Name: _____ Date: _____ Period: _____

Honors Physics – Momentum and Impulse Homework (Due: Monday, January 12, 2015)
Section 9.1 Practice Problems (#1-5), p. 233

Directions: Show all of your work (sketches, GUESS Method, etc.) on a separate sheet of paper.

PRACTICE Problems

• Additional Problems, Appendix B
• Solutions to Selected Problems, Appendix C

1. A compact car, with mass 725 kg, is moving at 115 km/h toward the east. Sketch the moving car.

a. Find the magnitude and direction of its momentum. Draw an arrow on your sketch showing the momentum.

b. A second car, with a mass of 2175 kg, has the same momentum. What is its velocity?

2. The driver of the compact car in the previous problem suddenly applies the brakes hard for 2.0 s. As a result, an average force of 5.0×10^3 N is exerted on the car to slow it down.

a. What is the change in momentum; that is, the magnitude and direction of the impulse, on the car?

b. Complete the "before" and "after" sketches, and determine the momentum and the velocity of the car now.

3. A 7.0-kg bowling ball is rolling down the alley with a velocity of 2.0 m/s. For each impulse, shown in **Figures 9-3a** and **9-3b,** find the resulting speed and direction of motion of the bowling ball.

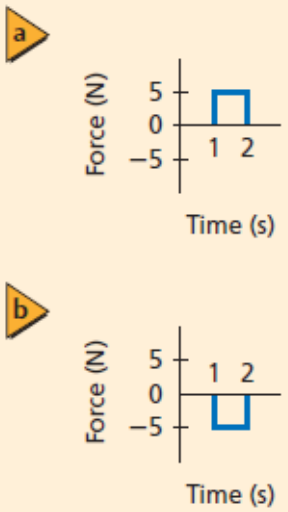

Figure 9-3

4. The driver accelerates a 240.0-kg snowmobile, which results in a force being exerted that speeds up the snowmobile from 6.00 m/s to 28.0 m/s over a time interval of 60.0 s.

a. Sketch the event, showing the initial and final situations.

b. What is the snowmobile's change in momentum? What is the impulse on the snowmobile?

c. What is the magnitude of the average force that is exerted on the snowmobile?

5. Suppose a 60.0-kg person was in the vehicle that hit the concrete wall in Example Problem 1. The velocity of the person equals that of the car both before and after the crash, and the velocity changes in 0.20 s. Sketch the problem.

a. What is the average force exerted on the person?

b. Some people think that they can stop their bodies from lurching forward in a vehicle that is suddenly braking by putting their hands on the dashboard. Find the mass of an object that has a weight equal to the force you just calculated. Could you lift such a mass? Are you strong enough to stop your body with your arms?