Quiz 3: Energy

Section_____ _____

Table and Group Number _____

Name _____

A ball of negligible size and mass m hangs from a string of length l. It is hit in such a way that it then travels in a vertical circle. The initial speed of the ball after being struck is v_0. The goal of the first part of this problem is to find the tension in the string when the ball is at the top of the circle. You may assume that there are no external forces doing work on the ball and string. Let g denote the magnitude of the gravitational constant.
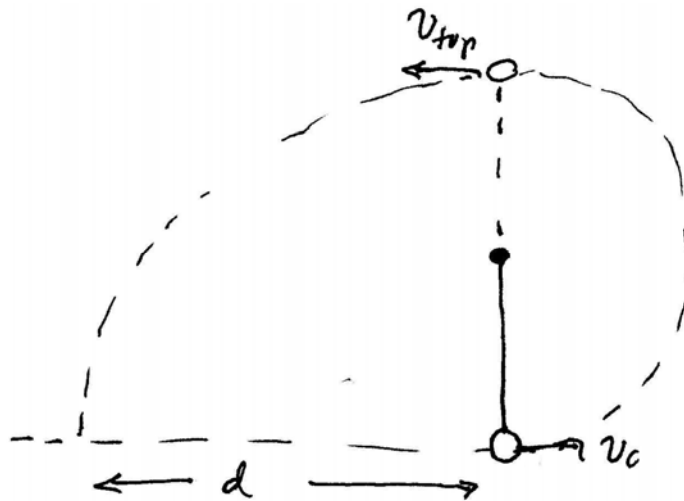
a) Outline a strategy and then a plan for solving this problem. State any concepts you plan to use, include sketches and diagrams as needed.

b) Find the tension in the string when the ball is at the top of the circle.

It turns out that the string breaks exactly when the ball is at the top of the circle and it follows the trajectory shown on the figure above. When the ball returns to the level of the bottom of the circle, it is a distance d from the bottom of the circle.

c) Find the distance d .