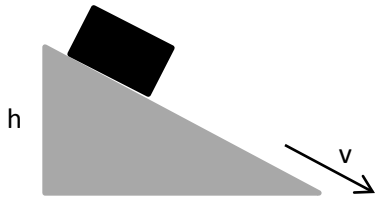
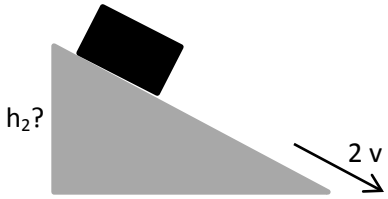
Kinetic energy - potential energy examples

Example 1

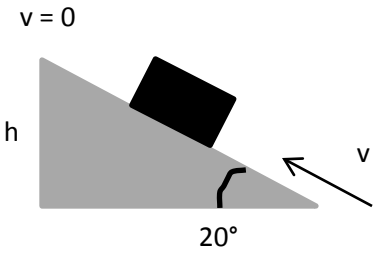
A block is released from rest at the top of a frictionless ramp of height h. It reaches a velocity v at the bottom of the ramp. For what height h_2 of the ramp would the block reach a velocity of 2v at the bottom?

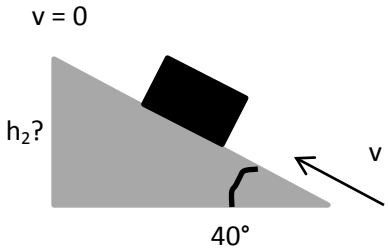




Example 2

A block slides up a 20° frictionless ramp. The velocity of the block at the bottom of the ramp is v. The block reaches a zero velocity at height h on the ramp. At what height h_2 would the block reach zero velocity if the angle of the ramp was changed to 40°?





Example 3

Two masses m and 2m are dropped from the same height h. What is the ratio $\frac{K_{2m}}{K_m}$ of their kinetic energies just before they reached the ground?

Example 4

A 200 g ball is dropped from a height of 2 m. Find the velocity of the ball just before it reaches the ground using conservation of mechanical energy. Compute the potential energy by taking

a) y = 0 at ground level.
b) y = 0 at the point where the ball is released (i.e. 2 m above ground).