

Tusant abdullatef

Civil Engineering

16/ENG03/053

ENG081

$$\lim_{x \rightarrow \pi/4} \frac{\left(x^2 - \frac{x}{4} \right) \sin(\cos x)}{x - \pi/2}$$

$$\frac{\left(x^2 - \pi/4 \right) \sin(\cos x) \rightarrow \text{undefined}}{\frac{2x}{2} - \frac{x}{2}}$$

$$\lim_{x \rightarrow \pi/4} \frac{\frac{d}{dx} \left(x^2 - \frac{x}{4} \right) \sin(\cos x)}{x - \pi/2}$$

for Numerator

$$y = x^2 - \frac{x}{4} \sin(\cos x)$$

$$u = x^2 - \frac{x}{4}$$

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

$$v = \sin(\cos x)$$

$$\text{let } u = \cos x \quad v = \sin u$$

$$\frac{dy}{dx} = \frac{dv}{du} \times \frac{du}{dx}$$

$$= \cos x \times -\sin u$$

$$u = \cos x$$

$$= -\sin x (\cos x) \cos$$

$$y = uv$$

$$\frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

$$\left(x^2 - \frac{x}{4} \right) - \sin x \cos(\cos x) + \sin(\cos x) 2x$$

$$\frac{dy}{dx} = - \left(x^2 - \frac{x}{4} \right) \sin x \cos(\cos x) + 2x \sin(\cos x)$$