

PREFLIGHTS**LESSON 32 – LORENTZ TRANSFORMATIONS****LEARNING OBJECTIVES:**

- 1. Determine the process for transforming from one reference frame to another using the Lorentz transformations.**
- 2. Utilize more sophisticated techniques for making reference frame transformations, such as the Lorentz transformation matrix, the displacement 4-vector, and Minkowski diagrams.**

1) Study Examples 12.4 and 12.5. In Example 12.4, are Events A and B timelike, spacelike, or lightlike? In Example 12.5, is the measurement that takes place in reference frame S timelike, spacelike, or lightlike?

2) Give the definition of these three terms or tell me how they are related to each other: *covariant, contravariant, Einstein summation convention*.

3) Problem 12.21 in Griffiths is actually pretty simple. Describe in words how you would do it.

4) If a spaceship passes by moving at $\frac{1}{4}$ the speed of light, what is the slope of its world line on a Minkowski diagram?

5) *Note: This is a review question from Chapter 7.* In Problem 7.13 on page 305 of Griffiths, assume the length of the sides of the square loop is $a = 0.50$ m and the constant k in the magnetic field equation is $k = 10 \text{ T}/(\text{m}^3 \cdot \text{s}^2)$. What is the emf as a function of time induced in the loop?

6) What did you find difficult or confusing in the pre-class work? If nothing was difficult or confusing, tell me what you found most interesting. Please be as specific as possible.

7) Document whatever help you received on the preclass work.