Problem Set 3
Due Date: April 23, 2007 at NOON

3.1 Exercise 3.4 from Hansen, Kawaler, & Trimble (second edition).

3.2 Consider an ideal monatomic gas with temperature $T$ and number density $n$.
   (a) How is the volume density of the gas internal energy (due to thermal motions) $E$ connected to the mean kinetic energy of the particle $< \mathcal{E}(p) >$, where $p$ is linear momentum?
   (b) Use the Maxwell-Boltzmann distribution to derive the mean kinetic energy and hence the expression for $E$. How does your result compare to the expression for $E$ derived from the distribution function directly?

3.3 (extra undergraduate credit) Exercise 3.7 from Hansen, Kawaler, & Trimble (second edition).