

Chapter-8

Application of Integrals

- The area of the region bounded by the curve $y = f(x)$, x-axis and the lines $x = a$ and $x = b$ ($b > a$) is given by the formula: $Area = \int_a^b y dx = \int_a^b f(x) dx$.
- The area of the region bounded by the curve $x = \phi(y)$, y-axis and the lines $y = c$, $y = d$ is given by the formula: $Area = \int_c^d x dy = \int_c^d \phi(y) dy$
- The area of the region enclosed between two curves $y = f(x)$, $y = g(x)$ and the lines $x = a$, $x = b$ is given by the formula, $Area = \int_a^b [f(x) - g(x)] dx$, where, $f(x) \geq g(x)$ in $[a, b]$
- If $f(x) \geq g(x)$ in $[a, c]$ and $f(x) \leq g(x)$ in $[c, b]$, $a < c < b$, then

$$Area = \int_a^c [f(x) - g(x)] dx + \int_c^b [g(x) - f(x)] dx.$$