A torus knot/link is a knot or link which can be embedded in the standard torus $T^2$. A basic example is the $(q, r)$-torus knot (link) $K(q, r)$, where $q$ and $r$ are positive integers.

It is easy to check that $K(q, 1)$ and $K(1, r)$ are equivalent with the unknot, so assume $q, r \geq 2$.

Fact (you do not need to prove this): $K(q, r)$ and $K(q', r')$ are equivalent iff $\{q, r\} = \{q', r'\}$.

1: Show that $K(3, 2)$ is equivalent with the trefoil knot.

2: (a) Let $g$ be the greatest common divisor of $q$ and $r$. Show that $K(q, r)$ is a link with $g$ components. (Thus $K(q, r)$ is a knot if and only if $q$ and $r$ are relatively prime.)

(b) By part (a), $K(4, 2)$ is a 2-component link. Calculate its linking number.

3: Let $L$ be a 2-component link. Show that the linking number of the components of $L$ is an integer.

4: Classify the Seifert surface $S_L$ for the link $L$ consisting of a pair of unlinked unknots (shown in the following diagram). What is the genus of $S_L$? How many boundary components does it have? How does this surface differ from the Seifert surface for the Hopf link (discussed in class)?