MAT336: History of Mathematics

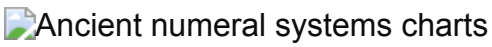
Spring 2026

Study Guide: Quiz 2

Number Systems

Note: This is a study guide. The quiz will consist of approximately four questions covering the material below. If you understand the ideas and facts in the non-computational questions and can work through the computational problems, you will be well prepared.

Numeral Charts: The numeral charts shown below will be provided with your quiz. You may refer to them when answering questions.



Charts showing Egyptian, Chinese, Mayan, Babylonian, Greek, and Hieratic numerals

Reading

Chapter 1 of the book "An introduction to the history of mathematics" by Howard Eves Print Book, English, (4th ed Holt, Rinehart and Winston, New York, 1976) has a good discussions about number systems. You can find it here. (This is a free Internet liibrar, but you will need to create an account to read this book.)

Quiz like questions

1. What is the difference between a numeral and a number?
2. What are the three components of a number system?
3. What is an additive number system?
4. What makes a number system positional?
5. What are the two sets of numerals in a multiplicative system?
6. Write 2,316 in Egyptian hieroglyphics.
7. What number is represented by: [4 lotus flowers, 3 coiled ropes, 8 vertical strokes]?
8. What is the rule about repeating numerals in Egyptian hieroglyphics?
9. Is the Greek alphabetic system positional? Why or why not?
10. Write 462 in traditional Chinese.
11. What type of system is traditional Chinese?
12. State the Integer Division Theorem and find the quotient and remainder when 95 is divided by 12.
13. Convert 386 to the Mayan number system.
14. Convert $(3, 15, 8)_{20}$ to base 10.
15. Express 425 in the Babylonian number system.

16. Is the Babylonian system positional?
17. If we look at Mayan and Babylonian numerals (only the numerals themselves, not knowing about the full system), we may think that both systems are not positional but have another characteristic. Which characteristic? Give an explanation of why the numerals look like that.
18. **(This question is too long for a quiz so a subset of its entries may be asked)** Complete the comparison table for 936. Which number system uses the fewest numerals? Why? Is this characteristic specific to the number 936, or does it hold for other numbers?

System	Representation	# of numerals used
Egyptian hieroglyphic		
Greek alphabetic		
Traditional Chinese		
Mayan (base 20)		
Hindu-Arabic		
Babylonian		

19. Egypt used two different number systems: hieroglyphic (for stone monuments) and hieratic (for papyrus documents). Looking at the hieratic numerals, what type of system (additive, ciphered, multiplicative, positional) does it appear to be? Explain your reasoning.
20. Can a system have multiple characteristics?
21. Is the Roman numeral system positional?
22. Why did different civilizations develop different bases (10, 20, 60, etc.)?
23. Why do positional systems need zero?

Part 2: Reflection Questions

24. Which of these systems would make arithmetic (addition, subtraction) easiest? Which would make it hardest? Explain your reasoning.
25. Today we use one number system worldwide (Hindu-Arabic). What might we have lost when number systems were standardized? What did we gain?

Quiz Problem Rubric

Points	Criteria
3	Correct answer with reasoning/work shown
2	Partially correct with some reasoning shown
1	Correct answer without reasoning/work OR significant attempt with some understanding

Points	Criteria
0	Incorrect or blank

Notes

- For computational problems: "reasoning/work" = steps shown
- For conceptual problems: "reasoning" = explanation given
- Round partial credit up when in doubt