

PHYS 703 - More Magnetic fields.

1.

(i) Show, keeping explicit track of indices, that

$$\int d^3x' \vec{x}' \left(\vec{J}(\vec{x}') \cdot \vec{B}(\vec{x}) \right) \Big|_{\vec{x}=0} = \left\{ \vec{B}(\vec{x}) \times \int d^3x' \vec{M}(\vec{x}') \right\} \Big|_{\vec{x}=0}$$

(ii) Show that the equation for a magnetic field line due to a magnetic dipole at the origin and oriented along the z -axis is $r = r_0 \sin^2 \theta$.

(iii) Obtain Jackson's equation 5.73.