

We claim...

$$\bigcup_{i \in \mathbb{N}} A_i = \{\dots, -3, -2, -1, 1, 2, 3, \dots\}$$

This claim is true because for all natural numbers k , $A_{k+1} \subset A_k$. Thus $A_k \subset A_1$ for all k (this could be proved by induction, but we don't do that here), and so A_1 contains everything contained in any other set.