Mat 604 Sample Midterm Exam

Name

1. State the five axioms that define the counting numbers (15 points)
2. (a) Prove that for every counting number x, $x \neq x^{++}$
   (b) State the definition of addition for counting numbers.
   (c) Prove that for any counting number x, $1 + x = x^{+}$.
   (15 points)
3. State the Well ordering Theorem (10 points)
4. (a) State the definition of $x > y$ for whole numbers.
   (b) State the transitivity law for whole numbers.
   (c) State the Cancellation law for addition of whole numbers
   (15 points)
5. Let d be a base n digit. Define the base n name of the successor d^s of d. (10 points)
6. State the axioms for a field. What has to be changed to get the axioms for an integral domain. (15 points)
7. Write out the addition and multiplication tables for the integers mod 5 (that is, the digits in base 5). Do they form a field? (20 points)