1. A 4600 kg helicopter accelerates at 2 m/s2 upward. What is the lifting force exerted by the propellers?
2. The maximum force that a grocery bag can withstand without ripping is 250 N. Suppose the bag is filled with 20 kg of groceries and lifted with an acceleration of 5 m/s2. Does the grocery bag rip? How do you know?
3. A 70 kg cliff diver hits the water and slows to rest. Suppose the water provides an upwards resistive force of 1000 N. What is the diver’s acceleration? If she impacts the water at a speed of 15 m/s, then how far will she sink underwater before she comes to rest?
4. A mover pushes an 80 kg couch across the floor at a constant velocity. If the mover applies a force of 100 N to the couch, what is (a) the force of kinetic friction opposing this motion and (b) the normal force acting on the couch?
5. A rock climber is momentarily at rest while climbing a vertical cliff. The combined weight of the climber and gear is 68 kg. The climber is supported by a both a climbing rope and the force of static friction between her body and the cliff. If the force of static friction is only 3N, then what is the tension in the climbing rope?