

Physics 241
Problem Set 4

Name:

Number:

Problem 1:

Two protons (each with $M = 1.67 \times 10^{-27}$ kg) are initially moving with equal speeds in opposite directions. They continue to exist after a head-on collision that also produces a neutral pion of mass $m = 2.40 \times 10^{-28}$ kg. If the protons and the pion are at rest after the collision, find the initial speed of the protons. Energy is conserved in the collision.

Problem 2:

What is the speed of a particle whose kinetic energy is equal to:

- a. Its rest energy
- b. Five times its rest energy