



MATHS

BOOKS - MTG WBJEE MATHS (HINGLISH)

APPLICATION OF INTEGRALS

Wb Jee Workout Category 1 Single Option Correct Type

1. The area enclosed between the curve $y = 1 + x^2$, the Y-axis and the straight line $y = 5$ is given by

A. $\frac{14}{3}$ square units

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

C. 5 square units

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

Answer: D



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2. The area bounded by astroid $x^{2/3} + y^{2/3} = 1$ (in sq. units) is

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

B. $\frac{3\pi^2}{8}$ sq. units

C. $\frac{3\pi}{16}$ sq. units

D. None of these

Answer: A



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3. The area enclosed by $y = 3x - 5$, $y = 0$, $x = 3$ and $x = 5$ is

A. 12 sq. units

B. 13 sq. units

C. $13\frac{1}{2}$ sq. units

D. None of these

Answer: D



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4. The area bounded by the curves $y^2 = 4a(x + a)$ and $y^2 = 4b(b - x)$, where $a, b > 0$ units

A. $(a + b)\sqrt{ab}$

B. $\frac{8}{3}(ab)(a^2 + b^2)$

C. $\frac{8}{3}\sqrt{ab}(a + b)$

D. None of these

Answer: C



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5. Area bounded by the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$ is equal to

- A. 6π sq. units
- B. 3π sq. units
- C. 12π sq. units
- D. None of these

Answer: A



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6. The area bounded by the curves

$$y = \tan x, -\frac{\pi}{3} \leq x \leq \frac{\pi}{3}, y = \cot x, \frac{\pi}{6} \leq x \leq \frac{\pi}{2}$$

and the x - axis is

A. $\ln \sqrt{3}$

B. $\ln \sqrt{2}$

C. $\ln 2$

D. $\ln \left(\frac{3}{2} \right)$

Answer: C



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7. Find the area of the smaller region bounded by

the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ and the line

$$\frac{x}{3} + \frac{y}{2} = 1.$$

- A. $(\pi - 2)$ sq. units
- B. $\frac{3}{2}\pi$ sq. units
- C. $\frac{3}{2}(\pi - 2)$ sq. units
- D. None of these

Answer: C



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8. The area of the region bounded by the curve $y = x^2$ and the line $y = 16$ (in square units) is

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

B. $\frac{256}{3}$

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

D. $\frac{128}{3}$

Answer: B



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9. The area of the region bounded by parabola

$y^2 = 16x$ and its locus rectum is _____

- A. $\frac{32}{3}$ sq. units
- B. $\frac{64}{3}$ sq. units
- C. $\frac{128}{3}$ sq. units
- D. $\frac{116}{3}$ sq. units

Answer: B



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10. The parabola $y^2 = 2x$ divides the circle $x^2 + y^2 = 8$ in two parts. Then, the ratio of the areas of these parts is

A. $3\pi - 2 : 10\pi + 2$

B. $3\pi + 2 : 9\pi - 2$

C. $6\pi - 3 : 11\pi - 5$

D. $2\pi - 9 : 9\pi + 2$

Answer: B



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11. The area included between the parabolas

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

A. $\frac{8}{3}$ sq. units

B. 8 sq. units

C. $\frac{16}{3}$ sq. units

D. 12 sq. units

Answer: C



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12. The area of the region bounded by the curves

$y = x^3$, $y = \frac{1}{x}$, $x = 2$ and x - axis (in sq. units) is

A. $4 - \log_e 2$

B. $\frac{1}{4} + \log_e 2$

C. $3 - \log_e 2$

D. $\frac{15}{4} - \log_e 2$

Answer: B



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13. Determine the area of the figure bounded by two branches of the curve $(y - x)^2 = x^3$ and the straight line $x = 1$.

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

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

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

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

Answer: D



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14. The area of the region surrounded by the curves

$y = x^3$ and $y = 2x^2$ (in sq. units) is

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

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

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

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

Answer: A



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15. 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. -9 sq. units
- B. $\frac{-15}{4}$ sq. units
- C. $\frac{15}{4}$ sq. units
- D. $\frac{17}{4}$ sq. units

Answer: D



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16. 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. 4 sq. units

B. 2 sq. units

C. $13\sqrt{2}$ sq. units

D. $12\sqrt{2}$ sq. units

Answer: A



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17. Using the method of integration, find the area of the region bounded by the lines $5x - 2y - 10 = 0$, $x + y - 9 = 0$ and $2x - 5y = 0$

- A. 10 sq. units
- B. 10.5 sq. units
- C. 11 sq. units
- D. None of these

Answer: B



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18. The area bounded by the curve $x^2 = 4y + 4$ and line $3x + 4y = 0$ is

- A. $\frac{25}{4}$ sq. units
- B. $\frac{125}{8}$ sq. units
- C. $\frac{125}{16}$ sq. units
- D. $\frac{125}{24}$ sq. units

Answer: D



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19. Using integration, compute the area of the region bounded by the curve $x^2 + y^2 = 9$.

A. 3π sq. units

B. 4π sq. units

C. 9π sq. units

D. 5π sq. units

Answer: C



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20. The area bounded by the parabola

$y = \sqrt{6x + 4}$, X - axis from $x = 0$ to $x = 2$ is

A. $\frac{56}{9}$ sq. units

B. $\frac{28}{9}$ sq. units

C. $\frac{56}{3}$ sq. units

D. $\frac{28}{3}$ sq. units

Answer: A



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Wb Jee Workout Category 2 Single Option Correct Type

1. The area bounded by the parabola

$y = 4x^2$, $y = \frac{x^2}{9}$ and the line $y = 2$ is (A) $\frac{20\sqrt{2}}{3}$

(B) $\frac{10\sqrt{2}}{3}$ (C) $\frac{40\sqrt{2}}{3}$ (D) $\frac{\sqrt{2}}{3}$

A. $\frac{5\sqrt{2}}{3}$ sq. units

B. $\frac{10\sqrt{2}}{3}$ sq. units

C. $\frac{15\sqrt{2}}{3}$ sq. units

D. $\frac{20\sqrt{2}}{3}$ sq. units

Answer: D

2. Area bounded by the curves

$$\frac{y}{x} = \log x \text{ and } \frac{y}{2} = -x^2 + x \text{ (in sq. units)}$$

equals

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

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

C. $\frac{7}{6}$

D. $\frac{6}{7}$

Answer: A



3. The area bounded by the curve $|x| + |y| = 1$ is

A. 2

B. 4

C. 6

D. 8

Answer: A



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4. The area between the curve $x = y^2$ and $x = 4$ which divide into two equal parts by the line $x = a$.

Find the value of a

A. $(12)^{1/3}$

B. $(16)^{2/3}$

C. $(16)^{1/3}$

D. None of these

Answer: C



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

A. 16

B. 21

C. 27

D. 36

Answer: C



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6. The area of the region bounded by $y^2 = x$ and $y = |x|$ is

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

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

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

D. 1 sq. units

Answer: B



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7. Area bounded by the curves satisfying the

conditions $\frac{x^2}{25} + \frac{y^2}{36} \leq 1 \leq \frac{x}{5} + \frac{y}{6}$ is given by

A. $15\left(\frac{\pi}{2} - 2\right)$ sq. units

B. $\frac{15}{4}\left(\frac{\pi}{2} - 1\right)$ sq. units

C. $30(\pi - 1)$ sq. units

D. $\frac{15}{2}(\pi - 2)$ sq. units

Answer: D



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8. If A is the area of the region bounded by the curve $y = \sqrt{3x + 4}$, x axis and the line $x = -1$ and $x = 4$ and B is that area bounded by curve $y^2 = 3x + 4$, x - axis and the lines $x = -1$ and $x = 4$ then $A : B$ is equal to

A. 1 : 1

B. 2 : 1

C. 1 : 2

D. None of these

Answer: C



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

A. 21 sq. units

B. 20 sq. units

C. $\frac{15}{2}$ sq. units

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

Answer: D



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

A. π sq. units

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

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

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

Answer: C



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11. The area of the region bounded by the parabola

$y = x^2 - 4x + 5$ and the straight line $y = x + 1$ is

A. $1/2$

B. 2

C. 3

D. $9/2$

Answer: D



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12. The area of the region bounded by the curves

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

A. $1/3$

B. $1/2$

C. $1/4$

D. 3

Answer: A



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13. The area of the region bounded by the curve $y = x^3$, its tangent at (1, 1) and x-axis is

A. $\frac{1}{12}$

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

C. $2\frac{1}{17}$

D. $\frac{2}{15}$

Answer: A



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14. Area of the region bounded by

$y = |x|$ and $y = -|x| + 2$ is

A. 4 sq. units

B. 3 sq. units

C. 2 sq. units

D. 1 sq. units

Answer: C



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15. Area bounded by $y = \sqrt{5 - x^2}$ and $y = |x - 1|$

is:

(A) $\frac{5\pi - 2}{3}$ sq units (B) $\frac{5\pi - 2}{4}$ sq units (C)

$\frac{5\pi}{4}$ sq units (D) none of these

A. $\left(\frac{5\pi}{4} - 2\right)$ sq. units

B. $\left(\frac{5\pi - 2}{2}\right)$ sq. units

C. $\left(\frac{5\pi}{4} - \frac{1}{2}\right)$ sq. units

D. $\left(\frac{\pi}{2} - 5\right)$ sq. units

Answer: C



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Wb Jee Workout Category 3 One Or More Than One Option Correct Type

1. The area of the region, bounded by the curves

$$y = \sin^{-1} x + x(1 - x) \text{ and } y = \sin^{-1} x - x(1 - x)$$

in the first quadrant (in sq. units), is

A. 1

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

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

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

Answer: A



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2. The area of the region bounded by the curve $y = 2x - x^2$ and the line $y = x$ is

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

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

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

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

Answer: B



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3. If the area of bounded between the x-axis and the graph of $y = 6x - 3x^2$ between the ordinates $x = 1$ and $x = a$ is 19 units, then a can take the value 4 or -2 two value are in (2,3) and one in $(-1, 0)$ two value are in (3,4) and one in $(-2, -1)$ none of these

A. one value in (2, 3)

B. one value in $(-2, -1)$

C. one value in $(-1, 0)$

D. one value in (3, 4)

Answer: B::D



4. Which of the following is the possible value/values of c for which the area of the figure bounded by the curves $y = \sin 2x$, the straight lines $x = \pi/6$, $x = c$ and the abscissa axis is equal to $1/2$?

A. $-\frac{\pi}{6}$

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

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

D. None of these

Answer: A::B



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5. The area induced between the curves $y = \frac{x^2}{4a}$ and $y = \frac{8a^3}{x^2 + 4a^2}$ is given by

A. $\frac{1}{3}(6\pi - 4)$, if $a = 1$

B. $\frac{1}{3}(4\pi + 3)$, if $a = 1$

C. $\frac{4}{3}(6\pi - 4)$, if $a = 2$

D. $\frac{1}{3}(2\pi + 3)$, if $a = 1$

Answer: A::C



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

A. 3 sq. units

B. 4 sq. units

C. 2 sq. units

D. 1 sq. units

Answer: D



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7. Draw a rough sketch of the curves $y = \sin x$ and $y = \cos x$ as x varies from 0 to $\frac{\pi}{2}$. Find the area of the region enclosed by the curves and the y -axis.

A. $1:2$

B. $\sqrt{2}:1$

C. $2:1$

D. $1:\sqrt{2}$

Answer: B



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8. Area included between curves

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

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

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

C. 1 sq. units

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

Answer: D



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9. Find the smaller of the two areas enclosed by the curves $x^2 + y^2 = 4$ and $y^2 = 3(2x - 1)$.

- A. $(4\pi - \sqrt{3})$ sq. units
- B. $\frac{1}{2}(2\pi + \sqrt{3})$ sq. units
- C. $\frac{1}{3}(4\pi - \sqrt{3})$ sq. units
- D. None of these

Answer: C



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10. Find the area enclosed by the curves

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

A. $3 - 4 \log 3$

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

C. $2 \log 3^{3/2}$

D. $2 - \log 3$

Answer: B::C



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We Jee Previous Years Questions Category 2 Single Option Correct Type

1. Let $f(x) = x^{2/3}$, $x \geq 0$. Then the area of the region enclosed by the curve $y = f(x)$ and the three lines $y = x$, $x = 1$ and $x = 8$ is

A. $\frac{63}{2}$

B. $\frac{93}{5}$

C. $\frac{105}{7}$

D. $\frac{129}{10}$

Answer: D



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2. Let $f(x) = \max \{x + |x|, x - [x]\}$, where $[x]$ denotes the greatest integer $\leq x$. Then the value of $\int_{-3}^3 f(x) dx$ is:

A. 0

B. $51/2$

C. $21/2$

D. 1

Answer: C



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

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

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

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

D. $\frac{6}{7}$ sq. units

Answer: A



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We Jee Previous Years Questions Category 3 One Or More Than One Option Correct Type

1. The area of the region enclosed between parabola $y^2 = x$ and the line $y = mx$ is $\frac{1}{48}$. Then the value of m is

A. -2

B. -1

C. 1

D. 2

Answer: A::D



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2. The area of the region lying above x - axis, and included between the circle $x^2 + y^2 = 2ax$ & the parabola $y^2 = ax, a > 0$ is

A. $8\pi a^2$

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

C. $\frac{16\pi a^2}{9}$

D. $\pi \left(\frac{27}{8} + 3a^2 \right)$

Answer: B



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3. The area bounded by $y = x + 1$ and $y = \cos x$ and the x - axis, is

A. 1 sq. units

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

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

D. $\frac{1}{8}$ sq. units

Answer: B



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