



Even during our best years, Mathematics and I shared a strained relationship. Today this relationship is so vexed that I have been accused on several occasions of having a 'block', an irrational fear almost phobic in nature with respect to anything even vaguely Mathematical. I admit to this. However I do not see this as baseless paranoia, instead I see it as arising from a painful awareness of my own limitations in this area. This awareness is a burden which prevents any further confrontation with Math, thereby reinforcing the limitation. The problem therefore is not the limitation itself but the intense discomfort or fear that it triggers which disallows any fruitful engagement. The fact is that when faced with a Mathematical threat to my personhood I choose 'flight' over 'fight' every single time.

This was not always the case. I would like to describe the golden years when a brilliant teacher helped me strike a precarious friendship (in urgent need for revival) with Mathematics. I grew up at Centre For Learning, a small community made up of students and teachers who together radically re-image the learning space. In Math class, as we cracked problems together, made mistakes, asked questions, I grew more confident. Slowly, in place of hesitation, nervousness and fear, developed a real sense of awe for the language of Math. Looking back I think it was remarkable how in spite of all my self-doubt and anxiety the classroom was never a threatening place. I felt safe because I knew I wasn't being judged or constantly evaluated. It was because my classroom was always a friendly and responsive environment in which I was able to face up to my fears. The process of wrestling with something that I had no knack for became one in which the reward (i.e. a correct answer) was highly satisfying and most importantly fun. How my teacher achieved this tremendous feat is a real mystery (and let me tell you, the fact that she succeeded in showing me, of all people, how to take pleasure in the Mathematical battle is an incredible accomplishment!). In fact I think this should become the standard way of testing a teacher's expertise. Can you show your most resistant and difficult student the route to enjoyment? The education ministry should make this the basic qualification. What I remember most vividly of my classes is how much I spoke in them – my most recurrent sentence of course being 'but I don't understand'.

I followed the steps carefully and cautiously, the wheels in my head turning, and whenever I hit a temporary dead end I interrupted. I interrupted because I wanted to understand. I interrupted because I was encouraged to do so. Math was always a struggle but became one which I wanted to take part in. I find it amazing that even though Math never came easy and was such an effort, I never dreaded or hated class. It felt like a long distance run up a steep hillside—difficult and energy consuming but ultimately rewarding once you arrive at your destination. "Ah okay, now I understand", was what I said once I reached my little hilltop.

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It has been seven years since I exited that classroom. As far as Mathematics goes I am rusty and terribly out of form. My skills which were once in shape because of persistent practice have now slacked like unused muscle and due to my complete lack of confidence, I revert to my old response of fear and dread.

So why is this particular experience of Math relevant or significant to educators? Does it teach us anything useful about the process of learning? I ask this because, we can safely assume that this is not a unique experience that is wholly mine. Vast numbers of students who are disinclined to Mathematics find it very difficult, frustrating and downright scary. This is constantly reinforced by poor

performances in tests, comparisons made by teachers and a general sense of feeling 'stupid' as compared to friends. Teachers have to keep finding innovative and creative ways of reaching out to these students so as to minimize the emotional reaction of panic and anxiety. Math has to be converted into a plaything. Like solving a gigantic jigsaw puzzle or unravelling a big ball of tangled wool. Play with it. Work at it. Admire the precision.

Only if the teacher is able to achieve this, will Math transform from being a predatory monster into a challenging game to have fun with.

I know that when I will have to step up to the challenge again, it will be far from easy and will take tremendous effort and hard work. However, the one thing I will remember from class is how to enjoy the process.

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Number Trivia

- ✿ A circle is a round straight line with a hole in the middle.
- ✿ A Pangram is a sentence or a paragraph which describes itself, for example the following:
 - ✿ This Pangram contains four as, one b, two cs, one d, thirty es, six fs, five gs, seven hs, eleven is, one j, one k, two ls, two ms, eighteen ns, fifteen os, two ps, one q, five rs, twenty-seven ss, eighteen ts, two us, seven vs, eight ws, two xs, three ys, & one z.
- ✿ Prime numbers are numbers which can be divided completely (without leaving any remainder) only by 1 and itself, like 2, 5, 7, 11, 13 etc. The odd thing about 2 is that it is the only prime number which is 'even'.
- ✿ The number 11 is a very interesting number. You will notice that 11×11 gives 121. Try the multiplication with larger such numbers. Try with 11111×11111 or 111111×111111 and so on and you will find an interesting pattern emerging. Try it out.

Take any 4 digit number (with at least one digit different from others) and perform the following:

1. Reorder the digits to form the largest four digit number.

2. Then, reorder the digits to form the smallest four digit number (use a leading 0 if needed)
3. Subtract the smaller of the two numbers from the larger one to get a new 4 digit number
4. Then repeat the steps 1 to 3 above

This process can be repeated till you reach a stage when you constantly end up with exactly the same 4 digit number. This stage is reached in a maximum of 7 iterations (usually less).

This constant number is **6174** and is known as the **Kaprekar Constant** after the Indian who identified it. For example: if you start with number 3524 the steps would be

$$5432 - 2345 = 3087$$

$$8730 - 0378 = 8352$$

$$8532 - 2358 = 6174$$

Actually, this process can also be carried out with 3 digit numbers and after a few iterations, you end up with a 3 digit number which then repeats itself. Try and work out this number. Interestingly, both these 4 digit and 3 digit constant numbers are divisible by 9.