# 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.*
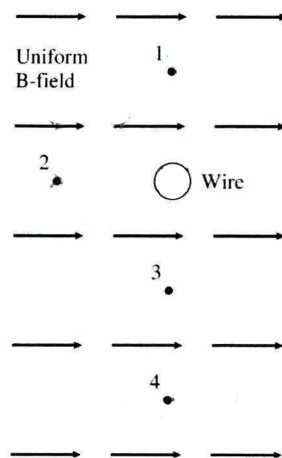
Activity 1

(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.
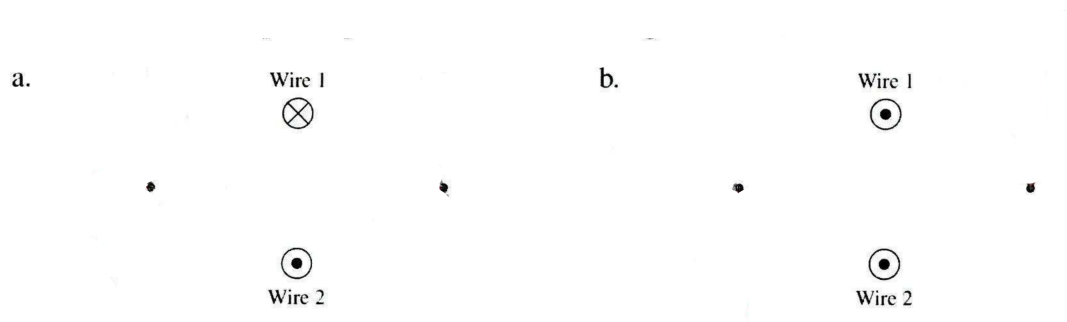
(b) A long, straight wire, perpendicular to the page, passes through a uniform magnetic field. The *net* magnetic field at point 3 is zero.
(i) On the figure, show the direction of the current in the wire.
(ii) Points 1 and 2 are the same distance from the wire as point 3, and point 4 is twice as distant. 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.
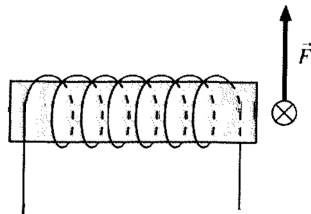
Activity 3

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 Φ_1 to Φ_4. Some may be equal.