$$E_1 = \frac{1}{2}kx_1^2 \tag{1}$$

$$E_2 = \frac{1}{2}kx_2^2 \tag{2}$$

$$\Delta E = E_2 - E_1 \tag{3}$$

$$= \frac{1}{2}k(x_2^2 - x_1^2) \tag{4}$$

$$\neq \frac{1}{2}k(x_2 - x_1)^2 \tag{5}$$