習題一

1.

A close up of a text

Description automatically generated

Sol: B

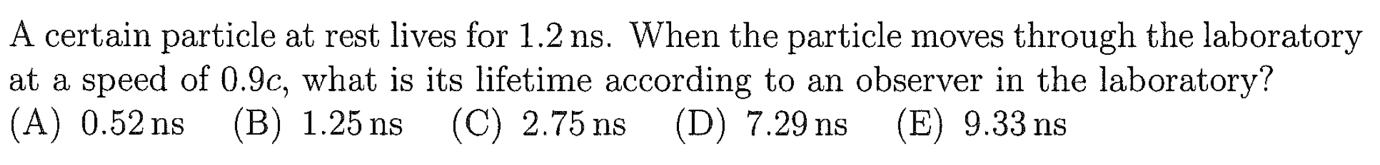
2.

A black text on a white background

Description automatically generated

Sol: B

3.



Sol: C

4.

A math equations and numbers

Description automatically generated with medium confidence

提示：

Sol:

A math equations and formulas on a white background

Description automatically generated

5.

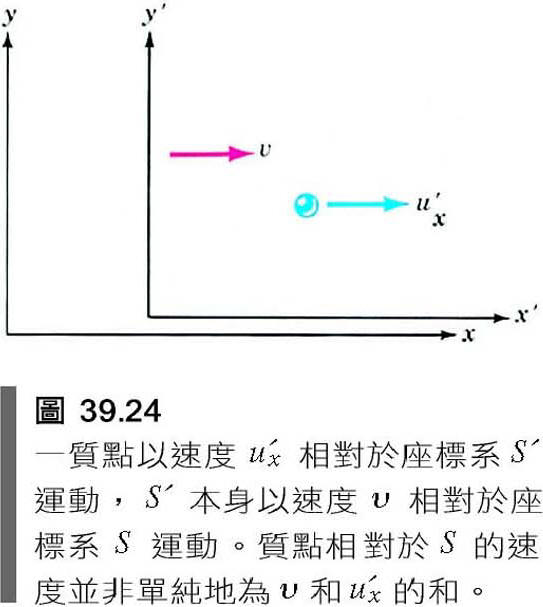
A white paper with black text

Description automatically generated

Hint: problem (b) is bit challenging. You can try it but there is no need to hand it in. I’ll give you the solution later.

For Problem (a), you can treat Rocket A as the moving observer S’, and Rocket B as the particle the observers S and S’ are observing. Then while the answer will be , using the standard notation we used in class.

Sol: (a) Treat Rocket A as the moving observer S’, and Rocket B as the particle.



(b) I’ll observe first from the point of view of A ie. S’, and then inverse Lorentz Transform the data to earth ie. S.

From A, assume that nose of A rocket is at and the event when the noses passes each other occurs at . Convince yourself, by Inverse Lorentz Transformation, it is observed on earth as The tail of rocket A is at At , the tail of rocket B is at , due to length contraction. The tail B will move at speed and will pass the tail A at This event happens at and Now use Inverse Lorentz Transformation: . This is the time the earth will observe when the two tails pass each other.

5.

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Sol: A, B, C

6.

A graph of a function

Description automatically generated

Sol: ，First find the slope, I’ll choose the first and the final points of data and working in SI unit:

，accepted value