Proof: By Indution

$$A_n = \{x | 0 \leq x \leq \frac{1}{2^n}\}$$

Since $\frac{1}{2^n} > \frac{1}{2^{n+1}}$, $A_{n+1} \subset A_n$

Since $\lim_{n\to\infty} \frac{1}{2^n} = 0$ *and* $\{0\} \in A_n$ *is true* for all n

$$\bigcap_{n=1}^{\infty} A_n = \{0\}$$

the proof is complete.