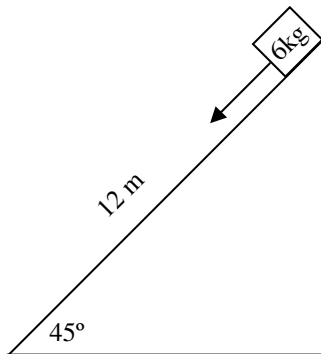


2009 PreAP Energy 5

1. Do the Regular homework first: Energy 5.

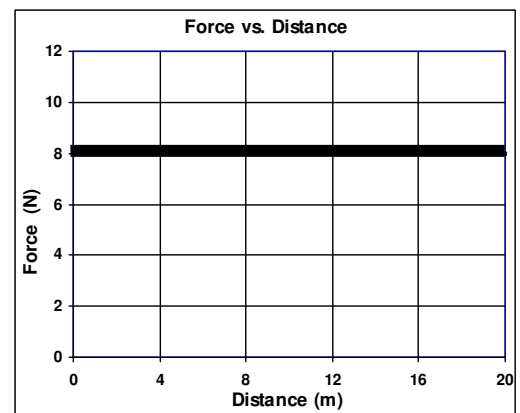


2. A 6 kg object is at the top of a 12m long ramp tilted at 45°. There is friction on the ramp.
- For potential energy, h must always be _____.
 - Calculate “ h ”:
 - The distance friction acts is:
 - If the object is only moving 10.5 m/s at the bottom of the ramp, calculate the force of friction.
 - How much mechanical energy was lost?

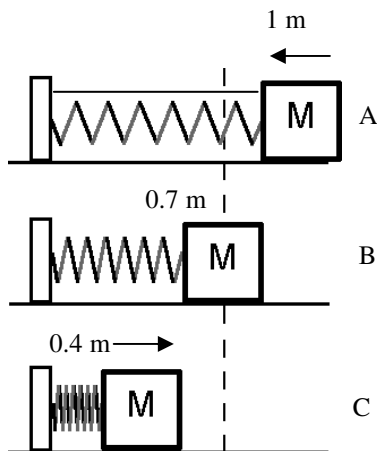
3. Use the different energy equations to answer the following proportionality questions.
- If you double the speed of an object, by how much does its kinetic energy change?
 - If you triple the mass of an object, but how much does its gravitational potential energy change?
 - If you compress a spring half as far, but how much does the potential elastic energy change?
 - If you double the spring constant, by how much does the potential elastic energy change?
 - If you double the velocity of an object, by how much does the potential energy change?
 - If you half the mass of an object, by how much does the potential elastic energy change?
 - If an object gains the same amount of potential energy in half the time, by how much did the power change?
4. Object 1 is 3kg and is moving 4 m/s to the right. Object 2 is also 3kg and is moving 4m/s to the left.
- Which one has a negative velocity?
 - Which one has more kinetic energy?
5. A 3kg object is launched horizontally from 15m in the air with an initial velocity of 6m/s.
- How much potential energy does it have?
 - How much kinetic energy does it have?
 - What is the sum of its mechanical energy?
 - How long will it take for it to hit the ground?

- E. How far away will it land?

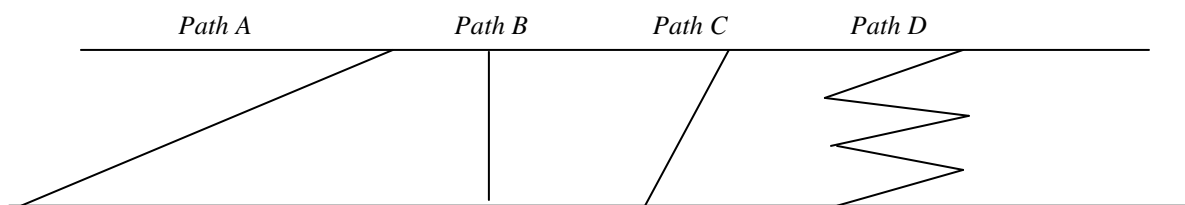
6. A. Calculate the work done on the graph for the 20 m shown.
- B. If the force lifts a 50N object, how high was it lifted?



7. A 3.5 kg box is moved from one table to another of the same height?
 A. How much total work was done on the object?
 B. Defend your answer.



8. (08P3) The diagram at the right shows a mass-spring system sliding back and forth on a frictionless surface. The spring is fully stretched at position A and fully compressed at position C.
 A) Which position is the equilibrium (relaxed) position?
 B) What kind of energy does it have at position A?
 C) What kind of energy does it have at position B?
 D) How does the total amount of mechanical energy compare at B and C?
 E) How does the amount of total energy compare at A, B, and C?
 F) If the object has 25 joules of kinetic energy at B, find the spring constant of this spring.



9. A. If there is no friction, which path will give the most potential energy?
 B. If there is friction, which path will give the most potential energy?
 C. If there is friction, which will take the most work to move an object up?
 D. If there is friction, on which path will an object have the most kinetic energy at the bottom?
 E. Which path will require the most time (assuming constant velocity)?
 F. Which path will require the most power?
10. Express the units for work as base units (only seconds, meters, and kg).
 A. Give the equation for work:
 B. Substitute in the equation for force:
 C. Substitute the units for each and simplify.
11. A person pushes with 12N on a 4 kg object for 8 meters.
 A. If there is no friction the object will do what?
 B. If there IS friction, what would happen to the object without the force?
 C. If there is friction and the object is at constant speed, how does the energy of the object change?
 D. How much work is done by the force?
 E. How much work is done by friction?
12. Sketch the following graphs. (*Hint: refer to the equations to do this.*)

