



5. Smaller area enclosed by the circle $x^2 + y^2 = 4$

and the line x+y=2is

(A) $2(\pi-2)$ (B) $\pi-2$ (C) $2\pi-1$ (D) $2(\pi+2)$

6. Using integration find the area of the triangular region whose sides have the equations y=2x+1

,
$$y=3x+1$$
 and $x=4$.

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