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Nota di contenuto	A -- I Introduction -- II Syntax of First-Order Languages -- III Semantics of First-Order Languages -- IV A Sequent Calculus -- V The Completeness Theorem -- VI The Löwenheim-Skolem and the Compactness Theorem -- VII The Scope of First-Order Logic -- VIII Syntactic Interpretations and Normal Forms -- B -- IX Extensions of First-Order Logic -- X Limitations of the Formal Method -- XI Free Models and Logic Programming -- XII An Algebraic Characterization of Elementary Equivalence -- XIII Lindström's Theorems -- References -- Symbol Index.
Sommario/riassunto	What is a mathematical proof? How can proofs be justified? Are there limitations to provability? To what extent can machines carry out mathematical proofs? Only in this century has there been success in obtaining substantial and satisfactory answers. The present book contains a systematic discussion of these results. The investigations are centered around first-order logic. Our first goal is Godel's completeness theorem, which shows that the consequence relation coincides with formal provability: By means of a calculus consisting of simple formal inference rules, one can obtain all consequences of a given axiom system (and in particular, imitate all mathematical proofs). A short digression into model theory will help us to analyze the

expressive power of the first-order language, and it will turn out that there are certain deficiencies. For example, the first-order language does not allow the formulation of an adequate axiom system for arithmetic or analysis. On the other hand, this difficulty can be overcome--even in the framework of first-order logic--by developing mathematics in set-theoretic terms. We explain the prerequisites from set theory necessary for this purpose and then treat the subtle relation between logic and set theory in a thorough manner.
