Work-energy

1. A constant force of 10 N is exerted to lift a l.0-kg mass a vertical height of 1.0 m. Find (a) the work done by the person. (b) the increase in its gravitational energy.
    a. Ans = 10 J
    b. Ans = 10 J

2. A 2000-kg car was initially moving at a speed of 20 m/s. The speed of the car increases to 30 m/s after a constant force applied on it for 0.5 second. Find (a) the magnitude of the force, (b) the change in the kinetic energy of the car, (c) the work done on the car, and (d) the displacement of the car.
    a. Ans = 40000 N
    b. Ans = 500000 J
    c. Ans = 500000 J
    d. Ans = 12.5 m

3. A car having a mass of 500 kg is initially traveling with a speed of 60 m/s. It slows down at a constant rate, coming to a stop in a distance of 50 m.

a.) What is the change in the car's kinetic energy over the 50 m distance it travels while coming to a stop?

b.) What is the net force on the car while it's coming to a stop?

c.) What is the work applied?

a. Ans = 900000 J

b. Ans = 18000 N

c. Ans = 900000 J

4. A 1 kg ball is dropped from the top of a cliff and falls with a constant acceleration due to gravity (10.0 m/s^2). Assume that effects of air resistance can be ignored.

a.) By how much has the ball's gravitational potential energy changed after it has fallen by 10 m?

b.) How fast is the ball going after it has fallen by 10 m?

c.) What is the force (if any) that does work on the ball?

d.) How much work has been done on the ball?

a. Ans = 100 J

b. Ans = 14 m/s

c. Ans = force of gravity

d. Ans = 100 J

5. A car having a mass of 500 kg is initially at rest. A constant 1,000 N net force acts on the car over a distance of 50 m, causing the car to speed up. After it travels 50 m, the car moves with constant velocity.

a.) What is the total work done on the car over the 50 m distance it travels while speeding up?

b.) How fast is the car moving after 50 m?

c.) What is the net force on the car while it is moving with constant velocity?

d.) What is the total work done on the car while it is moving with constant velocity?