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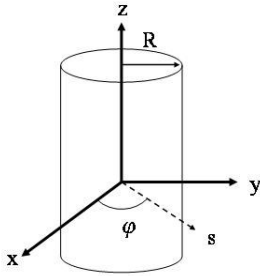
1. A long circular cylinder of radius *R* carries a magnetization $M = ks^2\hat{\phi}$, where *k* is a constant, *s* is the distance from the axis, and $\hat{\phi}$ is the usual azimuthal unit vector. Find the magnetic field due to **M**, for points inside and outside the cylinder.

2. A current *I* flows down a long straight wire of radius *a*. If the wire is made of linear material with susceptibility χ_m, and the current is distributed uniformly, what is the magnetic field a distance *s* from the axis? Find all the bound currents. What is the net bound current flowing down the wire?