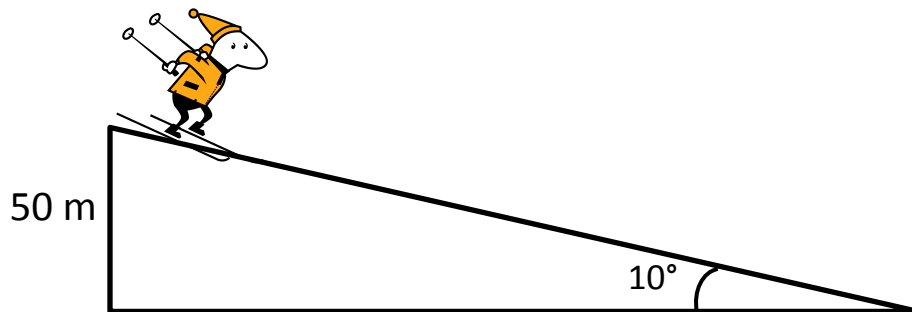# Friction examples

Example 1

A 75 kg skier starts down a 50-m high, 10° slope. What is the speed of the skier at the bottom of the slope, if friction is not ignored? Take μ_s = 0.12 and μ_k=0.06.

How would you include air resistance? The drag force is $D = \frac{1}{4}Av^2$, opposite to the direction of the motion. A is the cross-section area of the object.
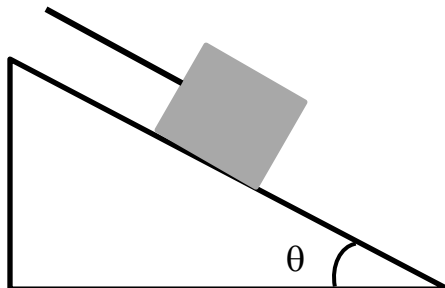
50 m

10°

Example 2

Burglars are trying to haul a 1000-kg safe up a ramp to their getaway truck. The coefficients of friction between the safe and the ramp are μ_s = 0.8 and μ_k=0.6.

For what value T of the tension does the safe start moving? If that value of T is still applied while the safe is moving, what is the acceleration of the safe?

Take θ = 20°.

θ

Example 3

A car moving with an initial speed of 20 m/s comes to a stop over a distance 50 m. Assume that the deceleration of the car is constant. A 40-kg passenger in the car is not wearing a seat belt! The coefficients of static and kinetic friction between the passenger and the seat are $\mu_s = 0.4$ and $\mu_k = 0.3$. Does the passenger slide off the seat while the car is slowing down?

Legal notice: this is a hypothetical example. Don't try this outside of class!