Name: _____

> You may answer the questions in the space provided here, or if you prefer, on your own notebook paper.

1. **Chapter 8: 37**
   A shell of mass m and speed v explodes into two identical fragments. If the shell was moving horizontally with respect to Earth, and one of the fragments is subsequently moving vertically with speed v, find the velocity **v** of the other fragment immediately following the explosion.

2. Someone shoots a pellet gut a piece of cheese that sits on a massive block of ice. The 1.2 g pellet gets stuck in the cheese causing it to slide 25 cm before coming to a stop. If the muzzle velocity of the gun is known to be 65 m/s and the cheese has a mass of 120 g, what is the coefficient of friction between the cheese and the ice?

3. **Chapter 8: 47** A 60 g handball moving with a speed of 5.0 m/s strikes the wall at 40°
   angle with the normal and then bounces off with the same speed at the same angle. It
   is in contact with teh wall for 2.0 ms. What is the average force exerted by the wall?

4. **Chapter 8: 87** A puck of mass $5.0kg$ moving at 2.0 m/s approaches an identical puck
   that is stationary on frictionless ice. After the collision, the first puck leaves with a speed
   of v_1 at 30° to the original line of motion; the second puck leaves with speed v_2 at $-60°$
   relative to the original line of motion.

5. A 1500 kg car traveling north at 70 km/h collides at an intersection with a 2000 kg car traveling west at 55 km/h. The two cars stick together. (a) What is the total momentum of the system before collision? (b) What are the magnitude and direction of the velocity of the wreckage just after the collision?