Physics 200-05
Practice 2

1)From the definitions

$$cosh(\theta) = \frac{e^{\theta} + e^{-\theta}}{2} \tag{1}$$

$$sinh(\theta) = \frac{e^{\theta} - e^{-\theta}}{2} \tag{2}$$

show that $cosh(\theta)^2 - sinh(\theta)^2 = 1$ and find the derivatives of both $cosh(\theta)$ and $sinh(\theta)$.

If $\tanh(\theta) = \frac{sinh(\theta)}{cosh(\theta)} = \frac{v}{c}$, find $cosh(\theta)$ and $\sinh(\theta)$.

2)Find the expression for the Lorentz transformation to first order in $\frac{v}{c}$.

3. What would the Lorentz transformation with velocity v in a direction at 30 degrees from the x axis in the x-y plane?

4. What would the expression for distance be in three dimensions if the z directions are measured in feet, and x,y in meters? What would the expression for rotation by angle θ about the y axis be.