Applied Mathematics

CSTA Launchpad
Open Mind Guruji

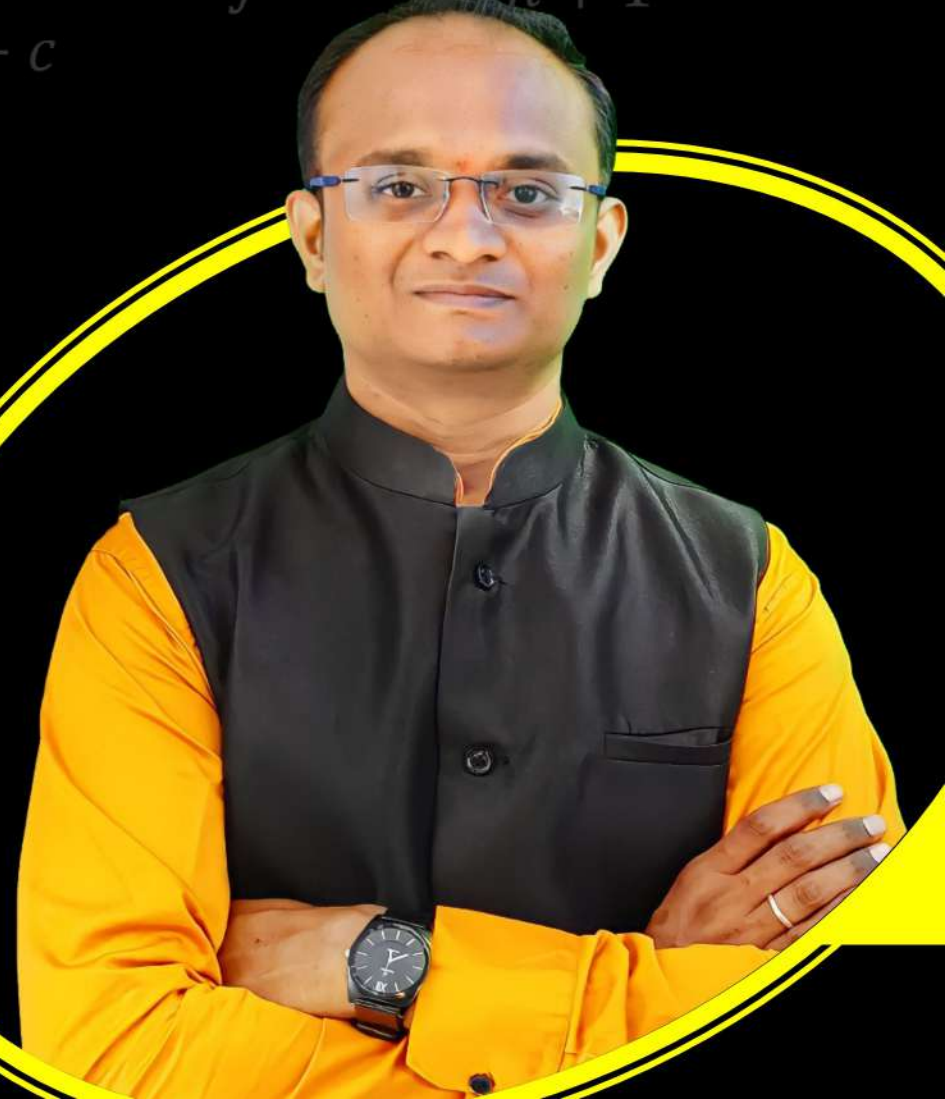
Derivatives of Implicit Functions

Derivatives

2 ND Semester Diploma All Branches

Lec-6

MSBTE -Polytechnic



Applied Mathematics

CSTA Launchpad
Open Mind Guruji
Download App

Derivatives of Implicit Functions

Derivatives

2 ND Semester Diploma All Branches

Lec-6

MSBTE -Polytechnic

1. Find $\frac{dy}{dx}$, if $x^2 + y^2 = 25$

$$2x + 2y\frac{dy}{dx} = 0$$

$$2y\frac{dy}{dx} = -2x$$

$$\frac{dy}{dx} = \frac{-2x}{2y}$$

Ans

$$\frac{dy}{dx} = -\frac{x}{y}$$

Final

=	
+	−
−	+
D ÷	× N
N ×	÷ D

6. Find $\frac{dy}{dx}$, if $13x^2 + 2x^2y + y^3 = 1$

$\frac{d}{dx}x^n = n \cdot x^{n-1}$

$2 \cdot x^{2-1} = 2x^1$

→ given eq.

$$13x^2 + 2x^2y + y^3 = 1 \quad \text{—— (1)}$$

diff. w.r.t x

$$\frac{d}{dx}[13x^2 + 2x^2 \cdot y + y^3] = \frac{d}{dx}[1]$$

$$\frac{d}{dx}13x^2 + \frac{d}{dx}2x^2 \cdot y + \frac{d}{dx}y^3 = \frac{d}{dx}1$$

$$13 \times 2x + 2\frac{d}{dx}[x^2 \cdot y] + 3y^2\frac{d}{dx}y = 0$$

$(u \cdot v)$

$\frac{d}{dx}y \rightarrow \frac{dy}{dx}$

6. Find $\frac{dy}{dx}$, if $13x^2 + 2x^2y + y^3 = 1$

$$26x + 2\frac{d}{dx}(x^2 \cdot y) + 3y^2\frac{dy}{dx} = 0$$

(u v)

$$\frac{d}{dx}[u \cdot v] = u \cdot \frac{d}{dx}v + v\frac{d}{dx}u$$

$$26x + 2\cdot\left[x^2 \cdot \frac{d}{dx}y + y\frac{d}{dx}x^2\right] + 3y^2\frac{dy}{dx} = 0$$

$$26x + 2\left[x^2\frac{dy}{dx} + y \cdot 2x\right] + 3y^2\frac{dy}{dx} = 0$$

$$26x + 2x^2\frac{dy}{dx} + 4xy + 3y^2\frac{dy}{dx} = 0$$

$$2x^2\frac{dy}{dx} + 3y^2\frac{dy}{dx} = -26x - 4xy$$

$$\frac{dy}{dx} \times \left[2x^2 + 3y^2\right] = -26x - 4xy$$

6. Find $\frac{dy}{dx}$, if $13x^2 + 2x^2y + y^3 = 1$

$$\frac{dy}{dx} = \frac{-26x - 4xy}{2x^2 + 3y^2}$$

Final Ans

6. Find $\frac{dy}{dx}$, if $13x^2 + 2x^2y + y^3 = 1$