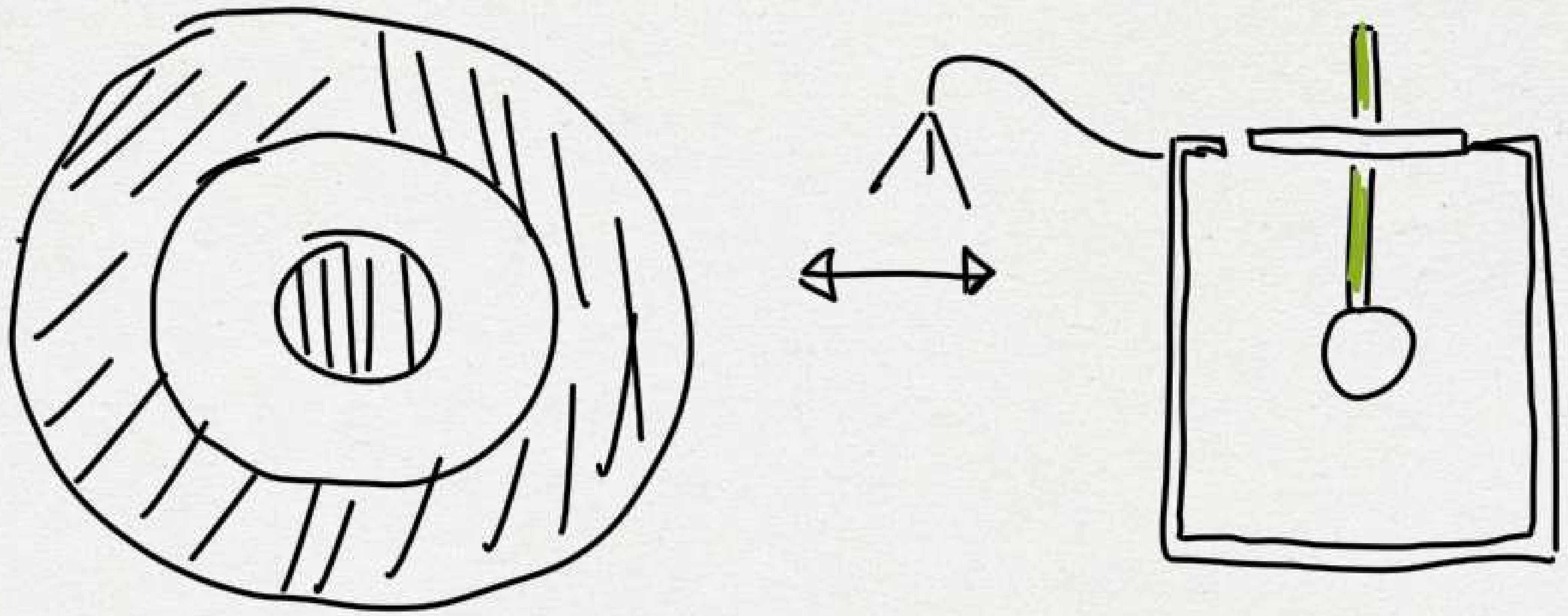
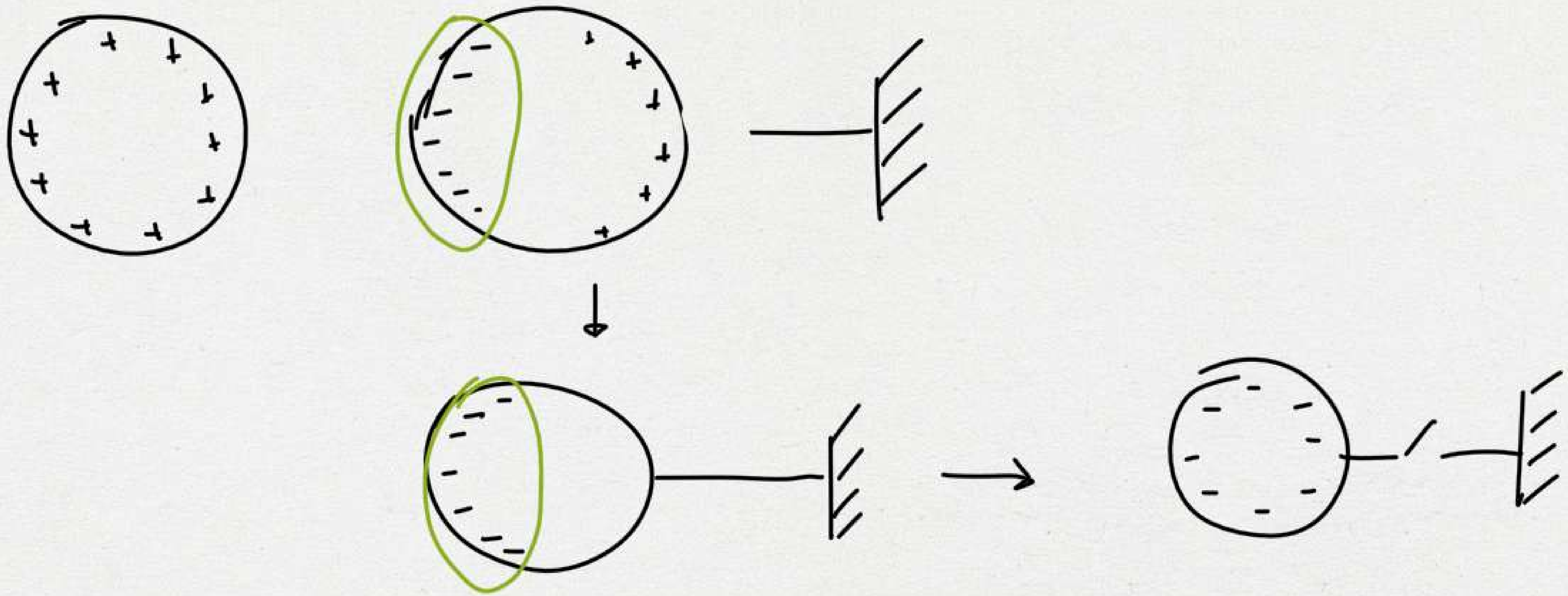
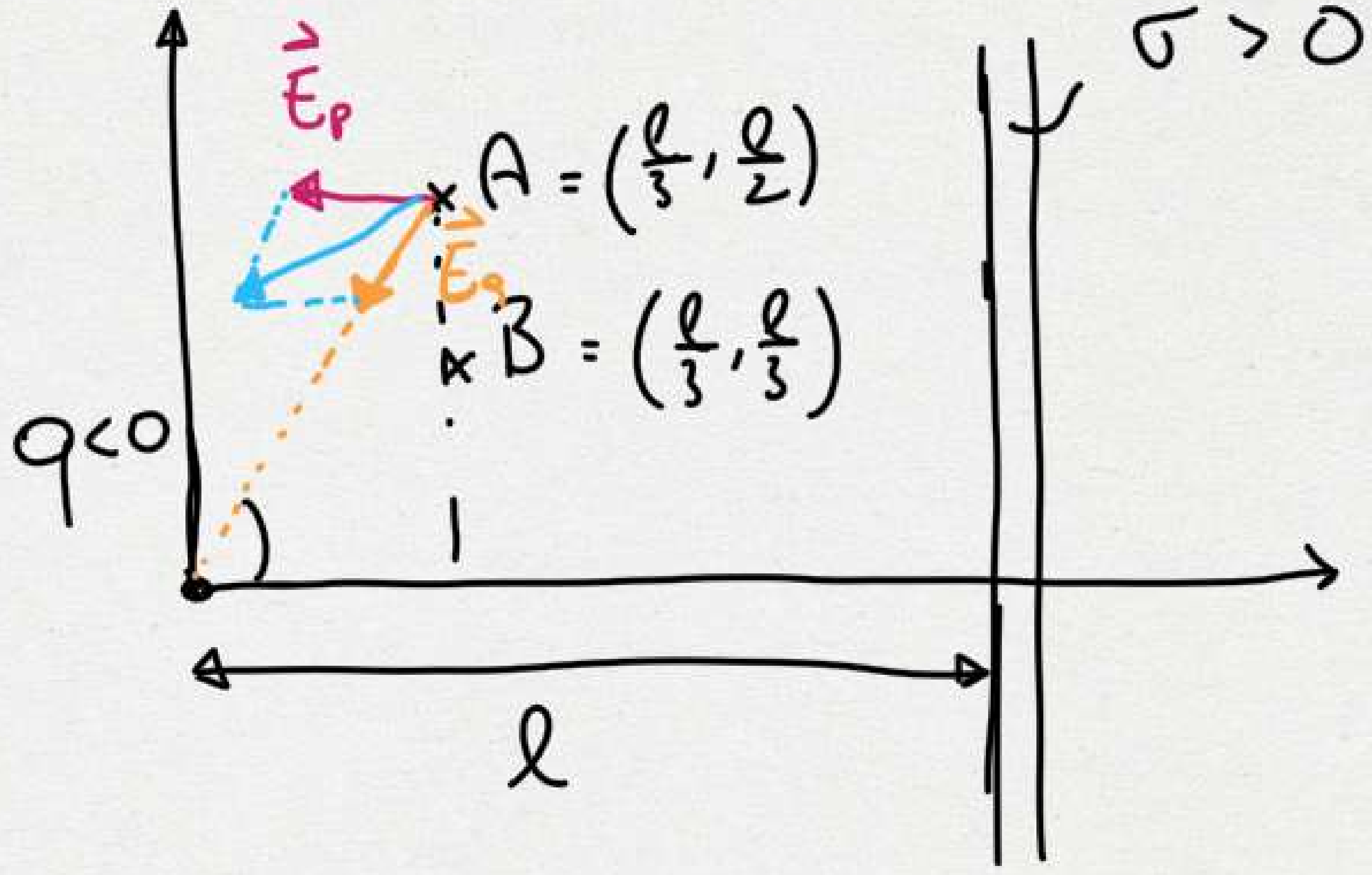






$$\vec{E} = \vec{E}_p + \vec{E}_q$$

$$\vec{E}_p = -\frac{\sigma}{2\varepsilon_0}\hat{x}$$

$$\vec{E}_q = \frac{q}{4\pi\varepsilon_0}\frac{\hat{r}_A}{r_A^2} =$$

$$= (E_x, E_y)$$

$$\vec{r}_A = \left(\frac{l}{3}, \frac{l}{2}\right)$$

$$r_A = \sqrt{\frac{l^2}{9} + \frac{l^2}{4}} = l\sqrt{\frac{13}{36}} = \frac{\sqrt{13}}{6}l$$

$$\hat{r}_A = \frac{\vec{r}_A}{r_A} = \frac{6}{\sqrt{13}}\left(\frac{1}{3}, \frac{1}{2}\right) =$$

$$= \frac{1}{\sqrt{13}}(2, 3)$$

$$\vec{E}_q = \frac{q}{4\pi\varepsilon_0}\frac{1}{\sqrt{13}}\frac{36}{13 l^2}(2,3) \Rightarrow$$

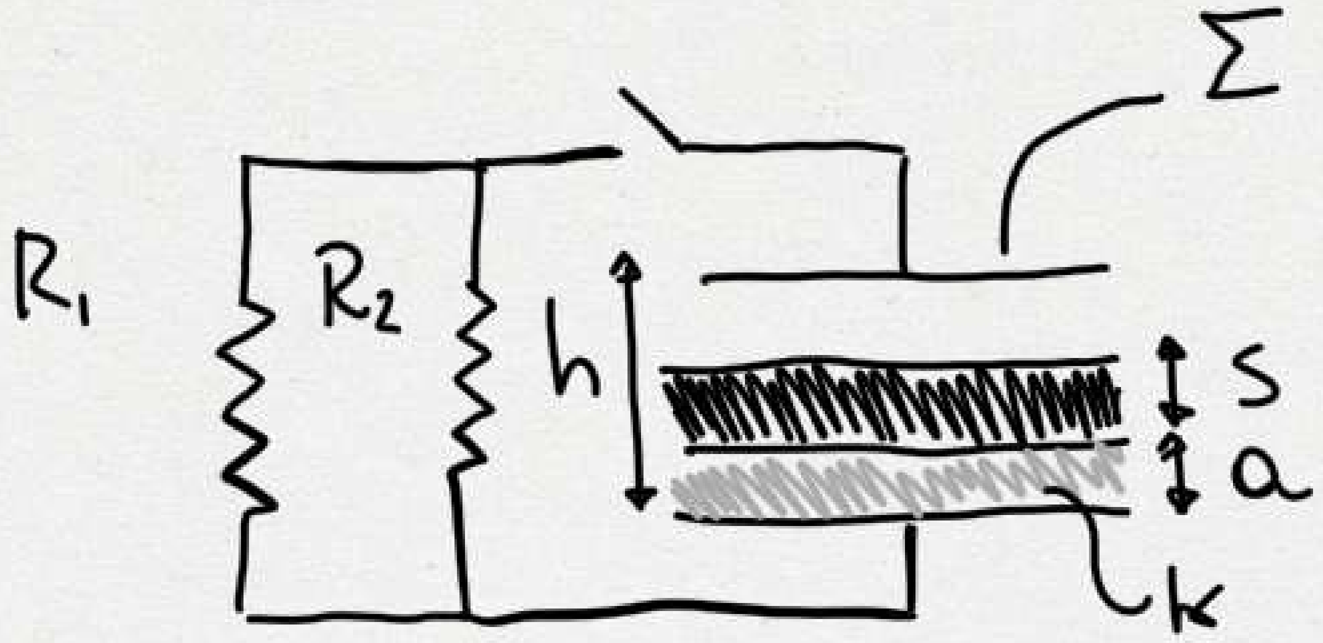
$$\vec{E} = \left(\underbrace{-\frac{\sigma}{2\varepsilon_0} + \frac{q}{\pi\varepsilon_0}\frac{18}{13\sqrt{13}\,l^2}}_{<0}, \underbrace{\frac{q}{4\pi\varepsilon_0}\frac{27}{13\sqrt{13}\,l^2}}_{<0}\right)$$

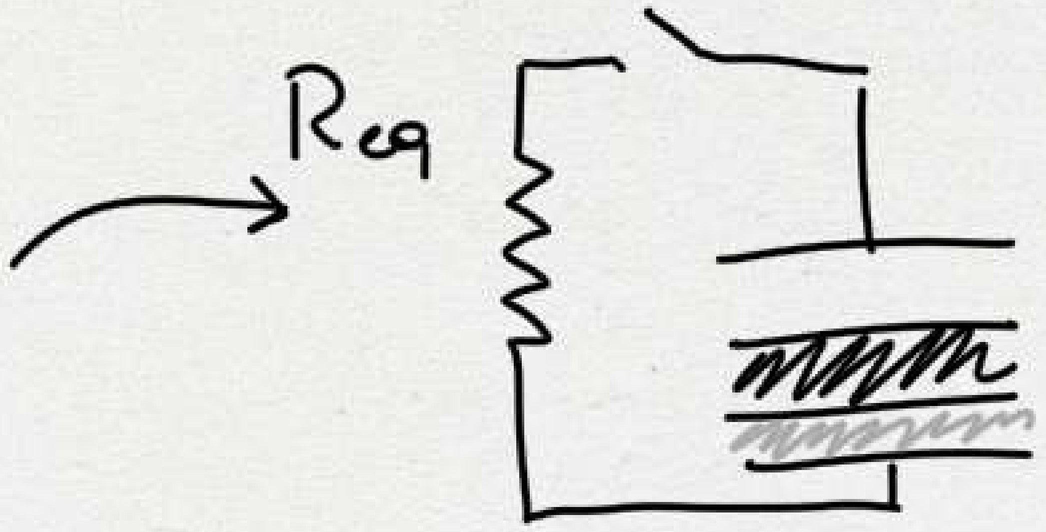
$$\Delta V = -\int \vec{E}\cdot d\vec{s} = \int (E_x, E_y)\cdot d\vec{s}$$

$$\Delta V = V(A) - V(B) = V_q(A) - V_q(B) =$$

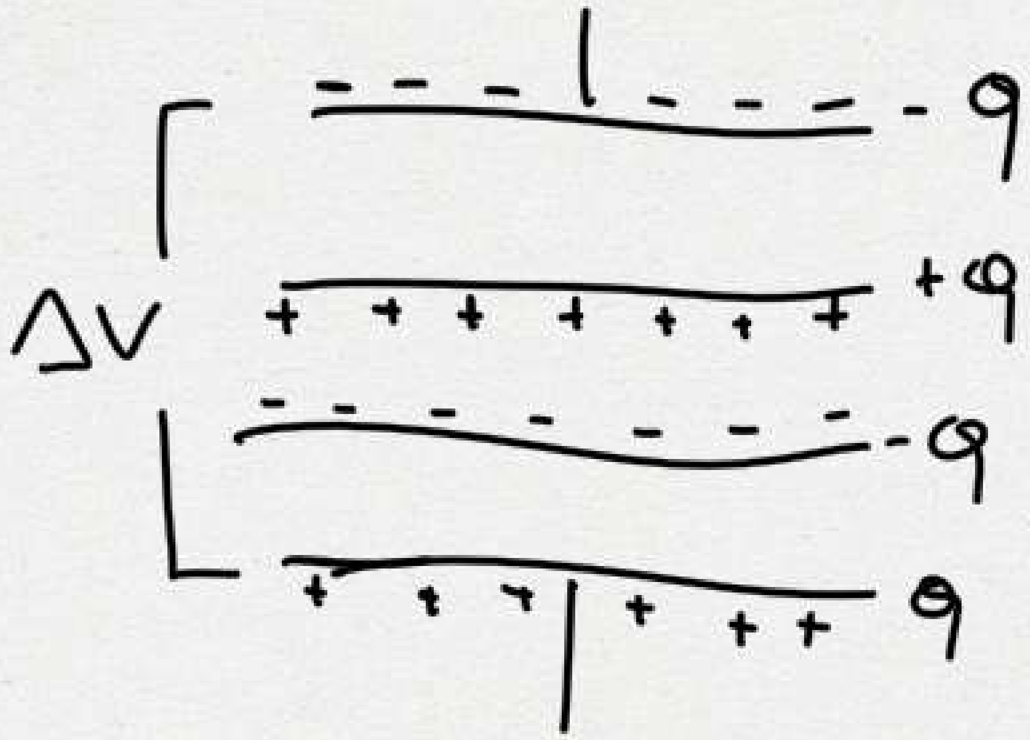
$$= \frac{q}{4\pi\varepsilon_0}\left(\frac{1}{r_A} - \frac{1}{r_B}\right) = \frac{q}{4\pi\varepsilon_0 l}\left(\frac{6}{\sqrt{13}} - \frac{3}{\sqrt{2}}\right) = -41\,V$$

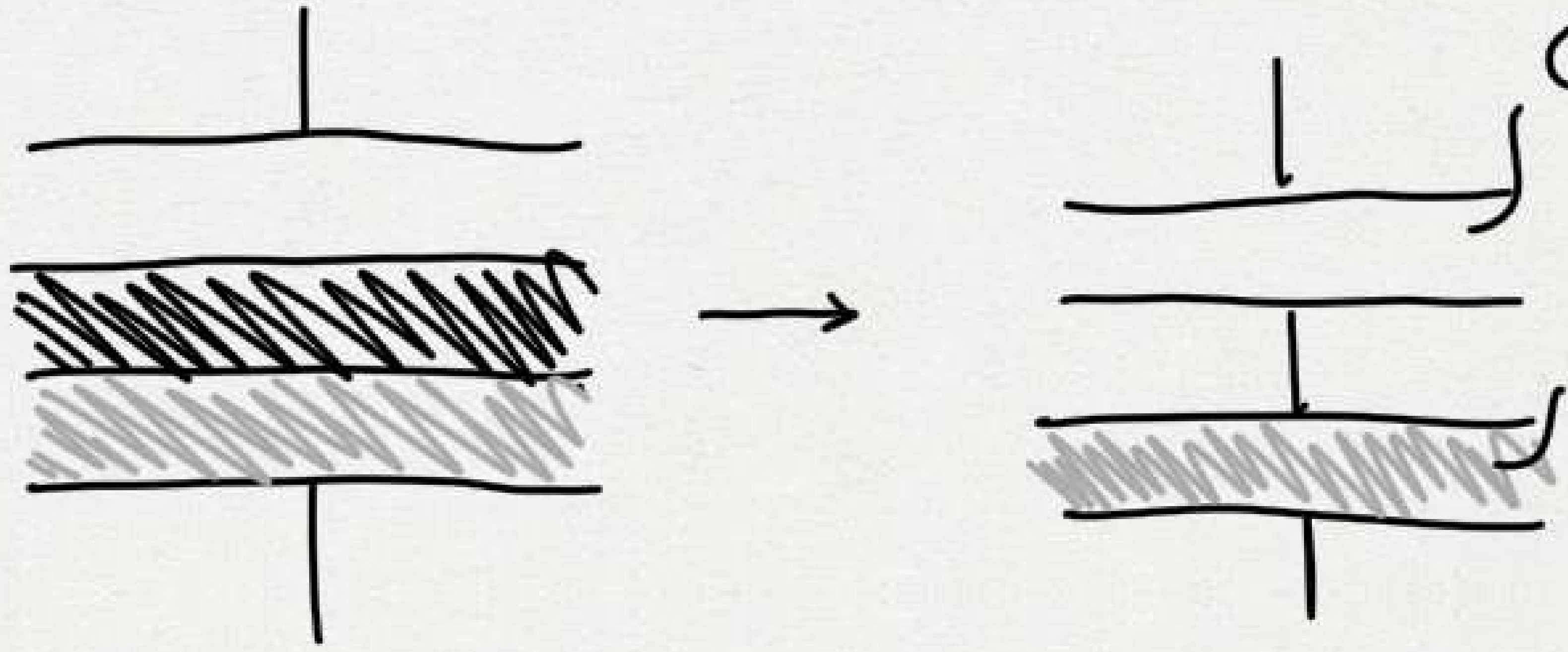
$$r_B = l\sqrt{\frac{1}{9} + \frac{1}{9}} = l\,\frac{\sqrt{2}}{3}$$





$$R_{eq} = \frac{R_1 R_2}{R_1 + R_2}$$



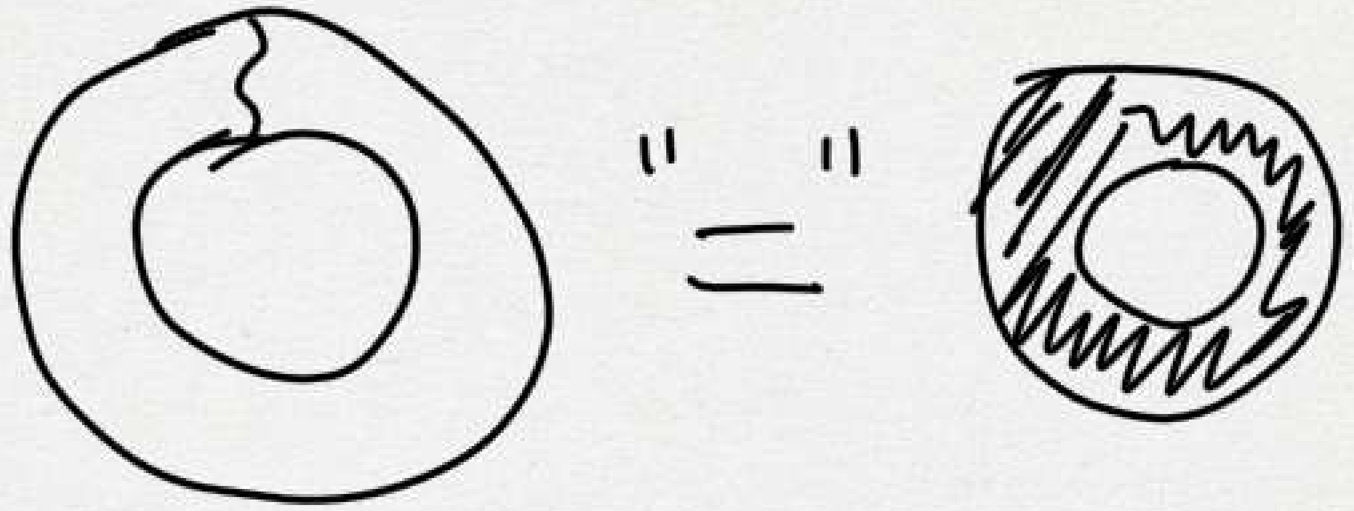


$$C_v = \frac{\Sigma \varepsilon_0}{a}$$

$$C_d = \frac{\Sigma \varepsilon_0}{a} k$$

$$C_{eq} = \frac{C_v C_d}{C_v + C_d}$$

$$C_{eq} = \frac{q}{\Delta V} , \quad \Delta V = E_d a + E_v a = \frac{q}{\Sigma} \frac{a}{\varepsilon_0 k} + \frac{q}{\Sigma} \frac{a}{\varepsilon_0}$$



$\Delta V,\ q = ?$

$q = C_{eq} \Delta V$

3) $U_{diss} = U_0 - U_\infty = U_c - 0 = \frac{1}{2} C_{eq} \Delta V^2 = \frac{1}{2} q \Delta V$