

MORE WORK AND POWER PRACTICE

Instructions: Show your work completely for the following problems.

1. Ryan is applying his physics skills by doing a little carpentry. Through his effort and gravity, a total downward force of 50. N is applied to a 0.60 kg hammer through a distance of 1.5 m.
 - a. How much work is done on the hammer?
 - b. If the hammer starts from rest, how much kinetic energy does it have at the end of the swing?
 - c. What is the speed of the hammer at the end of the swing?
 - d. The hammer comes to rest after impacting a nail which moves 6.0 mm into the wood. How much work does the nail do on the hammer?
 - e. What is the force the nail pushes against the hammer with to stop it?

2. Richard is pulling Alexis across the snow with a constant force of 40. N at an angle of 35° from the horizontal.
 - a. If Alexis and the sled have a combined mass of 40. kg, how far does Richard have to pull to speed the sled up from 0 to 2.0 m/s ?
 - b. Richard lets go and Alexis coasts to a stop. If the friction force is 5.0 N, how far does the sled coast?

3. Javier designs a crash test while investigating a case: A 700 kg car is initially moving at $10. \text{ m/s}$. It is crashed into a solid wall and the car's "crumple zone" crumples up a distance of 1.5 meters during impact. Calculate the impact force on the car. Show all proper equations, substituting and canceling of units.

4. Kate climbs a flight of stairs 10. meters high. She has a mass of 65 kg.
 - a. How much work is required?
 - b. If Kate is forced to jump from this level into a safety net below, what will be her speed just before impact?