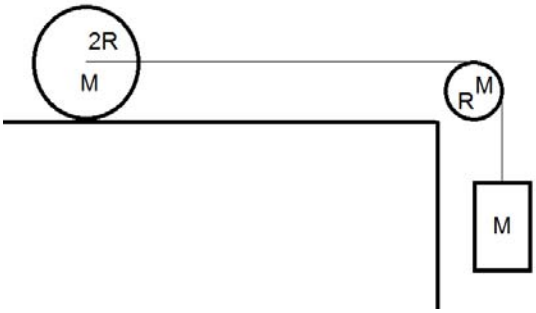
8-9)

A cylinder of mass M and radius 2R (careful!) is at rest on a rough table. A light string runs from the center of the cylinder in such a way as to allow the cylinder to be pulled horizontally. Said string runs over a disc of mass M and radius R on a frictionless axle. The string continues down over the disc and is connected to a hanging mass M.



Once released from rest, the cylinder rolls without slipping on the table, and the string does not slip over the disc. What is the linear acceleration of the masses?

HINT: You can NOT assume that $F_{fs} = \mu_{fs}F_N$ here. The frictional force is just enough to prevent slipping of the surfaces. You can NOT assume that the tensions are the same in each part of the string.