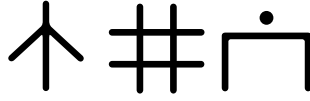# Power-based number system

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V 0.29 α

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1 Power-based number system for toki pona

Written by jan Loje with the help of jan Tamalu and Shaevor (mistakes are mine only)

This system should be:

1. based on power-of-10 notation, a.k.a. scientific notation,

2. easy to understand, learn, and use,

3. suitable for *toki pona*.

NOTES: < >: *read as*

2 Vocabulary

1	wan	个	one
2	tu	‖	two
3	sin	-ˈ-	three [3 lines]
4	lipu	□	four [4 sides]
5	luka	∩	five [toki pona hand]
6	pipi	井	six [6 elements]
7	len	冂	seven [4 sides + 3 lines]
8	musi	ઈ9	eight [two circles look like a kind of 8]
9	suli	∨	nine [the "big" digit]
10	sewi	宁	10 (base) followed by integer powers (1 is implicit): 2, 3, 4,... [raise]
20	tu sewi	‖宁	two × ten
30	sin sewi	-ˈ-宁	three × ten
100	sewi tu	宁‖	10^2
300	sin sewi tu	-ˈ-宁‖	three × ten^2
1000	sewi sin	宁-ˈ-	10^3
+	en	+	addition
-	weka	⋊⋉	negative [toki pona subtract]
.	sike	◎	separator for decimal part
№	nanpa	#	number prefix (ordinal)*
#	mute	‖‖	number prefix (cardinal)

*NOTE: compare Philipino ika- or pang-, Malay and Indonesian ke-, Chinese 第

3 Rationale

This system is a way to *read* numbers and dates written with the digits (0-9) in *toki pona* text. Additional meanings are added to some already existing *toki pona* words.

4 Use

4.1 Prefixes (when needed)

Ordinal and cardinal numbers

    $\#$ \<nanpa\> ordinal number

    ||| \<mute\> cardinal number

    ◯\>$\#$5 \<ona li nanpa luka\> *it's the 5th* (ordinal)

    ◯\>|||5 \<ona li mute luka\> *it's 5* (cardinal)

4.2 Positional digits

The values of digits are *positional* (common usage)

    That is $212 = 2 \times 10^2 + 1 \times 10^1 + 2 \times 10^0$

    12 \<wan tu\>

    2024 \<tu ala tu lipu\>

4.3 Numbers as powers of 10

sewi is the base 10 for all powers.

    $1000 = 10^3$ \<sewi sin\> *one thousand*

    $10{,}000 = 10^4$ \<sewi lipu\> *ten thousand*

    ...

    $10{,}000{,}000 = 10^7$ \<sewi len\> *a crore*

    ....

    $1\ 000\ 000\ 000 = 10^9$ \<sewi suli\> *a billion*

    ◯\>☺\>\>\$1,000,000,000 \<jan li jo e mani Mewika pi mute sewi suli\>

4.4 Very large (or small) numbers

Very large (or small) numbers can be expressed easily.

    10^{100} \<sewi wan ala ala\> *one googol*

    10^{10^2} \<sewi sewi tu\> *one googol*

4.5 Composed numbers

Numbers with multiplicative and additive values.

    The number to the left of *sewi* has multiplicative value.

    The additive value of a number (sequence) is stated explicitly with *en*.

    $4{,}000{,}000{,}012 = 4 \times 10^9 + 12$ \<lipu sewi suli en wan tu\>

4.6 Numbers with fractional parts

Number with a fractional part separated by a decimal point.

3.14 <sin sike wan lipu>

$3.14 = 314 \times 10^{-2}$ <sin wan lipu sewi weka tu>

4.7 Numbers with negative exponents

Negative exponents are prefixed by *weka*.

6.62×10^{-34} <pipi sike pipi tu sewi weka sin lipu>

4.8 Dates

ISO 8601 system

2024-05-12 <tenpo sike tu ala tu lipu **en** tenpo mun luka **en** tenpo suno wan tu>

5-12⟩○〉𝈺⨪ <tenpo mun luka en tenpo suno wan tu la ona li kama lon ale> His birthday is May 12th