

Math 181
Day 19 Notes

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Numerical Notation

- Babylonian: Base 60, with horizontal and vertical symbols
- Greek Alphabetic: $\alpha, \beta, \dots, \zeta$
- Western Arabic: 1, 2, 3 ...

Anthropologist Steven Chrisomalis

A numerical notational system is a visual, long term, non-phonetic structured system representing numbers that involves numerical signs and rules for combining them into numeral phrases.

This definition would preclude systems like tally marks as they have little structure, and cannot be combined into numerical phrases.

This definition also excludes things like written English words since they are phonetic, at least in a loose sense.

Of the systems we have seen so far.

- Babylonian positional: Base 60, with subbase 10 for ones place
- Greek Alphabetic: Base 10
- Western Arabic: Base 10

Analysing Number Systems

- Base, ie: Which groups of symbols are used
- Positional vs Additive

Greek and Roman systems are additive (sort of, Roman is more complicated), Modern Arabic and Babylonian are positional.

What does the value of a given symbol depend on?

Can you repeat symbols?

- Cumulative vs. Ciphred

Cumulative systems add or accumulate the same symbol when it appears multiple times (Babylonian system, Roman system).

Ciphred systems can only use the symbol once (Greek, Western Arabic)

Western Arabic symbols each mean a unique value. You cannot use three of the same symbol to mean three times the value.

Babylonian Numerals In Practice

Many systems used.

- Archaic systems, some used base 10, others used combinations of 10 and 60.
- Cuneiform symbols used some additional symbols.
- Sumerian System, Assyro-Babylonian, etc. Added additional symbols for specific values.

What is being recorded?

- Nearly impossible to know in most cases
- Good Archeology will give geographic location, some context, approximate date, approximate chronology.
- Bad case it was either forged or looted and extracted from its original context.