1. A ground observer in (t, x, y, z) sees a particle moving at 0.8c, at an angle of 30 degree in relative to the x-axis. For an observer in (t', x', y', z') moving in relative to the ground observer along the x-x'axis at speed of -0.6c, what is the speed and angle of the particle?

2. A star moves at speed of $5x10^{-3}c$ away from the earth. It emits light at a wavelength of 5890A (observed on the star). What is the wavelength of light observed on the earth? The maximum wavelength human eyes can see is 6500A. How fast does the star have to move for its light to be invisible to an earth observer?

3. An electron is accelerated by a synchrotron accelerator to an energy of 2GeV. What is its velocity and what is the ratio between its mass after the acceleration and the rest mass?