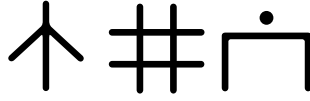


# Power-based number system



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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 proposal should be:

1. based on the common positional-digit decimal system,
2. unambiguous,
3. easy to understand, learn, and use for all common non-scientific and non-mathematical purposes,
4. suitable for *toki pona*.

## 2 Vocabulary

The ideas for the choice of the names are indicated between square brackets [ ]

1	wan	1	one
2	tu		two
3	sin	┌┐	three [3 lines]
4	lipu	□	four [4 sides]
5	luka	∩	five [toki pona hand]
6	pipi	≡	six [6 elements]
7	len	≡	seven [4 sides + 3 lines]
8	musi	∞	eight [two circles look like a kind of 8]
9	suli	∇	nine [the "big" digit]
10	sewi	┐	10 (base) followed by integer powers (1 is implicit): 2, 3, 4,... [raise]
20	tu sewi	┐	two × ten
30	sin sewi	┌┐┐	three × ten
100	sewi tu	┐	10 <sup>2</sup>
300	sin sewi tu	┌┐┐	three × ten <sup>2</sup>
1000	sewi sin	┐┌┐	10 <sup>3</sup>
+	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 Use

#### 3.1 Prefixes (when needed)

**Ordinal and cardinal numbers.**

*nanpa* #: ordinal number

*mute* |||: cardinal number

*ona li nanpa luka* = it's the 5th (ordinal)

*ona li mute luka* = it's 5 (cardinal)

#### 3.2 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*

#### 3.3 Numbers as powers of 10

***sewi* is the base 10 for all powers.**

1000 =  $10^3$  = *sewi sin*

10 000 =  $10^4$  = *sewi lipu*

...

1 000 000 000 =  $10^9$  = *sewi sul*

*jan li jo e \$1,000,000,000*

**reading:** *jan li jo e mani Mewika pi mute sewi sul*

#### 3.4 Very large (or small) numbers

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

a googol =  $10^{100}$  = *sewi wan ala ala*

or

$10^{10^2}$  = *sewi sewi tu*

#### 3.5 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 sul en wan tu*

#### 3.6 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*

### 3.7 Numbers with negative exponents

Negative exponents are prefixed by *weka*.

$$6.62 \times 10^{-34} = \text{pipi sike pipi tu sewi weka sin lipu}$$

### 3.8 Dates

ISO 8601 system

$$2024-05-12 = \text{tenpo sike tu ala tu lipu en tenpo mun luka en tenpo suno wan tu}$$

$$5-12 \text{ ona li kama lon} = \text{His birthday is May 12th}$$

*reading:* tenpo mun luka en tenpo suno wan tu la ona li kama lon

$$\textcircled{\text{L}} \textcircled{\text{D}} 5 + \textcircled{\text{L}} \textcircled{\text{O}} 12 \textcircled{\text{O}} > \wedge \div$$

### 3.9 Conflict with other number systems

In order to reduce the conflict with other toki-pona number systems, the numbers could be written with the usual digits (0-9), i.e. not "spelled-out":

$$\text{Ex. 3: } 4-3 \text{ ona li kama lon} = \text{His birthday is April 3rd}$$

*reading:* tenpo mun lipu en tenpo suno sin la ona li kama lon

$$\textcircled{\text{L}} \textcircled{\text{D}} 4 + \textcircled{\text{L}} \textcircled{\text{O}} 3 \textcircled{\text{O}} > \wedge \div$$