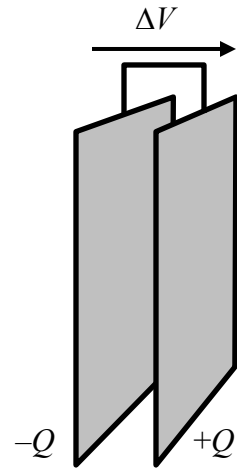

PHYS 1220-02 Group Work Sheet
Capacitors

1. Two parallel conducting plates of equal area A spaced a distance D apart are charged with opposite charges $+Q$ and $-Q$. Let's see how the potential difference between the plates depends on the separated charge.



- a. What is the electric field magnitude at a position near the surface of one plate?
- b. What is the electric field magnitude between the two plates?
- c. What amount of work is needed to move a charge $+q$ from the negative plate to the positive plate?
- d. What is the voltage between the plates?
- e. What is the voltage rule in terms of charge Q ?
- f. What is the capacitance of the device?

2. Let's find the energy needed to charge the plates of the capacitor to $\pm Q$.
 - a. When the plates are charged to $\pm q$, how much work dW is needed to move charge $+dq$ from the negative plate to the positive plate?
 - b. To put charges of $\pm Q$ on the plates of the capacitor, you'd start from $q = 0$ and continue until $q = Q$. To find the work required, you'd integrate dW from $q = 0$ to $q = Q$. Go ahead and do that.
 - c. Express the work in terms of:
 Q and V Q and C V and C
3. A 600 nF capacitor is charged to a voltage of 50 V.
 - a. What is the charge on the plates?
 - b. How much energy is stored in the capacitor?