Midterm project suggestions

Below are some suggestions for your midterm project. You are **not** required to pick a project from this list — you can come up with your own project, and this list is only meant to help guide you. Similarly, you can modify any project on this list as you like.

1) Report on the very early history of number. What kind of historical records exist? What are the earliest dates that we know of with some history of written numbers? What is the earliest known time where what we can call mathematics appears?

2) Explore in more depth the mathematics and culture of any one of the early civilizations we have talked about, namely any one of the:
    a) Mayans
    b) Inca
    c) Egyptians
    d) Babylonians
    e) Greeks
    f) Romans (we have not talked about that yet, but we will)
    g) civilizations of the near and far east (we have not talked about that yet, but we will)

3) Discuss some of the more sophisticated mathematics we have discussed, and how it would have been used in the ancient world. For example, what can we surmise about why the Babylonians had ways to solve quadratic equations —- why would they have cared? Or, why did they care about Pythagorean triples? And/or why would the Greeks have cared? Why might the Babylonians have cared about cubic equations?

4) Discuss some examples of "bad mathematical practices" from the ancient world, and look into the damage they caused. For example, you could compare how the Babylonians and Egyptians treated their number system, and/or fractions. Another possibility is to try to understand more about the Zeeman article we assigned for homework.

5) Discuss the interplay between society and the individual in the development of mathematics. You could, for example, make arguments about whether progress in math comes more from momentary flashes of brilliance in individuals, or sustained commitments by societies. Does this interplay evolve over time, and/or from society to society?

6) Make physical reproductions of some materials related to the history of mathematics. For example, can you make a fairly accurate quipus? What might an early Babylonian clay tablet have looked like? Or, an Egyptian papyrus? Or Babylonian teaching materials?

7) What were some of the famous mathematical problems of antiquity? Discuss their influence in later years.

8) Discuss examples of influence of early mathematical practices on our thinking about mathematics today.

9) Imagine explaining some mathematics today to various societies in the ancient world; speculate on how interested they would be. What is an example of some modern math that most ancient societies would find amazing? What about something they would find very strange, or uninteresting, or not believe at all? Although this project has a speculative component, try to provide some evidence for your views.

10) Read (parts of, or all of) any of the following books, and report on what you learned:
    - "Greek mathematical thought and the origin of algebra" (Klein)
    - "The mathematics of Plato's academy" (Fowler)
    - "Euclid: the Creation of Mathematics" (Artman)
    - "Ptolemy's Almagest" (Toomer)

11) Read some of Euclid's elements, available here — https://mathcs.clarku.edu/~djoyce/java/elements/elements.html — and report on it. What are some particularly interesting aspects?

12) Explore and write about the challenges and ambiguities in constructing narratives for mathematical history. Where can bias seep in? What are some fundamental challenges? How might mathematicians and historians see things differently?

13) Imagine an alien civilization, about as sophisticated as our own, but developing without contact with us. Do you imagine their history of mathematics is similar to ours? What kind of commonalities might there be? What kind of differences? Although this project has a speculative component, make sure to provide rigorous support for your views.

14) Explore and write about the challenges of interpreting ancient sources. How do we learn about the mathematics of civilizations that have long since died out, and what kind of challenges can arise? Make sure to go beyond what we discussed in class.

15) Read the article "Ancient Babylonians took the first steps to calculus" (in *Science*) and report on it.

16) How might different cultures at different times have thought about various mathematical concepts differently? For example, do you think that most cultures thought about the counting numbers similarly? What about rational numbers? Irrational ones? How about algebraic operations, like squaring and cubing numbers?

What about extremely large numbers? Although this project has a speculative component, try to provide some evidence for your views.

17) Why study the history of mathematics? Make a persuasive argument (or, you can argue against it if you want!)