

M98E.2—Cylindrical Magnet and a Steel Sheet

Problem

A cylindrical magnet has a cross-section area A , length L and uniform magnetization M parallel to L . The magnet is very long, $L \gg A^{1/2}$. It is placed on end against a steel sheet, with the axis of the cylinder perpendicular to the surface of the steel sheet. The steel has infinite magnetic permeability. What force F is necessary to pull the magnet from the sheet? Neglect gravity.