

1a

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16/ENKOS/27

Mechatronics Engineering

ENK 281 Assignment

$$1a \quad \lim_{x \rightarrow \frac{\pi}{2}} \left[\frac{\left[x^2 - \frac{\pi}{2} \right] \sin(\cos x)}{x - \frac{\pi}{2}} \right]$$

solution

$$\frac{u}{v}, \frac{u'}{v'} = ?$$

$$\text{for } u = x^2 \sin(\cos x) - \frac{\pi}{2} \sin(\cos x)$$

$$w = \cos x, \quad y = \sin w$$

$$\frac{dw}{dx} = -\sin x, \quad \frac{dy}{dw} = \cos w$$

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

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

by product rule

$$a = x^2$$

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

$$= \left[\frac{-x^2 \cos(\cos x) (\sin x) + \sin(\cos x) \cdot 2x}{1} + \frac{\pi}{2} \cos(\cos x) \cdot 1 \right]$$