

The language of arithmetic

The variables are terms.

"0s" is a term.

If  $\tau$  and  $\rho$  are terms, so are  $S\tau$ ,  $(\tau + \rho)$ , and  $(\tau \cdot \rho)$ .

Nothing else is a term.

Expressions of the form  $\tau = \rho$  and  $\tau \leq \rho$  are atomic formulas.

Every atomic formula is a formula.

If  $\phi$  and  $\psi$  are formulas, so are  $(\phi \vee \psi)$ ,  $(\phi \wedge \psi)$ , and  $\sim \phi$ .

If  $\phi$  is a formula, so is  $(\forall v)\phi$  and  $(\exists v)\phi$ .

Nothing else is a formula.

A term without variables is closed.

A formula without free variables is a sentence.