

9. Consider the family of intervals defined as

$$A_n = (0, 1/n)$$

$$\Rightarrow A_1 = (0, 1), A_2 = (0, 1/2), A_3 = (0, 1/3), \text{ etc.}$$

We see that each successive interval A_{n+1} is smaller than and contained in A_n ; i.e. $A_{n+1} \subset A_n$ because $(\forall n \in \mathbb{N}) \left[\frac{1}{n+1} < \frac{1}{n} \right]$.

Since the intervals get smaller with increasing n , and $1/n \rightarrow 0$ as $n \rightarrow \infty$, $\bigcap_{n=1}^{\infty} A_n = \emptyset$ as they have no common elements.

(0 is not included in $A_n = (0, 1/n)$ as it's an open interval.)

