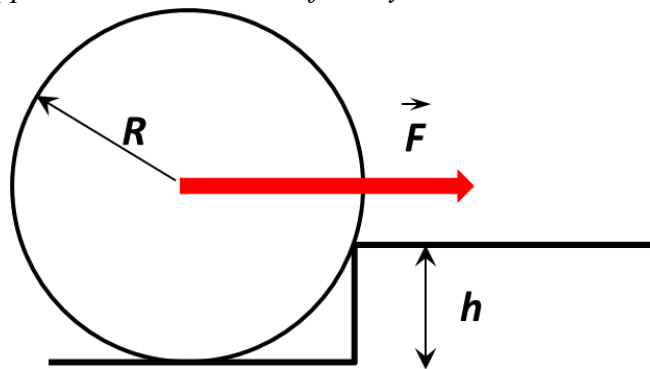


Homework 9

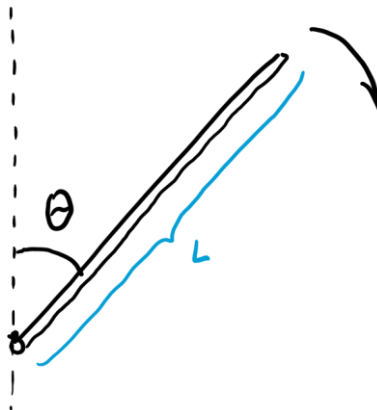
1. A heavy cylinder of mass m is being lifted to the step of height h . The force F is applied to the center of the cylinder as it is shown in the figure below. The radius of the cylinder is R and it is larger than the height of the step. Find minimal force we have to apply to the cylinder to roll it on the top of the step. The moment of inertia of a cylinder with respect to the edge of the step is $(3mR^2)/2$.

To start solving this problem I would recommend you to:

- Mark all the forces applied to the cylinder.
- Write all the torques applied to the cylinder with respect to the pivot point.
- Consider the first moment after the cylinder starts rolling on the step. What happens to the normal force applied to the “bottom” of the cylinder?



2. A uniform 25-cm long stick rotates freely about a horizontal axis through one of its ends. It is released at an angle Θ to the vertical. When it hangs straight down, the speed of the tip of the stick is 3.0 m/s. How large is Θ ? The moment of inertia of the rod with respect to one of its ends is $mL^2/12$.



1. A chain of mass m is placed at the round table as in shown in the figure below. The chain forms a circle with a radius R , and the center in the same point as the center of the table. The table is rotated with an angular velocity ω . Find tension of the chain.

