Physics 12

Assignment #11
Conservation of Momentum and Energy
Due Friday, June 3rd, 2016

1. A bullet of mass of 25.0 g strikes a wooden block, of mass 1.20kg, that is sitting on a rubber coated desk. The coefficient of friction is 0.35. The bullet becomes embedded in the block. The block, with the bullet in it, then slides along the desk to a distance of 6.38m before coming to a complete stop. What was the original velocity of the bullet?

2. Cally is driving her 2006 Pontiac G5 at 72km/h in a direction of N15°E when she collides with Trevor (intentionally). Trevor is driving a 2001 Ford F-150 at 90km/h in a direction of E15°N. After the collision Cally is travelling at 75km/h in a direction of E5°N. a) What Trevor's velocity after the collision if truck has a mass of 4000kg and Cally's car has a mass of 3200kg? b) After the collision each car comes to a halt. Cally's car has good tires and the coefficient of friction is 0.45 but Trevor's tires are not as good and the coefficient of friction is 0.30. How far away from the point of the collision does each car stop?

3. A bomb, sitting at rest, having a mass of 18.0 kg explodes into three pieces that fly out horizontally in opposite directions. One piece was found to have a mass of 3.00 kg and flew off with a speed of 80 m/s west. The mass of the second piece was 5.0 kg, and flew off with a velocity of 60 m/s at 112°. State the direction and velocity of the third piece.