

Physics 385, Fall 2007
Electromagnetism (I); Grader: Yi Zhang

Prof. Bartynski
Due Fri. 28-Sept. 2007

PROBLEM SET 4

Reading: Griffiths, Chapters 2.3.

1. Griffiths 1.28
2. Griffiths 1.31
3. Find an expression for the electrostatic potential both inside and outside the spherical charge distribution described in Griffiths 2.14. Do so by performing the integral $V(\vec{r}) = -\int_{\infty}^r \vec{E} \cdot d\vec{l}$ [using $\mathbf{E}(\mathbf{r})$ that you calculated last week] from ∞ to a point a distance r from the center of the sphere. Assume that $V(\infty) = 0$.
4. Repeat problem (3) but use: $V(\vec{r}) = \frac{1}{4\pi\epsilon_0} \int \frac{\rho d\tau'}{\mathfrak{R}}$ where $\mathfrak{R} = |\vec{r} - \vec{r}'|$.
5. Griffiths 2.24
6. Griffiths 2.30