Problem E14:

Find the following quantities for an electron in the ground state of hydrogen:

(a) The expectation value of $r$.

(b) The expectation value of the potential energy $V = -\frac{e^2}{4\pi\epsilon_0 r}$. (Note that $\langle \frac{1}{r} \rangle$ is not the same as $\frac{1}{\langle r \rangle}$.)

(c) The expectation value of the kinetic energy. Here you can make use of the fact that $\langle KE \rangle + \langle V \rangle = E$. 