

# Cast Puzzle



## Mr. Nobuyuki's fraction puzzle

$$\frac{\square}{\square\square} + \frac{\square}{\square\square} + \frac{\square}{\square\square} = 1$$

Fill in the boxes using each number from one to nine exactly once. Note that all the denominators are two-digit numbers.

Stanford University's Dr. Knuth, Donald Ervin is considered a god in the field of programming. Since attending my lecture in the U.S., though, he's become such a fan of my puzzles that he treats me like a god. I visited him at his home early this summer, and shortly thereafter he made his first trip to Japan as a recipient of the "Kyoto Prize." After meeting with the emperor at the Imperial Palace, he came to visit me in my work studio, at which time, he drew a puzzle I had created on a piece of paper and told me he and two other recipients of the "Kyoto Prize" had enjoyed solving it at their hotel in Kyoto.

I would like you to try to solve this puzzle as he did, using only your brain, without the help of a computer. Donald told me that he thinks advanced puzzle fans will be able to solve it in about 30 minutes.

My two fondest memories of Donald are of taking him to a sushi shop with a rotating carousel following a formal dinner at the Imperial Palace and staying at a Japanese inn in Hakone, together with our wives. Also, after their return to the U.S. we received a quilt that Donald's wife Jill had made for us by hand.



■ **Question #1:**

What toy can you play with for anywhere from a couple of days to a week if you're fast, and a lifetime if you're not, and costs only a few hundred yen?

Answer: the interlocking ring puzzle. This toy was originally made by blacksmiths in the U.S. using flattened wires, mainly as a distraction from working on horseshoes and other livery items. The problem with these early versions was that they were easily deformed, and if you became frustrated, you could use brute force to separate the pieces. The Cast Puzzle, a slightly larger version of this original, is made of strong zinc alloy rather than delicate wire, and the level of difficulty has been increased.

We spoke to Mr. Nobuyuki Ashigahara, the puzzle-maker who created the Cast Puzzle, to hear the stories behind its development.

It was 27 years ago when I bought an interlocking key puzzle at a flea market in London. I found it to be so fascinating that I wanted to try and improve upon the original to make a toy that everyone could enjoy. Three years later I approached Hanayama Gangu Corp. to see if they were interested in marketing such a toy. From that point, it took

two more years of extensive time and effort for me to produce the final product, even though its only apparent difference is that it's slightly larger and more precision-made. We have since exported it around the world, even back to England, and all the refinements over the original have contributed to its being exceptionally well-received. And it all started from my simple question of, "How could I made this toy better?"

Beyond upgrading existing brain teasers, Mr. Ashigahara also creates his own mathematical and logic puzzles. He even came up with a popular question game called "Does it exist?" used for contestants on the "Magical Brain Power" Japanese TV quiz show. Of the many questions we wanted to ask this creative thinker, the one we chose was: When do you come up with the idea for a puzzle? This was his answer.

I often have scary dreams at night, so I think about puzzles before I go to bed. I also think about puzzles when I'm taking a bath, sitting on the toilet, traveling on a bullet train and many other places. I basically think about them everywhere, because there is no time or place where I am prohibited from doing so. Don't you sometimes wish you had a certain item or product

that just doesn't exist yet? My thinking is basically that same kind of wishful thinking. When I come up with ideas for mathematical puzzles, I first test them by programming them into a computer. Some are solved so quickly they don't work well at all, while others have no answers, or too many answers. The computer is a great tool for ascertaining if I have a viable puzzle question. About 90% of my ideas I end up eliminating at this stage. This process, though, is very important for developing a good puzzle.

■ **Question #2:**

What aspects of life help create abundance, or facilitate technological breakthroughs?

What's most important is that people are constantly engaged in imagining or wondering about things that don't yet exist.

$$\frac{12}{9} + \frac{34}{5} + \frac{68}{7} = 1$$