Math 2326 - Introduction to Abstract Mathematics
Assignment 28 - Due Monday, April 7

Problem 93: Let X be and infinite set and A an infinite countable subset of X. Assume $A = \{a_1, a_2, a_3, \ldots\}$ and define the map $f : X \to X - \{a_1\}$ given by:

$$f(x) = \begin{cases} x, x \notin A \\ a_{n+1}, x = a_n \end{cases}$$

Show that f is a bijection.

Problem 94: Let $f : X \to X$ be an injective map such that $f(X) \neq X$. Conclude that X is infinite and show that for $x \in X - f(X)$, the elements $x, f(x), f(f(x)), \ldots$ are pairwise distinct.

Problem 95: Let $X \subset \mathbb{N}$, show that X is countable.