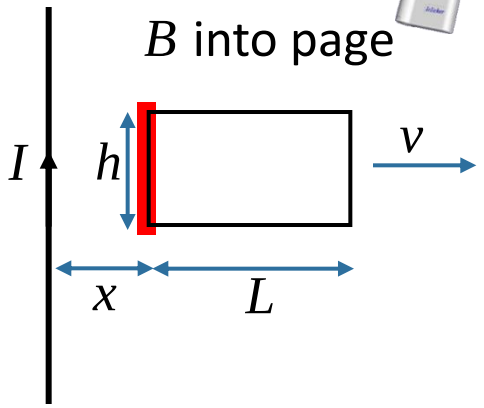
Example Problem

A rectangular loop ($h = 0.3m\ L = 1.2\ m$) with total resistance of 5Ω is moving away from a long straight wire carrying total current 8 amps. What is the induced current in the loop when it is a distance $x = 0.7\ m$ from the wire?



Which expression represents the *emf* induced in the left wire?

A) $\varepsilon_{left} = \dfrac{\mu_o I}{2\pi x} Lv$

B) $\varepsilon_{left} = \dfrac{\mu_o I}{2\pi x} hv$

C) $\varepsilon_{left} = \dfrac{\mu_o I}{2\pi (L+x)} Lv$

$qvB = qE \rightarrow E = vB \rightarrow \varepsilon = Eh = vBh$

$B = \dfrac{\mu_o I}{2\pi x} \rightarrow \varepsilon = \dfrac{\mu_o I}{2\pi x} hv$