(d) Similarly, for the RIGHT side of the chunk we find:

$$\begin{cases} F_{on\,R,x} = \tau \cos\theta_R \approx \tau = \underline{\underline{\left(\frac{\omega}{k}\right)^2 \frac{m}{L}}} \\ F_{on\,R,y} = \tau \sin\theta_R \approx \tau \tan\theta_R = \tau \frac{\partial y}{\partial x}(x+dx,t) \end{cases}$$

$$= \underline{\underline{\left(\frac{m\omega^2}{k}\right)\frac{A}{L}\cos(k(x+dx))\cos(\omega t)}} \quad (5d)$$

(e) From (c) & (d), the NET FORCE acting on the chunk (in components) is:

$$\begin{cases} F_{net,x} = F_{on\,L,x} + F_{on\,R,x} \cong -\tau + \tau = \underline{\underline{0}} \\ F_{net,y} = F_{on\,L,y} + F_{on\,R,y} \cong \tau(\tan\theta_R - \tan\theta_L) \end{cases}$$

$$= \underline{\underline{\tau\left[\frac{\partial y}{\partial x}(x+dx,t) - \frac{\partial y}{\partial x}(x,t)\right]}} \quad (5e)$$

$$= \underline{\underline{\left(\frac{m\omega^2}{k}\right)\frac{A}{L}\left[\cos(k(x+dx)) - \cos(kx)\right]\cos(\omega t)}}$$

$$= \underline{\underline{-\left(\frac{m\omega^2}{k}\right)\frac{A}{L}\, 2\sin\left(\frac{k}{2}(2x+dx)\right)\sin\left(\frac{k}{2}dx\right)\cos(\omega t)}}$$