

Proof: By Induction

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

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

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

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

the proof is complete.