

Math 181
Day 8 Notes

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How did the ancient Greeks add, subtract, etc.?

The obvious answer is the same way we do today. Using a table and algorithms. Using pencil and paper, using calculators.

These are obviously incorrect answers.

For small computations fingers and mental math work fine. However larger computations still require a different approach.

Larger numbers used an abacus. Modern abacus worked via moving beads and using them as a counter. Greeks used a different kind of Abacus.

We knew they had sophisticated abilities to do mathematics, they had calculated many digits of π and various astronomical constants.

We don't have any explicit sources for how an ancient Greek abacus worked, only passing references in other texts. One historian in the Roman court mentions in passing that "for those men in the king's court are exactly like counters on a reckoning board...".

There was also a reference in Aristophanes' play, *The Wasps*, which mentions a reckoning board and pebbles.

The Darius Vase has a depiction of what is believed to be a man doing a calculation using a reckoning board and recording the results in his other hand. Believed to be a tax collector with a wax tablet in his left hand as a semi-permanent way of writing. He has a table which may have pebbles for computation, or coins the second man is putting on the table.

A zoomed in view shows various symbols on the table. It could be coins or it could be some calculation. If it was a calculation it looks like there might be various categories that you add pebbles to? This would be around the time the system covered in class was popularized. The first few numerals are believed to be Attic Numerals which have the structure.

- 10,000
- 1,000
- 100
- 10
- ?
- Obol
- $\frac{1}{4}$ Obol
- $\frac{1}{8}$ Obol

The last three aren't numerals, but are symbols for currency. The unknown one could either be 5 or a Drachma, its ambiguous.

Our best guess was that they had a marker which kept track of the count, moving from one side to the other increases the value. This is just a guess from literary reference.

One issue too is that the table appears to be wood, so the reckoning boards likely didn't survive to be found via archeology.

Some artifacts seem like they could be reckoning boards.

We have a number of what are believed to be Marble reckoning boards. However they are mostly rubble which was reused as part of a building.

The Salamis Tablet, is the best artifact we have. Its is still woefully incomplete. We don't know how historically it was used, we can only speculate. It could have just been a game board rather than a reckoning board, it is just too incomplete and isolated. It is fairly large, and has three sets of numerals which is strange if it is a reckoning board.

Several theories of where Greek mathematics came from. Older theories attributed it to Pythagorus and Egypt, new theories argue that it arose from everyday mathematical work like surveying and accounting. One piece of evidence was Nichomachus and his work which echos work on a Reckoning board.