Kinetic Energy and Work-Kinetic Energy Theorem

Name: _____ Period: ____ Date: _____

1. In 1994, Leroy Burrell of the United States set what was then a new world record for the men's 100 m run. He ran the 1.00×10^2 m distance in 9.85 s. Assuming that he ran with a constant speed equal to his average speed, and his kinetic energy was 3.40×10^3 J, what was Burrell's mass? (What do you need, how do you get it?)

2. In 1995, Karine Dubouchet of France reached a record speed in downhill skiing. If Dubouchet's mass was 51.0 kg and kinetic energy was 9.96×10^4 J. What was her speed?

3. Susie Maroney from Australia set a women's record in long-distance swimming by swimming 93.625 km in 24.00 h.
    a. What was Maroney's average speed in m/s?
    b. If Maroney's mass was 55 kg, what was her kinetic energy?

4. Paul and George are running with the same velocity but Paul has 3 times the mass as George. If Paul has a kinetic energy of 411 J, what is George's kinetic energy?

5. Two identical baseballs are hit by the same batter but ball A has 5.5 times the velocity as ball B. If Ball B has a kinetic energy of 1.23×10^3J what is the kinetic energy of ball A?

6. At the 1984 Winter Olympics, William Johnson of the United States reached a speed of 29.0 m/s in the downhill skiing competition. Suppose Johnson, who had a mass of 65.4 kg, left the slope at that speed and then slid freely along a horizontal surface. If the coefficient of kinetic friction between the skis and the snow was 0.120 and his final speed was half of his initial speed, find the distance William traveled.

7. The tops of the towers of the Golden Gate Bridge, in San Francisco, are 227 m above the water. Suppose a worker drops a 655 g wrench initially at rest from the top of a tower. What will the velocity of the wrench be when it hits the water? (Use the work energy theorem and Watch Units)

8. In 1979, Dr. Hans Liebold of Germany drove a race car 1.26×10^4 m with an average speed of 112 m/s. Suppose Liebold applied the brakes to reduce his speed. What was the car's final speed if -3.00 MJ (MEGAJOULES and yes you have to convert) of work was done by the brakes? Assume the combined mass of the car and driver to be 1.00×10^3 kg.

9. In 1990, Roger Hickey of California reached a speed 35.0 m/s on his skateboard. Suppose it took 21 kJ (Kilojoules) of work for Roger to reach this speed from a speed of 25.0 m/s. Calculate Hickey's mass. (Hint: Factor out the masses.)