Pictographic Numbers

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‘Pictographic Numbers’ is a pictographic number system in the tradition of ancient societies such as the Egyptians.

Different graphics pictures are used to represent different quantities.

Due to practical limitations, in this work I have used uppercase English letters in place of the graphics pictures. However it is possible to also use a range of graphics pictures, such as a picture of a goat, a house or a bag of wheat to represent the quantities in the model.

**Base 10 version**

Number system -

A 1

B 10

C 100

D 1,000

E 10,000

.

.

.

Z 10^26

Example

Number: CCAA1 = 1,000+1,000+1+1 = 2,002

Also written as C2A2

Each letter appears 0 to 9 times

addition: concatenate the two strings of letters and simplify,

e.g EBBA + BA = EBBA BA = EBBBAA = ECA

multiplication: for C x DAB, shift each of the letters D,A,B up two letters (C = 3rd letter)

simplification: for 9 occurrences of the same letter, replace with the next letter up

subtraction: reverse simplification, replace a letter with 9 or the next lowest letter then remove the subtraction value, e.g. N with MMM,

e.g. CN – M = CMMM – M = CM

By convention highest letter is listed first although that is not necessary

**Simplification**

For 10 occurrences of a letter, replace with the next higher letter in the alphabet

HCCCCCCCCCC = HD

BAAA = BA3

Example Number

Decimal 78,384

Alphabetic Number E7D8C3B8A4

**Addition**

1). Write the two numbers along the page as one number

EBBA + BA = EBBA BA

2). Simplify the total list of letters

= EBBBAA = EB3A2

**Subtraction**

1). Write the two numbers across the page

ECA – BA

2). Expand letters in the first number to make available letters to remove, e.g a C is equal to six B’s, a B is equal to six A’s, the next lower letter in the alphabet.

= EBBBBBBBBBBA – BA Expand the C into an BBBBBBBBBB to allow the removal of a B

It may be necessary to expand one of these letters into ten of the next lower letter, down several steps in the alphabet until reaching the number that is to be removed.

3). Remove the letters in the second number from the first number

= EBBBBB

= EB5

**Multiplication**

CBAA x ECBA (e.g 44 \* 1339 = 58916)

1). Write down 1 line for each letter in the first number

*C* GEDC (each letter shifted up 2 letters because ‘C’ is the third letter in the alphabet)

*B* FDCB (each letter shifted up 1 letter because ‘B’ is the second letter in the alphabet)

*A* ECBA

*A* ECBA

2). Write the second column down along the page

= ECBA ECBA FDCB GEDC

3). Simplify the total list of letters

= GFEEEDDCCCCBBBAA

= GFE3D2C4B3A2

Other examples

BA x B = CB (11 x 10 = 42)

B5A2 x B2 = DC4B4

FE3D3BA3 x G2F3E5A3  = L4KI3HF3ED3B4A3

**Superscripts**

A A

AA A2

AAA A3

AAAA A4

AAAAA A5

AAAAAA A6

AAAAAAA A7

AAAAAAAA A8

AAAAAAAAA A9

***The first 5 letters***

**A** 1 10^0 I

**B** 10 10^1 ||||| |||||

**C** 100 10^2 ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| |||||

**D** 1,000 10^3 |||||| |||||| |||||| |||||| |||||| |||||| |||||| |||||| |||||| |||||| |||||| |||||| |||||| |||||| …………

**E** 10,000 10^4

.

.

**Z** 10^26

Example number

**BBAAA**  |||||| |||||| |||||| |||||| || | = 23

***Superscripts***

Example

AAAA= A4