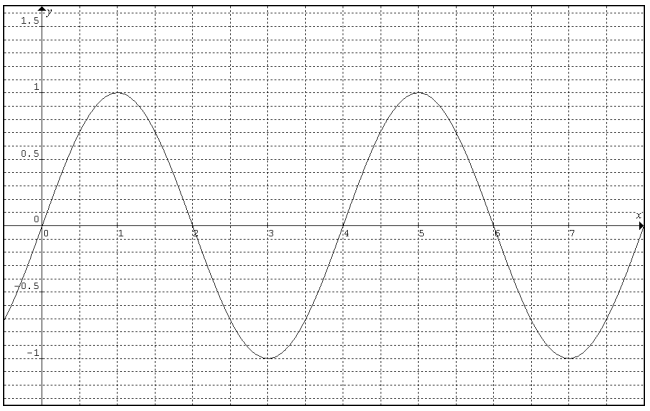
Simple Harmonic Motion Worksheet

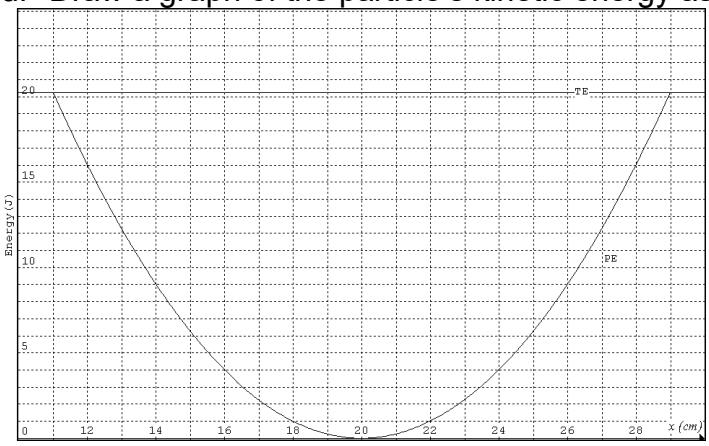
1. Give three examples of oscillatory motion (note circular motion is not the same as oscillatory motion.

2. Sketch three cycles of displacement vs. time graph for
   a. A particle undergoing periodic motion that is not SHM
   b. A particle undergoing SHM

3. The figure shows the position-vs-time graph of a particle in SHM
   a. At what time or times is the particle moving to the right at a maximum speed?
   b. At what time or times is the particle moving to the left at a maximum speed
   c. At what time or times is the particle instantaneously at rest?



4. The figure below shows the potential energy diagram and the total energy line of a particle oscillating on a spring.
   a. What is the spring's equilibrium length?
   b. Where are the turning points of the motion? Explain how you identify them.
   c. What is the particle's maximum kinetic energy?
   d. Draw a graph of the particle's kinetic energy as a function of position?



5. A block oscillating on a spring has an amplitude of 20 cm. What will be the block's amplitude if its total energy is doubled? Explain.

6. A pendulum on planet X, where the value of *g* is unknown, oscillates with a period of 2.0 s. What is the period of this pendulum if:
   a. It's mass is doubled (you do not know values of *m*, *L*, or *g*, so do not assume an specific values
   b. It's length is doubled?
   c. Its oscillation amplitude is doubled?.