Homework 14 (Extra Credit)
EE 381 Electric & Magnetic Fields (Fall 2025)
Monday, December 8, 2025

1) 8.42 Round to nearest integer.
2) 8.45
3) A long straight wire, located along the z-axis, carries a current of 24 A in the z-direction. Adjacent to this wire, there is a rectangular loop described by $0.1 \le \rho \le 0.2$ m, $-0.1 \le z \le 0.1$ m, & $\phi = \pi/2$. Find the magnetic flux ψ_{loop} through the rectangular loop due to the long straight wire. Then, find the mutual inductance M_{loop} between the loop and the long wire. If the single rectangular loop is instead a 16-turn tightly wound coil, find the flux linkage λ_{coil} and new mutual inductance M_{coil}.
4) 8.51 Also, calculate the magnetic field intensity vector $\bar{H}$ and magnetic energy density w_m.

Due Thursday, December 11, 2025 by 4 pm my office or EECS mail box.

- This is an ***optional*** **extra credit** assignment. If you choose to do it, I will replace your lowest counted HW or quiz score (whichever helps the most).
- There will be *at least* one question dealing with this material on the final.
- Every problem should include a sketch of the problem geometry (if applicable).
- If not otherwise specified, assume units of meters for all positions and distances.