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.