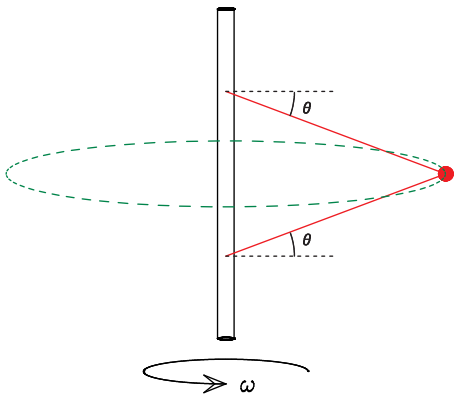
Recitation Exercises

{(This didn't get printed with the main set because of a mixup, sorry!)

Question 1: Practice from Earlier (this should be quick)

Consider a ball tethered to a rotating pole by two cables of equal length as shown to the right. The ball rotates along with the pole, making a horizontal circle (shown in green on the diagram). Suppose that you know the ball has a mass m, the pole is rotating at angular velocity ω, and the radius of the circle it makes is r.



You want to find the relationship between m, ω, r, and the tensions in the cables T_1 and T_2.

Draw a force diagram for the ball below, and indicate your choice of coordinate system.

Construct Newton's laws in both x and y for the ball based on your force diagram, putting in what you know about a_x and a_y. (You don't need to actually solve the system of equations, but show it to your TA/coach.)