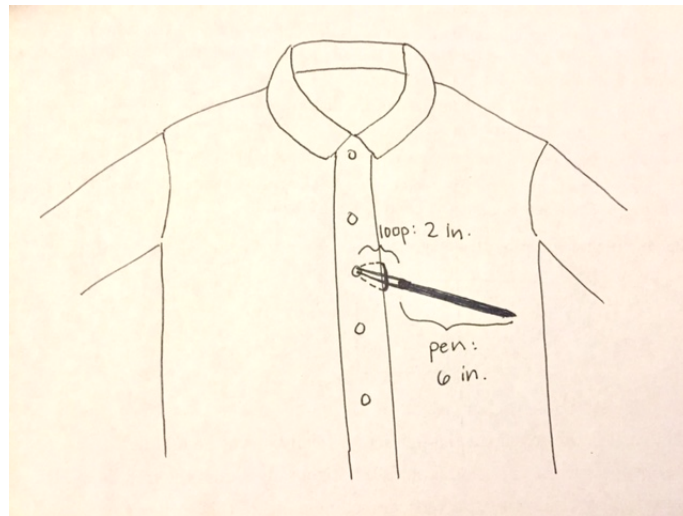


UW Math Circle  
February 9, 2017  
Homework

Try to solve these topological puzzles for next time. We'll have models for you to try your solution.

1. A pen is attached to a string and looped through a buttonhole, as shown below. Without breaking the pen or cutting the loop, can you figure out how to remove the pen from the shirt? The pen is solid and does not bend.



2. In class you saw that if you are wearing a pair of pants you could tie your feet together and turn the pants inside out without breaking the rope tying your feet together. (If you didn't do this in class— get a pair of sweatpants and a rope and do it at home!)

Is it possible to have on a pair of pants, tie your feet together, and turn the pair of pants backwards— without breaking the rope tying your feet together? Either figure out how to do it, or explain why doing so is impossible.