MATHS

BOOKS - MODERN PUBLICATION

APPLICATIONS OF THE INTEGRALS

Example

1. Find the area enclosed by the circle : $x^2 + y^2 = a^2$.

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2. Find the area of region bounded by

The parabola $y^2 = 4ax$ and its latus rectum

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

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4. Find the area of the region founded by the curve $y = x^2$ and the line y=4.

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5. Area of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a > b$ is :

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6. Find the area bounded by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and the ordinates $x = 0$ and $x = ae$, where $b^2 = a^2\left(1 - e^2\right)$ and $e < 1$.

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7. Find the area bounded by the region given by :

$$A = \left\{(x, y) : (x, y) : \frac{x^2}{25} + \frac{y^2}{9} \leq 1 \leq \frac{x}{5} + \frac{y}{3}\right\}.$$

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8. Using integration, find the region bounded by the line 2y=-x+8, x-axis, and the lines x=2 and x=4.

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9. Find the area of the region in the first quadrant enclosed by the x-axis, the line $y = x$, and the circle $x^2 + y^2 = 32$.

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10. Using integration, find the area of the region bounded by : (-1,1), (0,5) and (3,2).

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11. Using the method of integration, find the area of the triangular region whose vertices are (2,-2), (4,3) and (1,2).

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12. Using the method of integration, find the area of the region bounded by the lines : $3x-2y+1=0$, $2x+3y-21=0$ and $x-5y+9=0$.

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

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14. Calculate the area of the region enclosed between the circles : $x^2 + y^2 = 4$ and $(x - 2)^2 + y^2 = 4$ (using integration)

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15. Make a rough sketch of the region given below and find its area, using integration : $\{(x, y) : y^2 \leq 4x, 4x^2 + 4y^2 \leq 9\}$

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16. Using integration, find the area of the region bounded by the parabola $y^2 = 4x$ and the circle : $4x^2 + 4y^2 = 9$.

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

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18. Find the area included between the curves $y^2 = 4ax$ and $x^2 = 4ay, a > 0$.

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19. Draw a rought sketch of $y^2 = x + 1$ and $y^2 = -x + 1$ and determine the are enclosed by the two curves.

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20. Find the area of the region bounded by the curves $y = 6x - x^2$ and $y = x^2 - 2x$.

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21. Find the area of the region : $\{(x, y): 0 \leq y \leq x^2, 0 \leq y \leq x + 2, 0 \leq x \leq 3\}$.

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

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23. Using integration, find the area of the region: $\left\{(x, y): |x - 1| \leq y \leq \sqrt{5 - x^2}\right\}$.

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24. Sketch the region bounded by the curves: $y = \sqrt{5 - x^2}$ and y=|x-1| and find its area, using integration.

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25. Using integration, find the area of the triangle formed by positive x-axis and tangent and normal to the circle $x^2 + y^2 = 4$ at $\left(1, \sqrt{3}\right)$.

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26. Sketch the graph of: $f(x) = \begin{cases} |x-2|+2 & x \leq 2 \\ x^2 - 2 & x > 2 \end{cases}$. Evaluate $\int_0^4 f(x)dx$. What does the value of this integral represent on the graph?

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27. Find the area of the region bounded by the curve $ay^2 = x^3$, the y-axis and the lines y=a and y=2a.

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

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Exercise

1. Using integration, find the area of the circle $x^2 + y^2 = 4$

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2. Using integration, find the area of the circle $x^2 + y^2 = 4$

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3. Find the area of the region bounded by the curve $y^2 = 4x$ and the line $x = 3$.

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4. Using integration, find the area bounded between the parabola $x^2 = 4y$ and the line y=4.

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5. Find the area bounded by the curve $y^2 = 2y - x$ and the Y-axis.

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6. (i) Find the area bounded by y=2x+3, the x-axis and the ordinates x=-2 and x=2.

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7. Find the area bounded by y=x, the x-axis and the lines x=-1 and x=2.

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8. Find the area of the region bounded by (i) $y = x^4$, x=1,x=5 and x-axis.

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9. Find the area of the region bounded by (ii) $y = x^2$,x=0,x=2 and x-axis.

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10. Find the area of the region bounded by (iii) $y = x^2 - 4$, x=0,x=3 and x-axis.

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11. Find the area of the region bounded by (iv) $y = x^3$,x=2,x=4 and x-axis.

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12. Find the area of the region bounded by $y^2 = 9x, x = 2, x = 4$ and the x-axis in the first quadrant.

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13. Find the area of the region bounded by $y = 4x^2$,x=0,y=1,y=4 in the first quadrant.

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14. Calculate the area undder the curve : $y = 2\sqrt{x}$

between the ordinates x=0 and x=1.

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15. Find the area under the curve $y = \left(x^2 + 2\right)^2 + 2x$ between the ordinates $x = 0$ and $x = 2$.

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16. Find the area of the region in the first quadrant enclosed by x-axis, line $x = \left(\sqrt{3}\right)y$ and the circle $x^2 + y^2 = 4$.

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17. 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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18. (i) Determine the area under the curve $y = \sqrt{a^2 - x^2}$ included between the lines x=0 and x=a.

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19. (ii) Using definite integrals, find the area of the circle $(x-1)^2 + y^2 = 1$.

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20. Determine the area enclosed between the curve y=cos 2x, $0 \leq x \leq \frac{\pi}{4}$ and the co-ordinate axes.

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21. Calculate the area bounded by the curve: $f(x) = \sin^2\left(\frac{x}{2}\right)$, axis of x and the ordinates: x=0, $x = \frac{\pi}{2}$.

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22. Draw a rough sketch of the curve $y = \cos^2 x$ in $[0, \pi]$ and find the area enclosed by the curve, the lines x=0, $x = \pi$ and the x-axis.

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23. (i) Make a rough sketch of the graph of the function y=sin x,$0 \leq x \leq \frac{\pi}{2}$ and determine the area enlosed between the curve, the, the x-axis and the line $x = \frac{\pi}{2}$.

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24. (ii) Find the area bounded by the curve : (I) y=sin x between x=0 and $x = 2\pi$.

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25. Find the area bounded by the curve $y = \cos x$ between $x = 0, x = 2\pi$.

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26. Find the slopes of the tangent and normal to the curve given by : x=asin3θ , y = a cos3θ .

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27. (i) Make a rough sketch of the graph of the function y=sin x,$0 \leq x \leq \frac{\pi}{2}$ and determine the area enlosed between the curve, the, the x-axis and the line $x = \frac{\pi}{2}$.

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28. Draw a rough sketch of $y = \sin 2x$ and determine the area enclosed by the curve. X-axis and the lines $x = \pi/4$ and $x = 3\pi/4$.

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29. (ii) Draw the graph of y=cos 3x, $0 \leq x \leq \frac{\pi}{6}$ and find the area between the curve and the axes.

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30. Make a rough sketch of the graph of $y = \cos^2 x, 0 \leq x \leq \frac{\pi}{2}$ and find the area enclosed between the curve and the axes.

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31. Using integration, find the area of the region bounded by the circle $x^2 + y^2 = 16$ and line $y = x$ in the first quadrant.

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32. 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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33. Find the area under the given curves and given lines: $y = x^2, x = 1, x = 2$ and x-axis

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34. Draw a rough sketch of the curve $y^2 + 1 = x$, $x \leq 2$. Find the area enclosed by the curve and the line x=2.

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35. Find the area of the region bounded by the elipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$

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36. Find the area of the region bounded by the elipse $\frac{x^2}{9} + \frac{y^2}{16} = 1$

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37. Find the area of the region bounded by the ellipse : $4x^2 + 25y^2 = 1.$

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38. Find the area between the curve $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and the x-axis between x=0 and x=a. Draw a rough sketch of the curve also.

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39. Sketch the region of the ellipse and find its area using integration $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

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40. Sketch the region $\{(x, y) : 4x^2 + 9y^2 = 36\}$ and find its area using integration.

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

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42. Using integration, prove that the area bounded by : $|x|+|y|=1$ is 2 sq.units.

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43. Using integration, find the area of the region bounded by: (i) (2,0),(4,5) and (6,3).

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44. Using integration, find the area of the region bounded by: (ii) (1,0),(2,2) and (3,1).

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45. Using integration find the area of region bounded by the triangle where vertices are : (-1,2), (1,5) and (3,4)

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46. Using integration, find the area of region of triangle whose vertices are

(3,0),(4,5) and (5,1)

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47. Using integration find the area of regeion bounded by the triangle whose vertices are (-1,0), (1,3) and (3,2)

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48. Using integration find the area of region bounded by the triangle where vertices are : (1,3), (2,5) and (3,4)

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49. Using integration find the area of region bounded by the triangle where vertices are : (4,1), (6,6) and (8,4)

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50. Using integration find the area of region bounded by the triangle where vertices are : (2,5), (4,7) and (6,2)

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51. (a) Using integration, find the area of the region bounded by the triangle whose sides are : (i) $3x-y-3=0$, $2x+y-12=0$, $x-2y-1=0$.

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52. (a) Using integration, find the area of the region bounded by the triangle whose sides are : (ii) $5x-2y-10=0$, $x+y-9=0$, $2x-5y=0$.

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53. Using integration, find the area of the region bounded by the triangle whose sides are $y = 2x + 1, y = 3x + 1$ and $x = 4$.

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54. (a) Using integration, find the area of the region bounded by the triangle whose sides are :

(iv) 2x+y=4, 3x-2y=6 and x-3y+5=0.

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55. (b) If a triangular field is bounded by the lines $x+2y=2$, $y-x=1$ and $2x+y=7$. Using integration, compute the area of the field.

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56. (b) If a triangular field is bounded by the lines $x+2y=2$, $y-x=1$ and $2x+y=7$. Using integration, compute the area of the field.

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57. Find the area of the region bounded by the line $y = 3x + 2$,the x-axis and the ordinates $x = -1, x = 1.$

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58. Find the area of the region: (i) $\{(x, y) : x^2 \leq y \leq x\}.$

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59. Find the area of the region: (ii) $\{(x, y): x^2 \leq y \leq |x|\}$.

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60. Consider the functions: f(x)=|x|-1 and g(x)=1-|x|.

(a) Sketch their graphs and shade the closed region between them

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61. Consider the functions: f(x)=|x|-1 and g(x)=1-|x|.

(b) Find the area of their shaded region.

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62. Using integration, find the area of the region bounded between : (i) the line x=2 and the parabola $y^2 = 8x$.

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63. Using integration, find the area of the region bounded between : (ii) the line x=3 and the parabola $y^2 = 4x$.

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64. Find the area of the region bounded between parabola $y^2 = x$ and the line $y = x$ (Using integration).

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65. Find the area of the region bounded by : (ii) the parabola $y^2 = x$ and the line x+y=2.

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

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67. Find the area of region bounded by

The parabola $y^2 = 4ax$ and its chord y=mx

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68. Find the area of region bounded by

The parabola $y^2 = 4ax$ and its latus rectum

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69. Find the area of the region bounded by the parabola $y^2 = 8x$ and the latus-rectum.

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70. Find the area of the region enclosed by the parabola $x^2 = y$, the line$y = x + 2$ and the x-axis.

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71. The area between $x = y^2$ and $x = 4$is divided into two equal parts by the line $x = a$, find the value of a.

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72. Area lying between the curve $y^2 = 4x$ and the line $y = 2x$ is :

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73. Find the area bounded between the curve $y^2 = 4x$ and the lines x=3

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74. Find the area of the region founded by the curve $y = x^2$ and the line y=4.

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75. Find the area enclosed by the straight line $y = x + 2$ and the curve $x^2 = y$

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

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77. Find the area of the smaller region bounded by the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and the straight line $\frac{x}{a}+\frac{y}{b}=1$ (using integration)

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78. Find the area of the smaller region bounded by the (ii) $\frac{x^2}{16}+\frac{y^2}{9}=1$ and the straight line 3x+4y=12.

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79. Draw the rough sketch and find the area of the region : $\{(x, y) : 4x^2 + y^2 \leq 4, 2x + y \geq 2\}$.

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80. Draw the rough sketch and find the area of the region : $\{(x, y) : 16x^2 + y^2 \leq 16, 4x + y \geq 4\}$.

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81. Draw the rough sketch and find the area of region bounded between the parabolas, $y^2 = 4x$

and $x^2 = 4y$ by using integration.

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82. Draw the rough sketch and find the area of region bounded between the parabolas, $y^2 = 9x$ and $x^2 = 9y$ by using integration.

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83. Draw the rough sketch and find the area of region bounded between the parabolas, $y^2 = 16x$ and $x^2 = 16y$ by using integration.

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84. (b) 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.

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85. Find the area of the region bounded between parabolas $y^2 = x$ and the line $x^2 = y$.

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86. Find the area of region founded by two parabolas :

$y^2 = ax$ and $x^2 = ay$

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87. Find the area of region founded by two parabolas :

$y^2 = \frac{9}{4}x$ and $x^2 = \frac{16}{3}y$

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88. Calculate the area of the region enclosed between the circles : $x^2 + y^2 = 1$ and $(x-1)^2 + y^2 = 1$ (using integration)

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89. Calculate the area of the region enclosed between the circles : $x^2 + y^2 = 4$ and $(x-2)^2 + y^2 = 4$ (using integration)

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90. Calculate the area of the region enclosed between the circles: (iii) $x^2 + y^2 = 9$, $(x-3)^2 + y^2 = 9$

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91. Calculate the area of the region enclosed between the circles: (iv) $(x-6)^2 + y^2 = 36$and $x^2 + y^2 = 36$

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92. (i) Show that the areas under the curves $f(x) = \cos^2 x$ and $f(x) = \sin^2 x$ between x=0 and $x = \pi$ are 1:1.

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93. (ii) Compare the areas under the curves $y = \cos^2 x$ and $y = \sin^2 x$ between x=0 and $x = \pi$.

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94. (a) (i)Find the area of the circle $x^2 + y^2 = 16$, which is exterior to the parabola $y^2 = 6x$.

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95. Find the area of the circle $4x^2 + 4y^2 = 9$ which is interior to the parabola $x^2 = 4y$.

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96. (b) Find the area of the region bounded by the circle $x^2 + y^2 = 16$ and the parabola $x^2 = 6y$.

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97.

find the area of region founded by the circle $x^2 + y^2 = 1$ and line $x + y = 1$

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98. Make a rough sketch of the region given below and find its area, using integration : $\{(x, y) : y^2 \leq 4x, 4x^2 + 4y^2 \leq 9\}$

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99. Calculate the area enclosed in the region: (iii) $\{(x, y) : x^2 + y^2 \leq 16, x^2 \leq 6y\}$

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100. Calculate the area enclosed in the region: (iv) $\{(x, y) : y^2 \leq 6ax, x^2 + y^2 \leq 16a^2\}$.

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101. Draw the rough sketch and find the area of the region: (i)$\{(x, y) : x^2 < y < x + 2\}$

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102. Draw the rough sketch and find the area of the region : $\{(x, y) : 4x^2 + y^2 \leq 4, 2x + y \geq 2\}$.

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103. Find the area of the region $\{(x, y) : 0 \leq y \leq x^2 + 1, 0 \leq y \leq x + 1, 0 \leq x \leq 2\}$

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104. Draw the rough sketch and find the area of the region: (iv)

$\{(x, y) : x^2 + y^2 \leq 2ax, y^2 \geq ax, x, y \geq 0\}$

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105. (i) Find the area of the region given by: $\{(x, y) : x^2 \leq y \leq |x|\}$.

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106. Find the area bounded by curves $\{(x, y): y \geq x^2 \text{ and } y = |x|\}$

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107. (iii) Find the area of the region bounded by the parabola $y = x^2$ and y=|x|.

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108. Using integration, find the area of the region bounded by the following curves, after making a

rough sketch: (i) y=1+|x+1|,x=-3,x=3,y=0.

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109. Using integration, find the area of the region bounded by the following curves, after making a rough sketch:(ii) y=1+|x+1|,x=-2,x=3,y=0.

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110. Find the area of region bounded by the curve $y^2 = x$ and the lines $x = 1$, $x = 4$ and the x-axis.

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111. Find the area of the region bounded by $y^2 = 9x, x = 2, x = 4$ and the x-axis in the first quadrant.

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

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113. Using integration find the area of region bounded by the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$

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114. Find the area of region bounded by the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$

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115. Find the area of the region in the first quadrant enclosed by x-axis, line $x = \left(\sqrt{3}\right)y$ and

the circle $x^2 + y^2 = 4$.

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116. 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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117. The area between $x = y^2$ and $x = 4$is divided into two equal parts by the line $x = a$, find the value of a.

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118. Find the area of the region bounded by the parabola $y = x^2$ and $y = |x|$.

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

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120. Find the area of the region bounded by the curve $y^2 = 4x$ and the line $x = 3$.

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

Answer:

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122. Area of the region bounded by the curve $y^2 = 4x$, y-axis and the line $y = 3$ is

A. 2

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

C. $\frac{9}{3}$

D. $\frac{9}{2}$.

Answer:

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123. Find the area of the circle $4x^2 + 4y^2 = 9$ which is interior to the parabola $x^2 = 4y$.

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124. Find the area bounded by curves $(x-1)^2 + y^2 = 1$ and $x^2 + y^2 = 1$.

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

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126. Using integration find the area of regeion bounded by the triangle whose vertices are (-1,0), (1,3) and (3,2)

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127. Using integration find the area of triangle whose sides are given by the equations $y = 2x + 1, y = 3x + 1, x = 4.$

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

A. $2(\pi - 2)$

B. $\pi - 2$

C. $2\pi - 1$

D. $2(\pi + 2)$

Answer:

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129. Area lying between the curve $y^2 = 4x$ and the line $y = 2x$ is :

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

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

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

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

Answer:

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130. Find the area under the given curves and given lines: $y = x^2, x = 1, x = 2$ and x-axis

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131. Find the area under the given curves and given lines: $y = x^4, x = 1, x = 5$ and x-axis.

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132. Find the area between the curves y = x and $y = x^2$

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133. Find the area of the region lying in the first quadrant and bounded by $y = 4x^2, x = 0, y = 1, y = 4$

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134. Sketch the graph of $y = |x + 3|$ and evaluate

$$\int_{-6}^{0} |x + 3| dx$$

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135. Find the area bounded by the curve $y = \sin x$

between $x = 0,$ and $x = 2\pi$

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136. Find the area enclosed between the parabola

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

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

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138. Find the area of smaller region bounded by the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ and straight line $\frac{x}{3} + \frac{y}{2} = 1.$

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139. Find the area of the smaller region bounded by the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and the line $\frac{x}{a}+\frac{y}{b}=1$

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140. Find the area of the region enclosed by the parabola $x^2=y$, the line$y=x+2$ and the x-axis.

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141. Using the method of integration find the area bounded by the curve $|x| + |y| = 1$

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142. Find the area bounded by curves $\{(x, y) : y \geq x^2 \text{ and } y = |x|\}$

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143. Using integration, find the area of the triangle ABC, co ordinate of whose vertics are A(2,0),B(4,5)

and C(6,3).

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144. Using the method of integration find the area of the region bounded by lines: $2x + y = 4, 3x - 2y = 6, x - 3y + 5 = 0$

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145. Make a rough sketch of the region given below and find its area, using integration : $\{(x, y) : y^2 \leq 4x, 4x^2 + 4y^2 \leq 9\}$

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146. Area bounded by the curve $y = x^3$, the x-axis and the ordinates $x = -2, x = 1$ is:

A. -9

B. $-\frac{15}{4}$

C. $\frac{15}{4}$

D. $\frac{17}{4}$

Answer:

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

A. 0

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

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

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

Answer:

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148. (a) (i)Find the area of the circle $x^2 + y^2 = 16$, which is exterior to the parabola $y^2 = 6x$.

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

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

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

D. $\frac{4}{3}(8\pi + \sqrt{3})$

Answer:

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149. The area bounded by the y-axis, $y = \cos x$, and $y = \sin x$ when 0

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

B. $\sqrt{2} - 1$

C. $\sqrt{2} + 1$

D. $\sqrt{2}$

Answer:

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150. Find the area of the region bounded by the parabolas $y^2 = 6x$ and $x^2 = 6y$.

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151. Find the area of the region bounded by the curves $x = at^2$ and y=2at between the ordinates corresponding to t=1 and t=2.

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152. Find the area enclosed by the curve : x=3 cos t, y=2 sin t.

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

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154. Find the area of the region bounded by the curve $y^2 = 4x$ and the line $x = 3$.

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155. Prove that the curves $y^2 = 4x$, $x^2 = 4y$, divide the area of the square bounded by $x = 0, x = 4, y = 4, y = 0$ into three equal parts.

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156. Draw the diagram to show the area enclosed by the curves: $y^2 = 16x$ and $x^2 = 16y$. The straight line x=4 divides the area of the larger portion by integration.

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157. AOBA is the part of the ellipse $9x^2 + y^2 = 36$ in the first quadrant such that OA=2 and OB=6. Find the area between the arc AB and the chord AB.

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158. Calculate the area of the region enclosed between the circles : $x^2 + y^2 = 1$ and $(x-1)^2 + y^2 = 1$ (using integration)

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159. Draw a rough sketch of the following region and find the area enclosed by the region, using method of integration: $\{(x, y) : y^2 \leq 5x, 5x^2 + 5y^2 \leq 36\}$.

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160. Find the area bounded by $y = 1 + 2\sin^2 x$, X-axis, $X = 0$ and $x = \pi$.

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161. Is the parabola $y^2 = 4x$ symmetrical about x-axis?

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162. Is the circle $x^2 + y^2 = r^2$ symmetrical about the line y=x?

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163. Find the area enclosed by the circle $x^2 + y^2 = 9$.

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164. Find the area of the semi-portion of the circle $x^2 + y^2 = 4$

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165. Find the area of the region bounded by (i) $y = x^4$, x=1,x=5 and x-axis.

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

Answer:

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167. Area of the region bounded by the curve $y^2 = 4x$, y-axis and the line $y = 3$ is

A. 2

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

C. $\frac{9}{3}$

D. $\frac{9}{2}$

Answer:

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

A. $2(\pi - 2)$

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

C. $2\pi - 1$

D. $2(\pi + 2)$

Answer:

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169. Area lying between the curve $y^2 = 4x$ and the line $y = 2x$ is :

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

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

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

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

Answer:

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170. Area bounded by the curve $y = x^3$, the x-axis and the ordinates $x = -2, x = 1$ is:

A. -9

B. $-\frac{15}{4}$

C. $\frac{15}{4}$

D. $\frac{17}{4}$

Answer:

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

A. 0

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

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

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

Answer:

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172. (a) (i)Find the area of the circle $x^2 + y^2 = 16$, which is exterior to the parabola $y^2 = 6x$.

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

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

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

D. $\frac{4}{3}(8\pi + \sqrt{3})$

Answer:

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173. Find the area enclosed by the circle $x^2 + y^2 = 2$

A. 4π sq.units

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

C. $4\pi^2$ sq.units

D. 2π sq.units

Answer:

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174. Area of ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1, a>b$ is :

A. $\pi^2 ab$

B. πab

C. $\pi a^2 b$

D. πab^2

Answer:

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175. The area of the region bounded by the curve $y = x^2$ and the line y=16 is:

A. 1) $\frac{32}{3}$

B. 2) $\frac{256}{3}$

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

D. 4) $\frac{128}{3}$

Answer:

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176. The area bounded by the y-axis, $y = \cos x$, and $y = \sin x$ when 0

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

B. $\left(\sqrt{2}+1\right)$ sq. units

C. $\left(\sqrt{2}-1\right)$ sq.units

D. `(2sqrt2-1) sq.units

Answer:

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177. The area of the region bounded by the curve $x^2 = 4y$ and the straight line x=4y-2` is

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

B. $\frac{5}{8}$ sq.units

C. $\frac{7}{8}$ sq.units

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

Answer:

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178. The area bounded by the curve y=f(x), above the x-axis, between x=a and x=b is:

A. $\int_{f(a)}^{b} ydy$

B. $\int_{a}^{f(b)} xdx$

C. $\int_{a}^{b} xdy$

D. $\int_{a}^{b} ydx$

Answer:

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179. The area of the circle $x^2 + y^2 = a^2$ is :

A. πa^2

B. $2\pi a$

C. $2\pi a^2$

D. None of these

Answer:

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180. The area between the curve $y = x^2$, x-axis and the lines x=0 and x=2 is :

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

B. 4 sq.units

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

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

Answer:

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181. Find the area of the region enclosed by the parabola $y^2 = 9x$ and the line $y = 3x$.

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

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

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

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

Answer:

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182. The area bounded by the curve y=4 sin x, x-axis from x=0 to $x = \pi$ is equal to :

A. 1 sq.units

B. 2 sq.units

C. 4 sq.units

D. 8 sq.units

Answer:

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183. The area bounded by $y = 2 - |2 - x|$ and $y = \frac{3}{|x|}$ is:

A. 2 sq.units

B. 4 sq.units

C. 12 sq.units

D. 6 sq.units

Answer:

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184. The area in square units of the region bounded by $y^2 = 9x$ and y=3x is:

A. 2

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

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

D. 1

Answer:

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185. The area of the figure bounded by the curves $y = e^x, y = e^{-x}$ and the straight line $x = 1$ is

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

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

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

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

Answer:

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186. The area of the region bounded by the curves:

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

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187. The area of the region bounded by the curves:

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

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

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

C. 4

D. 3

Answer:

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188. The area of the region bounded by the curves: $y = x^3, y = \frac{1}{x}$, x=2 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:

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189. The area of the plane region bounded by the curves $x + 2y^2 =$ and $x + 3y^2 = 1$ is equal to

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

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

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

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

Answer:

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190. 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. 6

B. 9

C. 12

D. 3

Answer:

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

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

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

C. 3) $4\sqrt{2} - 1$

D. 4) $4\sqrt{2} + 1$

Answer:

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192. The area of the region enclosed by the curve $y = x, x = e, y = \frac{1}{x}$ and the positive X-axis is

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

B. 1 square units

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

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

Answer:

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193. If the straight line x=b divide the area enclosed by $y = (1-x)^2, y = 0$ and $x = 0$ into two parts $R_1(0 \leq x \leq b)$ and $R_2(b \leq x \leq 1)$ such that $R_1 - R_2 = \frac{1}{4}$. Then, b equals to

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

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

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

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

Answer:

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194. Let $f:[-1,2] \to [0,\infty]$ be a continuous function such that $f(x) = f(1-x),\ \forall x \in [-1,2]$. If $R_1 = \int_{-1}^{2} xf(x)dx$ and R_2 are the area of the region bounded by $y = f(x), x = -1, x = 2$ and the X-axis . Then,

A. $R_1 = 2R_2$

B. `R_1=3R_2

C. 2R_1=R_2

D. 3R_1=R_2

Answer:

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195. The area bounded by the curves $y^2 = 4x$ and $x^2 = 4y$ is :

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

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

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

D. 0

Answer:

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196. The area bounded between the parabola $x^2 = \frac{y}{4}$ and $x^2 = 9y$ and the straight line $y = 2$ is

A. $20\sqrt{2}$

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

C. $\frac{20\sqrt{2}}{3}$

D. $10\sqrt{2}$

Answer:

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197. The area (in sqaure units) bounded by the curves: $y = \sqrt{x}$, 2y-x+3=0, x-axis, and lying in the first quadrant is:

A. 36

B. 18

C. $\frac{27}{4}$

D. 9

Answer:

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

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

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

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

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

Answer:

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199. 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. $\frac{\pi}{2} - \frac{4}{3}$

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

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

D. $\frac{\pi}{2} + \frac{4}{3}$

Answer:

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

A. $\frac{4}{32}$

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

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

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

Answer:

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201. The area (in sq. units) of the region $\{(x, y) : y^2 \geq 2x$ and $x^2 + y^2 \leq 4x, x \geq 0, y \geq 0\}$ is

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

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

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

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

Answer:

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202. Using integration, find the area of the circle $x^2 + y^2 = 4$

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203. Find the area bounded by y=x, the x-axis and the lines x=-1 and x=2.

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204. Calculate the area undder the curve : $y = 2\sqrt{x}$ between the ordinates x=0 and x=1.

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205. Area of ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1, a>b$ is :

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206. Find the area of the region bounded by $y^2=9x, x=2, x=4$ and the x-axis in the first quadrant.

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207. Using integration find the area of triangle whose vertices are

(-1,1),(0,5) and (3,2)

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

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209. Calculate the area of the region enclosed between the circles : $x^2 + y^2 = 1$ and $(x-1)^2 + y^2 = 1$ (using integration)

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210. Find the area of the region in the first quadrant enclosed by the x-axis, the line $y = x$, and the circle $x^2 + y^2 = 32$.

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211. 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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