

Concept and Nature of Mathematics Pedagogy

Meaning & Definition of Mathematics:

The Hindi version of mathematics is called 'Ganita'. 'Ganita' means the science of calculation. To understand its meaning very clearly. Let us have a view on some definitions given by great scholars and Mathematicians.

- **According to Locke:** Mathematics is a way to settle in the mind a habit of reasoning.
- **According to Bertrand Russel:** Mathematics may be defined as the subject in which we never know what we are talking about nor whether what we are saying is true.
- **According to Berzamin Pirce:** Mathematics is a science which draws necessary conclusions.
- **According to Galileo:** Mathematics is the language in which God has written the universe.
- **According to Marshal H stone:** mathematics is the study of an abstract system built of abstract elements. These elements are not described in concrete form.
- **According to Mathematicians:** Mathematics may be defined as the science of number and space.

On the basis of given definitions, we can conclude that:

1. Mathematics is the science of quantity and space.
2. Mathematics is the science of calculations.
3. Mathematics is the method of the progress of the various subjects.
4. Mathematics is the abstract form of science.
5. Mathematics is a systematized, organised and exact branch of science.
6. Mathematics is an important means of generalization.
7. Mathematics is the means of draw conclusion and Judgement.
8. Mathematics is the science of logical reasoning.

Why do we study Mathematics:

A common man cannot lead his daily life activities very well without basic knowledge of mathematics. He can never pull on without learning how to count and calculate. Most of the occupations, by which the needs of people are fulfilled cannot run without the use of Mathematics. The entire business and commercial system are based on the knowledge of Mathematics. Mathematics helps to develop a scientific attitude in children. It is also helpful in the study of other sciences. Thus, a person may belong to any kind and class of society but, he utilizes knowledge of mathematics in one form or another. So, there is the unavoidable practical utility of mathematics in everyone's life.

Categories of Mathematics:

- Pure Mathematics or Basic Mathematics
- Applied Mathematics

Sub-categories of Basic Mathematics:

- **Algebra**—It includes arithmetic, elementary and multivariate algebra, linear multivariate algebra. Algebraic structures.
- **Geometry** -It includes Euclidean and non-Euclidean geometry, analytic geometry. Trigonometry etc.
- **Modern Mathematics**—It includes set theory topology. Algebraic systems
- **Analysis**—It includes real and complex analysis. Functional analysis. A differential equation, vector and Tensor.
- **Combinatorics and Number system**—It includes combinatorial geometry and number system.

Sub-categories of Applied Mathematics:

- Calculatory science
- Statistics
- Mathematical Aspects of Physical Theories

Relation Between Pure and Applied Mathematics:

Applied Mathematics acts as a bridge to link Basic Mathematics with Physical, biological and Social sciences etc. It acts and reacts not only to science and technology but also on Basic Mathematics. Example: Fluid dynamics, space dynamics, Mathematical biology by

using only Pen and Paper we can solve problems of trade and commerce, determine the paths of planets, weight the earth.

Nature of Mathematics:

- Mathematics has its own language. It means that Mathematical concepts, terms, symbols, formulae and Principles.
- The knowledge of Mathematics remains the same in the whole universe, everywhere and every time. It is not changeable.
- Mathematics is an exact science. Its knowledge is always clear, logical and systematic and that may be understood easily. It provides a clear and exact response like yes or no, right or wrong.
- It is the science of logical reasoning. It involves Inductive and deductive reasoning and can generalize any proposition universally.
- Mathematical knowledge is developed by our sense organs therefore, it is exact and reliable.
- It is related to each aspect of human life. It is numerical and calculation part of human life and knowledge. Mathematics helps in the self-evaluation.
- Mathematics involves the conversion of abstract concepts into the concrete form. Its knowledge is applied in the study of science and its different branches. **Example:** Physics, Chemistry, Biology etc.

On the basis of the above point, Mathematics is more strong as compared to the other school subjects that are why its study is essential in school education.