

52. (a) Since the two conductors are connected V_1 and V_2 must be the same.
- (b) Let $V_1 = q_1/4\pi\epsilon_0 R_1 = V_2 = q_2/4\pi\epsilon_0 R_2$ and note that $q_1 + q_2 = q$ and $R_2 = 2R_1$. We solve for q_1 and q_2 : $q_1 = q/3$, $q_2 = 2q/3$.
- (c) The ratio of surface charge densities is

$$\frac{\sigma_1}{\sigma_2} = \frac{q_1/4\pi R_1^2}{q_2/4\pi R_2^2} = \left(\frac{q_1}{q_2}\right) \left(\frac{R_2}{R_1}\right)^2 = 2 .$$