A particle with mass $m$ and velocity $\vec{V}_1$ crosses the border between the $y>0$ region, where its potential energy is $U_1 = \text{const}$, and the $y<0$ region, where its potential energy becomes $U_2 = \text{const}$. In general, find $|\vec{V}_2|$ in terms of $|\vec{V}_1|$ and use it to find $\frac{\sin \theta_1}{\sin \theta_2}$. 