1. Show that $T^2 \# RP^2 \cong RP^2 \# RP^2 \# RP^2$. In the lectures it was shown that any compact connected surface can be written $\Sigma_g \# \Xi_h$ deduce that any compact connected surface can be written as either Σ_g or Ξ_h.

2. Show that when you refine a *triangulation* by subdividing one to the triangles, the Euler characteristic of the triangulation remains the same. Deduce that the Euler characteristic χ of a surface is a topological invariant.

3. What is $\chi(X \# Y)$? What is $\chi(\Sigma_g)$? $\chi(\Xi_h)$?

4. Find a function f of three real variables such that $f(x, y, z) = 0$ is a homeomorphic to Σ_g. If you have access to Mathematica or a similar package, you could use your answer to plot such a surface. Doing this is strangely satisfying.