How to prove experimentally that $\infty = 3$ in my definition

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ABSTRACT

In this chapter, I describe how to prove my definition, in particular, $\infty = 3$, using random functions in EXCEL.

VERIFICATION METHOD

The random function in Windows and Excel generates random numbers greater than 0 and less than 1.

The inverse of the random number is used in this study.

In this study, we displayed 100,000 $f(x) = 1/RAND()$ and checked its average value $A(x)$. Then, we continued to refresh all 100,000 random numbers at the same time and continued the operation of observing the variation of the average value $A(x)$.

As a result of refreshing 100 times, $A(x) > 10$ with a probability of 99%. From this result, it is thought that as the number of $f(x)$ is increased as much as possible, the probability of $A(x) > 10$ will approach 100% as much as possible.

The probability that $10 \times \text{RAND()}$ is $n \leq 10 \times \text{RAND()} \leq n + 1$ ($0 \leq n < 9$) is 1/10.

**PROOF**

\[
C = \frac{1}{10} \left( \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7} + \frac{1}{8} + \frac{1}{9} + \frac{1}{10} \right)
\]

from my definition

\[
= \frac{2}{10} \left( \frac{1}{1} + \frac{6}{2} + \frac{6}{3} + \frac{16}{4} + \frac{1}{0} \right) = \frac{1}{0} \left( 1 + 3 + 2 + 4 + \frac{1}{0} \right)
\]

$= \infty (x + 10)$

\[
D = \frac{1}{10} \left( \frac{1}{0} + \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7} + \frac{1}{8} + \frac{1}{9} \right)
\]

from my definition

\[
= \frac{2}{10} \left( \frac{1}{1} + \frac{6}{2} + \frac{6}{3} + \frac{16}{4} + \frac{1}{0} \right) = \frac{1}{0} \left( 1 + 3 + 2 + 4 + \frac{1}{0} \right)
\]

$= \infty (x + 10)$

\[
C \times \left( \frac{\infty - 3}{5} \right) + 1 + 2 + 3 \leq A(x) \leq \frac{\infty - 3}{5} + 1 + 2 + 3
\]

\[
C \times \left( \frac{\infty - 3}{5} \right) + \alpha \leq A(x) \leq D \times \left( \frac{\infty - 3}{5} \right) + \alpha
\]

\[
\infty (x + 10) \times \left( \frac{\infty - 3}{5} \right) + \alpha \leq A(x) \leq \infty (x + 10) \times \left( \frac{\infty - 3}{5} \right) + \alpha
\]

\[
\therefore A(x) = (\infty + 10) \left( \frac{\infty - 3}{5} \right) + \alpha
\]

\[
A(x) = (\infty + 10) \left( \frac{\infty - 3}{5} \right) + \alpha \geq 10
\]

\[
\therefore (\infty + 10) \left( \frac{\infty - 3}{5} \right) = 10
\]

\[
\therefore \infty^2 + 7 \infty - 80 = \infty^2 + 7 \infty = \infty^2 + 2 \infty = 0
\]

\[
\therefore \infty = -2 = 3
\]