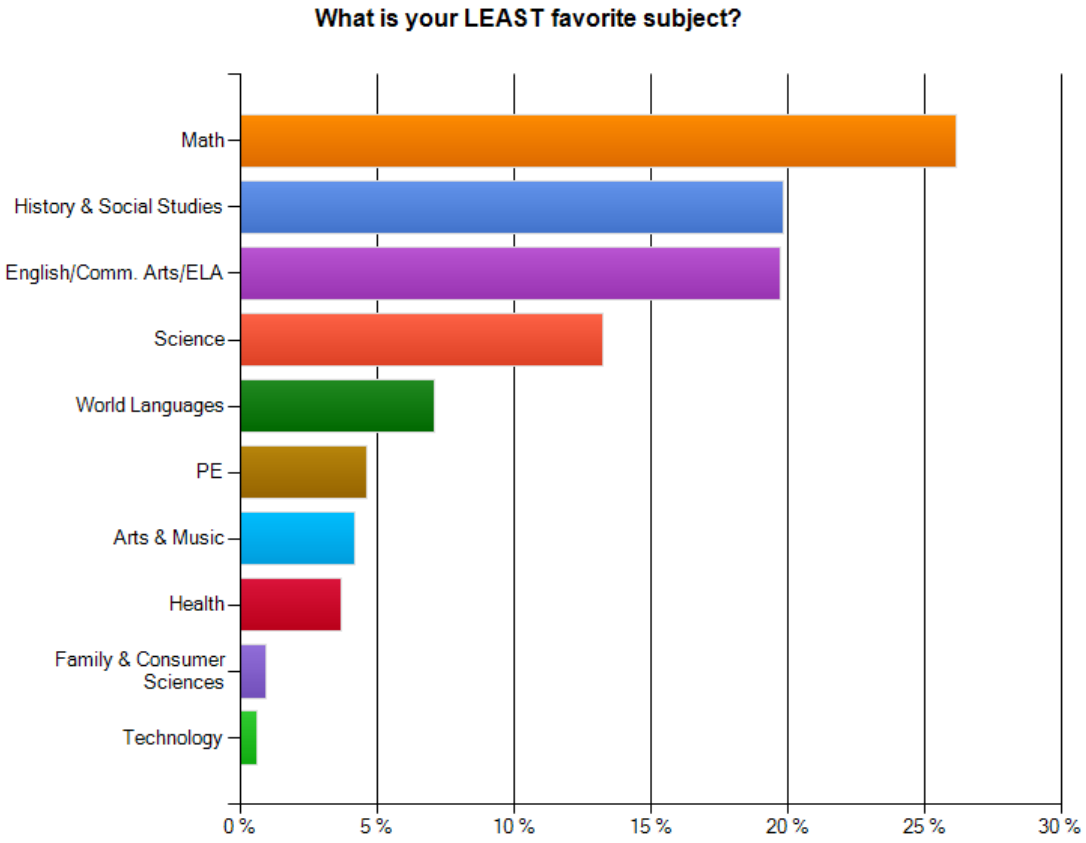
MATHS: From indifference to hatred

"Most Of Those Tests Are Culturally Biased. The Only Part That's Universal Is The Math." **Furious Styles, Boys'n' the hood (Hughes brothers)**

Disclaimer: *the below views and opinions are mine and mine only, based on my experience and my school journey in the French system.*

Maths, loved by some, dreaded by many… By the title of this article, you probably guessed where I stand on the topic, and it seems I'm not the only one:



Source : https://www.teachthought.com/learning/fixing-high-school-listening-to-students/

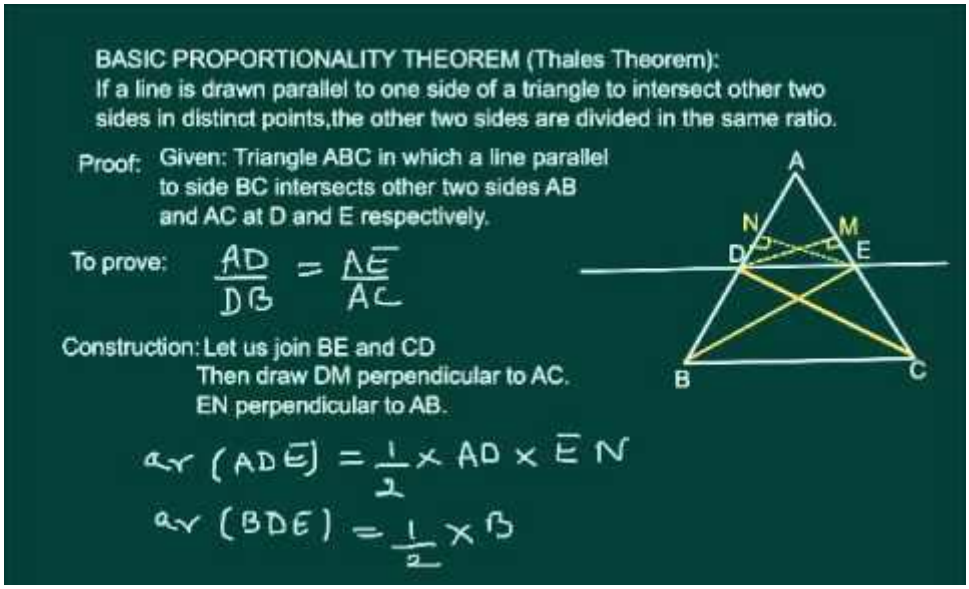
The interesting question though, at least for me, is how it came to that? As a "lambda" student, I entered school without specific fear or disgust for mathematics, however, along the way, I developed a real aversion to it, let's try to analyse why.

But first, a quick trip down memory lane:

- *Kindy/Maternelle:* if you can count to 10 or more by the time you go to primary school (with or without your fingers), you're all good and I was no different.

- *Primary school:* basic operations (“+”, “-“…), basic geometry (squares, triangles, solids…), metric system and conversions, etc, etc… So far so good.

- *Junior high/College*: Quite a step up with introduction to fractions, decimal numbers, trigonometry, basic equations with unknown terms… I got by without much trouble.



Source : https://www.youtube.com/watch?v=I0a1olaEBaA

- *High school/Lycee:* Another step up, mostly for me as it became more and more abstract. Derivation, integration, basic probabilities, Euler relation, advanced fractions manipulations, multiple unknown terms equations… I held on.

- *Uni/Engineering school:* that is where the proverbial s..t hit the fan. Complex numbers, differential equations, convolution, Laplace, Fourier, advanced statistics and probabilities… only fun stuff, pure magic for me… the dark kind.

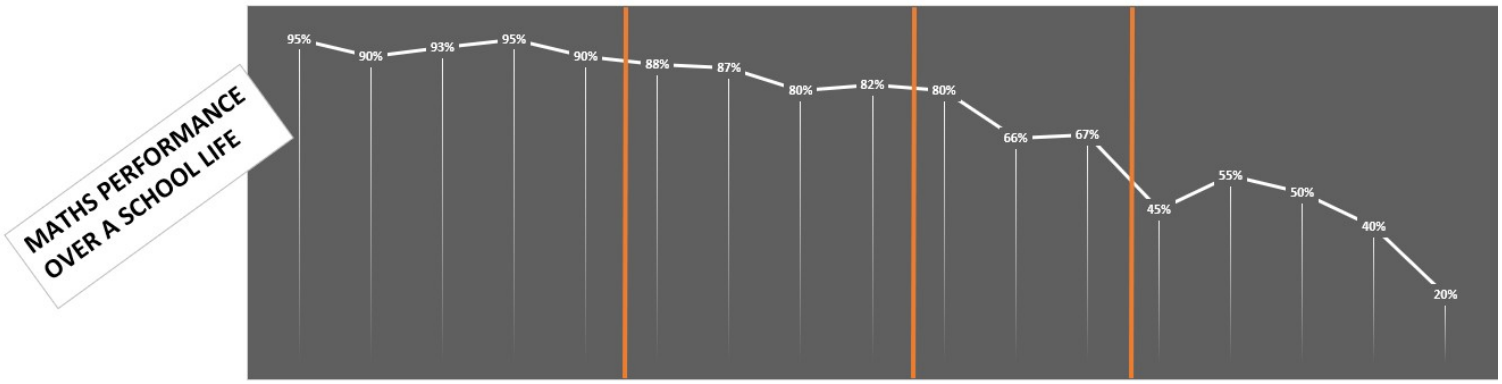
$$\mathcal{L}\left[\int_0^t u(x)dx\right] = \frac{U(p)}{p} + \frac{1}{p}\lim_{t\to 0_+}\int_0^t u(x)dx$$

GOOD Luck !!

“A difficult theorem can like a ... symphony. It's very erotic.” **Pr. Gerald Lambeau, Good Will Hunting (Gus Van Sant)**

Let’s say I’m not sold on this quote… I doubt this pick-up line works anywhere but in the movies.

I have compiled my performances in maths along my school years and clearly, something happened…



	KINDY	PRIMAIR / PRIMARY					COLLEGE / JUNIOR HIGH				LYCEE / HIGH SCHOOL			UNI / ENGINEERING SCHOOL				
Classe	Maternelle	CP	CE1	CE2	CM1	CM2	6ieme	5ieme	4ieme	3ieme	Seconde	Premiere	Terminale	1	2	3	4	5
Year	Pre-school	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
Note over 20	☆☆☆	19	18	18.5	19	18	17.5	17.3	16	16.3	16	13.2	13.4	9	11	10	8	4
Score over 100%		95%	90%	93%	95%	90%	88%	87%	80%	82%	80%	66%	67%	45%	55%	50%	40%	20%

The inevitable decline, proportional with my aversion for the subject and which begs 2 questions:

- What happened? I'll try to answer below
- How could I graduate from an Engineering school with such low results? That is a question for another time 😉

So, how can I explain the decline?

- *Increased complexity:* straight forward and logical, as difficulty increases, it gets harder to perform. Fair enough but as far as I'm concerned, the least significant cause.

- *The French teaching system:* In France, teachers are bound to holly curriculum (i.e.: all schools in France teach the same program for all students, everywhere). A good idea in theory, however it leaves little flexibility for a teacher to pause on some harder notions, go faster on others, etc etc. In other words, "go with the flow" of a class, adapt. Also, and I suppose it is the same in many countries, a teacher is not evaluated on his students' happiness/wellbeing. At the end of the day, however the students feel will not impact your career whatsoever. Only results, amongst other things count. I would argue that a happy student is a more interested student and eventually, a better student: academically of course but also in their behaviour, their self-confidence, their will to study … Conversely, it would entice teachers to truly focus on their students. A Win Win in my book.

- *The nature of Mathematics:* Math is the science of abstraction. It is not something I invented, it is a commonly admitted axiom. The real difficulty of Maths at school, as I experienced it, is that the divide between abstract and real or practical keeps growing along the years. Any kid easily understands how basic operations and trigonometry relates to the world they are living in, however, when it comes to more arduous notions, the link becomes foggy or inexistent at times. In this we are not all equal, it is easier from some brains than it is for others and this translation from abstract to practical should be a prime focus of the subject; sadly, it was not the case for me.

"What interests me is the connection between maths and the real world." **Terence Tao**

- *People:* Yes, I will try to blame it on the teachers… I do not exempt myself from the equation (pun intended 😉), I could have done more, much more, however, so could have the system and the teachers… Unfortunately for me, I can't say I ever encountered an inspiring Maths teacher… Like in many subjects, the ability of the teacher to inspire and motivate is key. For those who read my article on distance learning last week, this should ring a bell. Most of my teachers (no offense) appeared to be there just to deliver their course, not really caring if the students were following or not. Interesting to realize that the same people will then grade your papers and sometimes harshly comment them. Somehow, in an ideal world (yes, I sometimes live in Lala Land) they should own their students' failures… And successes for that matter.

"There Are *No Bad Students*, *Only Bad Teachers".* **Mr Miyagi, Karate Kid.**

This reached its peak my last years of University/Engineering school where let's say that my teacher and I never really managed to see eye to eye. This guy would simply enter the class and start filling black board after black board of equations, at an incredible pace, never stopping, never tiring… a Machine. Forget about trying to understand, it was hard enough to capture all of it on paper.

In essence, it was the perfect (and deadly) combination of all the above:

- It was quite hard Maths
- Delivering the program at all costs: no matter if the students get it or not
- The link between these endless equations and the real world was inexistent (at least I never saw/understood it)
- This teacher, was first a researcher and in order to keep his grants and research position, he had to "deliver" a certain number of hours of teaching at University. God forbid, I never been in his mind, but I highly doubt he was animated by a true will to get a message across and share his passion when he came to teach.

I could go on, lots could be said, but it would appear like a personal vendetta…

"*Science sans conscience n'est que ruine de l'âme*". **Rabelais**

Science without conscience only leads to the ruin of the soul…

So, do I hate Maths? Well, I hated studying it towards the end of my school years, that is for sure; but we all use maths every day, and saying "I hate Maths" bears no more logic than saying "I hate breathing". However, as you may have guessed, I believe there's lots of room for improvements in the way it is taught… Maybe, hopefully, it is better now, I will not go back to school to check but I'll pay attention to how my kids perceive that subject as they grow up.

So far so good…