

Review for the First Midterm Exam

1 First Midterm Exam

- on Monday 1 July from 2:00pm till 3:40pm
- skipping policy

2 Numbers and Expressions

- first steps
- polynomials and expressions

MCS 320 Lecture 16
Introduction to Symbolic Computation
Jan Verschelde, 28 June 2024

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- You must sign up to the exam before noon on Sunday 30 June by sending an email that you commit to taking the exam.
- Without signing up, you will not receive the questions.
- You must solve the questions on the exam *individually*.
- The exam will have multiple versions of the questions.
- The answers must be uploaded into gradescope
 - ▶ in one single Jupyter notebook,
 - ▶ before 3:40pm on Monday 1 July 2024.

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Skipping Policy

- You skip the exam automatically if you do not do anything.
- If you skip a midterm exam, then the 100 points are transferred to the final exam, which will count for 100 points more.
- If you have seen the questions, but do not submit your answers, then you will receive 0/100.
- If you have taken the exam, then your score counts.

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First Steps

The first 10 lectures (5 sessions) cover the first part.

- SageMath in a Jupyter notebook, code and markdown cells
- symbols, exact and floating-point approximations
- complex numbers and algebraic numbers, finite fields
- sharing objects with references, functions to store data
- binary expression trees for fast callable objects
- apply vectorization and Cython for speed

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- **polynomials and expressions**

Polynomials and Expressions

Lectures 11 to 15 (3 sessions) cover the second part.

- polynomials, quotients, multivariate polynomials, expressions
- numeric, exact, and symbolic factorization
- expression trees are not binary
- manipulating expressions by substitution, expansion, factorization
- normal forms to solve the equality problem