Directions. Please submit your answer to the following problem in a \LaTeX-
prepared document. Class participants are encouraged to prepare solutions
in a collaborative mode but to prepare their to-be-submitted write-ups in-
dividually. The consequences of sharing files, electronic or otherwise, are
discussed in the course syllabus.\footnote{If the wording of this problem was
discussed in detail in the classroom, the course instructor expects to see similar phrases and sentences in reading the submissions.}

Please include the problem number along with a statement of the problem
in your submission. Please also include your e-mail address.

\textbf{Problem.} Prove the following theorem:

\textbf{Negative Induction Theorem.} Let $S$ be a non-empty subset of \( \mathbb{Z} \) (of the integers) that contains a maximal element; call it \( l \). If \( n - 1 \in S \) whenever \( n \in S \) then

\[ S = \{ m \in \mathbb{Z} : m \leq l \}. \]