Work and Power   Name: _____

1. A 1200 kg block starting from rest is accelerated by a 2200 newton force for a distance
   of 50.0 meters along a horizontal frictionless surface.
        a. What is the final velocity of the mass?

        b. How much work was done on the mass?

2. A stock boy is told to put boxes of mass 5.0 kg on shelves that are 1.5 meters above the
   floor. They young man finds that he can do this at a rate of 4.0 per minute.
        a. How much work will he do in 15 minutes?

        b. What is his power for this job?

3. A weight lifter lifts 250 N of weight when doing curls. If he lifts the weight a distance
   of 40 cm on each curl (rep), how many reps must he make in 1.0 minute in order to
   reach a power 25 Watts?

4. A horse pulls a carriage filled with people around a circular park road of radius .50 km.
   The horse exerts an average force of 800 N.
        a. How much work does the horse do in a round trip?

        b. If it takes 12 minutes to circle the park, what is the horse's power?

5. A young boy starts from home and pulls his wagon around the block (a distance of 700
   meters). The wagon weighs 90.0 N and the handle makes an angle of 40 degrees with
   the road. If he pulls with an average force of 75.0 N, how much work does he do?

6. Gerry's job requires that she carry 25 kg masses up three flights of stairs that are each
   5.0 meters high. Timing herself one day, she finds that she can climb the stairs in 12.4
   seconds at 9 am, 15.8 seconds at noon, and 24.3 seconds at 5 pm. How much work
   does she do in each of these three cases? How much power does she produced in each
   case?

7. In a record-breaking lift, Samson Agonistes jerked 222.2 kg. In doing so, he raised the weights a distance of 2.42 meters from the floor to a position above his head. How much work did he perform in this event?

8. During a major downtown fire, the Leyden Fire Department pumped 400,000 liters of water to the 27th floor of a building 96 meters above the street. How much work was done in the process?

9. A crane lifts a marble block with a mass of 500 kg to a height of 50 meters in 2.5 minutes. What is the power output of this crane?

10. A pile driver drops a mass of 1250 kg. From a height of 12.8 meters each time it falls on a steel column. The resistance offered against this force by the ground is 2.5×10^5 N. How far is the column driven into the ground each time?

11. A 3.0 hp motor is used to raise iron ore from a min. In each trip, a bucket of ore whose total mass is 150 kg is raised a distance of 10.0 meters. How long does it take to raise the bucket?

12. Festus and Louisa are using a pulley system to lift their new 420 kg. Piano to the third floor of their house, 28.4 meters above street level. Each of them is able to develop a sustained power of .25 hp. How long will the job take them?

13. The power output of a new truck is being tested. The truck manages to exert a steady pull of 15,522 N as it ravels at a speed of 14 km/her. How much power is the truck developing?