Problem 59. Two small spheres of mass $m$ are suspended from strings of length $l$ that are connected at a common point. One sphere has charge $Q$, and the other has charge $2Q$. The strings make angles $\theta_1$ and $\theta_2$ with the vertical. (a) How are $\theta_1$ and $\theta_2$ related? (b) Assume that $\theta_1$ and $\theta_2$ are small. Show that the distance $r$ between the spheres is given by

$$r \approx \left( \frac{4k_e Q^2 l}{mg} \right)^{1/3}$$

(1)