Consider the world line of an object drawn on a Minkowski (space-time) diagram. At any point in that space, the slope of that line is:

A. larger than 1
B. less than 1
C. able to take on any value

ANNOUCEMENTS

- Last Quiz (This Friday)
  - Use special relativity to determine the time between signals
  - Discuss if events are timelike or spacelike separated and how you know
  - Explain why two events could occur at the same place (or time)
- Last Homework
  - Due next Friday NOT Monday! No project problem
- Rest of class
  - Finish up Relativity (next Monday-ish) and discuss E&M in general (next Wednesday-ish)
  - Extra credit assessment (next Friday)

Points that lie outside the light cone for a given event are:

A. accessible no matter where they are
B. accessible for given world lines (trajectories)
C. always inaccessible

The space time interval is defined by:

$$I \equiv x^2 + c^2 t^2$$

Events with common space time intervals lie on a hyperbole of constant I.

True or False: A Lorentz boost can allow you to shift between different hyperboles.

A. True
B. False

Consider the product of the speed of light and the proper time: $c\,d\tau$.

Is this quantity invariant?

A. Yes
B. No
C. I don't know how to tell

Is this "4-velocity" a contravariant 4-vector?

$$\eta^\mu \equiv \frac{dx^\mu}{d\tau}$$

A. Yes
B. No
C. I don't know how to tell

What is $\frac{dt}{d\tau}$?

A. γ
B. $1/\gamma$
C. γ^2
D. $1/\gamma^2$
E. Something else

With $\eta^0 = c\gamma$ and $\vec{\eta} = \gamma\vec{u}$, what is the square of η?

$$\eta^2 \equiv \eta \cdot \eta = \eta_\mu \eta^\mu$$

A. c^2
B. u^2
C. -c^2
D. -u^2
E. Something else

The momentum vector $\vec{p}$ is given by,

$$\vec{p} = \frac{m\vec{u}}{\sqrt{1 - u^2/c^2}}$$

What is $|\vec{p}|$ as u approaches zero?

A. zero
B. $m\,u$
C. $m\,c$
D. Something else

$$E - E_{rest} = (\gamma - 1)mc^2$$

What happens to the difference in the total and rest energies when the particle speed (u) is much smaller than c?

A. It goes to zero
B. It goes to $m\,c^2$
C. It goes to $1/2\,m\,u^2$
D. It depends