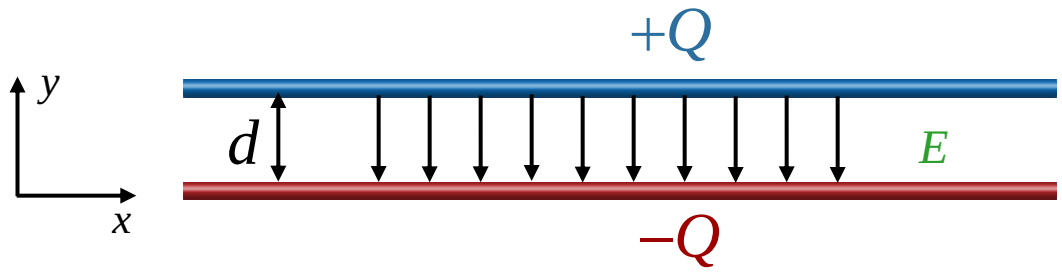
# Example (done in Prelecture 7)




$$E = \frac{\sigma}{\varepsilon_o}$$

What is σ ?

$$\sigma = \frac{Q}{A}$$

$A$ = area of plate

Second, integrate $E$ to find the potential difference $V$

$$V = -\int_0^d \vec{E} \cdot d\vec{y} \quad \rightarrow \quad V = -\int_0^d (-E dy) \quad = E\int_0^d dy \quad = \frac{Q}{\varepsilon_o A} d$$

As promised, $V$ is proportional to $Q$ !

$$C \equiv \frac{Q}{V} = \frac{\cancel{Q}}{\cancel{Q} d / \varepsilon_o A} \quad \rightarrow \quad C = \frac{\varepsilon_0 A}{d}$$

$C$ determined by geometry !