

55. The Carnot efficiency (Eq. 21-11) depends linearly on  $T_L$  so that we can take a derivative

$$\varepsilon = 1 - \frac{T_L}{T_H} \implies \frac{d\varepsilon}{dT_L} = -\frac{1}{T_H}$$

and quickly get to the result. With  $d\varepsilon \rightarrow \Delta\varepsilon = 0.100$  and  $T_H = 400$  K, we find  $dT_L \rightarrow \Delta T_L = -40$  K.