Electrostatic Potential
Electrick Field
] relationship $V_{(p)} = \int_{Ref.}^{P} \vec{E} \cdot d\vec{l}$

Concept of Capacitance
Arrangements — parallel
Series

$\vec{E} = |E| \hat{a}$

$\Delta V = -\vec{E} \cdot \Delta \vec{l}$

$= -|E| \Delta l \cos\theta$

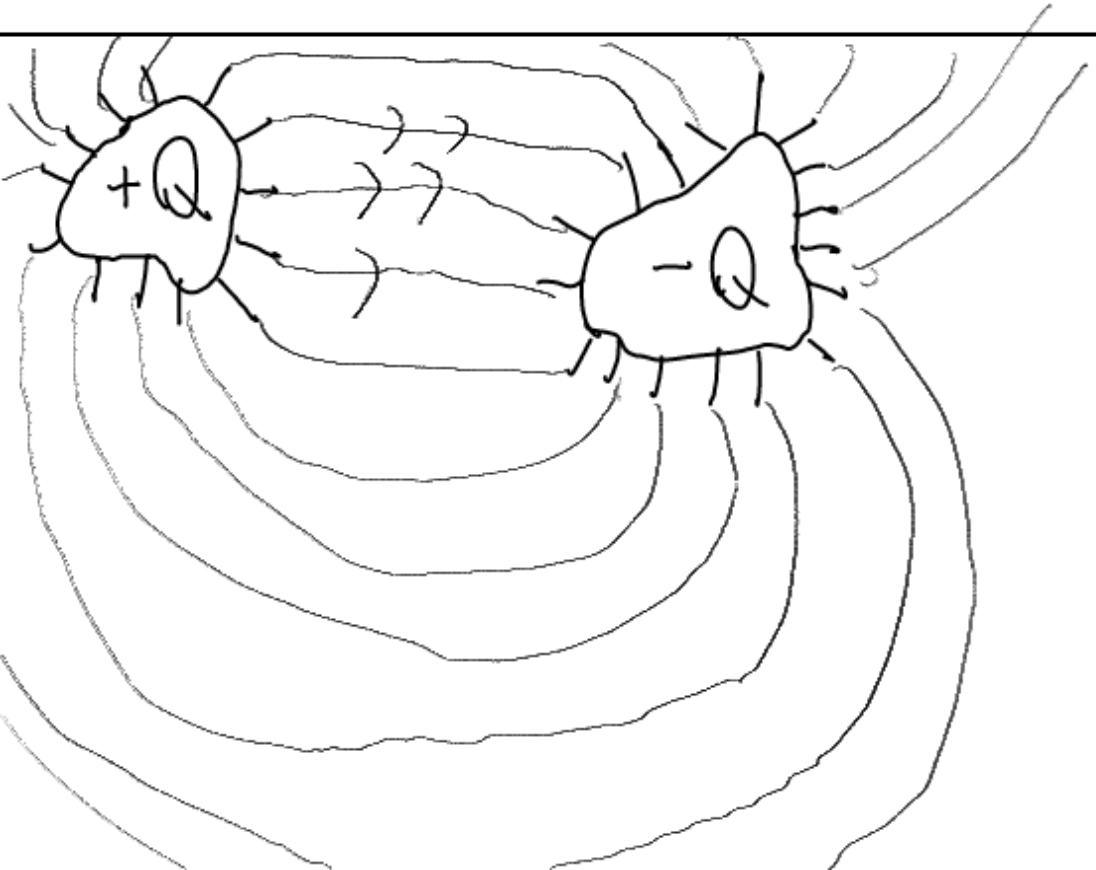
$\frac{\Delta V}{\Delta l} = -|E| \cos\theta$

$\left.\frac{dV}{dl}\right|_{Max} = |E|$

$-\left.\frac{dV}{dl}\right|_{max} \hat{a}_e = \vec{E}$

$-\frac{dV}{dN} \hat{a}_e = \vec{E}$

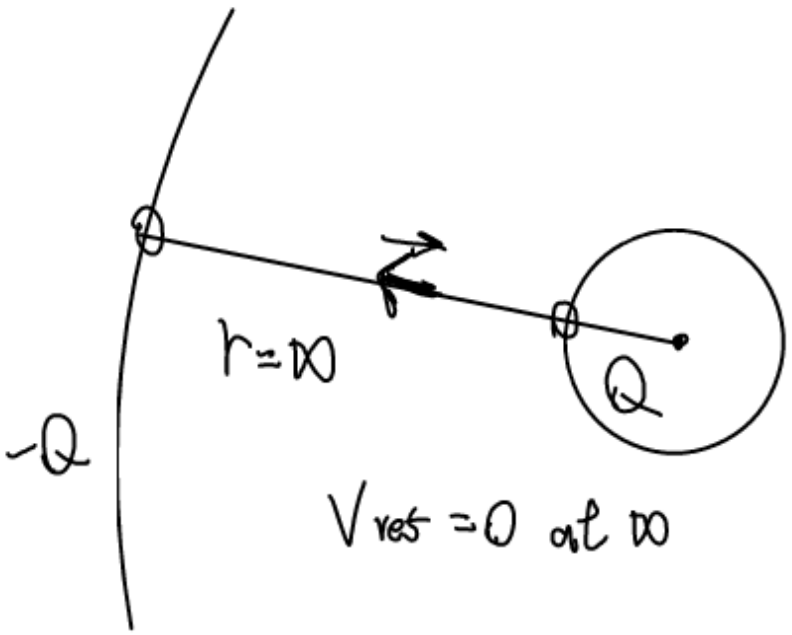
N = number of field lines



$$C = \frac{Q}{\Delta V}$$

$\Delta V \equiv$ pot. Δ between the 2 conductors

$$= -\int_{①}^{②} \vec{E} \cdot d\vec{l}$$



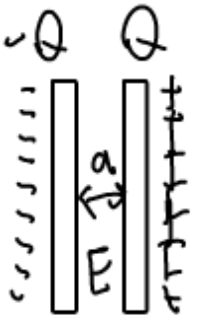
$$V_{(p)} = -\int_{(\infty)}^{r} \vec{E} \cdot d\vec{l}$$

$$= \int_{r}^{\infty} \frac{Q}{4\pi\epsilon_0 r^2} dr$$

$$= \frac{Q}{4\pi\epsilon_0 r}$$

$$C\Big|_{\text{sphere}} = \frac{Q}{\Delta V} = \frac{Q}{Q} 4\pi\epsilon_0 a \Longleftarrow V\Big|_{\text{sphere}} = \frac{Q}{4\pi\epsilon_0 a} \text{ - sphere}$$

$$= 4\pi\epsilon_0 a$$



$$E = \frac{\rho_s}{\epsilon_0}$$