Introductory Mathematics

Bc. Xiaolu Hou, PhD.

FIIT, STU
xiaolu.hou @ stuba.sk

Goal

- Math terminologies in English
- Check what is missing from your knowledge, what should be improved

Topics – Discrete Mathematics and Linear Algebra

- Set theory and Venn diagrams
- Fundamentals of mathematical logic (propositions, truth tables, logical connectives)
- Principles of mathematical induction
- Combinatorics: basic counting techniques and properties of combinatorial numbers
- Variations, permutations, and combinations
- Binomial theorem and Pascal's triangle
- Polynomials: rational roots, multiplication, and division of polynomials
- Number theory: number systems and divisibility of integers
- Sequences: arithmetic and geometric sequences
- Infinite geometric series and their applications
- Basic linear algebra: vector spaces and determinants of matrices
- Systems of linear equations with two or three variables

Materials

- Discrete Mathematics: An Open Introduction (3rd ed.), Levin, Oscar. CRC Press, 2023. [PDF]
  - Set theory and Venn diagrams
  - Fundamentals of mathematical logic (propositions, truth tables, logical connectives)
  - Principles of mathematical induction
  - Combinatorics: basic counting techniques and properties of combinatorial numbers
  - Variations ($k-$permutations of n elements), permutations, and combinations
  - Binomial theorem and Pascal's triangle
- College Algebra. Abramson, Jay. United States, 12th Media Services, 2016. [PDF]
  - Polynomials: rational roots, multiplication, and division of polynomials
  - Number theory: number systems and divisibility of integers
  - Sequences: arithmetic and geometric sequences
  - Infinite geometric series and their applications
  - Systems of linear equations with two or three variables
- Linear Algebra (4th ed.), Hefferon, Jim. Joshua Smcvt Edu, 2020. [PDF]
  - Basic linear algebra: vector spaces and determinants of matrices

Topics – Calculus

- Algebraic expressions and absolute value
- Linear equations and inequalities
- Basics of analytic geometry in the Cartesian plane
- Cartesian product, binary relations, and functions
- Linear, quadratic, and rational functions
- Logarithmic functions
- Exponential functions
- Trigonometric functions
- Complex numbers and their algebra
- Function properties and graph analysis
- Basic rules of differentiation
- Applications of differentiation

Materials

- CK-12 Algebra I- Second Edition, Eve Rawley, Anne Gloag, Andrew Gloag, United States, CK-12 Foundation, 2010. [PDF]
  - Algebraic expressions and absolute value
  - Linear equations and inequalities
  - Basics of analytic geometry in the Cartesian plane
- Discrete Mathematics: An Open Introduction (3rd ed.), Levin, Oscar. CRC Press, 2023. [PDF]
  - Cartesian product, binary relations, and functions
- Thomas' Calculus, (14th ed.) George Thomas, Hass Joel, Heil Christopher, and Weir Maurice. Pearson Education, 2018. [PDF here or here]
  - Linear, quadratic, and rational functions
  - Logarithmic functions
  - Exponential functions
  - Trigonometric functions
  - Complex numbers and their algebra
  - Function properties and graph analysis
  - Basic rules of differentiation
  - Applications of differentiation

Download all course materials

https://xiaoluhou.github.io/Teaching_material/

Test

- 19th - 30th Sep
- Unlimited time
- Designed to help you assess your knowledge and identify areas for improvement