Physics 410 Homework 14:

1. (7 pts) **Reflective heat shield and Kirchhoff’s law.** Consider a plane sheet of material of absorptivity $a$, emissivity $e$, and reflectivity $r = 1-a$. Let the sheet be suspended between and parallel with two black sheets maintained at temperatures $T_u$ and $T_l$. Show that the net flux density of thermal radiation between the black sheets is $(1 - r)$ times the flux density when the intermediate sheet is also black, which is the solution to this problem in the limit that $a = e = 1; r = 0$. Liquid helium dewars are often insulated by many, perhaps 100, layers of an aluminized Mylar film called Superinsulation.

2. (5 pts) Problem 7.57 from Schroeder.
3. (5 pts) Problem 7.60 from Schroeder.
4. (8 pts) Problem 7.66 from Schroeder.
5. (7 pts) Problem 7.72 from Schroeder.