Keystone - Chapter 22: Faraday's Law

A long straight wire carrying current I is moving with speed v toward a small circular coil of radius r containing N turns, which is attached to a voltmeter as shown. The long wire is in the plane of the coil. (Only a small portion of the wire is shown in the diagram.)
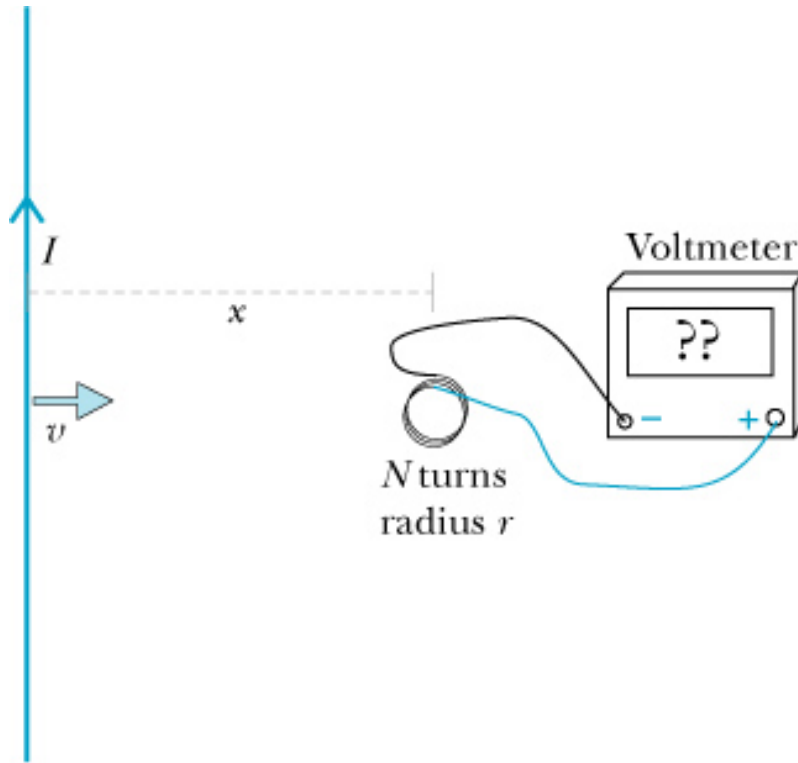

Figure 1: A current-carrying wire moves toward a coil.

At the instant when the long wire is a distance x from the center of the coil, what is the voltmeter reading? Include both magnitude and sign. (Remember that a voltmeter reads "+" if the higher potential is connected to the "+" terminal of the voltmeter.) Explain. State what approximations or simplifying assumptions you made.

This problem is 22.P.45 from M&I vol 2, second edition.