Kaktovik-numerals

Intro

On 18-04-2023 Haraban Ramm posted on the mailing-list about the Kaktovik numerals.

https://mathstodon.xyz/@johncarlosbaez/110215432175491555

The Inuit have a counting system based on the base 20. Back in 1994 in the local school at Kaktovik in Alaska students developed a counting system for the local language on the base 20. There is a subunit in the form of 5.
The counting system with base 20 is known in different cultures. e.g. The Mayans (Mexico) used a system with dots and horizontal bars.
Even in modern languages there are traces of the base 20 counting system. e.g. French express 80 as ‘quatre-vingt’ and 90 as ‘quatre-vingt-dix’…

Hans Hagen's implementation

A couple of hours after Hraban's post, Hans came already up with an implementation of the Kaktovik-numeral-shapes in MetaFun.

meta-imp-kaktovik.mkxl

Further information on the Kaktovik-numerals-system

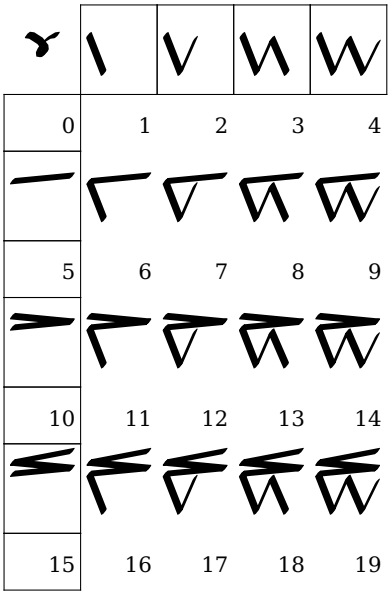
https://www.youtube.com/watch?v=EyS6FfczH0Q&ab_channel=Artifexian
https://www.youtube.com/watch?v=fIZB4bRwxqI&ab_channel=Dave
https://www.youtube.com/watch?v=ObRFHiU_r9I&ab_channel=TheFerret

The key to writing numbers in Kaktovik system

In order to understand how numbers are composed hereunder is the way in the decimal and in the Kaktovik system.

Decimal				Kaktovik			
10^3	10^2	10^1	10^0	20^3	20^2	20^1	20^0
1000	100	10	1	8000	400	20	1

The following table shows the relation between the vertical bars (1 to 4) and the horizontal bars tuplets of 5



Examples

20	$1 \times 20^1 + 0 \times 20^0$	
30	$1 \times 20^1 + 10 \times 20^0$	
40	$2 \times 20^1 + 0 \times 20^0$	
100	$5 \times 20^1 + 0 \times 20^0$	
1000	$2 \times 20^2 + 10 \times 20^1 + 0 \times 20^0$	
2023	$5 \times 20^2 + 1 \times 20^1 + 3 \times 20^0$	

So the date of today would be:

19 - 4 - 2023

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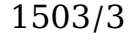
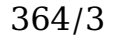
Frappant is the possibility to solve arithmetic visually with these Kaktovik-numerals. The approach is to look how patterns fit in the left and right part of the equation.

The presented examples are from:
https://www.youtube.com/watch?v=ObRFHiU_r9I&ab_channel=TheFerret

Decimal		Kaktovik
2 + 2 = 4	→	
17 − 7 = 10	→	
1503/3	→	
364/3	→	remainder