

**Discrete Math**  
**Quiz 4**

**Name:** \_\_\_\_\_

You have 10 minutes to complete this quiz. If you have a question raise your hand and remain seated. In order to receive full credit your answer must be **complete**, **legible** and **correct**. Show your work, and give adequate explanations.

1. Give an example of a function  $f: \mathbb{R} \rightarrow \mathbb{R}$  that is

(a) injective but not surjective.

Examples.

(I)  $f(x) = e^x$ . (We discussed this example in class on September 27.)

(II)  $f(x) = \begin{cases} x + 1 & x > 0 \\ x & x \leq 0. \end{cases}$

(III) There are many other correct answers!

(b) surjective but not injective.

Examples.

(I)  $f(x) = x \cdot \sin(x)$ . (We discussed this example in class on September 27.)

(II)  $f(x) = x(x - 1)(x - 2)$ .

(III) There are many other correct answers!

2. Give the definition of the natural numbers.

The natural numbers is the intersection of all inductive sets.