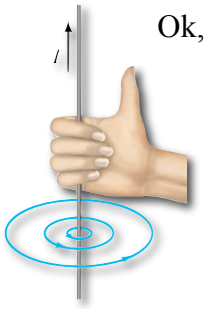


Ok, here's a *hand* for you....

$$F = qvB\sin\theta \qquad B = \frac{\mu_0 I}{2\pi r} \qquad \Phi_m = AB\cos\theta$$

$$F = IlB\sin\theta \qquad \mu_0 = 4\pi x10^{-7}\,\frac{Tm}{A} \qquad EMF = \frac{\Delta\Phi_m}{t}$$

For Numbers 1 – 4 North is the **back** of the classroom **B** = 5 T

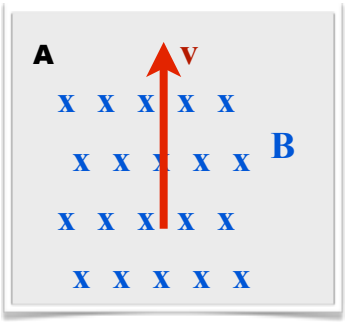
1. A proton is traveling to the left at 200 m/s
   What is the force on the charge? _____towards _____

2. An electron is traveling to the ceiling at 200 m/s
   What is the force on the charge? _____towards _____

3. An electron is traveling to the front of the room at 400 m/s
   What is the force on the charge? _____towards _____

4. A proton travels to the right with a velocity of 400 m/s.
   What is the force on the charge? _____towards _____

5. A single charge of +2C is traveling at 30 m/s in a magnetic field B=8T as shown.

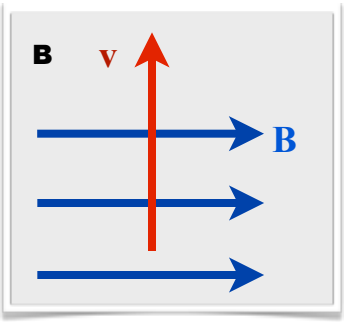


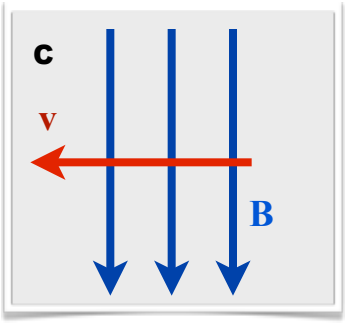
a) What is the force on the charge?
_____towards _____

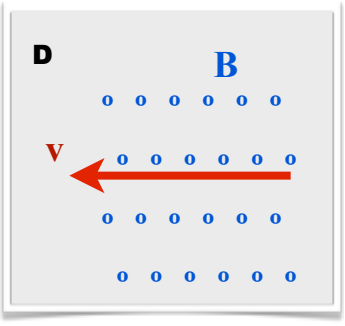
b) What is the force on the charge?
_____towards _____

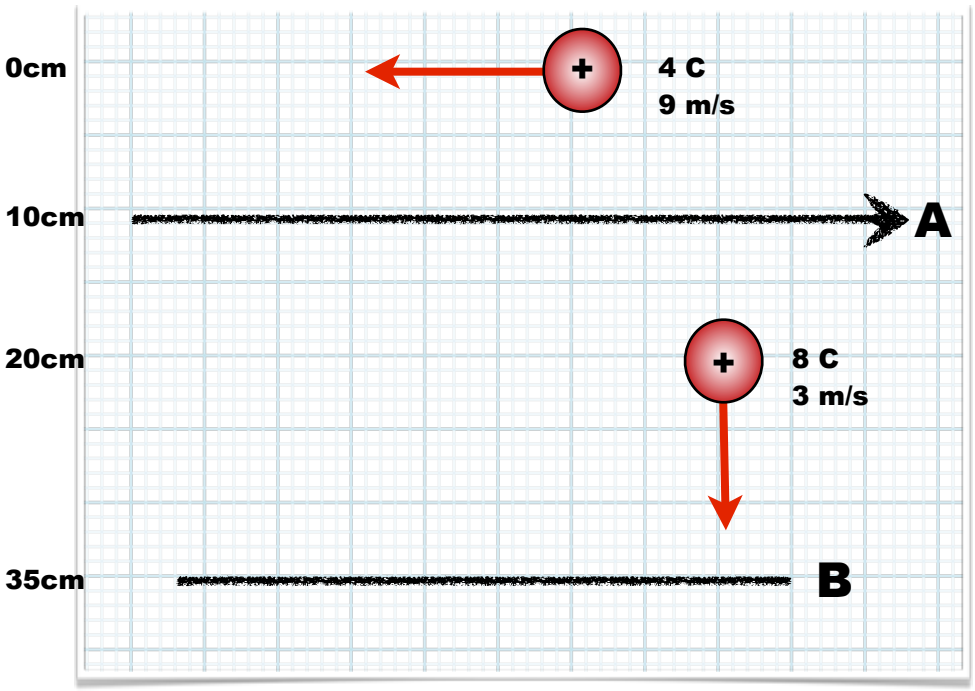
c) What is the force on the charge?
_____towards _____

d) What is the force on the charge?
_____towards _____









6. A single wire (A) carries a 3A current from left to right. Using the style learned in class, draw the magnetic field created by wire A.

7. Find the Forces on the two charges in the field. What is the force on wire B that is 45 cm long with a 6A current going from right to left?

For Numbers 8-10 A magnetic Field, B = 2.4 T, has a North pole in the **floor** of the room

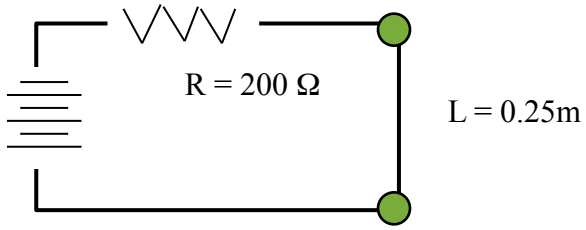
8. A 30 cm wire carries a 5A current from left to right on your paper.

the force on the wire _____ is in a direction to the _____

9. A 3 m wire carries a 20A current from the front of the room to the back.

the force on the wire _____ is in a direction to the _____

10. Use this diagram with your paper on the desk.



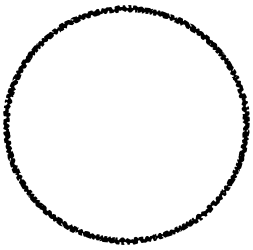
What is the current in the wire? $\mathcal{E} = 100\,V$

What is the force on the wire between the points?

11. A switch controls a large magnet, B = 6 T, with the North Pole in the floor. The area of the loop is .6 m^2 and the total resistance in the wire is 30 Ω.

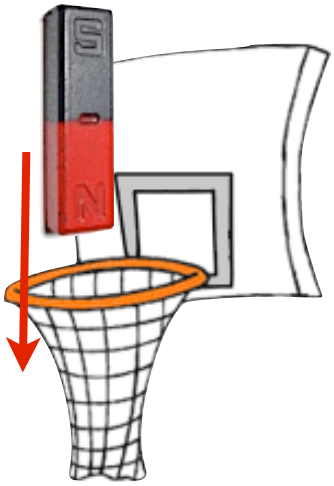
a) What is the value of the Magnetic Flux?

_____



b) The switch is turned off, taking 3.2 ms. What is the induced current in the loop?

_____ in a _____ direction.



12. A magnet is dropped into the metal ring of a basketball goal. It has a maximum magnetic field of 6.0T, and is released from 3 m above the net. The hoop is 35 cm across.

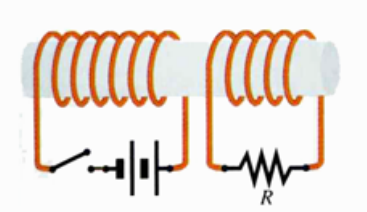
If the magnet is dropped as shown, what is the direction of the current in the ring? Explain your answer.

What is the maximum flux in the ring?

If it takes 0.05 s to pass through the loop, what is the maximum EMF produced?

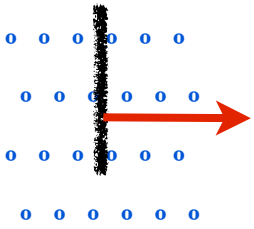
If the ring has an internal resistance of 50 Ω, what is the maximum current?

13. Define Magnetic Flux without an equation.



14. When the switch is closed in the left hand coil, what is the direction of the induced current in the resistor, and why?

15. A single straight wire, 65 cm long, is pulled through the Earth's magnetic field (3.1×10^{-5} T) at a velocity of 4.7 m/s. What is the induced EMF in the wire?



16. A circular coil, 15 cm in diameter, is placed in a uniform field of 1.5 T.

Find the flux through the coil.

If the coil is stretched to 25 cm diameter in 0.24 s, what is the induced voltage?