

6. INTERGRATION

1. $y = f(x) + C$, where C is an arbitrary constant, is called the indefinite integral of $\frac{dy}{dx} = f'(x)$

2. $\int x^n dx = \frac{1}{n+1}x^{n+1} + C$, where $n \neq -1$.

3. $\int (u + v)dx = \int udx + \int vdx$, where u and v are functions of x .

4. A statement such as $\frac{dy}{dx} = f'(x)$, $\frac{d^2y}{dx^2} + y = \frac{dy}{dx}$, $\frac{d^3y}{dx^3} + \frac{d^2y}{dx^2} = x$, is called a differential equation.

5. The differential equation $\frac{dy}{dx} = f'(x)$ is a first order equation.

6. The solution of a differential equation which contains one or more arbitrary constants is called the general solution of the equation.

7. The conditions which allow you to evaluate the arbitrary constant(s) in the general solution of a differential equation are the boundary conditions.

8. A solution to a differential equation where the value of the arbitrary constant is known is called a particular solution.

9. $\int_a^b f'(x)dx = [f(x)]_a^b = f(b) - f(a)$

provided that $f'(x)$ is the derived function of f throughout the interval (a, b) .

10. The area of the region bounded by the curve $y = f(x)$, the ordinates $x = a$ and $x = b$ and the x -axis can be

found by evaluating the definite integral $\int_a^b f(x)dx$, when it exists.