54. We look for the distance along the incline d which is related to the height ascended by $\Delta h = d \sin\theta$. By a force analysis of the style done in Ch. 6, we find the normal force has magnitude $N = mg\cos\theta$ which means $f_k = \mu_k mg\cos\theta$. Thus, Eq. 8-31 (with $W = 0$) leads to

$$\begin{aligned} 0 &= K_f - K_i + \Delta U + \Delta E_{\text{th}} \\ &= 0 - K_i + mgd\sin\theta + \mu_k mgd\cos\theta \end{aligned}$$

which leads to

$$d = \frac{K_i}{mg(\sin\theta + \mu_k \cos\theta)} = \frac{128}{(4.0)(9.8)(\sin 30^\circ + 0.30\cos 30^\circ)} = 4.3 \text{ m} .$$