Electrostatic Potential

• Reminder: **Electric Field** = electric force acting on a probe charge q, divided by q:

$$\vec{E} = \frac{\vec{F}_{elect}}{q}$$

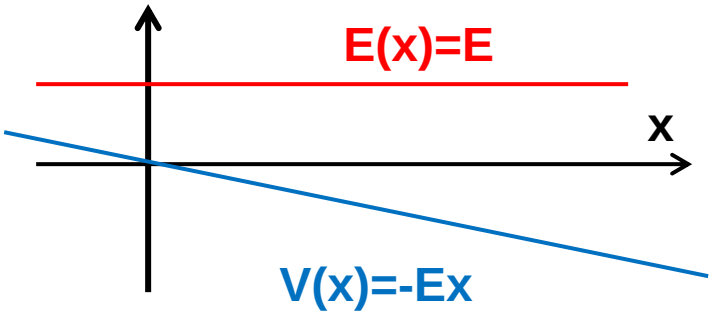
• Similarly, **Electrostatic Potential** = electrostatic potential energy divided by charge. It is also known as Voltage, since SI unit of potential is Volt (V):

$$V = \frac{U_{elect}}{q}$$

• **Example.** Consider constant electric field E(x)=E,(as inside a capacitor). Potential energy change = - Work:

$$\Delta U_{elect} = -F_{elect}\Delta x = -Eq\Delta x$$

$$V(x) = \frac{U_{elect}}{q} = -Ex$$



Homework

A capacitor is made of two parallel metallic plates separated by distance **h=1mm**. Area of each plate is A=1cm. The capacitor is attached to a 3 Volt battery as shown below. Find the charge Q at each of the plates.

Note: electric field inside a capacitor is $4\pi kQ/A$.