Work-Kinetic Energy Theorem Homework Worksheet

Name:_____

1. A boy pushes a 5.00 kg cart in a circle, starting at 0.500 m/s and accelerating to 3.00 m/s. How much work was done on the cart?

2. A 30.0 kg box sliding at 5.00 m/s on a rough surface is brought to rest by 20.0 N of friction. What distance does the box slide?

3. A 1000.0 kg truck accelerates from 20.0 m/s to 25.0 m/s over a distance of 300.0 m. What is the average net force on the truck?

4. A space ship of mass 5.00×10^4 kg is traveling at a speed 1.15×10^4 m/s in outer space. Except for the force generated by its own engine, no other force acts on the ship. As the engine exerts a constant force of 4.00×10^5 N, the ship moves a distance of 2.50×10^6 m in the direction of the force of the engine.
a. Determine the final speed of the ship using the work-energy theorem.
b. Determine the final speed of the ship using the kinematics equations.

5. A 0.600-kg particle has speed of 2.00 m/s at point A and kinetic energy of 7.50 J at point B. What is
a. its kinetic energy at A?
b. its speed at B?
c. the total work done on the particle as it moves from A to B?

6. A weapon fired a 25.8-kg shell with a muzzle speed of 880 m/s. What propulsive force was necessary to attain the muzzle speed within the 6.00-m barrel? (Assume constant acceleration and neglect the Earth's gravitational effect.

7. A catcher stops a 40.4 m/s (91 mph) pitch in his glove, bringing it to rest in 0.00179 m. If force exerted by the catcher is 785 N, what is the mass of the ball?

8. A toy cart moves with a kinetic energy of 30 J. If its speed is doubled, what will its kinetic energy be?

9. A 70 kg diver steps off a 10 m tower and drops from rest straight down into the water. If he comes to rest 5 m beneath the surface, determine the average resistive force exerted on him by the water.

10. The masses of the javelin, discus, and shot are 0.80 kg, 2.0 kg, and 7.2 kg, respectively, and record throws in the corresponding track events are about 98 m, 74 m, and 23 m, respectively. Neglecting air resistance, calculate the minimum initial kinetic energies that would produce these throws and estimate the average force exerted on each object during the throw, assuming the force acts over a distance of 2 m.