## Tarski Undefinability Theorem Succinctly Refuted

Tarski proves that the Liar Paradox is true in his meta-theory and not provable in his theory. By creating three truth predicate axioms that Tarski presumed could not possibly exist I prove that the Liar Paradox is false in his theory with no need to reference any meta-theory.

The following refutation applies to the generalized conclusion of the Undefinability Theorem: **All formal systems of greater expressive power than arithmetic necessarily have undecidable sentences.**

The key aspect of my proof is that I provide axiom of Truth (3) that correctly decides that some expressions of language such as the formalized Liar Paradox are either ill-formed or false. We evaluate these as not true.

### Eliminating Undecidability in Formal Systems

With a very slight change to how formal systems are defined undecidability would no longer be able to be expressed in any of these formal systems.

**Truth Predicate Axioms**
(Tarski Notation, Conventional Notation and Simple English)
(1) $x \in Tr \leftrightarrow x \in Pr$ // True(x) ↔ (⊢x)
**A set of facts adds up to X being TRUE.**

(2) $\sim x \in Tr \leftrightarrow \sim x \in Pr$ // False(x) ↔ (⊢~x)
**A set of facts adds up to X being FALSE.**

(3) $x \notin Tr \leftrightarrow x \notin Pr$ // ~True(x) ↔ ~(⊢x)
**There is no set of facts that add up to X being TRUE.**

### The general result of the Truth Predicate Axioms:

All formal systems having the above axioms as their formalized notion of truth would be incapable of expressing any undecidable sentences.

Anyone truly understanding the Tarski Undefinability proof would know that the whole proof would fail as soon as its third step would be proven false: (3) $x \notin Pr \leftrightarrow x \in Tr$ // page 275

**Applying the general result to the above step (3):**
Swap the LHS of the above equation that matches RHS of Truth Predicate Axiom(3) with the LHS of Truth Predicate Axiom(3) and we derive $x \notin Tr \leftrightarrow x \in Tr$, which is clearly false, thus decidable.

The above can only be understood within the context of the Proof:
http://liarparadox.org/Tarski_Proof_275_276.pdf