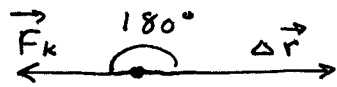


Exercise 8-28

(a) Thermal energy $E_{th} = |\text{work done by friction}|$
 $= |W_{F_k}|$



$$W_{F_k} = F_k \Delta r \underbrace{\cos 180^\circ}_{-1}$$
$$= -F_k \Delta r$$

$$\therefore E_{th} = F_k \Delta r = (7.45 \times 10^3 \text{ N})(49.0 \text{ m}) = 3.65 \times 10^5 \text{ J}$$

$(3.65_0 \times 10^5 \text{ J})$

(b) The thermal energy produced was originally KE of the car.

$$\therefore KE = \frac{1}{2} m v^2 = 3.65_0 \times 10^5 \text{ J}$$

$$v = 87.0 \frac{\text{km}}{\text{h}} \times \frac{1 \text{ h}}{3600 \text{ s}} \times \frac{1000 \text{ m}}{1 \text{ km}} = 24.17 \text{ m/s}$$

$$\Rightarrow m = 1.25 \times 10^3 \text{ kg}$$