1. Sutherland 2.1

2. Sutherland 2.2

3. Sutherland 2.5 **(AI-free)**

4. Sutherland 2.7 as follows:

   Suppose $\sim$ is an equivalence relation on a set X. Show that the equivalence classes partition X in the following sense. Let $\mathcal{C}$ denote the collection of equivalence classes. Then $\cup_{C\in\mathcal{C}} C = X$, and if $C, C' \in \mathcal{C}$ then either $C = C'$ or $C \cap C' = \varnothing$.

5. Give examples of collections of open intervals $I_i = (a_i, b_i)$ with $i \in \mathbb{N}$ such that

   a) $\cap_{i\in\mathbb{N}} I_i = [0,1]$
   b) $\cap_{i\in\mathbb{N}} I_i = (0,1)$
   c) $\cap_{i\in\mathbb{N}} I_i = (0,1]$

   For part (a) give a formal proof. For the remainder, just give an example and a brief justification.

6. Sutherland 3.2 (No formal proof needed)

7. Sutherland 3.3

8. Sutherland 3.4

9. Sutherland 3.8 (Make your proof as short as possible)