

**Homework #1 — due Wednesday, January 24**

Numbers refer to the problems in Griffiths

*From Wednesday, January 17:* No problems

*From Friday, January 19:*

1. 7.35
2. 7.37
3. 4.10

*From Monday, January 22:*

4. **Problem A.** A sphere of radius  $R$  is made up of a linear dielectric material with dielectric constant  $\epsilon_r$ . Embedded in the sphere is a uniform free charge density  $\rho_f$ . Outside the sphere there is no free charge. Determine the displacement field  $\mathbf{D}$ , the electric field  $\mathbf{E}$ , the bound charge  $\rho_b$  and/or  $\sigma_b$ , and the charge  $\rho$  both inside and outside the sphere.
5. **Problem B** Check that your solutions for  $\mathbf{D}$  and  $\mathbf{E}$  in Problem A satisfy the appropriate boundary conditions at the surface of the sphere.
6. 4.18