The Common Origins of Mathematics and Democracy

Mathematics has been called the great equalizer because the validity or falsehood of a mathematical argument can be seen or demonstrated by anyone regardless of their position of power.

The ancient Greek mathematician Euclid famously said “There is no royal road to geometry” when King Ptolemy asked if there was an easier way for him to learn mathematics.

It is interesting to speculate on the common origins of both mathematics and democracy in ancient Greece. It can be argued that early Greek mathematics provided a style of argument and thought that promoted democracy. The presentation of a mathematical argument, in a certain sense, creates an implicit assumption of teacher and student as equals. A good math teacher does not force the student to accept the truth of the conclusions through a position of power. Instead, the steps of the argument are made clear so that the student can follow the reasoning and is free to accept or refute the conclusion. In the steps of a mathematical argument only universally accepted rules of logical reasoning are used – rules that are universally accepted because ultimately they can be shown to be simple, clear and undeniably true. These rules of logical reasoning are not kept secret by a powerful few but are shared with everyone with the assumption that everyone is equal – or at least has equal right to pursue such knowledge.

A good education in mathematics trains people to listen, and to reason effectively and to make clear and logical arguments. These are exactly the skills necessary to form a successful democracy.

The following quote is from the article *Mathematics Teaching and Political Freedom: the unnoticed connection* by Colin Hannaford, a mathematics educator in England.

The original purpose of mathematics teaching... is unknown to all but a handful of classical historians. They know that the style of argument on which mathematics depends was always intended to give more political freedom to ordinary people, to increase their confidence in democracy. Its purpose is to persuade people to accept logical truths freely and voluntarily, not to be bullied or oppressed by dogma or dogmatists to accept their ideas as absolute truths.

This pattern of logic had also a definite beginning. It was developed spontaneously in early democratic Greece c. 500 BC to encourage ordinary people to take part in democracy, to help them to resist being over-awed and confused by the rich and their lawyers who were trained in the clever use of rhetoric. Rhetoric was certainly persuasive as well. But rather than logic it used imagery and drama, emotions and myth, and as its teachers proudly boasted it could be used to prove anything to anyone. The truth of this boast was destroying democracy.

Unfortunately, there are many people who think of themselves as non-mathematical. Many people say of themselves, “I’m not a math person” or “Math is my worst subject” and close themselves off to mathematical reasoning. While it’s true that some people have more talent in math than others, this is true in every subject, indeed in every human endeavor. Most people are not award-winning writers or professional basketball players and yet many enjoy reading, writing and playing basketball. Perhaps one reason for this disparity is that math is sometimes taught in a way in which students are expected to accept the truths of mathematics without question or are expected to repeat the steps of a problem without understanding the underlying reasons. This approach to mathematics education is contrary to the ideals of a democracy. In this way, the student is alienated from mathematical thought, does not fully appreciate the usefulness of mathematics or the freedom of thought it promotes and the student does not develop the ability to think critically and independently. This unfortunate situation can be eventually reversed by communicating to students their right to question everything and their responsibility to think independently. In this way, mathematics can provide a model for the means in which people can cooperate, find mutual respect, solve problems and promote a better society.