

# Curriculum for Mathematics vg1 practical

## (Mathematics P)

This is a translation from Norwegian Nynorsk of the official Norwegian subject curriculum text.

Established as regulations by the Ministry of Education and Research on 15 November 2019. The examination scheme was established by the Ministry of Education and Research on 29 June 2020.

Valid from 01.08.2020

## About the subject

### Relevance and central values

Mathematics P is an important subject for understanding and describing conditions and relationships in society through the use of mathematical modelling. Mathematics P shall help pupils to develop a precise language for critical thinking and mathematical problem solving strategies. Mathematics P shall prepare pupils for a society and working life in development through the practical application of mathematics.

All subjects shall help the pupils to understand the value system for learning. Critical thinking in mathematics includes critical evaluation of reasonings and arguments and can arm the pupils to make their own decisions and take a stand on important questions in their own life and in society. When the pupils are given the time to think, reflect, reason mathematically, ask questions and experience that the subject is relevant, the subject facilitates creativity and innovation. Mathematics shall help pupils to develop their ability to work independently and to collaborate with others through exploration and problem solving, and can help pupils to become more aware of their own learning. Giving the pupils the opportunity to solve problems and master challenges on their own contributes to developing perseverance and independence.

### Core elements

#### Exploration and problem solving

Exploration in mathematics P means that the pupils search for patterns, find relationships and discuss their way to a shared understanding. The pupils shall place more emphasis on strategies and approaches than on solutions. Problem solving in mathematics P means that the pupils develop a method for solving a problem not previously encountered. Computational thinking is important in the process of developing strategies and approaches to solve problems, and means breaking a problem down into sub-problems that can be solved systematically. This also includes evaluating whether sub-problems can be solved best with or without digital tools. Problem solving also means analysing and reformulating known and unknown problems, solving them and evaluating whether the solutions are valid.

#### Modelling and applications

A model in mathematics P is a description of reality using mathematical language. The pupils shall gain insight into how mathematical models are used to describe everyday life, working life and society in general. Modelling in mathematics P means creating such models. It also means to critically

evaluate whether the models are valid and what limitations the models have, evaluate the models in view of the original situations, and evaluate whether they can be used in other situations. Applications in mathematics P means giving the pupils insight into how to use mathematics in different situations within and outside of the subject.

## Reasoning and argumentation

Reasoning in mathematics P means the ability to follow, evaluate and understand mathematical chains of thought. It means that the pupils shall understand that mathematical rules and results are not random, but have clear reasons. The pupils shall formulate their own reasoning in order to both understand and solve problems. Argumentation in mathematics P means that the pupils give reasons for their approaches, reasonings and solutions, and prove that these are valid.

## Representation and communication

Representations in mathematics P are ways of expressing mathematical concepts, relationships and problems. Representations can be concrete, contextual, visual, verbal and symbolic. Communication in mathematics P means that the pupils use mathematical language in conversations, argumentation and reasoning. The pupils shall have the opportunity to use mathematical representations in different contexts through their own experiences and in mathematical conversations. The pupils shall have the opportunity to explain and give reasons for the choice of form of representation. The pupils must be able to switch between mathematical representations and everyday language and to switch between different representations.

## Abstraction and generalisation

Abstraction in mathematics P means using a formal symbol language and formal reasoning. Generalisation in mathematics P refers to the pupils discovering relationships and structures without being presented a finished solution. The pupils shall have the opportunity to explore concepts and symbols in order to express results and relationships by using algebra and suitable representations.

## Mathematical fields of knowledge

The fields of knowledge in mathematics P are related to the everyday life of the pupils, the work life and the society as a whole. The fields of knowledge form the basis the pupils need in order to develop their mathematical understanding by exploring relationships within and between the mathematical fields of knowledge.

## **Interdisciplinary topics**

### Health and life skills

In mathematics P the interdisciplinary topic of health and life skills refers to giving the pupils competence in personal economy. Through the subject, the pupils shall develop an understanding of mathematical representations and models. This will help them to make responsible life choices.

### Democracy and citizenship

In mathematics P the interdisciplinary topic of democracy and citizenship refers to giving the pupils the opportunity to explore, model and analyse real datasets and data related to life in society.

## **Basic skills**

### Oral skills

Oral skills in mathematics P refers to creating meaning through dialogue in and about mathematics. This means communicating ideas and discussing mathematical problems, strategies and solutions with others.

### Writing

Writing in mathematics P refers to describing and explaining relationships, discoveries and ideas using suitable representations. Writing in mathematics P is a tool for developing one's own thoughts and learning. This means the ability to solve problems and present solutions that are adapted to the receiver and the situation.

### Reading

Reading in mathematics P refers to creating meaning in texts from society, working life and the field of mathematics. Reading in mathematics P means being able to sort information, analyse and evaluate its form and content, and summarise information in multimodal texts.

### Numeracy

Numeracy in mathematics P refers to using mathematical representations, concepts and approaches to do calculations and evaluate whether solutions are valid. This means recognising problems that can be solved using mathematics and formulating questions about these. Mathematics has a particular responsibility for teaching numeracy.

## Digital skills

Digital skills in mathematics P refers to the ability to use graphing tools, spreadsheets, CAS, dynamic geometry software and programming to explore and solve mathematical problems. It also means finding, analysing, processing and presenting information using digital tools.

## Competence aims and assessment

### Competence aims and assessment mathematics 1P

#### Competence aims after mathematics 1P

The pupil is expected to be able to

- read, extract and evaluate mathematics in texts about situations from the local environment, do calculations related to this, and present and argue for the results
- explore how different premises may impact how mathematical problems from society and working life are solved
- model situations related to issues from society and the workplace, present and argue for the results and for when the models are valid
- identify variable quantities in different situations and use them for exploration and generalisation
- interpret and use formulas that apply to society and the workplace
- use percentages, percentage points, thousandths and growth factors in calculations, and present and justify solutions
- explore, describe and apply the concepts of proportionality and inverse proportionality
- interpret and use compound units of measurements in practical contexts and choose suitable units of measurement
- interpret and use functions in mathematical modelling and problem solving
- plan, carry out and present independent work related to mathematical modelling and functions within social studies topic areas
- use digital tools in exploration and problem solving related to the properties of functions, and discuss the solutions
- interpret and calculate using radical expressions, powers and numbers in standard form

#### Formative assessment

Formative assessment shall help to promote learning and develop competence in mathematics 1P. The pupils demonstrate and develop competence in the subject when they use mathematical concepts in

communication, and when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. The pupils also demonstrate and develop their competence when they make and explore mathematical models, using mathematical methods and reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in programming and strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.

### Assessment of coursework

The grade awarded for coursework shall express the overall competence of the pupil after completing mathematics 1P. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, problem solving strategies and reflecting on and arguing for solutions and models.

## **Competence aims and assessment mathematics 1P-Y for Building and Construction**

### Competence aims after mathematics 1P-Y for Building and Construction

The pupil is expected to be able to

- evaluate choices related to personal finances and reflect on the consequences of taking out loans and using credit cards
- interpret and use formulas related to everyday life and working life
- interpret and use compound units of measurement in practical contexts and choose suitable units of measurement
- collect data from the practice field, make estimates and do calculations, and prepare suitable representations of these results, and present them

- read, use and create spreadsheets when working with budgets, bids and cost calculations related to Building and Construction, and evaluate how different factors affect the result
- explore and use the properties of geometric shapes, scale and trigonometry to calculate lengths, angles and areas when problem solving in Building and Construction

## Formative assessment

Formative assessment shall help to promote learning and develop competence in mathematics 1P-Y for Building and Construction. The pupils demonstrate and develop competence in the subject when they use mathematical concepts in communication, and when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. The pupils also demonstrate and develop their competence when they make and explore mathematical models, using mathematical methods and reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.

## Assessment of coursework

The grade awarded for coursework shall reflect the overall mathematical competence of the pupil after completing mathematics 1P-Y for Building and Construction. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, using problem solving strategies and reflecting on and arguing for solutions and models.

## **Competence aims and assessment mathematics 1P-Y in Electrical Engineering and Computer Technology**

### Competence aims after mathematics 1P-Y in Electrical Engineering and Computer Technology

The pupil is expected to be able to

- evaluate choices related to personal finances and reflect on the consequences of taking out loans and using credit cards
- interpret and use formulas related to everyday life and working life
- interpret and use compound units of measurement in practical contexts and choose suitable units of measurement
- use various strategies to solve equations
- explain the definitions of sine, cosine and tangent, interpret the definitions graphically and relate them to examples in Electrical Engineering and Computer Technology
- use trigonometry to calculate lengths, angles and areas of triangles when problem solving in Electrical Engineering and Computer Technology

### Formative assessment

Formative assessment shall help to promote learning and develop competence in mathematics 1P-Y for Electrical Engineering and Computer Technology. The pupils demonstrate and develop competence in the subject when they use mathematical concepts in communication, and when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. The pupils also demonstrate and develop their competence when they make and explore mathematical models, using mathematical methods and reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.



## Assessment of coursework

The grade awarded for coursework shall reflect the overall mathematical competence of the pupil after completing mathematics 1P-Y for Electrical Engineering and Computer Technology. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, using problem solving strategies and reflecting on and arguing for solutions and models.

## Competence aims and assessment mathematics 1P-Y for Hairdressing, Floral, Interior and Retail Design

### Competence aims after mathematics 1P-Y for Hairdressing, Floral, Interior and Retail Design

The pupil is expected to be able to

- evaluate choices related to personal finances and reflect on the consequences of taking out loans and using credit cards
- interpret and use formulas related to everyday life and working life
- interpret and use compound units of measurement in practical contexts and choose suitable units of measurement
- collect data from the practice field, make estimates and do calculations, and prepare suitable representations of these results, and present them
- read, use and create spreadsheets when working with budgets, bids and cost calculations related to Hairdressing, Floral, Interior and Retail Design, and evaluate how different factors affect the result
- explore and use the properties of geometric shapes and calculate lengths, angles, area, volume, proportions and scale when problem solving in Hairdressing, Floral, Interior and Retail Design

### Formative assessment

Formative assessment shall help to promote learning and develop competence in mathematics 1P-Y for Hairdressing, Floral, Interior and Retail Design. The pupils demonstrate and develop competence in the subject when they use mathematical concepts in communication, and when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. The pupils also demonstrate and develop their competence when they make and explore mathematical models, using mathematical methods and reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.

### Assessment of coursework

The grade awarded for coursework shall reflect the overall mathematical competence of the pupil after completing mathematics 1P-Y for Hairdressing, Floral, Interior and Retail Design. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, using problem solving strategies and reflecting on and arguing for solutions and models.

## **Competence aims and assessment mathematics 1P-Y for Crafts, Design and Product Development**

### Competence aims after mathematics 1P-Y for Crafts, Design and Product Development

The pupil is expected to be able to

- evaluate choices related to personal finances and reflect on the consequences of taking out loans and using credit cards
- interpret and use formulas related to everyday life and working life
- interpret and use compound units of measurement in practical contexts and choose suitable units of measurement
- collect data from the practice field, make estimates and do calculations, and prepare suitable representations of these results, and present them
- read, use and create spreadsheets when working with budgets, bids and cost calculations related to Crafts, Design and Product Development, and evaluate how different factors affect the result
- explore and use the properties of geometric shapes, calculate lengths, angles, area, volume, proportions and scale when problem solving in Crafts, Design and Product Development

## Formative assessment

Formative assessment shall help to promote learning and develop competence in mathematics 1P-Y for Crafts, Design and Product Development. The pupils demonstrate and develop competence in the subject when they use mathematical concepts in communication, and when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. The pupils also demonstrate and develop their competence when they make and explore mathematical models, using mathematical methods and reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.

## Assessment of coursework

The grade awarded for coursework shall reflect the overall mathematical competence of the pupil after completing mathematics 1P-Y for Crafts, Design and Product Development. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, using problem solving strategies and reflecting on and arguing for solutions and models.

## **Competence aims and assessment mathematics 1P-Y for Healthcare, Child and Youth Development**

### Competence aims after mathematics 1P-Y for Healthcare, Child and Youth Development

The pupil is expected to be able to

- evaluate choices related to personal finances and reflect on the consequences of taking out loans and using credit cards

- interpret and use formulas related to everyday life and working life
- interpret and use compound units of measurement in practical contexts and choose suitable units of measurement
- collect data from the practice field, make estimates and do calculations, and prepare suitable representations of these results, and present them
- read, use and create spreadsheets when working with budgets, bids and cost calculations related to Healthcare, Child and Youth Development, and evaluate how different factors affect the result
- do calculations related to welfare technology involving economy

## Formative assessment

Formative assessment shall help to promote learning and develop competence in mathematics 1P-Y for Healthcare, Child and Youth Development. The pupils demonstrate and develop competence in the subject when they use mathematical concepts in communication, and when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. The pupils also demonstrate and develop their competence when they make and explore mathematical models, using mathematical methods and reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.

## Assessment of coursework

The grade awarded for coursework shall reflect the overall mathematical competence of the pupil after completing mathematics 1P-Y for Healthcare, Child and Youth Development. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, using problem solving strategies and reflecting on and arguing for solutions and models.

## **Competence aims and assessment mathematics 1P-Y for Information Technology and Media Production**

### Competence aims after mathematics 1P-Y for Information Technology and Media Production

The pupil is expected to be able to

- evaluate choices related to personal finances and reflect on the consequences of taking out loans and using credit cards
- interpret and use formulas related to everyday life and working life
- interpret and use compound units of measurement in practical contexts and choose suitable units of measurement
- collect data, process large datasets, and do calculations and prepare suitable representations of these results, and present them
- read, use and create spreadsheets when working with budgets, bids and cost calculations related to Information Technology and Media Production, and evaluate how different factors affect the result
- explore and use geometric shapes and proportions and use them in design and product development

### Formative assessment

Formative assessment shall help to promote learning and develop competence in mathematics 1P-Y for Information Technology and Media Production. The pupils demonstrate and develop competence in the subject when they use mathematical concepts in communication, and when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. The pupils also demonstrate and develop their competence when they make and explore mathematical models, using mathematical methods and reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.

## Assessment of coursework

The grade awarded for coursework shall reflect the overall mathematical competence of the pupil after completing mathematics 1P-Y for Information Technology and Media Production. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, using problem solving strategies and reflecting on and arguing for solutions and models.

## Competence aims and assessment mathematics 1P-Y for Agriculture, Fishing and Forestry

### Competence aims after mathematics 1P-Y for Agriculture, Fishing and Forestry

The pupil is expected to be able to

- evaluate choices related to personal finances and reflect on the consequences of taking out loans and using credit cards
- interpret and use formulas related to everyday life and working life
- interpret and use compound units of measurement in practical contexts and choose suitable units of measurement
- collect data from the practice field, make estimates and do calculations, and prepare suitable representations of these results, and present them
- read, use and create spreadsheets when working with budgets, bids and cost calculations related to Agriculture, Fishing and Forestry, and evaluate how different factors affect the result
- explore and use the properties of geometric shapes and calculate lengths, angles, area, volume, proportions and scale when problem solving in Agriculture, Fishing and Forestry

### Formative assessment

Formative assessment shall help to promote learning and develop competence in mathematics 1P-Y for Agriculture, Fishing and Forestry. The pupils demonstrate and develop competence in the subject when they use mathematical concepts in communication, and when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. The pupils also demonstrate and develop their competence when they make and explore mathematical models, using mathematical methods and reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.

### Assessment of coursework

The grade awarded for coursework shall reflect the overall mathematical competence of the pupil after completing mathematics 1P-Y for Agriculture, Fishing and Forestry. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, using problem solving strategies and reflecting on and arguing for solutions and models.

## **Competence aims and assessment mathematics 1P-Y for Restaurant and Food Processing**

### Competence aims after mathematics 1P-Y for Restaurant and Food Processing

The pupil is expected to be able to

- evaluate choices related to personal finances and reflect on the consequences of taking out loans and using credit cards
- interpret and use formulas related to everyday life and working life
- interpret and use compound units of measurement in practical contexts and choose suitable units of measurement
- collect data from the practice field, make estimates and do calculations, and prepare suitable representations of these results, and present them
- read, use and create spreadsheets when working with budgets, bids and cost calculations related to Restaurant and Food Processing, and evaluate how different factors affect the result
- interpret and do calculations on nutritional and energy content, and convert between different compound units related to Restaurant and Food Processing

## Formative assessment

Formative assessment shall help to promote learning and develop competence in mathematics 1P-Y for Restaurant and Food Processing. The pupils demonstrate and develop competence in the subject when they use mathematical concepts in communication, and when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. The pupils also demonstrate and develop their competence when they make and explore mathematical models, using mathematical methods and reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.

## Assessment of coursework

The grade awarded for coursework shall reflect the overall mathematical competence of the pupil after completing mathematics 1P-Y for Restaurant and Food Processing. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, using problem solving strategies and reflecting on and arguing for solutions and models.

## **Competence aims and assessment mathematics 1P-Y for Sales, Service and Tourism**

### Competence aims after mathematics 1P-Y for Sales, Service and Tourism

The pupil is expected to be able to

- evaluate choices related to personal finances and reflect on the consequences of taking out loans and using credit cards



- interpret and use formulas related to everyday life and working life
- interpret and use compound units of measurement in practical contexts and choose suitable units of measurement
- collect data from the practice field, make estimates and do calculations, and prepare suitable representations of these results, and present them
- read, use and create spreadsheets when working with budgets, bids and cost calculations related to Sales, Service and Tourism, and evaluate how different factors affect the result
- interpret and do calculations on statistical data that are relevant to Sales, Service and Tourism

## Formative assessment

Formative assessment shall help to promote learning and develop competence in mathematics 1P-Y for Sales, Service and Tourism. The pupils demonstrate and develop competence in the subject when they use mathematical concepts in communication, and when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. The pupils also demonstrate and develop their competence when they make and explore mathematical models, using mathematical methods and reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.

## Assessment of coursework

The grade awarded for coursework shall reflect the overall mathematical competence of the pupil after completing mathematics 1P-Y for Sales, Service and Tourism. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, using problem solving strategies and reflecting on and arguing for solutions and models.

## Competence aims and assessment mathematics 1P-Y for Technological and Industrial Production

### Competence aims after mathematics 1P-Y for Technological and Industrial Production

The pupil is expected to be able to

- evaluate choices related to personal finances and reflect on the consequences of taking out loans and using credit cards
- interpret and use formulas related to everyday life and working life
- interpret and use compound units of measurement in practical contexts and choose suitable units of measurement
- collect data from the practice field, make estimates and do calculations, and prepare suitable representations of these results, and present them
- do calculations and evaluations related to measurement uncertainty and tolerance
- explore and use the properties of geometric shapes, and calculate length, angles, area, volume, proportions and scale when problem solving in Technological and Industrial Production

### Formative assessment

Formative assessment shall help to promote learning and develop competence in mathematics 1P-Y for Technological and Industrial Production. The pupils demonstrate and develop competence in the subject when they use mathematical concepts in communication, and when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. The pupils also demonstrate and develop their competence when they make and explore mathematical models, using mathematical methods and reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.

## Assessment of coursework

The grade awarded for coursework shall reflect the overall mathematical competence of the pupil after completing mathematics 1P-Y for Technological and Industrial Production. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, using problem solving strategies and reflecting on and arguing for solutions and models.

## Type of assessment

### Assessment of coursework

Mathematics 1P: The pupil shall receive one grade for coursework.

Mathematics 1P-Y: The pupil shall receive one grade for coursework.

### Examination for pupils

Mathematics 1P: The pupil can be selected for a written examination. The written examination is prepared and graded centrally. The pupil can also be selected for an oral-practical examination with a preparation part. The oral-practical examination is prepared and graded locally.

Mathematics 1P-Y: The pupil can be selected for a written examination. The written examination is prepared and graded centrally. The pupil can also be selected for an oral-practical examination with a preparation part. The oral-practical examination is prepared and graded locally.

### Examination for external candidates

Mathematics 1P: The external candidate must sit for a written examination. The written examination is prepared and graded centrally.

Mathematics 1P-Y: The external candidate must sit for a written examination. The written examination is prepared and graded centrally.