(1) Verify the equivalence, up to mirroring, of the five knots described on the first day of class (you do not have to verify equivalence with the tangle toy model).

(2) Determine the topological type of the surface depicted in the fourth description, using the classification of surfaces.

(3) Starting from the fifth description, use the Seifert-van Kampen theorem to find a presentation for the fundamental group of the complement of the knot that has two generators and one relator.

(4) Show that the complement of an unknotted curve in S^3 is diffeomorphic to an open solid torus and that the complement of the Hopf link is diffeomorphic to $T^2 \times (-1, 1)$.

(5) Let D^2 denote the unit disk in $\mathbb{R}^2$. Prove that if $f : D^2 \to \mathbb{R}^3$ is a smooth embedding, and $K = f(\partial D^2)$, then K is isotopic to $U = \{(x, y, 0) \in \mathbb{R}^3 \,|\, x^2 + y^2 = 1\}$. Hint: use the definition of $Df_{(0,0)}$ to define an isotopy from f to a linear map, adjust the resulting map by an affine transformation, and apply the isotopy extension theorem.