1. Let \( n \) be a positive integer and let \( f : \{1, 2, \ldots, n\} \to \{1, 2, \ldots, n\} \) be a function. Then, \( f \) is injective if and only if \( f \) is surjective.

2. Let \( A \) be a set. Show that \( |\mathcal{P}(A)| = |\{f \mid f : A \to \{0, 1\} \text{ function}\}| \)

3. Let \( A_n = \{a_{n,1}, a_{n,2}, a_{n,3}, \ldots\}, n \geq 1 \) a countable collection of countable, mutually disjoint sets. Let \( f : \{1, 2, 3, \ldots\} \to \bigcup_{n \geq 1} A_n \) the function defined as follows: if there exists \( N \geq 0 \) such that
\[
N(N + 1)/2 < i \leq (N + 1)(N + 2)/2
\]
then \( f(i) \) is defined as
\[
f(i) := a_{i - \frac{N(N+1)}{2}, \frac{(N+1)(N+2)}{2} - i + 1}
\]
Show that \( f \) is bijective.

4. Prove by induction that \( n < 2^n \) for all \( n \in \mathbb{N} \).

5. Ex. 1.2.1.

6. Ex. 1.2.2.

7. Ex. 1.2.7

8. Ex. 1.2.9.

9. * Ex. 1.2.10.