The Application of "Sets" of Discrete Mathematics everyday in life

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ABSTRACT

Mathematics is related to something that can be calculated or something expressed in terms of quantity (number). There are so many economic variables (concepts) that are quantified, such as the price of goods, the amount of goods demanded and offered, the money supply, the level of profit sharing margin, national income, investment level, and so on. Mathematics does not only play a role in quantifying economic variables, but also explores the relationship between economic variables. The relationship of an economic variable with other economic variables is often expressed in the form of an economic model. Because economic variables can be quantified, these economic models can be expressed in the form of mathematical symbols / models.

Keywords : *Mathematics, Sets, Symbols***.**

1. INTRODUCTION

1. Background

Mathematics is a lesson that has a lot of formulas and also people who learn it must memorize a lot. Memorizing is not enough, because we must try to apply it in everyday life. Mathematics is also a medium that is able to solve problems, from simple problems to even complex problems.

Often we ask ourselves, "what are the benefits of learning mathematics? Is mathematics used in everyday life? What are the benefits of the set? " Surely we often ask this question to ourselves, to our friends, or to our math teacher. This question occurs because we are already upset or give up to learn a lesson that they think is very boring and unnecessary.

"Set". Some people don't know what the meaning of the set is so that sometimes people misinterpret it. Actually the word set is related to grouping. There are some who have known the association of associations with groupings, finally they conclude themselves even though they have not been able to describe it clearly.

Set is commonly used in mathematics and daily life. In everyday life we find that understanding as in the Amikom Student Association, a collection of books, stamp collections, study groups, and others. The set and collection words are used in the same definition, even though both have the same meaning. Thus the word set and collection.

The benefit of the association is to help people who work to think rationally, critically, straightly, steadily, orderly, methodical and coherent, improve their ability to think abstractly, meticulously, and

 ISSN: 2085-1367
https://www.doi.org/10.22303/csrid.10.3.2018.153-161 *eISSN :2460-870X*

objectively, improve intelligence and improve abilities sharply and independently, with and encourage people to think for themselves by using systematic principles, increasing love for truth and avoiding thinking errors, errors and errors, are able to analyze events.

2. *Formulation of the Problem*
    a. What is the definition of the Sets and specify the theory? (jangan lupa nyebutin teori dasarnya)
    b. What are the types and operation of Sets?
    c. What is the law of algebra in the set?
    d. How to write the correct Sets and operate the Sets?
    e. what are the benefits of learning about sets?
    f. what are the applications in the set?

3. *Purpose*
    a. Explain the definition of Sets and the Theory of Sets
    b. Mention the types and operation of Sets
    c. Mention the Law of Algebra in the Sets
    d. Describe how to write and operate the Sets
    e. Describe the benefits of learning about sets
    f. Describe the aplications in the Sets

Theories

A. *Definition of Sets*

The set was introduced by George Cantor (1845 - 1918), a German mathematician. He is the Father theory of Sets, because he was the first to develop the branch of mathematics. He said that the sets is a collection of objects. These items can be abstract or concrete objects. Basically, objects in a set do not have to have the same character/character or set is a collection of clearly defined objects or objects.

Sets are The set is a collection of objects or objects or symbols that have a meaning that can be clearly defined which are members of the set and which are not members of the set. In our daily lives, we often talk about discrete objects, such as books, pencils, classes, computers, students, and so on. Or we can tell, The set is a collection of objects or symbol that have a meaning that can be clearly defined which are members of set and which are not the members of set.

Let's look at the objects around us, for example a group of students B, a group of students studying in class Y, etc. if we observe all the objects around us that are used as examples above can be clearly defined and which members can be distinguished and which are not. Objects contained in the set are called elements, members, and unsure.

Delicious food set, beautiful girl set and beautiful flower set are examples of sets that cannot be clearly defined. Why? Because of the delicious food, the beauty of the girl and the beauty of flowers for some people is very relative. The beauty of flowers for someone is not necessarily beautiful for others. So it's relative for everyone. Object or objects included in the set are called members or elements of the set. Generally the writing of sets uses capital letters A, B, C and so on, and the set members are written in lowercase letters.

Intuitively the set is a collection of objects that have certain properties. The objects in the set are called members (elements) of the set. The particular nature of the members of the set is called the nature of the set. The nature of the set is clearly defined.

B. Type of Sets

There are a lot of type of Sets :

1. Subset

   Set A is said to be a Subset of Set B written $\boldsymbol{A \subset B}$, if each member A is member of B. they have some Requirements :

   A ⊂ B, is said : A is set member of B
   A ⊂ B, is said : A is not set member of B
   B ⊂ A, is said : B is not set member of A
   B ⊂ A, is said : B is not called set member of A

   Example :

   If A ={1,2,3,4,5} and B={2,4} , then $\boldsymbol{B \subset A}$

   Because every elements of B is set member of A.

   Explanation : From the definition above, the set of parts must have an element of set A also an element of set B. The meaning of the two sets must be interrelated.

2. Nullset

   Nullset is a set that does not have the same member element at all. Nullset have some Requirements :

   Blank set = A or {} Blank set is single. An empty set is a subset of each set.

   NOTE : an empty set cannot be declared {0} because {0} ≠ {}

   Explanation : from the definition above the blank set is a set that does not have a single member and usually an empty set is denoted by the Greek Letter ø (phi).

3. Universes set

   The set of universes is usually denoted by "U" or "S" (Universum) which means a set that contains all the members discussed or in the other words the set of obejcts being discussed.

4. Equal set

   If each member of set A is also a member of set B, and vice versa. Denote by A= B

   Requirements : two sets of members must be the same.

   Example :

   A = {q,w,e} B = {q,w,e} then A = B

   Equal set or set is the same, has two sets whose members are the same member of set A {q,w,e} then set B will also have members namely {q,w,e}.

5. Disjoint set

   Disjoint set is a set of members that have no equal.

   Example :

   A = {2,3,4,5} and B = {6,7,8} then the set A and set B are seperated.

   NOTE : two non-empty sets are said to be mutually exclusive if the two sets do not have any of the same members.

6. Complement set

   The complement set can be stated by AC nation. Complement set if suppose

   A = {1,2,3,4,5,6,7} and B = {3,4,5} then A ⊂ U.

   The set {1,2,6,7} is also a complement, so it's a AC = {1,2,6,7}

   With the set-forming notation written : AC = {x | x Є U, x Є A}

7. Equivalent set
   The equivalent set is a set whose members are as many as other sets. They have some requirements :
   Cardinal numbers are expressed by notation n(A) A≈B, said to be aquivalent to set B,
   Example :
   A = {a,b,c,d} → n (A) = 4
   B = {q,w,e,r} →n (B) = 4
   Then n(A) = n(B) →A≈B
   Explanation : the equivalent set has a cardinal number from the set, if set A has 4 characters, then set B has 4 members.

C. The Operation of sets

1. Union
   A union of sets A and B is a set which each member is a member of set A or set B. It is denote A B
   Notation : A B = {x | x Є A atau x Є B}

2. Intersection
   An intersection of the sets of A and B is the set which each member of set A and member of set B.
   Notation : A B = {x | x Є A dan x Є B}

3. Complement
   A complement of set A to universe set S is a set whose members are S members who are not members A. Denoted A^c

   Notation : A^c = {x | x Є S dan x Є A}

4. Difference
   A Difference in sets A and B is a set whose members are members of set A and it is not members of set B. Difference in set A and B is complement set B to set A. It is denoted A-B
   Notation : A – B = {x | x Є A dan x Є B}

5. Cartesion Product
   The yield of the cartesius set A and B, denoted A x B, is the set whose members are all ordered pairs (a, b) where a member A and b member B.
   Mathematically written like this : A x B = {(a,b)| a Є A dan b Є B}

D. The way to write the Sets

To express a set, in the field of mathematics can be expressed in several ways, including:

1. Mention all members (roster) placed in a pair of curly brackets, and among each member separated by a comma. This method is also called the Tabulation method. State the set by using words or mentioning the conditions
   Example :
   A = {prime number less than 20}
   B = {real numbers between 7 and 25}

2. State the set by mentioning or registering its members, this method is also called Description. Namely by the way the members of the set are written in curly brackets and between members with one another are separated by commas.

   Example :
   A = {apple, watermelon, guava, orange, mango}
   This is for groups with few or limited members
   B = {Jogjakarta, Semarang, Palembang, Padang, … , Aceh}
   This is for groups with many but limited members
   C = {2,3,4,5,6,10,11,…}
   This is for groups with a large number of members

3. State the set with the set-up notation, by writing down general characteristics or general characteristics (roles) of its members. The way to declare a set with a set-up notation is to follow the following rules :
   a. The object or object is represented by a variable (a,b,c,…,z)
   b. Writhe down the terms of membership behind the sign '|'

   Example :

   A = {x | x < 7, x is real number}

   Read : the set of each x such that x is less than 7 and x is the real number

   B = {(x,y) | y + x = 7, x and y is real number}
   Read : a pairs set of x and y such that y + x is equal to 7 for x and y is the real number.

4. The set can also be presented graphically (Venn Diagram)
   Presentation of setd with Venn Diagrams was discovered by a British Mathematician named John Venn in 1881. The set of universes by rectangles and other sets with circles in the quadrilateral.

E. *The Law of Algebra in the Sets*

The laws of the set are called set algebra laws. There are many laws are contained in the set algebra, but here only spelled put 1-1. Some of these laws are similar to algebraic laws on real number systems such as a (b + c) = ab + ac ,namely distributive law.

Tabel 1. Laws of Algebra

1. Law identity: $\mathbf{A \cup \varnothing = A}$ $\mathbf{A \cap U = A}$	**2. Law null/dominasi:** $\mathbf{A \cap \varnothing = \varnothing}$ $\mathbf{A \cup U = U}$
3. Law complement: $\mathbf{A \cup A = U}$ $\mathbf{A \cap A = \varnothing}$	4. **Law idempoten**: $A \cup A = A$ $A \cap A = A$

https://www.doi.org/10.22303/csrid.10.3.2018.153-161 *eISSN :2460-870X*

5. Law involusi: **(A)= A**	**6.** Law **absorpsi :** $A \cup (A \cap B) = A$ $A \cap (A \cup B) = A$
7. Law komutatif: $\mathbf{A \cup B = B \cup A}$ $\mathbf{A \cap B = B \cap A}$	**8.** Law **asosiatif:** $A \cup (B \cup C) = (A \cup B) \cup C$ $A \cap (B \cap C) = (A \cap B) \cap C$
9.Law distributif: $\mathbf{A \cup (B \cap C) = (A \cup B) \cap (A \cup C)}$ $\mathbf{A \cap (B \cup C) = (A \cap B) \cup (A \cap C)}$	**10.** Law **De Morgan**: $A \cap B = A \cup B$ $A \cup B = A \cap B$
11. Law 0/1 $\mathbf{\varnothing = U}$ $\mathbf{U = \varnothing}$	

F. *The benefits of Sets*

By studying the Sets, it is expected that the logical ability will be increasingly honed and will spur us so that we are able to think logically, because in life logic has an important role because logic is related to reason. There are many logical uses include :

1. It can be helping everyone who learns logic to think rationally, critically, straightly, permanently, orderly, methodically, and coherently.
2. It can be improve the ability to think abstractly, carefully, and objectively.
3. It can be increase intelligence and improve the ability to think sharply and independently.
4. It can be forching and encouraging people to think for themselves by using systematic principels.
5. It can be increase love of truth and avoid mistakes in thingking, errors and error
6. It can be able to analyze an event

There are some example of sets :

1. Sets of cutlery
   a. Fork
   b. Plate
   c. Glass
   d. Spoon
2. Sets of school supplies
   a. Book
   b. Bag
   c. Pencil
   d. Pen
   e. Pencil case
   f. Eraser
3. Sets of house
   a. Living room

b. Bathroom
c. Bedroom
d. Kitchen
e. etc

G. The practice a Sets in daily Life

A sets is some collection that is considered as a unit that is combined in a circle. There are so many implementations that we can see in everyday life. Some examples that are often used by teachers and lecturers are examples of hobbies, because many hobbies in life are the same. For example, there are hobbies who play soccer, while those who like playing basketball. But as for those who like both. In this case we can use the set to know it. Example questions There are 20 children in the class and 5 people who like soccer, 5 people like basketball, 10 people like both. And the results will be like this.

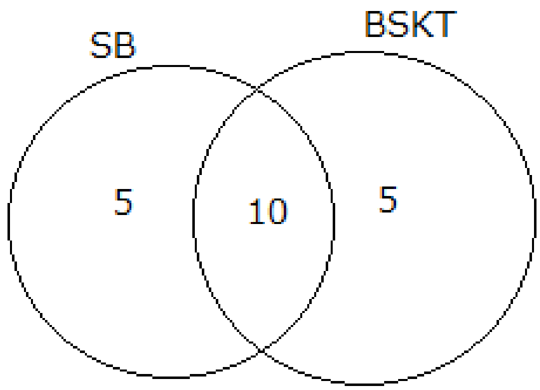

Figure 1. The practice a Sets in daily Life

There are many things that we can see in everyday life about the set. Where we are grouped every time in making a big project. For sure, every project like that needs grouping. There was a team that made about this and the tone of the team that made it. Some people help both because of experts in both. Like a set curve in a work environment.

2. RESEARCH METHODS

Member of research, the name of sets mostly using capital letters like A,B,C, and X. while members of sets are usually denoted by lowercase letters such as a,b,c,x,and y. for example H is the sets of all vowels in the latin alphabet so the objects included in the set H are a,i,u,e, and o. the objects that enter in a set are referred to as members of the set. The notation for declaring members of a set is "$\in$" while the notation for non-members is "$\notin$". Therefore $a \in H$, $i \in H$, $u \in H$, $e \in H$, and $o \in H$ while $b \notin H$, $c \notin H$ and $d \notin H$. the term member used above can be replaced with the term elements or element. The special symbols used in set teory are :

Table 2. Symbols Used In Set Teory

Symbol	Meaning
or	Nullset

https://www.doi.org/10.22303/csrid.10.3.2018.153-161 *eISSN :2460-870X*

	Two sets of joint operations
	Operation of two sets of slices
, , ,	Subset, Subset true, Superset, Superset true
	Complements

Example :

A= {a,b,c} states that the set A of its members is a,b, and c.

Can be written : $a \in A$; $b \in A$; *and* $c \in A$
If A = {a,b,c} so, d is not the set member of A
Can be written : $d \notin A$. *the number of members of the set*

1. Principles of Inclusion-Exclusion

   How many members are in a combination of two sets A and B? Merging two pieces produces two new sets whose elements come from set A and set B. Set A and set B may have the same elements. The number of shared elements between A and B is $|A \cap B|$. Each of the same elements has been counted twice, once in $|A|$ and once in $|B|$, although it should be considered as one element in $|A \cup B|$, therefore, the number of elements resulting from the connection should be the number of elements in- each set is reduced by the number of elements in the slice, or $|A \cup B| = |A| + |B| - |A \cap B|$.

   This principle is known as the principle of inclusion-exclusion. In the same way, we can calculate the number of elements of the result of a different operation of a hand:

   $$|\mathbf{A} \oplus \mathbf{B}| = |\mathbf{A}| + |\mathbf{B}| - 2|\mathbf{A} \cap \mathbf{B}|$$

2. Partition

   The partition of a set A is a set of non-empty parts A1, A2 ... of A such so:

   (a) A_1 A_2 …. = A, and
   (b) The set of Parts A_i come apart;That is $A_i \cap A_j = \emptyset$ for $i \neq j$.
   Example if A = {1, 2, 3, 4, 5, 6, 7, 8}, then { {1}, {2, 3, 4}, {7, 8}, {5, 6} } is partition of A.

3. RESULT AND DISCUSSIONS

The set sentence is a statement that uses set notation. Sentences can be the same set, for example "$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$" is a set of similarities, or in the form of sentence implications like "if $A \cap B = \emptyset$ and $A \subseteq (B \cup C)$ then always applies that $A \subseteq C$ ". The benefit of the association is to help people who work to think rationally, critically, straightly, steadily, orderly, methodical and coherent, improve their ability to think abstractly, meticulously, and objectively, improve intelligence and improve abilities sharply and independently, with and encourage people to think for themselves by using systematic principles, increasing love for truth and avoiding thinking errors, errors and errors, are able to analyze events.

4. CONCLUSION

1. Set is a collection of objects or objects or symbols that have a meaning that can be clearly defined which are members of the set and which are not members of the set.
2. By studying the Association, it is expected that the logical ability will be more honed and spur us so that we are able to think logically.
3. Examples of the application of mathematical assemblies are very much in everyday life, including to calculate surveys such as the example above.

Without us knowing it turns out there are so many benefits from mathematical applications for everyday life. Both in the fields of economics, education, and in various other disciplines. Therefore the authors suggest that we be more genius in learning mathematics and not be used as mathematics as something scary to learn because mathematics is a very close part that is inseparable from our lives.

ACKNOWLEDGMENTS AND NOTES

First of all, thanks to Allah SWT because of help of Allah, we can finished writing this paper. Thanks to my friends and family to help me reach the logic of Sets. Sorry for some mistakes and plagiarism, because my free time on quetext or grammarly is out of the day, and I hope that my paper doesn't have any plagiarism at all, but it must be 1 or 2 site that have the same language and topics. Here I am ninda putri hermawanti and elsa dona want to say sorry. We don't want to plagiat and we try our best to do this paper and done with it. I hope you understand that we cant buy the quetext with the price is $9.99. Thankyou so much for people who help us and people who dropped us.

REFERENCES

https://iffaiffatunnufus.wordpress.com/2014/11/25/makalah-himpunan-mata-kuliah-matematika-dasar/

https://www.academia.edu/29497480/MAKALAH_HIMPUNAN.docx

https://www.slideshare.net/ZuhriPatriaSiregar/himpunan-matematika-diskrit-71898417

http://zidaganteng.blogspot.com/2015/09/tugas-makul-matematika-himpunan.html

http://blogngori.blogspot.com/2015/11/makalah-himpunan.html

https://www.academia.edu/19998651/MAKALAH_MATEMATIKA_DISKRIT

http://susi-deswati.blogspot.com/2012/12/makalah-matematika-himpunan.html

http://emodjeh.blogspot.com/2014/04/makalah-teori-himpunan.html#

https://annisarido.wordpress.com/2013/09/29/matematika-diskrit-teori-himpunan/