The Z.F.C. Axioms

This is a list of the axioms in which (almost) all words are in logical and undefined terms.

(i) Extensionality Axiom: Let A, B be sets. If they both contain all elements of the other, then $A = B$.

(ii) Union Axiom: For a set A, there is a set U such that a set $x \in U$ if and only if $x \in S$ with $S \in A$.

(iii) Power-set Axiom: For a set A, there is a set $\mathcal{P}$ such that a set $s \in \mathcal{P}$ if and only if s has all its elements in A.

(iv) The empty set: There's a set B such that for any set x, $x \notin B$.

(v) Infinity Axiom: There is a set C such that

  (a) if B is a set containing noting, then $B \in C$, and moreover,

  (b) if $S \in C$, and T is a set containing exactly those in S, and S itself, then $T \in C$.

(vi) The Replacement Axiom: Let A be a set. Suposely that for sets $x \in A, y_p$, and y_q, $y_p = y_q$ whenever $\varphi(x, y_p)$ and $\varphi(x, y_q)$, then,

  ·) there is a set B such that for a set y, $y \in B$ if and only if $\varphi(x, y)$ for some $x \in A$.

(vii) Regularity Axiom: If A is a set containing some set(s), then there is a set $m \in A$ such that for any set x, $x \notin m$ whenever $x \in A$.

(viii) The Choice Axiom: Let $\mathscr{A}$ be a set such that for any sets $S, T \in \mathscr{A}$, there is no set x in both sets. Then there is a set B such that

  (a) for any $t \in B$, $t \in S$ for some $S \in \mathscr{A}$, and

  (b) for any $S \in \mathscr{A}$, there is a unique $t \in S$ such that $t \in B$.