IMPROVE THE KNOWLEDGE OF STUDENTS, EXPRESSING MATHEMATICAL REASONS, USING LOGIC AND RESTORING THE LOGICAL FUNCTION

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ABSTRACT

The global education system is recognized as a guarantee of economic development and social security for all countries. At present, the process of teaching the exact sciences is developing on the basis of new socio-economic and political ties, the achievements of science and technology. The active use of interactive methods in many educational institutions of foreign countries, including the widespread introduction of trends in improving the quality of teaching mathematics, helps to develop students' creative and critical thinking skills. does. The use of innovative technologies in the teaching of all subjects related to mathematics in the world, thereby increasing the quality of education, developing the creative abilities of students, increasing the effectiveness of mathematical applications and interdisciplinary training. studies are conducted on a wide range of issues. This is especially important for using innovative strategies in mathematics, to increase the activity of students in deeper schools, for self-study and wider application of the knowledge gained. As we know, mathematics in education is mainly taught by practical examples, and various interesting examples are used to accumulate knowledge and skills among students. This article is devoted to improving students' knowledge with the help of logical expression, one of the key concepts in mathematics and the logical function of the truth table.

Keywords: Reflection, compound, design, denial, implantation, equivalence, truth chart.

INTRODUCTION, LITERATURE REVIEW, METHODOLOGY

Aristotle attempts to formulate a logical process using various mathematical symbols are obvious. In the sixteenth and seventeenth centuries, with the development of mechanics and mathematics, the possibility of using mathematical methods became more widespread. The German philosopher Leibniz founded mathematical logic, trying to create a logical mathematical method that would solve various problems. The mathematical expression of the logical process began to develop in the 19th century.

Currently, mathematical logic is one of the most common subjects for solving practical problems, for example, in the development of logical foundations and software for computer technology, because of the simplicity of using the method and its ease of use in any complex field. widely used among engineers. A number of production system accounts have been successfully used in this method. This means that the practical importance of mathematical logic is high. Mathematical logic was first proposed by engineers, and later it had its own mathematical basis. In general, it will be useful for students to teach the theoretical foundations of mathematical logic their practical role and features, apply practical problems, and study various subjects.

Mathematical logic is, on the one hand, the use of mathematical methods for problems of formal logic, and on the other hand, the use of mathematics as a science. Modern mathematics is the theoretical basis of automation, machine mathematics, automatic translation from one language to another, mathematical linguistics, information theory and cybernetics in general.
The creation and implementation of information systems for teaching mathematics by foreign scientists are disclosed in the works of J. Gilbert, F. Cochran, J. Reznulli, A. Rene, J. De Ruiter, R.E. Meder, J.W. Gray, M. L. Lezhonga, M. Trotta, R. J., This study focuses on various aspects of teacher training, such as preparing for innovative and pedagogical activities, access to information and communication technologies in education, teaching problematic, mathematical logical elements in mathematical education .

The student's level of theoretical and general subjects is determined by the level and effectiveness of his / her ability to perform practical tasks, training materials, solve problems independently, and do homework. Thus, students should acquire the ability to independently solve typical problems and problems in different fields of science. In this process, the student will be able to apply general theoretical laws to the student's practical tasks, thereby deepening the meaning of learning. For this, the student must complete at least 5-6 tasks with increasing complexity in practice. As an independent work and homework, it is desirable to give students a task that can be solved using moderate difficulties and methodological resources. It is necessary to pay attention to the use of theoretical knowledge and special implementation techniques. Thus, the student learns to solve the problems of various sections of the discipline based on theoretical information. In this process, it is advisable to consider the following recommendations:
• write a summary of the problem, then transfer all the data to one system and include, if necessary, some link;
• Analysis of the problem with the search for logical ways to search for nominal quantities that reflect all relevant laws and regulations.
It is important to note the following: Monitoring and evaluation of student homework, homework and independent assignments:
• to check home work;
• verification of control tasks;
• control during the lesson;
• task protection independent work
Expected results from a practical lesson:
• apply theoretical concepts to solve practical problems;
• choose the right method to solve the problem
• develop the ability to independently solve problems;
• be able to analyze the solution yourself.

The educational developments developed in educational institutions on the basis of modern pedagogical and innovative technologies in each subject to some extent play an important role in improving the quality and effectiveness of training. In this article, we will focus on several examples that positively affect the effectiveness of training, including the expression of mathematical reasoning using logical signs and the restoration of the visibility of a logical function in accordance with the fact table.

For this, first of all, we give logical considerations and their description.
Thinking and its values. One of the basic concepts of mathematical logic is the concept of reason. By “thinking” we mean a statement that is true or false. Any review is either true or false. No reasoning can be false or false at the same time. For example, “”, “”, “5 prime

numbers", "1 prime number", "A child older than his father", His thinking, the first is true, the second is false, the third is true, the fourth and fifth are false.

Interrogation and rhetoric cannot be meditation. Definitions cannot even speculate. For example, the definition of "a number divisible by 2 is called a pair number" cannot be a reflection. But "if the whole number is divided equally by 2, then this number is divided equally." This is true, but there are some assumptions that we cannot substantiate whether they are true or false. For example, "Tomorrow is snowing," "Anwar will go to class tomorrow."
When we say the value of a comment, we mean that it is true or false. Comments are usually capital letters of the Latin alphabet (A, B, C, ... X ,,), and their values ("true", "false") are indicated by the letters T and F. Here T is true, F is false. They are also numbered, and true feedback is 1, and false is 0.

Ideas that are not divided into parts are called elementary judgments. Elementary reasoning can create more complex judgments. If we put logic in the center of thought, a new thought is created, which is called mixed opinion. In the algebra of comments, basic concepts are true or false. Planning makes it more convenient, depending on whether the comment is true or false. This table is also called the truth table.

Logical actions on reflection.

In the following thoughts, we will discuss how to make other judgments using actions called logical actions.

Logical negation or inversion:

Inversion is a complex logical expression, if the original logical expression is true, then the result of the negation will be false, and vice versa, if the original logical expression is false, then the result of the negation will be true. In other simple words, this operation means that the particle is NOT added to the original logical expression or the words are incorrect, that.

Truth table for inversion

A	**$\neg$A**
0	1
1	0

We call such tables the truth table.

For example, thinking "7 cardinal number" is true, and now $\neg$A - "7 cardinal number" consists of checking what is false.

Logical multiplication or conjunction:

A conjunction is a complex logical expression that is considered true if and only if both simple expressions are true, in all other cases this complex expression is false.

Designation: F = A & B.

Truth table for conjunction

A	**B**	**A $\wedge$ B**
0	0	0
0	1	0
1	0	0
1	1	1

Logical addition or disjunction:

Disjunction - it is a complex logical expression that is true if at least one of the simple logical expressions is true and false if and only if both simple logical expressions are false.

Designation: F = A + B.

Truth Table for Disjunction

A	B	A $\vee$ B
0	0	0
0	1	1
1	0	1
1	1	1

Logical follow or implication:
Implication is a complex logical expression that is true in all cases, except from the truth follows a lie. That is, this logical operation connects two simple logical expressions, of which the first is condition (A), and the second (B) is a consequence.
The truth table for the implication

A	B	A $\to$ B
0	0	1
0	1	1
1	0	0
1	1	1

Logical equivalence or equivalence:
Equivalence is a complex logical expression that is true if and only if both simple logical expressions have the same truth.

Truth table for equivalence

A	B	A $\leftrightarrow$ B
0	0	1
0	1	0
1	0	0
1	1	1

$\wedge$ - logical multiplication, $\vee$ - called logical addition operations. A $\wedge$ B to reflect A and B; A $\vee$ B thinking A or B; A $\to$ B meditation A from meditation B come from meditation or now And if so, he will be there B; A $\leftrightarrow$ B opinion A comes from opinion B or opinion B, and opinion B is based on opinion B, and we only read that if it is B.
The sequence of logical operations is as follows: firstly, this is the action of the failure, if the failure is located behind the brackets, then the operations on the brackets follow, then the pairing, then the design, implantation and, finally, equivalence. Performed.

RESULTS, DISCUSSION

Here are some examples of expressing mathematical reasoning using the symbols above:

Example - 1. If a $a > b$ and $b > c$ if so, there will be $a > c$. $(a > b) \wedge (b > c) \Rightarrow (a > c)$

Example - 2. If $a > b$ if so, there will be $a + c > b + c$. $(a > b) \Rightarrow (a + c > b + c)$.

Example - 3. If $a = 0$ or $b = 0$ if so, there will be $ab = 0$ and vice versa, $ab = 0$ if so, $a = 0$ or there will be $b = 0$. $(ab = 0) \Leftrightarrow ((a = 0) \vee (b = 0))$.

Example -4. If a $a > 0$ and $b > 0$ if so, there will be $ab > 0$. $(a > 0) \wedge (b > 0) \Rightarrow (ab > 0)$.

Example - 5. Voluntary for real numbers $|x| \geq x$. $\forall x \in R$: $|x| > x$.

Example - 6 Volunteer $a \geq 0$ for the number, yes $x \in R$ there is a number there will be $x^2 = a$, i.e $\forall a \geq 0$, $\exists x \in R : x^2 = a$.

You can create an honesty table for more complex considerations using the Action Truth Chart.

Example 7. One person said: “I am a liar or a blonde.” Find out who this person is.Вывод. Мы будем делать заметки для комментариев в случае:
C = “I am a liar or a blonde”;
A = “I am a liar”;
B = “I am blonde ”

Then we can write a difficult opinion on this issue: C = A OR B. The truth table for this operation is as follows:

A	B	C=A **or** B
True	True	True
True	False	True
false	true	True
False	False	False

Now, to find a solution, consider the following:

a) If the feedback A is correct, then the person who expresses an opinion on this issue is lying, and, therefore, her opinion is a lie. Therefore, C must be “lying”. However, the table shows that the opinion of A cannot be false if the opinion of A is true.
b) If the feedback A is false, then the person who expresses an opinion on this issue is true and, of course, everything is true. Therefore, C must be true. As can be seen from the table, this is only true if the feedback A is “false” and B is true.
Answer: the person who claims to be true and blond in the case of a case.
Restore the logical function of the truth table.
Example 1. Let's say A, B, C. Variables are divided. The formula is $\alpha=\alpha(A,B,C)$.

A	B	C	α=α(A,B,C)
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

with this truth table there are infinitely many equally powerful formulas. Let's look at two of them.
In the truth table $\alpha = \alpha$ (A, B, C), we write down the numbers of the series that are equal to formula 1. 2-line, 6-line, 8-line. We write formulas equal to 1 in each series and 0 for other possibilities. To do this, you need to convert the value of the comment variable to 1 (true) and get the agreement of the variable opinions.
For line 2: $\urcorner A\wedge \urcorner B\wedge C$; for line 6: $A\wedge \urcorner B\wedge C$; for line 8: there will be $A\wedge B\wedge C$. If the formula for a series is derived from a derivative formula, the resulting formula is a search formula:

$$\alpha=\alpha(A,B,C)= \urcorner A\wedge\urcorner B\wedge C\vee A\wedge\urcorner B\wedge C\vee A\wedge B\wedge C \quad (1)$$

Now let's create the second equation: In the truth table $\alpha = \alpha$ (A, B, C) We write the numbers of the series that have the formula 0. 1-line, 3-line, 4-line, 5-line, 7-line. We write formulas equal to 0 in each series and 1 for other possibilities. To do this, you need to turn the value of variable 0 to 0 (false) and get a feedback variable.

Then for row 1: $A\vee B\vee C$; for line 3: $A\vee\neg B\vee C$; for line 4: $A\vee\neg B\vee\neg C$; for line 5: $\neg A\vee B\vee C$; for line 7: there will be $\neg A\vee\neg B\vee C$.
If you get an agreement on the formulas obtained by the array, the resulting formula will be a search formula

$$\alpha=\alpha(A,B,C)=(A\vee B\vee C)\wedge(A\vee\neg B\vee C)\wedge(A\vee\neg B\vee\neg C)\wedge(\neg A\vee B\vee C)\wedge(\neg A\vee\neg B\vee C) \quad (2)$$

CONCLUSIONS

Reasoning is basically a matter of mathematics. This article gives readers a logical understanding: “or” is logical addition ”and“ is logical multiplication ”,“ not ”is logical negation, implantation, equivalence, simple reasoning,“ true ”or“ false ”provides logical values, a logical diagram, and also ways of expressing mathematical reasoning using logical symbols and restoring the appearance of logical functions in the truth table.
In conclusion, we can say that teaching students how to express mathematical reasoning using logical symbols and restoring logical functions according to the truth schedule allows them to create truthful schedules and expand logical thinking..

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