Math and Desserts

G'Day!

This is your math friend James. Today I am answering an "I wonder" math question from Jenn M. in Pennsylvania. She asked:

"CAN YOU DO SOMETHING WITH MATH AND DESSERTS?"

Again, it is one of those questions that makes me think! First, since I was about to write an essay about desserts, something non-mathy came to my mind. I recall a friend of telling me she once had to write a story for her English class entitled LOST IN THE DESSERT. Her teacher had made a spelling mistake, clearly wanting her students to write an exciting story about surviving heat and thirst. But instead, my friend wrote a story about being lost in yellow custard. We all make slips and mistakes, even English teachers, and this was a fun mistake to make!

> Can you think of other words in the English language that possess a double s, like "dessert," that become another English word if you change the double s to a single s, like "desert"?
>
> I can think of "caress" and "cares" as another example. There must be more!

And thinking of this made me recall my childhood in Australia. In the U.S. there are things called "sprinkles" that you put on top of sundaes and such. They are tiny, colorful, little candy pieces, each a section of a thin long string of candy. The equivalent in Australia are tiny little candy balls, called "Hundreds and Thousands." We used to put them on ice-cream too. But better yet, we'd put them on buttered bread and make what is called Fairy Bread.

And then, after thinking about Fairy Bread, I noticed that the photo I have above shows a square piece of bread sliced along the diagonal to make two triangles. I actually prefer my bread sliced to make two rectangles. And then I wondered: Does it matter? (At least, mathematically.)

puzzle #1

A perfectly square slice of bread is cut into TWO pieces by a straight line cut through the center of the square.
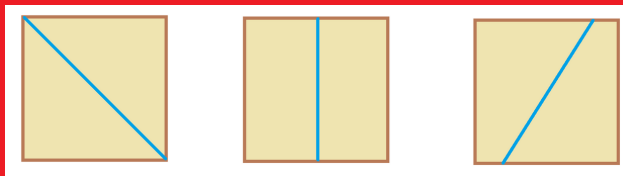
Each of the two pieces has the same area and possesses the same amount of crust.

Is it possible to slice the square into THREE pieces, each of the same area and each with the same amount of crust? (More than one cut is probably needed.)

puzzle #2

Telvar baked a rectangular pan of brownies. While they were cooling, someone came in and cut out a perfectly rectangular piece, but at an odd angle.

Telvar was disappointed because he was going to give his brownies to two friends, cutting the large rectangle into two equal parts.

But then Telvar realize all is not lost. He figured out he could, with a single straight-line cut, still divide what remains of the brownies into two pieces of exactly the same area.
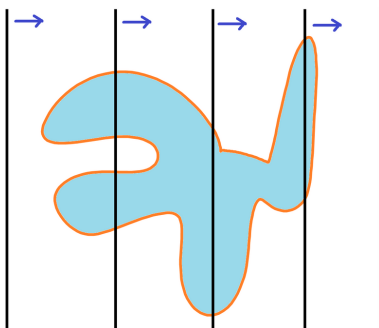

Can you see how?

↑ Here's a famous puzzle!

In theory, it is always possible to divide ANY given shape into two portions of equal area. Just start with your cutting knife to the left of the shape and slowly sweep it across the figure to the right. Initially, no area lies to the left of the knife, but by the end of the process, all the area of the shape lies to the left of the knife. So, in theory, there must be some intermediate position that has 50% of the area of the shape to the left of the knife.

One trouble: this theory doesn't tell you when to stop moving the knife!

Tevlar, on the other hand, knew exactly where to place his knife to solve his puzzle.

WRITE TO ME

Do you have a math question you'd like me to answer, or try to answer?

Have an adult help you to write to me at the website. Each week I'll pick a new question and give my thoughts on it! Plus I'll give me solutions to the most recent puzzles.

OTHER RESOURCES

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!

If you are interested in cutting unusual things in half, check out this video from Numberphile on cutting Möbius bands.

The NMF Weekly is written by mathematician Dr. James Tanton as a resource for friends and fans of the 2021 National Math Festival.
Learn more at globalmathproject.org/nmf-weekly & nationalmathfestival.org