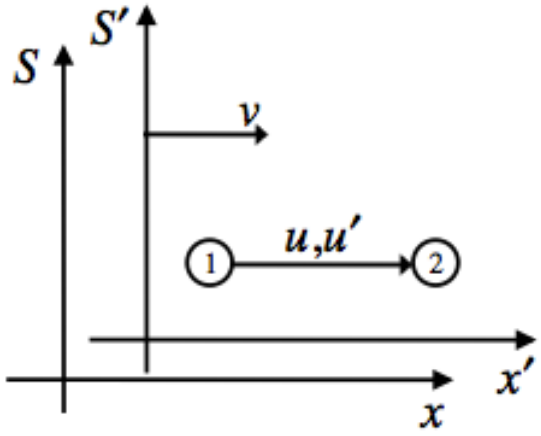
15-Velocity addition

$$\Delta x = \gamma\left(\Delta x' + \beta c \Delta t'\right)$$

$$c\Delta t = \gamma\left(c\Delta t' + \beta \Delta x'\right)$$



Frame S moves with a constant velocity v relative to frame S'. An object moves from Event 1 to Event 2 with constant speed along the x/x' direction.

In frame S, its velocity is $u = \dfrac{\Delta x}{\Delta t}$.

In frame S', its velocity is $u' = \dfrac{\Delta x'}{\Delta t'}$.

Rewrite u in terms of the primed variables $\Delta x'$ and $\Delta t'$ using the Lorentz transformations at the top of the page.

Simplify this result to find a relationship between u and u'.
(Notice that this is not a simple Lorentz transformation. Why not?)

Challenge questions: What is u if v<c, but u'=c?