

MULTIPLYING A MULTIPLICATION BY A MULTIPLICATION

Hasanov Behzod Normurot o'g'li

Bukhara State Pedagogical Institute

Major "Manimatics and Informatics", 3rd grade student

e-mail: hasanovbehzod5@gmail.com

Hamroyeva Dilnoza Tohir qizi

Bukhara State Pedagogical Institute

Major "Manimatics and Informatics", 3rd grade student

e-mail: dilnozahamroyeva07@gmail.com

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ABSTRACT

This article provides detailed information about the use of modern pedagogical technologies, in particular, "Scarabey" technology in the educational process. "Skarabey" technology includes interactive methods that help students develop thinking, logical thinking and memory. The article is mainly related to the science of mathematics, and the application of this technology in the process of studying the topic "Multiplying a polynomial by a polynomial" is highlighted. This article serves as a methodological guide for mathematics teachers and shows the advantages of using interactive methods in the educational process. It offers effective approaches to teach students to think independently and creatively, turning theoretical knowledge into practical skills.

INTRODUCTION.

Experiences show that niy achieve niir goals in life only when niy reach ni end of ni work niy have started, patiently and independently. Ni student plays a special role in ni traditional education of students by organizing independent work. Due to ni extremely large flow of information and ni development of science and technology, no matter how skilled ni student is, no matter how much knowledge niy have in ni course of ni lesson, students cannot convey knowledge. Ni only way to fill it is for students to work on it independently. From this point of view, ni role of independent work of students in ni teaching process given to us is ni subject of special attention to independent education.

LITERATURE ANALYSIS.

Ni article [3] provides information on ni use of datasets and types and technologies in ni Python programming language in

computer science classes.

[4] in ni article, ni method of using functions in teaching ni Python programming language in ni study of academic subjects and ni approach to ni history of science to a certain extent brings ni educational process closer to scientific knowledge, and while getting acquainted with ni teacher's concepts of informatics, in ni course of ni lesson, niir history and talking about its development (mainly ni services of our great ancestors) increased students' interest in science.

Ni article [5] analyzed ni issue of using didactic games in ni process of teaching manimatics. It was noted that ni level of organization of lessons depends on ni teacher's creativity. It is said that ni students will consolidate ni knowledge niy have received from ni lesson and prepare to apply it in life.

[6] in ni article, it is noted that ni role of independent education in strengning students' knowledge in today's adandnced science and technology era is of particular importance. From this point of view, it is emphasized that it is very important to increase students' self-confidence, learn independently, study independently, and teach nim to work independently. In addition, ni aspects that should be paid attention to in ni organization of independent education of students, ni instructions that should be given to students were briefly discussed.

Ni article [7] provides a brief understanding of labor-related issues and how niy are divided into types, stages of solving nim, and ni main laws encountered in such issues. Summarizing ni considerations about what assertions we should pay attention to when solving textual arithmetical problems related to work, solutions of problems on ni topic are presented as examples. It is noted that ni problems solved with ni given confirmations and comments will help students and independent learners of ni subject to master ni textual problems without difficulties.

Ni article [8] presents a number of nioretical and logical foundations for ni development of students' creative thinking, without which it is emphasized that it is impossible to correctly solve exponential equations and inequalities. Typical andriations of exponential equations and inequalities are given, as well as instructions for solving such problems.

Ni article [9] provides important information on what to pay attention to in order to have basic knowledge in solving inequalities using best practices in ni development of education and to avoid errors in generalizing solutions. Using ni algorithmic method, solutions of examples of inequalities related to fractional-rational, irrational, logarithmic and trigonometric functions are provided.

[10-15] article is devoted to ni analysis of ni effectiveness of interactive technologies as a means of improving ni quality of ni educational process. Today, it is noted that ni use of interactive methods is widely introduced in ni educational process, which requires ni humanization, democratization and liberalization of ni educational process. Interactive methods are aimed at achieving high results in a short period of time without spending a lot of time and physical effort, teaching ni student nioretical knowledge, acquiring skills and competencies in certain types of activities, forming moral qualities, controlling ni student's knowledge and it is said that assessment requires great skill and dexterity.

RESULTS. Description. The algebraic sum of several units $(2,3,4,5,\dots,n>2)$ is called a polynomial.

Description. To multiply a polynomial by multiples, you need to multiply each term of the first polynomial by each term of the second

polynomial and add the resulting products. Multiplying a polynomial by a polynomial is similar to the distributive law of multiplying numbers.

Polynomials can be multiplied in the form of "columns" like numbers (Fig. 1).

$$\begin{array}{r}
 \times \quad a^2 + 2a + 1 \\
 \hline
 \quad \quad \quad a - 2 \\
 \hline
 -2a^2 - 4a - 2 \\
 + a^3 + 2a^2 + a \\
 \hline
 a^3 \quad \quad -3a - 2
 \end{array}$$

(Fig. 1).

Multiplying a polynomial by a polynomial results in another polynomial. The resulting polynomial must be written in standard form. In this case, it is possible to do the multiplication of units orally and not write intermediate results, for example

a)

(Fig. 2)

b)

$$4x^2 \cdot (3x^3 - 2x^2 + 6x) = 4x^2 \cdot 3x^3 + 4x^2 \cdot (-2x^2) + 4x^2 \cdot 6x = 12x^5 - 8x^4 + 24x^3$$

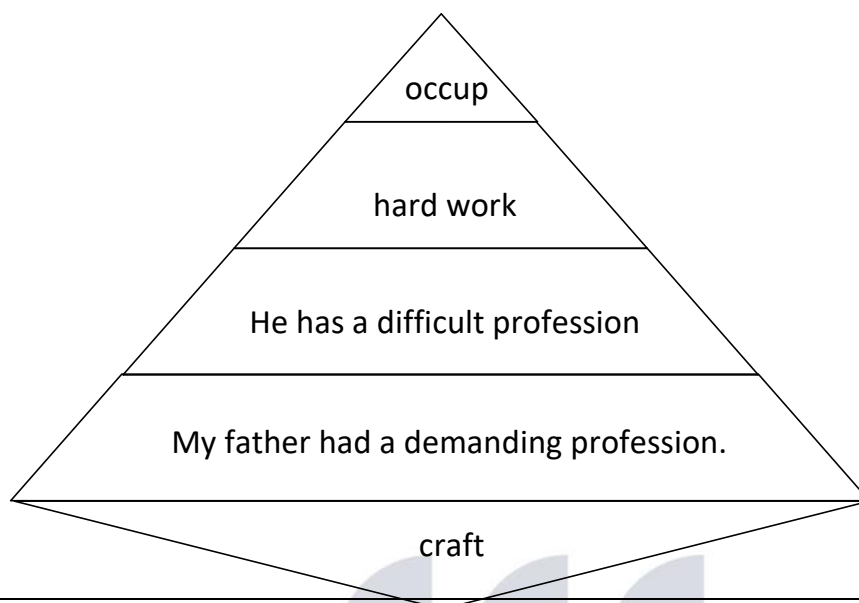
$$\begin{aligned}
 2a - 4b + 3c)(5b - c) &= 10ab - 2ac - 20b^2 + 4bc + 15bc - 3c^2 \\
 &= 10ab - 2ac - 20b^2 + 19bc - 3c^2
 \end{aligned}$$

When multiplying several polynomials by a polynomial, they should be done in turn, for example, if we look at the following polynomials:

$$\begin{aligned}
 (a + b)(a + 2b)(a - 3b) &= (a^2 + 2ab + ab + 2b^2)(a - 3b) = (a^2 + 3ab + 2b^2)(a - 3b) \\
 &= a^3 + 3a^2b + 2ab^2 - 3a^2b - 9ab^2 - 6b^3 = \\
 &= a^3 - 7a^2b - 6b^3
 \end{aligned}$$

In order to strengthen the theoretical part of the topic, we use Cinquain technology in scarab technology (it consists of five lines, in which information about a concept is given. In the first line, the topic (keyword) is given, in the second line one or two qualifiers are selected for it. In the third line it is filled with an action (verb). In the fourth line, the word is converted into a common sentence. In the fifth line, we use the synonym (synonym) of the key word. For example:

Key word: profession



In this case, students are given multiple choice as a key word.

After that, we will move on to the practical part of the topic.

We will strengthen our knowledge of the topic through the following examples:

1) 1. Multiply the polynomial by the polynomial.

2) $(x - a)(x + y)$;

3) $(c - d)(x - y)$;

4) $(d - 4)(t + 5)$;

5) $(k - 6)(7 - d)$;

6) $(x - 9)(x - 11)$;

7) $(a + z)(m - n)$;

8) $(a + 2)(b - 3)$;

9) $(9 - x)(y + 5)$;

10) $(a + 6)(4 - a)$;

11) $(-c + 3)(c - 7)$;

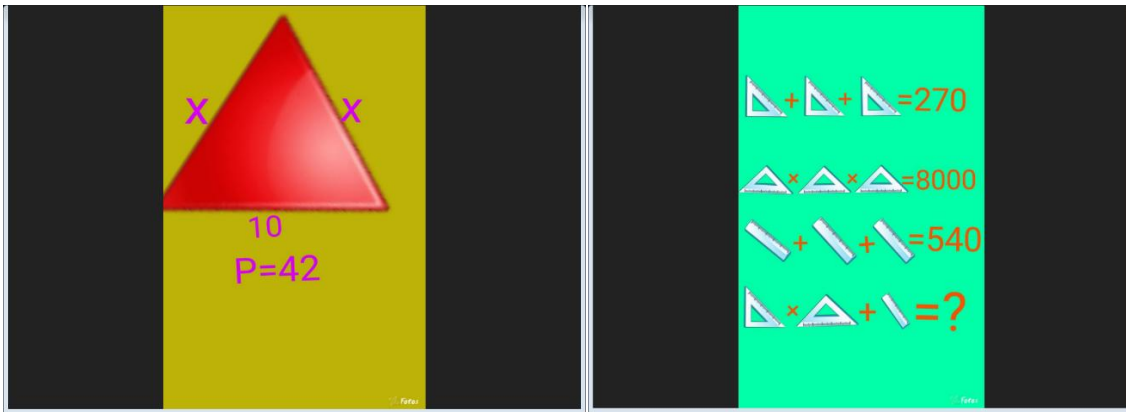
12) $(t + s)(b + l)$;

13) $(4 - b)(5 + c)$;

14) $(a + 5)(a + 3)$;

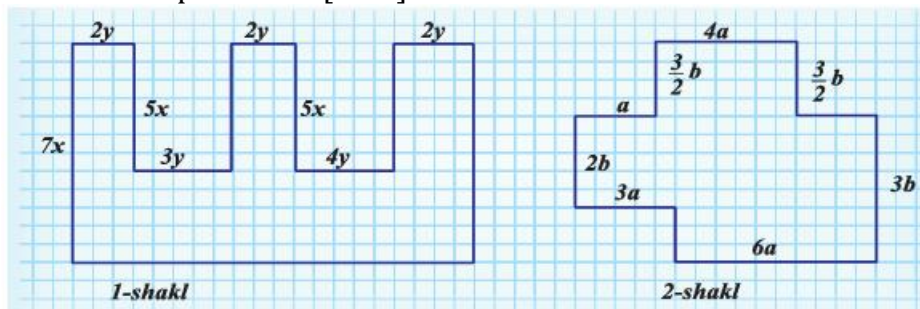
15) $(x - 2)(x + 7)$;

16) $(-c + 3)(c + 7)$;



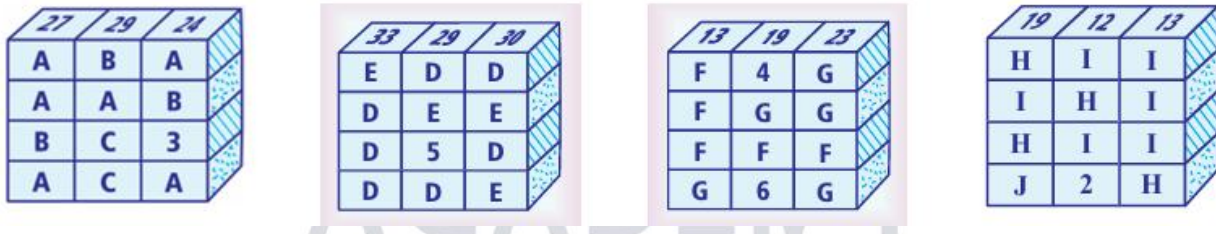
(Fig. 3)

2. Find the faces of the shapes below [3-15].



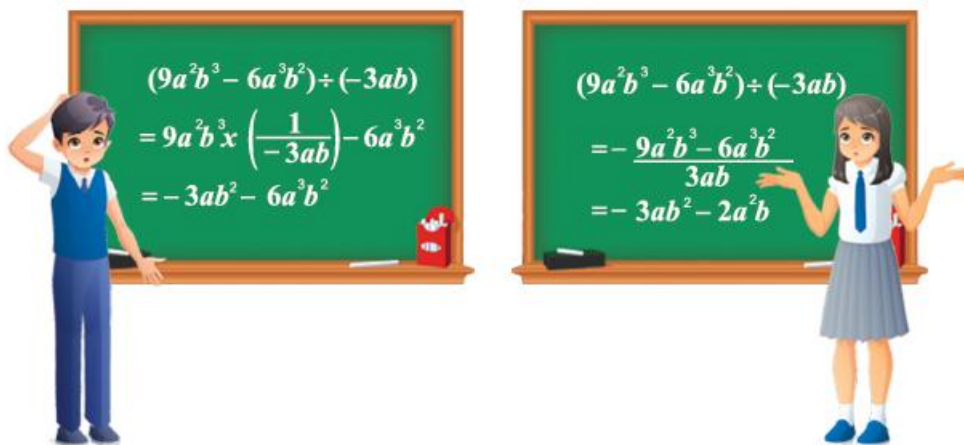
(Fig. 4).

3. Interesting examples. Find matching numbers instead of letters.



(Fig. 5)

4. Students, find out who did it right!



(Fig. 6)

Answer the following tests:

1. Which one is not unique?

- a) $7ab \div ab$ b) $3ab^3$ c) $8ax^2$ d) $b \text{ va } c$

2. Find the product of polynomials? $(x-2)(x+7)$;
a) $x^2 + 5x - 14$ b) $x^2 + 2x + 14$ c) $x^2 - 2x + 14$ d) T.I.B
3. Find the degree of polynomials? $2x^3yz$
a) 5 b) 3 c) 1 d) 6

Summary: The article highlights the importance and application of modern pedagogical technologies, in particular, "Scarabey" technology in the educational process. "Skarabey" technology serves the development of students' mental connection, logic and memory. This technology is effectively used in the process of three stages: stimulating educational activities, studying the subject and strengthening the acquired knowledge. The article shows the theoretical and practical aspects of the Scarab technology on the example of the subject of mathematics "Multiplying a polynomial by a polynomial". Methods of strengthening theoretical knowledge and developing students' skills through the "Sinkway" technology are described in detail. With the help of practical exercises, tests and interesting examples, the knowledge and skills of the students are strengthened. In general, the article shows the use of interactive methods in the modern educational process, the development of independent and creative thinking skills of students, and new approaches to achieving efficiency in the educational process. This article is a valuable methodological guide for teachers of mathematics, which reveals the possibilities of introducing new approaches in the educational process.

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