



MATHS

BOOKS - NTA MOCK TESTS

AREA UNDER CURVES TEST

Single Choice

1. Let the area bounded by the x-axis curve

$y = \left(1 + \frac{8}{x^2}\right)$ and the ordinates $x=2$ and $x=4$ is A

sq . Unit and if the ordinate $x=a$ divides the area

into two equal pairs, then the correct statement among the following is

A. $A=3$ and $a=2$

B. $A=2$ and $a=1$

C. $A = 4\sqrt{2}$ and $a = \sqrt{2}$

D. $A = 4$ and $a = 2\sqrt{2}$

Answer: D



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2. The area bounded by the curves $y = |x| - 1$ and $y = -|x| + 1$ is (in sq. units)

A. 1

B. 2

C. $2\sqrt{2}$

D. 4

Answer: B



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3. The values of m for which the area of the region bounded by the curve $y = x - x^2$ and the line $y = mx$ is equal to $\frac{9}{2}$ sq.units are

A. $-5, 1$

B. $-2, 4$

C. $2, -4$

D. $-4, 3$

Answer: B



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4. The area of the region

$$\{(x, y), 0 \leq y \leq x^2 + 1, 0 \leq y \leq x + 1, 0 \leq x \leq 2\}$$

is

A. $\frac{23}{3}$ sq. unit

B. $\frac{23}{4}$ sq. unit

C. $\frac{23}{5}$ sq. unit

D. $\frac{23}{6}$ sq unit

Answer: D



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5. If the area of the region bounded by the curve $C = y = \tan x$, the tangent drawn to C at $x = \frac{\pi}{4}$ and the x-axis is $\frac{k}{10} \left(\log 2 - \frac{1}{2} \right)$, then the value of k is

A. 5

B. 10

C. 2

D. 4

Answer: A



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6. The area of the region bounded by $y^2 = 4ax$ and $x^2 = 4ay$, $a > 0$ in square units is

A. $\frac{16a^2}{3}$ sq. units

B. $\frac{14a^2}{3}$ sq. units

C. $\frac{13a^2}{3}$ sq. units

D. $16a^2$ sq. units

Answer: A



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7. The area of the region bounded by $1 - y^2 = |x|$

and $|x| + |y| = 1$ is

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

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

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

D. 1

Answer: B



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8. The slope of the tangent to the 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 equal to

A. $\frac{5}{7}$ sq. units

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

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

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

Answer: B



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9. If area bounded by the curve $y = e^{x^2}$, x-axis and the line $x=1$ and $x = 2$ is a sq. units then area bounded by the curve $y = \sqrt{\ln x}$, x-axis and the line $x=e$ and $x = e^4$ is

- A. $(e^4 - e - a)$ sq unit
- B. $(2e^4 - e - 2a)$ sq.unit
- C. $(2e^4 - e - a)$ sq. unit
- D. $(2e^4 - 2e - a)$ sq.unit

Answer: C



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10. Through any point $P(x, y)$ of a curve which passes through the origin, lines are drawn parallel to the coordinate axes. The curve, given that it divides the rectangle formed by the two lines and the axes into two areas, one of which is twice the other, represents a family of

A. circles

B. parabolas

C. hyperbolas

D. straight lines

Answer: B



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11. The area of the region $\{(x, y), x^2 \leq y \leq |x|\}$ is

- A. $1/3$ sq. units
- B. $1/2$ sq. units
- C. $1/4$ sq. units
- D. None of these

Answer: A



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12. The area bounded by the graph $y = |[x - 3]|$, above the x-axis from $x = -$ to $x=3$ is ([.] denotes the greatest integer function)

- A. 7 sq. units
- B. 15 sq.units
- C. 21 sq.units
- D. 28 sq.units

Answer: B



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13. The area bounded by the curve $y = f(x)$, $y = x$ and the lines $x = 1$, $x = t$ is $(t + \sqrt{1 + t^2}) - \sqrt{2} - 1$ sq. units for all $t > 1$. If $f(x)$ satisfying $f(x) > x$ for all $x > 1$ then $f(x)$ is equal to

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

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

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

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

Answer: A



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14. The area bounded by the curves

$$\sqrt{|x|} = \sqrt{|y|} = \sqrt{a} \text{ and } x^2 + y^2 = a^2, a > 0 \text{ is}$$

A. $\left\{ \pi a^2 - \frac{2}{3} a^2 \right\}$ sq. units

B. $\left\{ 2\pi a^2 - \frac{a^2}{3} \right\}$ sq. units

C. $\left\{ \pi a^2 - \frac{3a^2}{3} \right\}$ sq. units

D. None of these

Answer: A



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15. The area of the region bounded by the straight lines $x = 0$, $x = 2$ and the curves $y = 2^x$, $y = 2x - x^2$ is

- A. $\left(\frac{3}{\log 2} - \frac{4}{3}\right)$ sq.units
- B. $\left(\frac{3}{\log 2} + \frac{4}{3}\right)$ sq. units
- C. $\left(\frac{3}{\log 2} - \frac{2}{3}\right)$ sq. units
- D. $\left(\frac{3}{\log 2} - \frac{1}{2}\right)$ sq. units

Answer: A



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16. If the area above the x-axis, bounded by the curves $y = 2^{kx}$, $x = 0$ and $x = 2$ is $\frac{3}{\log 2}$ sq. units then the value of k is

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

B. 1

C. -1

D. 2

Answer: B



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17. The area of the region bounded by the curves

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

A. 2 sq. unit

B. 4 sq. unit

C. 5 sq. unit

D. 6 sq. unit

Answer: D



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

- A. $(\sqrt{2} - 1)$ sq.unit
- B. $\sqrt{2}$ sq. unit
- C. $(\sqrt{2} + 1)$ sq. unit
- D. None of these

Answer: A



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19. The area (in sq. units) of the region described by $[(x, y) : y^2 \leq 2 \text{ and } y \geq 4x - 1]$ is

A. $\frac{9}{32}$ sq. units

B. $\frac{7}{32}$ sq. units

C. $\frac{5}{64}$ sq. units

D. $\frac{15}{64}$ sq. units

Answer: A



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20. Area bounded by the curve $y=6x$ and x-axis between $x=0$ and $x = 2\pi$ is

- A. 2 sq. unit
- B. 4 sq. unit
- C. 8 sq. unit
- D. None of these

Answer: B



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21. Area bounded by under the curve $y = \sqrt{3x + 4}$ and x-axis between $x=0$ and $x = 4$ is

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

B. $\frac{64}{9}$ sq. unit

C. 8 sq. unit

D. $\frac{112}{9}$ sq. unit

Answer: D



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22. The area included between the parabola

$$y = \frac{x^2}{4a} \text{ and the curve } y = \frac{8a^3}{(x^2 + 4a^2)} \text{ is } \{a > 0\}$$

(in sq. units)

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

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

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

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

Answer: D



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23. Area enclosed by the curve $y = f(x)$ defined parametrically as $x = \frac{1 - t^2}{1 + t^2}$, $y = \frac{2t}{1 + t^2}$ is equal to (where t is parameter)

A. π sq. units

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

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

D. $\frac{3\pi}{2}$ sq. units

Answer: A



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24. The area of the region enclosed by the curves

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

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

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

C. $\frac{5}{12}$ sq. units

D. None of these

Answer: A



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25. The area of the closed region bounded by $y = \sec^{-1} x$, $y = \cos ec^{-1} x$ and the line $x - 1 = 0$ is

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

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

C. $\pi - 3 \log_e 3$ sq. units

D. None of these

Answer: A



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26. The area of the closed region whose boundaries are defined by the curves $y = 2 \cos x$, $y = 3 \tan x$ and the y-axis is

A. $\left\{ 1 + 3 \log \left(\frac{2}{\sqrt{3}} \right) \right\}$ sq. units

B. $\left\{ 1 + \frac{3}{2} \log 3 - 3 \log 2 \right\}$ sq. units

C. $\left\{ 1 + \frac{3}{2} \log 3 + \log 2 \right\}$ sq. units

D. $\{ \log 3 - \log 2 \}$ sq. units

Answer: B



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27. The area bounded by the curve

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

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

B. $\frac{a^2}{4}$ sq. units

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

D. $\frac{a^2}{12}$ sq. units

Answer: D



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28. 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

A. $\frac{9}{8}$ sq.units

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

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

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

Answer: A



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29. The area 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 x-axis is

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

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

C. $\frac{13}{3}$ sq. units

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

Answer: A



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30. The value of the parameter a such that the area bounded by $y = a^2x^2 + ax + 1$, ($a \neq 0$), coordinate axes and the line $x=1$ attains its least value, is equal to

A. $-\frac{1}{4}$

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

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

D. -1

Answer: C



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