Why

We name a statement which involves an identity.[1]

Definition

An *equation* is any statement (see Statements) relating two terms by the relation of identity (see Identities). Some authors also call an equation an *equality*. The symbol "=" is called the (or an) *equals sign* or *equals symbol*.

Variables

It is regularly the case that we are interested in equations relating all objects of one set to another. For example: Let X and Y be sets and let $f : X \to Y$ and $g : X \to Y$. We may write the logical assertion $(\forall x)(f(x) = g(x))$. In this case it is understood that f and g are *free* names and x is a *bound* name (see Quantified Statements).

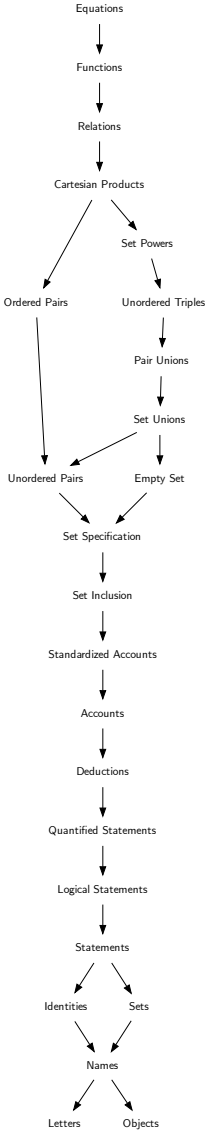
We will regularly, however, refer to the equation $f(x) = g(x)$ without the quantifier $\forall x$. In this case, x appears free, but is not. In other words, in the statement $f(x) = g(x)$, depending on context, x is an implicitly bound name. This usage is in slight offense to normal English usage. The name is *bound* (see Quantified Statements) because the use of the particular symbol x is irrelevant. We may as well have used the symbol y, and so the name is bound to the quantifier $\forall$.

[1] Future editions will expand on this statement.

In a second sense, however, the choice of name is "free", and the name is meant as a placeholder (see Names). For these reasons, we introduce terminology for this common case. We are discussing the equation

$$f(x) = g(x).$$

The name x we call a *variable*. It is a placeholder name, which is bound in the quantified statement. But the particular choice of name is irrelevant. In contrast to the variable x, the names f and g we call *constant*. We refer to them as the *constants* in the equation. The meaning is meant to convey that these names are *fixed* in the present discussion. That we are considering a particular function f and function g.


Equations
Functions
Relations
Cartesian Products
Set Powers
Ordered Pairs
Unordered Triples
Pair Unions
Set Unions
Unordered Pairs
Empty Set
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects