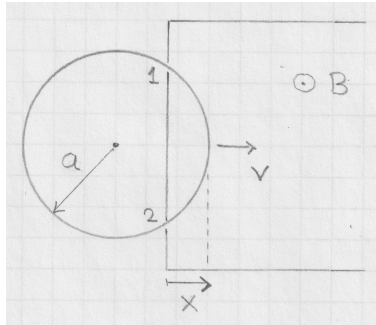## [lex138] Conducting ring moving into region of magnetic field II

Consider a conducting ring of radius a and resistance R being moved at constant velocity v into a region of uniform magnetic field B directed as shown.
(a) Calculate the magnetic flux $\Phi_B(x)$ through the ring.
(b) Plot the function $\Phi_B(x)$ vs x appropriately scaled.
(c) Infer from $\Phi_B(x)$, via Faraday's law, the induced EMF $\mathcal{E}(x)$ around the ring.
(d) Plot the function $\mathcal{E}(x)$ vs x appropriately scaled.
(e) Determine the direction (cw/ccw) of the induced current.
(f) Calculate the instantaneous power $P(x)$ dissipated when the ring is at position x.
(g) Determine the total energy E dissipated in the ring during its entry into the magnetic field.

Solution: