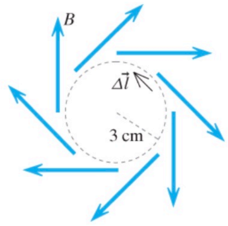
Along the path shown in the figure the magnetic field is measured and is found to be uniform in magnitude and always tangent to the circular path.



If the radius of the path is 0.03 m and B along the path is 1.7e-06 T, use Ampere's law to calculate the magnitude of the conventional current enclosed by the path.

I = A.

What is the direction of the current?

into the page ✓

$$B = \frac{\mu_0}{4\pi}\frac{2I}{r}$$

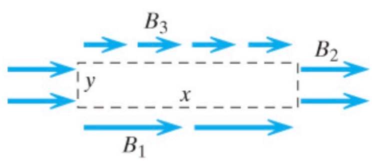
$$B = \frac{\mu_0 I}{2\pi r}$$

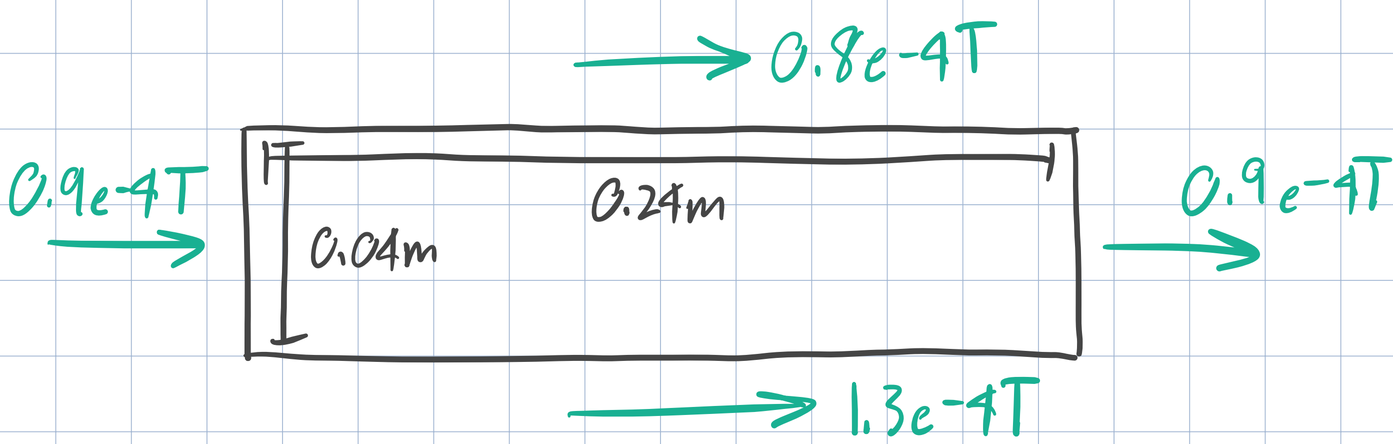
$$I = \frac{2\pi r B}{\mu_0}$$

$$= 0.255\text{ A}$$

The magnetic field has been measured to be horizontal everywhere along a rectangular path x = 24 cm long and y = 4 cm high, shown in the figure. Along the bottom the average magnetic field B_1 = 1.3 × 10^{-4} tesla, along the sides the average magnetic field B_2 = 0.9 × 10^{-4} tesla, and along the top the average magnetic field B_3 = 0.8 × 10^{-4} tesla. What can you conclude about the electric currents in the area that is surrounded by the rectangular path?

I = A





$$\oint \vec{B}\cdot d\vec{l} = \mu_0 I$$

$$-|\vec{B}_3| x + |\vec{B}_1| x = \mu_0 I$$

$$I = \mu_0 \left(-|\vec{B}_3| x + |\vec{B}_1| x\right)$$

$$= 9.549 \text{ A}$$