$$E_{1} = \frac{1}{2}kx_{1}^{2}$$

$$E_{2} = \frac{1}{2}kx_{2}^{2}$$
(1)
(2)

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

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

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

$$\Delta E = E_2 - E_1$$

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

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