PHYS 621 – HOMEWORK # 6 – DUE FRIDAY, 10/09/2009

Problem 1. Show that the Green function for a flat two dimensional circular wedge of angle β and radius a is

$$G(\rho,\rho',\varphi,\varphi') = \sum_{n=1}^{\infty} \frac{4}{n} \rho_-^{n\pi/\beta} \left[\rho_+^{-n\pi/\beta} - \left(\frac{\rho_+}{a^2} \right)^{n\pi/\beta} \right] \sin(n\pi\varphi/\beta) \, \sin(n\pi\varphi'/\beta) \,,$$

where ρ and φ are the two-dimensional polar coordinates, and $\rho_- = \mathrm{Min}(\rho,\rho')$, $\rho_+ = \mathrm{Max}(\rho,\rho')$.

Problem 2. A flat conducting ring of infinitesimal thickness, internal radius a, and external radius b is uniformly charged with total charge Q.

(a) Write the three-dimensional charge distribution density in cylindrical coordinates;

(b) Find the potential outside the ring.

Problem 3. Jackson problem 3.7.