Free pdf Discrete mathematical structures sample paper [PDF]

1 imagine taking the numbers 0 1 2 and 3 these are the elements we re going to add them but we ll do this mod 4 that just means that we ll write down the remainder when the answer is divided by 4 this is the operation so for example 2 3 5 1 mod 4 we can build up a table of the answers we get thus our game of arithmetic might begin with the following five rules which we hope w i l l give the necessary degree of objectivity e 1 for any number b b b the reflexive rule e 2 for any numbers a and b i f a b then b a the symmetry rule e 3 given any three numbers a b and c i f a b and example the real numbers the set of real numbers has several standard structures an order each number is either less than or greater than any other number algebraic structure there are operations of addition and multiplication the first of which makes it into a group and the pair of which together make it into a field discrete mathematics is the study of mathematical structures that are countable or otherwise distinct and separable examples of structures that are discrete are combinations graphs and logical statements discrete structures can be finite or infinite majority of mathematical works while considered to be formal gloss over details all the time for example you ll be hard pressed to find a mathematical paper that goes through the trouble of justifying the equation a 2 b a b a b in e□ect every mathematical paper or lecture assumes a shared knowledge base with its readers examples the set 1 2 3 together with 2 is a pointed set it would normally be written as 1 2 3 2 mathbb r 0 is a pointed set mathbb r pi is a pointed set it is not the same pointed set as mathbb r 0 mathbb z pi is not a pointed set because pi otin mathbb z relations examples of groups are everywhere in abstract mathematics we now give some of the more important examples that occur in linear algebra please note though that these examples are primarily aimed at motivating the definitions of more complicated algebraic 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function d which in mathematics an algebraic structure consists of a nonempty set a called the underlying set carrier set or domain a collection of operations on a typically binary operations such as addition and multiplication and a finite set of identities known as axioms that these operations must satisfy example s 1 1 is algebraic structure under as 1 1 1 1 1 1 1 1 1 all results belong to s but the above is not an algebraic structure under as 1 1 0 not belongs to s semi group a non empty set s s is called a semigroup if it follows the following axiom closure a b belongs to s for all a b s mathematical logic 3 1 a structures every mathematician recognizes a mathematical structure as such when he sees it here are some examples 1 1 a a graph is a pair g g e where g is the set of nodes and eis a binary relation on g i e e g2 b a partial ordering is a pair p p where pis a set and is a binary relation 0 introduction 2 oftheequation x n yn z fermat s last theorem was only proven 1995 by a 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