

Special and General Relativity (PHZ 4601/5606) Fall 2017 Solutions**Set 4****10. Time in Minkowski space.**

We use natural units, $c = 1$.

- (1) The coordinates of B_0 are $(t, x) = (75, 60)$.
- (2) The proper time of B is then $\tau = \sqrt{t^2 - x^2} = 45$.
- (3) At position A_2 the time on the clock of A is 135.
- (4) The coordinates of position B_1 are $(t, x) = (25, 20)$ so that $\tau = \sqrt{t^2 - x^2} = 15$ holds.
- (5) The light signal from B reaches A at time 45 at position A_0 , which agrees with the time of B at B_0 .
- (6) The coordinates of B_2 are $(t, x) = (225, 180)$ and the clock of B shows $\tau = \sqrt{t^2 - x^2} = 135$.
- (7) The times agree. That has to be the case, because the travel of A in the rest frame of B does just mirror (opposite velocity signs) the travel of B in the rest frame of B.