International Journal of Education, Social Science & Humanities.
Finland Academic Research Science Publishers
ISSN: 2945-4492 (online) | (SJIF) = 7.502 Impact factor
Volume-11| Issue-12| 2023 Published: |22-12-2023|

ABOUT THE BASIC CONCEPTS OF ARITHMETIC AND OPERATIONS PERFORMED ON THEM

https://doi.org/10.5281/zenodo.10275335

Adham Normatov
Teacher of Kokand State Pedagogical Institute

Annotation

This article talks about how to introduce the basic concepts of arithmetic with the help of set theory, the concepts of natural numbers and zero, and the concepts of arithmetic operations performed on them.

Key words

equivalence, equivalence, reflexivity, transitivity, classes, union, intersection, difference, subset, sum, multiplication.

Below, we will consider how the basic concepts of arithmetic, natural numbers and zero, and the concepts of arithmetic operations performed on them are introduced using set theory.

If it is possible to establish a one-value correspondence between sets A and B, these sets are said to be of equal strength and written in the form A~B.

Since the relation "equivalence" is reflexive and transitive, it is an equivalence relation and divides all finite sets into equivalence classes. Each class consists of collections of different elements, the common property of which is that they are of equal strength.

A general property of the class of non-empty, finite, even-powered sets is called a natural number.

A general property of each equivalence class is fully expressed by one of its sets. A natural number representing each class property is designated by a separate symbol. The number a defined by a set A is called the power of this set and is written as a = n(A). For example, the number 3 represents a common property of the class of sets with three elements, and it is defined by any set of this class. 3 natural numbers of the class of equivalent sets A={a;b;c}, B = {red, yellow, green}, C = {□; ∇; ○} can be identified by showing its representatives.

We form a set that is not equivalent to the given set by adding an element that does not belong to each finite set. Continuing this process, we form an infinite sequence of mutually non-equivalent sets and a sequence of natural numbers defined by these sets in the form 1, 2, 3, n, ... The set of all natural numbers N= {1; 2; 3; ...} we come to write in the form.

The general property of the class of empty sets is called the number 0, 0= n(∅).

The number 0 and all natural numbers together form the set of non-negative integers. This set is denoted as N_0. N_0 = {0}∪N. Here, N is the set of all natural numbers. Or else N_0 ={0;1;2;3;…}

Comparison of non-negative integers. Let's find out on what theoretical basis the comparison of numbers occurs. Let two non-negative integers a and b be given and defined by finite sets A and B.

If the numbers a and b are determined by sets of equal power, then they are called equal.

a = b ⇔ A ~ B, where n(A) = a; n(B) = b.

If sets A and B are not of equal power, then the numbers determined by them will be different.

If the set A is equal to the set of characteristic parts of the set B and n(A) = a; If n(B) = b, the number a is said to be less than the number b and is written as a < b. In the same situation, the number b is said to be greater than the number a and is written as b > a.

a < b⇔A ~ B1, where B1⊂B and B1≠B,B≠∅.

Arithmetic operations on non-negative integers. Every operation performed on sets corresponds to operations on numbers defined by these sets. For example, a set C consisting of the union of non-intersecting sets A and B determines a number c, which is called the sum of non-negative integers a and b defined by sets Ava B.

n(A)=a is the sum of non-negative integers a and b; n(B)=b is the number of elements in the union of non-intersecting sets A and B.

a + b = n(A∪B), where n(A) = a; n(B) = b and A∩ B =∅.

Using the given definition, we explain that 5 + 2 = 7. 5 is the number of elements of a set A, 2 is the number of elements of a set B, in which their intersection should be an empty set. For example, A = {x; y; z; t; p}, B= {a; b} we get sets. We combine them: A∪B = {x; y; z; t; p; a; b}. By counting, we determine that n(A∪B) = 7. So 5 + 2 = 7.

In general, the sum a + b does not depend on the selection of non-intersecting sets A and B satisfying the condition n(A)=a, n(B)=b. We accept this general claim without proof.

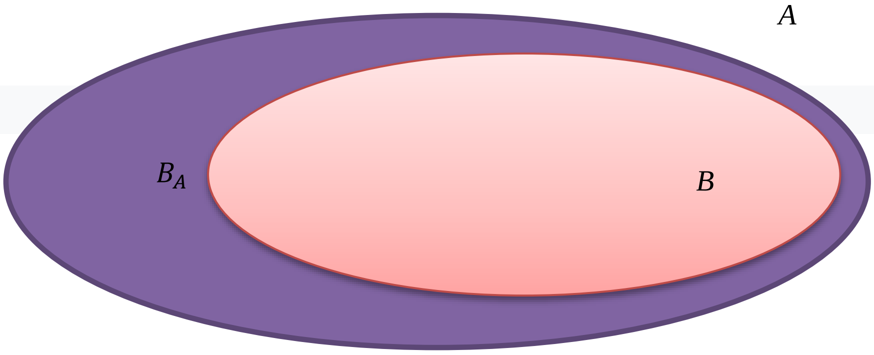
The difference of non-negative integers a and b is called the number of elements of the set that completes the set B up to the set A when the conditions n(A) = a, n(B) = b and B⊂A are fulfilled.

a - b = $n(B'_A)$, where a = n(A),b = n(B), B⊂A.

Miso1. Using the given definition, we explain that 7-4 = 3. Let 7 be the number of elements of some set A, 4 be the number of elements of set B, which is a subset of this set A. For example: A = {x; y; z; t; p; r,s}, B = {x; y; z; Let us take the sets t}. We find the complement of set B to set A: B'_A= {p; r; s}, $n(B'_A)$= 3. So, 7-4 = 3. The difference a - b does not depend on the selection of sets A and B satisfying the conditions n(A) = a, n(B) = b and B⊂A.

Let a = n(A), b = n(B) and B⊂A be given nonnegative integers a and b, and let the difference of these numbers be the number of elements in the complement of set B to set A, or is a - b = $n(B'_A)$

In Euler circles, the sets A, B, A\B are represented as shown in the figure. It is known that A = B∪ B'_A, from which n(A)=$n(B \cup B'_A)$. Since $B \cap B'_A = \emptyset$, we have a = n(A)= $n(B \cup B'_A)$= n(B) +$n(B'_A)$ = b + (a-b)



Let a and b be non-negative integers such that a = n(A) and b = n(B).

A and b are the product of non-negative integers, and c is a non-negative integer representing the number of elements of the Cartesian product A×B. Here A×B= {(a,b) | Let's mention that a∈A,b∈B}. So, by definition:

a·b = n(A×B) = c, where a, b, c∈N0,

In the notation a·b = c, a is the 1st multiplier, b is the 2nd multiplier, c is the multiplication, and the operation of finding the number $c \in N_0$ is called multiplication.

For example, let's find the product 5 • 2 according to the definition. For this, A = {a; b; c; d; e}, B = {1; 2} we construct the Cartesian product of sets:

A×B={(a; 1), (a; 2), (b; 1), (b; 2), (c; 1), (c; 2), (d; 1), (d; 2), (e; 1), (e; 2)}. Since the number of elements of the Cartesian product is 10, 5·2= 10. The concept of dividing the set into classes is used to describe the operation of division in the set of non-negative integers.

Let the set A with power equal to a be divided into classes of equal power.

If the number b is the number of partitions in the partition of the set A, then the partition of a and b is a non-negative integer, and the number of elements in each partition is called c.

If the number b is the number of elements of each partition in the division of the set A into classes, then a and b are the division of numbers, and the number of partitions is called c.

The operation of finding the division of non-negative integers a and b is called division, a is a divisor, b is a divisor, and a : b is a division. According to the definition of being, questions about being are divided into two types:

1) to be according to the content; 2) division into equal parts.

Type 1 problem: If 48 pencils are packed in 6 boxes, how many pencils are in each box?

Type 2 problem: If 48 pencils are packed in boxes of 6, how many boxes are needed?

LITERATURE

1. Normatov, A. (2023). MATEMATIKA DARSLARIDA MATEMATIK MASALANING AHAMIYATI VA O‘RNI HAQIDA. *Ustozlar uchun*, *19*(2), 81-89.

2. Normatov, A. (2023). ANIQ INTEGRALNING BA’ZI TATBIQLARI. *Ustozlar uchun*, *19*(2), 74-80.

3. Gulirano, A., & Adhamjon, N. (2023). Algebra of Quaternions. *Journal of Pedagogical Inventions and Practices*, *21*, 53-58.

4. Норматов, А. А. (2023). ПОМОЩЬ УЧЕНИКАМ ПРИ РЕШЕНИИ НЕКОТОРЫХ ЗАДАЧ. *Conferencea*, 76-82.

5. Normatov, A. (2023, June). SOME APPLICATIONS OF THE DEFINITE INTEGRAL. In *Proceedings of International Conference on Modern Science and Scientific Studies* (Vol. 2, No. 6, pp. 260-263).

6. Normatov, A. (2022). Text problems. *INTERNATIONAL JOURNAL OF SOCIAL SCIENCE & INTERDISCIPLINARY RESEARCH ISSN: 2277-3630 Impact factor: 7.429*, *11*(11), 341-347.

7. Normatov, A. (2022). APPLICATIONS OF THE DERIVATIVE. *Galaxy International Interdisciplinary Research Journal*, *10*(12), 1161-1164.

8. Normatov, A. A., Tolipov, R. M., & Musayeva, S. H. Q. (2022). MAKTABLARDA MATEMATIKA FANINI O ‘QITISHNING DOLZARB

MASALALARI. *Oriental renaissance: Innovative, educational, natural and social sciences*, *2*(5), 1068-1075.

9. Рахманкулова, Н. Х. (2021). Исторические данные о числах и количестве. *INTERNATIONAL JOURNAL OF DISCOURSE ON INNOVATION, INTEGRATION AND EDUCATION*, *2*(2), 97-100.

10. HH, M., AA, N., NX, R., GB, U., & UA, M. (2022). КОМПЕТЕНТНОСТНЫЙ ПОДХОД В ПРОФЕССИОНАЛЬНОЙ ПОДГОТОВКЕ БУДУЩИХ УЧИТЕЛЕЙ НАЧАЛЬНЫХ КЛАССОВ В ОБЛАСТИ ИКТ. *Международный журнал специального образования детей раннего возраста*, *14*(7).

11. Raxmankulova, N., & Mirzanazarova, S. (2022, January). DIDAKTIK OYINLAR-BILISHGA QIZIQISHNI UYGOTISH VOSITASI. In *International journal of conference series on education and social sciences (Online)* (Vol. 2, No. 1).

12. Rakhmankulova, N. K. (2022). METHODS OF TEACHING MATHEMATICS IN EDUCATION. In *ПЕДАГОГИЧЕСКИЕ НАУКИ: АКТУАЛЬНЫЕ ВОПРОСЫ ТЕОРИИ И ПРАКТИКИ* (pp. 15-17).

13. Рахмонкулова, Н. К. Важность решения математических задач в начальных классах. *Международный журнал инновационных исследований в области науки, техники и технологий*.

14. Khasanovna, R. N. METHODS OF TEACHING MATHEMATICS IN EDUCATION. *51 ТЕХНОЛОГИИ СОЦИАЛЬНО-ЭМОЦИОНАЛЬНОГО ОБУЧЕНИЯ (SEL) В ПРОФИЛАКТИКЕ БУЛЛИНГА УЧАЩИХСЯ БЫЛИНА ВЕРА ВЛАДИМИРОВНА*, *52*, 15.

15. Mamadalievich, Y. M., & Mamasolievich, T. R. (2022). THE NEWSPAPER" SADOI FERGHANA" IS THE NEWSPAPER OF THE FERGANA REGION. Galaxy International Interdisciplinary Research Journal, 10(12), 1236-1240.

16. Tolipov, R., & Yusupov, M. (2022). THE ROLE AND IMPORTANCE OF THE FORM OF EDUCATION IN IMPROVING THE EFFECTIVENESS OF THE LESSON. Galaxy International Interdisciplinary Research Journal, 10(12), 1633-1637.

17. Tolipov, R. (2022). Characteristics of the levels of formation of the control action in younger schoolchildren. INTERNATIONAL JOURNAL OF SOCIAL SCIENCE & INTERDISCIPLINARY RESEARCH ISSN: 2277-3630 Impact factor: 7.429, 11(11), 9299.

18. Yusupov, M. M. (2022). FEATURES OF THE ORGANIZATION AND CONDUCT OF EDUCATIONAL PRACTICE OF FUTURE PRIMARY SCHOOL

TEACHERS. INTERNATIONAL JOURNAL OF SOCIAL SCIENCE & INTERDISCIPLINARY RESEARCH ISSN: 2277-3630 Impact factor: 7.429, 11(06), 195-200.

19. Normatov, A. A., Tolipov, R. M., & Musayeva, S. H. Q. (2022). MAKTABLARDA MATEMATIKA FANINI O 'QITISHNING DOLZARB MASALALARI. Oriental renaissance: Innovative, educational, natural and social sciences, 2(5), 1068-1075.

20. Толипов, Р. М. (2023, February). СПОСОБЫ ИСПОЛЬЗОВАНИЯ МЕТОДОВ ИНДУКЦИИ, ДЕДУКЦИИ И АНАЛОГИИ ПРИ РЕШЕНИИ ПРИМЕРОВ И ЗАДАЧ В МЛАДШИХ КЛАССАХ. In E Global Congress (Vol. 2, pp. 36-46).

21. Mamasoliyevich, T. R. (2023). BOSHLANG 'ICH SINF MATEMATIKA DARSLARIDA DIDAKTIK O 'YINLAR ORQALI DARSLARNI TASHKIL ETISH DARS SAMARADORLIGINI MUHIM OMILI. Ustozlar uchun, 19(2), 195-201.

22. Mamasolievich, T. R. (2023). PECULIARITIES AND TYPES OF ORGANIZING EXTRACURRICULAR ACTIVITIES IN MATHEMATICS IN ELEMENTARY GRADES. Conferencea, 102-107.