Answer on Question #45707, Physics, Electromagnetism

One end of a simple rectangular wire-loop current balance is inserted into a solenoid. A force of
3:0×10−3N
is found to act on this end when a current of 2.0A is flowing in it. If the length of the conductor forming the end of the the wire-loop is 0.10m. What is the magnetic flux density in the solenoid?

On the one hand, torque is applied to the frame equal :

$$M = I\phi$$

Where I is the current and ϕ is the flux

From the other hand this torque may be expressed as :

$$M = F * l$$

Where F is the force that act on the one side of frame and l is the one end side length

Also use that fact that flux going through full frame than it's density may be calculated as

$$\beta = \frac{\phi}{S} = \frac{\phi}{l^2}$$

Where β is the flux density , S is the frame square.

Than we have :

$$\beta = \frac{F * l}{I * l^2} = \frac{F}{I * l} = \frac{3 * 10^{-3} N}{2\ A * 0.1\ m} = 1.5 * 10^{-2}\ \frac{Wb}{m^2}$$