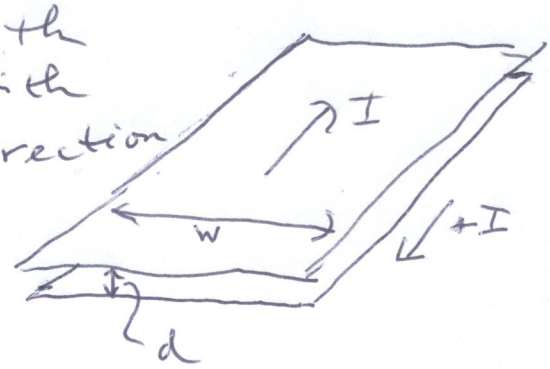
Homework # 6, Due 3-18-2021, 11.59pm

1. Consider a cylindrical magnet with radius a and length h with constant magnetization $\vec{M}$. Calculate $\vec{B}$ and $\vec{H}$ on the axis of the cylinder both inside and outside the magnet

2. A current I flows uniformely through a hollow cylinder of radius b. Use Ampère law to calculate the magnetic field as a function of the distance ρ to the axis both for $\rho < b$ and $\rho > b$. The cylinder is infinitely long.

3) Find the vector potential of the magnetic field in an ∞ long solenoid with current I and n loops per unit lenghth. Find $\vec{A}$ such that $\vec{\nabla} \cdot \vec{A} = 0$ (Coulomb gauge)

4) Consider 2 strips with $d \ll w$ (see figure) with current I in opposite direction



To leading order in $\frac{d}{w}$ calculate $\vec{B}$ and the vector potential $\vec{A}$ between the strips.