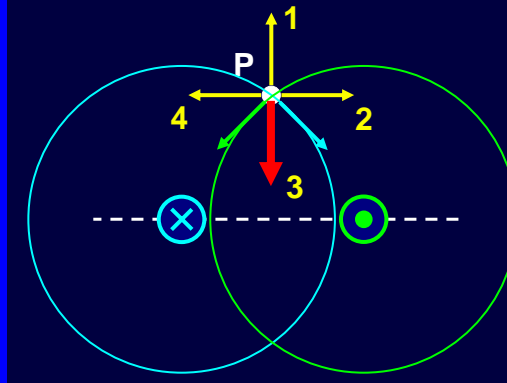


### ConcepTest 28.1a Magnetic Field of a Wire I

If the currents in these wires have the same magnitude but opposite directions, what is the direction of the magnetic field at point P?

- 1) direction 1
- 2) direction 2
- 3) direction 3
- 4) direction 4
- 5) the  $B$  field is zero

Using the right-hand rule, we can sketch the  $B$  fields due to the two currents. Adding them up as vectors gives a total magnetic field pointing downward.



### ConcepTest 28.2a Field and Force I

A positive charge moves parallel to a wire. If a current is suddenly turned on, in which direction will the force act?

- 1)  $+z$  (out of page)
- 2)  $-z$  (into page)
- 3)  $+x$
- 4)  $-x$
- 5)  $-y$

Using the right-hand rule to determine the magnetic field produced by the wire, we find that at the position of the charge  $+q$  (to the left of the wire) the  $B$  field *points out of the page*. Applying the right-hand rule again for the magnetic force on the charge, we find that  $+q$  experiences a force in the  $+x$  direction.

