Mathematics

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Chapter 1

Primitive Terms and Axioms

1.1 Primitive Terms

Let there be *sets*. We write $A : \mathrm{Set}$ for: A is a set.

For any set A, let there be *elements* of A. We write $a : \mathrm{El}(A)$ for: a is an element of A.

For any sets A and B, let there be *functions* from A to B. We write $f : A \to B$ for: f is a function from A to B.

For any function $f : A \to B$ and element $a : \mathrm{El}(A)$, let there be an element $f(a) : \mathrm{El}(B)$, the *value* of f at the *argument* a.

For any sets A and B, let there be *relations* between A and B. We write $R : A \nrightarrow B$ for: R is a relation between A and B.

For any set A and elements $a, b : \mathrm{El}(A)$, let there be a proposition that a and b are *equal*, $a = b$.

For any relation $R : A \nrightarrow B$ and elements $a : \mathrm{El}(A)$, $b : \mathrm{El}(B)$, let there be a proposition aRb, that R *holds* between a and b.

1.2 Axioms

Axiom 1.1 (Equality Preservation)**.** *Let* $f : A \to B$ *and* $x, y : \mathrm{El}(A)$*. If* $x = y$ *then* $f(x) = f(y)$*.*