These exercises are mainly taken from the last week's lectures. Please let me know if any of the problems are unclear or have typos.

Exercise 10.1. [Harder] Give an upper bound on $g(K)$ where K is a four-plat in standard position.

Exercise 10.2. Show that the trefoil, the figure eight, the 6_1 knot and the 9_{46} knot all have genus one.

Exercise 10.3. Looking at KnotInfo, find a relation between knot genus and the span of the Alexander polynomial.

Exercise 10.4. If $\gcd(p,q) = 1$ then let $T(p,q)$ be the knot on the standard two-torus with *slope* $p/q \in \mathbb{Q} \cup \{\infty\}$.

- For all $n \in \mathbb{Z}$ the knots $T(1,n)$ and $T(n,1)$ are isotopic to the unknot.

- Draw $T(4,3)$, the $(4,3)$ torus knot.

- (Hard) Show that 4_1 is not a torus knot.

- Show that $T(p,q)$ is isotopic to $T(q,p)$.

- Show that if $\gcd(p,q) = n$ then the link $T(p,q)$ has n components.

Exercise 10.5. [Harder] Prove that any knot K has ∇_K being a polynomial in z^2. Here ∇_K is the Conway polynomial of K.

Exercise 10.6. Compute the Conway polynomial of the trefoil, figure eight knot, and the Whitehead link.

Exercise 10.7. Show that the Conway polynomial does not distinguish mirror image knots. Does it distinguish mirror image links?

Exercise 10.8. Give formulas for P_{mK} and P_{rK} in terms of P_K, the HOMFLY polynomial of K.