9.

Example: $A_n = \{x | 0 < x < \frac{1}{n}\}$ n=1,2,⋯

Prove that $A_{n+1} \subset A_n$ for all n and $\bigcap_{n=1}^{\infty} A_n = \emptyset$

Proof:

(1) Prove that $A_{n+1} \subset A_n$ for all n

Since $A_n = \{x | 0 < x < \frac{1}{n}\}$ n=1,2,⋯,

We have $A_{n+1} = \{x | 0 < x < \frac{1}{n+1}\}$, since $\frac{1}{n} > \frac{1}{n+1}$, so we have $A_{n+1} \subset A_n$ for all n

The statement has been proved.

(2) Prove that $\bigcap_{n=1}^{\infty} A_n = \emptyset$

When $n \to \infty$, $\frac{1}{n} \to 0$, $A_n = \{x | 0 < x < \frac{1}{n}\} \to \emptyset$

Since there is no element in A_n when $n \to \infty$, according to the definition of intersection, $\bigcap_{n=1}^{\infty} A_n = \emptyset$. The statement has been proved.