Is mathematics scary for you ?

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Abstract

Many people believe that "Mathematics is stuff which nightmares are made of" . More often than not, this is only a mental blockade which leads many people to avoid mathematics. This short article will try to dispell the usual aversion to mathematics.

1 Why fear mathematics?

Mathematics is stuff which nightmares are made of.

The above sentence summarises the sentiment of many people. Maybe there is truth in it. Maybe not.

Quite often, the fear is only a mental blockade. There is also the contribution of mental conditioning, created largely by over-eager parents, movies, commercials and hearsay. The maths teacher is often picturised as a grumpy, short-tempered, wicked, sadist. I have myself witnessed this phenomenon often. Whenever I make a long journey by air, I notice that the person sitting next to me is curious and wants to open a conversation with me. It is enough for me to introduce myself as a maths teacher, his face turns pale and he is visibly uncomfortable. For the rest of the flight he will not even turn to me,

or utter a single word. Good for me, since I can now concentrate on the book I am carrying.

The first stumbling block is mathematical abstraction. The very sight of x, y and z mingled with Greek letters α, θ, λ, and weird looking symbols, in a concoction of cryptic prose, is enough to put off the bravest souls. Mathematics excels in the use of such (and many other) abstractions. Sometimes abstraction is a necessary curse. Mathematical abstraction makes concise and unambiguous statements possible. Here are two examples :

Take a look at the following paragraph, borrowed from [4], and see if it makes sense to you :

> *A square and 10 roots are equal to 39 units. The question therefore in this type of equation is as follows: what is the square which combined with ten of its roots will give a sum total of 39? The manner of solving this type of equation is to take one-half of the roots just mentioned. Now the roots in the problem before us are 10. Therefore take 5, which multiplied by itself gives 25, an amount which you add to 39 giving 64. Having taken then the square root of this which is 8, subtract from it half the roots, 5 leaving 3. The number three therefore represents one root of this square, which itself, of course is 9. Nine therefore gives the square.*

The same paragraph is now cast in maths. Bingo ! Things become much clearer now ! :

Find x^2 *if* $x^2 + 10x = 39$

$$x^2 + 10x = 39 \tag{1}$$
$$x^2 + 10x + 5^2 = 39 + 5^2 \tag{2}$$
$$(x+5)^2 = 64 \tag{3}$$
$$x + 5 = 8 \tag{4}$$
$$x = 3 \tag{5}$$
$$x^2 = 9 \tag{6}$$

And, here is another masterpiece [2]:

There do not exist four positive integers, the last being greater than two, such that the sum of the first two, each raised to the power of the fourth, equals the third raised to that same power.

In case you trying to figure out what that means, take a look at a mathematical version of the same statement.

There do not exist positive integers x, y, z, and n, with $n > 2$, such that $x^n + y^n = z^n$.

Which version is clearer, you be the judge.

Of course, there are authors who make a perverted usage of abstraction. You can get examples, from [1] and also from the classic book by Linderholm [3].

Some of us cannot think in an abstract sense. It is just a natural behaviour which is often misunderstood, only to blame the maths teacher or mathematics. To draw a comparison, many of us (including me) cannot sing. Should we stop enjoying music ? Should we start hating music teachers ?

2 Is there a cure?

YES. If you are thinking of a visit to your psychiatrist, banish the idea. All you need is self-counselling and some understanding teacher. You can build immunity to maths phobia yourself. Recall how you learnt to swim. The first time you jumped into the water you almost drowned. Kicking around vigorously and trying to stay afloat made you actually stay afloat. The fear of water was just a mental blockade. Now that you learnt swimming, you will find swimming the most enjoyable (and healthy) pastime of your life. Mathematics is no different.

3 Concluding remarks

This document is a part of tutorials and demonstrations documents created by the author. The entire collection can be found on the web [9].

This is a LaTeX document, created under Linux, using Kile. You can get the LaTeX source of this document from drpartha@gmail.com. Please mention the Reference Code, and Version code, given at the top of this document. Please follow the "basic rules of decency" explained in [6].

If you found this article useful, please send a note to `drpartha@gmail.com` **As always, suggestions and constructive comments are always welcome.** The author operates by Crocker's Rules [7], and believes in Radical Honesty [8] , so do not hesitate to speak plainly and frankly. Honest and frank opinion is more constructive than polite and diplomatic silence.

4 About the author

Figure 1: The pensive Professor

Parthasarathy is an aggressive supporter of FOSS, based in Secunderabad, India. He teaches discrete mathematics, and preaches LaTeX and Linux, to students of Computer Science. He would be happy to assist anyone, particularly students, teachers, and institutions, who are genuinely interested in these topics.

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