1 Basic definitions

1. The set of integers $\mathbb{Z} = \{\ldots -3, -2, -1, 0, 1, 2, 3 \ldots \}$.

2. The set of natural numbers $\mathbb{N} = \{(0), 1, 2, 3 \ldots \}$.

3. If $n, d \in \mathbb{Z}$, then $d | n$ divides $n$ if $\exists q \in \mathbb{Z}$ called the quotient such that $n = dq$.

4. In general, if $n, d \in \mathbb{Z}$, then there are integers $r, q \in \mathbb{Z}$ such that $n = dq + r$ and $0 \leq r < d$. Here $d$ is called the divisor, the integer $q$ is called the quotient, the dividend is $n$, and the remainder is $r$.

5. In an implication $P \Rightarrow Q$, the statement $P$ is called the hypothesis or antecedent and the statement $Q$ is called the consequence or the conclusion.

6. The well-ordering principal states that any non-empty subset of the natural numbers has a least element.

2 Divisibility

Be able to give complete proofs for statements 1.3 through 1.8. Think carefully about the analogues of parity. What happens when a number is not divisible by 3, 5, or 7.

3 Induction

I expect to ask three questions from among 1.9 through 1.13. N.B. I will also ask a question about an inductive proof that you will not have seen.