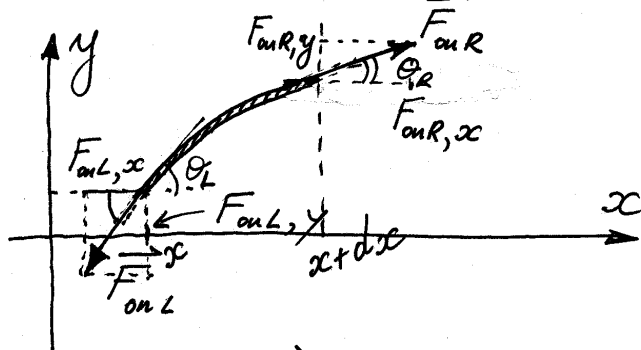


$$\Rightarrow F_{\text{on } W, y} = \left(\frac{m\omega^2}{k} \right) \frac{A}{L} \cos(\omega t), \quad (5b) \quad (17)$$

where we have used that

$$\tan \theta = \text{SLOPE @ } x=0 = \frac{\partial y}{\partial x}(x=0, t)$$

(c) Now, consider a CHUNK OF STRING that is NOT attached to the wall:



The force $\vec{F}_{\text{on } L}$, exerted on the LEFT side of the chunk by the rest of the string has MAGNITUDE τ and components:

$$\begin{cases} F_{\text{on } L, x} = -\tau \cos \theta_L \approx -\tau = -\left(\frac{\omega}{k} \right)^2 \frac{m}{L} \\ F_{\text{on } L, y} = -\tau \sin \theta_L \approx -\tau \tan \theta_L = -\tau \frac{\partial y}{\partial x}(x, t) \\ = -\left(\frac{m\omega^2}{k} \right) \frac{A}{L} \cos(kx) \cos(\omega t) \end{cases} \quad (5c)$$