What is Mathematics?

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Mathematics probably originated from man using his fingers to indicate, "How many?" From fingers man moved to using pebbles in a relationship of one-to-one to keep record of the number of a specific item he owned, such as a pebble for each goat that he owned. The Egyptians and the Babylonians were among the first to construct a device (the abacus) for computing as the need for mathematics evolved. The history of mathematics development indicates that the Chinese also devised an abacus which was different from the abacus used in the Middle East. Symbols were soon devised to record the results of the mathematics calculating on an abacus. We know that different civilizations developed different methods for recording mathematics.

In Europe, as an outgrowth of the abacus, a counting board was devised. It was very difficult to manipulate on the counting board so it became necessary to devise a computational system. History seems to indicate that the people of India were among the first to develop a usable computation system and then it was passed along to the Arabs. Today, we still are using the numeration system developed at that time.

The Arabs are probably the first to develop algorithms for calculation. Algorithms are a set of systematic procedures for handling recurrent mathematics situations. Today we use algorithms as the techniques in solving arithmetic situations. We use algorithms because they are quick and efficient in producing correct results. However, with the invention and introduction of calculators and computers, these devices can do the calculating much more rapidly then using paper, pencil, and algorithms.

Our definition and understanding of what mathematics is is an outgrowth of an evolution of the mathematics processes over hundreds of years. Computers and calculators have revolutionized how an information world deals with mathematics and thus has revolutionized our definition of what mathematics is.

In many classrooms, learning is conceived of as a process in which students passively absorb information, store it in easily retrievable fragments as a result of repeated practice and reinforcement. The common understanding of what mathematics is today seems to be calculating to obtain one correct answer. The procedure seems to be that students are to memorize many mathematical facts, apply these ideas to algorithms when they seem appropriate in order to solve our daily mathematics needs. The procedure seems to be to memorize a group of unrelated facts, use these facts in algorithms, follow memorized rules, break problems into subparts, and generate a result.

Memorize Facts → Apply Algorithms → Follow Memorized Rules → Calculate a Result

If our understanding of what mathematics is being efficient calculators, then we will present children with many addition examples and through repetition the children will memorize the 100 basic addition facts. This same procedure is followed as we have children memorize the 100 basic subtraction facts, the 100 multiplication facts and the 90 division fact. We learn to place digits in proper place by following rules as presented by the teacher and repeated many times calculating examples provided in textbooks or on chalk boards.

In our world today, the meaning of mathematics is continuously and constantly evolving as man becomes more astute. The world is shifting from an industrial age into an informational age. Then what should the meaning of mathematics be as it becomes of age in an information-oriented world? The constant increase of calculators, computers, and technology has forced us to redefine mathematics in a new context.