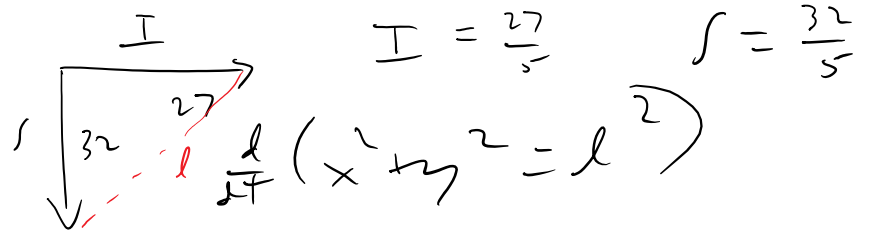


12b



$$x \frac{dx}{dt} + y \frac{dy}{dt} = l \frac{dl}{dt}$$

$$\frac{27}{5} (27) + \frac{32}{5} (32) = 8.374 \frac{dl}{dt}$$

$$y = f(x) = x^{\cot x}$$

Find  $f'(\frac{\pi}{4})$

$$\ln y = \ln x^{\cot x} = \cot x \ln x$$

$$x = e^{\ln x}$$

$$\frac{d}{dx} (\ln y = \cot x \ln x) \rightarrow \frac{1}{y} \frac{dy}{dx} = -\csc^2 x \ln x + \frac{\cot x}{x}$$

$$\frac{dy}{dx} = x^{\cot x} \left( -\csc^2 x \ln x + \frac{\cot x}{x} \right)$$

$$= \frac{\pi}{4} \left( -2 \ln \frac{\pi}{4} + \frac{1}{\frac{\pi}{4}} \right)$$