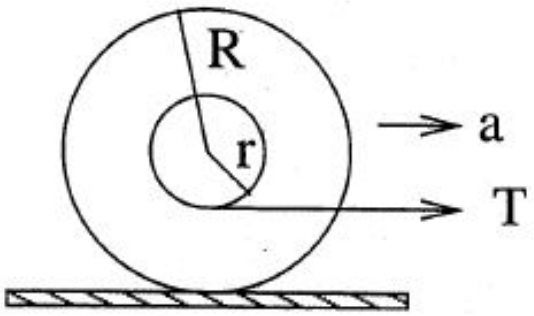
QP25

A yo-yo has mass m, inner radius r, and outer radius R. Its moment of interia is I about its center. The yo-yo rolls without slipping on a horizontal table and is pulled along by a horizontal string wound around its inner radius. The pulling by the string gives rise to an acceleration a.



a) (3 points) Find the tension T in the string, and the force of friction, f.

b) (1 point) Find the minimum coefficient of friction μ_{min} so that the yo-yo rolls without slipping. If $I = kmR^2$, find μ_{min} in terms of k, a and g.

c) (1 point) In the pictures, in which direction does the yo-yo roll? Explain.