

A Disproof of the Theorem of Triviality

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Abstract

We disprove the Theorem of Triviality, which claims that if one is asked to prove a statement K , then this statement must be true, since it is being asked. We then discuss some possible explorations of this idea.

1 Preliminaries

The theorem of triviality is a common theorem used among students trying to solve math problems. We restate it here.

Theorem 1 (Theorem of Triviality). *If one is asked to prove a statement K , then it must be true, since it is being asked.*

2 Disproof

We now disprove Theorem 1.

Proof. This statement is logically equal to its contrapositive, which is “if a statement is not true, then one will not be asked to prove it.” This is clearly false, as we can ask to prove the following two statements:

Prove that the Theorem of Triviality is true.

Prove that the Theorem of Triviality is false.

These two statements are complements, and so one must be false, contradicting the hypothesis. Hence the Theorem of Triviality is false. \square

3 Open Questions

We have also been considering this idea of “metaproofs” where we ask questions about proofs themselves; in specific, we ask for the answer to the following question: out of all conditional statements of the form “if A , then B ”, what percent are always true?

One can also muse what other “metaproblems” one can come up with, and make a problem about those metaproblems. We encourage readers to explore these questions and then make more questions about said questions.