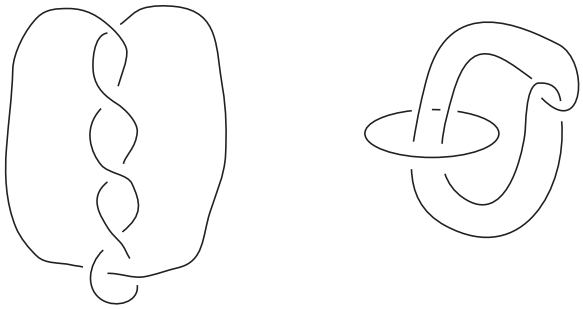
Math 4432 - Spring 2021
Homework 6

Work all these problems and talk to me if you have any questions on them.
Due: April 19

1. Compute the fundamental group of the complement of the knot shown on the left of the figure. Show that it has a presentation with just two generators and one relation



2. Compute the fundamental group of the complement of the link on the right of the figure. (The formula to compute the fundamental group is just like the one for knots.)

3. What is the abelianization of the fundamental group from Problem 2. (Any guesses as to what the abelianization of the fundamental group of an n-component link might be?)

4. If G is the fundamental group of a knot complement then show that you can add one relation to a presentation of G that makes the presentation a presentation of the trivial group.

5. Let K be the figure eight knot. Is there a homomorphism from $\pi_1(X_K)$ onto the dihedral group D_3? Is there a homomorphism from $\pi_1(X_K)$ onto the dihedral group D_5? If so what is the homomorphism (this means write down a presentation for the group and then describe the homomorphism) and if not why?

6. Same question for $\pi_1(X_K)$ where K is the right handed trefoil knot.