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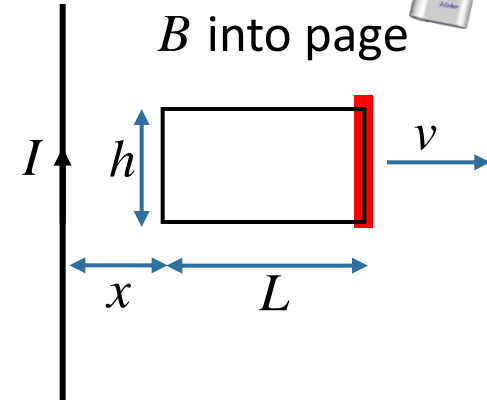
A rectangular loop ($h = 0.3m\ L = 1.2\ m$) with total resistance of 5Ω is moving away from a long straight wire carrying total current $8\ \text{amps}$. What is the induced current in the loop when it is a distance $x = 0.7\ m$ from the wire?

B into page

I h v

x L

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

A) $\varepsilon_{right} = \dfrac{\mu_o I}{2\pi(L+x)}hv$

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

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

$B = \dfrac{\mu_o I}{2\pi(L+x)} \longrightarrow \varepsilon = \dfrac{\mu_o I}{2\pi(L+x)}hv$

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