Computability Assignment
Year 2013/14 - Number 1

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1 Question

Define a binary property $p(x, y)$ over natural numbers that satisfies both the requisites:

1. $\forall x \in \mathbb{N}.\exists y \in \mathbb{N}.p(x, y)$ and

2. *it is false that* $\forall y \in \mathbb{N}.\exists x \in \mathbb{N}.p(x, y)$

Provide a definition for p, and a proof for the above claims.

1.1 Answer

We take a binary property p expressed as x<y .

In this way we are going to prove that exist a binary property that satisfies both the requisites.

So we have that:

Case 1)

Taking x=z and y=z+1 (so the successor) we have that the property is always satisfied.

Case 2)

The counterexample to prove the second case is defining y equal to 0. The consequence is that will never exist an x s.t. x<y.