Math 322,
Lecture 1

Lior Silberman

Abstract
algebra

1 About the
course

2 Learning
methods

3 About me

Math 322: Introduction to Group Theory

Lecture 1

Lior Silberman[1]

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http://www.math.ubc.ca/~lior/teaching/1718/322_F17/

Groups ???

- Algebraic Structure = Underlying set + operations + axioms

Math 223,412	Math 322	Math 323	Math 422
Vector space	Group	Ring	Field
Subspace	Subgroup	Subring, ideal	Subfield
Linear map	Homomorphism		Field embedding
Spanning set	Set of generators		

Galileo says

Philosophy is written in that great book (I mean the universe) ... but the book cannot be understood unless one first learns the language and the symbols in which it is written. This book is written in the mathematical language ... without whose help it is impossible to comprehend a single word of it; without which one wanders in vain through a dark labyrinth.

— *Galileo Galilei, The Assayer, 1623.*

- Vector space: state space of QM system, space of singnals. space of codewords, tangent space to manifold, . . .
- Group = symmetries of a shape, a number system, ...

Today's Goals

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1. About of the course
2. Learning methods
3. About me
4. A concerete group

Learning goals

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D Computations in concrete groups
Basic notions, axioms, and basic implications.

C Definitions, Theorems, basic calculations in
abstract groups

B Can work in abstract groups

A Mastery of course material

A+ Problem-solving

Course plan

- Concerete Groups
- Groups and Homomorphisms
- Group Actions
- Sylow's Theorems
- Solvable and Nilpotent groups

Components of the course

- Classes (TTh 14:00-15:30, LSK 460)
- Written homeowrk (generally due Thursdays) [25%]
    - First problem set due September 14
- Weekly online homework (due 9pm on Tuesdays) [5%]
    - First WebWork due September 19
- Midterm exam October 17 [20%]
- Final exam [50%]

MUST SCORE 80% ON CONCRETE COMPUTATIONS TO PASS (Unlimited retakes for midterm)
- Office Hours

- Read before class
- Mindful learning in and out of class
- Come to office hours

*Abducted by an alien circus company,
Professor Doyle is forced to write
calculus equations in centre ring.*

(Gary Larson, "The Far Side", 15/9/1992)

- Dr. Lior Silberman (Li'$\overline{\text{or}}$ $\overline{\text{Zi}}$lberman)
- Email: `lior@math.ubc.ca`, Office: MATH 229B.
- Work: Number Theory, PDE, Topology, Random Structures, . . .