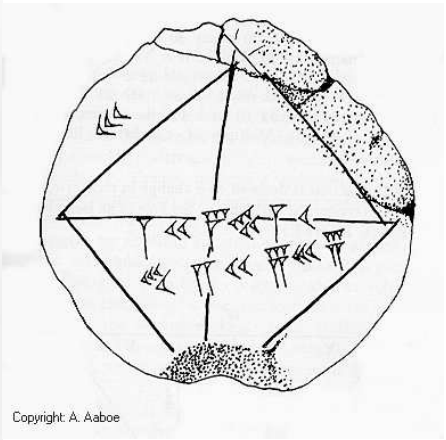
Épreuve de section européenne

1 Document

The famous "root of 2" tablet
from the Yale Babylonian Collection.



This tablet is a round school tablet of unknown provenance from the Old Babylonian period. It has a picture of a square with both diagonals drawn in. On one side of the square is written the number 30, along one of the diagonals is the number 1,24,51,10 and below it is 42,25,35.

It is easy to see that 30 times 1,24,51,10 is 42,25,35 (or, recalling that the reciprocal of 30 is 2, that 42,25,35 times 2 is 1,24,51,10). From the positioning of the numbers, the natural interpretation to make is that a square with side of length 30 (or 1/2) has diagonal of length 42,25,35. This means that the number 1,24,51,10 must be the "coefficient of the diagonal of a square" and, indeed we do have an Old Babylonian coefficient list that has this number.

We know that the ratio of the side to diagonal in a square is 1 to the square root of 2. Since root(2) is irrational, it cannot be expressed as a finite sexagesimal number, so 1,24,51,10 can only be approximate. In fact, the square of 1,24,51,10 is 1,59,59,59,38,1,40, a remarkably good approximation to 2.

From *Mesopotamian Mathematics*,
http ://it.stlawu.edu/ dmelvill/mesomath/index.html, by Duncan J. Melville.

Questions

1. What are the two pictures in this document ?
2. Use the text to find out the Mesopotamian symbols for 1 and 10.
3. The notation of a number "a, b, c, d" in this text corresponds in our own system to the number
$$a + \frac{b}{60} + \frac{c}{60^2} + \frac{d}{60^3}.$$
Write in this way the numbers appearing in this text.
4. Check the affirmation "It is easy to see that 30 times 1,24,51,10 is 42,25,35."
5. Compute the numbers 1,24,51,10 and 1,59,59,59,38,1,40. Do you agree with the last sentence of this text.