A Philosophical Approach towards the Fundamental Concepts of Mathematics

AIJAZ AHMED SOOMRO
Department of Agronomy
Faculty of Crop Production
Sindh Agriculture University
Tandojam, Pakistan

Abstract:

Mathematics is not only a science of numbers, figures, digits or counting but it is a real science of understanding the real meaning of life. When we know the real meaning of life then we can pass our life as per rules leading to a happy, successful and long lasting life. In this context, I had tried hard and worked day and night to find out the essence, real meanings, messages, and philosophies of fundamental concepts such as plus (+), minus (-), multiplication (X), division (÷), union set (U), set of intersection (∩), equal (=), not equal (≠) and equivalent (~) of mathematics,. It is doubtless that these fundamental concepts are widely used throughout the world and also taught to the students of different levels in all schools, but these basic concepts have some highly important lessons which are hidden in their strong and hard shells. In order to disclose these philosophical lessons from these initial concepts, I had not used any hammer to break these strong and hard shells, but I had hit my head to break them. I am sure to say that this article/paper will lead the readers from darkness to the light and from long-ways to the short-cuts to successful and happy life.

Key words: Mathematics, plus, minus, multiplication, division.

Introduction

Professor Arnold's May (2003) once addressed, titled "Doing the Math and Making an Impact", and this address was given by

him for the mathematics and statistics graduation at the University of Illinois in Urbana-Champaign. Professor Arnold is the Director of the Institute for Mathematics and its Applications. He was asked "What makes the math sciences so central?" He answered by quoting Galileo: "The great book of nature can be read only by those who know the language in which it was written. And that language is mathematics.", and also added "Math is the way to understand all sorts of things in the world around us." To elaborate on this point he gave some well-chosen examples, beginning with some insightful comments on the Swiss victory in the 2003 America's Cup. "...you know that Switzerland is a small, mountainous, land-locked country. So how did the Swiss pull this upset off?" While acknowledging that a number of diverse factors had to come together, he made his point: "Well Switzerland may not have a great sailing tradition (at least until now!) But it does have a very strong tradition in mathematics--Euler's picture appeared on a Swiss 10 franc note--and the Swiss team wisely brought this strength in math to bear on the America's Cup challenge. They enlisted a group of mathematicians specializing in mathematical modeling and numerical computation led by Professor Alfio Quarteroni at the national poly technical university in Lausanne. The mathematicians used partial differential equations to model the flow of the sea around the hull, the dynamics of the air and the sails, and the turbulent interaction of the ocean, wind, and boat. They then applied advanced numerical algorithms to solve these equations on high performance computers. This allowed them to optimize such things as hull and keel design, sail geometry and placement, and so forth. Their work was essential to the design of the Alinghi, and so to the Swiss victory. They did the math and made a big impact." ("Alinghi" was the name of the Swiss boat.)

On the increasing role of mathematics in biological sciences he commented as follows: "Increasingly math is making an impact in the life sciences as well, prompting

biologist Rita Colwell, director of the National Science Foundation, to observe that "mathematics is biology's next microscope--only better." In their recent bio textbook Keener and Sneyd wrote that "teaching physiology without a mathematical description of the underlying dynamical processes is like teaching planetary motion to physicists without mentioning...Kepler's laws;" He then mentions still other areas of applications: "And math increasingly reaches outside the sciences, to economics, sociology, and business for example illinois's new Applied Mathematics Program ...involves no less than 22 departments from bioengineering to linguistics. ...Problems which need mathematics for their solution also arise throughout industry."

Mathematics is not just a subject but a universal tool. The language of mathematics is same all over the world. Math is the study about numbers, patterns, shapes, estimations etc. The application of math is so vast that it is used in almost every subject. For example we can say that without math, science is not possible, whenever we need to calculate something we need math whether it is geography, astronomy, physics, chemistry, general observations of everyday life and daily transactions. Infact, while crossing the road, our mind is also doing mathematics; for instance with what speed is the car coming, would I be able to cross the road in that time or not. Almost every sport involves math too. Math is also involved in every business from a junk seller to a manufacturer. So math is almost everywhere and is a very important element of our day to day life. If integrated properly with the human brain, math can change the world drastically.

Mathematical literacy is a must element in providing the child with the basic skills to live their life. It is one of the basic pillars for the child on which his life is, and would be standing. So the base of this pillar needs to be really strong and clear. **Mathematics helps the child in developing analytical and reasoning skills with logical and**

structured thoughts. Children start making observations about the phenomenon around them. Open ended questions in mathematics helps them to draw analogies between the previous concepts taught and its applications. The most interesting thing is that they get a chance to hear different point of views from their peers and discuss each other views that helps them to broaden their perspective. Many methods may be used in solving a mathematical task. Emphasis should be placed on using skills and discussion rather than seeking a unique solution. This provides them with confidence in expressing their views in front of people and also accepting and respecting views of the others. If we are able to make the children see the math involved in his daily life and activities, then certainly it would become much more than just learning. It helps the child to develop their skills in multiple dimensions simultaneously.

The core objectives of this study are to disclose the hidden philosophy of basic concepts of math, to guide the peoples for their daily life properly, to assess the current position of oneself by comparing oneself with this study and to motivate the readers of this paper to think deeply (minutely) whenever they take any action in their daily life.

The fundamental concepts of mathematics and their philosophy are given in detail as below:

1. Plus (+):

The symbol of Plus (+) is also known as addition, summation, in another sense positive. When we use this sign then we sum-up or add two or more than two digits (figures) together, as below:
1+1=2

From the above given example, it is clear that one plus one makes two. Its simplest philosophy for us is that "if we want to add/collect anything, idea+ money+ clothes+ shoes+

caps+ pens+ beds+, bed-sheets+ houses+ industries+ pieces of land+ books+ knowledge etc we must add them as soon as we get them. Then, we must keep their proper record to know their proper number as well. Because the proper number of these added/collected materials, articles, things, ideas or abstracts will be the right answer to the question of1+1=2. If anybody has lost the real number of his collection/addition then his loss would be the great loss in his life, which will be same to the wrong answer of 1+1=1. Therefore, we must answer rightly as 1+1=2, not 1+1=1.

It has been generally observed that people usually collect many different types of the articles, things, ideas, books etc, but by the passage of time they forget the real answer of the question: "How many have you added/collected?" Then some sensible and responsible persons feel their mistake while could not answer this question, but mostly peoples dam care about that rule of summation. It is therefore, suggested that whenever anybody looks at the sign of summation/addition/plus, he must reminds himself that how much he has collected/added! In this way, he would have a complete idea of his present status which will lead him to future development through adding some other ideas, articles, things etc. as there is an old proverb "Unity is strength."

2. Minus (-):

The symbol of minus (-) is also called as deduction in another sense as negative (-). This sign (-) asks us to deduct one figure (digit)/number from another figure, such as below:

$$2-1=1$$

From the above example, it is clear that when we deduct 1 from 2, the correct answer is 1. This deduction, no doubt teaches some solution of a problem, but it has a great deal with our 24

hours daily life. Through this rule of deduction, we can understand that if there are two good and sincere friends. But due to some reasons anyone of them separates from the other friend. In this way not only other friend will become alone but also the person who is leaving his friend alone will also become alone himself as 2-1=1, means both will become one (1) at their sides. Therefore, by keeping in view the importance of losses occurring in deduction of good and sincere friends, we must avoid rule of deduction but we must apply the rule of summation.

Furthermore, in case of some two friends whose friendship is only for making some robberies, theft, drinking, raping etc. In such case, when any of them finds himself cautious, vulnerable and accountable to the state-law. At this stage, he must apply the rule of deduction in his life, 2-1=1, means, it is better to be alone than in a bad company. He must teach this rule of deduction to his friends as well. Otherwise, they all will get an unbearable loss by their bad mutual company. In this way, not only in such situation, but we must apply the rule of deduction with our body by which we must try to deduct our mistakes, blunders, mis-chiefs or bad habits from our life and throw them in dustbin forever. Hence, we must know how much we have good habits and bad habits. If we have 5 good habits and 2 bad habits, then, 5+2=7, people will see that we have all 7 bad habits. Because of bad doings/habits are more visible than good habits. But when we feel that we have 5 good habits and 2 bad habits, then, we deduct 2 bad habits from our life and retain only 5 good habits only, such as, life=-2 bad habits but after deduction of these 2 bad habits, now it has only +5 good habits. This rule will enshrine us in the society forever.

3. Multiplications (X):

The sign of multiplication (X) tells us to double or triple any figure or digit with a given multiplier, such as, 2X2=4. Simply,

this rule of multiplication guides us to get rapid development in any field. Suppose, if an industrialist wants get his rapid development, he must starts his industries at different locations or different industries at same location. When he will get the profit from these different industries, then automatically, he will multiply his wealth. Suppose, one person has only one industry, even though he is capable of starting another industry, but due to his laziness or limited mental approach or any other reason, he depends upon that one industry wherefrom his savings are $10000 every month. There is another person who have two industries, where from his savings are $10000 from each industry per month, then, his savings are $10000X2=$20000, which are double than first person. Of course, the person with two industries will get rapid development as compared to person with one industry. We can apply this rule of multiplication on our country-basis as Peoples Republic Of China has already done this. It is only because of "Rule of Multiplication" China has become second largest economy of the world today. By applying this rule of multiplication even on individual basis or collective basis, we can alleviate poverty level in the world very rapidly. If we are highly interested to get rapid change or development, we need to multiply our all good qualities, good habits, good deeds, assets; even we should multiply our moments of happiness to overcome stresses and all crises.

4. Division (÷):

The symbol of division (÷) is used to divide some number/figures with some other number/figures to get the divided/broken parts of the number/figure properly. Suppose, 13÷2=6.5, it means if we divide 13 in two halves, each part would be 6.5 equally. But when we think deeply upon division, it gives us great thoughts and big ideas to pass a very meaningful life in the world. First of all, through this rule, parents are distributing/dividing their

assets/wealth to their off-spring which helps to save the family from dangerous crisis. If we want to pass our time efficiently and effectively, then we must divide our time as per our activities and the importance of these activities. Besides that many sharp-minded persons are using the rule of division in many other ways. Suppose, if a one good person is living alone in a street where five bad brothers/persons are living together and ruling-over that street. In such difficult situation, if an alone-living good person is knows the rule of division, he can divide the strength and power of these street- ruling bad brothers/persons by using any trick. When these five bad brothers/persons will be divided into five equal bodies, then each one of them will become one person only, who will be equal to that same alone good person in strength or power who was living alone there. At least, the monopoly of these five bad persons will be broken. No doubt it can happen to vice-versa as well. In this context, it is division of strength and power. On international level, this rule of division has been applied to divide the peoples' power of many countries then it became very easy to rule over the nations or countries. It is same to "Divide and rule" whereas, symbol of addition (+) is "unity is strength".

Division of labor has also been suggested by many best Economists of the world. Through division of labor, an institution, an industry, an organization or a country can divide different skills, responsibilities, duties, assignments, authorities and powers to different persons according to their limited abilities. So for this, world has also been divided into seven continents and continents have been further divided into countries. Finally, we can use division (÷) more than it seems apparently.

5. Union set (U):

Set of union (U) shows all the articles, things, commodities, persons, qualities, quantities or some other components which are given in two different sets, such as example is given below:

A= {good, sharp, intelligent, tall, beautiful, white, wise, dedicated, hard-working}

B={bad, dull, lazy. Dwarf, small, short, ugly, confused, thief, robber, kidnaper}

Then,

A UB= {good, sharp, intelligent, tall, beautiful, white, wise, dedicated, hard-working, bad, dull, lazy, dwarf, small, short, ugly, confused, thief, robber, kidnaper}

Set of union teaches that when union of any organization, society, nation or nations of the world is built, then, the union-makers should not see that they will select some members/persons, nations of the world as per their required criteria and eligibility. If any leader will make the union according to his own criteria and requirements, then, very soon, that union will be collapsed and divided into different sub-unions. Suppose, if a person is going to make a union of Employees in any organization, then, he must allow all the employees of that organization to become their members. If he will make some criteria such as, all wise employees will be able to become the members of this union. Then, automatically, comparatively less-wise persons will establish their own union which can be problematic for the union of wise persons. And it is commonly happening in the different countries of the world now. Therefore, unions should include all the persons belonging to that set irrespective of caste, color, creed, religion, region, sect, family, wisdom, beauty, sharpness etc. Such union will be said as a right union otherwise, pick and choose as per some persons choice is not a union but also a set of intersection.

6. Set of intersection (∩) :

Set of intersection (∩) contains only members of same nature, same values or same quality, for example:

A= {good, sharp, intelligent, tall, beautiful, white, wise, dedicated, hard-working}

B= {good, dull, lazy. Dwarf, small, short, ugly, confused, thief, robber, kidnaper}

Then,

A∩B= {good}, because there is one single member of the each set A or B is same by any means. However, intersection is another name of friendship. Because when two persons have some same qualities then they become friends otherwise, they cannot be friends at all.

Another example of intersection is as below:

A= {wise, intelligent, sharp, black, curly hair, thick nose}

B= {wise, intelligent, sharp, white, straight-hair, slim}

Then,

A∩B= {wise, intelligent, sharp}

Such type of the persons can be good friends for long lasting until and unless they possess some similar qualities or values. In other case, two different persons with different qualities can be members of a union but cannot be friends for long last. Therefore, if a person wants to become a friend of any other person he/she must try to know some matching qualities or values. This rule of intersection has also been applied by "Match-makers" and "Marriage Bureaus".

7. Equal (=) and not equal (≠):

The symbol of equal (=) indicates that two different values are 100% same in all aspects and weight-age, such as, first of all, we are going to find out the philosophy of equal, for this an example is given below:

A= {1, 2, 3, 4, 5, 6, 7, 8} or A= {wise, tall, smart, clean, handsome, honest, straight forward, punctual, regular}

B= {1, 2, 3, 4, 5, 6, 7, 8} or B= {wise, tall, smart, clean, handsome, honest, straight forward, punctual, regular}

Then,

A=B

Because set A is 100% similar in values with that of set B. The figures or qualities of both of the sets are 100% similar with each other.

However, in case of not equal ($\neq$), the following example opens the philosophy:

A= {1, 2, 3, 4, 5, 6, 7, 8} or {wise, tall, smart, clean, hard working, honest, thick lips, small nose}

B= {1, 2, 3, 4, 5, 6, 9, 10} or {wise, tall, smart, clean, lazy, dishonest, slim lips, long nose}

Then,

A$\neq$B

In above mentioned example, even though set A contains eight members and set B also contains eight members and six of them in each set are also same and equal, but overall, these two sets are not equal but each set contains two different figures or values which make them not equal to each other. In this world, two persons cannot be equal. It is very hard to find out two equal persons. I have also keenly observed many twin brothers or twin sisters (twins) in my whole life, I have noted that they were also not equal, but they had little differences and inequalities in their life style or features as well. Hence, if any of us wants to find out two equal persons, he will waste his time, money, efficiencies and sources. Therefore, he should compromise with a person, company, organization which is not equal with him at his criteria. In this regard, symbol of equivalent (~) is useful and helpful for which further details are given below.

8. Equivalent (~):

The symbol of equivalent (~) shows that two things, articles, values or persons are not equal but equivalent when these have only same number of components/members, such as:

A= {1, 2, 3, 4, 5, 6, 7, 8} or {wise, tall, smart, clean, hard working, honest, thick lips, small nose}

B= {1, 2, 3, 4, 5, 6, 9, 10} or{wise, tall, smart, clean, lazy, dishonest, slim lips, long nose}

Then

A~B

In above example, set A is equivalent to set B, because the members of set A are same in number with that of set B. Even the members of these two sets are not 100% similar to one another but as their quantity is same, therefore, we say them that A~B. In this world, there are uncountable persons, things, articles, organizations, institutions, departments or associations which are not equal to each other or one another but in terms of same number, quantity, quality or other means these are equivalent to each other or one another.

The sense of equivalent teaches us to accept the equivalence of two persons, things, articles, organizations, departments, unions, associations or something other than that. This concept and philosophy of equivalent can break the monopoly and superiority of any person, thing, article, organization, department, union or association. Through this concept peoples of any street, area, region, country or world can feel free, better and a properly placed within the area of their vicinity.

Recommendations

In the light of all above very much clarified and logically proved philosophy of fundamental concepts of mathematics it is strongly recommended that while teachers are teaching these all concepts to the students of any level they must teach them their philosophy as well. In this way, our coming generations will change this world like a paradise and they will pass a very happy life. Science has proved that all the societies which are passing happy life their life-span is higher than the societies

which are passing unhappy life. There is a very popular proverb "Happy goes lucky" and there is also well-known story of a "Happy-cobbler."

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