Honors Physics Momentum - Problem Set 3 Mr. McMullen

Name _____ Date _____ Period _____

1. A 70.0 kg man and his 40.0 kg daughter on skates stand together on a frozen lake. If they push apart and the father has a velocity of 0.50 m/s eastward, what is the velocity of the daughter? (neglect friction)

2. To get off a frozen, frictionless lake, a 70.0 kg person takes off a 0.150 kg shoe and throws it horizontally directly away from the shore with a speed of 2.00 m/s. If the person is 5.00 m from the shore, how long does it take him to reach it?

3. Identical railroad freight cars hit each other and couple together. In each of the following cases, what are the velocities of the cars immediately after coupling?

a.) A moving car approaches a stationary car with a velocity of +10 km/hr.

b.) Two cars approach each other with velocities of +20.0 km/hr and -15.0 km/hr, respectfully.

c.) Two cars travel in the same direction with velocities of +20.0 km/hr and +15.0 km/hr.

4. A 1600. kg empty hopper car rolls under a loading bin with a speed of 2.5 m/s, and a 3500 kg load is deposited in the car. What is the magnitude of the velocity of the car after being loaded?

5. For a movie scene, a 75.0 kg stunt man drops from a tree onto a 50.0 kg sled moving with a velocity of 6.00 m/s toward the shore of a frozen lake.

a.) What is the speed of the sled after the stunt man is on board?

b.) If the sled hits the bank and stops but the stunt man keeps going, with what speed does he leave the sled? (neglect friction)