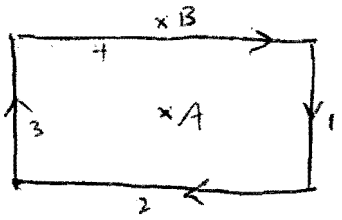
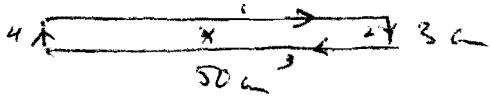
17. RQ. 32



At point A, each side gives a field that is into the paper $\Rightarrow \otimes$

At point B, sides 1, 2, 3 give fields into the page and side 4 gives a field that is out of the paper. Because point B is much closer to wire 4 than the other points are to wire 1, 2, and 3, the net field at B is out of the page. $\odot$

17. RQ. 36



$I = 0.3\ A$

Side 1 $B_1 = \frac{\mu_0}{4\pi} \frac{LI}{r\sqrt{r^2 + L^2/4}} = (10^{-7}) \frac{(0.5m)(0.3A)}{(0.015m)\sqrt{(0.015m)^2 + (0.25m)^2}}$

$= 3.99 \times 10^{-6}\ T$ $\otimes$ into page

Side 3 $B_3 = 3.99 \times 10^{-6}\ T$ $\otimes$ into page

Side 2 $B_2 = \frac{\mu_0}{4\pi} \frac{LI}{r\sqrt{r^2 + (L/2)^2}} = (10^{-7}) \frac{(0.03m)(0.3A)}{(0.25m)\sqrt{(0.25m)^2 + (0.015m)^2}}$

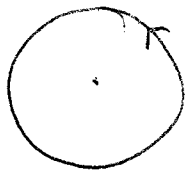
$= 1.44 \times 10^{-8}\ T$ $\otimes$ into page

Side 4 $B_4 = 1.44 \times 10^{-8}\ T$ $\otimes$ into page.

Net $B = B_1 + B_2 + B_3 + B_4$

$= 8.01 \times 10^{-6}\ T$ $\otimes$ into page

17.RQ.37



$R = 5\text{ cm} = 0.05\text{ m}$
$I = 4\text{ A}$

$$B = \frac{\mu_0 I}{2R} = \frac{(4\pi \times 10^{-7})(4\text{ A})}{2(0.05\text{ m})} = 5.0 \times 10^{-5}\text{ T}$$

out of page ⊙

Each loop of the wire gives the same field in the same direction, so the field for 100 turns is

$100(5.0 \times 10^{-5}\text{ T}) = \underline{5.0 \times 10^{-3}\text{ T}}$ out of the page ⊙