

14. We refer to the side of length L as the long side and that of length W as the short side. The center is a distance $W/2$ from the midpoint of each long side, and is a distance $L/2$ from the midpoint of each short side. There are two of each type of side, so the result of problem 11 leads to

$$B = 2 \frac{\mu_0 i}{2\pi(W/2)} \frac{L}{\sqrt{L^2 + 4(W/2)^2}} + 2 \frac{\mu_0 i}{2\pi(L/2)} \frac{W}{\sqrt{W^2 + 4(L/2)^2}} .$$

The final form of this expression, shown in the problem statement, derives from finding the common denominator of the above result and adding them, while noting that

$$\frac{L^2 + W^2}{\sqrt{W^2 + L^2}} = \sqrt{W^2 + L^2} .$$