Before doing these problems, you should read over the first section of the handout on circular motion.

1. (4 points) A spinning flywheel has rotational inertia $I = 300.0 \text{ kg-m}^2$. Its angular velocity decreases from 15.0 rad/s to zero in 300.0 s due to friction. What is the frictional torque acting?

2. (5 points) An old “45” turntable must spin at 45 rpm (revolutions per minute) to play a record. How much torque must the motor deliver if the turntable is to reach it final angular speed in 2.5 revolutions, starting from rest? The turntable is a uniform disk of diameter 30.5 cm and mass 0.34 kg.

3. (5 points) A painter is standing on a 2.2-m-long platform of mass 10 kg. The platform is held up by two ropes, each connected 10 cm from the end of the platform, so that the ropes are 2.0 m apart. The painter stands at a distance $d = 0.60 \text{ m}$ from the left-hand rope. The painter’s mass is 60 kg. Find the tension in each rope.

4. (5 points) A cylinder of radius 15 cm has some string wrapped around it. It is sitting on a surface, and someone pulls on the string, as shown in the left side of the diagram below. The tension in the string is 3.0 N and the cylinder’s mass is 1.2 kg. Find the acceleration of the cylinder. At right below is part of a free-body diagram, so get you started.