

AMARUET RESURTH  
 15/2003/079  
 CIVIL ENGINEERING  
 60

$$I_9 \quad \lim_{x \rightarrow \pi/2} \frac{\ln \left( x^2 - \frac{\pi}{4} \right) \sin(\cos x)}{x - \pi/2}$$

Solution

L'Hopital rule

$$\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \lim_{x \rightarrow a} \frac{f'(x)}{g'(x)}$$

Product rule

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

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

function of a function

$$\frac{dy}{dx} = -\sin(\cos x)$$

$$y = \cos x \quad ; \quad \frac{dy}{dx} = -\sin x$$

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

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

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

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

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

$$\frac{ds}{dx} = -\sin x [\cos(\cos x)]$$

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