Physics 322, Winter Quarter 2016 Electrodynamics: Homework Assignment 1 (a) Turn in all problems and clearly note all constants and assumptions you use. (1-point penalty each otherwise) (b) Use 8½ x 11 paper & staple (1-point penalty each otherwise) (c) Due January 14 either 9:00 am at the beginning of class or 8:45 am in the instructor's mailbox

1. Consider a thick conducting sheet carrying a uniform surface current **K** with lines of **B** passing through the sheet. Find by how much the normal and parallel components change on passing through the sheet.

2. Consider a short solenoid of radius R having n turns/length. (a) Find the magnetic field at the center of the solenoid. (f) Find the magnetic field on-axis at the end of the solenoid. Hint: you might apply Griffiths equation 5.41

3. A current path consists of a pair of long wires connected to a semicircle, as shown. What's the magnetic field at the center of the circle?



4. Consider three co-planar equally-spaced parallel wires of negligible radius. Each wire carries current *I* (all 3 currents are in the same direction). (a) Where does the magnetic field vanish? (b) Sketch the magnetic field through a cross-section of the wires. (c) Suppose you displace the middle wire a small distance δ in the plane containing the wires, then release it. Describe the resulting motion of the middle wire.