Mechanical Energy Conservation Practice Problems

1. Legend has it that Isaac Newton “discovered” gravity when an apple fell from a tree and hit him on the head. If a 0.20 kg apple fell 7.0 m before hitting Newton, what was its change in potential energy during the fall?
2. A greyhound at a race track can run at a speed of 16.0 m/s. What is the kinetic energy of a

20.0 kg greyhound as it crosses the finish line?

1. In a wild shot, Bo flings a pool ball with a mass, *m*, off a 0.68 m high pool table, and the ball hits the floor with a speed of 6.0 m/s. How fast was the ball moving when it left the pool table?
2. Frank, a San Francisco hot dog vendor, has fallen asleep on the job. When an earthquake strikes, his 300 kg hot dog cart rolls down Nob Hill and reaches points A at a speed of 8.00 m/s. How fast is the hot dog cart going at point B when Frank finally wakes up and starts to run after it?

**A**

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**50.0 m**

**B**

**30.0 m**

1. It is said that Galileo dropped objects off the Leaning Tower of Pisa to determine whether heavy or light objects fall faster. If Galileo had dropped a 5.0 kg cannon ball to the ground from a height of 12 m, what would have been the change in potential energy of the cannon ball?
2. The 2000 Belmont Stakes winner, Commendable, ran the horse race at an average speed of 15.98 m/s. If Commendable and jockey Pat Day had a combined mass of 550.0 kg, what was their kinetic energy as they crossed the finish line?
3. Brittany is changing the tire on her car on a steep hill 20.0 m high. She trips and drops the 10 kg spare tire, which rolls down the hill with an initial speed of 2.00 m/s. What is the speed of the tire at the top of the next hill, which is 5.00 m high?
4. A Mexican jumping bean jumps with the aid of a small worm that lives inside the bean.
5. If a bean of mass 2.0 g jumps 1.0 cm from your hand into the air, how much potential energy has it gained in reaching its highest point?
6. What is its speed as the bean lands back in the palm of your hand?
7. A 500. kg pig is standing at the top of a muddy hill on a rainy day. The hill is 100.0 m long with a vertical drop of 30.0 m. The pig slips and begins to slide down the hill. What is the pig’s speed at the bottom of the hill?
8. While on the moon, the Apollo astronauts enjoyed the effects of a gravity much smaller than that on Earth. If Neil Armstrong jumped up on the moon with an initial speed of 1.51 m/s to a height of 0.700 m, what amount of gravitational acceleration did he experience?