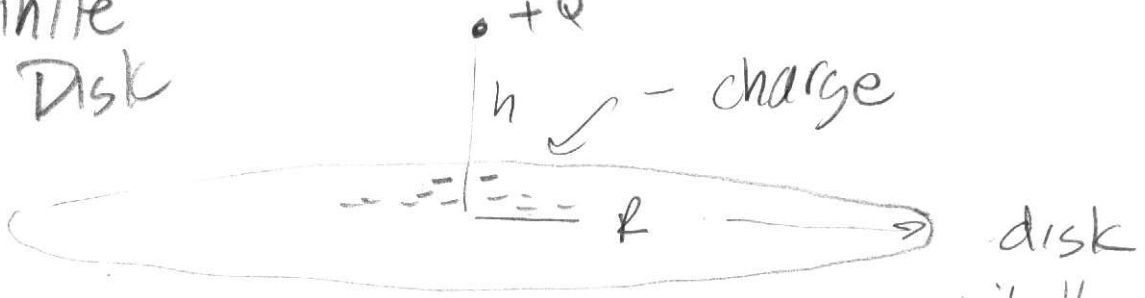
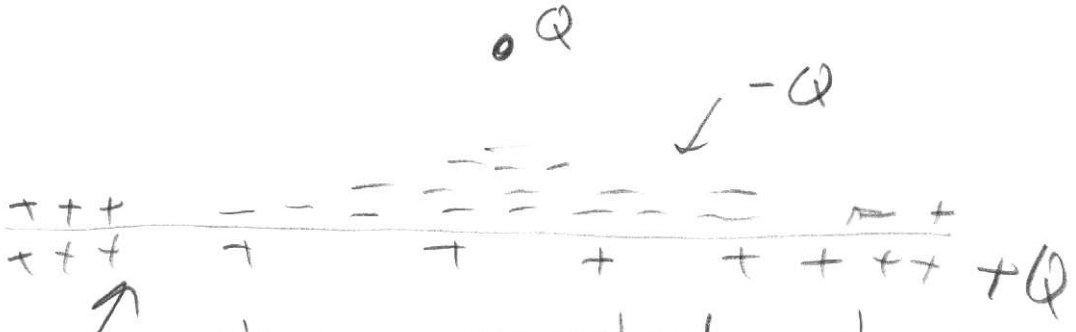
Finite Disk




side view

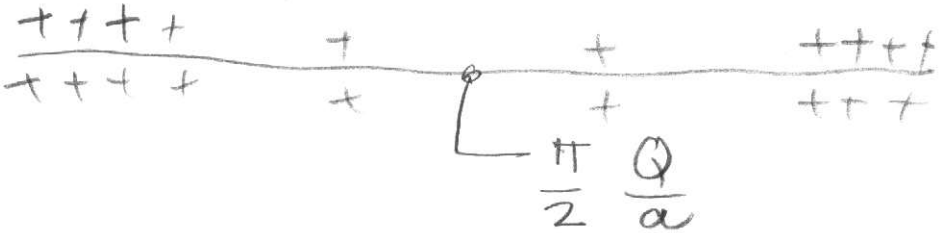



+ charge consistent with a constant potential, $-Q$ "shields" $+Q$

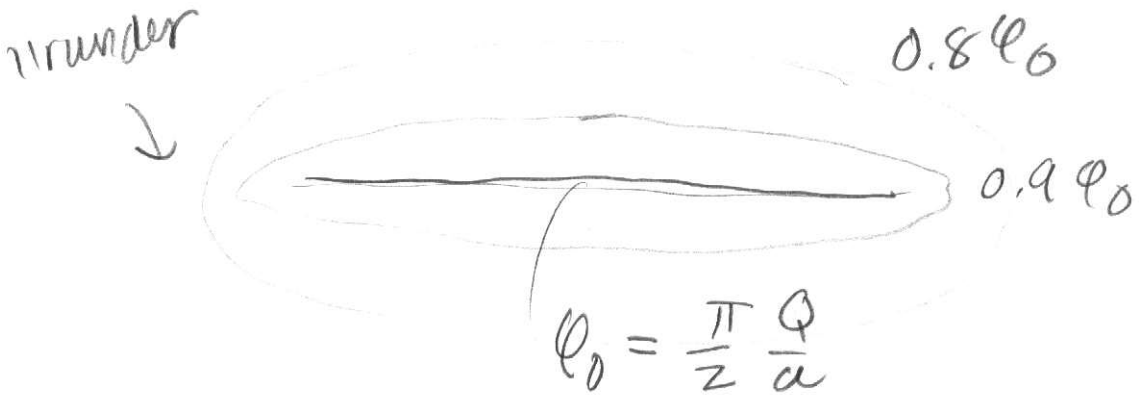
"sticky" disk:

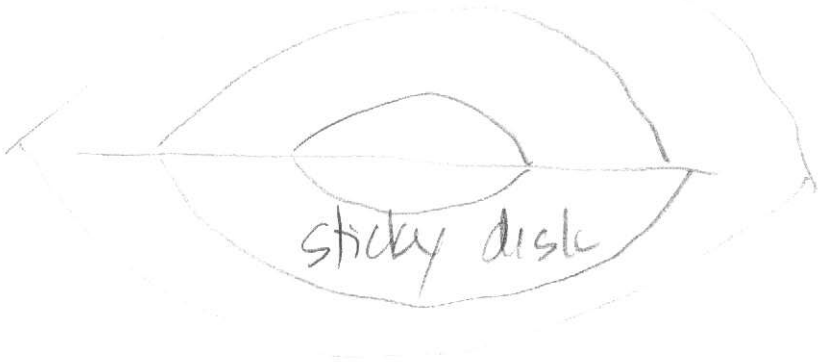

$Q = \pi a^2 \sigma$ $\quad 2\pi\sigma a = \frac{2Q}{a}$ $\quad 4\sigma a = \frac{4}{\pi}\frac{Q}{a}$

conducting disk



# Equipotentials "oblate spheroids" footballs



Imagine conducting disk at a constant potential...

charge tries to spread out!

edge-on view

$\sigma$ low

$\sigma$ big

$\varrho \neq 0$

$\varrho > 0$ (Q on it...)

Q on conducting disk

$\varrho = \left(\frac{\pi}{2a}\right) Q$

# Capacitance

Consider an isolated conductor; its electric potential, relative to infinity, is $\phi_0$. The charge on the conductor is $Q$.

Should not be too surprising that:

$$\phi_0 \propto Q$$

argument: $\phi_0 \propto \int_{\infty}^{\text{surface}} \vec{E} \cdot d\vec{s}$, $\vec{E} \propto Q$

Example: sphere:


$$\phi_0 = \frac{Q}{a}$$

Constant of proportionality is called ... 1/capacitance

$$\phi_0 = \left(\frac{1}{a}\right) \cdot Q$$

Memorize "$Q = C \cdot V$"

or $Q = a \cdot \phi_0 \equiv C\phi_0$