HW 5_4

First study section 5.4.3. Most important of this section in equation 5.86, i.e. the definition of magnetic dipole moment.

- 1. A circular wire loop with radius R is situated in the xy plane centered at the origin. It carries a current I running counterclockwise as viewed from the positive z-axis.
 - a. Determine its magnetic dipole moment.
 - b. What is the magnetic field at points far away from the origin.
 - c. Show that for points on the z-axis, your answer is consistent with the exact field given by example 5.6 on page 227.
- 2. A record of radius R carries a uniform surface charge σ . It is rotated at constant angular velocity ω . Find its magnetic dipole moment.
- 3. Find the magnetic dipole moment of a spinning spherical shell in example 5.11. Show that for points r>R the potential is that of a perfect dipole.
- 4. Work through example 5.11.