

# Applied Mathematics



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Derivatives of Parametric Functions

# Derivatives

2 ND Semester Diploma All Branches

Lec-7

MSBTE - Polytechnic



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## Derivatives of Parametric Functions

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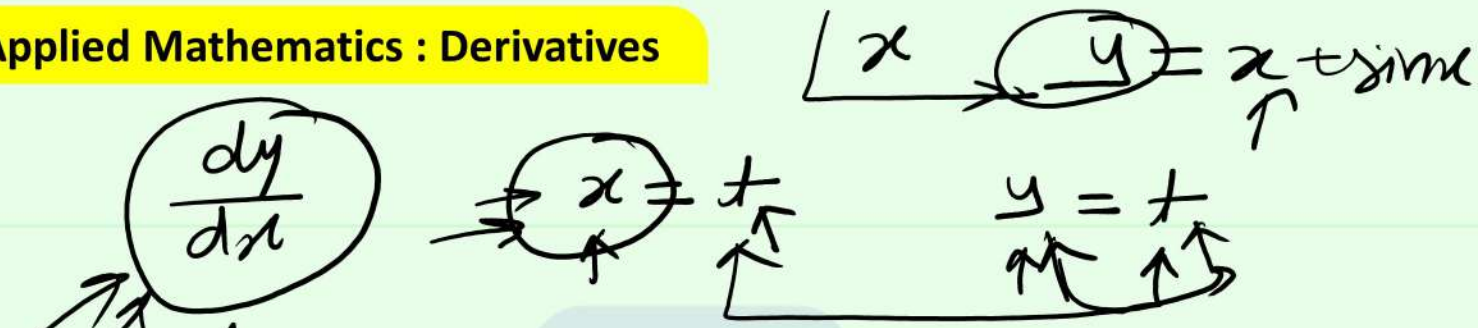
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$$\frac{dx}{dt} \quad \text{--- (1)} \qquad \frac{dy}{dt} \quad \text{--- (2)}$$

$$\frac{\text{eq (2)}}{\text{eq (1)}} = \frac{dy/dt}{dx/dt} = \frac{dy}{dx}$$

$$\frac{2/3}{5/3} = \frac{2}{5}$$

Find  $\frac{dy}{dx}$  if  $x = 4at^2, y = 3at^4$

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

$$t^4 = 4 \cdot t^3$$

→ given eq.

$$x = 4at^2 \quad \text{--- (1)}$$

diff w.r.t t

$$\frac{d}{dt} x = \frac{d}{dt} [4at^2]$$

$$\frac{dx}{dt} = 4a \frac{d}{dt} t^2$$

$$\frac{dx}{dt} = 4a \cdot 2t$$

$$\frac{dx}{dt} = \underline{8at} \quad \text{--- (3)}$$

$$y = 3at^4 \quad \text{--- (2)}$$

diff w.r.t t

$$\frac{d}{dt} y = \frac{d}{dt} [3at^4]$$

$$\frac{dy}{dt} = 3a \frac{d}{dt} t^4$$

$$= 3a \cdot 4t^3$$

$$\frac{dy}{dt} = \underline{12at^3} \quad \text{--- (4)}$$

Find  $\frac{dy}{dx}$  if  $x = 4at^2, y = 3at^4$

eq(4)  
eq(3)

divide eq(4) by eq(3)

$$\frac{\cancel{dy/dt}}{\cancel{dx/dt}} = \frac{\cancel{12}at^{\cancel{3}2}}{\cancel{8}at^{\cancel{2}2}}$$

$$\frac{dy}{dx} = \frac{3t^2}{2}$$

lined

Find  $\frac{dy}{dx}$  if  $x = 4at^2, y = 3at^4$



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