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 $d^+$ 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)