

Name: _____

Date: _____

Physics 1

Kinetic and Potential Energy

Problem Set 2. Challenge Problems

Complete the problems below.

1. Compute the kinetic energy, in joules, of a 5.00 g rifle bullet traveling at 500 m/s.

2. A man with a mass of 65 kg sits on a platform suspended from a movable pulley. The man raises himself at a constant speed by a rope passing through the pulley. The platform and the pulleys have negligible mass. Assuming no friction losses
 - a. Calculate the force he must exert.
 - b. Find the increase in his energy when he raises himself 1.5 m.

3. A skier with a mass of 80.0 kg starts from rest at the top of a ski slope 75.0 m high. Assuming negligible friction between the skis and the snow, how fast is she going at the bottom of the slope?
- Now moving horizontally, the skier crosses a patch of rough snow with a coefficient of kinetic friction equal to 0.20. If the patch is 225 m wide, how fast is she going after crossing the patch?
 - The skier hit a snowdrift and penetrates 2.5 into it before coming to a stop. What is the average force exerted on her by the snowdrift as it stops?
4. A rock climber with a mass of 90 kg takes a fall onto a rope while he is 80 meters off the deck. If the rope catches him after he falls 12 meters, what is his speed at that moment?
- What is the kinetic energy the climber has at the moment the rope catches him? What is her overall energy?
 - If the rope stretches 1.68 meters under the fall, calculate the amount of energy absorbed by the rope as the climber comes to a complete stop.