AREAS

SYNOPSIS

1. The area of the region bounded by the curve y = f(x), X-axis and the lines x = a, x = b is $\left|\int_a^b f(x)dx\right|$. (If curve does not cut x-axis between x = a and x = b).

2. The area of the region bounded by the curve x = f(y), Y-axis and the line y = c, y = d is $\left|\int_c^d f(y)dy\right|$. (If curve does not cut y-axis between y = c and y = d).

3. If f(x) > 0, ∀ x ∈ [a, c] and f(x) < 0, ∀ x ∈ [c, b], then the area bounded by the curve y = f(x), X-axis, the lines x = a, x = b is $\int_a^c f(x)dx - \int_c^b f(x)dx$.

4. Let y = f(x) and y = g(x) are two curves. Then the area between the two curves and the lines x = a, x = b is $\left|\int_a^b (f(x)-g(x))dx\right|$.

5. Let y = f(x), y = g(x) are two curves intersect at x = c (a < c < b) then the area bounded between the given curves and x = a and x = b is $\left|\int_a^c (f(x)-g(x))dx\right| + \left|\int_c^b (f(x)-g(x))dx\right|$.

6. The area of the region bounded by $y^2 = 4ax$ and $x^2 = 4by$ is $\frac{16ab}{3}$ sq. units.

7. The area of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2} = 1$ is π ab sq. units.

8. The area of the circle $x^2 + y^2 = a^2$ is πa^2 sq. units.

9. The area of the region bounded by one arch of sin ax **or** cos ax and X-axis is $\frac{2}{a}$ sq. units.

10. The area of the region bounded by the curve y = sin ax or cos ax and X-axis in [0, nπ] is $\frac{2n}{a}$ sq. units.

11. The area of the region bounded by $y^2 = 4ax$ and $y = mx$ is $\frac{8a^2}{3m^3}$ sq. units.

12. The area of the region bounded by $x^2 = 4ay$ and $y = mx$ is $\frac{8}{3}a^2m^3$ sq. units.