

"What is Math?" Quotes

1. *"Perhaps we can see more easily why one should study mathematics if we take a moment to consider what mathematics is. Unfortunately, the answer cannot be given in a single sentence or a single chapter. The subject has many facets or, some might say, is Hydra-headed. One can look at mathematics as a language, as a particular kind of logical structure, as a body of knowledge about number and space, as a series of methods for deriving conclusions, as the essence of our knowledge of the physical world, or merely as an amusing intellectual activity."* (from *Mathematics for the Non-mathematician* by Morris Kline)
2. *"The study of mathematics should instill in students an ever-increasing sense of wonder and awe at the profound way in which the world displays order, pattern, and relation. Mathematics is studied not because it is first useful and then beautiful, but because it reveals the beautiful order inherent in the cosmos."* (from *The Education Plan of St. Jerome Classical School*, Hyattsville, MD)
3. *"The chief aim of all investigations of the external world should be to discover the rational order and harmony which has been imposed on it by God and which He revealed to us in the language of mathematics."* (Johannes Kepler)
4. *"We must endeavor that those who are to be the principal men of our State to go and learn arithmetic, not as amateurs, but they must carry on the study until they see the nature of numbers with the mind only; ... arithmetic has a very great and elevating effect, compelling the soul to reason about abstract number, and rebelling against the introduction of visible and tangible objects into the argument."* Plato's *Republic* (Book VII)
5. *"The knowledge at which geometry aims is knowledge of the eternal, and not of anything perishing and transient. Geometry will draw the soul towards truth, and create the spirit of philosophy, and raise up that which is now unhappily allowed to fall down. Therefore, nothing should be more sternly laid down than that the inhabitants of your fair city should by all means learn geometry."* Plato's *Republic* (Book VII)
6. *"The abstractions of mathematics possessed a special importance for the Greeks. The philosophers pointed out that, to pass from a knowledge of the world of matter to the world of ideas, man must train his mind to grasp the ideas. These highest realities blind the person who is not prepared to contemplate them. He is, to use Plato's famous simile, like one who lives continuously in the deep shadows of a cave and is suddenly brought out into the sunlight. The study of mathematics helps make the transition from darkness to light. Mathematics is in fact ideally suited to prepare the mind for higher forms of thought because on one hand it pertains to the world of visible things and on the other hand it deals with abstract concepts. Hence through the study of mathematics man learns to pass from concrete figures to abstract forms; moreover, this study purifies the mind by drawing it away from the contemplation of*

the sensible and perishable and leading it to the eternal ideas.” (Mathematics for the Non-mathematician by Morris Kline)

7. *“There are other fields in which knowledge is built on previous knowledge, but in no other field do the towers reach such heights, nor do the topmost layers rely so clearly on the bottom ones. ... The secret to proper teaching of mathematics lies in recognizing these layers and establishing them systematically” (from Arithmetic for Parents by Ron Aharoni)*
8. *“The same is true of elementary mathematics. However, since it deals with the bottom of the tower, the number of layers it establishes is smaller. There is no long chain of arguments as in higher mathematics. This is one of the reasons it is appropriate for children. Elementary school mathematics is not sophisticated, but it contains wisdom. It is not complex, but it is profound.” (from Arithmetic for Parents by Ron Aharoni)*

Recommended books for teachers of mathematics:

- *Arithmetic for Parents, Ron Aharoni*
 - *Excellent book which discusses the structure of K-6 mathematics*
- *Knowing and Teaching Elementary Mathematics, Liping Ma*
 - *Provides insight into the difficulties of math instruction*
- *Online Geometry course (free): Treloar and Murphy*
 - <https://online.hillsdale.edu/courses/promo/mathematics-and-logic-from-euclid-to-modern-geometry>
- *Fractions (arithmetic) lecture: Treloar*
 - <https://vimeo.com/714535123/e0bf2f95c4>