

# CSCI 1323 (Discrete Structures), Spring 2006

## Quiz 6 Solution

1. (6 points) Suppose  $f$  is a function  $f : \mathbb{R} \rightarrow \mathbb{R} \times \mathbb{R}$  defined by  $f(x) = (x, x)$ . ( $\mathbb{R}$  is the set of real numbers.) Answer the following questions about  $f$ .

(a) Is it one-to-one? (That is, if  $f(x) = f(y)$ , does that mean that  $x = y$ ?)

**Solution:** Yes.

(b) Is it onto? (That is, for every  $(y, z)$ , is there an  $x$  for which  $f(x) = (y, z)$ ?)

**Solution:** No. (For example, there is no  $x$  for which  $f(x) = (1, 2)$ .)

(c) What is its inverse, or does it have one?

**Solution:** It doesn't have one, since it's not onto.

2. (4 points) Which of the following are  $O(N^4)$ ? Circle all that are.

(a)  $\frac{1}{2}N^5 - 1$

**Solution:** No.

(b)  $N^4 - 1000N^3$

**Solution:** Yes.

(c)  $4^N$

**Solution:** No.

(d)  $N^3$

**Solution:** Yes.