## CSE 311 Quiz Section: June 6, 2013

## 1 Countability

Show that the following sets are countable:
a) The set of all rational numbers (not just the positives)
b) The set of all pairs of binary strings

## 2 Computability

Show the following problem INFINITE is undecidable:
Given: $\langle Q\rangle$, the code of a program $Q$
Output: 1 if $Q$ halts on an infinite number of inputs
0 if $Q$ only halts on a finite number of inputs

## 3 Another Computability Problem

(Note: The solution to this one will be posted online if we don't have time to go over it.) Show the following problem ONE is undecidable:
Given: $\langle Q\rangle$, the code of a program $Q$
Output: 1 if $Q$ halts and outputs 1 on input!
0 if $Q$ runs forever or outputs something else on input!

