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# Mathematical Questions in Tajik Poetry

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A B S T R A C T

*The intense interaction and mutual influence of modern science's different subjects and methodologies, as well as the ever-increasing integration of various areas of knowledge, is one of its most distinguishing traits. This issue is discussed in this paper using the example of Tajik "mathematical poetry." The with mathematical content produced by medieval Tajik scholars - encyclopedists - mathematicians, astronomers, poets, and others are the subject of our research.*

A R T I C L E I N F O

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## Introduction

Tajik mathematical poetry to reflect mathematical challenges in Tajikistan. Tajik mathematical poems, which have been gathered, systematized, and thoroughly examined, as well as manuscripts comprising mathematical treatises by Tajik scholars and philosophers from the 16th to 19th century.

The questions of mathematics are expressed in a broad variety of ways in these mathematical poetry. Almost all concerns and problems of elementary mathematics - the mathematics of constants - are formulated, solved, and popularized in them, and countless medieval Tajik experts contributed greatly to their growth.

Among these questions are about the subject and meaning of arithmetic, the numbering of numbers and their digits, the abjad calculus, the six operations of arithmetic: doubling, splitting, which are special cases, multiplication and division operations, addition, subtraction, multiplication, division, questions of extracting square roots, solving linear and quadratic algebraic equations with one unknown and their classification, squaring of positive integer numbers, applying mathematical questions to solving various practical problems, in particular, buying and selling, metrology, measuring land areas of various geometric configurations.

In such, there are also presentations of a number of issues in number theory - one of the remarkable sections of classical mathematics. In particular, a mathematical poem was discovered, the content of which is equivalent to an algorithm for finding even perfect numbers. In them, along with questions of the arithmetic of positive integers, questions of the arithmetic of fractional numbers are also elegantly presented.

Almost all significant scientists - mathematicians of the medieval East paid close attention to the philosophical and methodological issues of this discipline in their mathematical works, highlighting its enormous and enduring function and relevance in objective world knowledge. For example, in his book "The Right Guidance for Aspiring to a Brilliant Goal," **Muhammad ibn Ibrohim Al-Ansori** writes: "He adds that it is essential in all fields and that neither the ruler, nor the scientist, nor ordinary people can manage without it or without it." However, according to **Giyasuddin Jamshed al - Koshi**, the greatest

scientist of the fifteenth century, "arithmetic is the science of the principles for determining numerical unknowns using the corresponding known ones."

The great role of mathematics in various areas of science and practical life is emphasized - and quite often - by many scientists, researchers, and poets of our time. The well-known Lithuanian poet, laureate of the Lenin Prize Eduardas Mezhelaitis writes:

«If you want specifics,

Don't shy away from mathematics»

Further, he says that

"... And best of all, try

Create some synthesis:

Poetic - mathematics,

That is to say, synthesis

Earth and sky

Otherwise - remember this -

You will remain in the poetic darkness ..."

In this kind of literature, it is underlined that the subject of mathematics in general, and arithmetic in particular, is a number, and that its major work and goal is to find numerical unknowns using the known numbers associated with them. Here's an example of one of the group's poems:

« Mathematics is the science through which,

It is possible to free the unknown from doubt.

Know that the subject of this science is number,

Provided that if it is material! »

The calculus system, on which all future growth of this ancient and forever youthful science will be founded, is one of the most essential topics in the formation and development of mathematics in all periods and peoples.

The abjad system is frequently utilized in practically all arithmetic operations, and particularly in the presentation of a number of metrology and astronomy problems.

The number is one of the most fundamental and, at the same time, most ancient concepts in mathematics. It has piqued the interest of scientists since the dawn of time and continues to do so today.

From this we can conclude that Tajik scientists - mathematicians of the 16th - 19th centuries made a certain contribution to this direction, the significance of which both in the development of mathematics and in the development of Tajik classical literature is quite high. The table below shows that the lexicological comparison of the first four terms from the mentioned "Patiganita", modern Indian and Tajik languages shows that they have the same lexical bases:

| № | Modern Tajik terms | Terms from "Patiganita" | Modern Indian terms | Translating to English language |
|---|---|---|---|---|
| 1 | Як | Эка | Эк | One |
| 2 | Дах | Даша | Дас | Ten |
| 3 | Сад | Шата | Сау | Hundred |
| 4 | хазор | хазор | хазор | One thousand |

This event once again demonstrates the relationship between the mathematics of the Maverannarkh, Khorasan, and Indian peoples. Some of the terminology used in this literature was employed in Tajik classical literature, and they are still used today in Afghanistan, India, Iran, Pakistan, and other eastern nations, in a living colloquial language, and in the literary Tajik language - for stylistic purposes...

The exposition of the rules and practical applications of the six basic - in the medieval East - arithmetic operations is the subject of a vast number of mathematical poetry. Doubling, bifurcation, addition, subtraction, multiplication, and division are the operations in question. Muhammad al-Khorazmiy, Giyasuddin Jamshed al-Koshi, Alouddin Muhammad Ali Kushchi, Muhammad Amin Muminabadi, Bahouddin Amuli, Bobokalon Samarkandi, and Ataullah Lohuri are only a few of the well-known mathematicians.

In these literature, we are talking about doubling simple fractions ( $\frac{a}{b}$ , a < b, b≠ 0), mixed fractions ($l\frac{m}{n}$ , $l \geq 1, m < n, n \neq 0$), doubling both fractions at the same time, doubling whole numbers.

The following literature is an example of doubling integers:

If you wish to double the number, start on the right,

Double the first digit, then add the second.

Write what is less than 10 or more in the box below.

Take ten for the unit and write them down slowly.

Add it to the result of double the left digit's digit, and

If you're on the right track, keep going in the same direction.

Specific numerical examples are supplied for all cases of arithmetic operations; in particular, the classic chess problem of doubling the number 1 to$2^{64}$ and splitting the latter to 1 with the corresponding verification method is given as an example for doubling and doubling operations in poems.

**References**


1. Ходжиев И. «Математика в поэзии» Душанбе. «Маориф» 1990 г.
2. «Узбек совет энциклопедияси». Тошкент -1978 й. 10 – том.