MATHS

BOOKS - NIKITA MATHS (HINGLISH)

APPLICATION OF DEFINITE INTEGRAL

Multiple Choice Questions Mcq

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1. Tangents are drawn to the ellipse $\dfrac{x^2}{9} + \dfrac{y^2}{5} = 1$ at the end of latus rectum. Find the area of quadrilateral so formed

A. $\dfrac{27}{2} sq.\ units$

B. $\dfrac{27}{4}$ sq. units

C. 27 sq. units

D. 18 sq. units

Answer: c

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2. Find the area of the region bounded by $x^2 = 16y, \ y = 1, \ y = 4$ and the y-axis in the first quadrant.

A. $\dfrac{112}{3}$ sq. units

B. $\dfrac{56}{3}$ sq. units

C. $\dfrac{28}{3}$ sq. units

D. $\dfrac{14}{3}$ sq. units

Answer: b

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3. Find by integration the area of the region bounded by the curve $y = 2x - x^2$ and the x-axis.

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

B. $\dfrac{4}{3}$ sq. units

C. $\dfrac{5}{3}$ sq. units

D. $\dfrac{8}{3}$ sq. units

Answer: b

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

A. $\dfrac{1}{2} sq.\ units$

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

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

D. $\dfrac{1}{6} sq.\ units$

Answer: d

5. The area of the region bounded by the parabola $y = x^2$ and the line y = 4x is

A. $\dfrac{32}{3}$ $sq.\ units$

B. $\dfrac{16}{3}$ $sq.\ units$

C. $\dfrac{8}{3}$ $sq.\ units$

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

Answer: a

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6. The area of the region described by the curves $y^2 = 2x$ and y = 4x - 1 is

A. $\dfrac{15}{64}$ $sq.\ units$

B. $\dfrac{9}{32}$ $sq.\ units$

C. $\dfrac{7}{32}$ $sq.\ units$

D. $\dfrac{5}{64}$ $sq.\ units$

Answer: b

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7. Find the area enclosed by the parabola $4y = 3x^2$ and the line $2y = 3x + 12$.

A. 27 sq. units

B. 18 sq. units

C. 9 sq. units

D. 3 sq. units

Answer: a

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

A. $\dfrac{3}{4}\, sq.\ units$

B. $\dfrac{3}{8}\, sq.\ units$

C. $\dfrac{9}{4}\, sq.\ units$

D. $\dfrac{9}{8}\, sq.\ units$

Answer: d

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9. The area of the region bounded by the curves $y^2 = 4a^2(x - 1)$ and the lines x = 1 and y = 4a, is

A. $\dfrac{2a}{3}$ sq. units

B. $\dfrac{4a}{3}$ sq. units

C. $\dfrac{8a}{3}$ sq. units

D. $\dfrac{16a}{3}$ sq. units

Answer: d

10. Find the area of the region bounded by the curve $(y - 1)^2 = 4(x + 1)$ and the line y= x-1

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

B. $\dfrac{4}{3} sq.\ units$

C. $\dfrac{64}{3} sq.\ units$

D. $\dfrac{16}{3} sq.\ units$

Answer: c

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11. The area of the region bounded by the parabola $y^2 = 16(x - 2)$ and the line y = 2 (x - 1) and X-axis is

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

B. $\dfrac{4}{3} sq. \ units$

C. $\dfrac{8}{3} sq. \ units$

D. $\dfrac{16}{3} sq. \ units$

Answer: b

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12. Find the area of the region included between the parabolas $y^2 = 4ax$ and $x^2 = 4ay$, where $a > 0$.

A. $(2a^2)$ sq. units

B. $\dfrac{4a^2}{3}$ sq. units

C. $\dfrac{8a^2}{3}$ sq. units

D. $\dfrac{16a^2}{3}$ sq. units

Answer: d

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13. Find the area of the region bounded by the two parabolas $y = x^2$ and $y^2 = x$.

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

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

C. $\dfrac{1}{3}$ sq. units

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

Answer: c

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14. The area between parabolas $y^2 = 7x$ and $x^2 = 7y$ is

A. $\dfrac{7}{3}$ sq. units

B. $\dfrac{7}{9}$ sq. units

C. $\dfrac{49}{3}$ sq. units

D. $\dfrac{49}{9}$ sq. units

Answer: c

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15. Find the area of the region bounded by the curves $y^2 = x + 1$ and $y^2 = -x + 1$.

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

B. $\dfrac{4}{3}$ sq. units

C. $\dfrac{8}{3}$ sq. units

D. $\dfrac{16}{3}$ sq. units

Answer: c

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16. The area of the plane region bounded by the curves

$x + 2y^2 = 0$ and $x + 3y^2 = 1$ is equal to

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

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

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

D. $\dfrac{5}{3} sq.\ units$

Answer: c

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17. Find the area enclosed between first quadrant of a circle $x^2 + y^2 = 16$ and line $y = x$.

A. $8\pi sq.\ units$

B. $\pi sq.\ units$

C. $4\pi sq.\ units$

D. $2\pi sq.\ units$

Answer: d

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18. Find the area enclosed between the circle $x^2 + y^2 = 1$ and the line $x + y = 1$ lying in the first quadrant.

A. $\dfrac{\pi}{4} - \dfrac{1}{2}$ sq. units

B. $\dfrac{\pi}{4} - \dfrac{1}{4}$ sq. units

C. $\dfrac{\pi}{2} - 2$ sq. units

D. $\dfrac{\pi}{4} - 2$ sq. units

Answer: a

19. Using integration, find the area of the region common to the circle $x^2 + y^2 = 16$ and the parabola $y^2 = 6x$.

A. $\dfrac{2}{3}\left(\sqrt{3} + 4\pi\right) sq.\ units$

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

C. $\dfrac{2}{3}\left(\sqrt{3} + 8\pi\right) sq.\ units$

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

Answer: b

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20. The area lying above the X-axis and included between the circle $x^2 + y(2) = 8x$ and the parabola $y^2 = 4x$ is

A. $4\pi - \dfrac{16}{3} sq.\ units$

B. $4\pi - \dfrac{32}{3} sq.\ units$

C. $8\pi - \dfrac{16}{3} sq.\ units$

D. $8\pi - \dfrac{32}{3} sq.\ units$

Answer: b

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21. 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. $\pi - \dfrac{4}{3}$

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

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

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

Answer: b

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22. 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. $\dfrac{\pi}{2} + \dfrac{4}{3} sq. \; units$

B. $\dfrac{\pi}{2} - \dfrac{4}{3} sq. \; units$

C. $\dfrac{\pi}{2} - \dfrac{2}{3} sq. \; units$

D. $\dfrac{\pi}{2} + \dfrac{2}{3} sq. \; units$

Answer: b

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23. Find the area of the region $\{(x, y) : y^2 \leq 4x, 4x^2 + 4y^2 \leq 9\}$

A. $\dfrac{1}{3\sqrt{2}} + \dfrac{9\pi}{8} - \dfrac{9}{4}\sin^{-1}\left(\dfrac{1}{3}\right)$ sq. units

B. $\dfrac{1}{3\sqrt{2}} + \dfrac{9\pi}{4} - \dfrac{9}{4}\sin^{-1}\left(\dfrac{1}{3}\right)$ sq. units

C. $\dfrac{1}{3\sqrt{2}} + \dfrac{3\pi}{8} - \dfrac{3}{4}\sin^{-1}\left(\dfrac{1}{3}\right)$ sq. units

D. $\dfrac{1}{3\sqrt{2}} + \dfrac{3\pi}{4} - \dfrac{3}{4}\sin^{-1}\left(\dfrac{1}{3}\right)$ sq. units

Answer: a

24. Area common to the circle $x^2 + y^2 = 9$ an the parbola $y^1 = 8x$ is

A. $\dfrac{4\sqrt{2}}{3} + \dfrac{9\pi}{4} + \sqrt{2} + \dfrac{9}{2}\sin^{-1}\left(\dfrac{1}{3}\right) sq.\ units$

B. $\dfrac{4\sqrt{2}}{3} + \dfrac{9\pi}{4} - \sqrt{2} - \dfrac{9}{2}\sin^{-1}\left(\dfrac{1}{3}\right) sq.\ units$

C. $\dfrac{8\sqrt{2}}{3} + \dfrac{9\pi}{2} + 2\sqrt{2} + 9\sin^{-1}\left(\dfrac{1}{3}\right) sq.\ units$

D. $\dfrac{8\sqrt{2}}{3} + \dfrac{9\pi}{2} - 2\sqrt{2} - 9\sin^{-1}\left(\dfrac{1}{3}\right) sq.\ units$

Answer: d

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25. Find the area of the circle $x^2 + y^2 = 16$ which is exteri or $\rightarrow$ the parabola $y^2 = 6x$ by using integration.

A. $\dfrac{1}{3}\left(8\pi - \sqrt{3}\right) sq.\ units$

B. $\dfrac{2}{3}\left(8\pi - \sqrt{3}\right) sq.\ units$

C. $\dfrac{2}{3}\left(8\pi - \sqrt{3}\right) sq.\ units$

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

Answer: d

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26. 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 sq. units

B. 6 sq. units

C. 9 sq. units

D. 1.2 sq. units

Answer: c

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27. The area bounded by the curves $x^2 + y^2 = 25, 4y = |4 - x^2|$ and $x = 0$ in the first quadiant is

A. $\dfrac{10}{3} + \dfrac{5}{2}\sin^{-1}\left(\dfrac{2}{5}\right)$ sq. units

B. $\dfrac{10}{3} + \dfrac{15}{2}\sin^{-1}\left(\dfrac{2}{5}\right)$ sq. units

C. $\dfrac{10}{3} + \dfrac{5}{2}\sin^{-1}\left(\dfrac{4}{5}\right)$ sq. units

D. $\dfrac{10}{3} + \dfrac{25}{2}\sin^{-1}\left(\dfrac{4}{5}\right)$ sq. units

Answer: d

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28. The area of the region bounded by the lines y=2x+1y=3x+1 and x=4 is

A. 16 sq. units

B. 121/3 sq. units

C. 121/6 sq. units

D. 8 sq. units

Answer: d

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29. The area of $\triangle ABC$ whose vertices are A (2,5), B (4,7) and C(6,2) is

A. 7 sq. units

B. 14 sq. units

C. 21 sq. units

D. 28 sq. units

Answer: a

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30. The area of $\triangle ABC$ with vertices A (2,1), B(3,4) and C (0.5) is

A. 1 sq. units

B. 2 sq. units

C. 3 sq. units

D. 4 sq. units

Answer: d

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31. Using integration, find the area of the triangle ABC whose vertices are $A(-1, 1), B(0, 5)$ and $C(3, 2)$.

    A. 15/2 sq. units

    B. 3/2 sq. units

    C. 5/2 sq. units

    D. 9/2 sq. units

Answer: a

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32. The area of the region enclosed by the curves y = sin x and y = cos x from x = 0 to x = $\dfrac{\pi}{4}$ and Y-axis is

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

B. $1 - \sqrt{2}sq.\ units$

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

D. $\sqrt{2} - 1sq.\ units$

Answer: d

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33. The area of the region bounded by the curves $y = ex \log x$ and $y = \dfrac{\log x}{ex}$ is

A. e/4 - 5/e sq. units

B. e/4 - 4/e sq. units

C. e/4 - 5/4e sq. units

D. 4/e - 5/2e sq. units

Answer: c

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34. The area (in sqaure 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. $\dfrac{5}{2}$

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

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

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

Answer: a