ASSIGNMENT CLASS XII AREAS OF BOUNDED REGIONS

1. Sketch the region bounded by $y=2x-x^2$ and x - axis and find its area.
2. Find the area of the region included between the parabolas $y^2=4ax$ and $x^2=4ay$, where $a>0$.
3. Find the smaller area bounded by the curves $x^2+y^2=8$ and $y=|x|$.
4. Find the area of the region $\{(x,y): x^2 \le y \le x\}$.
5. Find the area of the region $\{(x,y): x^2 \le y \le |x|\}$.
6. Find the area bounded by the curves $y^2=4ax$ and the lines $y=2a$ and $y-$axis .
7. Find the area of the region $\{(x,y): x^2+y^2 \le 1 \le x+y\}$.
8. Find the area bounded by the curves $y=x, y=x^3$.
9. Using integration, find area of ΔABC whose vertices have the coordinates:
   (i) $A(2,5), B(4,7)$ and $C(6,2)$ (ii) $A(3,0), B(4,5)$ and $C(5,1)$
10. Find the area of the region bounded by the following curves after making a rough sketch:
    $y=1+|x+1|, x=-3, x=3, y=0$
11. Sketch the graph of $y=|x+1|$. Evaluate $\int_{-3}^{1}|x+1|dx$. What does this value represent on the graph?
12. 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 integration.
13. Find the area bounded by the lines :
    (i) $y=4x+5, y=5-x, 4y=x+5$ (ii) $x+2y=2, y-x=1, 2x+y=7$
14. Sketch the graph of $f(x)=\begin{cases}|x-2|+2 & \text{when } x\le 2\\ x^2-2 & \text{when } x>2\end{cases}$. Evaluate $\int_0^4 f(x)\,dx$. What does this value represent on the graph?
15. Find the area of the smaller region bounded by the ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1$ and the line $\frac{x}{4}+\frac{y}{3}=1$.
16. Find the area of the region enclosed between the circles $x^2+y^2=16$ and $(x+4)^2+y^2=16$.
17. Draw the rough sketch of $y^2=x+1$ and $y^2=-x+1$ and determine the area enclosed by them.
18. Find the area of the region bounded by the curve $y=\sqrt{1-x^2}$, line $y=x$ and the positive $x-axis$.

ANSWERS

1. $\frac{4}{3}$ sq. units 2. $\frac{16}{3}a^2$ sq. units 3. 2π sq. units 4. $\frac{1}{6}$sq. units 5. $\frac{1}{3}$sq. units
6. $\frac{2}{3}a^2$ sq. units 7. $\left(\frac{\pi}{4}-\frac{1}{2}\right)$sq. units 8. $\frac{1}{2}$sq. units 9 (i). 7 sq. units (ii) $\frac{9}{2}$sq. units
10. 16 sq. units 11. 4 12. $\left(\frac{4\sqrt{3}}{3}+\frac{16\pi}{3}\right)$sq. units 13 (i). $\frac{15}{2}$ sq. units (ii) 6 sq. units
14. $\frac{62}{3}$ sq. units , This value represents the area of the region bounded by the given curve and x-axis between $x=0$ to 4. 15. $3(\pi-2)$ sq. units 16. $8\left(\frac{4\pi}{3}-\sqrt{3}\right)$sq. units 17. $\frac{8}{3}$sq. units 18. $\frac{\pi+1}{8}$ sq. units