PHY505 - Classical Electrodynamics
Homework No. 5
Due: Monday, October 14, 2002

1. Jackson 2.4

2. Let $\phi_S(\vec{x})$ be the arbitrarily given value of $\phi$ on the surface of a sphere of radius $R_0$.
   (a) Show that $\phi(\vec{x}_p)$ at any point inside the sphere is given by
   $$\phi(\vec{x}_p) = \frac{R_0^2 - R_p^2}{4\pi R_0} \int dS \frac{\phi_S(\vec{x})}{r^3}$$
   where $R_p = |\vec{x}_p|$, and $r$ is the distance from $\vec{x}_p$ to the integration point on the sphere.
   (b) Find the corresponding solution of the problem for points outside of the sphere.

3. Jackson 1.21