MATHS

BOOKS - CENGAGE

APPLICATION OF INTEGRALS

Solved Examples And Exercises

1. If the area by $y = x^2 + 2x - 3$ and the line $y = kx + 1$ is the least, find k and also the least area.

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2. 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

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3. Let $f(x)$=M a xi mu m $\left\{x^2, (1 - x)^2, 2x(1 - x)\right\}$, where $0 \leq x \leq 1$. Determine the area of the region

bounded by the curves $y = f(x)$,x-axis ,x=0, and x=1.`

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

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5. 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.

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6. Find the area lying above x-axis and included between the circle $x^2 + y^2 = 8x$ and inside the parabola $y^2 = 4x$.

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7. Find the area of the smaller part of the circle $x^2 + y^2 = a^2$ cut off by the line $x = \frac{a}{\sqrt{2}}$.

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8. Prove that the area bounded by the circle $x^2 + y^2 = a^2$ and the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is equal to the area of another ellipse having semi-axis $a - b$ and a, $a > b$.

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9. Each question has four choices, a,b,c and d, out of which only one is correct. Each question contains STATEMENT 1 and STATEMENT 2. If both the statement are TRUE and STATEMENT 2 is the correct explanation of STATEMENT 1. If both the statements are TRUE but STATEMENT 2 is NOT the correct explanation of STATEMENT 1. If STATEMENT 1 is TRUE and STATEMENT 2 is FLASE. If STATEMENT 1 is FALSE and STATEMENT 2 is TURE. Statement 1: Lagrange mean value theorem is not applicable to

$f(x) = |x-1|(x-1)$ Statement 2: $|x-1|$ is not differentiable at $x = 1$.

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

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11. The area of the circle $x^2 + y^2 = 16$ exterior to the parabola $y^2 = 6x$ is

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12. The are a bounded by the y-axis, y = cos x and y sin x when $0 \leq x \leq \frac{\pi}{2}$ is

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13. Prove that sec x-cos x=tan x sin x

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14. The area of the region whose boundaries are defined by the curves $y = 2\cos x, y = 3\tan x, and they - a\xi sis$

$1 + 31n\left(\frac{2}{\sqrt{3}}\right) squnits$

$1 + \frac{3}{2}1n3 - 31n2squnits$

$1 + \frac{3}{2}1n3 - 1n2squnits\ 1n3 - 1n2squnits$

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15. 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) $\pi a^2 sq\dot{u}nits$ (c) $3\pi a^2 sq\dot{u}nits$

(d) None of these

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16. 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.unit (B) $\frac{3}{8}$ sq.units (C) $\frac{3}{2}$ sq.units (D) $\frac{9}{4}$ sq.units

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

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