

1. Find the area bounded by the following curves, the x-axis and lines $x=a$ and $x=b$.

(i) $y=3\cos x$ $a=0, b=\frac{\pi}{2}$

(i) $y=x^2+4$ $a=0, b=4$

(ii) $y=\cos^2 x$ $a=0, b=\pi$

(ii) $y=\sin^2 x,$ $a=0, b=\frac{\pi}{2}$

(iii) $y=4-x^2$ $a=0, b=2$

(iv) $y=\cos 3x$ $a=0, b=\frac{\pi}{6}$

(v) $y=\sin x$ $a=0, b=2\pi$

(vi) $y=\cos x$ $a=0, b=2\pi$

(vi) $y=2\sqrt{1-x^2}$ $a=0, b=1$

(vii) $y=9-x^2$ $a=2, b=4$

(viii) $y=\sqrt{x-1}$ $a=0, b=4$

2. Find the area bounded by the ellipse $x^2 + y^2 = a^2$

3. Find the area bounded by the curve $y=16-x^2$ and find the x-axis.

4. Find the area of a circle of radius r .

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

6. Find the area enclosed between $y=x^2$ and $x=y^2$

7. Find the area enclosed between $y = x$ and $y = x^3$
8. Find the area bounded by $x^2 = 4y$, $y=4$ and the y axis in the first quadrant.
9. Find the area bounded by the parabola $y^2 = 4ax$ and its latus rectum.
10. Find the area bounded by the parabola $y^2 = 4ax$, the line $y=2a$ and y -axis.
11. Find the area enclosed by the parabola $y^2 = 4ax$ and the line $y = mx$.
12. Find the area of the region $\{(x, y) : x^2 \leq y \leq x\}$
13. Find the area of the region $\{(x, y) : x^2 \leq y \leq |x|\}$
14. Find the area of the region bounded by $x = y^2 - 2y$ and the y -axis
15. Find the area of the triangular region whose sides have the equations $y = 2x + 1$, $y = 3x + 1$ And $x = 4$
16. Find the area enclosed between $y^2 = 4x$ and $x = 3$
17. Find the area enclosed between the parabola $y = x^2 + 2$ and the line $y = x$ and $x = 1$ and $x = 2$.
18. Find the area in the first quadrant bounded by $y = 4x^2$, $x = 0$, $y = 1$ and $y=4$
19. Find the area lying above x -axis and included between the circle $x^2 + y^2 = 8x$ and the parabola $y^2 = 4x$
20. Find the area bounded by curves $(x - 1)^2 = y^2 = 1$ and $x^2 + y^2 = 1$
21. Find the area enclosed between $y = \sin x$ and $y = \cos x$ for $0 \leq x \leq \frac{\pi}{2}$

22. Find the area bounded by the curves $y = \tan x$ for

$$-\frac{\pi}{3} \leq x \leq \frac{\pi}{3}, y = \cot x \text{ for } \frac{\pi}{6} \leq x \leq \frac{3x}{2} \text{ and x-axis.}$$

23. Find the area of the smaller region enclosed between the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \text{ and the line } \frac{x}{a} + \frac{y}{b} = 1$$

24. Find the area enclosed between the circles $x^2 + y^2 = \frac{9}{4}$ and the parabola $y^2 = 4x$.

25. Compute the area bounded by the line $x + 2y = 2$, $y - x = 1$ and $2x + y = 7$

26. Find the area of the triangle with the vertices $(-1,3)$, $(0,6)$ and $(3,1)$.

27. Find the area of the region

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

28. Find the area of the region

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

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

30. Using integration, find the area of the region bounded by the following curves, after making a rough sketch:

$$y = 1 + |x + 1|, x = -3, x = 3, y = 0$$