Problem 30.39

This is a simple problem in the sense that all we have to do is use the B-fld function for a coil to determine the current. That is:

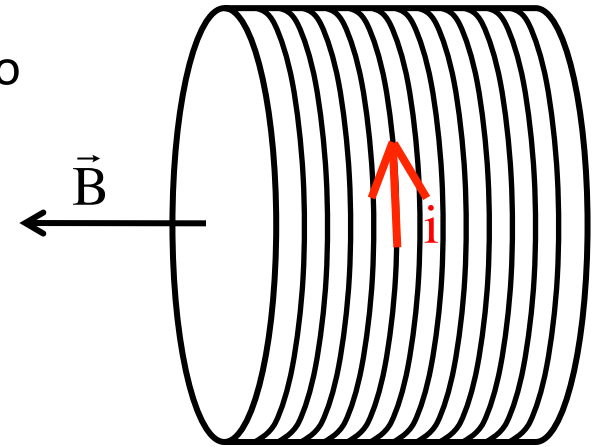$$B = \mu_o n i$$

where the "n" term identifies the number of turns in the coil *per unit length*.

Using that, we can write:

$$B = \mu_o n i$$

$$\Rightarrow \quad \left(10^{-4} \text{ T}\right) = \left(4\pi \times 10^{-7} \text{ T} \bullet \text{m} / \text{A}\right)\left(\frac{(1000 \text{ turns})}{(.4 \text{ m})}\right)i$$

$$\Rightarrow \quad i = 31.8 \times 10^{-3} \text{ A}$$

Observation: This was probably mentioned in class, but if you missed it: If you lay your right hand on the coil with your fingers pointing in the direction of the current, your thumb will point in the direction of the B-fld . . .

1.)