Problem Set 5

CS 4860 - Spring 2018

April 19, 2018

Check for updates to the problem set. More problems will be added.

1. Let a and b be real numbers such that $(a \neq b \Rightarrow 0 = 1)$. Show that $a = b$.
2. Can we show that if $f : \mathbb{N} \to \{0, 1\}$ and $\neg(\forall x : \mathbb{N}.\ f(x) = 0)$, then $\exists y : \mathbb{N}.\ f(y) = 1$? Discuss.
3. Given reals $x_1, \ldots, x_n$ such that their product is *negative*, then can we find an i such that x_i is negative?
4. Show that each of these statements implies the other.
   - If r is a real number such that it is impossible that $r = 0$, then $r < 0$ or r > 0.
   - If x_n is a sequence of natural numbers 0 and 1, and not all of the x_n are 0, then we can find an m with $x_n = 1$.
5. (Extra credit) Construct a real number with no decimal expansion.