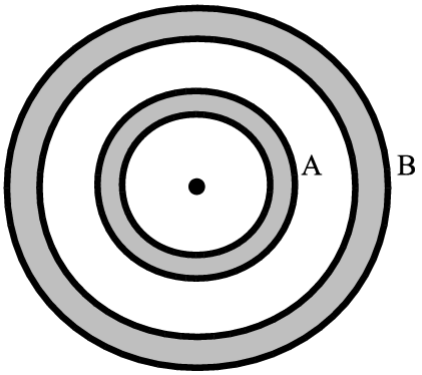
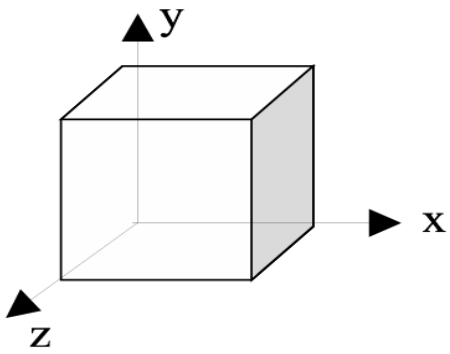
Homework #2

1- A charged particle is held at the center of two concentric conducting spherical shells. A cross section is shown in the figure. If the charged particle at the center has charge +2 μC, and the two conducting shells A and B have charges −3 μC and +4 μC deposited on them, respectively, what is the charge on the inner surface of shell B?.



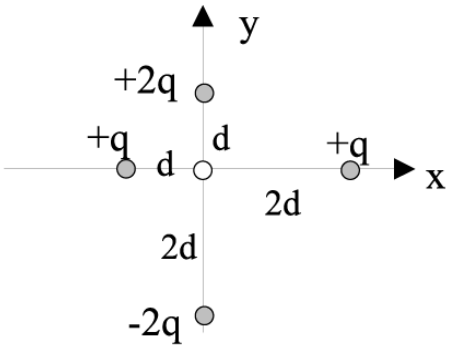
Answer: +1 μC

2- What is the flux through the right side face of the shown cube if the electric field is given by $\underline{E} = -2x\underline{i} + 3y\underline{j}$ and the cube has a side length of 2?



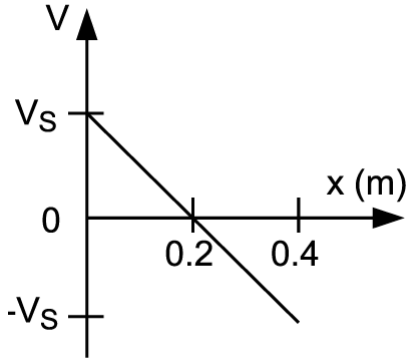
Answer: −16

3- In the figure shown, what is the net electric potential at the origin of the coordinate system due to the four other charged particles if V=0 at infinity? Express your answer in terms of the constants q, d, and k = $1/4\pi\varepsilon_o$.



Answer: 5kq/(2d)

4- The figure shows a graph of the electric potential as a function of x. The scale of the vertical axis is set by V_S = 200 V. What is x component of the force acting on a proton located at x = 0.2 m?



Answer: 1.6 × 10−16 N