[tex34] **Dieterici equation of state**

The Dieterici equation of state of a fluid system reads

$$p = \frac{nRT}{V - nb} \exp\left(-\frac{an}{RTV}\right),$$

where a, b are phenomenological constants.

(a) Show that the pressure, volume, and temperature at the critical point are

$$p_c = \frac{a}{4b^2e^2}, \qquad V_c = 2nb, \qquad T_c = \frac{a}{4Rb}.$$

(b) Rewrite the Dieterici equation of state as a relation between the dimensionless quantities $\bar{p} \equiv p/p_c$, $\bar{V} \equiv V/V_c$, $\bar{T} \equiv T/T_c$ (law of corresponding states).