

History of Mathematics

First Homework:

Due Monday 22 January 2024.

Math 629

18 January 2024

1. [15] Write one or two paragraphs answering the following questions: What are the two kinds of numbers? How are they used in common life? What evidence is there that non-Human animals use/understand either type? How about babies or very young children? Which type of number lends itself to arithmetic?
2. [10] Allen gives the formula $(n^3+n)/2$ for the (common) sum of the rows/columns of a magic square with side length n . Explain why this is the sum of any row/column of a magic square of side length n .
3. [10] In Allen's text, the Method of the Mean is discussed as a way to approximate the square root of a number n : Start with some initial guess, e.g. $a = 1$. Then, replace a by $(a+n/a)/2$, the average of a and n/a (which together multiply to n). On a calculator (or better) a computer carry out this procedure for a few steps (3-5), for some natural number n that is not a perfect square. Record and hand in the (base ten, digital) steps that you compute. If you have access to a computer and can do this with many digits of precision, by all means use it, and report your answers to higher precision (such as 100 digits). If anyone gets a particularly interesting answer, share it in a post on Piazza. This problem is very relevant to modern computation; I'll explain this after we share our answers.
4. [15] Explain how the Babylonians used tables of squares (n^2) to facilitate multiplication of whole numbers. Compare this to the method we commonly use for calculations by hand. Which do you think makes more sense for sexagesimal calculations? Why? (You may want to look at my table of Babylonian squares, from the course webpage for Week 1.)