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SOME BASIC CONCEPTS OF ELEMENTS OF SET THEORY

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Abstract

A set is one of the fundamental concepts of mathematics, so it is accepted without definition. A set is a collection of objects that have some common property.

In mathematics, a set is denoted by the capital letters of the Latin alphabet. The elements of a set are written in lowercase letters of the Latin alphabet. Sets are represented as follows: the empty set, the subset of sets, the union (sum) of sets, the intersection (product) of sets, the difference of sets, and the Cartesian product of sets.

Keywords. Set, definition, empty set, subset, union, intersection, subtraction, Cartesian multiplication

Introduction

Some general understanding of the collection

The term set is one of the earliest (undefined) methods of mathematics. It arises from the consideration of an infinite or finite number of things (objects, people.) together as a single whole.

For example: a set of villages, a set of buildings in cities, a set of natural numbers, a set of integers, a set of rational numbers; a set of students in a group, etc., the objects that make up the set are called its elements.

Sets of capital letters in the Latin alphabet (A,B,C,D,) with, while its elements are based on lowercase letters in the Latin alphabet (a,b,c,d,) is defined by. As an example,C={a,b,c,d} record A collection a,b,c,d that it consists of elements $a \in C$ indicates that it is visible or a element A that belongs to the set, c the element is C the fact that the set does not belong to is $c \notin C$ is expressed in terms of. An example is the set of all integers Z is defined by and 2,6,-1,$\frac{\pi}{2}$, 9 for numbers $2 \in Z$, $6 \in Z$, $-1 \in Z$, $\frac{\pi}{2} \notin Z$, $9 \in Z$ the expressions were deemed appropriate.

In mathematics, it is often desirable to use numerical sets rather than objects, as shown above. A finite set refers to sets whose elements are all made up of numbers. Examples of such sets may be:,Z, N- the whole hamada is in the set of natural numbers, Q, R while is a rational set and is a quotient consisting of a set of true numbers.

A set can be fully defined by maintaining a complete list of its elements, or by giving a system that only elements belonging to that set are satisfied. The only conditions to the set are the system, which satisfies, and the corresponding elements are called the characteristic direction of that set. All elements b the set that has the property X={x| b(x)} is expressed in a similar way.

Q={r|r=$\frac{p}{q}$, p Z q N} we can give in the form.

Definition 1: because of the number of Elements, sets are referred to as finite (infinite) sets. Sets whose number of elements is finite(Infinite) Fall into the order of finite(infinite) sets. A={x|x∈N, $x^2 > 8$} collection A={3,4,5,6,7,8,} is constructed from all natural numbers greater than 3, such as. A set elements infinitely many m since is, we call this set an infinite set.

D={x| x∈R, |x|=-2}, since the modulus of any real number here is not equal to -2, The Set D has no elements and D=∅. Definition 3: sets composed of elements composed of the same xarf or Numbers are referred to as equal sets.

y={x| (x-3)*(x-1)*(x-2)=0} of X={x| , x<3, x∈N } the set is made up of numbers 1,2,3, both of the topgasn and B⊂A expressed in the form. In this ∅⊂A, A⊂A certain relationships are always meant to be appropriate.

For a set of Natural, integer, rational, and real numbers containing all of these N⊂Z⊂Q⊂R . If B={x|$x^2 - 7x + 12 = 0$} A={5,4,3}, while B⊂ A is appropriate.

A⊂B, B⊂A while A=B and it is not difficult to dream that it will be the opposite.

X the number of elements of a finite set is n (X) let's see through k a set with an element ta k is said to be an element set.

Is an element of the no-cell set, written with the empty set symbol u θ. A set whose element is missing from one can also be said to be a finite set.

These equatenung real solutions are X= {-1; -2} and consisting of a finite set, this equation $x^2 + 3x + 3 = 0$ the equation may not have hackic roots, which means that its set of real solutions is calculated. Sets composed by exactly the same elements are included in the series of equal sets.

A of B attended both of his collections x to an element, is seen as a general element of those sets.

A and B the intersection of sets is said to be the set of all their common elements. A∩B is defined as: A ∩B={x|xA,x B} In Figure 1, a drawing named the Euler-Venn diagram shows the sets with a barcode.

A and B the Union (sum) of sets is said to be the set of an element that exists in one of them, and a∪B is defined as. A∪B={x|x∊A or x∈B}.

A from the collection B by subtraction of the set, A of the collection. B is said to be a set composed of all elements that are not present in the set, and A\B marked in the form. A\b={x|x∊A va x∉B}.

Let's say, B⊂A while, A\B collection B of the collection. (A) is called a filler and B' or B'_A is represented by such as.

The property of an action performed on a set is similar to the action property performed on numbers. Any X,Y,Z defined for sets:

X⋃Y=Y⋃X;

1) X⋂Y=Y⋂X;
2) (X⋃Y)⋃Z=X⋃(Y⋃Z);
3) (X⋂Y)⋂Z=X⋂(Y⋂Z);
4) $(X \cup Y) \cap Z = (X \cap Z) \cup (Y \cap Z)$;
5) (X⋂Y)⋃Z=(X⋃Z)⋂(Y⋃Z).

At the same time , the operations are considered sets, and if it is a part set of a set, it is part of the set secret in the universal expression of the set. We give some of the properties of the filling action:

$(X')'$ =X, 2) ∅′=U, 3) U′=∅, Any that can be obtained from it X and Y for compilations $(X \cup Y)' = X' \cap Y'$; $(X \cap Y)' = X' \cup Y'$;

If $X \subset Y$ if, $X \cap Y = X, X \cup Y = Y$ is. In particular $\emptyset \subset X$ and $X \subseteq X$ from, $\emptyset \cap X = \emptyset$ and respectively $\emptyset \cup X = X$, $X \cap X = X$, $X \cup X = X$ the relationship will be appropriate.
A={1,4,5,6,7} and B={1,2,3,5,8,9} while U={1,2,3,4,5,6,7,8,9,10} can Sets be a universal set.
Answer. A⊂U and B⊂U after U a set can be a universal set.
It is not difficult to see that the number q according to property 1 is prime because according to property 3 (Euclidean theorem). The prime numbers are chequy-free many.
We give proof:. That is, all prime numbers are n and are ql , q2, ..., qn let's think that consists of the numbers of consists. Then b = q1• q2•...• qn + 1 the number is a complex number, because ql, q2,. qn it will be possible to say that there is no prime other than numbers (according to the above hypothesis). b of 1 is the smallest divisor not equal to q let us say. According to property 1, q1 ,q2, ..., qn from any of the numbers and q the prime number consists of. b and q1 • q2-... • qn each of the numbers q because it is divisible by, the number 1 is also q is divided into. From this, q = 1 the fact that can cause.. This gives q≠ 1 contrary to expression.
What we think is wrong. Since the primes are infinite. When creating a table of prime numbers smaller or equal to a number, it is envisaged to use a simple method called Eratosphene galviri. Let's look at his ingenuity. All numbers divisible by itthat we will have to remove; after 3, the standing uninstalled biruncial number is 5; it is divisible by both 2 and by 3. So, summing up, 5 is divided only by itself and by 1, so it can be seen that it is an Prime Number, and so on.k.
One of the rules seen as the Basic Rules of set theory is the cumulative rule. It will be possible to find the number of incremental elements among the sets in which this rule does not intersect. We give the following theorem:
T: Non-intersecting A and B the elements in the Union of the set are the umimian number A and B we can say that is equal to the sum of the elements of the set.

$$n(A \cup B) = n(A) + n(B);$$

We give the proof: n(A)=k, n(B)=m is, A collection $a_1, a_2, a_3, a_4, \dots, a_k$ from the elements and B in the collection $b_1, b_2, b_3, \dots, b_m$ let be composed of elements.
If A and B if the set does not intersect then let it be A∪B collection $a_1, a_2, a_3, a_4, \dots, a_k, b_1, b_2, b_3, \dots, b_m$ it can be seen that it is made up of elements.
$A \cup B = \{a_1, a_2, a_3, a_4, \dots, a_k, b_1, b_2, b_3, \dots, b_m\}$.
Here in the collection k+m there are th elements namely

$$n(A \cup B) = n(B) + n(A) = k + m.$$

Just like in a finite number A,B,C,F for a set that does not intersect with the pair, the equality holds as follows.

$$N(A \cup B \cup \dots \cup F) = n(A) + n(B) + \cdots + n(F).$$

Any A and B for finite sets, these equalities would be appropriate:
$n(A \cup B) = n(A) + n(B) - n(A \cap B)$. (1)
Proof: Δ Let's say $A \cap B = \emptyset$ be done, then $n(A \cap B) = 0$ by the divisor theorem 1, (1) the equality holds. If $A \cap B \neq \emptyset$ if then A∪B a set can be viewed as a union of sets that do not intersect with three pairs of pairs

$$(A \setminus (A \cap B)) \cup (B \setminus (A \cap B)) \cup (A \cap B) = A \cup B. \quad (2)$$

$A \setminus (A \cap B)$, $A \cap B$ and $B \setminus (A \cap B)$ its elements in the collections are respectively
$n(B) - n(A \cap B)$, $n(A) - n(A \cap B)$, $n(A \cap B)$ is equal to.

If one sees according to the cumulative Rule, (2) from the expression n(A∪B)=(n(A)-n(A∩B))+(n(B)-n(A∩B))+ (n(A∩B))=n(A)+n(B)-n(A∩B), that is, (1) equality yields. ∇

Masala is a tourist group of 5: 100 people with 70 speakers of English, 45 speakers of French, and 23 speakers of both languages. How many of those in the tourist group do not know both languages.

Solubility: Δ A group of tourists who can speak English A considering the collection, the French-speaking tourist numbers are B we look at it as a collection. n(A)=70 and n(B)=45 it is known to us. For a set of speakers of both languages n(A∩B)=23, the set of speakers of at least one of these two languages is A∪B is. Then n(A∪B)=70+45-23=92 is equal to. As a result, 92 could speak at least one of English and French, while 100-92=8 could not speak any language. It is mentioned that the number 1 does not fall into any of them. A natural number with such a property is of course only 1.

Let's consider some properties of Natural numbers. Hut 1. Any p > 1 the smaller of the divisors of a natural number that is not equal to 1 is the prime number. We bring proof. It's natural p> 1 let the smallest divisor of the number not equal to 1 be Q. Consider it a complex number. Then by the definition of a complex number, q number 1< ql < q subject to the condition q1 will have a divisor and q1 number p can also be a divisor of.

Let's say B within the sets of each of the elements of A if the set also has all elements, then B collection A the part of the set is called and B A ⊂ is marked in the form. By definition, any set is called its part set. A A ⊂ an empty set can be a part set of any set. ∅⊂ A.

Partial sets differ in that they are divided into two groups. Because they are specific and uncharacteristic part sets. The set itself and the empty set can be said to be the non-trivial part sets. Z - the set of all integers; Q- set of all rational numbers; R- the set of all real numbers is called, N Z Q R ⊂ the conditions are met and R acts as a universal set for the remaining number of sets. In them, the other part sets are referred to as the characteristic part sets. Let us give an example: A a b c specific part sets of the set: {a}, {b} , {c}, {a b,}, {a c,}, {b c,} ; to the sets of the odd part: {abc} and ∅ let's go.

It can be seen to be formed from the Euler - Venn diagram to give a complete picture of the relationship between sets. In this case, the sets are made in the form of a circle, an oval or some closed sphere, or a universal set is usually made in the form of a rectangle

A and B being the product (or intersection) of sets, both of these sets are told at the same time to the set of elements, and A is treated in terms of B. The intersection of sets using symbols a b x x A and x B is in the direction of the beat.

1) A a N = ≤ ∈ { 4 14,} and B b N = < < ∈ { 10 19, } while, A B x N = ≤ ∈ {11 14,} performs. 2) Y d e f k performances X a b c d e while, X Y d e is. The intersection of sets is one of them. The intersection of sets that do not have a common part is written as empty. In this case, sets a and B are said to not intersect, and sets a b are written in the form of a string. For example, the set of even natural numbers and the set of odd natural numbers do not have a common element, that is, do not intersect.

A set with a general orientation is called an orifice intersection, and A B ≠ ∅ i.e. A and B we call the intersection of sets to be empty-looking and written. For example, sets of natural numbers with multiples of 2 and natural numbers with multiples of 5 are made up of a single element, either intersecting or not leaving the intersection empty. The intersection of these sets is made up of all 10-fold natural numbers.In the relationship of two sets, 4 cases occur. 1. Sets do not intersect (I); 2. Sets intersect (II); 3. One of the sets will be part of the other (III); 4. The sets are planked so that they are superimposed (IV).;

Suppose that A and B are the sum or union (or sum) of sets, and this is referred to as the set of elements belonging to at least one of the sets. It is marked as a B. The Union of sets with the help of symbols A B x x A and x B is made to look like a clock.

A and B Descartes of sets is a manifold, element 1 A from the set, Element 2 B from the collection (a b;) the view is said to consist of a set of all fixed pairs. Descartes manifold A B× is defined depending on the appearance.

A B a b a A and b B × = ∈ . For example: A ={2; 3; 4; 5}, B a b c ={ ; ; } while, A B a b c a b × ={ 2; , 2; , 2; , 3; , 3;) (3; , 4; , 4; , 4; , 5; , 5; , 5; } c a b c a b c is.

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