

#5737 Find the limit points and closure of \mathbb{Z} , \mathbb{Q} , \mathbb{R} **Solution**

1. It is obvious that \mathbb{Z} is closed, due to $\mathbb{Z}^c = \cup_{i \in \mathbb{Z}} (i, i + 1)$. Hence **closure** of \mathbb{Z} is \mathbb{Z} , and the **set of limit points is empty**, because each point on the real line has neighborhood that does not intersect with \mathbb{Z} .

2. **The closure** of \mathbb{Q} is \mathbb{R} , because for each point $r \in \mathbb{R}$ exists such sequence $(q_n)_{n \geq 0} \subset \mathbb{Q}$, that $q_n \rightarrow r, n \rightarrow \infty$. And the **set of limit points** is also \mathbb{R} , because every neighborhood of each point of the real line intersects with \mathbb{Q} infinitely many times.

3. \mathbb{R} is closed, hence the **closure** is \mathbb{R} and due to similar reasons as above the set of **limit points** is \mathbb{R} .