TEST 3
MATH 310

NAME:________________________ November 23, 2015

To receive full credit on each question, you must show **all** work! This assignment is due **at the beginning of class on Wednesday, December 2nd**. You are allowed to use your class notes, the course textbook, and me as a resource. **No other resources are permitted, including but not limited to: professors or students, other textbooks, the internet, etc.** By signing your name on this test, you pledge to abide by these guidelines. Good luck!

1. Show that the smallest element of a nonempty set of positive integers is unique. (Hint: Use induction.)

2. A sequence $a_0, a_1, a_2, \cdots$ is defined recursively as follows:

$$a_0 = 2;$$
$$a_{n+1} = (a_n)^2.$$

Find a formula for a_n and prove that your formula is correct.

3. Let V be a relation on $\mathbb{R}$ given by $(x, y) \in V$ iff $x = y$ or $xy = 1$. Prove that V is an equivalence relation. Give the equivalence class of 3; of $-\frac{2}{3}$; of 0.

4. Suppose that R is nonempty. Prove that if R is a symmetric, transitive relation on A and the domain of R is A, then R is reflexive on A.