HOMEWORK 1

Problem 1. Prove that there are no knots with crossing numbers 1 and 2.

Problem 2. Show that the knot $4_1$ (with an arbitrary chosen orientation) is equivalent to both its reverse and to its reflection. (Note: the reverse of an oriented knot is the same knot with the orientation reversed. The reflection of a knot is its mirror image).

Problem 3. Identify the following knots in the table of knots:

Problem 4. Find the Reidemeister moves transforming the first knot into the second one:

Problem 5. Find the Reidemeister moves transforming the first link into the second one:

Problem 6. (Torus links) Torus links are produced in the following way:

- Choose a pair of integers $p, q$ with $p > 0$;
- Take a cylinder together with $p$ strings running parallel to its axis:

- Twist the cylinder through $q/p$ full twists (the direction of the twist is determined by the sign of $q$);

- Glue the ends of the cylinder to form a torus:

- The resulting link is called $T_{p,q}$. (It is formed from the strands drawn on the surface of the torus).

Identify $T_{2,3}$ and $T_{2,5}$ in the table. Then try to identify $T_{3,4}$ as well.