Homework 6

Due 9/15/11

1. In Tuesday's class (9/13) we defined a new quantity $\mathsf{u}_0 = dt/d\tau$.

   (a) Show that under a Lorentz transformation, it transforms like the zeroth component of a *4-vector*. i. e. show that
   $$\mathsf{u}_0' = \gamma(\mathsf{u}_0 - \mathsf{u}_x v/c^2) \tag{1}$$

   (b) Argue that
   $$\mathsf{u}_0 = 1/\sqrt{1 - U^2/c^2}, \tag{2}$$
   where U is the speed of the particle in question.

   (c) What is the difference between the right hand side of Eq. (2) and γ that appears in Eq. (1)?

2. 2.59 of text. You will need to read section 2.11 before you attempt this.