

MATH 110-02 – Algebra Through History
The YBC 7289 Tablet
September 20, 2019

Background

On the back of this sheet is a photograph of another extremely famous Old Babylonian mathematical text from the Yale Babylonian Collection – YBC 7289. In today’s discussion, we will try to figure out what this tablet means and what it tells us.

Questions

- A) The tablet shows a square with both diagonals drawn in. What are the numbers
- On the side of the square
 - Written over the diagonal of the square, and
 - Written below the diagonal

Write each in our translated base-60 format, then convert each of the numbers to the equivalent base 10 form. As we discussed before, the whole number part is to the left of the ; in each case. The part to the right is the sexagesimal fraction. So for instance (this is not one of the numbers on the tablet)

$$27; 11, 32 = 27 + \frac{11}{60} + \frac{32}{60^2}.$$

- B) How do the three numbers relate to each other? There is a particular way to combine two of them to get the third; what is that?
- C) As we have stressed, there is some ambiguity in the Babylonian number system because the “sexagesimal point” is not indicated explicitly in what they wrote. What would be another way to interpret the number symbols here? How different would that make the conclusion from what you said in part B?
- D) The second number (the one over the diagonal) is a very close approximation to a number we would write in exact form in a different way. What is that number and how close is the approximation? (If you’re interested, various historians have written about ways this approximation may have been derived, but that is mostly conjectural and I will leave that to a possible final paper. The main (and interesting!) point is that the Babylonian scribal student who wrote this was working in a context where calculations could be carried out to this degree of accuracy!)
- E) The back of this tablet has a partially erased computation of $30^2 + 30^2$. What is going on here? What geometrical relationship is the person who wrote this tablet working with? (Note: This tablet is usually dated to about 1800 BCE, or about 1200 years before the time of the earliest known Greek mathematical work.)

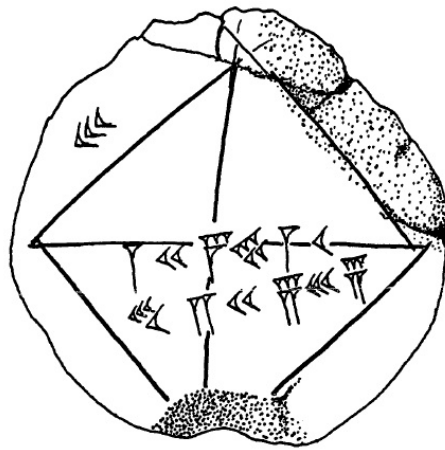


Figure 1: Drawing of the YBC 7289 tablet, Asger Aaboe