International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 5 Issue 11 | November. 2017 | PP. 52-53

Mathematics - A Blend of Common Pebbles And Costly Chrystals

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Date of Submission: 30-11-2017 Date of acceptance: 09-12-2017

The Webster's define MATHEMATICS as the science of numbers and their operations, interrelations, combinations, generalisations, and abstractions and of space configurations and their structure, measurement, transformations, and generalisations.The study of mathematics as a demonstrative discipline begins in the 6th century BC with the Pythagoreans, who coined the term "mathematics" from the ancient Greek , meaning "subject of instruction". Greek mathematics greatly refined the methods (especially through the introduction of deductive reasoning and mathematical rigor and expanded the subject matter of mathematics. Chinese mathematics made early contributions, including a place value system and the first use of negative numbers. The Hindu–Arabic numeral system and the rules for the use of its operations, in use throughout the world today evolved over the course of the first millennium AD in India and were transmitted to the west via Islamic mathematics through the work of Muḥammad ibn Mūsā al-Khwārizmī. Islamic mathematics, in turn, developed and expanded the mathematics known to these civilizations. Many Greek and Arabic texts on mathematics were then translated into Latin, which led to further development of mathematics in Medieval Europe. From ancient times through the Middle Ages, periods of mathematical discovery were often followed by centuries of stagnation. Beginning in Renaissance Italy in the 16th century, new mathematical developments, interacting with new scientific discoveries, were made at an increasing pace that continues through the present day.According to Babylonian mathematics refers to any mathematics of the peoples of Mesopotamia from the days of the early Sumerians through the Hellenistic period almost to the dawn of Christianity. The majority of Babylonian mathematical work comes from two widely separated periods: The first few hundred years of the second millennium BC and the last few centuries of the first millennium BC . It is named Babylonian mathematics due to the central role of Babylon as a place of study. Later under the Arab Empire, Mesopotamia, especially Baghdad, once again became an important centre of study for Islamic mathematics.

Whereas the Egyptians refer to mathematics written in the Egyptian language. From the Hellenistic period, Greek replaced Egyptian as the written language of Egyptian scholars. Mathematical study in Egypt later continued under the Arab Empire as part of Islamic mathematics, when Arabic became the written language of Egyptian scholars. Nevertheless Greek mathematics refers to the mathematics written in the Greek language from the time of Thales of Miletus to the closure of the Academy of Athens in 529 AD. Greek mathematicians lived in cities spread over the entire Eastern Mediterranean, from Italy to North Africa, but were united by culture and language. Greek mathematics of the period following Alexander the Great is sometimes called Hellenistic mathematics. Greek mathematics was much more sophisticated than the mathematics that had been developed by earlier cultures. All surviving records of pre-Greek mathematics show the use of inductive reasoning, that is, repeated observations used to establish rules of thumb. Greek mathematicians, by contrast, used deductive reasoning. The Greeks used logic to derive conclusions from definitions and axioms, and used mathematical rigor to prove them.

An analysis of early Chinese mathematics has demonstrated its unique development compared to other parts of the world, leading scholars to assume an entirely independent development. The oldest extant mathematical text from China is the *Zhoubi Suanjing*, variously dated to between 1200 BC and 100 BC, though a date of about 300 BC during the Warring States Period appears reasonable. However, the Tsinghua Bamboo Slips, containing the earliest known decimal multiplication table is dated around 305 BC and is perhaps the oldest surviving mathematical text of China.

Coming to India, the oldest extant mathematical records from India are the Sulba Sutras , appendices to religious texts which give simple rules for constructing altars of various shapes, such as squares, rectangles, parallelograms, and others. As with Egypt, the preoccupation with temple functions points to an origin of mathematics in religious ritual. The Sulba Sutras give methods for constructing a circle with approximately the same area as a given square, which imply several different approximations of the value of π.

In the 5th century AD, Aryabhata wrote the *Aryabhatiya*, a slim volume, written in verse, intended to supplement the rules of calculation used in astronomy and mathematical mensuration, though with no feeling for logic or deductive methodology. Though about half of the entries are wrong, it is in the *Aryabhatiya* that the decimal place-value system first appears. Several centuries later, the Muslim mathematician Abu Rayhan Biruni described the *Aryabhatiya* as a "mix of common pebbles and costly crystals".

In the 7th century, Brahmagupta identified the Brahmagupta theorem, Brahmagupta's identity and Brahmagupta's formula, and for the first time, in *Brahma-sphuta-siddhanta*, he lucidly explained the use of zero as both a placeholder and decimal digit, and explained the Hindu–Arabic numeral system. It was from a translation of this Indian text on mathematics that Islamic mathematicians were introduced to this numeral system, which they adapted as Arabic numerals. Islamic scholars carried knowledge of this number system to Europe by the 12th century, and it has now displaced all older number systems throughout the world. Various symbol sets are used to represent numbers in the Hindu–Arabic numeral system, all of which evolved from the Brahmi numerals. Each of the roughly dozen major scripts of India has its own numeral glyphs. In the 10th century, Halayudha's commentary on Pingala's work contains a study of the Fibonacci sequence and Pascal's triangle, and describes the formation of the matrix.

In the 12th century, Bhaskara II lived in southern India and wrote extensively on all then known branches of mathematics. His work contains mathematical objects equivalent or approximately equivalent to infinitesimals, derivatives, the mean value theorem and the derivative of the sine function. To what extent he anticipated the invention of calculus is a controversial subject among historians of mathematics.

In the 14th century, Madhava of Sangamagrama, the founder of the so-called Kerala School of Mathematics, found the Madhava–Leibniz series, and, using 21 terms, computed the value of π as 3.14159265359. Madhava also found the Madhava-Gregory series to determine the arctangent, the Madhava-Newton power series to determine sine and cosine and the Taylor approximation for sine and cosine functions. In the 16th century, Jyesthadeva consolidated many of the Kerala School's developments and theorems in the *Yukti-bhāṣā*. However, the Kerala School did not formulate a systematic theory of differentiation and integration, nor is there any direct evidence of their results being transmitted outside Kerala.

The period of Scientific Revolution saw a fundamental transformation in scientific ideas across mathematics, physics, astronomy, and biology in institutions supporting scientific investigation and in the more widely held picture of the universe. The scientific revolution led to the establishment of several modern sciences. In 1984, Joseph Ben-David wrote: Rapid accumulation of knowledge, which has characterized the development of science since the 17th century, had never occurred before that time. The new kind of scientific activity emerged only in a few countries of Western Europe, and it was restricted to that small area for about two hundred years. During this revolution Mathematics too saw its own upraise.

The 17th century saw an unprecedented increase of mathematical and scientific ideas across Europe. Galileo observed the moons of Jupiter in orbit about that planet, using a telescope based on a toy imported from Holland. Tycho Brahe had gathered an enormous quantity of mathematical data describing the positions of the planets in the sky. By his position as Brahe's assistant, Johannes Kepler was first exposed to and seriously interacted with the topic of planetary motion. Kepler's calculations were made simpler by the contemporaneous invention of logarithms by John Napier and Jost Bürgi. Kepler succeeded in formulating mathematical laws of planetary motion. The analytic geometry developed by René Descartes allowed those orbits to be plotted on a graph, in Cartesian coordinates. The most influential mathematician of the 18th century was arguably Leonhard Euler. His contributions range from founding the study of graph theory with the Seven Bridges of Königsberg problem to standardizing many modern mathematical terms and notations.

The 20th century saw mathematics become a major profession. Every year, thousands of new Ph.D.s in mathematics were awarded, and jobs were available in both teaching and industry. An effort to catalogue the areas and applications of mathematics was undertaken in Klein's encyclopedia. In 2000, the Clay Mathematics Institute announced the seven Millennium Prize Problems, and in 2003 the Poincaré conjecture was solved by Grigori Perelman. Most mathematical journals now have online versions as well as print versions, and many online-only journals are launched. Thus are the remarkable developments of Mathematics as a subject. Meanwhile, in the modern era mathematics has been successful in leaving a trademark in almost all the fields including education, business or any other professional domains. Right from the manufacture of a tiny needle to the launch of huge missiles or satellites, mathematics plays a crucial role and justifies its role. Almost all the activities going on, round the globe has a pinch of mathematical reasoning or calculation involved in it.

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