2. It depends on whether it slides up or down the ramp.

the work done by the ice worker : $W_1 = \int \vec{F} \cdot d\vec{l}$

$$W_1 = \begin{cases} 50 \times 0.5 = 25\,J & \text{up the ramp} \\ -50 \times 0.5 = -25\,J & \text{down the ramp.} \end{cases}$$

the work done by the gravity is W_2

$$W_1 + W_2 = \Delta E_K \Rightarrow W_2 = \Delta E_K - W_1$$

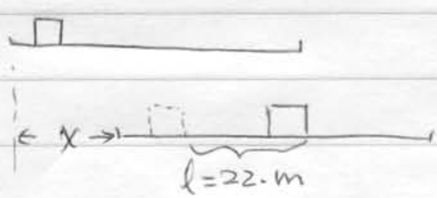
If there is no rope.

$$\Delta E_K' = W_2 = \Delta E_K - W_1$$

$$= \begin{cases} 80 - 25 = 55\,J & \text{up the ramp} \\ 80 + 25 = 105\,J & \text{down the ramp.} \end{cases}$$

So $\Delta E_K' - \Delta E_K = W_1 = \begin{cases} 25\,J & \text{up the ramp} \\ -25\,J & \text{down the ramp.} \end{cases}$

4. The combined system of the car and the halt has mass: $M_{car} + M_{yacht}$
$= 1800 + 5800 = 7600\,kg$, velocity $v = \dfrac{m_{car} v_{car}}{m_{car} + m_{yacht}} \doteq 54.5\,km/hr \doteq 15.1\,m/s$

initially  $t = 0$ acceleration: $a = \dfrac{v_{car} - v}{t}$

finally $t = t$ acceleration: a'

$$l = S_{car} - S_{yacht} = v_{car} t - \tfrac{1}{2} a t^2 + \tfrac{1}{2} a' t^2$$

According to Newton's third law: $\dfrac{|a|}{|a'|} = \dfrac{m_{yacht}}{m_{car}}$

$$l = v_{car} t - \tfrac{1}{2} a t^2 - \tfrac{1}{2} a t^2 \frac{m_{yacht}}{m_{car}}$$

$$= v_{car} t - \tfrac{1}{2} a t^2 \left(1 + \frac{m_{car}}{m_{yacht}}\right) = v_{car} t - \tfrac{1}{2} (v_{car} - v) t \left(1 + \frac{m_{car}}{m_{yacht}}\right)$$

then

$$t \left[v_{car} - \tfrac{1}{2} (v_{car} - v) \times \left(1 + \frac{m_{car}}{m_{yacht}}\right) \right] = l.$$