PH4210 HW 2 **Due: Wednesday Oct. 17, 2007**

1. Pollack & Stump 3.4

2. Pollack & Stump 3.5.
   (a) First do this by using eqn. 3.16.
   (b) Repeat the calculation by first computing the potential V along the z-axis and then take an appropriate derivative.
   (c) Could you show that E_x and E_y are zero along the z-axis using V computed in part (b)? If you can, do so. If you cannot, then explain why you cannot.

3. Pollack & Stump 3.5, but instead, try this for $z<\ell$ and see what happens at $z=0$. What happens in eqn 3.18 when r goes to zero? You can integrate dE or compute V in order to find the field for $z<\ell$.

4. Use Gauss's law to find the electric field inside of an infinitely long cylinder of radius *a* with uniform charge density ρ. Symmetry arguments should be explicit.

5. (a) Pollack & Stump 3.17 (a)
   (b) Use integration by parts to show that $x\frac{d}{dx}\delta(x) = -\delta(x)$.

6. Pollack & Stump 3.18

7. Pollack & Stump 3.23. Note: There are many ways to do this- think first about which method is simplest.

8. Pollack & Stump 3.26

9. Pollack & Stump 3.30

10. Pollack & Stump 3.43