

# The secret of $\sqrt{2}$

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Please indulge me as I ask an easy question: How far past the decimal point can you recite the square root of 2? A couple of digits, maybe, like 1.4 or 1.42?

If you asked the same question of Japanese people on the street, I'm pretty sure that many of them would be able to tell you as far as 1.41421356. Yes, up to the 8th decimal place. Check around if you don't believe me.

Last month, I discussed some of the advantages of using words of Chinese origin in Japanese. As everyone with exposure to Japanese knows, it is not just Chinese that Japanese has absorbed. Over the centuries Japanese has absorbed elements of, in rough historical order, Chinese, Portuguese, Dutch, German and English. Currently, American English greatly affects Japanese vocabulary. Today I'd like to demonstrate one way this adoption has increased the usefulness of Japanese.

If we go back to the question about  $\sqrt{2}$ , we might note that not just  $\sqrt{2}$ , but also  $\sqrt{3}$  and  $\sqrt{5}$  are commonly known among Japanese. Regarding  $\sqrt{3}$ , I'm pretty sure they will tell you that  $\sqrt{3}$  is 1.7320508 and  $\sqrt{5}$  is 2.2360679—again down to the 8th decimal place precisely. You might think the person a genius.

Actually, Japanese makes it much easier to memorize long strings of digits than English does. In order to do it in English you have to either be a genius with numbers or learn special memory techniques allowing you to assign sounds to numbers. In Japanese, we already have the latter tool, and most natives are taught to take advantage of it.

Recall that Japanese has two main ways of counting: "ichi, ni, san..." from Chinese, and "hito-tsu, futatsu, mittsu..." from Japanese. This looks complex and confusing, but because of the dual system, dry meaningless numbers like  $\sqrt{2}$  can be made into meaningful phrases.

1.41421356 for  $\sqrt{2}$  can be read as: *Hito-yo-hito-yo-ni-hito-mi-go-ro*. This phrase combines both the Japanese and Chinese systems arbitrarily for a purpose. It means something like: "Every single night offers the right time for seeing people."

These days we have the additional English influence on Japanese. This gives us further flexibility. The numerals of 1.7320508 for  $\sqrt{3}$  may be read as: *Hito-na-mi-ni-o-go-re-ya*, which means: "Treat me (to food or drink) like other people do." This phrase is made possible by reading the numbers using Japanese, Chinese and English. Can you tell which one is English? The first zero is read as "o"—from

the English letter "O," while the second zero is read as "re," from Chinese.

Similarly, 2.2360679 ( $\sqrt{5}$ ) is read as: *Fu-ji-san-roku-o-mu-na-ku*, again a combination of the three languages. The phrase means, "At the foot of Mt. Fuji sings a parrot." Here again, zero is read as "o."

Useful memory devices like this are wonderful for remembering historically important dates. The year U.S. Commodore Matthew Perry arrived in Uraga Port in what is now Kanagawa Prefecture—1853—is easily remembered this way: *I-yah-go-san*, which means "Oh no, a miscalculation!" The French Revolution in 1789 can be remembered with: *Hi-na-wa kusuburu Basutiyu*, which translates "Match cords smolder at the Bastille." The arrival of Christopher Columbus in what is now America in 1492 ("when Columbus sailed the ocean blue") can be read as: *i-shi-ku-ni*, which means "a stone country." I memorize it as Columbus finding a stone country! (To native English speakers, the English mnemonic device may be better for Columbus' big year, but certainly not to Japanese, who cannot naturally perceive the rhyming effect.)

I was a bad history student, so my stock of examples from Japanese is quickly exhausted. I have asked some friends with better memories for help, and thanks to them, we have some more interesting examples:

794: "*Na-ku-yo uguisu Heiankyo*." This translates "Nightingales sing at the Heiankyo capital." In this year the Japanese capital was moved from Nara to Kyoto, which was then called Heiankyo.

1192: "*Ii-ku-ni tsukuru Kamakura bakufu*" which means "A good nation built by the Kamakura shogunate."

1549: "*I-go-yo-ku hiromaru Kirisutokyo*," meaning "Since then Christianity expands well." This is the year when Spanish Jesuit missionary St. Francis Xavier arrived at Satsuma, today's Kagoshima, aboard a Portuguese ship.

Those of you more attuned to Japanese *mora*, the syllablelike units comprising the Japanese sound system, may have noticed all the phrases are basically composed of either five or seven *mora*, or beats. Because natives like this rhythm (it's found in haiku, for instance), such numbers are more easily memorized, especially when given a meaning associated with it, as in the historical examples above.

The advantages of being able to make phrases describing numbers seem to be losing out these days, however. A small calculator, or even mobile phone, is almost always available if we need to know a square root. For historical dates, we check the Internet. This all seems like yet another way we are losing "original skills" in exchange for convenience.

I'm afraid we have lost lots of indigenous intuitive abilities, thanks to great inventions and other innovative devices.