

## HW 8 – Magnetic Fields in Matter

Due October 30, 2009, 5 pm

1. Griffiths, 6.1 (p. 259)

2. Given a cylinder with radius roughly equal to its length ( $a \approx \ell$ ). Choose the coordinate system such that  $\hat{z}$  points along the axis of symmetry of the cylinder. The cylinder is uniformly magnetized such that  $\vec{M} = M_0 \hat{z}$ . Draw diagrams of field lines for  $\vec{M}$ ,  $\vec{H}$ ,  $\vec{B}$ ,  $\vec{A}$ ,  $\vec{K}_b$ , and  $\vec{J}_b$ . Make sure to clearly label your diagrams and explain your reasoning for why you choose to draw what you do.

3. Griffiths, 6.16 (p. 277)

4. Griffiths, 6.18 (p. 277). However, I want you to find  $\vec{B}$  **and**  $\vec{H}$  inside the sphere. Make sure to comment on the relation between  $\vec{H}$  and  $\vec{J}_f$  after you've found your answer.

5. Griffiths, 6.25(a) (p. 283).

6. Griffiths, 6.26 (p. 283). Make sure to compare and contrast your answer with Eq. 4.68.