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Arithmetic, Geometry & Algebra- A Historical View

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Abstract

To learn mathematics, it is important to learn the history of science. Learning mathematics through its historical development is essential for creating the interest among the students. Using history to teach mathematics makes the study not only motivating & exciting but more significant to a bulk of students as they are interested in knowing the who, how and why about certain laws, prepositions, definitions that they use daily in their regular studies. The present study is an attempt to learn the basic laws of arithmetic, geometry and algebra by considering the historical facts about them.

Keywords: - History of Mathematics, Mathematics education, Primary Schools

Introduction

When we learn mathematics in schools & colleges, we do it from a present view, by using abstract formulas and algorithms, rarely illumination where they come from. This plan is always applied to learn algebra, because all the relations established in the statement of a problem are enthused to this language. Also in geometry, we follow the essential procedures to understand and solve the problems. At beginning we absorb all this information instead of knowing what its source and foundation were.

In daily life we see many geometric shapes around us. To identify and to establish the connection between them is essential in progress of geometric thought. We can't understand the scientific formalization unless knowing their preliminary, experimental and instinctive stages. In my opinion, learning scientific subjects is more flourishing if we repeat the historical stages of the science. Students did not know the origin of fraction arithmetic**.** This lack of consideration proved not to be restricted to fraction arithmetic. If we gave the question to 8th graders to choose the closest integer number to the decimal arithmetic problem 2.9*5.2 . The response option were 1.5, 15, 150, 1500, and "I don't know". Only 20% to 25% of 8th graders choose the correct answer, 15 the most common answer was "1500". In present time many efforts are made to improve mathematics education.

Learning techniques

Three areas of teaching mathematics; arithmetic, geometry, and algebra are execute in a number of issues that we will explain and develop using examples. We will take some exercises from the recordist schools and use them as example of education in each of these fields.

Arithmetic

Learning arithmetic is not complicated. When we start learning arithmetic, first of all we learn arithmetic operations. The basic arithmetic operations are addition, subtraction

multiplication and division. Addition, subtraction, multiplication and division combine the two numbers into single number. The first connection with arithmetic begins with the idea of number. Primary education in mathematics often places a strong focus on algorithms for the arithmetic of natural numbers, integers, fractions and decimals. Division is based on the idea of distribution of objects. For example if a student has 20 items and he distribute these items equally to 5 students then each student carry 4 items. We know that division is the inverse of multiplication. Multiplication is connected with the addition. Multiplication of two numbers m*n is equal to m times n. i.e.(m+m+…….+m). Every operation is connected with each other. In class room's teacher teach our student to count and to identify how many objects of a certain class have, for example how many pens, how many benches in class room etc.

Geometry

When we start learning geometry first of all we learn that there are two dimensional and three dimensional shapes. We see many figures in daily life. All the figures are made with straight lines and angles. Some figures are closed and some are open. Properties of the different figures are different. There are different types of regular shapes (square, rectangle, hexagon, circle, etc.). We see many irregular shapes around us. Irregular shapes are combination of the regular shapes. Due to the irregularity of shapes of ropes and roads we calculated the area using the "average formula", but the results were only approximate.

$$S = \frac{W+w}{2} \times \frac{L+l}{2}$$

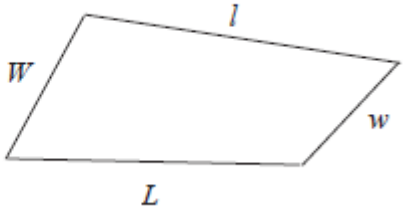

Figure 1

Algebra

The mathematicians transfer the arithmetical relations - those in which squares occur - to the context of geometry. We called them quadratic equations and we had an algorithm to find their solutions. Teacher teaches the algorithm at school without any proof where it comes from, or how it came into use. We give the language and convention, by which students must convey correspondences between elements of a problem, but all this, does not go ahead of mere catalogue of information.

Student should be familiar with the fundamental ideas before initiating them into the tools of algebra:

- Both the square of the sum and the square of the difference of two given magnitudes.
- The difference of squares.
- The equivalence between a rectangle and the difference of two squares.

With the help of arithmetical compositions, we can explain these concepts as follows:

1) $a^2+ba=c$: 2) $a^2-ba=c$: 3) $a^2+c=ba$:

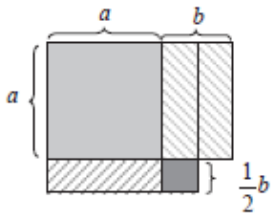

Figure 2

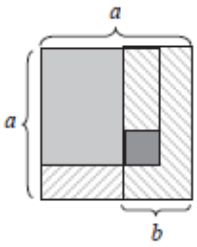

Figure 3

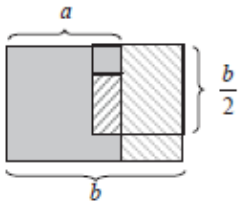

Figure 4

Conclusions

When we teach science, we can never forget the study of its particular history. Learning mathematics through its historical progress is required not only from a cultural view, but also because it facilitates understanding its contents. The subject history of mathematics is an introduced in the secondary schools, but it has been omitted in the education, probably because children think it is not necessary to be aware of the development in this discipline. Student easily understands the algorithm of sum but they think that it is not necessary to understand the roots of this algorithm. There are three tools for the knowledge of mathematics: arithmetic calculation, geometric constructions, and introduction to algebra.

Doing this one can go back to starting position of science concept. We can guide students in perspective manner from simple and obvious things. We can judge the idea with small scale of data.

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