Special Problem 5-3.4

Two slabs of dissimilar **dielectric** material share a common **boundary**, as shown below.

It is known that the electric flux density in region 1 (the left side) is:

$$\mathbf{D}_1(\bar{r}) = 6\,\varepsilon_0\,\hat{a}_x + 14\,\varepsilon_0\,\hat{a}_y \quad \left[{}^{C}\!/\!{}_{m^2}\right]$$

while the electric flux density in region 2 (the right side) is likewise a constant of the form:

$$\mathbf{D}_2(\bar{r}) = D_x\,\hat{a}_x + D_y\,\hat{a}_y \quad \left[{}^{C}\!/\!{}_{m^2}\right]$$

Determine (in terms of ε_0):

1) the **electric flux density** in region 2 (i.e., find D_x and D_y).
2) the **electric field** in region 2.
3) the **polarization (i.e., bound) surface charge density** at the dielectric boundary.