

NAME: _____

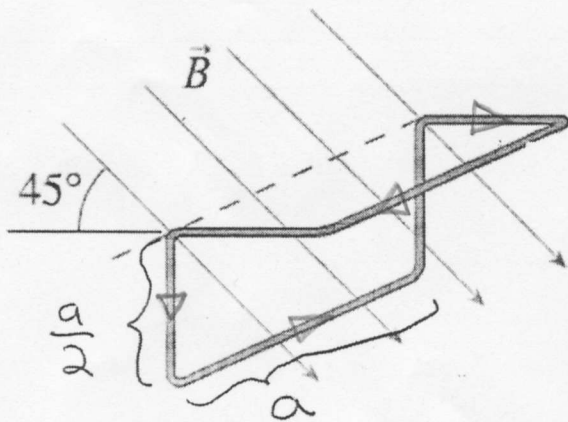
Quiz #2c:
Phys270

1. A square loop with sides of length "a" is bent at a right angle, and a uniform magnetic field is applied in the geometry depicted in the below diagram.

a. [5 pts] What is the magnetic flux through the loop?

Let's consider the downward normal of the upper half. To be consistent we should take rightward normal for the lower half. For upper half $B \cdot A = B(a \cdot \frac{a}{2}) \cos 45^\circ = Ba^2/2 \cdot \frac{1}{\sqrt{2}}$. Same goes for the lower half. Hence, in total we have $2 \cdot Ba^2/2 \cdot \frac{1}{\sqrt{2}} = \boxed{Ba^2 \cdot \frac{2}{\sqrt{2}}}$

b. [5 pts] If the applied magnetic field is decreasing in magnitude, what is the direction of the induced current? Draw the direction of the induced current on the diagram and explain your reasoning.



According to Lenz's law which says 'Nature opposes changes' we need to have induced current such a way that it reinforces the diminishing flux meaning

the induced magnetic field will be in the same direction as the original magnetic field. The direction of induced current is then determined by Right hand rule.