1. A rectangular loop of wire that is $35\ cm$ wide and $15\ cm$ long is placed in a region where the magnetic field is $B = 1.2\ T$ and directed perpendicular to the plane of the loop. What is the magnitude of the magnetic flux through the loop?

   $A = L \times W$
   $A = 0.35 \times 0.15$
   $A = 0.0525 m^2$

   $\Phi_B = B \cdot A = 1.2\ T \times 0.0525\ m^2$
   $\Phi_B = 0.063\ T \cdot m^2 = 0.063\ \text{Wb}$

2. The magnetic flux through a loop of wire is $\Phi_B = 5.5\ \text{T} \cdot \text{m}^2$. If the magnetic field has magnitude $B = 0.85\ T$, what is the smallest possible value for the area of the loop?

   $A = \frac{\Phi_B}{B} = \frac{5.5\ T \cdot m^2}{0.85\ T}$
   $A = 6.47\ m^2$

3. Calculate the inductance of a solenoid that is $3\ cm$ long and $4\ mm$ in diameter, with 350 turns of wire.

   $L = \frac{N\Phi_B}{I} = \frac{NBA}{I} = \frac{N(\mu_o NI)\text{A}}{I \times l} = \frac{\mu_o N^2 \times A}{l} = \frac{\mu_o N^2 \times (\pi r^2)}{l} = \frac{(4\pi \times 10^{-7})(350^2)(\pi(0.004m)^2)}{0.03\ \text{m}}$
   $L = 2.58\ \text{dm}H$ (dm = decimilli = x10^-4)

4. Calculate the self-inductance of a $10\ cm$ long, $4\ cm$ diameter solenoid that has 200 coils.

   $L = \frac{\mu_o \cdot N^2 \cdot (\pi r^2)}{l} = \frac{(4\pi \times 10^{-7}) \cdot (200^2) \cdot (\pi 0.04m)^2}{0.1m}$
   $L = 2.53\ \text{m}H$