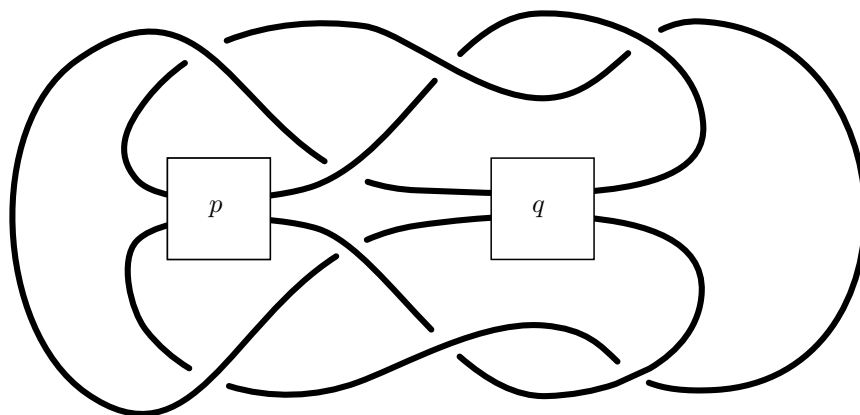# Math 309: Introduction to knot theory
Homework 5, due on Friday March 29 by 12:00 pm
(Submit your work at Room 219 of the Mathematics building)

1. Consider the Kanenobu $K(p, q)$ knots:

As seen in class, the integers p and q represent horizontal half-twists.

(a) Prove that the $K(n, -n)$ have the same Jones polynomial, for all integers n. What is this common Jones polynomial, and why?

(b) Prove that the $K(2n, 0)$ have the same Alexander polynomial, for all integers n. What is this common Alexander polynomial, and why?

2. For each of the three 6-crossing knots in the table, find a braid whose closure is the appropriate knot. You should justify your work, but you need not necessarily apply the algorithm in Adams.

3. (Adams, Exercise 5.17) Describe all the links of braid index 2.

4. (Adams, Exercise 5.21) Show that the closure of the n-strand braid $(\sigma_1 \sigma_2 \cdots \sigma_{n-1})^m$ is a knot if and only if m and n are relatively prime.

5. (Adams, Exercise 5.22) Check that when m and n are relatively prime, $(\sigma_1 \sigma_2 \cdots \sigma_{n-1})^m$ is simply the (m, n)-torus knot.