[tex29] **Assembling thermodynamic information**

The following thermodynamic information is known about $n = 1$mol of a system:

- At constant temperature T_0, the work done on the system when it is compressed from V_0 to V is $\Delta W_0 = -RT_0 \ln(V/V_0)$.

- The entropy is $S(T, V) = R(V_0/V)(T/T_0)^a$, where V_0, T_0, a are constants.

Use this information to determine (i) the Helmholtz freee energy $A(T, V)$, (ii) the equation of state $f(p, V, T) = 0$, and (iii) the work of compression ΔW done at an arbitrary temperature T.