Godel's Incompleteness Theorems (Oxford Logic Guides)

Synopsis

Kurt Godel, the greatest logician of our time, startled the world of mathematics in 1931 with his Theorem of Undecidability, which showed that some statements in mathematics are inherently "undecidable." His work on the completeness of logic, the incompleteness of number theory, and the consistency of the axiom of choice and the continuum theory brought him further worldwide fame. In this introductory volume, Raymond Smullyan, himself a well-known logician, guides the reader through the fascinating world of Godel's incompleteness theorems. The level of presentation is suitable for anyone with a basic acquaintance with mathematical logic. As a clear, concise introduction to a difficult but essential subject, the book will appeal to mathematicians, philosophers, and computer scientists.

Book Information

Series: Oxford Logic Guides (Book 19)

Hardcover: 160 pages

Publisher: Oxford University Press; 1 edition (August 20, 1992)

Language: English

ISBN-10: 0195046722

ISBN-13: 978-0195046724

Product Dimensions: 6.3 x 0.6 x 9.6 inches

Shipping Weight: 13.6 ounces (View shipping rates and policies)

Average Customer Review: 4.7 out of 5 starsÂ Â See all reviewsÂ (6 customer reviews)

Best Sellers Rank: #848,862 in Books (See Top 100 in Books) #155 inÂ Books > Computers & Technology > Programming > Software Design, Testing & Engineering > Logic #399 inÂ Books > Science & Math > Mathematics > Pure Mathematics > Logic #405 inÂ Books > Textbooks > Humanities > Philosophy > Logic

Customer Reviews

I highly recommend this title because it supplys all the necessary proofs for a nuts and bolts understanding of incompleteness, including incompleteness proofs for Peano arithmetic and the unprovability of consistency.This title is a difficult read but the only prerequisite is a familiarity of first-order logic equivalent to a one semester college course.A lot of the proofs are based on new material and are easier to understand than the original work by KG.An added benefit is the exercises. They are not impossible and aid in one's understanding.This book is well worth the work in demands.

Raymond Smullyan is a logician that I admire much. This book is very good but contains many typos and mistakes. For example, in p.31, the definition of xPy does not work as it is not able to account for 0P305. The definition should be corrected as:xPy iff There is z not greater than y (zBy and xEz). Similar mistakes can be found elsewhere. And this book thus requires another edition for the coorection of typos and mistakes.

Well. This is the book. Read this instead of, or before you read GoedelÃ Â¿Â s paper. Within 20 pages you will know the Ã Â¿Â trickÃ Â¿Â that Goedel used. ItÃ Â¿Â s a beauty, but it is far easier to see it under SmullyanÃ Â¿Â s tutelage than by coming to the classic paper cold, since Goedel uses a more difficult scheme to achieve his ends. Much work has been done since 1931, and we get the benefit of the stripping-down to essentials that such as Tarski (and Smullyan himself) have contributed.The book has much of interest to those who wish to pursue the subject of the incompleteness and/or consistency of mathematics, or to come at Goedel from a number of angles. For me, though, the first 3 chapters were enough. I just wanted to find out how K.G. did what he did. Now I know, and I know where to go if I need even more.The exercises are helpful to keep you on track and test your understanding. They also contribute materially to the exposition. A stumbling-block for many readers will be the extremely abstract nature of the discussion, and the new notations and definitions that constantly come at one. Viewing numbers as strings and strings as numbers (and knowing when to switch from one view to another) will be confusing at first. This is the hard part: what Goedel did, in essence, is demonstrate that one can view proofs in two ways Ã Â¿Â as numbers, and as strings of characters. As in viewing an optical illusion, it is sometimes tough to hold the proper picture in mind.SmullyanÃ Â¿Â s book Ã Â¿Â First-Order LogicÃ Â¿Â is enough preparation for this work. One must here, even more than there, keep straight the difference between the Ã Â¿Â proofsÃ Â¿Â that are part of the subject matter (and so are strings of characters), and the proofs we go through that verify facts about these strings. Before we started reading this book, of course, we had some informal sense that we were going to prove something about proofs. What we are REALLY doing, though, is proving something about Ã Â¿Â proofsÃ Â¿Â . You get the picture. Goedel must have been a lot of fun at parties.

J Alfonso, in a review of Dover's On Formally Undecidable Propositions of Principia Mathematica and Related Systems, wrote:You do not wade through difficult theorems in mathematical logic without the appropriate tools. And the appropriate tools include having done similar but simpler proofs on your own and having a solid background in mathematical logic. Without this background, it doesn't matter whether you have the ability to be a mathematics professor at Princeton or place top five in the Putnam - you simply will not understand the proof in a rigorous manner.It was in that review that he suggested interested readers get a copy of Smullyan's book. So I did. I was hesitant because it was expensive, but in the end if you really do want a complete and thorough understanding of GÃ¶del's proof then this is maybe the most efficient way to go about it.It is a challenging but accessible book that requires little prerequisite knowledge. A basic familiarity in first order logic is all that is required. And quite frankly if you can't make it through this book then I don't understand how you expect to make it through GÃ¶del's actual proof.I believe that both Smullyan's book and GÃ¶del's proof can be understood by any diligent student, so don't take my last comment to suggest this it's an impossibly difficult task. Rather what I am trying to suggest is that if you really want to understand GÃ¶del's proof then this book may or may not be easy for you, but it certainly will be tremendously valuable and is worth the effort.

Unlike most other popular books on Godel's incompleteness theorem, Smulyan's book gives an understandable and fairly complete account of Godel's proof. No longer must the undergrad fanboy/girl be satisfied in the knowledge that Godel used some system of encoding "Godel numbers" to represent a metamathematical statement with a mathematical one. The power of the proof can now be yours!Seriously though, among the large family of well written accounts of Godel's theorem, including Godel, Escher, Bach, as well as Nagel and Newman's book, Smulyan's is the most direct and serious account, and accessible to anyone with the mathematical maturity to handle an advanced level undergraduate math class.

I am happy to read the book, but the binding doesn't seem to close properly. The cover sticks outward and doesn't properly close.

Quick Reference) The Oxford Dictionary of Dance (Oxford Quick Reference) Oxford Bible Atlas 4th (fourth) Edition by Curtis, Adrian published by Oxford University Press, USA (2009) The Oxford Handbook of Quaker Studies (Oxford Handbooks) The Oxford Book of English Ghost Stories (Oxford Books of Prose & Verse) The Oxford Guide to Arthurian Literature and Legend (Oxford Quick Reference) The Oxford Companion to the Bible (Oxford Companions) The Communist Manifesto (Oxford World's Classics) Reissue Edition by Marx, Karl, Engels, Friedrich published by Oxford University Press, USA (2008) Paperback The Oxford Handbook of The History of Analytic Philosophy (Oxford Handbooks) The Oxford Handbook of Philosophical Methodology (Oxford Handbooks) The Oxford Handbook of Sacramental Theology (Oxford Handbooks) Diccionario Oxford Complutense de Ciencias / Oxford Dictionary of Science Complutense (Spanish Edition)