February 25th 2014

Important equations:

Kinetic Energy=1/2mv2

Potential Energy=mgh

Momentum (P)=mv

∑F(t)=Pf-P0

1. A car crashes into a wall at 25 m/s and is brought to rest in 0.1 s. Calculate the average force exerted on a 75 kg test dummy by the seat belt.
2. Sylvia (mass 40.0 kg), standing on slippery ice (no friction), catches her leaping dog (mass 15 kg), moving horizontally at 3.0 m/s. What is the speed of Judy and her dog after the catch?
3. Superman runs into an asteroid sitting idly in space and hurls it at 800m/s. The asteroid is a thousand times more massive than Superman. In this strip, Superman is seen at rest after the throw. Taking Physics into account, what is his recoil velocity?