Lorentz transformation II

Consider the two events with coordinates $x_1 = 1 \text{ ly}, t_1 = 1 \text{ y}$ and $x_2 = 2 \text{ ly}, t_2 = 0.5 \text{ y}$ in frame $S$. (Here “ly” stands for light-years and “y” for years.) The two events are simultaneous in frame $S'$. 

(a) Find the relative velocity $v$ between frames $S$ and $S'$. 
(b) Find the time $t'_1 = t'_2$. 

Solution: