Consider the function \( g : \mathbb{R} \to \mathbb{R} \) defined by 
\[ g(x) = \frac{1}{1 + 2 \lfloor x \rfloor - x} \]
where for any \( x \in \mathbb{R} \), \( \lfloor x \rfloor \) denotes the largest natural number less than or equal to \( x \). (For example, \( \lfloor \pi \rfloor = 3 \), \( \lfloor 3 \rfloor = 3 \), and \( \lfloor 3.99999 \rfloor = 3 \).) Let \( f : \mathbb{N} \to \mathbb{Q} \) be the function defined by the following rule:
\[ f(n) = (g \circ \cdots \circ g)(0). \]

Then prove that \( f \) is a bijection between \( \mathbb{N} \) and \( \mathbb{Q}_+ \), where \( \mathbb{Q}_+ \) denotes the set \( \{ x \in \mathbb{Q} : x \geq 0 \} \).