[tex43] **Reconstructing the equation of state of a gas**

It is found for a gas that $\alpha_p = RV/np + aV/nT^2$ and $\kappa_T = T(V/n)f(p)$, where a is a constant and $f(p)$ is an unknown function.

(a) Find the function $f(p)$ which makes the two response functions thermodynamically consistent.

(b) Reconstruct the equation of state $g(V,T,p) = 0$ from the two response functions.