Phys 104: College Physics

Name _____

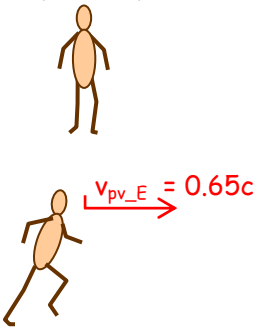
Quiz 10

$$\gamma = \frac{1}{\sqrt{1-\frac{v^2}{c^2}}},\ \Delta t = \gamma \Delta t_0,\ L = \frac{L_0}{\gamma}$$

1) A pole vaulter at the Relativistic Olympics sprints past you with a speed of 0.65 c. When he is at rest, his pole is 7.0 m long.

a)[2] What is gamma?

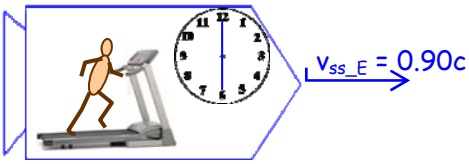
b)[2] What length do you perceive the pole to be as he passes you, assuming his pole is parallel to his motion? (Draw the poles for him at rest and running & label L_0 & L)

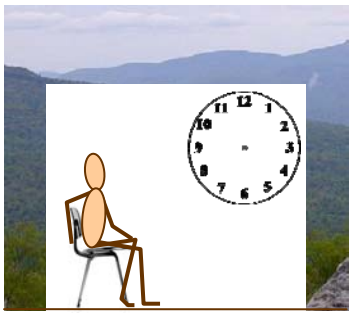


2) A spacecraft moves past a student with a relative velocity of 0.90 c. The pilot of the spacecraft works out for 30 minutes on her watch.

a)[2] What is gamma?

b)[2] How long does the pilot exercise according to the student? (Draw hands on Earth's clock and label Δt_0 & Δt)





3)[2] Solve the Lorentz factor for v: $\gamma = \frac{1}{\sqrt{1-\frac{v^2}{c^2}}}$