

MONT 107Q – Thinking About Mathematics
The YBC 7289 Tablet
February 13, 2017

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. This tablet is also discussed on pages 144-147 in *The Crest of the Peacock*. You can use that to check your work and your conclusions, but this exercise will be more valuable and interesting if you only look at that after you work through the following questions(!) Group writeups are due no later than 5:00pm, February 15

Questions

- A) The tablet shows a square with both diagonals drawn in. The most basic reading of the sexagesimal numbers gives
- 30 on the side of the square
 - 1; 24, 41, 10 written over the diagonal, and
 - 42; 25, 35 below that

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:

$$42; 25, 35 = 42 + \frac{25}{60} + \frac{35}{60^2}.$$

- 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, Joseph describes a way this approximation may have been derived, but that is mostly conjectural and we will not need to consider that aspect. The main point is that the Babylonian scribe 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: Photograph of the YBC 7289 tablet