

Answer on Question #47766 – Math – Real Analysis

Question.

Suppose that S is contained in R and that S is not closed. Is it true that there is a subsequence in S that converges to some x not in S ?

Solution.

S is not closed $\Rightarrow S$ contains not all its limit points $\Rightarrow \exists x \notin S, x$ is a limit point for $S \Rightarrow \exists$ subsequence $x_n \in S \forall n \in \mathbb{N}: \lim_{n \rightarrow \infty} x_n = x$.

Example Let $R = \mathbb{R}^1, S = (0; 2]$. Then there is a subsequence $x_n = \frac{1}{n} \in S, \lim_{n \rightarrow \infty} \frac{1}{n} = 0 \notin S$.

Answer. True.