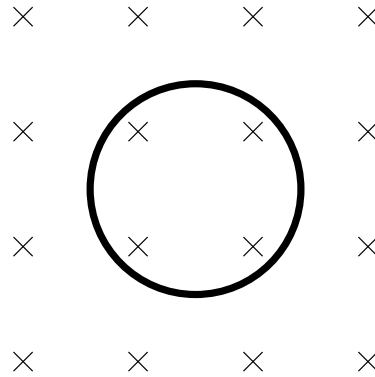


## Problem 20.10

Determine the magnetic flux through a coil (face in the plane of the page) due to a .15 tesla B-field oriented perpendicular to the page. Assume the coil's radius is .12 meters.



If the flux goes to zero in .2 seconds, what's the induced EMF?

1.

$$B_0 = .15 \text{ T}$$

$$A = \pi r^2 = (3.14)(.12 \text{ m})^2 = 4.5 \times 10^{-2} \text{ m}^2$$

in .2 seconds, the loop closes

What's the induced EMF?

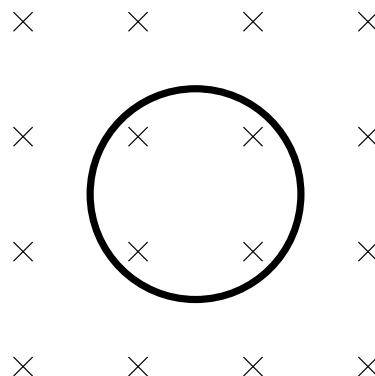
$$\epsilon_{\text{induced}} = -N \frac{\Delta \phi_B}{\Delta t}$$

$$= -N \frac{\Delta(BA \cos \theta)}{\Delta t}$$

$$= -N B \cos 0^\circ \frac{\Delta A}{\Delta t}$$

$$= -(1) (.15 \text{ T}) (1) \frac{(0 - 4.5 \times 10^{-2} \text{ m}^2)}{.2 \text{ seconds}}$$

$$= 3.3810^{-2} \text{ volts}$$



2.