Mathematical Induction Examples

Solution: Let, $P(n) = \dfrac{1}{1\times2} + \dfrac{1}{2\times3} + \dfrac{1}{3\times4} + \cdots\cdots\cdots + \dfrac{1}{n(n+1)} = \dfrac{n}{n+1}$

$P(1) = \dfrac{1}{1\times2} = \dfrac{1}{1+1}$ (By substituting $n=1$ on both sides)

$\therefore P(1)$ is true.

Let, $P(n)$ be true for some natural number K.

i.e., $P(K) = \dfrac{1}{1\times2} + \dfrac{1}{2\times3} + \dfrac{1}{3\times4} + \cdots\cdots + \dfrac{1}{K(K+1)} = \dfrac{K}{K+1}$

Now,

$P(K+1) = \dfrac{1}{1\times2} + \dfrac{1}{2\times3} + \dfrac{1}{3\times4} + \cdots\cdots + \dfrac{1}{K(K+1)} + \dfrac{1}{(K+1)(K+2)}$

$= \dfrac{K}{K+1} + \dfrac{1}{(K+1)(K+2)}$ [$\because P(K)$ is true]

The Method Of Mathematical Induction

Gautami Devar

The Method Of Mathematical Induction:

The Method of Mathematical Induction Il'â Samuilovič Sominskij,1961 **The Method of Mathematical Induction** Il'ja Samuilovič Sominskij,1975 **The Method of Mathematical Induction** Ilia Samuilovich Sominskii,1983 *The Method of Mathematical Induction* Il'ïa Samuilovich Sominskiĭ,1961 The Concept and Practical Improvement of the Method of Mathematical Induction in Teaching Dr. Matthew Yip, **Popular Lectures in Mathematics** ,1961 **The Method of Mathematical Induction** I.S. Sominsky (Mathématiques),1975 *The Method of Mathematical Induction* Elizabeth L. Nypaver,1964 **Automated Mathematical Induction** Hantao Zhang,2012-12-06 It has been shown how the common structure that defines a family of proofs can be expressed as a proof plan 5 This common structure can be exploited in the search for particular proofs A proof plan has two complementary components a proof method and a proof tactic By prescribing the structure of a proof at the level of primitive inferences a tactic 11 provides the guarantee part of the proof In contrast a method provides a more declarative explanation of the proof by means of preconditions Each method has associated effects The execution of the effects simulates the application of the corresponding tactic Theorem proving in the proof planning framework is a two phase process 1 Tactic construction is by a process of method composition Given a goal an applicable method is selected The applicability of a method is determined by evaluating the method s preconditions The method effects are then used to calculate subgoals This process is applied recursively until no more subgoals remain Because of the one to one correspondence between methods and tactics the output from this process is a composite tactic tailored to the given goal 2 Tactic execution generates a proof in the object level logic Note that no search is involved in the execution of the tactic All the search is taken care of during the planning process The real benefits of having separate planning and execution phases become appar ent when a proof attempt fails *Метод Математической Индукции. The Method of Mathematical Induction ... Translated ... by Halina Moss, Etc* Il'ya Samuilovich SOMINSKY,Halina MOSS,1961 *Метод Математической Индукции. The Method of Mathematical Induction ... Translated and Adapted ... by Luise Lange and Edgar E. Enochs* Il'ya Samuilovich SOMINSKY,Edgar E. ENOCHS,Luise LANGE,1963 **Mathematical Induction** Titu Andreescu,Vlad Crisan,2017-03-15 This book serves as a very good resource and teaching material for anyone who wants to discover the beauty of Induction and its applications from novice mathematicians to Olympiad driven students and professors teaching undergraduate courses The authors explore 10 different areas of mathematics including topics that are not usually discussed in an Olympiad oriented book on the subject Induction is one of the most important techniques used in competitions and its applications permeate almost every area of mathematics **The Methods of Mathematical Induction** I. S. Sominsky,1975 *The Method of Mathematical Induction. Translated and Adapted From the 5Th Russian Ed.)1959: by Luise Lange and Edgar E. Enochs* I.S. Sominski&I,1963 Induction in Geometry L.I. Golovina,I. M. Yaglom,2019-10-16 Introduction to mathematical induction for solving geometric problems includes many examples from

algebra geometry trigonometry Many problems solved in text others left for readers to solve with solutions at end 1963 edition   Mathematical Induction Francis C. Romano,1968   **Induction in Geometry** L.I. Golovina,I. M. Yaglom,2019-10-16 Induction in Geometry discusses the application of the method of mathematical induction to the solution of geometric problems some of which are quite intricate The book contains 37 examples with detailed solutions and 40 for which only brief hints are provided Most of the material requires only a background in high school algebra and plane geometry chapter six assumes some knowledge of solid geometry and the text occasionally employs formulas from trigonometry Chapters are self contained so readers may omit those for which they are unprepared To provide additional background this volume incorporates the concise text The Method of Mathematical Induction This approach introduces this technique of mathematical proof via many examples from algebra geometry and trigonometry and in greater detail than standard texts A background in high school algebra will largely suffice later problems require some knowledge of trigonometry The combination of solved problems within the text and those left for readers to work on with solutions provided at the end makes this volume especially practical for independent study   **Mastering Discrete Mathematics** Gautami Devar,2025-02-20 Mastering Discrete Mathematics is a comprehensive and accessible resource designed to provide readers with a thorough understanding of the fundamental concepts techniques and applications of discrete mathematics Written for students educators researchers and practitioners we offer a detailed overview of discrete mathematics a field that deals with countable distinct objects and structures We cover a wide range of topics including sets logic proof techniques combinatorics graph theory recurrence relations and generating functions Our clear and concise language makes complex mathematical concepts accessible to readers with varying levels of mathematical background Each concept is illustrated with examples and applications to demonstrate its relevance and practical significance in various domains Emphasizing the practical applications of discrete mathematics we explore its use in computer science cryptography optimization network theory and other scientific disciplines Each chapter includes exercises and problems to reinforce learning test understanding and encourage further exploration of the material Additional resources including supplementary materials interactive exercises and solutions to selected problems are available online to complement the book and facilitate self study and review Whether you are a student looking to gain a solid foundation in discrete mathematics an educator seeking to enhance your teaching materials or a practitioner interested in applying discrete mathematics techniques to real world problems Mastering Discrete Mathematics offers valuable insights and resources to support your learning and exploration of this fascinating field

  A Primer in Combinatorics Alexander Kheyfits,2021-09-07 The second edition of this well received textbook is devoted to Combinatorics and Graph Theory which are cornerstones of Discrete Mathematics Every section begins with simple model problems Following their detailed analysis the reader is led through the derivation of definitions concepts and methods for solving typical problems Theorems then are formulated proved and illustrated by more problems of increasing difficulty

An Introduction to Logic and Scientific Method Morris F. Cohen,2011-03-23 Though formal logic has in recent times been the object of radical and spirited attacks from many and diverse quarters it continues and will probably long continue to be one of the most frequently given courses in colleges and universities here and abroad Nor need this be surprising when we reflect that the most serious of the charges against formal logic those against the syllogism are as old as Aristotle who seems to have been fully aware of them But while the realm of logic seems perfectly safe against the attacks from without there is a good deal of unhappy confusion within Though the content of almost all logic books follows even in many of the illustrations the standard set by Aristotle s Organon terms propositions syllogisms and allied forms of inference scientific method probability and fallacies there is a bewildering Babel of tongues as to what logic is about The different schools the traditional the linguistic the psychological the epistemological and the mathematical speak different languages and each regards the other as not really dealing with logic at all No task is perhaps so thankless or invites so much abuse from all quarters as that of the mediator between hostile points of view Nor is the traditional distrust of the peacemaker in the intellectual realm difficult to appreciate since he so often substitutes an unclear and inconsistent amalgam for points of view which at least have the merit of a certain clarity And yet no task is so essential especially for the beginner when it is undertaken with the objective of adjusting and supplementing the claims of the contending parties and when it is accompanied by a refusal to sacrifice clarity and rigor in thought In so far as an elementary text permits such a thing the present text seeks to bring some order into the confusion of tongues concerning the subject matter of logic But the resolution of the conflicts between various schools which it effects appears in the selection and presentation of material and not in extensive polemics against any school The book has been written with the conviction that logic is the autonomous science of the objective though formal conditions of valid inference At the same time its authors believe that the aridity which is not always unjustly attributed to the study of logic testifies to the unimaginative way logical principles have been taught and misused The present text aims to combine sound logical doctrine with sound pedagogy and to provide illustrative material suggestive of the r le of logic in every department of thought A text that would find a place for the realistic formalism of Aristotle the scientific penetration of Peirce the pedagogical soundness of Dewey and the mathematical rigor of Russell this was the ideal constantly present to the authors of this book

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