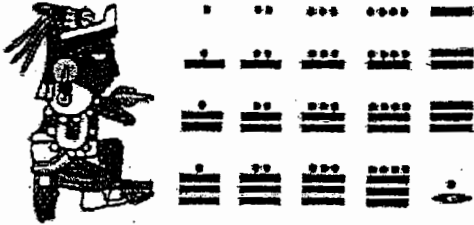


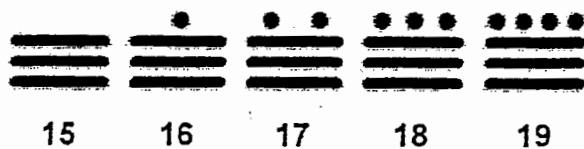
MAYAN ARITHMETIC



The Mayan system is a place value numeration system. Numbers, representing Mayan days, are written vertically, with each place representing, from the bottom up, days, months, years, twenty-years, and twenty-twenty years. There are 20 days in one month and 18 months in a year.

The inclusion of a symbol for zero was a notable achievement!

THE NUMERALS:



REPRESENTING NUMBERS:

The place holders in a Mayan numeral, from bottom up, count:

Lowest:	Single days	1's
Next place up:	Months, or 20 days	20's
Next place up:	Years, or 18 months, or 360 days	360's
Next place up:	Twenty-years	7200's

Example 1:

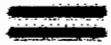


$$(2 \times 20) + 8 = 48$$

Example 2:



This is three years



This is 10 months



This is 9 days

$$(3 \times 360) + (10 \times 20) + 9 = 1080 + 200 + 9 = 1289$$

Example 3:



$$(1 \times 360) + (0 \times 20) + 7 = 367$$

CONVERTING A BASE TEN NUMBER TO MAYAN:

The place-holders are in groups of 7200, 360, 20 and 1. Dividing by successively smaller place-holders determines how many days are in that place and how many days are leftover for the next smaller place.

Example 4: Convert 307 to Mayan:

The largest place-holder needed is 20.

First, divide 307 by 20; the quotient is 15 and the remainder is 7.

This means we need 15 groups of 20 (months) with 7 days left over.

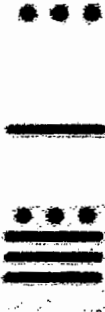


Example 5: Convert 1198 to Mayan:

First divide 1198 by 360, obtaining 3 remainder 118. We'll need 3 years.

Next, divide the remainder 118 by 20, obtaining 5 remainder 18.

We'll need 5 months and 18 days.



Example 6: Convert 371 to Mayan:

Dividing 371 by 360 gives 1 remainder 11.

We need 1 year, no months and 11 days.

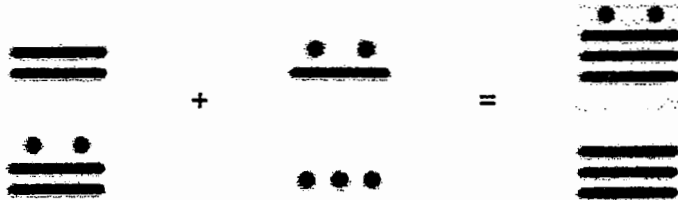


ADDITION:

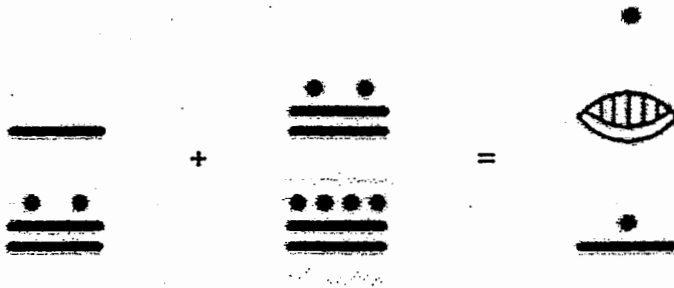
We add Mayan numbers from left to right in each place-holder.

The sum may have numerals to be adjusted, as any group of 5 dots becomes 1 bar, any group of 20 days becomes 1 month, and any group of 18 months becomes a year.

Example 7: This example is $212 + 143 = 355$



Example 8: This example is $112 + 254 = 366$



In the days position we add (2 bars 2 dots) to (2 bars 4 dots) and obtain (4 bars 6 dots). The 4 bars (20 days) become a carry equal to one month, and the 6 dots become (1 bar 1 dot).

In the months position, we add (1 dot) from the carry to (1 bar) to (2 bars 2 dots) and obtain (3 bars 3 dots).

Since this represents 18 months, it becomes 1 year and no months.