

50. Energy conservation, as expressed by Eq. 8-31 (with $W = 0$) leads to

$$\begin{aligned}\Delta E_{\text{th}} &= K_i - K_f + U_i - U_f \\ f_k d &= 0 - 0 + \frac{1}{2} k x^2 - 0 \\ \mu_k m g d &= \frac{1}{2} (200 \text{ N/m}) (0.15 \text{ m})^2 \\ \mu_k (2.0 \text{ kg}) (9.8 \text{ m/s}^2) (0.75 \text{ m}) &= 2.25 \text{ J}\end{aligned}$$

which yields $\mu_k = 0.15$ as the coefficient of kinetic friction.