MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

AREA OF BOUNDED REGIONS

Solved Examples

1. Using intergration find the area of the region bounded by the line $2y + x = 8$ x -axis and the lines x=2 and x = 4

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2. Using integration, find the area of ΔABC, whose vertices are $A(2, 3)$, $B(4, 7)$ and $(6, 2)$.

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3. Calculate the area bouded by the parabola $y^2 = 4ax$ and its latus rectum

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

B. $8a^2$ sq units

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

D. $\frac{8}{3}a^2$ sq units

Answer: D

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

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5. Find the area enclosed between the parabola $y^2 = 4ax$ and the line $y = mx$.

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6. Find the area of the region [(x,y) : $x^2 \leq y \leq x$)

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

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8. Find the area bounded by the cirxle $x^2 + y^2 = 16$ and the line y=x in the first quadrant .

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9. Using the method of integration find the area of the triangle ABC, coordinates of whose vertices are A(2, 0), B (4, 5) and C (6, 3).

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

A. 27 sq units

B. 12 sq units

C. 33 sq units

D. 21 sq units

Answer: A

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11. Find the area bounded by the line $y = x$, the x-axis and the ordinates $x = -1$ and $x = 2$

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

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

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14. By using intergration prove that the area of a circle of radius r units is πr^2 square units.

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

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

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18. Find the area of the region bounded by the curves $x^2 + y^2 = 4$ and $(x-2)^2 + y^2 = 4$.

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19. Find the area of the region bounded by the curves $x^2 + y^2 = 4$ and $(x-2)^2 + y^2 = 4$.

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20. Find the areas of the region $\{x, y\} : y^2 \leq 4x, 4x^2 + 4y^2 \leq 9\}$, using

integration.

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21. Find the area of the region $[x, y) : x^2 + y^2 \leq 1 \leq x + y\}$

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

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

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24. Find the area bounded by the line y=x and the curve $y = x^3$

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

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26. Find the are of the region bounded by the curve $y = x^2 + 2$ and the lines $y = x, x = 0$ and 3

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27. Find the area of 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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28. Examples: Find the area of the region bounded by the curve $y^2 = 2y - x$ and the y-axis.

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Exercise 17

1. Find the area of the region bounded by the curve $y = x^2$, the x-axis, and the lines x = 1 and x = 3.

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

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3. Find the area under the curve $y = \sqrt{6x + 4}$ (above the x-axis) from x=0 to x=2

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4. Determine the area enclosed by the curve $y = x^3$, and the lines $y = 0, x = 2$ and x = 4.

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5. 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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6. Using integration, find the area of the region bounded by the line 2y = 5x + 7, the x-axis, and the lines x = 2 and x = 8.

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

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8. Evaluate the area bounded by the ellipse $\frac{x^2}{4}+\frac{y^2}{9}=1$ above the x-axis.

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9. Using integration, find the area of the region bounded by the lines $Y=1+|x+1|, x=-2, x=3$ and $y=0.$

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10. Find the area bounded by the curve $y = \left(4 - x^2\right)$ the y-axis and the lines y=0 y=3

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11. Using integration, find the area of the region bounded by the triangle whose vertices are $(-1, 2), (1, 5)$ and $(3, 4)$.

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12. Using integration, find the area of the region bounded by the lines, $4x - y + 5 = 0; x + y - 5 = 0$ and $x - 4y + 5 = 0$

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13. Using intergration find the are of the region bounded between the line x=2 and the parabola $y^2 = 8x$

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14. Using integration, find the area of the region bounded by the line y-1 = x, the x-axis, and the ordinates x = -2 and x = 3.

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15. Sketch the region lying in the first quadrant and bounded by $y = 4x^2$,x = 0, y = 2 and y = 4. Find the area of the region using integration.

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16. Sketch the region lying in the first quadrant and bounded by $y = 9x^2, x = 0, y = 1 and y = 4.$ Find the area of the region using integration.

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17. Find the area of the region enclosed between the two circles $x^2 + y^2 = 1$ and $(x-1)^2 + y^2 = 1$

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18. Sketch the region common to the circle $x^2 + y^2 = 16$ and the parabola $x^2 = 6y$ Also find the area of the region using intergration

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19. Sketch the region common to the cirvle $x^2 + y^2 = 25$ and the parabola $y^2 = 8x$ Also find the area of the region using intergration .

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20. Draw a rough sketch of the region $\{(x, y) : y^2 \leq 3x, 3x^2 + 3y^2 \leq 16\}$ and find the ara enclesed by the region using the method of intergraion

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21. Draw a rough sketch and find the area of the region bounded by the parabolas $y^2 = 4x$ and $x^2 = 4y$, using the method of integration.

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22. Find by intergraiton the area bounded by the curve $y^2 = 4ax$ and the lines y=2a and x=0

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23. Draw a rough sketch of the curve $y = \frac{x}{\pi} + 2\sin^2 x$, and find the area between the x-axis, the curve and the ordinates $x = 0$ and , $x = \pi$.

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

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25. 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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26. Using integration find the area of the triangular region whose sides have equations

$y = 2x + 1,\ y = 3x + 1$ and $x = 4$

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

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28. Examples: Find the area of the region bounded by the curve $y^2 = 2y - x$ and the y-axis.

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29. 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 of the region enclosed between them and the x-axis

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30. Find the area of the bounded by the curve $y^2 = 2x + 1$ and the line x-y=1

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

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

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33. Find the area of the region by the curve $y = \sqrt{x}$ and the line $y = x$

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34. Find the are of the region included between the parabola $y^2 = 3x$ and the circle $x^2 + y^2 - 6x = 0$ lying in the first quadrant

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

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36. 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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37. Using integration, find the area of ΔABC, whose vertices are $A(2, 3)$, $B(4, 7)$ and $(6, 2)$.

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38. Using intergration find the area of the area of the triangle whose vertieces are A(1,3), B(2,5)and C(

3,4)

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39. Using integration find the area of the triangular region whose sides have equations $y = 2x + 1,\ y = 3x + 1$ and $x = 4$

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