

48. (a) We set $z = 0$ in Eq. 30-28 (which is equivalent using to Eq. 30-12 multiplied by the number of loops). Thus, $B(0) \propto i/R$. Since case b has two loops,

$$\frac{B_b}{B_a} = \frac{2i/R_b}{i/R_a} = \frac{2R_a}{R_b} = 4 .$$

- (b) The ratio of their magnetic dipole moments is

$$\frac{\mu_b}{\mu_a} = \frac{2iA_b}{iA_a} = \frac{2R_b^2}{R_a^2} = 2 \left(\frac{1}{2} \right)^2 = \frac{1}{2} .$$