Set Theory Axioms: ***Naive Set Theory by Paul R. Halmos***

1. Axiom of extension. Two sets are equal if and only if they have the same elements.

2. Axiom of unions. For every collection of sets there exists a set that contains all the elements that belong to at least one set of the given collection.

3. Axiom of specification. To every set A and to every condition S(x) there corresponds a set B whose elements are exactly those elements x of A for which S(x) holds.

4. Axiom of pairing. For any two sets there exists a set that they both belong to.

5. Axiom of powers. For each set there exists a collection of sets that contains among its elements all the subsets of the given set.

6. Axiom of infinity. There exists a set containing 0 and the successor of each of its elements.

7. Axiom of substitution. If S(a,b) is a sentence such that for each a in set A the set {b: S(a,b)} can be formed, then there exists a function F with domain A such that F(a) = {b:S(a,b)} for each a in A. (Anything intelligent that one can do to the elements of a set yields a set.)

8. Axiom of choice. The Cartesian product of a non-empty family of non-empty sets is non-empty.