

A Favorite Math Puzzle

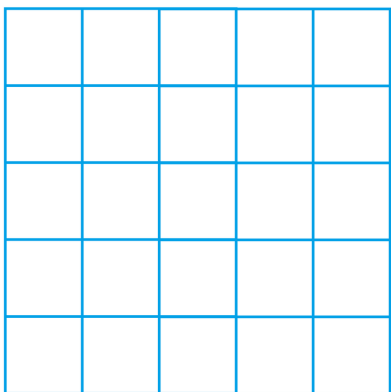
G'Day!

This is your math friend James. Today I am answering a question from Henry.

WHAT IS YOUR FAVORITE MATH PUZZLE?

Well, it turns out I have story to tell in response to this question!

I grew up in Adelaide, Australia, in an old Victorian home. Every room of that house had a pressed-tin ceiling and on each was imprinted some decorative design: flowers and patterns and such. The ceiling in my childhood bedroom had a particularly geometric pattern. It was just simply a five-by-five grid of squares (with little flowers at each corner).

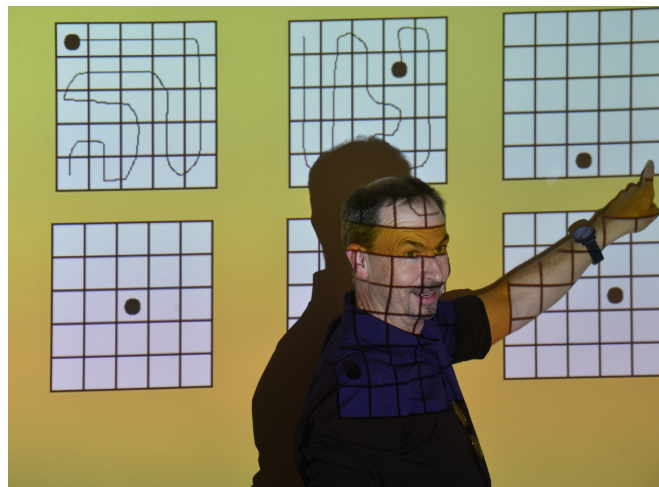


Every night I would lie in bed staring at that pattern as I was falling asleep. And what does a young lad naturally do? Start to make up puzzles and games for himself based on that grid.

Here's one of the first puzzles I remember that gave me a mathematical surprise.

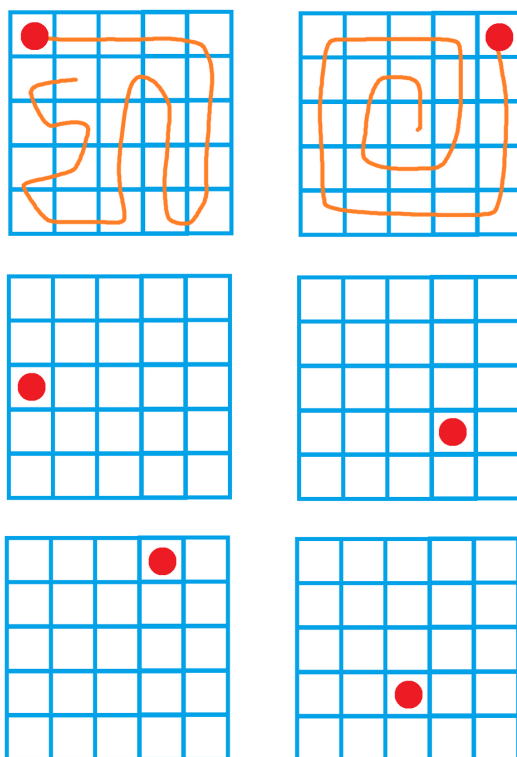
puzzle #1

How many squares are in that five-by-five grid of squares? (I saw more than 25!)



But there was one puzzle I made up for myself that really stayed with me ... for years! And I honestly believe that this puzzle is what made me a mathematician.

I'll share it here, first without words. Can you guess what the puzzle is? (You can also see me giving a talk about this puzzle in the photograph. I really like this puzzle!)



The challenge is: *Given a starting point, can you walk a path of vertical and horizontal steps that stays within the grid and visits each and every cell exactly once?*

Do try this puzzle. It is really fun!

And as you try it, you find that some starting positions are do-able, and that some starting positions seem tricky.

*Which starting positions seem do-able to you?
Which ones seem tricky?*

To continue my story ...

Those tricky starting points stuck in my head. I tried to solve this puzzle night-after-night, starting at those tricky positions, and could never solve it. And I began to wonder if they weren't just tricky, but were actually impossible starting points. But I wasn't sure. Maybe I just needed to try another 300 times?

And this is the question that stayed with me ... for years! Are those tricky points actually impossible? Could there be a logical explanation as to **why** they are impossible? (I was convinced they were.) Or maybe I just needed to try each of them yet again?

Check out [MATHICAL](#) for award-winning math books for middle-schoolers and teens, the YouTube channel [NUMBERPHILE](#) for math videos galore, and [MORE MATH!](#) for even more resources. Wowza!

One of the resources listed in [MORE MATH!](#) is a super mathematical coloring book by A. Bellos and E. Harris. It is perfect for this week's topic!

And then, about six years later, I remember I was walking to school (I was in grade 10 by then), not thinking about this puzzle in particular, when suddenly a picture just flashed into my mind! It was the five-by-five grid of squares, but the cells were colored this time. And then, I suddenly realized:

Oh! Those tricky cells really are impossible starting points AND I now know why!

I was ecstatic. I had finally solved my puzzle!

That really was an incredible moment for me. It gave me such a rush of joy. And it was experience that truly made me fall in love with mathematics.

puzzle #2

What do you think I saw? What coloring picture proved to me that it is NOT possible to walk a path that visits each and every cell of the grid exactly once for those "tricky" starting positions? (Maybe your flash of insight will come in less than six years!)

Do you have a math question for me to answer, or try to answer?

Write to me at the website. Each week I'll pick a new question and give my thoughts on it!

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The NMF Weekly is written by mathematician Dr. James Tanton as a resource for friends and fans of the 2021 National Math Festival.

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