23. (a) The efficiency is

$$\varepsilon = \frac{T_{\mathrm{H}} - T_{\mathrm{L}}}{T_{\mathrm{H}}} = \frac{(235 - 115)\,\mathrm{K}}{(235 + 273)\,\mathrm{K}} = 0.236 = 23.6\% \ .$$

We note that a temperature difference has the same value on the Kelvin and Celsius scales. Since the temperatures in the equation must be in Kelvins, the temperature in the denominator is converted to the Kelvin scale.

(b) Since the efficiency is given by $\varepsilon = |W|/|Q_{\mathrm{H}}|$, the work done is given by

$$|W| = \varepsilon |Q_{\mathrm{H}}| = 0.236(6.30 \times 10^4\,\mathrm{J}) = 1.49 \times 10^4\ \mathrm{J} \ .$$