

Math 181  
Day 18 Notes

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## Babylonian Mathematics

### Notation

- Babylon appears often in the Old Testament as an origin of the Jewish people.
- Appeared sometimes in Greek literature, which discussed Hanging Gardens of Babylon as a wonder of the world.
- Modern Archeology has uncovered mathematical theory and ancient artifacts. In some ways it surpassed Greek Mathematics.

History of Mathematics was revolutionized by Nordebour?? who uncovered much of the features and known discoveries of Babylonian mathematics.

### What is the Cuniform Numeral System?

- Positional Numerals (not official just for this class)

- Two Basic symbols
- Vertical Triangle and line indicates 1
- Horizontal Triangle and line indicates 10

These symbols were formed by pressing a reek stylus into wet clay. Once the clay dried it could be very well preserved.

- The symbols were used to build the numbers 1 to 60 by grouping symbols.
- There are some conventions for grouping symbols, generally you do rows of three symbols with leftovers centered.
- for the Tens, it has a similar structure, except you do diagonals which follow the slope of the triangle when you need to add another row.
- All Other numbers between 1 and 59 are written (10s) then (1s). ie: (10-50) (1-9)

The numbers 1-59 are known as number signs, or graphemes in linguistics. Beyond 59 numerical phrases are used which combine to form a larger number.

- Each digit in a large number are written left to right, largest digit to smallest. Each digit represents 60 times the value of the next. ie:  $62 = 1, 2$
- A late addition added a blank space symbol, but in general you figure out ambiguous values from context.
- Same algorithm as always for calculating the digits. Divide by 60, fractional is the ones place, repeat for all digits. Multiply all fractions by 60, and then you have your digits.

### History

- Babylonian writing Appears around 3000 BC
- Babylonian positional numerals appear around 2000BC
- Babylonian scribes had multiple different systems but the positional system was the latest system they used.
- Most of the tablets with positional numerals were dated to between 2000 and 1600 BC. From 330 BC to 1 AD it was mostly used in math and Astronomy rather than everyday use.
- Very interesting properties such as arbitrarily large numbers, but it didn't survive. Greek astronomical works used some Babylonian numerals to limited degrees.