

# PH 223 Week 8

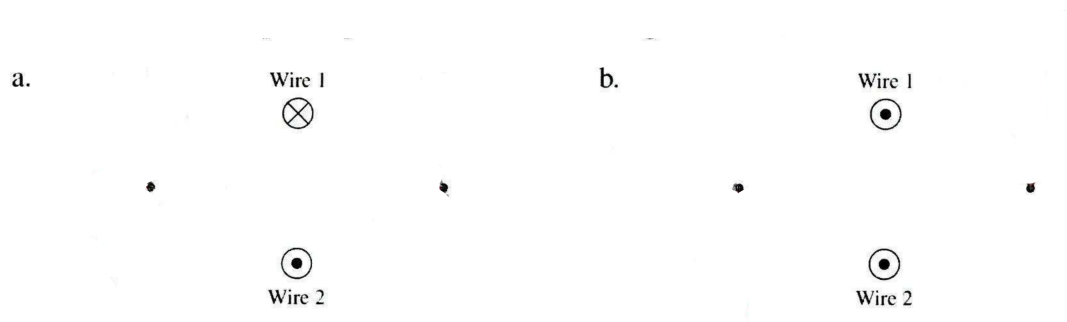
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These problems are borrowed/adapted from Chapters 29 and 30 of the *Student Workbook for Physics for Scientists and Engineers*.

## Activity 1

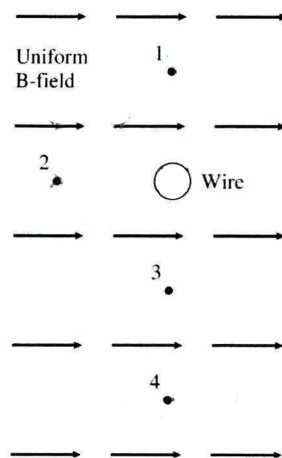
(a) Each figure below shows two long straight wires carrying equal currents into or out of the page. At each of the dots, use a **black** pen or pencil to show and label the magnetic fields  $\vec{B}_1$  and  $\vec{B}_2$  due to each wire. Then use a **red** pen or pencil to show the net magnetic field.



(b) A long, straight wire, perpendicular to the page, passes through a uniform magnetic field. The *net* magnetic field at point 3 is zero.

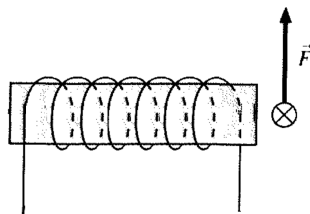
(i) On the figure, show the direction of the current in the wire.

(ii) Points 1 and 2 are the same distance from the wire as point 3, and point 4 is twice as distant. Construct vector diagrams at points 1, 2, and 4 to determine the net magnetic field at each point.



## Activity 2

A current-carrying wire passes in front of a solenoid that is wound as shown. The wire experiences an upward force. Use arrows to show the direction in which the current enters and leaves the solenoid. Explain your choice.



## Activity 3

The figure shows four circular loops that are perpendicular to the page. The radius of loops 3 and 4 is twice that of loops 1 and 2. The magnetic field is the same for each. Rank in order, from largest to smallest, the magnetic fluxes  $\Phi_1$  to  $\Phi_4$ . Some may be equal.

