



## MATHS

### BOOKS - OBJECTIVE RD SHARMA MATHS

### VOL I (HINGLISH)

### AREAS OF BOUNDED REGIONS

#### Section I Solved Mcqs

1. The area bounded by the curve

$$y = |x| - 1 \text{ and } y = -|x| + 1 \text{ is}$$

A. 1

B. 2

C.  $\sqrt{2}$

D. 4

**Answer: B**



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2. The area bounded by the curve

$$y = \left[ \frac{x^2}{64} + 2 \right], y = x - 1, y = x - 1 \text{ and } x = 0$$

above the x-axis will be-(Where  $[\ ]$  represents greatest integer function)

A. 2

B. 3

C. 4

D. none of these

**Answer: C**



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3. Find the area bounded by  $y = xe^{|x|}$  and lines  $|x| = 1, y = 0$ .

A. 4

B. 6

C. 1

D. 2

**Answer: D**



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4. The area bounded by the curves  $y=\ln x$ ,  $y=\ln|x|$ ,  $y=|\ln x|$  and  $y=|\ln|x||$  is

A. 5

B. 2

C. 4

D. none of these

**Answer: B**



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5. Let  $f(x)$  be a continuous function such that the area bounded by the curve  $y = f(x)$ , the  $x$ -axis, and the lines  $x = 0$  and  $x = a$  is  $1 + \frac{a^2}{2} \sin a$ . Then,

A.  $\left(\frac{\pi}{2}\right) = 1 + \frac{\pi^2}{8}$

B.  $f(a) = 1 + \frac{a^2}{2} \sin a$

C.  $f(a) = a \sin a + \frac{1}{2} \cos a$

D. none of these

**Answer: c**

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6. Area bounded by  $|x - 1| \leq 2$  and  $x^2 - y^2 = 1$ ,

is

A.  $6\sqrt{2} + \frac{1}{2} \ln|3 + 2\sqrt{2}|$

B.  $6\sqrt{2} + \frac{1}{2} \ln|3 - 2\sqrt{2}|$

C.  $6\sqrt{2} - \ln|3 + 2\sqrt{2}|$

D. none of these

**Answer: C**



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7. The area bounded by the curve  $f(x) = x + \sin x$  and its inverse function between the ordinates  $x = 0$  and  $x = 2\pi$  is

A.  $4\pi$

B.  $8\pi$

C. 4

D. 8

**Answer: D**



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8. Area bounded by  $f(x) = \frac{(x - 1)(x + 1)}{x - 2}$  x-axis  
and ordinates  $x = 0$  and  $x = \frac{3}{2}$  is

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

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

C. 1

D. none of these



**Answer: B**



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9. The area of the region

$$R = \{(x, y) : |x| \leq |y| \text{ and } x^2 + y^2 \leq 1\} \text{ is}$$

A.  $\frac{3\pi}{8}$

B.  $\frac{5\pi}{8}$

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

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

**Answer: C**

10. If  $f(x) = \max \left\{ \sin x, \cos x, \frac{1}{2} \right\}$ , then the area of the region bounded by the curves  $y = f(x)$ , x-axis, Y-axis and  $x = \frac{5\pi}{3}$  is

A.  $\sqrt{2} - \sqrt{3} + \frac{5\pi}{12}$

B.  $\sqrt{2} + \frac{\sqrt{3}}{2} + \frac{5\pi}{12}$

C.  $\sqrt{2} + \sqrt{3} + \frac{5\pi}{12}$

D. none of these

**Answer: b**

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

**Answer: d**



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12. If  $y = f(x)$  makes positive intercepts of 2 and 1 unit on x and coordinate axes and encloses an area of  $\frac{3}{4}$  square unit with the axes, then

$$\int_0^2 x f'(x) dx, \text{ is}$$

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

B. 1

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

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

**Answer: d**



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13. If a curve  $y = a\sqrt{x} + bx$  passes through the point (1,2) and the area bounded by the curve, line  $x=4$  and x-axis is 8 square units, then

A.  $a = 3, b = -1$

B.  $a = 3, b = 1$

C.  $a = -3, b = 1$

D.  $a = -3, b = -1$

**Answer: A**



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14. If the area enclosed between the curves  $y = ax^2$  and  $x = ay^2$  ( $a > 0$ ) is 1 square unit, then find the value of  $a$ .

A.  $\frac{1}{\sqrt{3}}$

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

C. 1

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

**Answer: A**



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15. The area of the region bounded by the curve

$y = |x - 2|$ ,  $x = 1$ ,  $x = 3$  and the x-axis is

A. 4

B. 2

C. 3

D. 1

**Answer: D**



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16. Sketch the region bounded by the curves

$y = \sqrt{5 - x^2}$  and  $y = |x - 1|$  and find its area.

A.  $\frac{5\pi}{4} - 2$

B.  $\frac{5\pi - 2}{4}$

C.  $\frac{5\pi - 2}{2}$

D.  $\frac{\pi}{2} - 5$

**Answer: B**



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17. The area enclosed between the curves  $y = x$  and  $y = 2x - x^2$  (in square units), is

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

B.  $\frac{1}{6}$

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

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

**Answer: B**



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

A. 4

B. 3

C. 2

D. 1

**Answer: D**



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19. 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  $S_1 : S_2 \equiv 1 : 1$  (b)  $S_2 : S_3 \equiv 1 : 2$   $S_1 : S_3 \equiv 1 : 1$  (d)  $S_1 : (S_1 + S_2) = 1 : 2$

A.  $1 : 1 : 1$

B.  $2 : 1 : 2$

C.  $1 : 2 : 3$

D.  $1 : 3 : 2$

**Answer: a**



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20. The area enclosed between the curves

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

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

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

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

D. 1

**Answer: A**



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21. 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. 3

B. 6

C. 9

D. 12

**Answer: c**



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22. The area bounded by the curves  $y = \cos x$  and  $y = \sin x$  between the ordinates  $x = 0$  and  $x = \frac{3\pi}{2}$  is

A.  $4\sqrt{2} - 1$

B.  $4\sqrt{2} + 1$

C.  $4\sqrt{2} - 2$

D.  $4\sqrt{2} + 2$

**Answer: C**



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**23.** Let  $f: [1, 2] \rightarrow [0, \infty)$  be a continuous function such that  $f(x) = f(1 - x)$  for all  $x \in [-1, 2]$ . Let  $R_1 = \int_{-1}^2 x f(x) dx$ , and  $R_2$  be the area of the region bounded by  $y = f(x)$ ,  $x = -1$ ,  $x = 2$  and the x-axis. Then,

A.  $2R_1 = R_2$

B.  $R_1 = 3R_2$

C.  $2R_1 = 3R_2$

D.  $3R_1 = R_2$

**Answer: A**



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24. If  $R_1 = \{(x, y) \mid y = 2x + 7, \text{ where } x \in R \text{ and } -5 \leq x \leq 5\}$  is a relation. Then find the domain and Range of  $R_1$ .

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

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

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

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

**Answer: b**



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25. The area (in square units) of the region enclosed by the curves  $y = x$ ,  $x = e$ ,  $y = \frac{1}{x}$  and the positive x-axis is

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

B. 1

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

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

**Answer: C**



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26. The area of the region bounded by the curve  $y = x^3$ , and the lines  $y=8$  and  $x=0$ , is

A. 16

B. 8

C. 10

D. 12

**Answer: D**



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27. Let  $S$  be the area of the region enclosed by

$y = e^{-x} - 2$ ,  $y = 0$ ,  $x = 0$ , and  $x = 1$ . Then

$$S \geq \frac{1}{e} \quad \text{(b)} \quad S \geq 1 = \frac{1}{e} \quad S \leq \frac{1}{4} \left( 1 + \frac{1}{\sqrt{e}} \right) \quad \text{(d)}$$

$$S \leq \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{e}} \left( 1 - \frac{1}{\sqrt{2}} \right)$$

A.  $S \geq \frac{1}{e}$

B.  $S \geq -\frac{1}{e}$

C.  $S \leq \frac{1}{4} \left( 1 + \frac{1}{\sqrt{e}} \right)$

D.  $S \leq \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{e}} \left( 1 - \frac{1}{\sqrt{2}} \right)$

**Answer: c**



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28. The area bounded by the curves  $y = \sqrt{x}$ ,  $2y - x + 3 = 0$ , X-axis and lying in the first quadrant is

A. 9

B. 36

C. 18

D.  $27/4$

**Answer: A**



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29. The area enclosed by the curves  $y = \sin x + \cos x$  and  $y = |\cos x - \sin x|$  over the interval  $\left[0, \frac{\pi}{2}\right]$

A.  $4(\sqrt{2} - 1)$

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

C.  $2(\sqrt{2} + 1)$

D.  $2\sqrt{2}(\sqrt{2} + 1)$

**Answer: B**



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**30.** Find the ratio in which the area bounded by the curves  $y^2 = 12x$  and  $x^2 = 12y$  is divided by the line  $x = 3$ .

A.  $\frac{245}{4}$

B.  $\frac{147}{4}$

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

D.  $\frac{137}{4}$

**Answer: B**



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31. 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**



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32. The area (in square units) of the region bounded by  $y^2 = 2x$  and  $y = 4x - 1$ , is

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

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

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

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

**Answer: B**



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33. Suppose that  $F(\alpha)$  denotes the area of the region bounded by  $x = 0$ ,  $x = 2$ ,  $y^2 = 4x$  and  $y = |\alpha x - 1| + |\alpha x - 2| + \alpha x$ , where  $\alpha \in \{0, 1\}$ .

Then the value of  $F(\alpha) + \frac{8\sqrt{2}}{3}$  when  $\alpha = 0$  is (A) 4

(B) 5 (C) 6 (D) 9

A. 4

B. 5

C. 6

D. 9

**Answer: c**



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34. Suppose that  $F(\alpha)$  denotes the area of the region bounded by  $x = 0$ ,  $x = 2$ ,  $y^2 = 4x$  and  $y = |\alpha x - 1| + |\alpha x - 2| + \alpha x$ , where  $\alpha \in \{0, 1\}$ .

Then the value of  $F(\alpha) + \frac{8\sqrt{2}}{3}$  when  $\alpha = 0$  is (A) 4

(B) 5 (C) 6 (D) 9

A. 5

B. 6

C. 7

D. 9

**Answer: a**



35. Let  $F(x) = \int_x^{x^2 + \pi/6} 2 \cos^2 t \, dt$  for all  $x \in \mathbb{R}$  and

$F: [0, 1/2] \rightarrow [0, \infty]$  be continuous function . For

$a \in [0, 1/2]$ , if  $F'(a)+2$  is the area of the region

bounded by  $x=0, y=0, y=f(x)$  and  $x=a$  , then  $f(0)$ , is

A. 1

B. 2

C. 3

D. 6

**Answer: c**



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36. The area of the region bounded by the curve C

:  $y = \frac{x + 1}{x^2 + 1}$  and the line  $y=1$ , is

A.  $\ln 2 - \frac{1}{2} \ln 2 + \frac{\pi}{4}$

B.  $\ln 2 - \frac{\pi}{4} + 1$

C.  $\frac{1}{2} \ln 2 + \frac{\pi}{4} - 1$

D.  $\ln 2 - \frac{\pi}{2} + 1$

Answer: c



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37. The graph of  $f(x) = x^2$  and  $g(x) = cx^3$  intersect at two points, If the area of the region over the interval  $\left[0, \frac{1}{c}\right]$  is equal to  $\frac{2}{3}$ , then the value of  $\left(\frac{1}{c} + \frac{1}{c^2}\right)$  is

A. 20

B. 2

C. 6

D. 12

**Answer: c**



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**38.** The area of the region bounded by the curves  $y = x^2$ ,  $y = |2 - x^2|$  and  $y=2$  which lies to the right of the line  $x=1$ , is

A.  $\left( \frac{12 - 20\sqrt{3}}{2} \right)$  sq. units

B.  $\left( \frac{20 - \sqrt{2}}{3} \right)$  sq. units

C.  $\left( \frac{20 - 12\sqrt{2}}{3} \right)$  sq. units

D.  $\left( \frac{12 - 20\sqrt{2}}{3} \right)$  sq. units

**Answer: c**



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

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

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

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

**Answer: B**



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40. If the line  $x = a$  bisects the area under the curve  $y = \frac{1}{x^2}$ ,  $1 \leq x \leq 9$ , then  $a$  is equal to

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

B.  $\frac{9}{5}$

C.  $\frac{5}{9}$

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

**Answer: B**



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

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

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

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

**Answer: d**



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42. Area of region

$$\left\{ (x, y) \in \mathbb{R}^2 : y \geq \sqrt{|x + 3|}, 5y \leq x + 9 \leq 15 \right\}$$

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

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

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

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

**Answer: c**



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43. The area (in square units) of the region

$$\{(x, y) : x \geq 0, x + y \leq 3, x^2 \leq 4y \text{ and } y \leq 1 + \sqrt{x}\}$$

is

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

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

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

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

**Answer: d**



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44. If the line  $x = \alpha$  divides the area of region  $R = \{(x, y) \in \mathbb{R}^2 : x^3 \leq y \leq x, 0 \leq x \leq 1\}$  into two equal parts, then

A.  $0 < \alpha < \frac{1}{2}$

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

C.  $2\alpha^4 - 4\alpha^2 + 1 = 0$

D.  $\alpha^2 + 4\alpha^2 - 1 = 0$

**Answer: b,c**



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## Exercise

1. Using integration, find the area bounded by the curves  $y = |x - 1|$  and  $y = 3 - |x|$ .

A. 2

B. 3

C. 4

D. 1

**Answer: C**



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2. The area of the figure bounded by the curves

$$y^2 = 2x + 1 \text{ and } x - y - 1 = 0, \text{ is}$$

A.  $2/3$

B.  $4/3$

C.  $8/3$

D.  $16/3$

**Answer: D**



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

A.  $9/2$

B.  $43/6$

C.  $34/6$

D.  $\frac{11}{2}$

**Answer: A**



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4. The area of the region bounded by  $y = |x - 1|$  and  $y = 1$  is

A. 1

B. 2

C.  $1/2$

D.  $3/2$

**Answer: A**



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

A. 0

B.  $1/3$

C.  $2/3$

D. 1

**Answer: C**



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6. Area of the region bounded by the curves  $y = 2^x$ ,  $y = 2x - x^2$ ,  $x = 0$  and  $x = 2$  is given by:

A.  $\frac{3}{\log 2} - \frac{4}{3}$

B.  $\frac{3}{\log 2} + \frac{4}{3}$

C.  $2\log 2 - \frac{4}{3}$

D.  $2\log^2 - \frac{4}{3}$

**Answer: D**



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7. Area lying in the first quadrant and bounded by the circle  $x^2 + y^2 = 4$  the line  $x = \sqrt{3}y$  and x-axis , is

A.  $\pi$

B.  $\pi / 2$

C.  $\pi / 3$

D.  $\pi / 4$

**Answer: C**



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8.  $AOB$  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.  $\frac{1}{2}ab(\pi + 2)$

B.  $\frac{1}{4}ab(\pi - 4)$

C.  $\frac{1}{4}ab(\pi - 2)$

D. none of these

**Answer: C**



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9. The area of the region lying between the line  $x - y + 2 = 0$  and the curve  $x = \sqrt{y}$  and  $y = 4$ , is

A. 9

B.  $9/2$

C.  $10/3$

D.  $5/2$

**Answer: C**



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10. The area cut off from a parabola by any double ordinate is  $k$  time the corresponding rectangle contained by the double ordinate and its distance from the vertex. Find the value of  $k$  ?

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

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

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

D. 1

**Answer: C**



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11. Area between the curve  $y = 4 + 3x - x^2$  and x-axis in square units , is

A.  $125/3$

B.  $125/4$

C.  $125/6$

D. 25

**Answer: C**



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12. If  $A$  is the area between the curve  $y = \sin x$  and  $x$ -axis in the interval  $[0, \pi/4]$ , then in the same interval, area between the curve  $y = \cos x$  and  $x$ -axis, is

A.  $A$

B.  $\pi/2 - A$

C.  $1 - A$

D.  $A - 1$

**Answer: C**



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13. If  $A$  is the area lying between the curve  $y = \sin x$  and  $x$ -axis between  $x=0$  and  $x = \pi/2$ . Area of the region between the curve  $y = \sin 2x$  and  $x$ -axis in the same interval is given by

A.  $A/2$

B.  $A$

C.  $2A$

D.  $3/2A$

**Answer: B**



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14. The area of the loop between the curve  $y = a \sin x$  and x-axis is (A)  $a$  (B)  $2a$  (C)  $3a$  (D) none of these

A.  $a$

B.  $2a$

C.  $3a$

D.  $4a$

**Answer: B**



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15. Area (in square units) of the region bounded by the curve  $y^2 = 4x$ , y-axis and the line  $y = 3$ , is

A. 2

B.  $9/4$

C.  $6\sqrt{3}$

D. none of these

**Answer: B**



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16. If  $A_1$  is the area of the parabola  $y^2 = 4ax$  lying between vertex and the latusrectum and  $A_2$  is the area between the latusrectum and the double ordinate  $x = 2a$ , then  $\frac{A_1}{A_2}$  is equal to

A.  $2\sqrt{2} - 1$

B.  $(2\sqrt{2} + 1) / 7$

C.  $(2\sqrt{2} - 1) / 7$

D. none of these

**Answer: B**



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17. The area of the region bounded by  $y = \sin x$ ,  $y = \cos x$  and x-axis in the first quadrant is

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

B.  $\sqrt{3} + 1$

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

D. none of these

**Answer: A**



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18. The area bounded by the curves

$y = xe^x$ ,  $y = xe^{-x}$  and the line  $x = 1$  is  $\frac{2}{e}$  squnits

(b)  $1 - \frac{2}{e}$  squnits  $\frac{1}{e}$  squnits (d)  $1 - \frac{1}{e}$  squnits

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

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

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

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

**Answer: A**



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19. 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. 2

B.  $3\sqrt{8 - \sqrt{17}}$

C. 3

D.  $-1$

**Answer: B**



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20. The figure into which the curve  $y^2 = 6x$  divides the circle  $x^2 + y^2 = 16$  are in the ratio

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

B.  $\frac{4\pi - \sqrt{3}}{8\pi + \sqrt{3}}$

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

D. none of these

**Answer: C**



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21. What is the area bounded by the curves

$y = e^x$ ,  $y = e^{-x}$  and the straight line  $x = 1$ ?

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

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

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

D. none of these

**Answer: C**



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22. The area bounded by the y-axis,  $y = \cos x$  and  $y = \sin x$ ,  $0 \leq x \leq \pi/4$ , is

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

B.  $\sqrt{2} - 1$

C.  $\sqrt{2} + 1$

D.  $\sqrt{2}$

**Answer: B**



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23. The positive value of the parameter 'a' for which the area of the figure bounded by  $y = \sin ax$ ,  $y = 0$ ,  $x = \pi/a$  and  $x = \pi/3a$  is 3, is equal to

A. 2

B.  $1/2$

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

D.  $3/2$

**Answer: B**



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24. If area bounded by the curve  $y^2 = 4ax$  and  $y = mx$  is  $a^2/3$ , then the value of  $m$ , is



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25. The area (in square units) bounded by the curve  $y = x^3$ , the x-axis and the ordinates at  $x = -2$  and  $x = 1$  is

A.  $17/2$

B.  $15/2$

C.  $15/4$

D.  $17/4$

**Answer: D**



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**26.** The area bounded by

$y = x^2$ ,  $y = [x + 1]$ ,  $x \leq 1$  and the y axis is

A.  $1/3$

B.  $2/3$

C. 1

D.  $7/3$

**Answer: B**

27. Find the area bounded by the x-axis, part of the curve  $y = \left(1 - \frac{8}{x^2}\right)$ , and the ordinates at  $x = 2$  and  $x = 4$ . If the ordinate at  $x = a$  divides the area into two equal parts, then find  $a$ .

A.  $2\sqrt{2}$

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

C.  $\pm \sqrt{2}$

D.  $\pm 2$

**Answer: B**

28. The area bounded by the curve  $y = f(x)$  (where  $f(x) \geq 0$ ), the co-ordinate axes & the line  $x = x_1$  is given by  $x_1 \cdot e^{x_1}$ . Therefore  $f(x)$  equals

A.  $e^x$

B.  $xe^x$

C.  $xe^x - e^x$

D.  $xe^x + e^x$

**Answer: C**

29. The area enclosed within the curve  $|x| + |y| = 1$ ,  
is

A. 1

B. 1.5

C. 2

D. 3

**Answer: C**



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30. The area of the triangle formed by the positive  $x$ -axis and the normal and tangent to the circle  $x^2 + y^2 = 4$  at  $(1, \sqrt{3})$  is  $2\sqrt{3}$  sq units (b)  $3\sqrt{2}$  sq units  $\sqrt{6}$  sq units (d) none of these

A.  $\sqrt{3}$

B.  $1 / \sqrt{3}$

C.  $2\sqrt{3}$

D.  $3\sqrt{3}$

**Answer: C**



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31. The area of the region for which

$$0 < y < 3 - 2x - x^2 \text{ and } x > 0, \text{ is}$$

A.  $\int_1^3 (3 - 2x - x^2) dx$

B.  $\int_0^3 (3 - 2x - x^2) dx$

C.  $\int_0^1 (3 - 2x - x^2) dx$

D.  $\int_{-1}^3 (3 - 2x - x^2) dx$

**Answer: C**



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32. The area between the curve  $y = 2x^4 - x^2$ , the axis, and the ordinates of the two minima of the curve is 11/60 sq. units (b) 7/120 sq. units 1/30 sq. units (d) 7/90 sq. units

A. 7 / 120

B. 9 / 120

C. 11 / 120

D. 13 / 120

**Answer: A**



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

A.  $3/8$

B.  $5/8$

C.  $7/8$

D.  $9/8$

**Answer: D**



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**34.** The area of the region bounded by the curve  $(a^4)(y^2) = (2a - x)(x^5)$  is to that of the circle whose radius is  $a$ , is given by the ratio (a) 4:5 (b) 5 8 (c) 2 3 (d) 3:2.

A. 4 : 5

B. 5 : 8

C. 2 : 3

D. 3 : 2

**Answer: B**



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35. The area between  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  and the straight line  $\frac{x}{a} + \frac{y}{b} = 1$  is (A)  $\frac{1}{2}\pi ab$  (B)  $\frac{1}{2}ab$  (C)  $\frac{\pi ab}{4} - \frac{ab}{2}$  (D)  $\frac{1}{4}ab$

A.  $\frac{1}{2}ab$

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

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

D.  $\frac{1}{4}\pi ab - \frac{1}{2}ab$

**Answer: D**



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36. The area induced between the curves  $y = \frac{x^2}{4a}$

and  $y = \frac{8a^3}{x^2 + 4a^2}$  is given by

A.  $a^2 \left( 2\pi - \frac{4}{3} \right)$

B.  $a^2 \left( \pi - \frac{4}{3} \right)$

C.  $a^2 \left( 2\pi + \frac{1}{3} \right)$

D.  $a^2 \left( \pi + \frac{4}{3} \right)$

**Answer: A**



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37. The area cut off from a parabola by any double ordinate is  $k$  times the corresponding rectangle contained by the double ordinate and its distance from the vertex. Find the value of  $k$  ?

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

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

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

D. 3

**Answer: A**



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**38.** Area bounded by the curve  $y = \sin x$  between .

$x = 0$  and  $x = 2\pi$  is

A.  $2\pi$

B.  $2\pi$

C.  $4\pi$

D.  $\pi$

**Answer: C**



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

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

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

D. 6

**Answer: A**



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40. The area of the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  is

A.  $\pi ab$

B.  $\frac{\pi}{4}(a^2 + b^2)$

C.  $\pi(a + b)$

D.  $\pi a^2 b^2$

**Answer: A**



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

A.  $2(\pi - 2)$

B.  $\pi - 2$

C.  $2\pi - 1$

D.  $\pi - 1$

**Answer: B**



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42. The area cut off a parabola  $4y = 3x^2$  by the straight line  $2y = 3x + 12$  in square units, is

A. 16

B. 41

C. 27

D. 36

**Answer: B**



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

A.  $9/8$

B.  $9/4$

C.  $9/2$

D.  $9/7$

**Answer: A**



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44. 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. 5

**Answer: C**



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45. The area in square units of the region bounded by the curve  $x^2 = 4y$ , the line  $x=2$  and the x-axis, is

A. 1

B.  $2/3$

C.  $4/3$

D.  $8/3$

**Answer: B**



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**46.** The area bounded by the x-axis and the curve

$$y = 4x - x^2 - 3 \text{ is}$$

A.  $4/3$

B.  $3/4$

C. 7

D.  $3/2$

**Answer: A**



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47. Find the area enclosed between the parabola

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

A.  $\frac{5a^2}{3}$

B.  $\frac{8a^2}{3m^3}$

C.  $\frac{7a^2}{4m^2}$

D.  $\frac{3a^2}{5m}$

**Answer: B**



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48. The area bounded by  $y = \tan x$ ,  $y = \cot x$ , X-axis in  $0 \leq x \leq \frac{\pi}{2}$  is

A.  $\log 2$

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

C.  $2 \log \left( \frac{1}{\sqrt{2}} \right)$

D.  $\frac{3}{2} \log 2$

**Answer: A**



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49. 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)  $\frac{3}{4}$

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

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

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

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

**Answer: B**



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50. Area common to the circle  $x^2 + y^2 = 64$  and the parabola  $y^2 = 4x$  is

A.  $\frac{16}{3} (4\pi + \sqrt{3})$

B.  $\frac{16}{3} (8\pi - \sqrt{3})$

C.  $\frac{16}{3} (4\pi - \sqrt{3})$

D. none of these

**Answer: B**



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51. The area of the figure bounded by the curve

$$|y| = 1 - x^2, \text{ is}$$

A.  $2/3$

B.  $4/3$

C.  $8/3$

D.  $-5/3$

**Answer: C**



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52. Find the area of the figure bounded by the parabolas  $x = -2y^2$ ,  $x = 1 - 3y^2$ .

A.  $8/3$

B.  $6/3$

C.  $4/3$

D.  $2/3$

**Answer: C**



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53. The area bounded by  $y = x|\sin x|$  and x - axis between  $x = 0, x = 2\pi$  is

A.  $2\pi$

B.  $3\pi$

C.  $4\pi$

D.  $5\pi$

**Answer: C**



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54. The area of the region bounded by the curve

$y = 2x - x^2$  and the line  $y = x$  is

A.  $1/2$

B.  $1/3$

C.  $1/4$

D.  $1/6$

**Answer: D**



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55. Find the area bounded by the curve  $y = (x - 1)(x - 2)(x - 3)$  lying between the ordinates  $x = 0$  and  $x = 3$ .

A.  $9/4$

B.  $\frac{11}{4}$

C.  $11/2$

D.  $7/4$

**Answer: B**



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56. Area common to the curves  $y = \sqrt{x}$  and  $x = \sqrt{y}$  is (A) 1 (B)  $\frac{2}{3}$  (C)  $\frac{1}{3}$  (D) none of these

A. 1

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

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

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

**Answer: C**



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57. The equation of the common tangent to the parabolas  $y^2 = 4ax$  and  $x^2 = 4by$  is given by

- A.  $(8/3) ab$
- B.  $(16/3) ab$
- C.  $(4/3) ab$
- D.  $(5/3) ab$

**Answer: B**



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58. Area (in square units) of the region bounded by  $[x]^2 = [y]^2$  for  $x \in [1, 5]$  ,(where  $[\cdot]$  denotes the greatest integer function) is

A. 4

B. 8

C. 5

D. 10

**Answer: B**



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59. If  $A$  denotes the area bounded by

$$f(x) = \left| \frac{\sin x + \cos x}{x} \right| \text{ x-axis, } x = \pi \text{ and } x = 3\pi,$$

then

A.  $1 < A < 2$

B.  $0 < A < 2$

C.  $2 < A < 3$

D. none of these

**Answer: D**



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**60.** Find the area of the region bounded by the curves  $y = x^2$  and  $y = \sec^{-1}[-\sin^2 x]$ , where  $[\cdot]$  denotes G.I.F.

A.  $\frac{1}{3}(4 - \pi)^{3/2}$

B.  $(8(4 - \pi)^{3/2})$

C.  $\frac{8}{3}(4 - \pi)^{3/2}$

D.  $\frac{8}{3}(4 - \pi)^{1/2}$

**Answer: C**



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61. The area of the region included between the regions satisfying  $\min(|x|, |y|) \geq 1$  and  $x^2 + y^2 \leq 5$  is

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

B.  $10 \left( \frac{\sin^{-1}(2)}{\sqrt{5}} - \frac{\sin^{-1}(1)}{\sqrt{5}} \right) - 4$

C.  $\frac{2}{5} \left( \frac{\sin^{-1}(2)}{\sqrt{5}} - \frac{\sin^{-1}(1)}{\sqrt{5}} \right) - 4$

D.  $15 \left( \frac{\sin^{-1}(2)}{\sqrt{5}} - \frac{\sin^{-1}(1)}{\sqrt{5}} \right) - 4$

**Answer: B**



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62. If  $f(x) \geq 0$  all  $x \in (0, 2)$  and  $y=f(x)$  makes positive intercepts of 2 and 1 unit on x and y axes respectively and enclose an area of  $\frac{3}{4}$  sq. units with axes, then  $\int_0^2 x f'(x) dx$  is

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

B. 1

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

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

**Answer: D**



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## Chapter Test

1. Area bounded by the curves  $y = |x - 1|$ ,  $y = 0$

and  $|x| = 2$  is (A) 4 (B) 8 (C) 5 (D) 9

A. 4

B. 5

C. 3

D. 6

**Answer: B**



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2. The area inside the parabola  $5x^2 - y = 0$  but outside the parabola  $2x^2 - y + 9 = 0$  is  $12\sqrt{3}$  sq units  $6\sqrt{3}$  sq units  $8\sqrt{3}$  sq units (d)  $4\sqrt{3}$  sq units

A.  $12\sqrt{3}$

B.  $6\sqrt{3}$

C.  $8\sqrt{3}$

D.  $4\sqrt{3}$

**Answer: A**



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

A.  $3\pi a^2$

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

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

D.  $\frac{\pi a^2}{4}$

**Answer: A**



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4. Area bounded by the curve  $xy^2 = a^2(a - x)$  and the y-axis is

A.  $\pi a^2 / 2$

B.  $\pi a^2$

C.  $3\pi a^2$

D.  $2\pi a^2$

**Answer: B**



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5. The area of the loop of the curve

$ay^2 = x^2(a - x)$  is  $4a^2$  squnits (b)  $\frac{8a^2}{15}$  squnits

$\frac{16a^2}{9}$  squnits (d) None of these

A.  $\frac{4a^2}{15}$

B.  $\frac{8}{15}a^2$

C.  $\frac{16}{15}a^2$

D.  $\frac{32}{5}a^2$

**Answer: B**



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6. Find the area common to the circle

$$x^2 + y^2 = 16a^2 \quad \text{and} \quad \text{the parabola}$$

$$y^2 = 6ax, \quad a > 0.$$

A.  $\frac{4a^2}{3} (4\pi - \sqrt{3})$

B.  $\frac{4a^2}{3} (8\pi - 3)$

C.  $\frac{2a^2}{3} (4\pi + \sqrt{3})$

D. none of these

**Answer: C**



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7. The line  $y = mx$  bisects the area enclosed by the curve  $y = 1 + 4x - x^2$  and the lines  $x = 0$ ,  $x = \frac{3}{2}$  and  $y = 0$ . Then the value of  $m$  is

A.  $13/8$

B.  $13/32$

C.  $13/6$

D.  $13/14$

**Answer: C**



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8. The area between the curve  $y = x \sin x$  and x-axis where  $0 \leq x \leq 2\pi$ , is

A.  $2\pi$

B.  $3\pi$

C.  $4\pi$

D.  $\pi$

**Answer: C**



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9. The area bounded by the curves  $y = e^x$ ,  $y = e^{-x}$  and  $y = 2$ , is

A.  $\log\left(\frac{16}{e}\right)$

B.  $\log(4/e)$

C.  $2\log(4/e)$

D.  $\log(8/e)$

**Answer: C**



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10. The area bounded by the curve

$x = a \cos^3 t$ ,  $y = a \sin^3 t$ , is :

A.  $\frac{3\pi a^2}{8}$

B.  $\frac{3\pi a^2}{16}$

C.  $\frac{3\pi a^2}{32}$

D.  $3\pi a^2$

**Answer: A**



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11. If  $A_1$  is the area enclosed by the curve  $xy = 1$ , x-axis and the ordinates  $x = 1, x = 2$ , and  $A_2$  is the area enclosed by the curve  $xy = 1$ , x-axis and the ordinates  $x = 2, x = 4$ , then

A.  $A_1 = 2A_2$

B.  $A_2 = 2A_1$

C.  $A_2 = 3A_1$

D.  $A_1 = A_2$

**Answer: D**



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12. If area bounded by the curve  $y^2 = 4ax$  and  $y = mx$  is  $a^2/3$ , then the value of  $m$ , is

A. 1

B. 2

C. 3

D.  $\sqrt{3}$

**Answer: B**



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13. The value of  $a$  for which the area between the curves  $y^2 = 4ax$  and  $x^2 = 4ay$  is 1 unit is

A.  $\sqrt{3}$

B. 4

C.  $4\sqrt{3}$

D.  $\sqrt{3}/4$

**Answer: D**



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15. The area bounded by the curve  $y = \sin 2x$ , axis and  $y = 1$ , is

A. 1

B.  $1/4$

C.  $\pi/4$

D.  $\pi/4 - 1/2$

**Answer: D**



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16. The area between the curve  $x = -2y^2$  and  $x = 1 - 3y^2$ , is

A.  $4/3$

B.  $3/4$

C.  $3/2$

D.  $2/3$

**Answer: A**



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17. The area between the curves  $y = \cos x$ , x-axis and the line  $y = x + 1$ , is

A.  $1/2$

B. 1

C. 3

D. 2

**Answer: A**



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18. The area bounded by  $y = x^2 + 1$  and the tangents to it drawn from the origin, is

A.  $8/2$  sq. units

B.  $1/3$  sq. units

C.  $2/3$  sq. units

D. none of these

**Answer: C**



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19. The positive value of the parameter 'a' for which the area of the figure bounded by  $y = \sin ax$ ,  $y = 0$ ,  $x = \pi/a$  and  $x = \pi/3a$  is 3, is equal to

A. 2

B.  $1/2$

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

D.  $\sqrt{3}$

**Answer: B**



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20. The area in square units bounded by the curves

$y = x^3$ ,  $y = x^2$  and the ordinates  $x = 1$ ,  $x = 2$  is

A.  $17/12$

B.  $12/13$

C.  $2/7$

D.  $7/2$

**Answer: A**



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21. The area bounded by the curve  $y^2 = x$  and the ordinate  $x = 36$  is divided in the ratio 1:7 by the ordinate  $x=a$ . Then  $a=$

A. 8

B. 9

C. 7

D. 0

**Answer: B**



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22. The area contained between the x-axis and one area of the curve  $y = \cos 3x$ , is

A.  $1/3$

B.  $2/3$

C.  $2/7$

D.  $2/5$

**Answer: B**



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23. The area of the figure bounded by  $|y| = 1 - x^2$  is in square units,

A.  $4/3$

B.  $8/3$

C.  $16/3$

D.  $5/3$

**Answer: B**



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24. The area of the figure bounded by

$y = e^{x-1}$ ,  $y = 0$ ,  $x = 0$  and  $x = 2$  is

A.  $< 2$

B.  $> 2$

C.  $= 2$

D. none of these

**Answer: B**



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25. The area of the region on plane bounded by  $\max$

$$(|x|, |y|) \leq \frac{1}{2} \text{ is}$$

A.  $\frac{1}{2} + \ln 2$

B.  $3 + \ln 2$

C.  $\frac{31}{4}$

D.  $1 + 2 \ln 2$

**Answer: B**



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26. The area of the closed figure bounded by

$y = \frac{x^2}{2} - 2x + 2$  and the tangents to it at

$\left(1, \frac{1}{2}\right)$  and  $(4, 2)$  is  $\frac{9}{8}$  squnits (b)  $\frac{3}{8}$  squnits

$\frac{3}{2}$  squnits (d)  $\frac{9}{4}$  squnits

A.  $9/8$

B.  $3/8$

C.  $3/2$

D.  $9/4$

**Answer: A**



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27. The area of the closed figure bounded by  $y = 1/\cos^2 x$ ,  $x = 0$ ,  $y = 0$  and  $x = \pi/4$ , is

A.  $\pi/4$

B.  $1 + \pi/4$

C. 1

D. 2

**Answer: C**



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28. The area (in square units) of the closed figure bounded by

$$x = -1, x = 2 \text{ and } y = \begin{cases} -x^2 + 2, & x \leq 1 \\ 2x - 1, & x > 1 \end{cases} \text{ and}$$

the abscissa axis, is

A.  $16/3$

B.  $13/3$

C.  $13/3$

D.  $7/3$

**Answer: A**



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29. The area boundd by

$$y = 2 - |2 - x| \text{ and } y = \frac{3}{|x|}, \text{ is}$$

A.  $\frac{4 + 3 \ln 3}{2}$

B.  $2 + 3 \ln(3\sqrt{3})/4$

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

D.  $\frac{1}{2} + \ln 3$

**Answer: B**



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30. The area of the region bounded by

$$x^2 + y^2 - 2y - 3 = 0 \text{ and } y = |x| + 1, \text{ is}$$

A.  $\pi$

B.  $2\pi$

C.  $4\pi$

D.  $\pi/2$

**Answer: A**



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31. The area of the region bounded by

$$y = |x - 1| \text{ and } y = 3 - |x|, \text{ is}$$

A. 2

B. 3

C. 4

D. 1

**Answer: C**



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32. Find the area of the closed figure bounded by the curves  $y = \sqrt{x}$ ,  $y = \sqrt{4 - 3x}$  and  $y = 0$

A.  $4/9$

B.  $8/9$

C.  $19/9$

D.  $5/9$

**Answer: B**



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**33.** The area of the closed figure bounded by the curves

$$y = \cos x, y = 1 + \frac{2}{\pi}x \text{ and } x = \pi/2, \text{ is}$$

A.  $\frac{\pi + 4}{4}$

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

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

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

**Answer: B**



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34. For which of the following values of  $m$  is the area of the regions bounded by the curve  $y = x - x^2$  and the line  $y = mx$  equal  $\frac{9}{2}$ ? (b)  $-2$  (c)  $2$  (d)  $4$

A.  $-4, 4$

B.  $-2, 2$

C.  $2, 4$

D.  $-2, 3$

**Answer: B**



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35. The area bound by the curve  $y = \sec x$ , then x-axis and the lines  $x = 0$  and  $x = \pi/4$ , is

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

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

C.  $\frac{1}{2}\log 2$

D.  $\sqrt{2}$

**Answer: A**



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36. The area bounded by the parabola  $y^2 = 8x$ , the x-axis and the latusrectum, is

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

B.  $\frac{23}{3}$

C.  $\frac{32}{3}$

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

**Answer: C**



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37. The area (in square units) bounded by the curve

$$y^2 = 8x \text{ and } x^2 = 8y, \text{ is}$$

A.  $64(3\sqrt{2}-1/3)$

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

C.  $\frac{14}{3}$

D.  $\frac{3}{14}$

**Answer: A**



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**38.** If the area bounded by the curve  $y=f(x)$ , x-axis and the ordinates  $x=1$  and  $x=b$  is  $(b-1) \sin(3b+4)$ , then-

A.  $(x - 1)\cos(3x + 4)$

B.  $\sin(3x + 4)$

C.  $\sin(3x + 4) + 3(x - 1)\cos(3x + 4)$

D. none of these

**Answer: C**



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**39.** The area in square units of the region bounded by the curve  $x^2 = 4y$ , the line  $x=2$  and the x-axis, is

A. 1

B.  $2/3$

C.  $4/3$

D.  $8/3$

**Answer: B**



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40. The area enclosed between the curve  $y^2(2a - x) = x^3$  and the line  $x = 2$  above the  $x$ -axis is  $\pi a^2$  sq units (b)  $\frac{3\pi a^2}{2}$  sq units  $2\pi a^2$  sq units (d)  $3\pi a^2$  sq units

A.  $\pi a^2$

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

C.  $2\pi a^2$

D.  $3\pi a^2$

**Answer: B**



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41. The area bounded by the curve  $y = 4x - x^2$  and x-axis is (A)  $\frac{30}{7}$  sq. units (B)  $\frac{31}{7}$  sq. units (C)  $\frac{32}{3}$  sq. units (D)  $\frac{34}{3}$  sq. units

A.  $\frac{30}{7}$

B.  $\frac{31}{7}$

C.  $\frac{32}{3}$

D.  $\frac{34}{3}$

**Answer: C**



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42. Area bounded by the parabola  $y^2 = x$  and the line  $2y = x$  is (A)  $\frac{4}{3}$  (B) 1 (C)  $\frac{2}{3}$  (D)  $\frac{1}{3}$

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

B. 1

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

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

**Answer: A**



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**43.** Area between the x-axis and the curve  $y = \cos x$ ,  
when  $0 \leq x \leq 2\pi$  is

A. 0

B. 2

C. 3

D. 4

**Answer: D**



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44. The ratio of the areas between the curves  $y = \cos x$  and  $y = \cos 2x$  and x-axis from  $x = 0$  to  $x = \frac{\pi}{3}$  is (A) 1:3 (B) 2:1 (C)  $\sqrt{3}:1$  (D) none of these

A. 1:2

B. 2:1

C.  $\sqrt{3}:1$

D. none of these

**Answer: B**



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45. Find the area bounded by the parabola

$y = x^2 + 1$  and the straight line  $x + y = 3$ .

A.  $\frac{45}{7}$

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

C.  $\frac{32}{3}$

D.  $\frac{3}{32}$

**Answer: D**



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46. The area common to the parabolas  $y = 2x^2$  and

$y = x^2 + 4$  (in square units) is (A)  $\frac{2}{3}$  (B)  $\frac{3}{2}$  (C)  $\frac{32}{3}$

(D)  $\frac{3}{32}$

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

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

C.  $\frac{32}{3}$

D.  $\frac{3}{32}$

**Answer: C**



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47. The area of the region

$$\{(x, y) : x^2 + y^2 \leq 1 \leq x + y\}, \text{ is}$$

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

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

C.  $\frac{\pi^2}{4}$

D.  $\frac{\pi}{4} - \frac{1}{2}$

**Answer: D**



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**48.** Examples: Find the area bounded by the parabola  $y^2 = 4ax$  and its latus rectum.

A. 0

B.  $\frac{4}{3}a^2$

C.  $\frac{8}{3}a^2$

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

**Answer: C**



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49. The area bounded by the curve  $y = x^4 - 2x^3 + x^2 + 3$  with x-axis and ordinates corresponding to the minima of y, is

A. 1

B.  $\frac{91}{30}$

C.  $\frac{30}{9}$

D. 4

**Answer: B**



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50. Find the area common to two parabolas

$x^2 = 4ay$  and  $y^2 = 4ax$ , using integration.

A.  $\frac{8a^3}{3}$

B.  $\frac{16a^2}{3}$

C.  $\frac{32a^2}{3}$

D.  $\frac{64a^2}{3}$

**Answer: B**



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51. The area (in square units) bounded by curves  $y = \sin x$  between the ordinates  $x = 0$ ,  $x = \pi$  and the x-axis, is

A. 2

B. 4

C. 3

D. 1

**Answer: A**



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52. 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. 3

B. 6

C. 7

D. none of these

**Answer: C**



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53. Find the area enclosed between the curves:

$$y = \log_e(x + e), x = \log_e\left(\frac{1}{y}\right) \text{ \& the x-axis.}$$

A. 2

B. 1

C. 4

D. none of these

**Answer: A**



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54. Find the area of the region formed by

$$x^2 + y^2 - 6x - 4y + 12 \leq 0, y \leq x \text{ and } x \leq \frac{5}{2}.$$

A.  $\frac{\pi}{6} - \frac{\sqrt{3} + 1}{8}$

B.  $\frac{\pi}{6} + \frac{\sqrt{3} + 1}{8}$

C.  $\frac{\pi}{6} - \frac{\sqrt{3} - 1}{8}$

D. none of these

**Answer: C**



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55. Let  $A_n$  be the area bounded by the curve

$y = (\tan x)^n$  and the lines  $x = 0, y = 0,$  and

$x = \frac{\pi}{4}$ . Prove that for

$n > 2, A_n + A_{n-2} = \frac{1}{n-1}$  and deduce  $\frac{1}{(2n+2)}$

A.  $A_n + A_{n-2} = \frac{1}{n-1}$

B.  $A_n + A_{n-2} < \frac{1}{n-1}$

C.  $A_n - A_{n-2} = \frac{1}{n-1}$

D. none of these

**Answer: A**



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56. The area bounded by the parabola  $y^2 = x$ , straight line  $y = 4$  and y-axis is

A.  $\frac{3}{32}$

B.  $\frac{64}{3}$

C.  $\frac{33}{2}$

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

**Answer: B**



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57. The area (in square units), bounded by

$y = 2 - x^2$  and  $x + y = 0$ , is

A.  $\frac{7}{2}$  sq. units

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

C. 9 sq. units

D. none of these

**Answer: B**



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58. The area bounded by the curve  $y = \log_e x$ , the x-axis and the line  $x = e$  is (A)  $e$  sq. units (B) 1 sq. unit (C)  $\left(1 - \frac{1}{e}\right)$  sq. units (D)  $\left(1 + \frac{1}{e}\right)$  sq. units

A.  $e$

B. 1

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

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

**Answer: B**



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59. Find the area included between the curves

$$x^2 = 4y \text{ and } y^2 = 4x.$$

A.  $4/3$

B.  $1/3$

C.  $16/3$

D.  $8/3$

**Answer: C**



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60. If the area above the x-axis, bounded by the curves  $y = 2^{kx}$  and  $x = 0$ , and  $x = 2$  is  $\frac{3}{\log_e(2)}$ , then the value of  $k$  is

A.  $1/2$

B. 1

C.  $-1$

D. 2

**Answer: B**



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