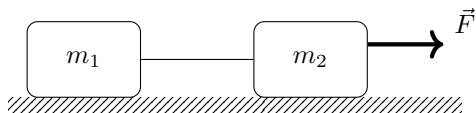# Multi-Body Practice Problems

For each situation, (a) Draw a free-body diagram for *each* box; (b) Calculate the acceleration of the system; (c) Calculate the tension of the cord connecting the boxes.

1. Two boxes have masses $m_1 = 20$ kg and $m_2 = 10$ kg and are sitting on a frictionless surface connected by a massless cord. They are pulled with an applied force of $F = 50$ N.

2. Two masses are attached by a string that hangs over a frictionless pulley. (This is known as an *Atwood Machine*)
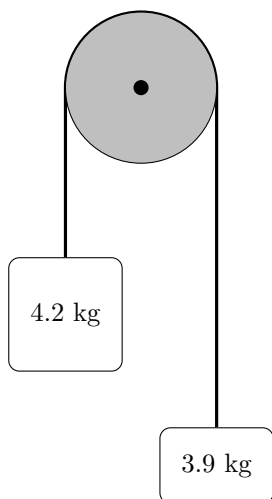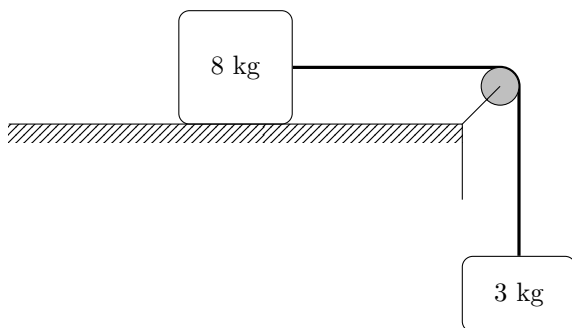
3. We now have what is called a *Modified Atwood Machine.* Again, the surface is frictionless.

8 kg

3 kg

4. **Challenge!**. For this problem, calculate the tension on each cord and the acceleration of the system.

10 kg

6 kg

2 kg