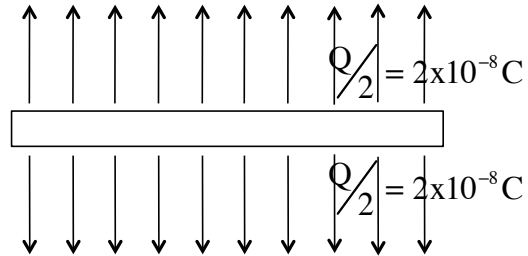


### Problem 24.44

Again, what's tricky about this is the fact that the charge on the conductor will be distributed over *both* sides of the sheet. Playing this out, we get:

a.) charge density?

$$\begin{aligned}\sigma &= \frac{\text{charge}}{\text{area}} \\ &= \frac{2 \times 10^{-8} \text{ C}}{(.5\text{m})(.5\text{m})} \\ &= 8 \times 10^{-8} \text{ C/m}^2\end{aligned}$$



b.) What is E above the plate:

$$\begin{aligned}E &= \frac{\sigma}{\epsilon_0} \\ &= \frac{8 \times 10^{-8} \text{ C/m}^2}{(8.85 \times 10^{-12} \text{ C}^2 \cdot \text{m}^2 / \text{N})} \\ &= 9 \times 10^3 \text{ N/C}\end{aligned}$$

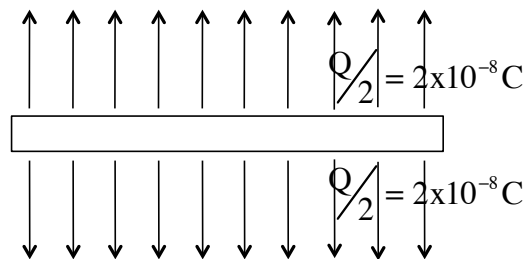
$$\Rightarrow \vec{E} = (9 \times 10^3 \text{ N/C})(+\hat{j})$$

1.)

b.) What E above the plate:

This will have the same magnitude as the field above the plate, but with a unit vector in the negative direction, or

$$\vec{E} = (9 \times 10^3 \text{ N/C})(-\hat{j})$$



2.)