SHOW ALL WORK!!!!
REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!
Use the conversion constants and data given on the front page.

A conducting rod moves on two parallel conducting rails that are a distance \( w \) apart. The only resistance is the \( R \) shown. The magnetic field is perpendicular to the paper, and into the paper, and is everywhere in the drawing.

(a) If the rod is moved to the right with constant velocity \( v \), calculate the current through \( R \).

(b) If the rod is moved to the right with constant force \( F \), calculate the velocity of the rod at a very long time. (the rails are infinitely long.)

\[
(a) \quad E = -\frac{d\phi}{dt} = -\frac{Bwdx}{dt} = -BWv
\]

\[
I = \frac{E}{R} = -\frac{BWv}{R} \quad \text{"-" indicates the current is counterclockwise.}
\]

\[
(b) \quad F = IWB = \frac{B^2w^2v}{R}
\]

\[
v = \frac{FR}{B^2w^2}
\]