

Name: _____

**Math 570 – History of Mathematics
Midterm
March 17, 2004**

Closed Book. You are permitted a calculator, straightedge, compass, and one 8½"×11" sheet of handwritten notes (both sides). Do not use scratch paper; show all your work on the test. The last page of the test is deliberately left blank in case you need extra room. Problems that ask for answers in paragraph form will be graded on both content and clarity.

Pledge:

On my honor, as a student, I have neither given nor received unauthorized aid on this

examination: _____

(signature)

(date)

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Historical Technique Section: 6 points per page. You must show your work to receive full credit.

1. Convert the following between base 60 and base 10.

- Write 5231 in base 60

- Write 3.14 in base 60

- Write 4,12;15 in base 10.

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2. Find the length and the width using Babylonian techniques in the following situation:
A rectangle I am given, area 4. Length over width, 1;10 it goes beyond.

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3. A Pythagorean triple is called *primitive* if the three numbers have no common factor. So 3, 4, 5 is primitive, but 6, 8, 10 is not primitive since 6, 8, and 10 share a common factor of 2. Find 5 primitive Pythagorean triples other than 3, 4, 5.

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4. Use the Euclidean algorithm to find the greatest common divisor of 4389 and 3528.

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5. Approximate $\sqrt{5}$ using techniques similar to Archimedes. If you use $a = 2$ and $b = 1$ you will get partial credit. For full credit, find a larger pair of a and b that will give you a more accurate answer, similar to the use of $a = 26$ and $b = 1$ to approximate $\sqrt{3}$ on the homework.

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6. Find two numbers whose difference is 8 such that the difference of their cubes is 1664 using techniques like Diophantus would have used.

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7. Find three numbers such that the product of any two added to the square of the third gives a square. [*Hint*: Let the numbers be x , $4x+4$, and 1, so that two of the conditions are satisfied.]

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11. What philosophical issues did Socrates use mathematics to explain in the *Meno*?

12. What is a likely reason that Diophantus used only a single variable in his work?

13. What civilization was the earliest to develop a place-value number system?

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14. (4 points) Put the following in historical order, from earliest to latest

- A. Pythagoras
- B. Diophantus
- C. Euclid
- D. Eratosthenes
- E. Kushyar Ibn Labban
- F. Socrates
- G. Thales
- H. Ptolemy (the mathematician, not the ruler)

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15. (10 points) Write a paragraph (or two) to explain how Ptolemy created a table of trigonometric values. You may include mathematical formulas and values in your paragraphs.

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