UNIT 1. NATURAL NUMBERS

Numeral system

The numeral system is a set of symbols and rules used to represent numbers. It help us to count. Each symbol represent a number. Together, these symbols produce a total.

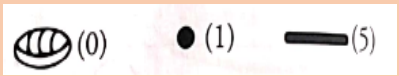
The ancient Egyptians used symbols to represent numbers. For example, 10 was represented by a handle, 100 was a piece of string, 1 000 was a lotus flower and 100 000 was a frog. For the number one, they drew a simple line. There was no symbol for the numbers 2 to 9. They simply drew the correct number of lines to show the numbers.

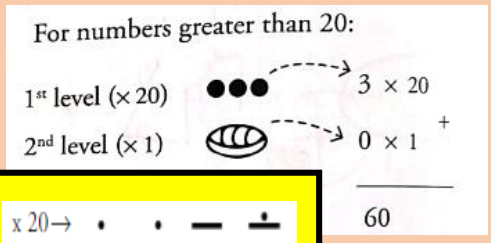
In around 500 BC, the Indians devised a different numeral system, which gave each number, from 1 to 9, a symbol. This system later became known as the Arabic numeral system because it spread to Islamic countries and then to Europe.

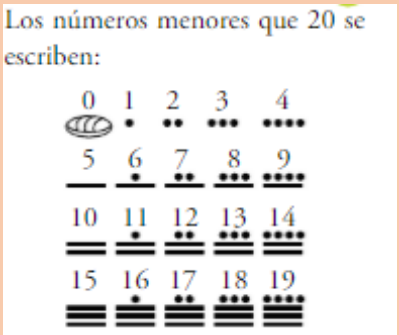
Show the map (last page) and tell about the evolution of numeral system across history and time!

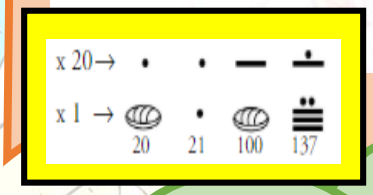
Mayan numeral system

There are three key symbols:

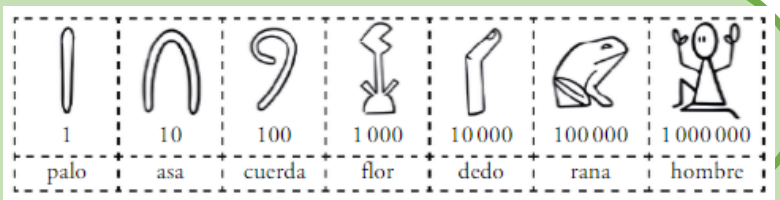




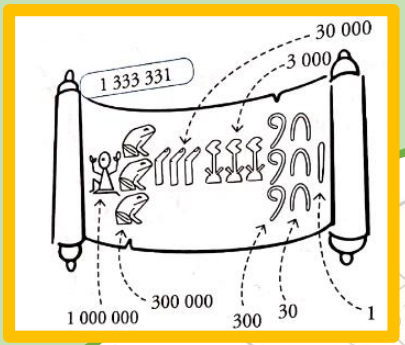




Egyptian numeral system



Doing more examples of numbers using Mayan and Egyptian numeral systems



VOCABULARY & EXPRESSIONS

Natural numbers – Números naturales

Numeral system – sistema de numeración

Large number - números grandes

Approximation – aproximación

Truncate – truncar

Round – redondear

Units – unidades

Tens – decenas

Hundreds – centenas

Million – millón

Thousands of millions – miles de millones

Billion – billón

Addition – suma

Subtraction – resta

Multiplication – multiplicación

Division – división

Commutative property – propiedad conmutativa

Associative property – propiedad asociativa

Distributive property – propiedad distributiva

Write as a single power – escribe como una sola potencia

Power – potencia

Exponent – exponente

Base – base

Square root – raíz cuadradad

Exact square root – raíz cuadrada exacta

Integer square root – raíz cuadrada entera (no exacta)

Large numbers

With the decimal numeral system you can represent quantities as large as you want. Below are some orders for numbers with more than 9 digits, with a few examples.

...	BILLIONS			THOUSANDS OF MILLIONS			MILLIONS			THOUSANDS	H	T	U
			1	3	8	0	0	0	0	0	0	0	0
		1	0	0	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0	0	0	0	0

a

The universe was created thirteen thousand, eight hundred million years ago.

b

The brain of a young person has about one hundred thousand millions of brain cells (neurons).

c

Earth's volume is approximately one billion cubic kilometres.

Say in words this numbers:

1.386.401.125 → One thousand of million, three hundred and eighty-six million, four hundred and one thousand, one hundred and twenty-five

More examples!

Watch out! A billion does not mean the same in the UK as it does in the USA!

In the UK, a billion is 1 000 000 000 000, not 1 000 000 000 as it is in the USA. What people from the USA call a billion is what people from the UK call a thousand million. What people from the UK call a billion is what people from the USA call a trillion!

Write using digits:

One billion, three hundred and fifty thousand of million, twenty-four million, three thousand, five hundred and forty-eight → 1.350.024.003.584

More examples!

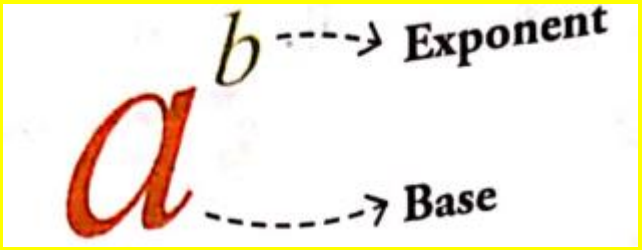
POWERS

Powers are a shortened form of writing a number that is multiplied by itself many times:

$$a^b = a \cdot a \cdot a \cdot \ldots \cdot a \quad (b \text{ times})$$

For example: $2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$

$$5^3 = 5 \cdot 5 \cdot 5 = 125$$



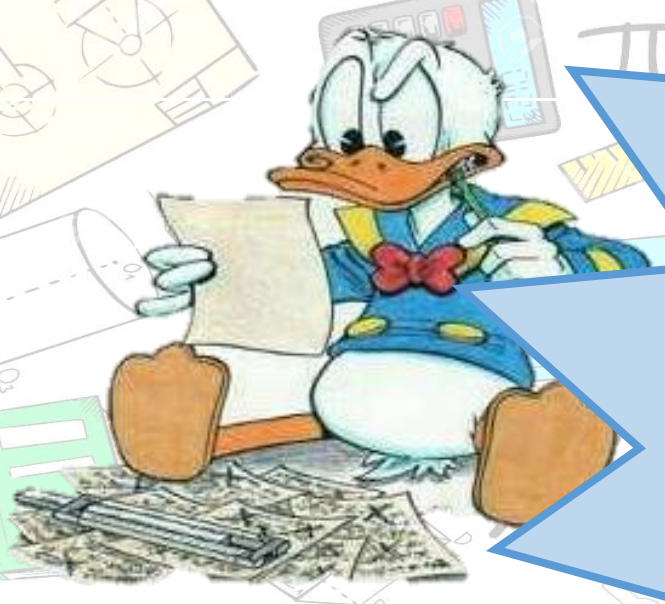
In words we say: a to the power of b or a raised to the b^{th} power

Doing examples:

4^2 → four to the power of two

Five raised to the third power → 5^3

Invent more examples and review ordinal numbers!



Guess the number

In this game, the pupil has to choose a number between 1 and 63, including both of them.

Then, you have to show him/her the cards in order and they have to say you in which card is the number.

So, while they are telling you the cards you have to add the first number of each card and, finally, you will guess the number.


Mayas
2000 BC
Romans
100 BC
Egyptians
3500 BC
Babylonians
2000 BC
Chinese
3500 BC
Arabs
700 AC
Indians
500 BC
Current decimal system
٠١٢٣٤٥٦٧٨٩
0 1 2 3 4 5 6 7 8 9