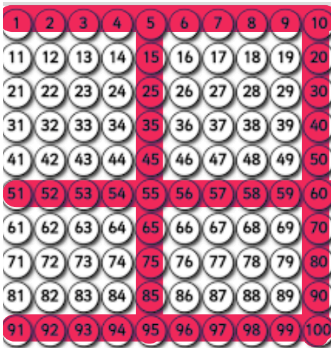
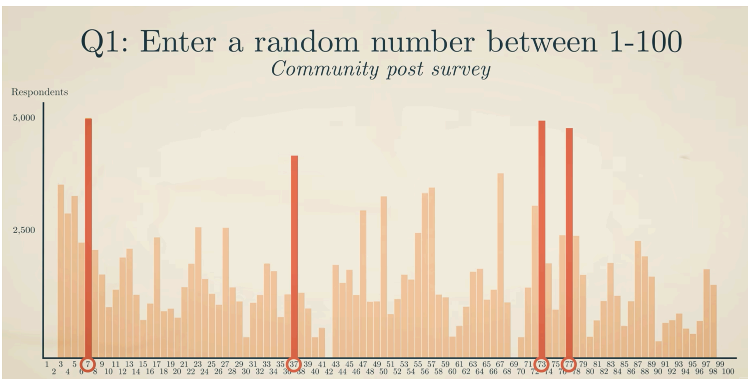
The Mystique of 37

Pick a number between one and one hundred; pick the most random number you can think of. If you are like the thousands of people who have been asked this question before, you likely just thought of 37. If so, 37 isn't magic, and it isn't a coincidence; it is a fascinating glimpse into the human brain's struggle with randomness. It is a deeply psychological choice that our brain makes. Writing out the numbers one to 100, we can see that we usually skip the extremes, 1–10, 90–100, and the 50s as we tend to think they are too central. Next, we can eliminate all round numbers ending in 0 or 5. This leaves us with the numbers below. Already, without realising it, we aren't being random at all; we tend to follow hidden algorithms shaped by familiarity, culture, and subconscious bias. What feels like freedom of choice is a carefully filtered process.

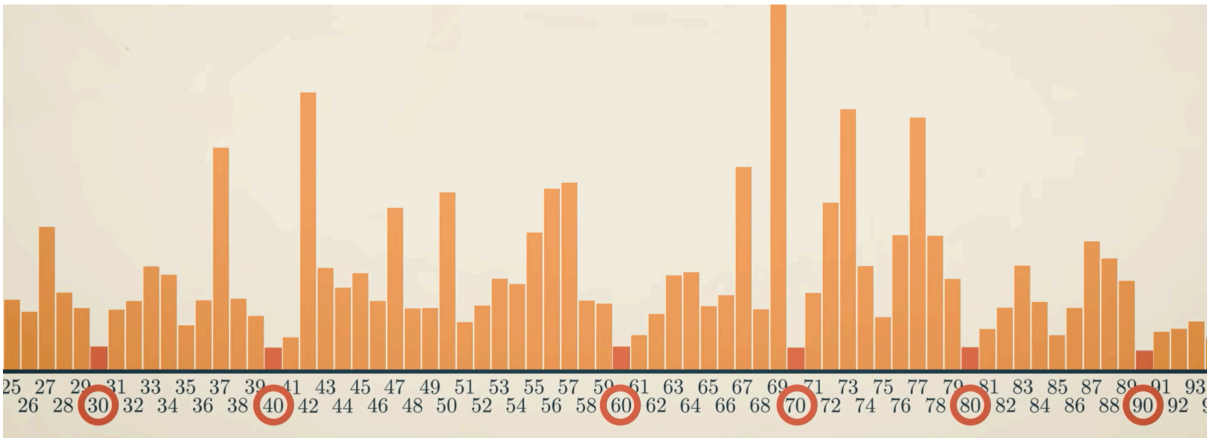


So why does 37 appear so often? Is it just a psychological quirk, or deeper? To answer this, we turn to mathematics. Far from a simple preference, 37% represents an optimal threshold for solving complex decisions—from choosing ice cream flavours to navigating the "apartment issue". This link between psychology and calculus reveals 37 as a number rooted in both human instinct and pure logic.

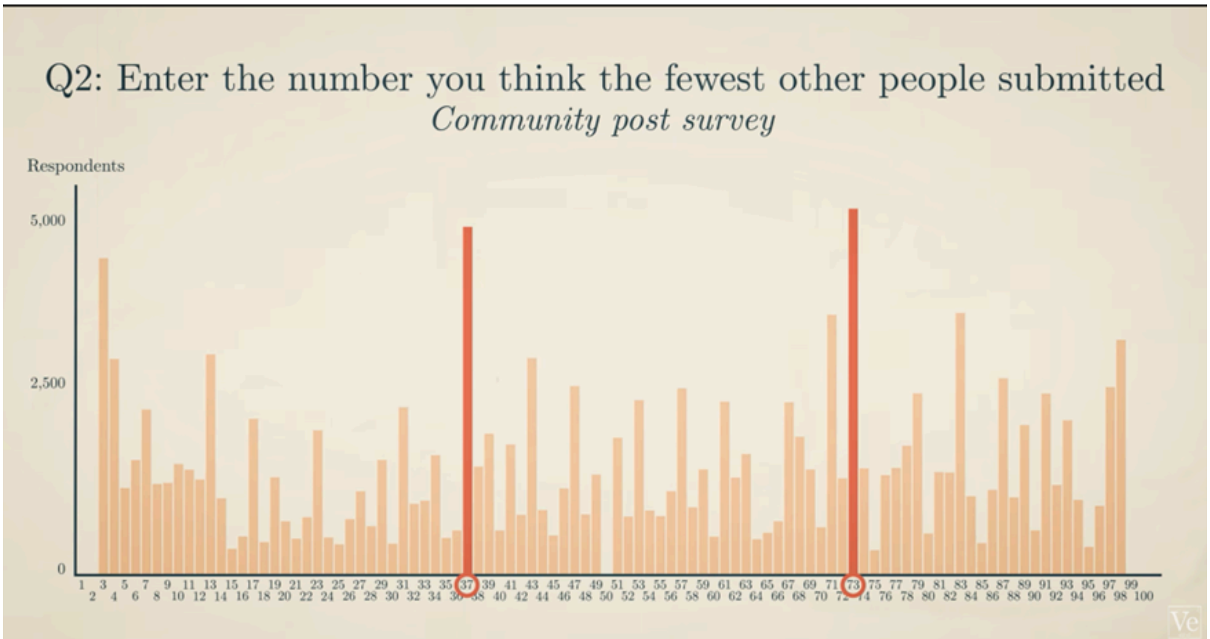
In a study in March 2024, by Veritasium, 200,000 people were asked to "enter a random number between 1 and 100." Excluding the extremes, the most common answers were 37 and 73, followed by 7 and 77 which all notably featuring the digits 3 or 7.



On the other hand, the **least-picked** numbers were ending in due to them being too round**,** as shown:



Another question was asked, “Enter the number you think the fewest other people submitted”.



This can be the overall of questions 1 and 2. These 2 clearly rise on top: 37 and 73

You may wonder why our brain does this and skips all the other numbers apart from **37** and **73.** Continuing the process of elimination, we can take out all the double numbers, like 11, 22, 33… etc. Next, we take out the numbers we see every day, like 64 in video games. Our brain also thinks even numbers are too orderly, or numbers starting with an even number, like **2**5 or **6**3. After this, we take out numbers ending in 9 and 1 as they are uncomfortably close to the next/previous decade. Finally, we are left with 17, 37, and 73, but psychologically, 17 is seen by us too often, eg, 17th birthday. The numbers 37 and 73 survive this filtering process: they are uncommon, non-round, and prime, giving them the appearance of randomness without familiarity. We also don't see them around much, and they just feel right. In this way, 37 isn't chosen because it is random, but because 37 survives every attempt to prove that it isn't common.

37 has many special qualities, like multiplying it gives repi-digits (37x3 = 111, 37x6=222… etc), also its reverse, 73 and it are both the 12th and 21st prime numbers.

What makes this even more fascinating is that 37% also appear in a well-known mathematical problem about decision-making. In our search for 'randomness,' are we unknowingly anchoring ourselves to a deep mathematical truth? We must pivot to the field of calculus, where the number 37 ceases to be a mere preference and transforms into a well known optimal-strategy for maximising success and being the optimum choice.

Now imagine a situation where a decision must be immediate and final—for example, going on a date with Zara and deciding whether to pursue a second date or wait for someone like Maya. There is no opportunity to return to previous choices; this is proven by the “secretary problem”. The question is how the “37% rule” can guide this decision. If there are 100 potential options, choosing within the first 10–15 likely means missing the best option, which would be forthcoming, while choosing within the last 10 risks having already passed it.

In practice, the strategy involves initially reviewing and rejecting a portion of options, then setting a stopping point (SP). After this point, each new option is evaluated against all previous ones, and the first option that is better than all prior choices is selected. Where is this point?

P(pick best option) = P(best option is here) x P(after SP you make it to x)

-Do this to all the options, and then you add them up.

= Σ P(best option is here) x P(after SP you make it to x)

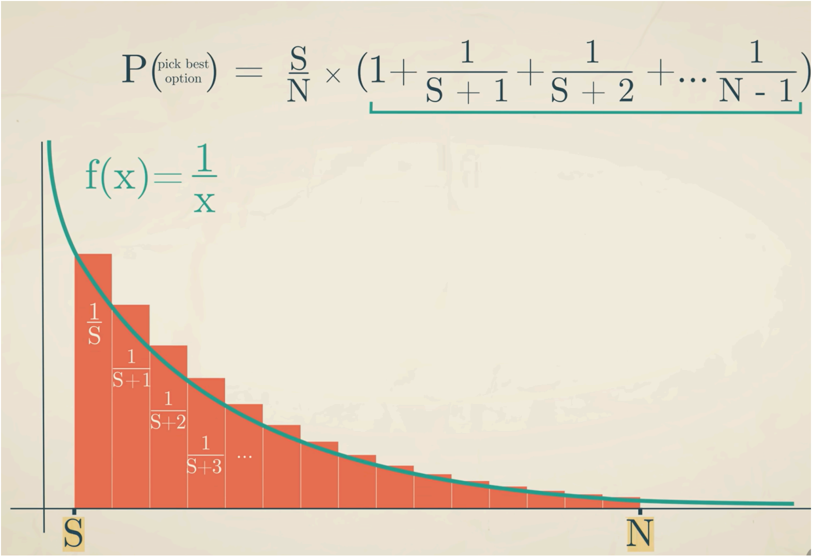
The P(best option is here) is always 1/N as it is completely random, but P(after SP you make it to x) is a bit trickier.

ΣP(**after SP you make it to** x). If the best option is right after (SP+1) the stopping point, the probability is 100%. If the best option is in SP + 2, the chance of you getting there is $\frac{S}{S+1}$**.**

This same calculation continues:
$=\frac{1}{N}$x$(1+\frac{S}{S+1}+\frac{S}{S+2}+\frac{S}{S+3}+\frac{S}{S+4}+\frac{S}{S+5}\ldots)$ up until the very last spot **N**. You only get there if you pass on all other options, which means the best option was before SP. Therefore, it is $\frac{S}{N-1}$.

In total, we get the expression $=\frac{1}{N}$x$(1+\frac{S}{S+1}+\frac{S}{S+2}+\frac{S}{S+3}+\frac{S}{S+4}+\frac{S}{S+4}\ldots\frac{S}{N-1})$.

If we factor out S, the remaining sum begins to resemble a well-known form. In fact, it closely approximates the function $\frac{1}{x}$, allowing us to find the area under the curve.



Then, if you take the integral (this means the bars above get infinitely small to find the area of the curve) with stopping point N and starting point S, you get:

$$\int_{S}^{N} \frac{1}{x} dx \quad = \quad [\ln(x)]_{S}^{N}$$

Next, to integrate, you take the log of the ending line and subtract the log of the starting line. When you integrate 1/x, the answer is the function ln(x). But since an integral measures a specific section, you must find the difference.

There is a 3-step logic:

1) Identify the formula: for 1/x, the formula - ln(x)
2) The top value (n): you calculate ln(n).
3) The bottom value (s): you calculate ln(s).

$$ln(N) \ - \ ln(S),$$

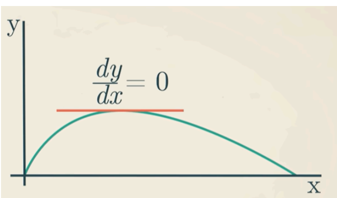
This. therefore leaves the bit that you need.

Now use the **logarithm quotient rule:** “subtracting two logs is the same as dividing numbers inside a log”.

$$ln(\frac{N}{S})$$

P(pick best option) = $\frac{s}{n} x ln(\frac{n}{s})$

To maximise this probability, we differentiate the function and set the derivative (in simple terms, the peak) to 0. This allows us to find the optimal stopping point.



This gives the formula: $ln(\frac{s}{n}) \ = \ -1$

$$\frac{s}{n} = e^{-1} = \frac{1}{e}$$

By the way, Euler's number is a mathematical constant approximately **2.718** representing the base of natural growth.

Solving this gives 0.37. In other words, revealing that this seemingly random number is mathematically inevitable.

This shows the stopping point (SP) is 37%: you should reject the first 37% of options, then choose the next best. The probability of success using this method is also 37%. Although this may be impractical if the total number of options is unknown, it can be applied to time—for example, in a 10-year period, spending the first 3.7 years exploring before choosing.

In conclusion, the mystique of 37 is not about the number itself, but what it reveals about us. Even when we think it is random, we follow hidden patterns. Surprisingly, it's proven that the best strategy is not based on guesswork, but on a precise mathematical balance between exploration and commitment.

Aditya Bhutoria Year 9

As a cherry on top, this document is 1373 words long, but unfortunately and surprisingly, only 31 thirty-sevens.

—Sources used through this essay—

www.youtube.com. (2024). *Why is this number everywhere?* [online] Available at: https://www.youtube.com/watch?v=d6iQrh2TK98 [Accessed 3 Apr. 2026].

Christian, B. and Griffiths, T. (2016). *Algorithms to live by : the computer science of human decisions*. Toronto: Henry Holt.