



Meaning and Nature of Mathematics

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Meaning of Mathematics

- ❖ *máthēma* - "that which is learnt", "what one gets to know"
- ❖ *máthēma* is derived from „*manthano*“, while the modern Greek equivalent is „*mathaino*“ - "to learn"
- ❖ adjective is „*mathēmatikós*“ meaning "related to learning" or "studious"
- ❖ In Latin, and in English until around 1700, the term *mathematics* more commonly meant "astrology" (or sometimes "astronomy") rather than "mathematics"; the meaning gradually changed to its present one from about 1500 to 1800.
- ❖ In English, the noun *mathematics* takes singular verb forms. It is often shortened to *maths* or, in English speaking North America, *math*.

Definition – Mathematics

“The abstract science which investigates deductively the conclusions implicit in the elementary conceptions of spatial and numerical relations, and which includes as its main divisions geometry, arithmetic, and algebra” - Oxford English Dictionary, 1933

“The study of the measurement, properties, and relationships of quantities and sets, using numbers and symbols” - American Heritage Dictionary, 2000

“The science of structure, order, and relation that has evolved from elemental practices of counting, measuring, and describing the shapes of objects” - Encyclopaedia

❖ “The science of quantity” - Aristotle

❖ “The science of indirect measurement” (1851). - Auguste Comte's

❖ Three leading types of definition of mathematics are called: **Logistic**

“The science that draws necessary conclusions” (1870). - Benjamin Peirce's O

❖ Intuitionist, "All Mathematics is Symbolic Logic" (1903). - Russell's O

❖ Formalist, "Mathematics is the mental activity which consists in carrying out constructs one after the other“ - L.E.J. Brouwer



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Student's View of mathematics (Schoenfeld, 1992)

- ✓ Mathematics problems have one and only one right answer.
- ✓ Mathematics is facts and rules with one way to get the right answer. You find the rule and get the answer. Usually, the rule to use is the one your teacher just taught you.
- ✓ You don't need to understand why the rules work.
- ✓ If you don't solve a problem in five minutes, then you'll never solve it. Give up.
- ✓ Only geniuses discover or create mathematics, so if you forget something, you'll never be able to figure it out on your own.
- ✓ Mathematics problems have little to do with the real world. In the real world, do what make sense. In mathematics, follow the rules.
- ✓ Mathematics is arithmetic

Parent's View of mathematics (Schoenfeld, 1992)

- Mathematics is about numbers and arithmetic, unbending accuracy and infallible rules.
- The students should know the basics.
- Mathematics is an innate ability. Mathematics is difficult, and so, students should not be expected to do too much.

Teacher's View of mathematics

Richard Skemp (1976) : there are two effectively different subjects being taught under the same name “mathematics”.

Instrumental Mathematics: It consists of a limited number of rules without reasons

Relational Mathematics: It is knowing both what to do and why. It involves building up conceptual structures or schemas from which a learner can produce an unlimited number of rules to fit an unlimited sets of situation.

Comprehensive View of Mathematics

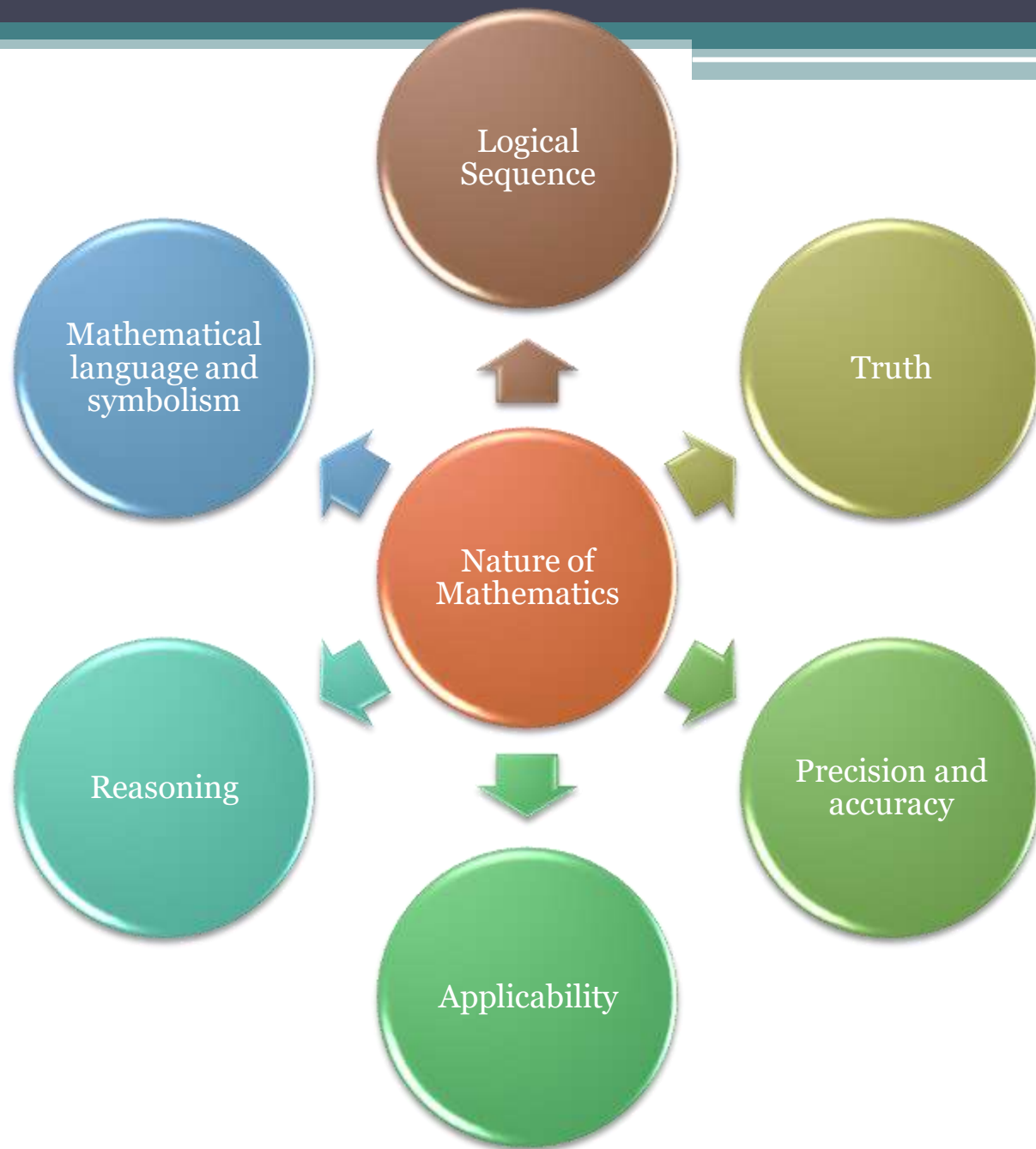
- Mathematics is not arithmetic.
- Mathematics is problem posing and problem solving. Meaningful problems take a long time to pose as well as to solve.

They stimulate curiosity about mathematics, not just about the answer to a problem. They engage a variety of students' ideas and skills. They lead students to thinking about how the world work from a mathematical point of view and to think about how mathematics itself works. They open up discussion to a variety of contributions from multiple participants.

Nature of Mathematics

Nature of Mathematics:

- A Science of discovery
- The art of drawing conclusions
- An intuitive method
- An intellectual game.
- Mathematics is a way to settle in mind a habit of reasoning.
- It involves man's highest cognitive power.
- It's a Science of logical reasoning.
- Mathematics is a tool specially dealing with abstract concepts.
- It has a highest utility in our daily life.





THANK YOU!