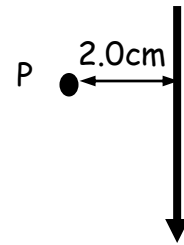


Magnetic Fields and Forces with current carrying wires

Physics 104

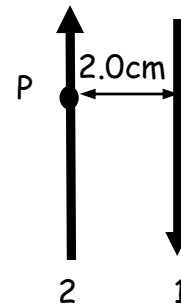
1. A wire carrying a current of 1.5 A is pointing straight downward as shown on the right.

- a) Calculate the magnitude of the magnetic field due to the wire at a point, P , 2.0 cm to the left of the wire as shown.



- b) What is the direction of the magnetic field vector at point P ? Show this on the diagram.

- c) If another wire with a length of 0.75 m and a current of 3.0 A is placed through point, P , pointing straight upward, what is the magnitude of the force it experiences due to wire 1?



- d) What is the direction of the magnetic force on wire 2? Show this on the diagram.

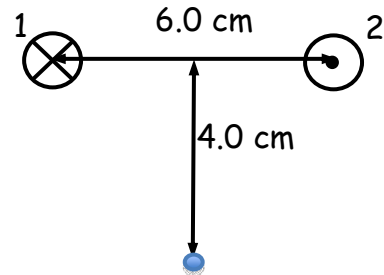
- e) Does wire 2 exert a force on wire 1? If so, what is the direction?

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2. Two wires are carrying a current of 3.3A are separated by a distance of 6.0 cm . Wire 1 on the left is pointing into the page, and wire 2 on the right is pointing out of the page. A point, P , is 4.0 cm below the center of the two wires.

a) Sketch in a circle around each wire with an arrow showing the direction of B .

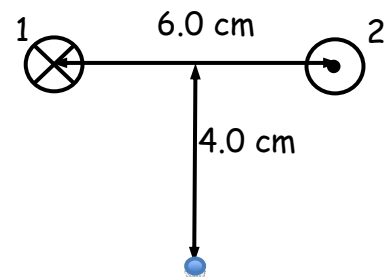


b) You know that the Magnetic field vector at a point, P , is perpendicular to r and points in the direction given by the loop you drew in A. Sketch in a vector originating at point P that points in the direction of B_1 and another in the direction of B_2 .

c) Find the magnitude of the magnetic force due to wire 1 at point, P .

d) Find the magnitude of the magnetic force due to wire 2 at point, P .

f) Find the angle that B_1 is pointing using the geometry of the wires and point P .



g) Find the x and y components of B_1 and B_2 .

h) Find the magnitude and direction of the B -field at point, P , due to wire 1 and 2.