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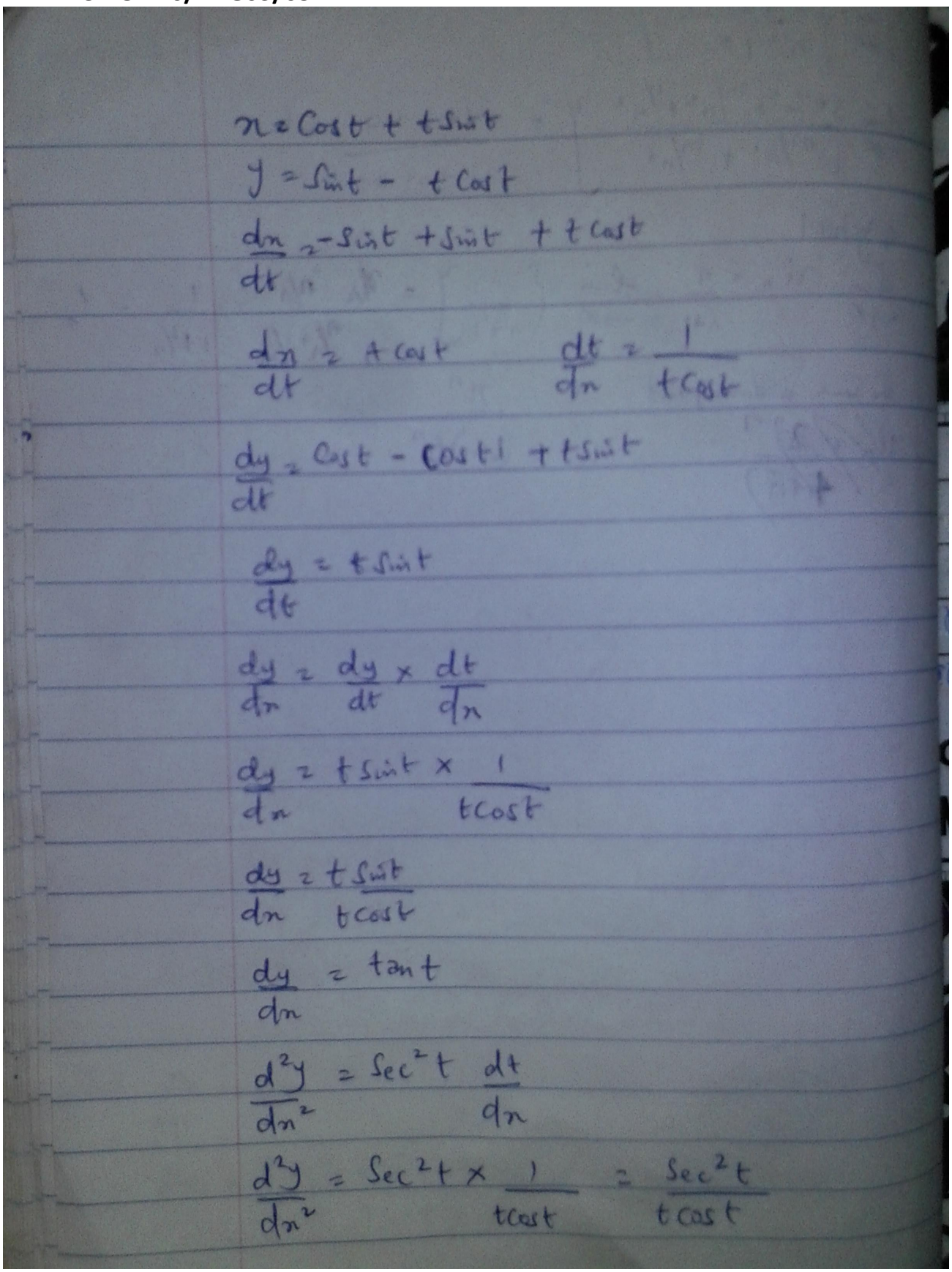
MATRIC NO : 16/ENG03/051



$$x = \cos t + t\sin t$$

$$y = \sin t - t\cos t$$

$$\frac{dx}{dt} = -\sin t + \sin t + t\cos t$$

$$\frac{dx}{dt} = t\cos t \qquad \frac{dt}{dx} = \frac{1}{t\cos t}$$

$$\frac{dy}{dt} = \cos t - \cos t + t\sin t$$

$$\frac{dy}{dt} = t\sin t$$

$$\frac{dy}{dx} = \frac{dy}{dt} \times \frac{dt}{dx}$$

$$\frac{dy}{dx} = t\sin t \times \frac{1}{t\cos t}$$

$$\frac{dy}{dx} = \frac{t\sin t}{t\cos t}$$

$$\frac{dy}{dx} = \tan t$$

$$\frac{d^2y}{dx^2} = \sec^2 t \frac{dt}{dx}$$

$$\frac{d^2y}{dx^2} = \sec^2 t \times \frac{1}{t\cos t} = \frac{\sec^2 t}{t\cos t}$$

Radius of Curvature $= \dfrac{\left(1+\left(dy/dx\right)^2\right)^{3/2}}{\dfrac{d^2y}{dx^2}}$

$$R = \frac{\left(1+\tan^2 t\right)^{3/2}}{\dfrac{\sec^2 t}{t\cos t}}$$

$$R = \frac{\left(\sec^2 t\right)^{3/2}}{\dfrac{\sec^2 t}{t\cos t}}$$

$$R = \sec^3 t \div \frac{\sec^2 t}{t\cos t}$$

$$R = \frac{\sec^3 t \times t\cos t}{\sec^2 t}$$

$$R = \sec t \times t\cos t$$

Recall $\sec t = \dfrac{1}{\cos t}$

$$R = \frac{1}{\cos t} \times t\cos t$$

$$R = t_4$$

$h = x_1 + R\sin t$

$k = y_1 + R\cos t$

$h = \cos t + t\sin t - t\sin t$

$h = \cos t$

$k = \sin t - t\cos t + t\cos t$

$k = \sin t$

Coordinate $(\cos t, \sin t)$