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Les démonstrations en famille avec Timothy Gowers au temps du confinement

- Extra-muros -



Date de mise en ligne : mardi 26 mai 2020

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Timothy Gowers, médaillé Fields, Professeur à l'Université de Cambridge, bientôt professeur au Collège de France a mis à profit son confinement avec ses enfants.

Devenu très actif sur Twitter, il a récemment posté sur Twitter une série de 14 tweets :

<https://twitter.com/wtgowers/status/1264672918983802882?s=20>

It is often suggested that one should teach Euclidean geometry in order to introduce children to the notion of proof. Today my children learnt a huge amount about proof in a completely different way when, as an experiment, I tried the "miracle Sudoku" with them. 1/

— Timothy Gowers (@wtgowers) [May 24, 2020](#)

In case you've been hiding under a rock recently, this delightfully compelling video can tell you what I'm talking about. 2/

— Timothy Gowers (@wtgowers) [May 24, 2020](#)

I had watched the video, which gave me a small advantage : I couldn't remember where anything went, but I had some idea of the style of argument required. Also, [@RichardGowers](#) had told me there was another puzzle of a similar kind, so I thought ... 3/

— Timothy Gowers (@wtgowers) [May 24, 2020](#)

we could do the first one together and then the second one individually. It's all made much less painful by a website that enables you to solve it online, but also to put in small numbers (e.g. to indicate the options not ruled out for a given number), ... 4/

— Timothy Gowers (@wtgowers) [May 24, 2020](#)

or colours (to indicate whatever you want them to indicate).

What's great about this is that it allows you to develop arguments that would, if written down, be proofs that were several lines long, without having to hold a lot in your head. Things like, "If I put a 2 ... 5/

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there, then none of those squares can be a 2, which means that there must be a 2 in that row, but that means that there can't be a 2 there, so there must be one there. But that's impossible, so I can't have put in the first 2."

What's also great is that it turns ... 6/

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very naturally into a cooperative exercise — it's easy for everyone to spot little arguments that other people haven't yet noticed. So it really felt as though I was collaborating on roughly equal terms with my 12yo son and 9yo daughter. 7/

— Timothy Gowers (@wtgowers) [May 24, 2020](#)

The first puzzle can be found here. 8/

<https://cracking-the-cryptic.web.app/sudoku/tjN9LtrTL>

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A sign of the success of this, other than the fact that we were all hooked on it for over an hour, is that my children were desperate to do the other one. So we all got set up. And then something else interesting happened. We all got pretty bogged down, in my case ... 9/

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partly because I misunderstood the "check" function. At some point I thought I might have made a mistake, so I pressed "check" and it told me that it didn't look right, so I deleted a lot, before realizing that it was merely telling me I hadn't finished. (But actually ... 10/

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I think I *had* made a mistake.)

The interesting thing wasn't that, however. It was that we decided it would be more fun to collaborate again, and, just as is so often the case in serious mathematical research, we were far more efficient as a team than as individuals. 11/

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So they got a remarkable glimpse of what it's actually like to do mathematical research, with the way it can grab you, its dead ends, the getting stuck and unstuck, how tiny progress can unlock the door to much larger progress, how proofs can split up into lemmas, how ... 12/

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you sometimes need to consider several cases, the use of proof by negation, how a problem that initially looks impossible can sometimes be cracked, and the efficiency gains that can come from joint work.

Did I mention that we probably spent about three hours on it, all told ? 13/

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I'd do the same again, and so would they.

Here's puzzle 2. 14/

<https://t.co/Y0JHt1tOke>

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