



## Using the "Mathematical lotto" method in teaching the topic "Vectors and operations on them"

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**Abstract:** This article presents ideas and reflections on the concept of vectors and the use of interactive methods in teaching the topic "Vectors and operations on them".

**Key words:** Vector, zero vector, unit vector, mathematical lotto, group, token, lotto stones.

The article [1] first gives a brief information about the theory of matrices. The relevance of problem-based learning in teaching mathematics in higher education institutions was also discussed. Examples of solving problems using the elements of matrix theory are given. In the first problem, the problem of solving a matrix equation is presented as a solution of a system of linear equations. In the second problem, the problem of determining the order of the determinant corresponding to the matrix and the sign of the expression using the given expression was analyzed.

[2] the article lists instructions for studying advanced foreign experiences in the concept of development of the higher education system of Uzbekistan until 2030 and applying them in the conditions of higher education institutions of the Republic. The issue of organizing lectures, practical and independent training sessions in higher education institutions of developed countries is analyzed and their role in the effective organization of training sessions is shown. Based on foreign experience, several methodological recommendations for improving the quality of education have been developed.

The article [3] provides feedback on the use of the "Methodology of working in small groups", which is one of the interactive methods of modern education, in the teaching of



higher mathematics in higher educational institutions. The structure and application of this method is described in the example of teaching the topic "Matrixes and operations on them". Also, the scientific novelty of matrix theory is considered, it is shown that it can be used to justify the relevance of this topic for other sciences. Advantages and disadvantages of using the method are also discussed.

The article [4] contains some methodical recommendations on the effective organization of educational activities in mathematics. The use of some interactive methods in the teaching of the topic "Spectrum and resolvent of a linear operator" of functional analysis has been studied.

The article [5] first presents the structure and origin of the Cantor set, and then explains the role, importance and application of interactive methods in teaching this subject.

The article [6] describes methods of passing the topic using modern methods and working examples on this topic in teaching the topic of unknown inequalities, which is a type of inequalities.

The article [7] analyzes several methods of calculating totals and the method of working examples in these methods.

**Vector concept.** A directed section is called a vector. It is known that a section is formed by connecting two points. The first point is the beginning of the vector, and the second is the end. A vector whose beginning and end overlap is called a zero vector. Any vector other than the zero vector is represented by a directed cross section.

Vectors are denoted as  $AB$ ,  $CD$ ,  $\overrightarrow{AB}$ ,  $\overrightarrow{CD}$  or  $\overrightarrow{AB}$ ,  $\overrightarrow{CD}$ .

Two non-zero vectors  $\overrightarrow{AB}$ ,  $\overrightarrow{CD}$  are called collinear if the straight lines  $AB$ ,  $CD$  are parallel or overlap. A zero vector is collinear to any vector. Non-zero  $\overrightarrow{AB}$  is the length of the vector,  $AB$  is the length of the segment, and  $|\overrightarrow{AB}|$  defined as By definition, the length (module) of the zero vector is zero. A vector of length one is called a unit vector.



The addition of two vectors is the vector that goes from the beginning of the first vector to the end of the second vector when the beginning of the second vector is brought to the end of the first vector. The sum of vectors  $\vec{a}, \vec{b}, \vec{c}, \dots, \vec{k}$  is called vector  $\vec{a} + \vec{b} + \vec{c} \dots + \vec{k}$  and it is formed as follows.

**Using an interactive method in teaching the subject.** In this article, we will mention how to use the "Mathematical lotto" method in teaching the topic "Vectors and operations on them". Let's say we are using this method in a practice class and there are 30 students in the group. To use the "Mathematical Lotto" method during the training, you will need the following.

- 1) lotto stones with numbers from 1 to 30;
- 2) 10 coins;
- 3) 24 questions on the subject being strengthened;
- 4) Give the group 5 sheets of paper as shown below:

1		
10	1	21
18	2	26

2		
5	13	23
19	22	7

3		
15	11	29
20	16	3

4		
12	4	14
27	8	24

5		
6	17	28
25	9	30

The rule of this method is that we first divide the group into 4 or 5 groups. We distribute sheets with six question numbers to each group. The teacher leads the lesson as



the leader and the students take the lotto stones from the bag and announce their number. Whichever group the announced number belongs to, that group will have to answer. The teacher reads the question on the announced number. If the group that has to answer answers correctly, the lotto stone is given to them. Otherwise, the lotto stone remains with the initiator, i.e. the teacher. The right to choose and answer the lotto stone is transferred to another group.

The game continues in this manner until all questions have been announced, and teams are scored based on the amount of tokens they have collected, and the team with the most tokens is the winner.

For example, let the topic be "Vectors and operations on them".

The purpose of the lesson:

- 1) Solving and strengthening examples and issues on the topic;
- 2) Development of students' abilities such as strengthening memory, resourcefulness, dexterity;

As suitable questions for lotto stones, you can get the following:

- 1) What methods do you know of adding vectors?
- 2) How to find the length of a vector?
- 3) What do you mean by unit vector?
- 4) What do you mean by zero vector?
- 5) How to find the angle between two vectors?

Questions on a similar topic are created according to the number of lotto stones.

The "mathematical lotto" method has several advantages in using it in the classroom. For example, since the lesson is held in the form of an interesting game, during the entire lesson, all students are focused on the lesson and they try to participate actively. This causes students to learn the lesson better. But this method has advantages as well as disadvantages. One of them is that the teacher should carefully read the questions while looking at the lotto



stones in each student's hand, and at the same time ensure that there is no noise in the audience.

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