A proton leaves the left hand plate with an initial velocity of $1.1 \times 10^7 \text{ m/s}$. What is the *minimum* potential difference between the plates such that the proton does not reach the right hand plate?
\[ E_{k_i} = \frac{1}{2}mv^2 = \frac{1}{2}(1.67 \times 10^{-27})(1.1 \times 10^7)^2 \]
\[ = 1.010 \times 10^{-13} \text{ J} \]

\[ \Delta E_k = E_{k_f} - E_{k_i} = 0 - 1.010 \times 10^{-13} \text{ J} \]
\[ \Delta E_k = -1.010 \times 10^{-13} \text{ J} \]

\[ \Delta E_p = -\Delta E_k \]
\[ \Delta E_p = 1.010 \times 10^{-13} \text{ J} \]

\[ \Delta V = \frac{\Delta E_p}{q} = \frac{1.010 \times 10^{-13} \text{ J}}{1.6 \times 10^{-19} \text{ C}} \]
\[ = +630000 \text{ V} \]