Dette er en oversettelse av den fastsatte læreplanteksten. Læreplanen er fastsatt på Bokmål

Laid down as a regulation by the Norwegian Directorate for Education and Training on 27 March 2006 as delegated in a letter of 26 September 2005 from the Ministry of Education and Research pursuant to the Act of 17 July 1998 no. 61 relating to primary and secondary education (Education Act) Section 3-4 first paragraph.

Valid from 01.08.2006

Valid to 31.07.2022

Purpose

Mathematics is a subject that plays a key role in our modern civilization, as a tool to understand and function in society and as bearer of a tradition with roots in many of the world's ancient cultures. Mathematics is used to research the universe, systematize experiences and describe and understand natural and social relations. The pleasure obtained from working with the subject has in itself been a source of inspiration for mankind's development of mathematics.

One of the main purposes of the programme subject is to acquire the mathematical competence needed to maintain and develop a hi-tech society. The programme subject gives specialization in mathematics for further education and work within a number of key areas of society. Through exercising mathematical skills, with and without digital aids, a fundamental and necessary competence for further work with mathematics is developed.

The programme subject gives pupils practice in modelling. It shall give them an opportunity to express practical problems and real-life phenomena as mathematical formulae and process these with the help of mathematical methods. These skills shall give the pupils a key to understanding and analyzing important social problems. In this way, mathematics becomes a useful tool for application in economics as well as areas of society such as health, environment and globalization. The programme subject, therefore, encompasses a practical and a cultural perspective.

Structure

Mathematics for the social sciences comprises two programme subjects: Mathematics S1 and Mathematics S2. Mathematics S2 builds on Mathematics S1.

These programme subjects have been structured into main subject areas, for which competence aims have been formulated. The main subject areas complement each other, and should be viewed in relation to one another.

Overview of the main subject areas:

Programme subject	**Main subject areas**			
Mathematics S 1	Algebra	Functions	Probability	Linear optimization
Mathematics S 2	Algebra	Functions	Probability and statistics	

Main subject areas

Mathematics S1

Algebra

The main subject area deals with the fundamental language of symbols in mathematics. It involves working with letters and symbols, and transformation of and use of formulae. Core concepts in the subject area are linear, quadratic and rational expressions, logarithmic expressions, exponential expressions and exponential growth.

Functions

The main subject area involves analyzing the dependence between two quantities. It also involves relations between quantities from algebra and practical areas, which are analyzed by the use of functions and their graphs. The main subject area covers empirical functions, polynomial functions,

power functions, rational functions, logarithmic functions and exponential functions. In addition, it deals with regression, average and momentary growth rate, and the derivative and graph of a function.

Probability

The main subject area deals with calculus of probability theory as a basis for statistical methods, which are used to obtain information about a population on the basis of a random selection. The main subject area also covers independence and conditioned probability, random and non-random selection and binomial and hypergeometric probability models.

Linear optimization

The main subject area deals with linear optimization as a useful tool in economics. It also involves the use of linear optimization to find the best possible solutions to practical problems that are naturally modelled by linear equations and incongruence.

Mathematics S2

Algebra

The main subject area deals with the use and manipulation of polynomials and rational expressions, and analysis and calculation of finite sums and infinite series. Core concepts in the main programme area are polynomials and polynomial division, linear equations, series and convergence.

Functions

The main subject area deals with general derivation rules. Moreover, it revolves around the use of these rules to elaborate on and discuss and calculate with functions composed of polynomials, power functions, rational functions, logarithmic function and exponential functions. It also includes use of functions for modelling, both in economics and for different growth phenomena.

Probability and statistics

The main subject area deals with the use of probability theory to describe and analyze random variations and systematic trends in a number of practical situations. Fundamental concepts in this main subject area are stochastic variables, expectation, variance and standard deviation, normal distribution, the central limit theorem and hypothesis testing.

Teaching hours

Teaching hours are given in 60-minute units.

Mathematics S 1: 140 teaching hours per year

Mathematics S 2: 140 teaching hours per year

Basic skills

Basic skills are integrated into the competence aims for this course in areas where they contribute to the development of and are part of the subject competence. In the Mathematics for the social sciences programme subject, basic skills are understood as follows:

Being able to express oneself orally and in writing in Mathematics for the social sciences involves the ability to explain a mode of thought and articulate findings, concepts and hypotheses. It means posing questions, participating in talks and discussions of mathematical situations and problems, and presenting a reasoned argument for one's own proposed solution. It also involves using logically consistent formulations with mathematical symbols to set up or draw tables, diagrams, graphs and figures.

Being able to read in Mathematics for the social sciences involves the ability to extract relevant mathematical information from written text. It also means understanding mathematical symbols and logical reasoning, as well as interpreting organized visual information such as tables, diagrams, graphs and figures.

Numeracy in Mathematics for the social sciences is the most basic skill in the subject. It involves carrying out various arithmetical operations with confidence and without use of digital tools. It also means making practical estimates and assessing the reasonableness of a solution.

Being able to use digital tools in Mathematics for the natural sciences involves using digital tools for comprehensive computations, visualization and simulation. It also means obtaining, processing and presenting mathematical information in electronic form, as well as evaluating the suitability, potential and limitations of the digital tool.

Competence aims

Algebra

The aims of the studies are to enable pupils to

- work with powers, formulae, brackets and rational and quadratic expressions with numerals and letters
- convert a practical problem into an equation, an inequality or a system of equations, solve it and assess the validity of the solution
- solve equations, inequality and systems of equations of the first and second degree, in longhand and by digital means
- calculate with logarithms and use them to simplify expressions and solve exponential equations and logarithmic equations
- use the concepts of implementation and equivalence in mathematical reasoning

Functions

The aims of the studies are to enable pupils to

- draw graphs of polynomial functions, exponential functions, power functions and rational functions with linear numerators and denominators with and without digital means
- create and interpret functions as models and describe practical problems in economics and social science, analyze empirical functions and use regression to find a polynomial approximation of a function, power function or exponential function
- determine zero points and intersection points between graphs, with and without digital means
- find the average growth rate for a function arithmetically, and find approximate values for momentary growth in practical applications
- give an account of the definition of the derivative, work out the derivative for polynomial functions and use this to discuss polynomial functions

Probability

The aims of the studies are to enable pupils to

- work with binomial coefficients and construct Pascal's Triangle
- give an account of non-random selection with and without replacement and random selection without replacement, and carry out simple probability calculations linked to such selections
- create binomial and hypergeometric probability models from practical situations, and work out probabilities for such models

Linear optimization

The aims of the studies are to enable pupils to

- model practical optimization problems in economics using linear equations and incongruence
- give an account of the geometrical interpretation of the linear optimization problem in two variables
- solve linear optimization problems graphically, using longhand and digital means

Algebra

The aims of the studies are to enable pupils to

- find patterns in numerical series and use them to sum finite arithmetical and geometrical series and other series, with and without digital means
- determine whether an infinite geometric series is convergent and calculate the sum of the series
- use series to solve practical problems related to savings, loans and hire-purchase
- factorize polynomials using zero points and polynomial division, and use the result to solve equations with polynomial and rational functions
- model practical problems using systems of linear equations with several unknowns, and solve them with and without digital means

Functions

The aims of the studies are to enable pupils to

- derive polynomial functions, power functions, exponential functions and logarithmic functions, and sums, differences, products and quotients of these functions, and use the chain rule to derive combined functions
- elaborate on and discuss the path of functions and interpret the derivative in practical contexts by using first and second derivatives
- interpret the basic characteristics of a function using the graph
- solve economic optimization problems in connection with income, cost and demand functions, and calculate and use marginal costs and income in simple models
- model exponential and logistical growth rate by using exponential functions and logarithmic functions
- calculate the area under graphs by digital means and interpret this in practical situations

Probability and statistics

The aims of the studies are to enable pupils to

- give an account of the concepts distribution and stochastic variable for finite probability spaces, and find expectation, variance and standard deviation for a stochastic variable
- give an account of the significance of the normal distributions and calculate probabilities linked to these
- give an account of the central limit theorem and use it to calculate probabilities for sums of independent stochastic variables and binomial distributions
- carry out simple hypothesis testing using p-values and interpret results

Assessment

Provisions for final assessment:

Overall achievement grades

Programme subject	Provision
Mathematics S1	The pupils shall have an overall achievement mark.
Mathematics S2	The pupils shall have an overall achievement mark.

Examination for pupils

Programme subject	Provision
Mathematics S1	The pupils may be selected for a written or oral exam. The written exam is prepared and marked centrally. The oral exam is prepared and marked locally.
Mathematics S2	The pupils may be selected for a written or oral exam. The written exam is prepared and marked centrally. The oral exam is prepared and marked locally.

Examination for external candidates

Programme subject	Provision
Mathematics S1	The external candidates shall sit for a written exam. The exam is prepared and marked centrally.
Mathematics S2	The external candidates shall sit for a written exam. The exam is prepared and marked centrally.

The provisions for assessment are stipulated in the regulations of the Norwegian Education Act.