

52. (a) For $x \gg a$, the result of problem 15 reduces to

$$B(x) \approx \frac{4\mu_0 ia^2}{\pi(4x^2)(4x^2)^{1/2}} = \frac{\mu_0(ia^2)}{4\pi x^3},$$

which is indeed the field of a magnetic dipole (see Eq. 30-29).

- (b) The magnitude of the magnetic dipole moment is $\mu = ia^2$, by comparison between Eq. 30-29 and the result above.