MATHS

BOOKS - A N EXCEL PUBLICATION

APPLICATION OF INTEGRALS

Question Bank

1. Find the area bounded by the curve y=3x, the x-axis and the ordinate x=1 and x=2

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2. Find the area bounded by the parabola $y = x^2$ and the lines y=0 and y=4

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

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

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

6. Find the area of the region bounded by the ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$, the ordinates x=0and

x= ae where

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

7. Find the area of the region bounded by the

curve

$$y^2 = x$$

x-axis and the lines x=1 and x=4

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

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

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

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

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

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

14. 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.

15. Find the area enclosed between the curve

$$x^2 = 4y$$

and the line x = 4y - 2

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

17. Choose the correct answer. 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. $\dfrac{\pi}{2}$

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

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

Answer: A

18. Choose the correct answer. Area of the region bounded by the curve $y^2 = 4x$, y-axis and the line y=3 is :
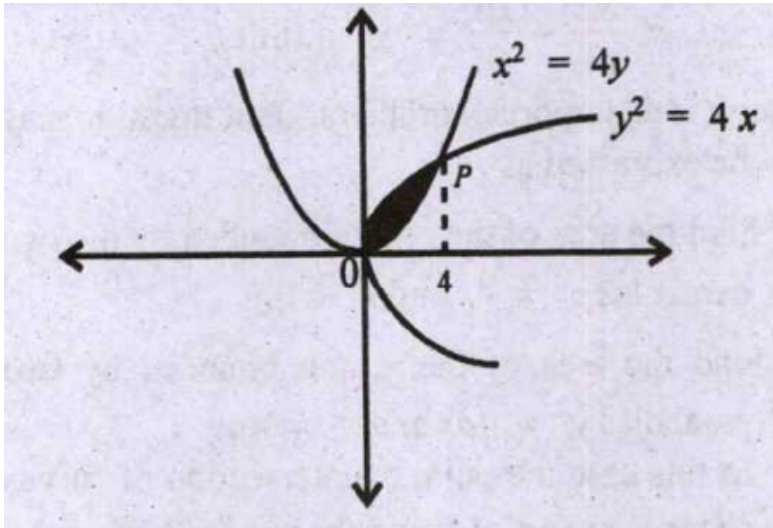
A. 2

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

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

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

Answer: B

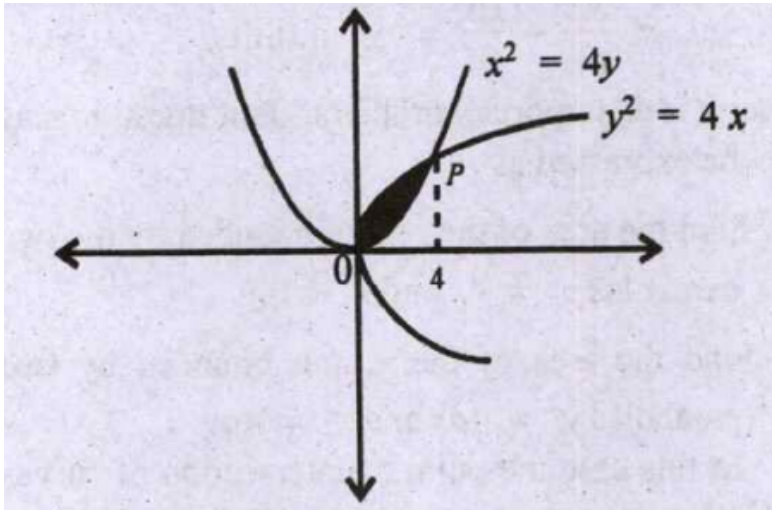▶ **Watch Video Solution**

19. Consider the figure

find the co-ordinates of the point P

20. Consider the figure

The figure shows the curves $x^2 = 4y$ and $y^2 = 4x$ with point P marked and the shaded region between them near the origin, with 4 marked on the x-axis.

Using integration find the shaded area

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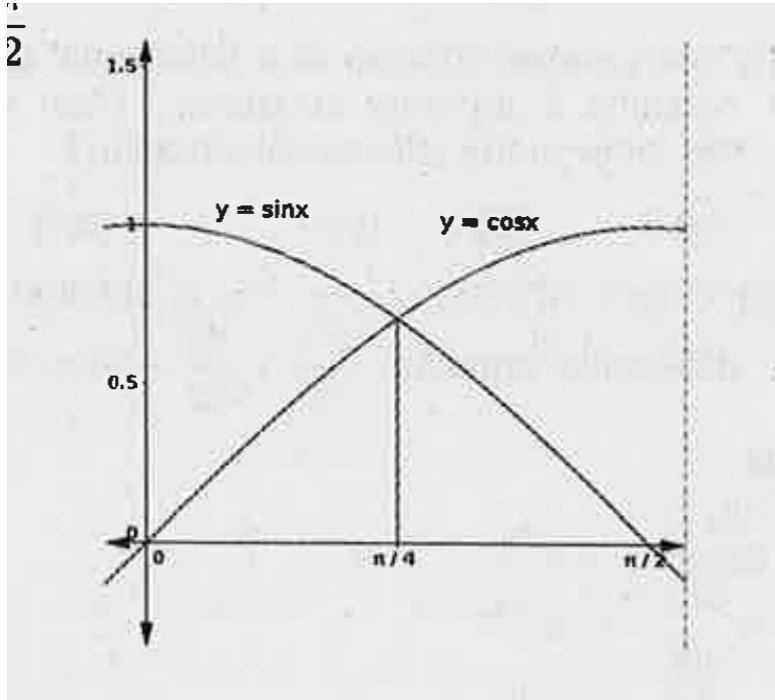**21.** Find the area lying above x-axis and included between the circle $x^2 + y^2 = 8x$ and

parabola $y^2 = 4x$.

22. From the following figure, find the area of the region bounded by the curves $y = \sin x$,

$y = \cos x$ and x axis as x varies from 0 to $\dfrac{\pi}{2}$

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

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

25. Using integration find the area of the region bounded by the curves $y = x^2 + 2$, y=x,x=0 and x=3.

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

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27. Choose the correct answer. 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

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28. Choose the correct answer. Area lying between the curves $y^2 = 4x$ and y=2x is :

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

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

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

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

Answer: B

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29. Find the area under the given curves a given line :

$y = x^2, x = 1, x = 2$ and x-axis

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30. Find the area under the given curves a

given line :

$y = x^4$,x=1,x=5 and x-axis

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

$y = x^2$.

32. Find the area of the region lying in the first quadrant and bounded by

$y = 4x^2$, $x = 0$, $y = 1$ and $y = 4$.

33. Sketch the graph of $y = |x + 3|$ and

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

34. Find the area bounded by the curve y= sin x with x-axis, between x=0 and $x = 2\pi$

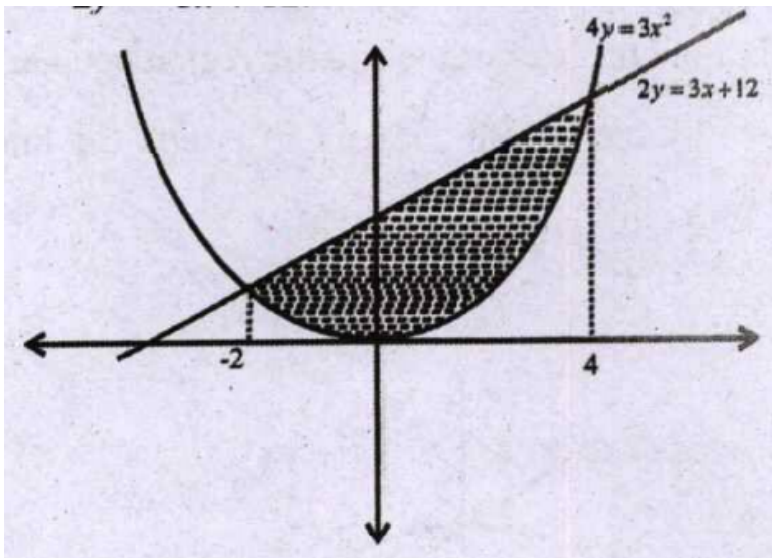**35.** Find the area enclosed between the parabola $y^2 = 4ax$ and the line y= mx.
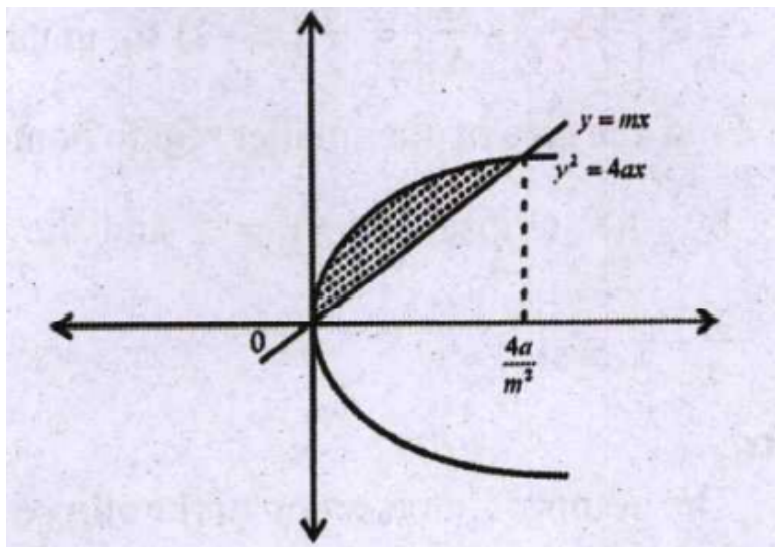
36. Find the area enclosed by the parabola
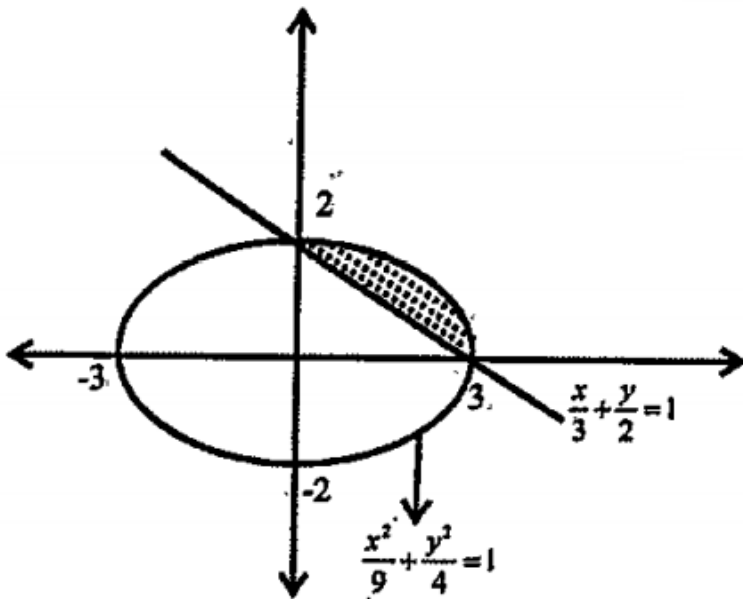
$4y = 3x^2$ and the line

2y=3x+12.

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

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

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

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

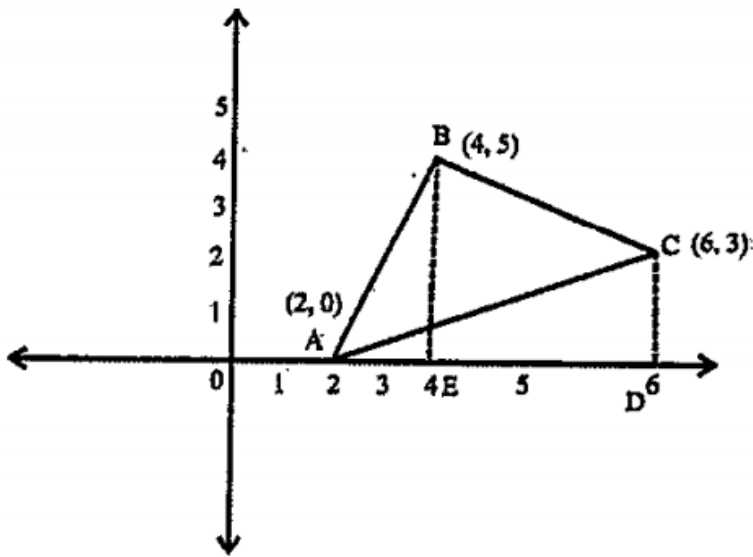**41.** Find the area of the region bounded by the curve

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

42. Using the method of integration , find the area of the $\triangle ABC$,co-ordinates of whose vertices are A(2,0),B(4,5) and C(6,3).
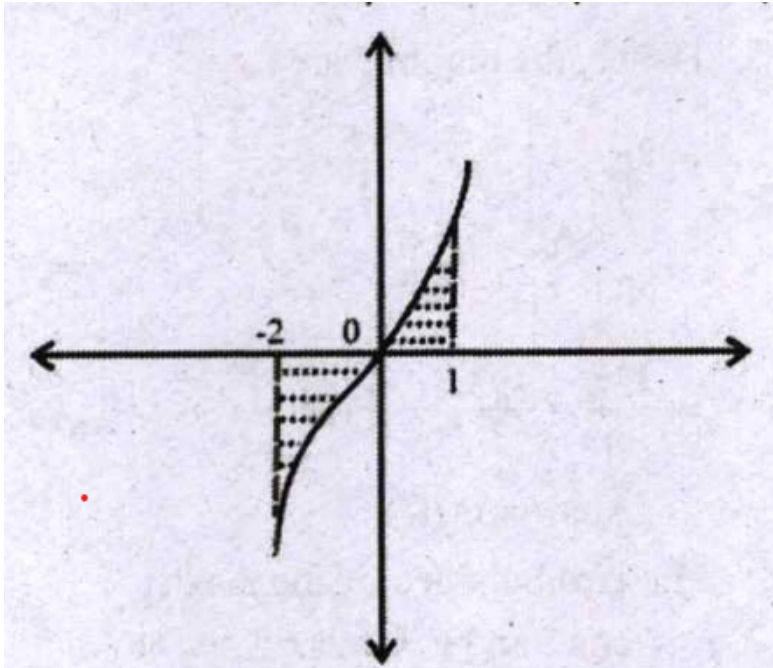

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43. Using the method of integration find the area of the region bounded by the lines 2x+y =4, 3x-2y =6 and x-3y + 5 =0.

44. Choose the correct answer. Area bounded by the curve$y = x^3$,The x-axis and the ordinates.

x=-2 and x=1 is:

A. -9

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

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

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

Answer: D

45. 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. `1/3

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

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

Answer: C

46. Find the area of the circle ,

$$x^2 + y^2 = 16$$

which Is exterior to parabola

$$y^2 = 6x$$

A. $\dfrac{4}{3}\left(4\pi - \sqrt{3}\right)$

B. $\dfrac{4}{3}\left(4\pi + \sqrt{3}\right)$

C. $\dfrac{4}{3}\left(8\pi - \sqrt{3}\right)$

D. $\dfrac{4}{3}\left(8\pi + \sqrt{3}\right)$

Answer: C

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47. The area bounded by the y-axis,y=cos x and

y =sin x when

$0 \leq x \leq \dfrac{\pi}{2}$

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

    B. $\sqrt{2} - 1$

C. $\sqrt{2} + 1$

D. $\sqrt{2}$

Answer: B

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