Students from a 20.m high second floor window of a fraternity house use a hose to throw water on the students in the other frat 40.0m away across the street. Water comes out of the hose with a speed 20.0m/s at an angle of 30.0o with the horizontal. How high above the ground does will the water strike the wall of the other frat?

A 10.0-kg block is released from rest on a quarter pipe 3.00m high. The track is frictionless except for a length (6.00m). The block travels down this track and hits a spring of force constant 2,250 N/m, and compresses the spring 0.300m from its equilibrium position before coming to rest momentarily. What is the coefficient of kinetic friction between the block and the rough surface on the 6.00m length?

A block sits motionless on an incline plane that is 25o up from the horizontal. What is the value of the coefficient of kinetic friction that allows this to happen?

You are standing on top of a truck as it makes a turn off of an exit. The exit can be considered an arc of the circle of radius 125m. He makes the turn at 25m/s. If the coefficient of friction between your shoes and the top of the truck is 0.558, will you stay on the truck? What is the fastest the truck can turn before you fall off?

An inclined plane of angle φ of 20o has a spring of force constant k= 500 N/m fastened securely at the bottom so that the spring is parallel to the surface. A block of mass m = 2.50kg is placed on the plane at a distance d = 0.300m from the spring. From this position, the block is projected downward toward the spring with speed v= 0.750 m/s. By what distance is the spring compressed when the block momentarily comes to rest

A 6 000-kg freight car rolls along rails with negligible friction. The car is brought to rest by a combination of two coiled springs. Both springs spring constants *k*1 =1,600 N/m and *k*2 =3,400 N/m. After the first spring compresses a distance of 30.0 cm, the second spring acts with the first to increase the force with additional compression. The car comes to rest 50.0 cm after first contacting the two-spring system. Find the car’s initial speed.



Two objects are connected by a light string that passes over a frictionless pulley as shown. Assume the incline is frictionless and take *m*1 = 2.00 kg, *m*2 = 6.00 kg, and θ = 55.0°. Find (a) the magnitude of the acceleration of the objects, (b) the tension in the string.