Magnetic Field Application (11)

The electric field E_x along the axis of a charged ring and the magnetic field B_x along the axis of a circular current loop are

$$E_x = \frac{Q}{4\pi\epsilon_0}\frac{x}{(x^2+R^2)^{3/2}}, \qquad B_x = \frac{\mu_0 I}{2}\frac{R^2}{(x^2+R^2)^{3/2}}$$

(a) Simplify both expressions for $x = 0$.

(b) Simplify both expressions for $x \gg R$.

(c) Sketch graphs of $E_x(x)$ and $B_x(x)$.