EXAMPLE: More exergetic efficiencies

Reconsider the waste heat recovery system from a previous example. The heat exchanger takes hot combustion gases and uses them to heat steam, which in turn passes through a turbine. The gases can be modeled as air treated as an ideal gas with variable specific heats. The surroundings are at $T_0 = 25\,^\circ\text{C}$ and $P_0 = 101\,\text{kPa}$.

Based on your previous results,

(a) find the exergetic efficiency of the turbine, $\varepsilon_T$.
(b) How does the answer to part (a) compare to $\eta_T$? Explain?
(c) find the exergetic efficiency of the heat exchanger, $\varepsilon_{HXR}$.
(d) find the exergetic efficiency of the entire waste heat recovery system, $\varepsilon$.
(e) Does $\varepsilon = \varepsilon_{HXR} \cdot \varepsilon_T$? Explain.