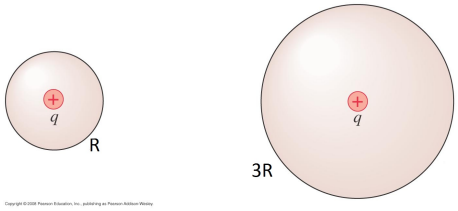
PHYS 212 Homework Assignment

Chapter 6

Problem 1 Two spheres of radius R and $3R$ both enclosing a positive charge q. How do the fluxes through each sphere compare to each other?



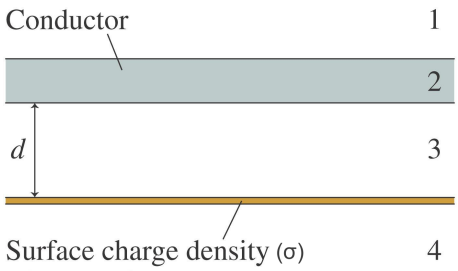
Problem 2 A 3.0 cm x 5.0 cm rectangle lies in the xy-plane. What is the flux through the rectangle if:

(a) $\vec{E} = (50\hat{i} + 60\hat{j})$ N/C

(b) $\vec{E} = (20\hat{i} + 40\hat{k})$ N/C

Problem 3 You measure the electric field very close to the surface of a charged disk and find that it is 1500 N/C pointing away from the disk. What is the surface charge density of the disk?

Problem 4 The figure below shows two infinite planes parallel do each other, separated by a distance d. One is a neutral conductor and the other is a material with a surface charge density σ. What are the electric fields $\vec{E}_1$, $\vec{E}_2$, $\vec{E}_3$ and $\vec{E}_4$ in regions 1 to 4?



Problem 5 A very long, uniformly charged cylinder has radius R and linear charge density λ. Find the cylinder's electric field:

(a) Outside the cylinder, $r \geq R$.

(b) Inside the cylinder, $r \leq R$.

(c) Show that your answers agree at the boundary $r = R$.