MATHS

BOOKS - DISHA PUBLICATION MATHS (HINGLISH)

APPLICATION OF INTEGRALS

Jee Main 5 Year At A Glance

1. Let $g(x) = \cos x^2$, $f(x) = \sqrt{x}$, and $\alpha, \beta(\alpha < \beta)$ be the roots of the quadratic equation $18x^2 - 9\pi x + \pi^2 = 0$. Then the area (in

sq. units) bounded by the curve $y = (gof)(x)$ and the lines $x = \alpha$, $x = \beta$ and $y = 0$ is

A. $\frac{1}{2}(\sqrt{3}+1)$

B. $\frac{1}{2}(\sqrt{3}-\sqrt{2})$

C. $\frac{1}{2}(\sqrt{2}-1)$

D. $\frac{1}{2}(\sqrt{3}-1)$

Answer: D

Watch Video Solution

2. If the area of the region bounded by the curves, $y = x^2, y = \frac{1}{x}$ and the lines $y = 0$ and $x = t(t > 1)$ is 1 sq. unit, then t is equal to :

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

B. $e^{\frac{2}{3}}$

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

D. $e^{\frac{3}{2}}$

Answer: B

Watch Video Solution

3. The area (in sq. units) of the region $\{(x, y) : x \geq 0, x + y \leq 3, x^2 \leq 4y$ and $y \leq 1 + \sqrt{x}\}$ is :

A. $\frac{5}{2}$

B. $\frac{59}{12}$

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

D. $\frac{7}{3}$

Answer: A

Watch Video Solution

4. The angle between the curves $x^2 + y^2 = 4$ and $x^2 = 3y$ is

A. $\frac{1}{2\sqrt{3}} + \frac{\pi}{3}$

B. $\frac{1}{\sqrt{3}} + \frac{2\pi}{3}$

C. $\frac{1}{2\sqrt{3}} + \frac{\pi}{3}$

D. $\frac{1}{\sqrt{3}} + \frac{4\pi}{3}$

Answer: D

Watch Video Solution

5. The area (in sq. units) of the region

$$\{(x, y) : y^2 \leq 2x \text{ and } x^2 + y^2 \leq 4x, x \geq 0, y \leq 0\},$$

is

A. $\pi - \frac{4\sqrt{2}}{3}$

B. $\frac{\pi}{2} - \frac{2\sqrt{2}}{3}$

C. $\pi - \frac{4}{3}$

D. $\pi - \frac{8}{3}$

Answer: D

Watch Video Solution

6. The area (in sq. units) of the region described by

$$A = \{(x, y) : y \geq x^2 - 5x + 4, x + y > 1, y \leq 0\}$$

is

A. $\frac{19}{6}$

B. $\frac{17}{6}$

C. $\frac{7}{2}$

D. $\frac{13}{6}$

Answer: A

Watch Video Solution

7. The area (in sq. units) of the region described by

$\{(x, y) : y^2 \leq 2x \quad \text{and} \quad y \geq 4x - 1\}$ is-

A. $\frac{15}{64}$

B. $\frac{9}{32}$

C. $\frac{7}{32}$

D. $\frac{5}{64}$

Answer: B

Watch Video Solution

8. The area (in square unit) of the region bounded by the curves $y = x^3$ and $y = 2x^2$ is-

A. $\frac{3}{5}$

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

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

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

Answer: C

Watch Video Solution

9. The area of the region described by $A = \{(x, y) : x^2 + y^2 \leq 1 \text{ and } y^2 \leq 1 - x\}$ is :

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

B. $\frac{\pi}{2} + \frac{2}{3}$

C. $\frac{\pi}{2} + \frac{4}{3}$

D. $\frac{\pi}{2} - \frac{4}{3}$

Answer: C

Watch Video Solution

10. Let $A = \{(x, y); y^2 \leq 4x, y - 2x \leq -4\}$ The area (insurunits) of the region A is

A. 8

B. 9

C. 10

D. 11

Answer: B

Watch Video Solution

Exercise 1 Concept Builder Topicwise

1. The area of the smaller segment cut off from the circle $x^2 + y^2 = 9$ by x = 1 is

A. $\frac{1}{9}\left(9\sec^{-1}3 - \sqrt{8}\right)$ sq unit

B. $\left(9\sec^{-1}3 - \sqrt{8}\right)$ sq unit

C. $\left(\sqrt{8} - 9\sec^{-1}3\right)$ sq unit

D. None of the above

Answer: B

Watch Video Solution

2. The area enclosed between the curve $y = \log_e(x + e)$ and the coordinate axes is

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

3. The area bounded by the curve $y^2(2a - x) = x^3$ and the line x = 2a is

A. $3\pi a^2$ sq. unit

B. $\frac{3\pi a^2}{2}$ sq. unit

C. $\frac{3\pi a^2}{4}$ sq. unit

D. $\frac{6\pi a^2}{5}$ sq. unit

Answer: B

Watch Video Solution

4. The area bounded by the x-axis, the curve $y = f(x)$, and the lines $x = 1, x = b$ is equal to $\sqrt{b^2+1} - \sqrt{2}$ for all $b > 1$, then $f(x)$ is $\sqrt{x-1}$ (b) $\sqrt{x+1}\sqrt{x^2+1}$ (d) $\frac{x}{\sqrt{1+x^2}}$

A. $\sqrt{x-1}$

B. $\sqrt{x+1}$

C. $\sqrt{x^2+1}$

D. $\frac{x}{1+\sqrt{x^2}}$

Answer: D

Watch Video Solution

5. The area between the curves $y = 2x^4 - x^2$, the x-axis and the ordinates of two minima of the be curve is (A) $\frac{7}{240}$ (B) $\frac{7}{120}$ (C) $\frac{7}{60}$ (D) None of these

A. $\frac{7}{120}$

B. $\frac{9}{120}$

C. $\frac{11}{120}$

D. $\frac{13}{120}$

Answer: A

Watch Video Solution

6. What is the area of the parabola $x^2 = y$ bounded by the lines $y = 1$?

A. $\frac{1}{3}$ square unit

B. $\frac{2}{3}$ square unit

C. $\frac{4}{3}$ square unit

D. 2 square unit

Answer: C

Watch Video Solution

7. If the ordinate x = a divides the area bounded by the curve $y = 1 + \frac{8}{x^2}$ and the ordinates $x = 2, x = 4$ into two equal parts, then a is equal to

A. $\sqrt{2}$

B. $2\sqrt{2}$

C. $3\sqrt{2}$

D. None of these

Answer: B

Watch Video Solution

8. The area under the curve $y = |\cos x - \sin x|, 0 \leq x \leq \frac{\pi}{2}$, and above x-axis is: (A) $2\sqrt{2} + 2$ (B) 0 (C) $2\sqrt{2} - 2$ (D) $2\sqrt{2}$

A. $2\sqrt{2}$

B. $2\sqrt{2} - 2$

C. $2\sqrt{2} + 2$

D. 0

Answer: B

Watch Video Solution

9. Calculate the area bounded by the curve $y = x(3 - x)^2$ the x-axis and the ordinates of the maximum and minimum points of the curve.

A. 1 sq. unit

B. 2 sq. unit

C. 4 sq. unit

D. None of these

Answer: C

Watch Video Solution

10. The area of the ellipse

$\frac{x^2}{9} + \frac{y^2}{4} = 1$ in first quadrant is 6π sq. units.

The ellipse is rotated about its centre in anti-clockwise direction till its major axis coincides with y-axis. Now the area of the ellipse in first quadrant is..... π sq. units.

A. 2

B. 4

C. 6

D. 8

Answer: C

Watch Video Solution

11. The area bounded by the graph of $y = f(x), f(x) > 0$ on [0,a] and x-axis is $\frac{a^2}{2} + \frac{a}{2}\sin a + \frac{\pi}{2}\cos a$ then find the value of $f\left(\frac{\pi}{2}\right)$.

A. 1

B. $\frac{1}{2}$

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

D. None of these

Answer: B

Watch Video Solution

12. The area between the curve $y = 1 - |x|$ and the x- axis is equal to

A. 1 sq. unit

B. $\frac{1}{2}$ sq. unit

C. $\frac{1}{3}$ sq. unit

D. 2sq. Unit

Answer: A

Watch Video Solution

13. What is the area of the parabola $y^2 = x$ bounde by its latus rectum ?

A. $2b^2/3$ square unit

B. $4b^2/3$ square unit

C. b^2 square unit

D. $8b^2/3$ square unit

Answer: D

Watch Video Solution

14. The value of $a(a > 0)$ for which the area bounded by the curves $y = \frac{x}{6} + \frac{1}{x^2}, y = 0, x = a, and x = 2a$ has the least value is__

A. 2

B. $\sqrt{2}$

C. $2^{1/3}$

D. 1

Answer: D

Watch Video Solution

15. The curve $y = x^2 - 7x + 10$ intersects the x-axis at the points A and B. Then the area bounded by the curve and the line AB is

A. $4\frac{1}{2}$sq unit

B. 4 sq unit

C. 6 sq unit

D. 2 sq unit

Answer: A

Watch Video Solution

16. What is the area bounded by the lines $x = 0, y = 0$ and $x + y + 2 = 0$?

A. $\frac{1}{2}$ square unit

B. 1square unit

C. 2 square unit

D. 4 square unit

Answer: C

Watch Video Solution

17. The area (in sq. units) bounded by the curve $|y| = |\ln|x||$ and the coordinate axes is

A. 2

B. 1

C. 5

D. $2\sqrt{2}$

Answer: B

Watch Video Solution

18. Find the area bounded by the curve $y = \sin^{-1} x$ and the line $x = 0, |y| = \frac{\pi}{2}$.

A. 1

B. 2

C. π

D. 2π

Answer: B

Watch Video Solution

19. The area of the region (in sq units), in the first quadrant, bounded by the parabola $y = 9x^2$ and the lines x = 0, y = 1 and y = 4, is

A. $7/9$

B. $14/3$

C. $7/3$

D. $14/9$

Answer: D

Watch Video Solution

20. The area enclosed between the graph of $y = x^3$ and the lines x=0, y=1, y=8 is

A. $\frac{45}{4}$

B. 14

C. 7

D. None of these

Answer: A

Watch Video Solution

21. The area of the region bounded by the curve $x = 2y + 3$ and the lines $y = 1, y = -1$ is

A. 4 sq. units

B. $\frac{3}{2}$ sq. units

C. 6 sq. units

D. 8 sq. units

Answer: C

Watch Video Solution

22. The area of the region bounded by $y^2 = 2x + 1$ and $x - y - 1 = 0$ is

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

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

C. $\frac{8}{3}$

D. $\frac{16}{3}$

Answer: D

Watch Video Solution

23. The area bounded by the curve $y = \left[\frac{x^2}{64} + 2\right], y = x - 1, y = x - 1$ and $x = 0$ above the x-axis will be-(Where [] represents greatest integer function)

A. 2 sq unit

B. 3 sq unit

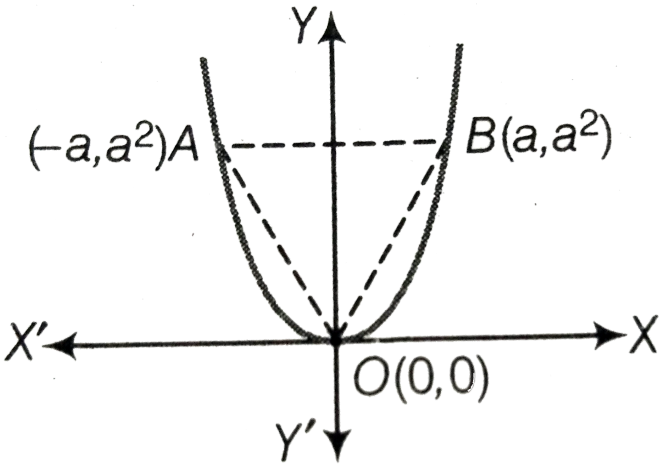
C. 4 sq unit

D. None of these

Answer: C

Watch Video Solution

24. The figure shows a ΔAOB and the parabola $y = x^2$. The ratio of the area of the ΔAOB to the area of the region AOB of the parabola $y = x^2$ is equal to



A. $\frac{3}{5}$

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

C. $\frac{7}{8}$

D. $\frac{5}{6}$

Answer: B

Watch Video Solution

25. If the area enclosed by $y^2 = 4ax$ and the line $y = ax$ is $\frac{1}{3}$ sq.units, then the area enclosed by $y = 4x$ with the same curve in sq. units is

A. 8 sq unit

B. 4 sq unit

C. $4/3$ sq unit

D. $8/3$ sq unit

Answer: D

Watch Video Solution

26. Which of the following is not the area of the region bounded by $y = e^x$ and x=0 and y= e?

A. e-1

B. $\int_1^e In(e+1-y)dy$

C. $e - \int_0^1 e^x dx$

D. $\int_0^e Inydy$

Answer: A,D

Watch Video Solution

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

A. $\frac{1}{6}$ sq. units

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

C. $\frac{1}{2}$ sq. units

D. None of these

Answer: A

Watch Video Solution

28. The area above the x-axis enclosed by the curves $x^2 - y^2 = 0$ and $x^2 + y - 2 = 0$ is

A. $\frac{5}{3}$

B. $\frac{7}{3}$

C. $\frac{8}{3}$

D. $\frac{10}{3}$

Answer: B

Watch Video Solution

29. Area bounded by the parabola $y = x^2 - 2x + 3$ and tangents drawn to it from the point P(1, 0) is equal to

A. $4\sqrt{2}$ sq. units

B. $\frac{4\sqrt{2}}{3}$ sq. units

C. $\frac{8\sqrt{2}}{3}$ sq. units

D. $\frac{16\sqrt{2}}{3}$ sq. units

Answer: B

Watch Video Solution

30. The area between the curves $y = x^2$ and $y = \frac{2}{1+x^2}$ is equal to

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

B. $\pi + \frac{2}{3}$

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

D. None of these

Answer: D

Watch Video Solution

31. If the area enclosed by $y^2 = 4ax$ and the line y=ax is $\frac{1}{3}$ sq. unit, then the roots of the equation $x^2 + 2x = a$, are

A. -4 and 2

B. 2 and 4

C. -2 and -4

D. 8 and -8

Answer: A

Watch Video Solution

32. The area of the region bounded by the parabola $(y-2)^2 = x-1$, the tangent to the parabola at the point $(2, 3)$ and the x-axis is

A. 6

B. 9

C. 12

D. 3

Answer: B

Watch Video Solution

33. Find the area lying in the first quadrant and bounded by the curve $y = x^3$ and the line $y = 4x$.

A. 2

B. 3

C. 4

D. 8

Answer: D

Watch Video Solution

34. Area bounded by the circle $x^2 + y^2 = 1$ and the curve $|x| + |y| = 1$ is

A. 2π

B. $\pi - 2$

C. π

D. $\pi + 3$

Answer: B

Watch Video Solution

35. AOB is the positive quadrant of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ in which $OA=a, OB=b$. Then find the area between the arc AB and the chord AB of the ellipse.

A. πabsq. units

B. $(\pi-2)$ sq. units

C. $\frac{ab(\pi+2)}{2}$ sq. units

D. $\frac{ab(\pi-2)}{4}$ sq. units

Answer: D

Watch Video Solution

36. Find the area enclosed between the curves: $y = \log_e(x + e), x = \log_e\left(\frac{1}{y}\right)$ & the x-axis.

A. 2 sq unit

B. 1 sq unit

C. 4 sq unit

D. None of these

Answer: A

Watch Video Solution

37. Find the area bounded by the curves $x^2 + y^2 = 25, 4y = |4 - x^2|$, and $x = 0$ above the x-axis.

A. $2 + \frac{25}{2}\sin^{-1}\left(\frac{4}{5}\right)$

B. $2 + \frac{25}{4}\sin^{-1}\left(\frac{4}{5}\right)$

C. $2 + \frac{25}{2}\sin^{-1}\left(\frac{1}{5}\right)$

D. None of these

Answer: A

Watch Video Solution

38. The area bounded by the curves $y = xe^x, y = xe^{-x}$ and the line $x = 1$ is $\frac{2}{e} sq units$ (b) $1 - \frac{2}{e} sq units$ $\frac{1}{e} sq units$ (d) $1 - \frac{1}{e} sq units$

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

B. $1 - \frac{2}{e}$

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

D. $1 - \frac{1}{e}$

Answer: A

Watch Video Solution

39. 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).

A. 2

B. 4

C. 7

D. 8

Answer: C

Watch Video Solution

40. If $y = f(x)$ makes positive intercepts of 2 and 1 unit on x and y-coordinates axes and encloses an area of $\frac{3}{4}$ sq unit with the axes, then $\int_0^2 x f'(x)\, dx$, is

A. $3/2$

B. 1

C. $5/4$

D. $-3/4$

Answer: D

Watch Video Solution

41. The parabolas $y^2 = 4x$ and $x^2 = 4y$ divide the square region bounded by the lines x=4, y=4 and the coordinate axes. If S_1, S_2, S_3 are the areas of these parts numbered from top to bottom, respectively, then

A. 1:2:1

B. 1:2:3

C. 2:1:2

D. 1:1:1

Answer: D

Watch Video Solution

Watch Video Solution

42. The area bounded by the curve

$y^2(a^2 + x^2) = x^2(a^2 - x^2)$ is

A. $a^2(\pi - 2)$ sq unit

B. $a^2(\pi + 2)$ sq unit

C. $a^2(\pi - 1)$ sq unit

D. $a^2(\pi + 1)$ sq unit

Answer: A

View Text Solution

43. Prove that area common to ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and its auxiliary circle $x^2+y^2=a^2$ is equal to the area of another ellipse of semi-axis $aanda-b$.

A. $(a+b)^2\tan^{-1}\frac{b}{a}$

B. $(a+b)^2\tan^{-1}\frac{a}{b}$

C. $4ab\frac{\tan^{-1}(b)}{a}$

D. $4ab\frac{\tan^{-1}(a)}{b}$

Answer: C

Watch Video Solution

44. If $C_1 \equiv y = \frac{1}{1+x^2}$ and $C_2 \equiv y = \frac{x^2}{2}$ be two curve lying in XY plane. Then

A. area bounded by $y = \frac{1}{1+x^2}$ and y=0 is $\frac{\pi}{2}$

B. area bounded by c_1 and c_2 is $\frac{\pi}{2} - 1$

C. area bounded by c_1 and c_2 is $1 - \frac{\pi}{2}$

D. area bounded by curve $y = \frac{1}{1+x^2}$ and x-axis is $\frac{\pi}{2}$?

Answer: B

Watch Video Solution

45. The area bounded by $y = x^2 + 3$ and $y = 2x + 3$ is (in sq. units)

A. $\frac{12}{7}$

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

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

D. $\frac{8}{3}$

Answer: B

Watch Video Solution

46. The area bounded by the curves $y = xe^x, = xe^{-x}$ and the line $x = 1$

A. $e + \frac{1}{e}$

B. $e + \frac{1}{e} + 2$

C. $e + \frac{1}{e} - 2$

D. $e - \frac{1}{e} + 2$

Answer: C

Watch Video Solution

47. The area bounded by the curve $y = x^2$, the normal at (1, 1) and the x-axis is:

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

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

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

D. None

Answer: A

Watch Video Solution

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

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

B. $\sqrt{2}-1$

C. $\sqrt{2}+1$

D. $\sqrt{2}$

Answer: B

Watch Video Solution

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

A. $\left(\frac{2\pi}{3}-\frac{\sqrt{3}}{2}\right)$

B. $\frac{2\pi}{3}$

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

D. $\left(\frac{2\pi}{3}+\frac{\sqrt{3}}{2}\right)$

Answer: A

Watch Video Solution

50. $f(x) = \min\{2\sin x, 1-\cos x, 1\}$ then $\int_0^{\pi} f(x)dx$ is equal to

A. $\frac{\pi}{3} + 1 - \sqrt{3}$

B. $\frac{2\pi}{3} - 1 + \sqrt{3}$

C. $\frac{2\pi}{3} - 1 - \sqrt{3}$

D. $\frac{5\pi}{6} + 1 - \sqrt{3}$

Answer: D

Watch Video Solution

Exercise 2 Concept Builder

1. The slope of the tangent to a curve $y = f(x)$ at $(x, f(x))$ is $2x + 1$. If the curve passes through the point $(1, 2)$ then the area of the region bounded by the curve, the x-axis and the line $x = 1$ is (A) $\frac{5}{6}$ (B) $\frac{6}{5}$ (C) $\frac{1}{6}$ (D) 1

A. $\frac{5}{6}$ sq unit

B. $\frac{6}{5}$ sq unit

C. $\frac{1}{6}$ sq unit

D. 6 sq unit

Answer: A

Watch Video Solution

2. The area of the region bounded by the curves $y = |x - 2|$, x=1, x=3 and $thex - a\xi sis(A)3(B)2$ $(C)1(D)4`$

A. 4

B. 3

C. 2

D. 1

Answer: D

Watch Video Solution

Watch Video Solution

3. The area bounded by y = |sin x|, X-axis and the line $|x| = \pi$ is

A. 2 sq unit

B. 1 sq unit

C. 4 sq unit

D. None of these

Answer: C

Watch Video Solution

4. The value of integrals $\int_{-2}^{2} \max\{x+|x|, x-[x]\}dx$ where [.] represents the greatest integer function is

A. 4

B. 5

C. $\frac{7}{2}$

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

Answer: B

Watch Video Solution

5. Sketch the curves and identify the region bounded by the curves $x = \frac{1}{2}, x = 2, y = \log x any = 2^x$. Find the area of this region.

A. $\frac{4}{3}$ sq. unit

B. $\frac{5}{3}$ sq. unit

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

D. None of these

Answer: D

Watch Video Solution

6. Area enclosed by the curve $x^2y = 36$, the X-axis and the lines x = 6 and x = 9, is

A. 6

B. 1

C. 4

D. 2

Answer: D

Watch Video Solution

7. The area between the curve $y = 2x^4 - x^2$, the x-axis, and the ordinates of the two minima of the curve is

A. $\frac{3}{120}$ sq unit

B. $\frac{5}{120}$ sq unit

C. $\frac{1}{20}$ sq unit

D. $\frac{7}{120}$ sq unit

Answer: D

Watch Video Solution

8. Area bounded by the curve $y = \log_e x, x = 0, y \leq 0$ and x-axis is:

A. 1 sq. unit

B. 2 sq. unit

C. $\frac{1}{2}$ sq. unit

D. None of these

Answer: A

Watch Video Solution

9. If $[x]$ denotes the integral part of x and $f(x) = \min(x - [x], -x - [-x])$ show that: $\int_{-2}^{2} f(x)dx = 1$

A. 1

B. 2

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

D. 0

Answer: A

Watch Video Solution

10. The area of the plane region bounded by the curves $x + 2y^2 = 0$ and $x + 3y^2 = 1$ is equal to

A. 1 sq. unit

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

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

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

Answer: D

Watch Video Solution

11. Area bounded by the curve $xy^2 = a^2(a - x)$ and the y-axis is $\frac{\pi a^2}{2} sq\dot{u}nits$ (b) $\pi a^2 sq\dot{u}nits$ $3\pi a^2 sq\dot{u}nits$ (d) None of these

A. $\pi a^2 / 2$ sq. unit

B. πa^2 sq. unit

C. $3\pi a^2$ sq. unit

D. None of these

Answer: B

Watch Video Solution

12. The value of k for which the area of the figure bounded by the curve $y = 8x^2 - x^5$, the straight line $x = 1$ and $x = k$ and the x-axis is equal to $16/3$

A. 1

B. 3

C. -1

D. 4

Answer: A

Watch Video Solution

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

A. $\frac{7}{3}$ Sq. unit

B. $\frac{4}{5}$ Sq. unit

C. $\frac{3}{4}$ Sq. unit

D. None of these

Answer: A

Watch Video Solution

14. The area bounded by the curve $x = 2 - y - y^2$ and Y-axis is

A. $-\frac{9}{2}$

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

C. 9

D. -9

Answer: B

Watch Video Solution

15. Let f and g be continuous functions on [0 , a] such that $f(x) = f(x) = f(a - x)$ and $g(x) + g(a - x) = 4$, then $\int_0^a f(x)g(x)dx$ is equal to

A. $\int_a^b (f(x) - g(x))dx$

B. $\int_a^b (p(x) - q(x))dx$

C. $\int_a^b |p(x) - q(x)|dx$

D. None of these

Answer: C

Watch Video Solution

16. The area bounded by the curves $y = \sin x$, y= cos x and y-axis in 1 quadrant is -

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

B. 1 sq. unit

C. $\sqrt{2}$ sq. unit

D. $\left(1 + \sqrt{2}\right)$ sq. unit

Answer: A

Watch Video Solution

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

A. 12π

B. 3π

C. 24π

D. π

Answer: A

Watch Video Solution

18. Find the area of the region enclosed by the curves $y = x \log x and y = 2x - 2x^2.$

A. $\frac{5}{12}$

B. $\frac{7}{12}$

C. 1

D. $\frac{4}{7}$

Answer: B

Watch Video Solution

19. The area between the curves $y = x^2$ and $y = \frac{2}{1+x^2}$ is equal to

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

B. $\pi + \frac{2}{3}$

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

D. None of these

Answer: D

Watch Video Solution

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

A. $\frac{2}{21}$

B. 21

C. $\frac{21}{2}$

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

Answer: C

Watch Video Solution

21. The area bounded by the parabola $y = (x+1)^2$ and $y = (x-1)^2$ and the line $y = \frac{1}{4}$ is (A) 4 sq. units (B) $\frac{1}{6}$ sq. units (C) $\frac{3}{4}$ sq. units (D) $\frac{1}{3}$ sq. units

A. 4 sq. units

B. $1/6$ sq. units

C. $4/3$ sq. units

D. $1/3$ sq. units

Answer: D

Watch Video Solution

22. The area of the region lying between the line $x - y + 2 = 0$ and the curve $x = \sqrt{y}$, is

A. 9

B. $9/2$

C. $10/3$

D. None of these

Answer: C

Watch Video Solution

23. Area bounded by the curve $y = \sin x$ between . $x = 0$ and $x = 2\pi$ is

A. The area bounded by the curve y =sin x between x = 0 and x = 2p is 2 sq. units.

B. The area bounded by the curve y = 2 cos x and the X-axis from x = 0 to x = 2p is 8 sq. units.

C. Both (a) and (b) are true.

D. Both (b) and (b) are false.

Answer: A

Watch Video Solution

24. The maximum area of a rectangle whose two vertices lie on the x-axis and two on the curve $y = 3 - |x|, \ -3 \leq x \leq 3$

A. 9 sq. units

B. $9/4$ sq. units

C. 3 sq. units

D. None of these

Answer: D

Watch Video Solution

Watch Video Solution

25. The area bounded by y-1 = |x|, y = 0 and $|x| = \frac{1}{2}$ will be :

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

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

C. $\frac{5}{4}$

D. None of these

Answer: C

Watch Video Solution

26. The area bounded by $f(x) = x^2, 0 \leq x \leq 1, g(x) = -x + 2, 1 \leq x \leq 2$ and x- axis is

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

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

C. $\frac{8}{3}$

D. None of these

Answer: D

Watch Video Solution

27. Find the area of the region R which is enclosed by the curve $y \geq \sqrt{1-x^2}$ and max $\{|x|, |y|\} \leq 4$.

A. $4+\pi$

B. $6+\pi$

C. $8-\frac{\pi}{2}$

D. $4+\frac{\pi}{2}$

Answer: C

Watch Video Solution

28. The area bounded by the curves $y = \sqrt{x}, 2y + 3 = x,$ and x-axis in the 1st quadrant is 18 sq. units (b) $\frac{27}{4}$ s qu n i t s $\frac{4}{3}$ s qu n i t s (d) 9 sq. units

A. 9

B. $\frac{27}{4}$

C. 36

D. 18

Answer: A

Watch Video Solution

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

A. $\frac{13}{2}$ sq unit

B. $\frac{9}{2}$ sq unit

C. $\frac{7}{2}$ sq unit

D. $\frac{21}{2}$ sq unit

Answer: B

Watch Video Solution

30. The area of the region bounded by $x = \frac{1}{2}, x = 2, y = \ln x$ and $y = 2^x$ is

A. $\frac{4}{3}$ sq. units

B. $\frac{5}{3}$ sq. units

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

D. None of these

Answer: D

Watch Video Solution