Phys 448 HW 1

1) Briefly describe the following experiments and their significance for demonstrating the quantum nature of matter: e/m expt, Rutherford scattering, spectrum of hydrogen, photoelectric effect
2) Read Phys. Rev. Lett. 56, 2797 (1986). How does Fig. 2 demonstrate the quantum nature of atoms and light?
3) Use Mathematica to evaluate $\int_{-\infty}^{\infty} \frac{d\Delta}{1+4\Delta^2/\Gamma^2}$
4) Use Mathematica to plot the series $\mathrm{Re}\left[\sum_{k=-N}^{N} cos[k\pi] sinc\left[k\pi(1-q)\right] e^{ik\theta}\right]$ for q=1.2, and N=5, 40, and 200. Show all four plots on the same graph.

5-8) BD Chapter 1 #1-4