Chapter C7: Potential Energy Practice

Physics I

College of the Atlantic

1. A spy satellite orbits at an altitude of 400 km above the earth's surface. Suppose the satellite suddenly stops orbiting and falls to earth. What is the speed of the satellite right before it hits the earth's surface? Ignore air friction. Do this problem two ways:

   (a) Use formula C7.3 for the gravitational potential energy

   (b) Use $V(z) = mgz$ for the gravitational potential energy

2. A spring with a spring constant of 300 J/m^2 is compressed 3 cm. This is then used to shoot a 30 g marble straight up into the air.

   (a) What is the marble's speed immediately after the spring is released and before it begins its upward trajectory.

   (b) How high will the marble go?

   (c) What is the marble's speed when it is at half of its maximum height?

3. You would like to get a spring that is springey enough to launch your friend 2 meters into the air. What strength spring should you buy?