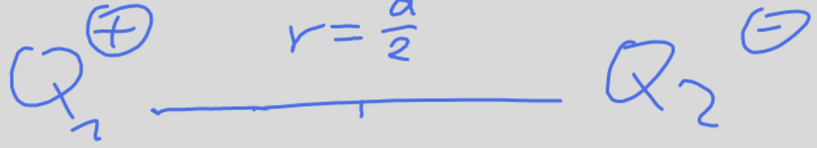

$$E = k \cdot \frac{Q}{r^2}$$

$$E_1(r) = k \cdot \frac{Q}{r^2}$$

$$E_2(r) = \begin{cases} k \cdot \frac{Q}{(r-a)^2} & r > a \\ k \cdot \frac{Q}{(a-r)^2} & r < 0 \end{cases}$$

$$E_{ges}(r) = E_1(r) - E_2(r)$$

$$= k \cdot Q \cdot \left(\frac{1}{r^2} - \frac{1}{(r-a)^2} \right) \quad r > a$$

$$= k \cdot Q \cdot \left(\frac{1}{r^2} - \frac{1}{(a-r)^2} \right) \quad r < 0$$

$$E_1(r) = E_2(r)$$

$$\frac{1}{r^2} = \frac{1}{(a-r)^2}$$

$$r^2 = (a-r)^2$$

$$r^2 = a^2 - 2ar + r^2 \quad | -r^2$$

$$0 = a^2 - 2ar \quad | +2ar$$

$$2ar = a^2 \quad | :2a$$

$$r = \frac{1}{2}a$$

$$\frac{1}{r^2} = \frac{1}{(r-a)^2}$$

$$r^2 = r^2 - 2ar + a^2 \quad | -r^2$$

$$0 = -2ar + a^2 \quad | +2ar$$

$$2ar = a^2 \quad | :2a$$

$$r = \frac{1}{2}a$$