

1. Two large parallel sheets of charge with uniform charge densities are separated by a distance that is small compared with their dimensions. One sheet carries a positive charge density of $+6.8 \mu\text{C}/\text{m}^2$, and the other a negative charge density of $-4.3 \mu\text{C}/\text{m}^2$.

What is the electric field (magnitude and direction) (a) to the left of the positive sheet; (b) in the region between the two sheets; and (c) to the right of the negative sheet?

Answer: (c) $1.4 \times 10^5 \text{ N/C}$

2. An infinite line of positive charge of charge density λ lies along the z axis. A second line of negative charge density -2λ lies parallel to the z axis at the location $x = d, y = 0$.

Calculate the electric field in the xy plane at the locations

(a) $x = d/2, y = 0$

(b) $x = 2d, y = 0$

(c) $x = 0, y = d$

Answer: (c) $E_x = \lambda / 2\pi\epsilon_0 d, \quad E_y = ???$