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Harvey Friedman*, friedman@math.ohio-state.edu. *GOEDEL'S SECOND THEOREM: ITS MEANING AND USE.*

Goedel's Second Incompleteness Theorem is a spectacular finding of the greatest general intellectual interest. The Theorem was established in the early 1930's, and we discuss some transparent rigorous formulations that have come much later. A weak form of the Theorem has a particularly transparent proof that provides a certain kind of information, raising the question of whether the full theorem can be treated analogously. The Theorem is used in an essential way for Concrete Mathematical Incompleteness.

The Theorem also has finite forms, which raise a number of open issues. We use Strict Reverse Mathematics to address the consistency of Peano Arithmetic. We close by comparing the inconsistency of Peano Arithmetic to such developments as spontaneous disintegration of the sun, annihilation of human life by black holes, gamma ray bursts, or comets, practical finite $P = NP$, perpetual motion machines, time travel, fast neutrinos, cold fusion, Jurassic Park, and million year life spans. (Received January 31, 2012)