Home Assignment 6

Discrete Mathematics – CSC/MAT A67, Winter 2024

PROOF BY CONTRADICTION

Prove the following statements by way of contradiction. For each proof, state the assumption that you are making towards a contradiction, explicitly, clearly, and accurately.

1. $\forall n \in \mathbb{N}$, $\exists m \in \mathbb{N}$ such that $n + m > n^2$.

   Assume towards a contradiction that

   $\exists n \in \mathbb{N}$, $\forall m \in \mathbb{N}$ it holds that $n + m \leq n^2$.

   It follows that $\forall m \in \mathbb{N}$, we have $m \leq n^2 - n < n^2$. In particular, for $m = n^2$, we have that $n^2 < n^2$, which is a contradiction.