[1] What are the fundamental distinctions between an inertial and noninertial frame of reference?

[2] Katie, in her rocket ship, flies past Isaac at 0.80c. Katie holds a meter stick that is aligned parallel to her flight path. Katie says that her meter stick is 1.00 m in length, while Isaac says that the meter stick is 0.60m in length. Which of these two friends is correct and explain your reasoning.

[3] Sarah decides that she needs to get away from the UR during the 4 day reading period to prepare for her P114 final examination. Therefore she flies her space racer at 0.9999c for two days, according to her watch, and then she returns to Hoyt at the same speed. She scheduled her trip to arrive at Hoyt exactly at the start of the exam according to her watch. Nick is waiting to greet her.
(a) Will she be early, late, or exactly on time for her P114 exam?
(b) Estimate the time she is away according to Nick’s watch.

[4] In proton-antiproton annihilation a proton and an antiproton (a negatively charged proton) collide and disappear producing electromagnetic energy. If each particle has a rest mass of $1.67 \times 10^{-27} \text{kg}$, and they are at rest just before annihilation, find the total energy of the radiation. Give the answer both in joules and electron-volts.

[5] A compound microscope has an objective with a power of 45 diopters and an eyepiece with a power of 80 diopters. The lenses are separated by 28 cm. Assuming the the final image is formed at 25 cm from the eyepiece, what is the magnifying power? Draw a ray diagram for this problem.

[6] A lens of focal length 6 cm is used as a simple magnifier with the image at infinity by a person whose near point is 25 cm and by another whose near point is 40 cm.
(a) What is the effective magnifying power of the lens for each person.
(b) Compare the size of the object on the retina when each looks at the same object with the magnifier.