MA 274: Some of the Zermelo-Frankel Axioms of Set Theory

The numbering has been chosen to correspond to that of the textbook.

I (existence): There exists a set.

II (extensionality): Two sets are equal if and only if they have exactly the same elements.

III (specification): If A is a set and if $Q(x)$ is a predicate, then there exists a set B consisting of exactly those elements $x \in A$ for which $Q(x)$ is true.

IV (pairing): If A and B are sets, then there i a set C such that $A \in C$ and $B \in C$.

V (union): If A is a set whose elements are all sets, then there is a set $\cup A$ consisting of all x such that $x \in B$ for some $B \in A$.

VI (power set): For any set A, there exists a set $\mathscr{P}(A)$ such that $B \in \mathscr{P}(A)$ if and only if $B \subset A$.

VII (infinity): There exists an inductive set.