

George Tourlakis

Lectures in Logic and Set Theory, Volume I: Mathematical Logic

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REVIEW

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Volume I: Mathematical Logic, of George Tourlakis' two volume *Lectures in Logic and Set Theory*, started out as a preliminary section to the volume on set theory that had been in preparation for some time. The author intended for the preliminary section to contain “absolutely essential topics in proof, model and recursion theory” (page ix). However, the section began to take on its own life as the author attempted to “say something about one of the most remarkable theorems of logic—arguably *the* most remarkable—about the limitations of formalized theories: Gödel's second incompleteness theorem” (page x).

An unspoken code among mathematicians is that one cannot in good conscience reference or include a result in one's own work without understanding why it is true. Another is that when presenting the proof of Gödel's incompleteness theorem cutting corners with, or avoiding completely, the “gory details” is okay. Tourlakis is true to the first code but violates the second. Volume I contains a *complete* proof of Gödel's second incompleteness theorem from Peano's axioms, “gory details and all.” But despite his formalist approach, the author has an engaging style and an infectious passion for the subject that helps make this book a highly worthwhile addition to the literature.

Part I (Basic Logic)

The author begins Chapter I with an insightful and highly readable explanation of what the book sets out to accomplish. Section 1 introduces first order languages, where logical and nonlogical symbols are given along with some enlightened heuristics concerning the relationship between formal systems and mathematics. The notion of