

Force Problem Set #2 (Friction and $F_f = \mu F_N$)

1. A 50.0 kg chair initially at rest on a horizontal floor requires a 365 N horizontal force to set it in motion. Once the chair is in motion a 327 N horizontal force keeps it moving at a constant velocity. Find the coefficient of friction between the chair and the floor. (In this problem use the **“327 N”** force, but just remember, because of static friction, it always takes a little bit greater of a force to “Get” an object moving.)
2. As a 55.0 kg ice skater is in motion, a horizontal force of 175 N keeps her moving at a constant velocity. Find the coefficient of friction between the skates and the ice.
3. A 95.0 kg clock requires a horizontal force of 565 N to keep it moving with constant speed. Find the coefficient of friction between the clock and the floor.
4. The coefficient of friction between a 155 kg chair and the carpet is 0.900.
 - a. How much would you have to push on the chair to move it across the carpet at a constant speed?
 - b. How much would you have to push on the chair in order to accelerate it at .500 m/s/s? (HINT: You already solved for friction in part a. Don't change it)
5. A 455 kg golf cart runs out of energy and stops dead in the middle of the 4th hole. The coefficient of friction between the wheels and the grass is 0.650. If 4 people push on the cart with a total horizontal force of 3200 N, calculate the acceleration of the golf cart.
6. After it is pushed, a block slides across a rough surface causing it to slow down with an acceleration of (- 7.25 m/s/s). What is the coefficient of sliding friction between the block and the surface? (HINT:Don't plug in any numbers until the very end! Trust your Physics!)
7. A shuffleboard disk is accelerated to a velocity of 5.8 m/s and then released down the lane. If the coefficient of kinetic friction between the disk and the concrete lane is 0.31, how far does the disk go before it comes to rest. (HINT: Very similar to #6, but finish with a VT – graph).
8. A boat moves through the water with two forces acting on it. One is a 2.10×10^3 N forward push by the motor, and the other is a -1.80×10^3 N resistive force due to the water.
 - a. Calculate the net force and indicate its direction.
 - b. What is the acceleration of the 1250 kg boat?
 - c. If it starts from rest, how far will it move in 10.0 s?
 - d. What will its velocity be at the end of this time interval?
9. A car is traveling at 50.0 km/h on a flat highway.
 - a. If the coefficient of friction between the road and the tires on a rainy day is .100, what is the minimum distance needed to stop? (HINT: Very similar to problem #6!!!!!!)
 - b. What is the stopping distance when the surface is dry and coefficient of friction is .600? (Use a vt-graph!!!!!!).