

Physics 10310
Discussion Section Questions

Set 6

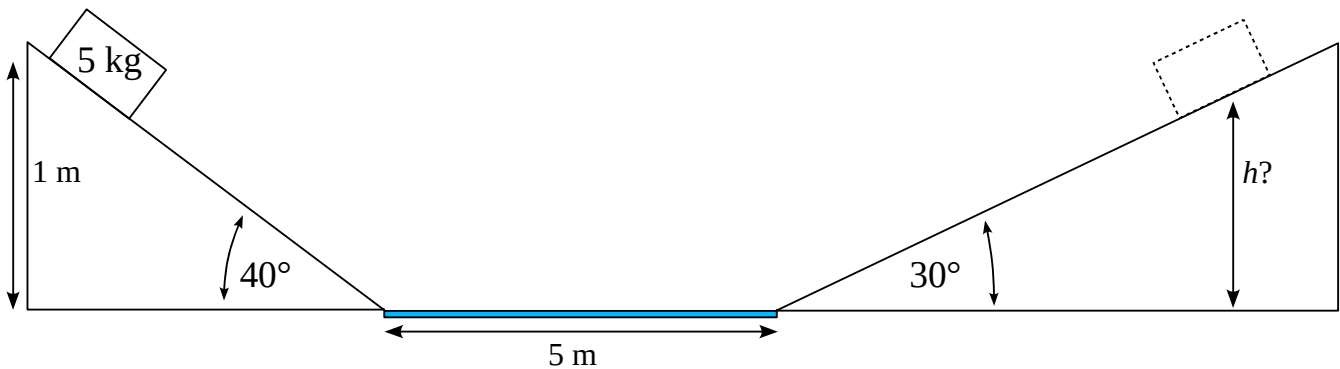
Directions: One person in your group should act as "scribe" to record your group's solution on a sheet of paper. Please make sure your answers are legible and comprehensible.

1. You've seen this before: A block of mass 5 kg slides down a frictionless ramp with a 40° angle of inclination. It starts from rest at a height of 1 m. After sliding across a frictionless floor, it begins to slide up another frictionless ramp, whose angle of inclination is 30° . No velocity is lost in the transitions from the ramps to the floor.

a.) Find the velocity of the block as it crosses between the ramps.

b.) How high up the second ramp does the block travel? (i.e., what is its final height h above the flat, level surface?)

c.) Now, assume that the 5 m stretch of open space between the ramps has a coefficient of kinetic friction $\mu_k = 0.15$. What is the final height that the block reaches in this case?



2. Walking by a creek, you find a rope attached to a tree limb. The rope is 4.6m long, but you estimate that it will break if the tension in the rope is 80N more than your weight of 650N. You decide you are going to use the rope to swing over the creek anyway. What is the maximum safe angle θ_m from which you can start swinging without breaking the rope?

