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The Practical Significance of Using the Scientific Heritage of Muhammad Al-Khorazmi In Mathematics Lessons

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Abstract

This article analyzes the works of the great thinker, scientist Abdullah Muhammad ibn Musa al-Khorazmi, who made a great contribution to the development of world mathematics. Also, through the scientist's works that have come down to us, the current issues of teaching mathematics in schools have been analyzed from a scientific and theoretical point of view.

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INTRODUCTION

It is known that the recognition of values specific to the spirituality of a nation by other nations is an expression of deep respect for the history of that nation. In the process of teaching mathematics classes, it is important to develop knowledge, skills, skills and competences in our students about the contributions of our great scientists to the development of science and society. The great scholar Abdullah Muhammad ibn Musa al-Khorazmi, who played an important role in the history of the peoples of not only Central Asia, but also the world, created in the field of mathematics and founded the science of algebra with his work "A short book about al-jabr and al-muqabala". Thanks to this work, the term "algorithm" appeared in the Latin form of the scientist's name.

LITERATURE REVIEW

Al-Khwarizmi was in charge of the observatory, library, and all scientific research in the "Bayt ul-Hikma" (House of the Wise) in Baghdad. The following 10 works of Al-Khwarizmi have come down to us:

1. "About Indian accounting" (Fi hisab al-hind). At the beginning of the 9th century (Mawrda), he served in the court of Ma'mun al-Rashid, and according to his orders, he traveled to the west of India, where he got acquainted with the mathematical knowledge of the peoples. As a result, he writes the treatise "On Indian numbers". The role of this expedition in the history of the science of "Hisab al-Hind" is huge, and it causes the spread of Indian numerals called "Arabic numerals" and the decimal positional system of calculation throughout the world. Khorezmi gives detailed comments about the writing and reading of numbers in his work.

In addition to arithmetic operations on numbers, it also includes doubling and halving numbers. This work was translated from Arabic into Latin by the Spanish scholar Adelard of Bat in the 12th century. Later Bonkompani, K. Fogel, L. Sevilskyi researched. The treatise consists of 8 chapters. This treatise had a major impact on the Near and Middle East and Western Europe as an accounting manual. In the Latin translation, the word "al-Khwarizmi" was written as Algorithmus (Algorithmus) and was introduced into world science as a new term "algorithm".

2. "A short book about al-jabr and al-muqabala" (Al-kitab al-mukhtasar fi hisab al-jabr wa-1-muqabala). Al-jabr (Recovery) - such an operation, with the help of which, if there is a term to be divided in the equation, by adding a term equal to it in terms of quantity to both parts of the equation, the term to be divided is transferred to the second side of the equation. Al-muqabala (put opposite) - if there is a similar term in both parts of the equation with the help of the operation, the common part of them is discarded. The work mainly consists of three sections:

1) ways to solve equations with one unknown of the first and second order using al-jabr and al-muqabala, to perform operations with rational and irrational expressions, and to solve numerical problems using equations;

2) dedicated to geometry, in which some applications of algebra to problems of measurement and measurement of quantities are shown;

3) practical application of algebra, i.e., problems related to inheritance distribution are given. In this book, Khorezmi calls the unknown x as a "root", a square root as a "square", and a natural number as a "simple number". He says that there are six relationships between these three numbers:

1) cx2=bx (squares are equal to the roots);

2) cx2=a (squares are equal to the number);

3) bx=a (the roots are equal to the number);

4) ax2+bx=c (squares and roots are equal to the number);

5) ax2=bx+c (squares are equal to roots and numbers);

6) bx=c+ax2 (the roots are equal to numbers and squares).

ANALYSIS AND RESULTS

"A Short Book on Al-Jabr and Al-Muqabala" was studied in the 12th century by Spanish scholars Gerardo from Cremona and Adelard from Bat based on its translation from Arabic to Latin, and later to English by Hans and Grant. This treatise consists of 27 chapters.

3. "A1-Khorazmi ziji" (i.e. tables) or "A1-Ma'mun ziji". This treatise consists of 37 chapters, and it was translated from Arabic to Latin by the Spanish scholar Adelard Batlik in the 12th century, later by H. Zuter into German, and B. Kopelevich into Russian.

4. "Book on the use of astrolabes" (Kitab al-amal bi-1-astrulab). This pamphlet covers 43 issues related to astronomy.

5. "Determining the azimuth using an astrolabe" (Ma'rif as-samt bi-1-astrulab). Ibn Nadimnitig, who lived in the 10th century, is mentioned in the work "Fixrist".

6. "About seeing the clock in the plane of the sundial" (Amal as-saat fabasitar-rukhama).

7. "Book on making an astrolabe" (Kitab amal as-astrulab). He is mentioned in the book "Fikhrist" by Ibn Nadim, who lived in the 10th century.

8. "Book about the sundial" (Kitab ar-rukhama). Information about this treatise is available in Ibn Nadim's "Fikhrist".

9. "Geography book" (Book picture-1-arz). Arabic text published by Mjik.

10. "Treatise about Jewish eras and holidays" This pamphlet was studied by the American scientist E. Kennedy.

From the 10 treatises of al-Khwarizmi that have reached us, the following 3 major discoveries can be said:

1. In his treatise "On Indian Arithmetic", he showed that the decimal number system is superior to the hexadecimal system, and through the translation of this work into Latin, the decimal number system has spread and is used by the peoples of the whole world.

2. In "A short book about al-jabr and al-muqabala", he raised algebra from an auxiliary part of astronomy to the level of an independent science, classified 6 linear and quadratic equations.

3. Al-Khwarazmi and his students calculated the length of the 10th meridian of the Earth passing through the cities of Tadmor and al-Raqqa, the distance between which is 35 km, and he found it to be 6.72 km.

CONCLUSION.

In short, al-Khwarazmi laid the foundations of didactic principles and educational technology, which is considered an urgent problem of school pedagogy, seven centuries before European scientists. He developed the method of explaining the laws of mathematics teaching in school in scientific language. In the works of the thinker Al-Khwarazmi, issues that have not lost their importance until now, such as distribution of inheritance, writing a will, legal and commercial work for the correct distribution of property, measuring land surfaces and laying canals, are also described.

LITERATURE REVIEW

1. Azamov A. Xaydarov B. Matematika sayyorasi. Matematikadan sinfdan va maktabdan tashqari ishlarni tashkil qilish bo'yicha o'quv-uslubiy qo'llanma. –T.: "O'qituvchi", 1993 y. 2. Al-Xorazmiy Muxammad ibn Musa. Tanlangan asarlar. Matematika, astronomiya, geografiya.— Toshkent: Fan, 1983.
2. Asadova M. O'rta Osiyo mashxur olimlari va ularning matematikaga oid ishlari.— Toshkent: «O'qituvchi», 1983.
3. Саиджонов Ю.С. Традиции просвешение на востоке. – T.: G'afur G'ulom nomidagi Adabiyot va san'at nashriyoti, 2000.
4. Mirzaahmedov M., Rahimqoriyev A., Ismoilov SH. Matematika, Umumiy o'rta ta'lim maktablari 6-sinfi uchun darslik. –T.: "O'qituvchi", 2017. 5.http://www.edunet.uz – maktab o'quvchi va o'qituvchilari sayti.
5. O'zbekiston Milliy ensiklopediyasi. 4-, 5-, 9-jildlar. – T.: «O'zbekiston Milliy ensiklopediyasi» Davlat ilmiy nashriyoti.