



Faculty of Science

MNXA21, Refresher Course In Mathematics, 1.5 credits

Repetitionskurs i matematik, 1,5 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2022-03-28 to be valid from 2022-03-28, autumn semester 2022.

General Information

Language of instruction: English

Learning outcomes

The overall goal of the course is to recall selected parts of the Swedish upper-secondary school mathematics curriculum (up to and including Mathematics 4) in order to facilitate the transition to studies in mathematics at university level. For international students, the course also serves the purpose of giving students an overview of relevant content from the Swedish mathematics upper-secondary school curriculum.

Knowledge and understanding

After completing the course, the student should be able to:

- describe basic properties of right-angled triangles and their connection to computing distance in the plane, the relationship between area of circle, circumference and radius, and the relationship between degrees and radians,
- explain how the sine, cosine and tangent functions are defined based on the unit circle, as well as their values for certain angles,
- describe what is meant by integers, rational numbers and irrational numbers as well as what is meant by the Cartesian and polar forms of a complex number
- explain what is meant by linear and quadratic equations
- explain how inequalities involving rational functions can be solved by using factorization and a table of signs
- explain what is meant by the graph of a function, as well as basic ways of manipulating functions (translation, dilation, reflection),
- explain the equation of a straight line, the equation of the circle, the absolute value function, and the graphs of simple elementary functions.

- describe how asymptotes of rational functions, as well as the definition of derivatives, can be expressed as in terms of a limit.
- describe the definition and computational rules for the derivative, as well as the proof of the summation rule for the derivative
- name the derivatives of basic elementary functions.
- explain what a primitive function is and name primitive functions for basic elementary functions.
- describe what a differential equation is,
- describe simple arithmetic rules for definite integrals.

Competence and skills

After completing the course, the student should be able to:

- perform basic geometric calculations concerning right-angled triangles, and calculate the distance between two points in the plane,
- calculate the sine, cosine and tangent of given right-angled triangles,
- use arithmetic rules for multiplication, fractions and powers to simplify arithmetic expressions
- solve linear and quadratic equations
- solve inequalities by using factorization and character table
- use the computational rules for the logarithm and the exponential function, as well as the arithmetic rules for the trigonometric functions (Pythagorean identity, periodicity, translation, reflection, addition formulas, half and double angle-formulas)
- write complex numbers in Cartesian and polar form
- determine asymptotes (horizontal and vertical) of rational functions
- verify that a given function is the solution of a given differential equation
- calculate basic derivatives, primitive functions and definite integrals of basic functions.

Course content

The course covers:

- basic geometry, arithmetic and algebra,
- basic properties of functions and graphs, right angle equation, circle equation, absolute amount, rational functions, exponential function, logarithm and trigonometric functions,
- cartesian and polar form of complex numbers,
- basic properties of limits, derivatives, primitive functions, differential equations and definite integrals.

Course design

The course consists of self-studies, supported by specially written course literature, pre-recorded films, computer based self-correction quizzes with randomly selected problems, and question and answer sessions with teachers. The completion of the computer based quizzes is compulsory.

Assessment

The assessment is based on computer based quizzes during the course.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass.

To pass the course, it is required that the student passes all the computer based quizzes.

Entry requirements

For admission to the course knowledge corresponding to Mathematics 4 and English 6 is required.

Further information

The course may not be included in a degree of science with major in Mathematics or Physics.

Subcourses in MNXA21, Refresher Course In Mathematics

Applies from H22

2201 Computer based quizzes, 1,5 hp
Grading scale: Fail, Pass