Phys 110A Homework 3; Due Thurs 9/15

1. (More Gauss's Law problems!)

A) Find the E-field inside the bulk of a solid sphere with charge density that increases with radius, as $\rho=kr^3$. k is a known constant.

B) Find the E-field outside a long solid cylinder of radius "a", with a charge density that increases with radius as $\rho=kr^2$. k is a known constant.

2. Show that the type of E-field you get in our symmetric Gauss's Law problems must necessarily have no "curl". (Use the appropriate coordinates for each case:)

A) Spherical symmetry

B) Cylindrical Symmetry

C) Planar Symmetry

Hint: just use the "curl" definitions in the front of the book.

3. Problem 2.21 (Use Gauss's Law as starting point.) (Same in 3rd edition).

4. Show that applying Poisson's equation to your answer in the previous question gives the correct result. (Check both inside and outside; don't worry about the exact surface!)