

47. (a) We use  $\varepsilon = |W/Q_H|$ . The heat absorbed is

$$|Q_H| = \frac{|W|}{\varepsilon} = \frac{8.2 \text{ kJ}}{0.25} = 33 \text{ kJ} .$$

(b) The heat exhausted is then

$$|Q_L| = |Q_H| - |W| = 33 \text{ kJ} - 8.2 \text{ kJ} = 25 \text{ kJ} .$$

(c) Now we have

$$\begin{aligned} |Q_H| &= \frac{|W|}{\varepsilon} = \frac{8.2 \text{ kJ}}{0.31} = 26 \text{ kJ} \\ \text{and } |Q_C| &= |Q_H| - |W| = 26 \text{ kJ} - 8.2 \text{ kJ} = 18 \text{ kJ} . \end{aligned}$$