



The proof is in the pudding.

Opening a copy of *The Mathematical Intelligencer* you may ask yourself uneasily, "What is this anyway—a mathematical journal, or what?" Or you may ask, "Where am I?" Or even "Who am I?" This sense of disorientation is at its most acute when you open to Colin Adams's column.

Relax. Breathe regularly. It's mathematical, it's a humor column, and it may even be harmless.

Overcoming Math Anxiety

Colin Adams

There is a crippling disease that has a vice grip on the nation. It is lowering the Gross National Product, causing whole communities to break out in hives, and convincing many people to stay home with the covers over their heads. Of course, I could only be talking about Math Anxiety.

This poison ivy of the soul has a long and mangy history. Isaac Newton himself had such a bad case that while he wrote the *Principia Mathematica* he was shaking from head to foot. Joseph Louis Lagrange was bedridden for a week before he could bring himself to write down his famous multiplier. And Evariste Galois preferred risking his life in a duel to grappling with the mathematics that made him so nauseous.

Of course, math anxiety is not the only ailment associated with mathematics. There is math incontinence, math male pattern baldness, math itch, and math runny nose. However, today, we will focus our attention on math anxiety, leaving those other maladies to a series of articles that I am writing for the *Notices of the American Mathematical Society*.

How do you know if you suffer from math anxiety? Here is a quick test. Check off each of the symptoms that you experience when confronted with mathematics.

Symptoms of Math Anxiety.

- A. Hyperventilation.
- B. Holding your breath.
- C. Sweating profusely, while holding your breath.

- D. Sweating profusely, while holding Spanier's *Algebraic Topology*.
- E. Eating other people's bag lunches.
- F. Uncontrollable shaking, hopping, or doing the rhumba.
- G. Wearing a heavy winter coat in the Math Resource Room.
- H. Putting pencils in your nostrils or ear holes.
- I. Sucking your thumb.
- J. Sucking your T.A.'s thumb.
- K. Rapid heart beat.
- L. Rapid pulse.
- M. Rapid heart beat but no pulse.
- N. Rapid pulse, but no heart beat.
- O. No pulse or heart beat.
- P. K, L, but not O.
- Q. P, M, N but not L.
- R. Not R.
- S. Extreme nausea, accompanied by hallucinations of large mammals lecturing you on Euclid's parallel postulate.
- T. The feeling that you and calculus are in a custody battle over your mathematical future and the judge has ordered you to make child support payments.
- U. The sensation that someone has poured soda water up your nose, and now expects you to thank him for doing so.
- V. Dizziness, accompanied by an inability to stand straight on an inclined plane.
- W. The feeling that the alphabet is endless.
- X. A thousand red ants are crawling over your body, biting and stinging you until you want to scream.
- Y. The impression that a thousand red ants are crawling over your body, biting and stinging you until you want to scream.
- Z. The feeling that you are running out of ideas, but you must complete a list.

For each of the symptoms that you checked off, write down the number 6.9986. Add these numbers together. Divide by 2π . Take the natural log of

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the result. Add 1.145, and subtract 1.946. Exponentiate the result. If you are now sweating profusely and feel as if you had eaten bad tuna, you have math anxiety.

(Note: Or you may have eaten bad tuna. If so, you may be suffering from gastronomic masochism. I should have an article out on that in about a week. Try to hang on until then.)

Many presidents suffered from Math Anxiety, including all of the presidents from 1872 to 1891, and Teddy Roosevelt, who had to wear diapers as he charged up San Juan Hill, knowing he would need to count the enemy once he got to the top. Sharon Stone breaks into a torrential sweat when asked to give a proof of the central limit theorem, as does Woody Harrelson. Ed Begley Jr. refuses to appear in any movie involving a covariant functor.

Psychologists have settled on the following four treatments for math anxiety:

1. B.F. Skinner Approach: Here, the student is hooked up to an anxiety detector—usually a rabbit taped to the student's leg. A trigonometry lecture begins. As soon as the rabbit senses anxiety on the part of the student, it

rings a bell. The student is immediately forced to run a maze, at the end of which he or she is force-fed a pellet of rat food.

2. The Nurturing Approach: The professor begins the lecture, and as soon as he sees a student looking uncomfortable, he stops the lecture, comes over and gives the student a warm hug. He says, "Don't worry, you can do it. You're special. We're all special. Love is all around, if you just let it in." The other students in the auditorium come over, take hands, form a giant circle around the student, and sway back and forth, singing songs about how great Coke tastes.

3. Confronting Your Fear Approach: The student is tied to the chair. A drill sergeant screams in his face, "You want to know about real anxiety? You have no idea! I'm going to show you real anxiety. I'm going to make you wish you could hide your head in a big fat textbook and never come out."

4. Nature's Own Approach: The student is tied to a large rock and thrown in a pond. If the student floats to the surface, the rock is replaced by a larger rock and the process is repeated. If the student does not float to the surface, he or she is declared cured.

Although much has been learned,

there are still many important questions to pursue.

Will there ever be a vaccine for math anxiety? And if so, will it be one of those ones where you swallow a pink cube of sugar? Should triskadekophobia be considered a type of math anxiety? Are math anxiety and math phobia the same or slightly different? These are just a few of the issues addressed in my upcoming anthology, appearing in a special issue of the *Journal of the Mathematical Psychoses Institute*.

Until this scourge can be cured, we will need dedicated facilities: ambulances to rush those with sudden-onset math anxiety to emergency rooms staffed by ready Ph.D. math educators, quarantine wings in hospitals to prevent Ebola-like epidemics. And most importantly, we will need substantial federal grants to support those of us who are at the cutting edge of research in this seminal field.

Some day, perhaps, no one will tremble at the sight of a percentage sign. Lunches will not be lost to logarithms. Then, researchers like me will need to find other sources of support. But in the meantime, continue to read my papers on the subject.

Errata

We recently have had some trouble correctly attributing articles. In vol. 22, no. 3, misspellings occurred of the names of Bernard Genevès and Nikolai V. Ivanov. And now in vol. 22, no. 4, we inadvertently interchanged the photographs of the authors, Oleksiy Andriychenko and Marc Chamberland (see below for the correction). Our apologies to these authors, and to the readers.



OLEKSIY ANDRIYCHENKO



MARC CHAMBERLAND