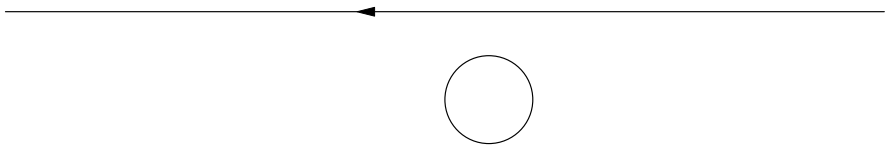
3. (20 pts.) A circular wire loop is located next to a long current-carrying wire as shown in the figure.



a. (10 pts.) If the magnitude of the current in the wire is *decreased*, what will be the direction (if any) of the current induced in the loop?

   A. Clockwise.

   B. Counter-clockwise.

   C. Neither—there will be no induced current.

   Explain your reasoning clearly. No credit will be given for any answer without valid supporting reasoning.

b. (10 pts.) If the loop is moved to the *right*, (parallel to the long wire) what will be the direction (if any) of the current induced in the loop?

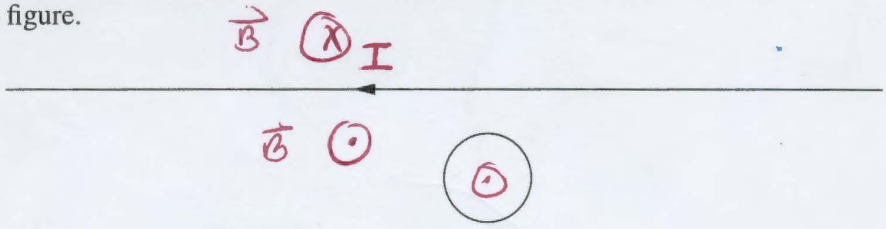
   A. Clockwise.

   B. Counter-clockwise.

   C. Neither—there will be no induced current.

   Explain your reasoning clearly. No credit will be given for any answer without valid supporting reasoning.

3. (20 pts.) A circular wire loop is located next to a long current-carrying wire as shown in the figure.



a. (10 pts.) If the magnitude of the current in the wire is *decreased*, what will be the direction (if any) of the current induced in the loop?

A. Clockwise.

(B.) Counter-clockwise.

C. Neither—there will be no induced current.

Explain your reasoning clearly. No credit will be given for any answer without valid supporting reasoning.

Originally, there is flux up out of the page through the loop. When the current in the wire is decreased, the flux is decreased. The induced current will flow in a direction to oppose this change. The induced current will flow counter-clockwise to create upward flux.

b. (10 pts.) If the loop is moved to the *right*, (parallel to the long wire) what will be the direction (if any) of the current induced in the loop?

A. Clockwise.

B. Counter-clockwise.

(C.) Neither—there will be no induced current.

Explain your reasoning clearly. No credit will be given for any answer without valid supporting reasoning.

Neither the magnitude nor direction of B change as the loop moves parallel to the wire. Since the area also doesn't change, Φ = constant. Since $\mathcal{E} = -\frac{\Delta\Phi}{\Delta t}$, $\mathcal{E} = 0$.