Mathematical concurrence concerning $\frac{x}{7^n}$

by

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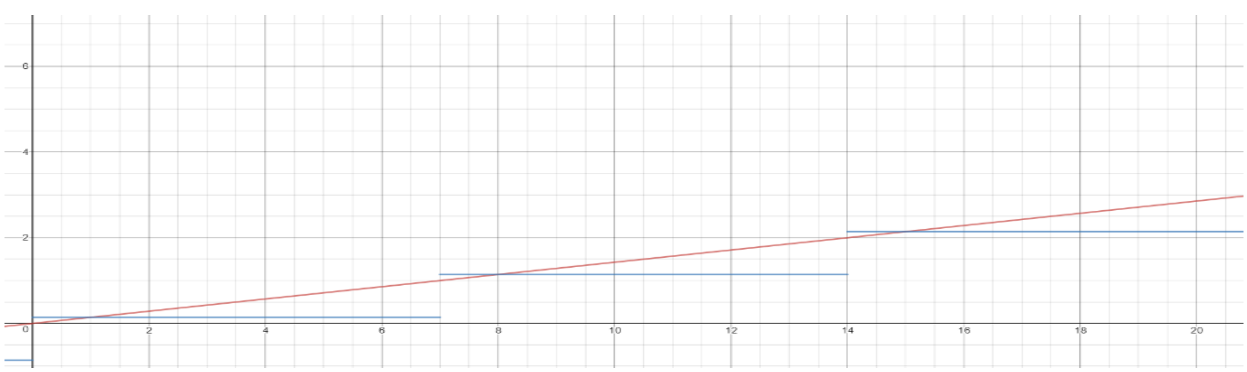
Abstract

In this combined work of mathematical concurrence, we present approximations for $\frac{x}{7^n}$ in the form of infinite sums where x being 1 and being equal to $\{y: y|7+1, y \in N^+\}$, consisting of mathematical constants i.e. Pi (π), the Golden Ratio (φ), the Silver Ratio (δ_S), Euler's number (e) and Archimedes Constant ($\sqrt{2}$).

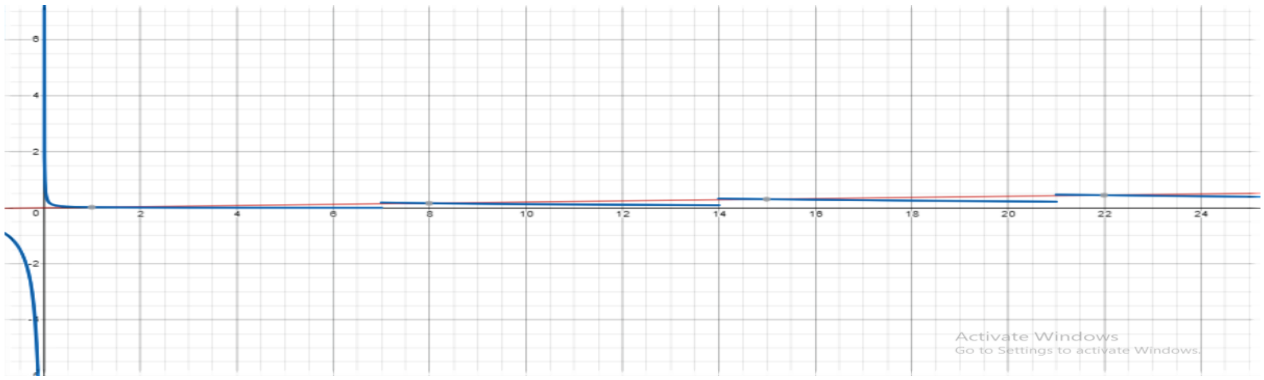
We have,

$$\frac{x}{7} \approx \left\lfloor \frac{x}{7} \right\rfloor + \pi - 3 \leftrightarrow x = \{1, \{y: y|7+1, y \in N^+\}\} \qquad (1)$$



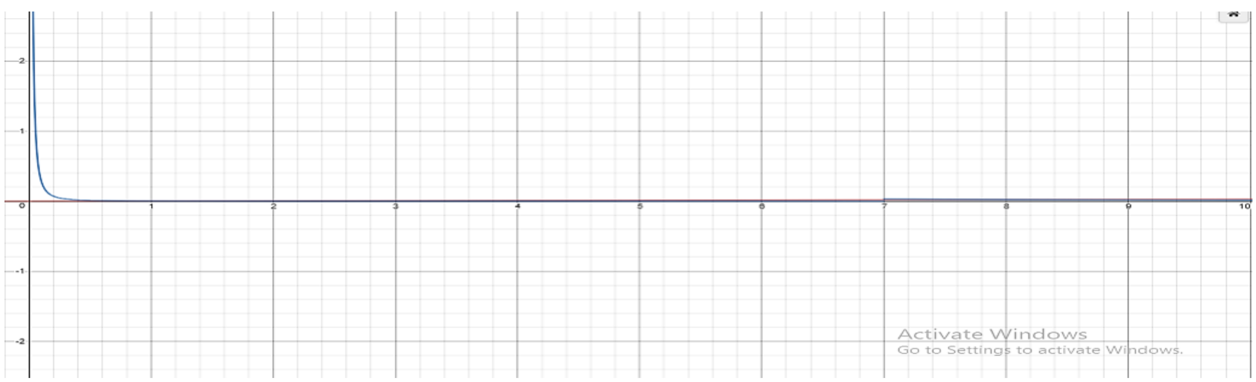
The above graph is for $\frac{x}{7}$ (red) and $\left\lfloor \frac{x}{7} \right\rfloor + \pi - 3$ (blue) where $x = \{1, \{y: y|7+1, y \in N^+\}\}$

$$\frac{x}{49} \approx \frac{1}{x}\left[\left\lfloor \frac{x}{7} \right\rfloor^2 + (\pi - 3)\left\{\pi - 3 + 2\left\lfloor \frac{x}{7} \right\rfloor\right\}\right] \leftrightarrow x = \{1, \{y: y|7+1, y \in N^+\}\} \qquad (2)$$



The above graph is for $\frac{x}{49}$ *(red) and* $\frac{1}{x}\left[\left\lfloor\frac{x}{7}\right\rfloor^2 + (\pi - 3)\left\{\pi - 3 + 2\left\lfloor\frac{x}{7}\right\rfloor\right\}\right]$ *(blue) where* $x = \{1, \{y: y|7 + 1, y \in N^+\}\}$

$$\frac{x}{343} \approx \frac{1}{x^2}\left[\left\lfloor\frac{x}{7}\right\rfloor^3 + (\pi - 3)^3 + (3\pi - 9)\left\lfloor\frac{x}{7}\right\rfloor\left\{\pi - 3 + \left\lfloor\frac{x}{7}\right\rfloor\right\}\right] \leftrightarrow \mathrm{x} = \{1, \{\mathrm{y}: \mathrm{y}|7 + 1, \mathrm{y} \in \mathrm{N}^+\}\} \quad (3)$$



The above graph is for $\frac{x}{343}$ *(red) and* $\frac{1}{x^2}\left[\left\lfloor\frac{x}{7}\right\rfloor^3 + (\pi - 3)^3 + (3\pi - 9)\left\lfloor\frac{x}{7}\right\rfloor\left\{\pi - 3 + \left\lfloor\frac{x}{7}\right\rfloor\right\}\right]$ *(blue) where* $x = \{1, \{y: y|7 + 1, y \in N^+\}\}$

Thus, from the aforementioned relations, we can conclude that,

$$\frac{x}{7^n} \approx \frac{1}{x^{n-1}}\left\{\left\lfloor\frac{x}{7}\right\rfloor + \pi - 3\right\}^n \leftrightarrow \mathrm{x} = \{1, \{\mathrm{y}: \mathrm{y}|7 + 1, \mathrm{y} \in \mathrm{N}^+\}\} \qquad (4)$$

From (4), we get,

$$\frac{x}{7^n} \approx \sum_{n \geq i \geq 0} x\binom{n}{i}\left(\frac{\left\lfloor\frac{x}{7}\right\rfloor + \pi - 4}{x}\right)^n \leftrightarrow \mathrm{x} = \{1, \{\mathrm{y}: \mathrm{y}|7 + 1, \mathrm{y} \in \mathrm{N}^+\}\} \qquad (5)$$

Using the coincidence $\pi \approx 2\delta_s\sqrt{\varphi} - 3$ ($accurate\ upto$ 0.008%) and substituting in (1), (2), and (3), we get,

$$\frac{x}{7} \approx \left\lfloor\frac{x}{7}\right\rfloor + 2\delta_s\sqrt{\varphi} - 6 \leftrightarrow \mathrm{x} = \{1, \{\mathrm{y}: \mathrm{y}|7 + 1, \mathrm{y} \in \mathrm{N}^+\}\} \qquad (6)$$

$$\frac{x}{49} \approx \frac{1}{x}\left[\left\lfloor\frac{x}{7}\right\rfloor^2 + \left(4\delta_s\sqrt{\varphi} - 12\right)\left\{\delta_s\sqrt{\varphi} - 3 + \left\lfloor\frac{x}{7}\right\rfloor\right\}\right] \leftrightarrow \mathrm{x} = \{1, \{\mathrm{y}: \mathrm{y}|7 + 1, \mathrm{y} \in \mathrm{N}^+\}\} \qquad (7)$$

$$\frac{x}{343} \approx \frac{1}{x^2}\left[\left\lfloor\frac{x}{7}\right\rfloor^3 + \left(2\delta_s\sqrt{\varphi} - 6\right)^3 + \left(2\delta_s\sqrt{\varphi} - 6\right)\left\lfloor\frac{x}{7}\right\rfloor\left\{2\delta_s\sqrt{\varphi} - 6 + \left\lfloor\frac{x}{7}\right\rfloor\right\}\right] \leftrightarrow \mathrm{x} = \{1, \{\mathrm{y}: \mathrm{y}|7 + 1, \mathrm{y} \in \mathrm{N}^+\}\} \qquad (8)$$

Thus, from the aforementioned, we can conclude that,

$$\frac{x}{7^n} \approx \frac{1}{x^{n-1}}\left\{\left\lfloor\frac{x}{7}\right\rfloor + 2\delta_s\sqrt{\varphi} - 6\right\}^n \leftrightarrow \mathrm{x} = \{1, \{\mathrm{y}: \mathrm{y}|7 + 1, \mathrm{y} \in \mathrm{N}^+\}\} \qquad (9)$$

From (8), we get,

$$\frac{x}{7^n} \approx \sum_{n \geq i \geq 0} x\binom{n}{i}\left(\frac{\left\lfloor\frac{x}{7}\right\rfloor + 2\delta_s\sqrt{\varphi} - 7}{x}\right)^n \leftrightarrow \mathrm{x} = \{1, \{\mathrm{y}: \mathrm{y}|7 + 1, \mathrm{y} \in \mathrm{N}^+\}\} \qquad (10)$$

Using the coincidence $\sqrt{2} \approx \left\{\sqrt[3]{\sqrt[3]{(\delta_s)^2 + (\varphi)^2 + (\pi)^2 + (e)^2}}\right\} - \sum_{k=01}^{\infty}\left(\frac{2}{10^{2k}}\right)$

($accurate\ upto$ 0.0014%) and substituting in (5), we get,

$$\frac{x}{7^n} \approx \sum_{n \geq i \geq 0} \frac{x}{\pi}\binom{n}{i}\left\{\frac{\pi\left\lfloor\frac{x}{7}\right\rfloor + \left(\left(\sqrt{2} - \frac{2}{99}\right)^{4.5}\right)^2 - (e)^2 - (\varphi)^2 - (\delta_s)^2 - \left(2\sqrt{\pi}\right)^2}{x}\right\}^n$$

$$\leftrightarrow \mathrm{x} = \{1, \{\mathrm{y}: \mathrm{y}|7 + 1, \mathrm{y} \in \mathrm{N}^+\}\} \qquad (11)$$

Substituting the coincidence

$$\pi^2 \approx \left[\left\{\sum_{10 \geq i \geq 01}\left(\ln\left(\varphi^{\frac{\varphi^i}{2i}}\right)\right)\right\} - \ln^2(\varphi)\right] - \frac{1}{100}\ (accurate\ up\ to\ 0.002\%)$$

in (5), we obtain,

$$\frac{x}{7^n} \approx \sum_{n \geq i \geq 0} \frac{x}{\pi}\binom{n}{i}\left\{\frac{100\pi\left\lfloor\frac{x}{7}\right\rfloor + \left[\left\{\sum_{10 \geq j \geq 01}\left(\ln\left(\varphi^{\frac{100\varphi^j}{2j}}\right)\right)\right\} - \ln^2(\varphi)\right] - \left(20\sqrt{\pi}\right)^2 - 1}{100x}\right\}^n$$

$$\leftrightarrow \mathrm{x} = \{1, \{\mathrm{y}: \mathrm{y}|7 + 1, \mathrm{y} \in \mathrm{N}^+\}\} \qquad (12)$$

From our observation we can conclude that, the greater the value of x in the L.H.S. be, the more accurate answer is yielded by the function at R.H.S.

References

1. 'Mathematical coincidences concerning π and $\sqrt{2}$' by Aditya Raj (http://vixra.org/pdf/1901.0296v1.pdf)