

DIFFERENTIAL EQUATION

Serial no.	Form	Substitution	Full Differential
1.	$dx \pm dy$	$x \pm y = v$	$d(x \pm y)$
2.	$x \, dx + y \, dy$	$x^2 + y^2 = v$	$\frac{1}{2}d(x^2 + y^2)$
3.	$x \, dy + y \, dx$	$xy = v$	$d(xy)$
4.	$x \, dy - y \, dx$	$y = vx$	$x^2d(\frac{y}{x})$
5.	$y \, dx - x \, dy$	$x = vy$	$y^2d(\frac{x}{y})$
6.	$\frac{x \, dy - y \, dx}{xy}$	$\log \left \frac{y}{x} \right = v$	$d(\log \left \frac{y}{x} \right)$
7.	$\frac{x \, dy - y \, dx}{x^2 + y^2}$	$\tan^{-1} \left(\frac{y}{x} \right) = v$	$d(\tan^{-1} \frac{y}{x})$
8.	$\frac{y \, dx - x \, dy}{x^2 + y^2}$	$\tan^{-1} \left(\frac{x}{y} \right) = v$	$d(\tan^{-1} \frac{x}{y})$
9.	$\frac{x \, dy - y \, dx}{\sqrt{1 - x^2y^2}}$	$\sin^{-1}(xy) = v$	$d(\sin^{-1} xy)$
10.	$\frac{x \, dx + y \, dy}{x^2 + y^2}$	$x^2 + y^2 = v$	$\frac{1}{2}d(\log x^2 + y^2)$

Order of Differential Equation:-

Highest order derivative in a differential equation.

Degree of Differential Equation:-

Power of highest order derivative in a differential equation.

Techniques of solving a Differential Equation

Type 1:- $\frac{dy}{dx} = f(x)$

$dy = f(x)dx$

Type 2:- $\frac{dy}{dx} = P(x)Q(y)$

$\frac{dy}{Q(y)} = P(x)dx$