

Syntax of FOL

1. Atomic constants (also called simple terms): $a, b, c, \dots$
2. Predicates (capitalized first letter, and specific arity): $\text{Cube}(x)$, $\text{Larger}(x, y)$
3. Atomic sentences are formed by putting a predicate of arity n in front of n names (enclosed in parentheses and separated by commas).
4. Atomic sentences are built from the identity predicate, $=$, using infix notation: the arguments are placed on either side of the predicate.
5. Complex terms are typically formed by putting a function symbol of arity n in front of n terms (simple or complex).
6. Complex terms are used just like names (simple terms) in forming atomic sentences.

Complex sentences:

7. If P is a sentence of FOL, then so is $\neg P$.
8. If P and Q are sentences of FOL, then so is $P \wedge Q$.
9. If P and Q are sentences of FOL, then so is $P \vee Q$.

Semantics of FOL

1. An atomic constant must name an (actually existing) object.
2. No individual constant can name more than one object.
3. An object can have more than one name or no name at all.
4. Predicates are interpreted by a determinate property or relation of the same arity as the predicate.
5. The order of the names is crucial in forming atomic sentences.
6. In FOL, complex terms are assumed to refer to one and only one object.

Truth-functional connectives

7. The sentence $\neg P$ is true if and only if P is not true.
8. The sentence $P \wedge Q$ is true if and only if both P and Q are true.
9. The sentence $P \vee Q$ is true if and only if P is true or Q is true (or both are true).