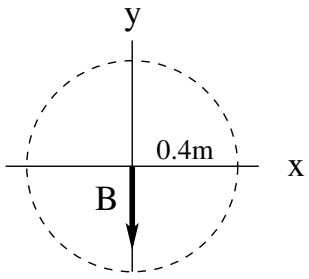
Intermediate Exam III: Problem #1 (Spring '05)

An infinitely long straight current of magnitude $I = 6$A is directed into the plane ($\otimes$) and located a distance $d = 0.4$m from the coordinate origin (somewhere on the dashed circle). The magnetic field $\vec{B}$ generated by this current is in the negative y-direction as shown.

(a) Find the magnitude B of the magnetic field.

(b) Mark the location of the position of the current $\otimes$ on the dashed circle.



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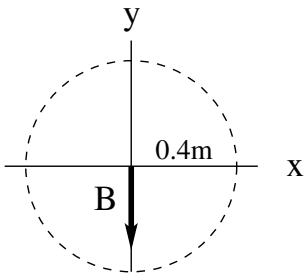

Solution:

(a) $B = \dfrac{\mu_0}{2\pi}\dfrac{I}{d} = 3\mu\text{T}.$

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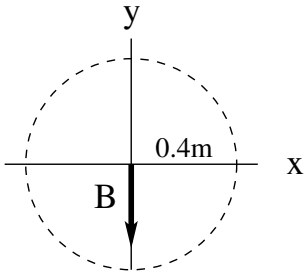

Solution:

(a) $B = \dfrac{\mu_0}{2\pi}\dfrac{I}{d} = 3\mu\text{T}.$

(b) Position of current $\otimes$ is at $y = 0,\ x = -0.4$m.