

# Metalogic An Introduction To The Metatheory Of Standard First Order Logic

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**Philosophical Semantics and Term Meaning** Charles Schlee 2012-05-03 In this book the author presents a meanings-as-entities view of term meaning utilizing set theory. In doing so the author discusses limitations of customary formal semantic theories, argues for the primacy of term meaning, provides an account of analyticity based on synonymy, discusses possible-worlds semantics, provides a defense of our traditionaland common-senseview of meanings as entities, and sketches an approach to bridging the gap between formal semantics and natural language. The author discusses the views of many philosophers, including Carnap, Donnellan, Hintikka, Kripke, Linsky, Quine, Russell, and Searle.

**How Logic Works** Hans Halvorson 2020-09-01 A concise introduction to logic that teaches you not only how reasoning works, but why it works How Logic Works is an introductory logic textbook that is different by design. Rather than teaching elementary symbolic logic as an abstract or rote mathematical exercise divorced from ordinary thinking, Hans Halvorson presents it as the skill of clear and rigorous reasoning, which is essential in all fields and walks of life, from the sciences to the humanities—anywhere that making good arguments, and spotting bad ones, is critical to success. Instead of teaching how to apply algorithms using “truth trees,” as in the vast majority of logic textbooks, How Logic Works builds on and reinforces the innate human skills of making and evaluating arguments. It does this by introducing the methods of natural deduction, an approach that teaches students not only how to carry out a proof and solve a problem but also what the principles of valid reasoning are and how they can be applied to any subject. The book also allows students to transition smoothly to more advanced topics in logic by teaching them general techniques that apply to more complicated scenarios, such as how to formulate theories about specific subject matter. How Logic Works shows that formal logic—far from being only for mathematicians or a diversion from the really deep questions of philosophy and human life—is the best account we have of what it means to be rational. By teaching logic in a way that makes students aware of how they already use it, the book will help them to become even better thinkers. Offers a concise, readable, and user-friendly introduction to elementary symbolic logic that primarily uses natural deduction rather than algorithmic “truth trees” Draws on more than two decades’ experience teaching introductory logic to undergraduates Provides a stepping stone to more advanced topics

**Sets, Logic, Computation** Richard Zach 2021-07-13 A textbook on the semantics, proof theory, and metatheory of first-order logic. It covers naive set theory, first-order logic, sequent calculus and natural deduction, the completeness, compactness, and Löwenheim-Skolem theorems, Turing machines, and the undecidability of the halting problem and of first-order logic. It is based on the Open Logic project, and available for free download at [slc.openlogicproject.org](http://slc.openlogicproject.org).

**LOGIC: Lecture Notes for Philosophy, Mathematics, and Computer Science** Andrea Iacona 2021-05-10 This textbook is a logic manual which includes an elementary course and an advanced course. It covers more than most introductory logic textbooks, while maintaining a comfortable pace that students can follow. The technical exposition is clear, precise and follows a paced increase in complexity, allowing the reader to get comfortable with previous definitions and procedures before facing more difficult material. The book also presents an interesting overall balance between formal and philosophical discussion, making it suitable for both philosophy and more formal/science oriented students. This textbook is of great use to undergraduate philosophy students, graduate philosophy students, logic teachers, undergraduates and graduates in mathematics, computer science or related fields in which logic is required.

**Making Semantics Pragmatic** Ken Turner 2011-06-08 A collection of invited papers that intends to explore the nature of the semantics/pragmatics interface by examining the extent to which the analysis of certain expressions or constructions can be pragmatised. It contains papers that address the topic of 'making pragmatics semantic'.

**The Structure of Scientific Inference** Mary B. Hesse 1974

**Logic and Theism** Jordan Howard Sobel 2003-11-10 This is a wide-ranging 2004 book about arguments for and against beliefs in God. The arguments for the belief are analysed in the first six chapters and include ontological arguments from Anselm to Gödel, the cosmological arguments of Aquinas and Leibniz, and arguments from evidence for design and miracles. The next two chapters consider arguments against belief. The last chapter examines Pascalian arguments for and against belief in God. There are discussions of Cantorian problems for omniscience, of challenges to divine omnipotence, and of the compatibility of everlasting complete knowledge of the world with free-will. There are appendices that present formal proofs in a system for quantified modal logic, a theory of possible worlds, notes on Cantorian set theory, and remarks concerning non-standard hyperreal numbers. This book will be a valuable resource for philosophers of religion and theologians and will interest logicians and mathematicians as well.

**An Introduction to Metalogic** Aladdin M. Yaqub 2014-10-24 An Introduction to Metalogic is a uniquely accessible introduction to the metatheory of first-order predicate logic. No background knowledge of logic is presupposed, as the book is entirely self-contained and clearly defines all of the technical terms it employs. Yaqub begins with an introduction to predicate logic and ends with detailed outlines of the proofs of the incompleteness, undecidability, and indefinability theorems, covering many related topics in between.

**An Historical Introduction to the Philosophy of Mathematics: A Reader** Russell Marcus 2016-02-11 A comprehensive collection of historical readings in the philosophy of mathematics and a selection of influential contemporary work, this much-needed introduction reveals the rich history of the subject. An Historical Introduction to the Philosophy of Mathematics: A Reader brings together an impressive collection of primary sources from ancient and modern philosophy. Arranged chronologically and featuring introductory overviews explaining technical terms, this accessible reader is easy-to-follow and unrivaled in its historical scope. With selections from key thinkers such as Plato, Aristotle, Descartes, Hume and Kant, it connects the major ideas of the ancients with contemporary thinkers. A selection of recent texts from philosophers including Quine, Putnam, Field and Maddy offering insights into the current state of the discipline clearly illustrates the development of the subject. Presenting historical background essential to understanding contemporary trends and a survey of recent work, An Historical Introduction to the Philosophy of Mathematics: A Reader is required reading for undergraduates and graduate students studying the philosophy of mathematics and an invaluable source book for working researchers.

**A Companion to Philosophical Logic** Dale Jacquette 2008-04-15 This collection of newly commissioned essays by international contributors offers a representative overview of the most important developments in contemporary philosophical logic. Presents controversies in philosophical implications and applications of formal symbolic logic. Surveys major trends and offers original insights.

*Studies in Inductive Logic and Probability* Rudolf Carnap (red.) 1971

**Logic** Paul Tomassi 2013-05-13 Bringing elementary logic out of the academic darkness into the light of day, Paul Tomassi makes logic fully accessible for anyone attempting to come to grips with the complexities of this challenging subject. Including student-friendly exercises, illustrations, summaries and a glossary of terms, Logic introduces and explains: \* The Theory of Validity \* The Language of Propositional Logic \* Proof-Theory for Propositional Logic \* Formal Semantics for Propositional Logic including the Truth-Tree Method \* The Language of Quantificational Logic including the Theory of Descriptions. Logic is an ideal textbook for any logic student: perfect for revision, staying on top of coursework or for anyone wanting to learn about the subject. Related downloadable software for Macs and PCs is available for this title at [www.logic.routledge.com](http://www.logic.routledge.com).

**Paradoxes** Piotr Lukowski 2011-06-02 This book, provides a critical approach to all major logical paradoxes: from ancient to contemporary ones. There are four key aims of the book: 1. Providing systematic and historical survey of different approaches - solutions of the most prominent paradoxes discussed in the logical and philosophical literature. 2. Introducing original solutions of major paradoxes like: Liar paradox, Protagoras paradox, an unexpected examination paradox, stone paradox, crocodile, Newcomb paradox. 3. Explaining the far-reaching significance of paradoxes of vagueness and change for philosophy and ontology. 4. Proposing a novel, well justified and, as it seems, natural classification of paradoxes.

**Everything and More: A Compact History of Infinity** David Foster Wallace 2010-10-04 "A gripping guide to the modern taming of the infinite."—The New York Times. With a new introduction by Neal Stephenson. Is infinity a valid mathematical property or a meaningless abstraction? David Foster Wallace brings his intellectual ambition and characteristic bravura style to the story of how mathematicians have struggled to understand the infinite, from the ancient Greeks to the nineteenth-century mathematical genius Georg Cantor's counterintuitive discovery that there was more than one kind of infinity. Smart, challenging, and thoroughly rewarding, Wallace's tour de force brings immediate and high-profile recognition to the bizarre and fascinating world of higher mathematics.

*Bibliography* Thomas A. Sebeok 2020-05-18

**Computation and its Limits** Paul Cockshott 2012-03-15 Computation and its Limits is an innovative cross-disciplinary investigation of the relationship between computing and physical reality. It begins by exploring the mystery of why mathematics is so effective in science and seeks to explain this in terms of the modelling of one part of physical reality by another. Going from the origins of counting to the most blue-skies proposals for novel methods of computation, the authors investigate the extent to which the laws of nature and of logic constrain what we can compute. In the process they examine formal computability, the thermodynamics of computation, and the promise of quantum computing.

**Fundamentals of Logic and Computation** Zhe Hou 2021-12-03 This textbook aims to help the reader develop an in-depth understanding of logical reasoning and gain knowledge of the theory of computation. The book combines theoretical teaching and practical exercises; the latter is realised in Isabelle/HOL, a modern theorem prover, and PAT, an industry-scale model checker. I also give entry-level tutorials on the two software to help the reader get started. By the end of the book, the reader should be proficient in both software. Content-wise, this book focuses on the syntax, semantics and proof theory of various logics; automata theory, formal languages, computability and complexity. The final chapter closes the gap with a discussion on the insight that links logic with computation. This book is written for a high-level undergraduate course or a Master's course. The hybrid skill set of practical theorem proving and model checking should be helpful for the future of readers should they pursue a research career or engineering in formal methods.

**The Concept of Logical Consequence** Matthew W. McKeon 2010 The Concept of Logical Consequence is a critical evaluation of the model-theoretic and proof-theoretic characterizations of logical consequence that proceeds from Alfred Tarski's characterization of the informal concept of logical consequence. This study evaluates and expands upon ideas set forth in Tarski's 1936 article on logical consequence, and appeals to his 1935 article on truth. Classical logic, as well as extensions and deviations are considered. Issues in the philosophy of logic such as the nature of logical constants, the philosophical significance of completeness, and the metaphysical and epistemological implications of logic are discussed in the context of the examination of the concept of logical consequence.

**Dictionary of Logic as Applied in the Study of Language** W. Marciszewski 2013-06-29 1. STRUCTURE AND REFERENCES 1.1. The main part of the dictionary consists of alphabetically arranged articles concerned with basic logical theories and some other selected topics. Within each article a set of concepts is defined in their mutual relations. This way of defining concepts in the context of a theory provides better understanding of ideas than that provided by isolated short definitions. A disadvantage of this method is that it takes more time to look something up inside an extensive article. To reduce this disadvantage the following measures have been adopted. Each article is divided into numbered sections, the numbers, in boldface type, being addresses to which we refer. Those sections of larger articles which are divided at the first level, i.e. numbered with single numerals, have titles. Main sections are further subdivided, the subsections being numbered by numerals added to the main section number, e.g. I, 1.1, 1.2, ..., 1.1.1, 1.1.2, and so on. A comprehensive subject index is supplied together with a glossary. The aim of the latter is to provide, if possible, short definitions which sometimes may prove sufficient. As to the use of the glossary, see the comment preceding it.

**The A to Z of Logic** Harry J. Gensler 2010 The A to Z of Logic introduces the central concepts of the field in a series of brief, non-technical, cross-referenced dictionary entries. The 352 alphabetically arranged entries give a clear, basic introduction to a very broad range of logical topics. Entries can be found on deductive systems, such as propositional logic, modal logic, deontic logic, temporal logic, set theory, many-valued logic, mereology, and paraconsistent logic. Similarly, there are entries on topics relating to those previously mentioned such as negation, conditionals, truth tables, and proofs. Historical periods and figures are also covered, including ancient logic, medieval logic, Buddhist logic, Aristotle, Ockham, Boole, Frege, Russell, Gödel, and Quine. There are even entries relating logic to other areas and topics, like biology, computers, ethics, gender, God, psychology, metaphysics, abstract entities, algorithms, the ad hominem fallacy, inductive logic, informal logic, the liar paradox, metalogic, philosophy of logic, and software for learning logic. In addition to the dictionary, there is a substantial chronology listing the main events in the history of logic, an introduction that sketches the central ideas of logic and how it has evolved into what it is today, and an extensive bibliography of related readings. This book is not only useful for specialists but also understandable to students and other beginners in the field.

**Philosophy of Logic and Mathematics** Gabriele M. Mras 2019-11-18 This volume presents different conceptions of logic and mathematics and discuss their philosophical foundations and consequences. This concerns first of all topics of Wittgenstein's ideas on logic and mathematics; questions about the structural complexity of propositions; the more recent debate about Neo-Logicism and Neo-Fregeanism; the comparison and translatability of different logics; the foundations of mathematics: intuitionism, mathematical realism, and formalism. The contributing authors are Matthias Baaz, Francesco Berto, Jean-Yves Beziau, Elena Dragalina-Chernya, Günther Eder, Susan Edwards-McKie, Oliver Feldmann, Juliet Floyd, Norbert Gratzl, Richard Heinrich, Janusz Kaczmarek, Wolfgang Kienzler, Timm Lampert, Itala Maria Loffredo D'Ottaviano, Paolo Mancosu, Matthieu Marion, Felix Mühlhölzer, Charles Parsons, Edi Pavlovic, Christoph Pfisterer, Michael Potter, Richard Raatzsch, Esther Ramharter, Stefan Riegelnik, Gabriel Sandu, Georg Schiemer, Gerhard Schurz, Dana

Scott, Stewart Shapiro, Karl Sigmund, William W. Tait, Mark van Atten, Maria van der Schaar, Vladimir Vasyukov, Jan von Plato, Jan Woleński and Richard Zach.

**Dictionary of Philosophical Logic** Roy T. Cook 2009-03-20 This dictionary introduces undergraduate and post-graduate students in philosophy, mathematics, and computer science to the main problems and positions in philosophical logic. Coverage includes not only key figures, positions, terminology, and debates within philosophical logic itself, but issues in related, overlapping disciplines such as set theory and the philosophy of mathematics as well. Entries are extensively cross-referenced, so that each entry can be easily located within the context of wider debates, thereby providing a valuable reference both for tracking the connections between concepts within logic and for examining the manner in which these concepts are applied in other philosophical disciplines.

**First-Order Logic** John Heil 2021-10-06 "In his introduction to this most welcome republication (and second edition) of his logic text, Heil clarifies his aim in writing and revising this book: 'I believe that anyone unfamiliar with the subject who set out to learn formal logic could do so relying solely on [this] book. That, in any case, is what I set out to create in writing An Introduction to First-Order Logic.' Heil has certainly accomplished this with perhaps the most explanatorily thorough and pedagogically rich text I've personally come across. "Heil's text stands out as being remarkably careful in its presentation and illuminating in its explanations—especially given its relatively short length when compared to the average logic textbook. It hits all of the necessary material that must be covered in an introductory deductive logic course, and then some. It also takes occasional excursions into side topics, successfully whetting the reader's appetite for more advanced studies in logic. "The book is clearly written by an expert who has put in the effort for his readers, bothering at every step to see the point and then explain it clearly to his readers. Heil has found some very clever, original ways to introduce, motivate, and otherwise teach this material. The author's own special expertise and perspective—especially when it comes to tying philosophy of mind, linguistics, and philosophy of language into the lessons of logic—make for a creative and fresh take on basic logic. With its unique presentation and illuminating explanations, this book comes about as close as a text can come to imitating the learning environment of an actual classroom. Indeed, working through its presentations carefully, the reader feels as though he or she has just attended an illuminating lecture on the relevant topics!" —Jonah Schupbach, University of Utah

**The Life and Work of Leon Henkin** Maria Manzano 2014-10-23 This is a comprehensive book on the life and works of Leon Henkin (1921–2006), an extraordinary scientist and excellent teacher whose writings became influential right from the beginning of his career with his doctoral thesis on “The completeness of formal systems” under the direction of Alonzo Church. Upon the invitation of Alfred Tarski, Henkin joined the Group in Logic and the Methodology of Science in the Department of Mathematics at the University of California Berkeley in 1953. He stayed with the group until his retirement in 1991. This edited volume includes both foundational material and a logic perspective. Algebraic logic, model theory, type theory, completeness theorems, philosophical and foundational studies are among the topics covered, as well as mathematical education. The work discusses Henkin's intellectual development, his relation to his predecessors and contemporaries and his impact on the recent development of mathematical logic. It offers a valuable reference work for researchers and students in the fields of philosophy, mathematics and computer science.

**Moderate Realism and Its Logic** Donald W. Mertz 1996-01-01 Applying the rules and systems of mathematics and logic to instance ontology, this work argues for the validity and problem-solving capacities of instance ontology, and associates it with a version of the realist position which is named by the author as moderate realism.

**Theory of Graded Consequence** Mihir Kumar Chakraborty 2019-07-22 This book introduces the theory of graded consequence (GCT) and its mathematical formulation. It also compares the notion of graded consequence with other notions of consequence in fuzzy logics, and discusses possible applications of the theory in approximate reasoning and decision-support systems. One of the main points where this book emphasizes on is that GCT maintains the distinction between the three different levels of languages of a logic, namely object language, metalanguage and metametalinguage, and thus avoids the problem of violation of the principle of use and mention; it also shows, gathering evidences from existing fuzzy logics, that the problem of category mistake may arise as a result of not maintaining distinction between levels.

**In Search of a New Humanism** M.R. Egidì 2013-04-17 This collection of essays presents a systematic and up-to-date survey of the main aspects of Georg Henrik von Wright's philosophy, tracing the general humanistic leitmotiv to be found in his vast, varied output. The analysis covers the developments in Von Wright's thought up to the end of the 1990s. The essays are arranged thematically to focus on the chief areas of Von Wright's interests: practical rationality; human action and determinism; philosophical logic and theories of norms; research in the analytical tradition; and Wittgenstein studies. Readership: Scholars and students of moral philosophy, logic, psychology, sociology, cognitive science and the history of contemporary philosophy.

**Logic: A Complete Introduction: Teach Yourself** Siu-Fan Lee 2017-01-12 Understand Logic is a comprehensive introduction to this fascinating though sometimes challenging subject. As well as looking at logic in theoretical terms the book considers its everyday uses and demonstrates how it has genuine practical applications. It will take you step by step through the most difficult concepts and is packed with exercises to help you consolidate your learning at every stage. Covering everything from syllogistic logic to logical paradoxes and even looking at logic in Alice in Wonderland, this is the only guide you will ever need.

**Managing Complexity in Software Engineering** Dr. R. J. Mitchell 1990 This book covers complex software engineering projects, new paradigms for system development, object-oriented design and formal methods, project management and automation perspectives.

**Metalogic** Geoffrey Hunter 1973-06-26 This work makes available to readers without specialized training in mathematics complete proofs of the fundamental metatheorems of standard (i.e., basically truth-functional) first order logic. Included is a complete proof, accessible to non-mathematicians, of the undecidability of first order logic, the most important fact about logic to emerge from the work of the last half-century. Hunter explains concepts of mathematics and set theory along the way for the benefit of non-mathematicians. He also provides ample exercises with comprehensive answers.

*Logic Matters* Peter Thomas Geach 1972

**Logic, Language, and Meaning, Volume 1** L. T. F. Gamut 2020-09-15 Although the two volumes of Logic, Language, and Meaning can be used independently of one another, together they provide a comprehensive overview of modern logic as it is used as a tool in the analysis of natural language.

Both volumes provide exercises and their solutions. Volume 1, Introduction to Logic, begins with a historical overview and then offers a thorough introduction to standard propositional and first-order predicate logic. It provides both a syntactic and a semantic approach to inference and validity, and discusses their relationship. Although language and meaning receive special attention, this introduction is also accessible to those with a more general interest in logic. In addition, the volume contains a survey of such topics as definite descriptions, restricted quantification, second-order logic, and many-valued logic. The pragmatic approach to non-truthconditional and conventional implicatures are also discussed. Finally, the relation between logic and formal syntax is treated, and the notions of rewrite rule, automation, grammatical complexity, and language hierarchy are explained.

**Handbook of Professional Ethics for Psychologists** William O'Donohue 2003-01-23 The Handbook of Professional Ethics for Psychologists provides comprehensive coverage of topics typically neglected in books on ethical issues in psychology. Rather than take ethical pronouncements as dogma not to be questioned but simply understood and observed, the authors encourage a questioning, critical attitude. Divided into four parts, this provocative text provides comprehensive coverage of foundational issues, professional issues, special topics, and special populations. A distinguished group of scholars and researchers examine Moral reasoning and the ethics of professional licensing; Confidentiality in psychotherapy; Fees and financial arrangements; The termination and referral of clients; The use of deception in research; Ethnic minority issues and Consent in the treatment and research of children. The Handbook of Professional Ethics for Psychologists considers the compatibility of science and morality. Challenging readers to question the fundamental philosophical values of professional psychology, the editors and contributors inspire the ethical impulse and encourage active moral leadership.

**Scaling the Secular City** J. P. Moreland 1987-02-01 This volume offers up-to-date arguments for God's existence and for Jesus's deity and resurrection, answers to objections to Christian theism, and discussions of four key issues.

*Historical Dictionary of Logic* Harry J. Gensler 2006 "Historical Dictionary of Logic contains a dictionary section of more than 300 entries on persons, concepts, theories, forms of logic, fields in which logic is used, and the many fallacies that can trap the unwary. It includes entries on historical periods and figures, including ancient logic, medieval logic, Buddhist logic, Aristotle, Ockham, Boole, Frege, Russell, Gödel, and Quine. It also includes information on propositional logic, modal logic, deontic logic, temporal logic, set theory, many-valued logic, mereology, and para-consistent logic. A substantial chronology lists the main events in the history of logic, and an introduction sketches the central ideas and their evolution. The bibliography provides a broad range of additional reading."—BOOK JACKET.

**Logic and Metalogic**

**Models, Truth, and Realism** Barry Taylor 2006-05-18 Barry Taylor's book mounts an argument against one of the fundamental tenets of much contemporary philosophy, the idea that we can make sense of reality as existing objectively, independently of our capacities to come to know it.Part One sets the scene by arguing that traditional realism can be explicated as a doctrine about truth - that truth is objective, that is, public, bivalent, and epistemically independent. Part Two, the centrepiece of the book, shows how a form of Hilary Putnam's model-theoretic argument demonstrates that no such notion of truth can be founded on the idea of correspondence, as explained in model-theoretic terms (more traditional accounts of correspondence having been already disposed of inPart One). Part Three argues that non-correspondence accounts of truth - truth as superassertibility or idealized rational acceptability, formal conceptions of truth, Tarskian truth - also fail to meet the criteria for objectivity; along the way, it also dismisses the claims of the latterday views ofPutnam, and of similar views articulated by John McDowell, to constitute a new, less traditional form of realism. In the Coda, Taylor bolsters some of the considerations advanced in Part Three in evaluating formal conceptions of truth, by assessing and rejecting the claims of Robert Brandom to have combined such an account of truth with a satisfactory account of semantic structure. He concludes that there is no defensible notion of truth which preserves the theses of traditional realism, norany extant position sufficiently true to the ideals of that doctrine to inherit its title. So the only question remaining is which form of antirealism to adopt.

**Logic Works** Lorne Falkenstein 2021-11-30 Logic Works is a critical and extensive introduction to logic. It asks questions about why systems of logic are as they are, how they relate to ordinary language and ordinary reasoning, and what alternatives there might be to classical logical doctrines. The book covers classical first-order logic and alternatives, including intuitionistic, free, and many-valued logic. It also considers how logical analysis can be applied to carefully represent the reasoning employed in academic and scientific work, better understand that reasoning, and identify its hidden premises. Aiming to be as much a reference work and handbook for further, independent study as a course text, it covers more material than is typically covered in an introductory course. It also covers this material at greater length and in more depth with the purpose of making it accessible to those with no prior training in logic or formal systems. Online support material includes a detailed student solutions manual with a running commentary on all starred exercises, and a set of editable slide presentations for course lectures. Key Features Introduces an unusually broad range of topics, allowing instructors to craft courses to meet a range of various objectives Adopts a critical attitude to certain classical doctrines, exposing students to alternative ways to answer philosophical questions about logic Carefully considers the ways natural language both resists and lends itself to formalization Makes objectual semantics for quantified logic easy, with an incremental, rule-governed approach assisted by numerous simple exercises Makes important metatheoretical results accessible to introductory students through a discursive presentation of those results and by using simple case studies

**A Transition to Advanced Mathematics** William Johnston 2009-07-27 A Transition to Advanced Mathematics: A Survey Course promotes the goals of a "bridge" course in mathematics, helping to lead students from courses in the calculus sequence (and other courses where they solve problems that involve mathematical calculations) to theoretical upper-level mathematics courses (where they will have to prove theorems and grapple with mathematical abstractions). The text simultaneously promotes the goals of a ``survey'' course, describing the intriguing questions and insights fundamental to many diverse areas of mathematics, including Logic, Abstract Algebra, Number Theory, Real Analysis, Statistics, Graph Theory, and Complex Analysis. The main objective is "to bring about a deep change in the mathematical character of students -- how they think and their fundamental perspectives on the world of mathematics." This text promotes three major mathematical traits in a meaningful, transformative way: to develop an ability to communicate with precise language, to use mathematically sound reasoning, and to ask probing questions about mathematics. In short, we hope that working through A Transition to Advanced Mathematics encourages students to become mathematicians in the fullest sense of the word. A Transition to Advanced Mathematics has a number of distinctive features that enable this transformational experience. Embedded Questions and Reading Questions illustrate and explain fundamental concepts, allowing students to test their understanding of ideas independent of the exercise sets. The text has extensive, diverse Exercises Sets; with an average of 70 exercises at the end of section, as well as almost 3,000 distinct exercises. In addition, every chapter includes a section that explores an application of the theoretical ideas being studied. We have also interwoven embedded reflections on the history, culture, and philosophy of mathematics throughout the text.

**Metalogic** Geoffrey Hunter 1973-06-26 This work makes available to readers without specialized training in mathematics complete proofs of the fundamental metatheorems of standard (i.e., basically truth-functional) first order logic. Included is a complete proof, accessible to non-mathematicians, of the undecidability of first order logic, the most important fact about logic to emerge from the work of the last half-century. Hunter explains concepts of mathematics and set theory along the way for the benefit of non-mathematicians. He also provides ample exercises with comprehensive answers.