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TYPES AND USES OF MATHEMATICAL EXPRESSIONS

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ABSTRACT

The article describes the role of mathematics in the world, its history and development. There is also talk of mathematical expressions, of several types. And in general, they enriched the science of mathematics with new creative discoveries. But math there are such misconceptions in the history of Central Asia in the IX-XV centuries has no math news. The definition of this value depends on the semantics assigned to the expression symbols. These semantic rules may declare that some expressions do not define any value (for example, when they include division by 0).

KEYWORDS: *Mathematics, Mathematics Expressions, Algebra, Syntax, Semantics, Formal Languages and Lambda Calculus, Variables.*

INTRODUCTION

As you know, there are many different sciences in the world. Each of them has its place in science. One such science is Mathematics. Mathematics is one of the fastest growing and most needed sciences in the world. Also, this science has been developing at various stages since ancient times. Scientists around the world have done a lot of research in the field of mathematics.

The demands of human life in mathematics, astronomy and other natural sciences satisfaction, improvement of various computational tasks and identification of new computational methods. In order to do this, various scientific research has been carried out in depth and extensively. Medium in this area In Asia, Baghdad and other cities, scientists of different nationalities worked together creatively and have achieved many scientific results.

In order to centralize the sciences, in Baghdad, "Baytul Hikmat" ("Wise Men." house ") was established. A large library and observatory were built in his presence. Scientists at this observatory made various observations and made various astronomical instruments. This is wisdom a number of scientists from several countries, including Central Asia, came to work at his home. Muhammad Khorezmi, Ahmad Fergani, Abbas Javhari and others are scientists at this university engaged in work.

During this period, Arabic was spoken in various languages under the rule of the caliph became not only the state language of the peoples, but also the language of science. That is why Medium Scholars of Asian and different nationalities: Persians, Uzbeks, Tajiks, Azerbaijanis, Turkmens and others have written in Arabic, and their manuscripts are mostly in Arabic preserved to this day. Well-known scholars of Greece and India also studied and analyzed them during this period and commenting on these works. The translation of works of Greek and Indian scholars into Arabic is also of great interest to scholars woke up. For example, Euclid's "Fundamentals" (third century BC), Archimedes' (3rd century BC) previous III century) "About the city and the cylinder", "Measurement of a circle", Ptolemy (II century) Algamest was translated into Arabic and commented on many of them.

Thabit ibn Qurra, a student of Khorezmi, wrote several works of Greek mathematicians translated into Arabic. Archimedes' Lemmas on the Seven Angles is in Arabic only copies of Euclid's Fundamentals III, VI, VII only in Arabic only the translation is preserved to us.

Central Asian mathematician’s use their own knowledge in the field of mathematics comprehensively studied and analyzed and created new areas of mathematical research. And in general, they enriched the science of mathematics with new creative discoveries. But math there are such misconceptions in the history of Central Asia in the IX-XV centuries has no math news. These countries are the works of Indian and Greek mathematicians those who have studied and, in some cases, perfected previous conclusions.

In mathematics, a (mathematical) expression is a finite combination of symbols that is correctly constructed according to context-dependent rules. Mathematical symbols can represent numbers (constants), variables, operations, functions, punctuation, grouping, and other aspects of logical syntax.

Mathematical expressions include arithmetic, polynomial, algebraic expressions, closed forms, analytical expressions. The table below shows some of the similarities and differences between them.

Syntax

Being an expression is a syntactic concept. The expression must be well-formed: operators must have the required number of inputs in suitable positions, the characters supplied to these inputs must be significant, etc. The character strings that violate the syntax rules are constructed

incorrectly and do not form an acceptable mathematical expression. For example, in normal arithmetic notation, the expression 2 + 3 is constructed correctly, but the following expression is unusable:

× 4) x +, / y × 4) x +, / y

Semantics

Semantics studies meanings. Formal semantics is concerned with the application of values to expressions.

In algebra, an expression can be used to denote a value that depends on the values of the variables included in the expression. The definition of this value depends on the semantics assigned to the expression symbols. These semantic rules may declare that some expressions do not define any value (for example, when they include division by 0). Such expressions are said to have undefined meanings, but nonetheless. they are well-formed expressions. Generally speaking, the meaning of expressions is not limited to the designation of quantities; for example, an expression can denote a condition, or an equation, that must be solved, or it can be treated as some object in its own context, which is governed according to certain rules. Certain expressions that denote a quantity simultaneously fix a necessary condition that is considered to be accepted.

Formal languages and lambda calculus

Formal languages make it possible to clarify (formalize) the concept of well-formed expressions. In the 1930s, a new kind of expression, called lambda expressions, was introduced by A. Church and S. Kleene to define functions and calculate them. These expressions form the basis of the formal lambda calculus system used in mathematical logic and the theory of programming languages. The equivalence of two lambda expressions is undecidable. Undecidability also occurs for expressions representing real numbers constructed from integers using arithmetic operations, logarithms, and exponentials (Richardson's theorem).

Variables

Many mathematical expressions contain variables. Some variable can be considered free or bound. For a given combination of values of free variables, the expression can be evaluated, but for some other combinations, the value of the expression may remain undefined. For example, the expression

x / yx / y

calculated for x = 10, y = 5, gives 2; but it is undefined for y = 0.

Thus, an expression represents a function whose inputs (arguments) are the values assigned to free variables, and whose result is the computed value of the expression. The result of evaluating an expression depends on the definition of the mathematical operators and on the system of values that is its context.

Two expressions are said to be equivalent if, for each combination of the values of the free variables, both expressions give the same result, that is, they represent the same function. For example, the expression

∑n = 13 (2nx) ∑n = 13 (2nx)

has a free variable x, a bound variable n, constants 1, 2, and 3, two occurrences of an implicit multiplication operator, and a summation operator. The expression is equivalent to the simpler 12x expression. The value for x = 3 and n = 3 is 36.

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