



FIND $V(x)$:

14-19

$$E = K + U$$

$$\text{so } K = E - U$$

$$\frac{1}{2} m v^2 = \frac{1}{2} k x_m^2 - \frac{1}{2} k x^2$$

$$v^2 = \frac{k}{m} (x_m^2 - x^2) \quad , \quad \frac{k}{m} = \omega^2$$

$$v^2 = \omega^2 (x_m^2 - x^2) \Rightarrow v = \pm \omega \sqrt{x_m^2 - x^2}$$

*NOTE: $v = 0$ when $x = x_m$



$\frac{1}{2}$ $v = v_{\text{max}}$ when $x = \underline{\hspace{2cm}}$.