6-8)

The *Lennard-Jones potential* attempts to model the forces between two atoms in a diatomic molecule (*e.g.*, H_2).

$$U(r) = C\left(\frac{r_o^{12}}{r^{12}} - 2\frac{r_o^6}{r^6}\right),$$

where r is the separation of the molecules' centers, r_o is the equilibrium separation, and C is a constant that depends on the type of atoms in the molecule.

a) Find the expression for the force one atom exerts on the other as a function of their separation.
b) Show that the force is indeed zero when $r = r_o$.
c) Show that this force is repulsive when $r < r_o$, and attractive when $r > r_o$.