Problem 1 (suggested by Prof. Matt Brin) (due Monday, September 14)

A loop of string has fixed length L. It is looped around a disk of radius r and pulled tight at one point so as to form an “ice cream cone” shape as pictured here. Consider the region labeled A that is inside the loop of string, but outside the disk. Note that the area of A is zero if either $r=0$ or if $r=L/2\pi$. What value of r maximizes the area of the region A and what is this maximum value of the area?

This was our warm-up problem but only two solutions were received, from John Giaccio and Yuqiao Huang, both correct. Both solutions are similar to the solution discussed in the following link Solution