

Exam History of Science

Date: Monday June 25, 2018

Lecturer: dr. D.J. Beckers

Time: 18:30 – 20:30u

Course code: FEW X 400652

In general:

1. Make sure your name and student number are on ALL your work.
2. Answer in English sentences. Spelling and grammar should be correct, either to the English or to the US standards. Just a few buzzwords never constitute an answer. Always explain yourself. Use appropriate examples to illustrate your answer.
3. This exam consists of 12 A-questions and 8 B-questions. The A-questions are about the lectures and the texts. The B-questions require you to reflect on the information from the lectures and texts, and / or information you might know from other sources.
4. You pick eight question: 5 A-questions and 3 B-questions. Each question is worth 1 point (or nothing!). Indicate clearly which questions you're answering by mentioning either the number and / or the title of the question in your answer. If you answer more than five A-questions, only the first five will be considered. Likewise for the B-questions.

A-questions

1. Euclidean algorithm

To what extent are theorems VII.1 and VII.2 from Euclid's Elements similar to our present-day notion of the Euclidean algorithm?

2. Hippocrates

Explain Hippocrates' attempt to square his "moons". Why was this interesting in his days?

3. Arithmetic in 14th century theology

Give examples of arithmetic in 14th century theology. How does Mark Thakkar explain the presence of arithmetic in these manuscripts?

4. Music

Changes in the status of mathematics may be illustrated by changes in the position of the musica within the quadrivium. Explain this statement.

5. Calculating chance

During the lecture it was argued that chance was not in the picture in ancient and medieval Europe. What was the line of thought? When and how *did* calculation of chance become an issue?

6. Mechanical calculators

Explain why 17th and 18th century mechanical calculators were no commercial success.

7. Moral algebra

Explain to what extent Benjamin Franklin's moral algebra illustrates the mathematical spirit of its time. What was algebraic about it?

8. Bernal's paradox

Explain Bernal's paradox. How is the paradox resolved?

9. Cauchy

Explain the political motives Barany describes behind Cauchy's attempt to rigorize calculus.

10. Riemann

To what extent can Bernhard Riemann be considered the first mathematician to introduce non Euclidean geometry.

11. To apply or not to apply

During the early twentieth century mathematician's ideas about the applicability of their subject study changed. Explain that remark.

12. Computer

Why were automatic calculators called computers only in the late 1950s?

B-questions:

1. Exhaustion method

Reflect on the exhaustion method as a form of calculus.

2. Proof

A number of times, in history, the notion of "proof" has changed, or at least, what people thought was the most valuable in a mathematical proof, changed. Describe one of these changes and explain the relation with societal changes at the time.

3. Computer language

Is a computer language a mathematical language?

4. Geometry

Why should we learn geometry?

5. Dutch healthcare

During the lecture, it was argued that Dutch healthcare policy was influenced by data analysis. In what sense is statistics (or mathematics, or a way to view numbers) supportive of that new view on how to finance healthcare?

6. Chance

Is it a necessary condition to be able to calculate chances to be able to use them?

7. Mathematics and computing

Did the rise of computing change mathematics?

8. Business Analytics

Can Business Analytics be considered as a form of applied mathematics?