## Unit 4 Review Sheet

## Terms:

inertia air resistance trajectory

force terminal velocity vertical velocity
net force projectile horizontal velocity

Newton's 1st Law - Law of \_\_\_\_\_ Newton's 2nd Law - Law of \_\_\_\_ Newton's 3rd Law - Law of \_\_\_\_

## I. Problems:

- 1. What is the weight of an object whose mass is 4.2 kg?
- 2. If the object in #1 is pushed across the floor with a net force of 20 N, what will the acceleration be?
- 3. Where would a sack of flour land horizontally from the dropping point if it were dropped out of a plane flying horizontally at 60.0 m/s at an altitude of 300.0 m?
- 4. While skiing, Ellen encounters an unexpected bump that she leaves traveling horizontally at 12.0 m/s. (a) How far out from her starting point will she land if she falls from a height of 7.00 m? (b) What is the final vertical velocity?

5. A "g" is an acceleration of  $9.80 \text{ m/s}^2$ . How much force is needed to accelerate a 0.0090 kg object at 3.0 "g's"?

6. What force is required to stop a 1200 kg in 7.0 s if the car is traveling at 22 m/s?

7. a. What is the acceleration of a falling skydiver (mass 72 kg including the parachute) when the upward force of air resistance is equal to  $\frac{1}{4}$  of her total weight?

b. Shortly after opening her parachute, the skydiver descends to the ground at constant velocity. What is the air resistance on her now?

8. A stone is thrown horizontally at 8.0 m/s from the edge of a cliff 78 m high. How far from the base of the cliff does the ball land?

## II. The following statements are false. Tell what is wrong with each or change it to a true statement.

- 1. An object always moves in the direction of the net force applied to it.
- 2. A horse must pull a cart harder than the cart pulls back on the horse to move forward.
- 3. Action-reaction forces cancel out so that neither object can accelerate.
- 4. When a car hits a bug, the bug hits back with the same force and both car and bug accelerate equally.
- 5. If everyone inside a car pushes forward on the car, they can make the car speed up.
- 6. To hit a distant target with an arrow, Robin Hood should aim directly at the target.
- 7. A feather and a hammer will fall with the same acceleration in a vacuum because there is no gravity in a vacuum.
- 8. The real reason for #7 is that gravity pulls the feather and the hammer with the same force.
- 9. When the human cannonball leaves the barrel of the cannon, his horizontal motion is accelerated and his vertical motion is uniform.