Problem E3:

According the the text, the energy distribution function for atoms in a gas can be written in the form

$$g(E) = C\, E^{\frac{1}{2}}\, e^{-E/kT}$$

where C is a constant. Use this formula to find the average energy of the atoms. You can work this problem without ever determining the constant C, if you integrate by parts and make use of the fact that $g(E)$ is normalized.