Practice – Work & Energy

1. For potential energy and kinetic energy, using alpha (α), communicate the relationship between:
   a. Mass (m) and gravitational potential energy (GPE) for an object at constant height: _____

   b. Height (h) and gravitational potential energy (GPE) for an object of constant mass: _____

   c. Distance stretched/compressed (x) and elastic potential energy (PE_s) for a particular spring: _____

   d. Differing springs (k) and elastic potential energy (PE_s) for a constant stretch/compress distance: _____

   e. Mass (m) and kinetic energy (KE) for an object at constant velocity: _____

   f. Velocity (v) and kinetic energy (KE) for an object of constant mass: _____

2. In each scenario below regarding a 1 kg box, draw a complete free body diagram and calculate the work done:
   a. What is the work done on the box by the applied force when the box is pushed along the ground horizontally with 10.0 N for a distance of 5.00 m (no friction)?

   b. What is the work done on the box by the normal force on the box in the previous question?

   c. What is the work done on the box by the applied force when the box is pushed along the ground horizontally at constant velocity with 10.0 N of force for 5.00 m (with friction)?

   d. What is the work done on the box by the friction force in the previous question?

   e. What is the work done on the box by the applied force when the box is pushed horizontally for 5.00 m with 10.0 N of force while hanging from a rope on a track (like a suit at the cleaners)(no friction)?

   f. What is the work done by the rope in the previous example?

   g. What is the work done on the box by the applied force when the box is pulled with 10.0 N at 45° to the horizontal so that the box moves 5.00 m horizontally?

   h. What is the work done on the box by the applied force if you lift the box 5.00 m straight up at constant velocity?

   i. What work is done on the box by gravity in the previous question?

3. A spring (k = 30 N/m) is compressed by 0.5 m. What PE_{spring} does it contain? How much PE_{spring} does it have if it is stretched 0.5 m off its equilibrium position? How much work can it do when sprung?