Due date: Wednesday, Dec. 5 (Last homework!)

Griffiths reading: 5.2-3

1. [4 points] Griffiths 5.9 (Biot-Savart integral for funny shapes).
   Note that in (a) the current returns along the inner arc of radius $a$. In (b), you can get the contributions from the semiinfinite straight segments in a clever way by thinking about what the contribution would be from an infinitely long wire at distance $R$.

2. [3 points] Referring to Fig. 5.24(a) on p. 228, calculate either the force on the long wire due to the square loop, or the force on the square loop due to the long wire, whichever is easier. (The other must then be equal and opposite.)

3. [3 points] Griffiths 5.13 (Electric vs. magnetic force between moving line charges).

4. [4 points] A straight, infinitely long cylindrical wire of radius $a$ carries a uniform current density $J$ in the direction parallel to the wire ($I = \pi a^2 J$). Using Ampère’s Law, find the magnetic field (magnitude and direction) at a distance $s$ from the axis of the wire, both for $s < a$ and $s > a$.


6. [3 points] Griffiths 5.16 (coaxial solenoids).