$$U = \frac{1}{4\pi\varepsilon_0}\frac{Q}{a} - \left(\frac{1}{4\pi\varepsilon_0}\frac{Q}{a}\right)$$

$$U = \frac{Q}{2\pi\varepsilon_0 a} \qquad \bar{E} = \frac{Q}{\varepsilon_0 \pi a^2}\,d\bar{r}$$

$$I = \int_S \bar{j}\,d\bar{S} = \frac{1}{\rho}\int_S \bar{E}\,d\bar{S} = \frac{1}{\rho}\frac{Q}{\varepsilon_0}$$

$$R = \frac{U}{I} = \frac{\frac{Q}{2\pi\varepsilon_0 a}}{\frac{Q}{\rho\varepsilon_0}} = \frac{\rho}{2\pi a}$$

$$\int E\,dS = \frac{Q}{\varepsilon_0}$$