

**Math 410, Spring 2009**  
**Final Exam (take-home)**

**Due date:** Tuesday, May 12, 1:00 PM. Turn in your solutions to Prof. Martin's office (Snow 541).

**Rules:** You may refer to any notes, text, or reliable Web source. You may not ask any person any question. Answer each question briefly — two or three sentences at most.

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(#1) (a) Name three mathematical results of Archimedes.

(b) Name three kinds of algebra problems the Babylonians could do.

(c) Name three areas of mathematics in the Chinese *Nine Chapters on the Mathematical Art*.

(#2) What did the ancient Greeks use instead of sines and cosines to do trigonometry? [You should include a diagram.]

(#3) The study of what sort of problems led to the notion of complex number? [Hint: it's not the problem "does  $-1$  have a square root?"]

(#4) What is Euler's famous equation involving the five most important constants in mathematics?

(#5) What is an Erdős number?

(#6) Identify the speaker of each of the following quotes from the history of mathematics, and briefly describe what the quote is about.

(a) "If I have seen further than others, it is only by standing on the shoulders of giants."

(b) "I have discovered a truly remarkable proof of this theorem, which this margin is too small to contain."

(c) "Out of nothing I have created a strange new universe."

(d) "I do not see that the sex of the candidate is an argument against her appointment; after all, we are a university and not a bathhouse."

(#7) Give a *brief* example of mathematics from the Americas before the European invasions. A suggested source: *MacTutor History of Mathematics Archive*, <http://www-history.mcs.st-andrews.ac.uk/Indexes/Americans.html>.

(#8) Give a *brief* example of traditional mathematics from southern Africa (i.e., mathematics that is not part of European mathematics). A suggested source: *Mathematics of the African Diaspora*, <http://www.math.buffalo.edu/mad/>.