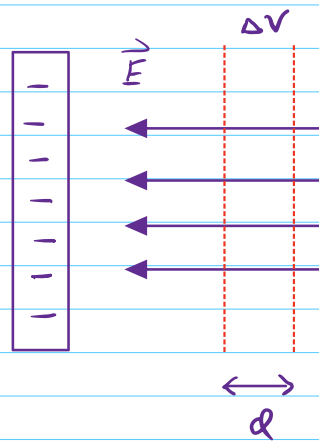


23.42

- A very large plastic sheet carries a uniform charge density of -6.00 nC/m^2 on one face. (a) As you move away from the sheet along a line perpendicular to it, does the potential increase or decrease? How do you know, without doing any calculations? Does your answer depend on where you choose the reference point for potential? (b) Find the spacing between equipotential surfaces that differ from each other by 1.00 V . What type of surfaces are these?



(a) Moving away from the sheet means V increases. The electric field points towards negative charges, and also points from high to low V .

\therefore moving away from the sheet increases E .

$$(b) \quad \sigma = -6.00 \text{ nC/m}^2$$

$$E = \frac{\sigma}{2\epsilon_0} = 338.8 \text{ V/m}$$

Recall $|\Delta V| = |Ed|$ for a uniform field.

$$1.00 \text{ V} = 338.8 \frac{\text{V}}{\text{m}} \cdot d$$

$$d = 0.00295 \text{ m}$$

These surfaces are planes parallel to the original sheet of charge.