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## Mathematical logic problems and solutions

**Logic topics in mathematics. Logical problems to solve. Mathematical logic problems and solutions pdf. Importance of mathematical logic in life. Explain mathematical logic.**

In a recent addition to the Springer series 'Problem Books in Mathematics. Laszlo Csirmaz and Zalán Gyenis have put together a fairly challenging collection Mathematical Logic: Exercises and Solutions.

From the Preface:Problems in this volume have been collected over more than 30 years of teaching undergraduate students Mathematical Logic at Eötvös Loránd University, Budapest. The problems come in great variety: routine applications of a newly introduced technique, checking whether the conditions of a particular theorem are really necessary, extending or finding the limitations of various methods, to amusing puzzles and interesting applications of established results. They range from easy questions and riddles to proving hard theorems when all the necessary ingredients are—hopefully—available.After preliminary chapters on sets, strategies in games, and formal languages, the main chapters are on recursion theory, propositional calculus, first-order logic, some model theory (Ehrenfeucht-Fraïssé games, quantifier elimination, ultraproducts), and formal arithmetic.The problems are set within the context of reminders of key definitions and theorems, with the occasional hints for solutions: these take 128 pages. Then there are about 200 pages of solutions. That page ratio will tell you that the solutions are typically not going to be fully-worked-through answers developed in the sort of detail that (e.g.) a student might be expected to turn in, but rather they are headline indications of the main ideas needed to get a solution (occasionally calling too on background mathematical knowledge). So this is a book, I'd say, better suited for a mathematically moderately strong reader, whether someone taking a taught course or someone self-studying an area of logic.Of course, a book like this is going to reflect the idiosyncrasies and special interests of the authors (so for example, the propositional/predicate logic topics are almost entirely semantically driven — proof theory doesn't get much of a look in). But such idiosyncrasies are no bad thing at all — it's always illuminating to be coming at perhaps familiar topics from different angles. Dipping through this book, I have found it very interestingly put together, with some of the exercises requiring real thought; all but the most expert are surely going to learn from sampling it. So your university library should certainly get a copy.Of course, there is no point in banging on about the absurdity of Springer publishing such a student-oriented book as a hardback/e-book way out of their price range. Maybe an eventual paperback is planned. (But in the meantime, you needn't feel too sorry for the impoverished seeker after knowledge, as I'm sure that a PDF will have already found its way to the usual repositories — an eventuality which respectable readers of this blog must of course entirely deplore.) Chapter 1 - Special Set Systems.- Chapter 2 - Games and Voting.- Chapter 3 - Formal languages and automata.- Chapter 4 - Recursion Theory.- Chapter 5 - Propositional Calculus.- Chapter 6 - First-order logic.- Chapter 7 - Fundamental Theorems.- Chapter 8 - Elementary Equivalence.- Chapter 9 - Ultraproducts.- Chapter 10 - Arithmetic.- Chapter 11 - Selected Applications.- Chapter 12 - Solutions. Laszlo Csirmaz is Senior Researcher at the Institute of Information Theory and Automation (UTIA), Czech Republic and Rényi Alfréd Institute of Mathematics. He started his career in 1975 at the Rényi Institute, where he co-founded the Cryptography Group. From 1996 to 2020, he was Chair of the Computer and Statistics Center at the Central European University, Hungary. Since 1990, he has been delivering lectures at the Eötvös Loránd University, Hungary, mainly on Set Theory and Mathematical Logic, and has held a part-time position at the University of Debrecen, Hungary, from 2001 to 2018. Zalán Gyenis got his Ph.D. in Mathematics in 2013 from the Central European University, Hungary, and has been Premium Postdoctoral Research Fellow at the Hungarian Academy of Sciences. Since 2017, he has been working as Assistant Professor at the Logic Department of the Jagiellonian University, Poland. In 2018, he was awarded the Alfred Tarski Logic Prize. 15k Accesses Page 2 A set system is a collection of subsets of a set X. Frequently X is called the ground set or base set of the set system. Set systems are often denoted by calligraphic letters such as  $\mathcal{F}$  or  $\mathcal{A}$ . This is a preview of subscription content, access via your institution. Unable to display preview. Download preview PDF. Laszlo Csirmaz is Senior Researcher at the Institute of Information Theory and Automation (UTIA), Czech Republic and Rényi Alfréd Institute of Mathematics. He started his career in 1975 at the Rényi Institute, where he co-founded the Cryptography Group. From 1996 to 2020, he was Chair of the Computer and Statistics Center at the Central European University, Hungary. Since 1990, he has been delivering lectures at the Eötvös Loránd University, Hungary, mainly on Set Theory and Mathematical Logic, and has held a part-time position at the University of Debrecen, Hungary, from 2001 to 2018. Zalán Gyenis got his Ph.D. in Mathematics in 2013 from the Central European University, Hungary, and has been Premium Postdoctoral Research Fellow at the Hungarian Academy of Sciences. 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