

1. Amy and Albert are observers in the S frame and are separated by a distance of 60 m. The reference frame S' is moving at a speed of $3/5 c$ relative to S , and the origins of the two systems are coincident at time $t' = t = 3 \times 10^{-7}$ s. Amy is at the origin of the S frame and Betty is at the origin of the S' frame. The second observer in the S' frame is Bob. Betty and Bob are located so that, according to the clocks in the S frame, Betty is opposite Amy at the same time that Bob is opposite Albert.
- What is the reading on Bob's clock when Bob is opposite Albert? Do this calculation twice: first, use the direct Lorentz transformation to find t' ; second, use the inverse Lorentz transformation but again solve for t' . Be sure your answers agree, and be careful with x and x' .
 - The S' system continues moving until Betty is opposite Albert. What is the reading on Albert's clock when he is opposite Betty?
 - What is the reading on Betty's clock when she is opposite Albert? Do this also two ways: first, use the Lorentz transformations; second, use the concept of time dilation.

You may find it convenient to express time in units of $1/c$. That is 3×10^{-7} s = 90 meters/ c and so on.

From the textbook (Harris):

Problems from Chapter 2:

2.54, 2.56, 2.60, 2.64, 2.79, 2.83, 2.87

Please use plenty of paper for your homework. Feel free to use the clean back side of old print-outs. Remember to include phrases explaining your work. All work must be clear and easy for me to understand in order to receive full credit.