Mechanics: Work, Energy and Power Worksheet **Name:** _____

Work Questions:

1. A tugboat pulls a ship with a constant net horizontal force of 5.00×10^3 N and causes the ship to move through a harbor. How much work is done on the ship if it moves a distance of 3.00 km?

2. A shopper in a supermarket pushes a cart with a force of 35 N directed at an angle of 25° downward from the horizontal. Find the work done by the shopper on the cart as the shopper moves along a 50.0 m length of aisle.

3. If 2.0 J of work is done in raising a 180 g apple, how far is it lifted?

4. For each of the following cases, indicate whether the work done on the second object in each example will have a positive or negative value.
   a. The road exerts a friction force on a speeding car skidding to a stop.
   b. A rope exerts a force on a bucket as the bucket is raised up a well.
   c. Air exerts a force on a parachute as the parachutist falls to Earth.

Kinetic Energy Questions:

5. What is the speed of a 0.145 kg baseball if its kinetic energy is 109 J?

6. Two 3.0 g bullets are fired with speeds of 40.0 m/s and 80.0 m/s respectively. What are their kinetic energies? Which bullet has more kinetic energy? What is the ratio of their kinetic energies?

7. A car has a kinetic energy of 4.32×10^5 J when traveling at a speed of 23 m/s. What is its mass?

Work-Kinetic Energy Theorem Questions:

8. A student wearing frictionless roller skates on a horizontal surface is pushed by a friend with a constant force of 45 N. How far must the student be pushed, starting from rest, so that her final kinetic energy is 352 J?