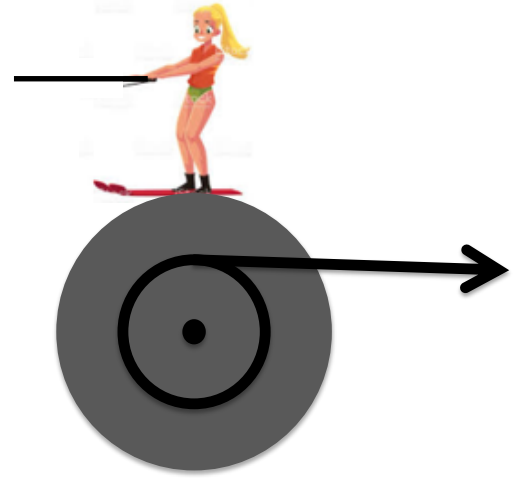


Big Exam #4

- 1) My friend (50 kg) is an amazing water skier, and I'm helping her train! She holds a rope tied to a wall while standing on a rotating wheel (50 kg disk, $r = 2\text{m}$). All I have to do is pull on the string tied around the ($r = 1\text{m}$) pulley attached to the wheel and run as fast as I can. The coefficient of friction between her skis and the wheel is only 0.1. Starting from rest, I pull with a force of 200 N
- When I'm running at 5 m/s, how fast is she skidding on the wheel?
 - Identify the forces acting on the wheel when I start pulling. (no lens needed)
 - When I'm pulling, what is the wheel's angular acceleration?



In each of the following, aim for a “C”: draw the picture, and outline how you’d solve it. Setting up the problem correctly for “B” is not required.

- 1) I pull on a string wrapped around the pulley of this flywheel with 100 N. Describe the motion of the wheel as I pull the string.
- 2) After I pull the string 2 meters with this force of 100 N, what is the speed of the wheel?
- 3) If the wheel was initially rotating the other way at ω_0 and pulling the string gives it angular acceleration of α , what is the position of the dot, θ and rotation speed, ω after 2 seconds?
- 4) If this motionless disk is dropped onto my spinning disk, and they stick together, what is their final ω ?

