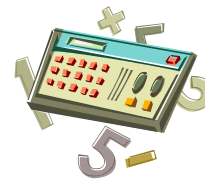


MATHEMATICS AND NUMERACY

NATIONAL MATHEMATICS



Course/Subjects Name

Mathematics

Levels Available (Entry based on prior attainment)

National 4 and National 5

Purpose, Aims and Benefits of the Course

The emphasis in both National 4 and National 5 Mathematics is very much on describing, tackling and solving problems which arise in real life using mathematical knowledge and techniques.

These Mathematics courses are designed to play a useful part in your personal development and overall education. They provide you with skills which are helpful in other school subjects and which will be important for your everyday life, now and in the world of work. These courses help you to learn to appreciate Mathematics and understand its importance in today's world.

National 4 is an internally assessed Pass/Fail Course. It comprises of units of work under the headings of Expressions and Formulae, Relationships and Numeracy. Each unit of work has an internal assessment associated, which must be passed before the completion of the course. Along with the Unit Assessments it also has a 'Value Added' Unit which is an internal assessment written to address skills and concepts covered across the three compulsory units.

National 5 comprises of units of work under the headings of Expressions and Formulae, Relationships and Applications. As with National 4 Mathematics, each unit must be passed at an internal level before a final overall exam that is set by the SQA, which is graded A - D.

Homework

Formal homework tasks will be set as they have been throughout S1 - S3 on a fortnightly basis, or as appropriate in line with the course.

These will usually involve worksheets with some straight forward examples as have been faced in class, as well as some more challenging questions designed to ensure that learners can apply their knowledge and skills in new settings.

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After each lesson there will also be an expectation for learners to reflect on the lesson. This may involve independently attempting extra examples from the lesson, or reading over the class work jotter. This is vital as the pace of the National courses in Maths is fast, and each lesson builds directly on from the lesson before.

Progression Routes

National 4 Mathematics leads onto National 5 Mathematics, which in turn leads onto Higher and Advanced Higher Mathematics.

Career Opportunities

For many Further Education courses this is a compulsory subject for entry and employers very often require job applicants to have a qualification in Mathematics. Careers might include:

Engineering, Accounting, Code Breaker, Risk Management, Actuary, Architect, Statistician, Teaching, Civil Service, Scientific Research, Telecommunication.

Faculty Contact

Mr C White

PT Mathematics & Numeracy

MATHEMATICS AND NUMERACY

MATHEMATICS HIGHER



Course/Subjects Name

Mathematics Higher

Purpose

Mathematics is important in everyday life, allowing us to make sense of the world around us and to manage our lives.

Using Mathematics enables us to model real-life situations and make connections and informed predictions. It equips us with the skills we need to interpret and analyse information, simplify and solve problems, assess risk and make informed decisions.

The course aims to:

- Motivate and challenge learners by enabling them to select and apply mathematical techniques in a variety of mathematical situations
- Develop confidence in the subject and a positive attitude towards further study in Mathematics and the use of Mathematics in employment
- Deliver in-depth study of mathematical concepts and the ways in which Mathematics describes our world
- Allow learners to interpret, communicate and manage information in mathematical form; skills which are vital to scientific and technological research and development
- Deepen the learner's skills in using mathematical language and exploring advanced mathematical ideas

Recommended Entry

Students would normally be expected to have attained National 5 Mathematics.

Course Details

The Higher course is designed to extend the learning at National 5. The course is delivered in three units; Expressions & Functions, Relationships & Calculus and Applications.

Topics in Higher include extending the work on the straight line, the equation of a circle and tangency, logarithms and exponentials, composite functions, trigonometric equations and the addition formulae, sequences, further algebra, calculus and vector geometry. Every opportunity is taken to demonstrate how what they are learning can be used in real life.

Assessment

At the end of each unit of work, there is a compulsory course unit assessment. These Unit Assessments test the learning at minimum competence level.

Having completed the Unit Assessments, students are presented for an external examination set by the Scottish Qualifications Authority.

In order to gain an award, candidates must succeed in the three course Unit Assessments and in the final external examination.

Where a candidate does not succeed at the final external examination, he or she will be given credit for any unit awards gained and these credits can be carried forward to following sessions if desired.

Progression

Students may progress to Advanced Higher Mathematics or exit to higher or further education, using either the qualification as a general or specific entry requirement for mathematics, engineering, or science HNC/D or degree courses.

Homework

It is vital that learners realise right away that any new work introduced in class must be taken home, studied, understood and learned. The pace of the course is much faster than at National 5 and learners will give themselves the best chance of passing just by being organised and regularly reviewing classwork. Beyond the taught aspects of the course, it is also expected that students will complete at least a further 40 hours of independent study throughout the year.

Students will be expected to finish off classwork at home and also provide a regular exercise for marking. Homework returns will be recorded as will the level of performance.

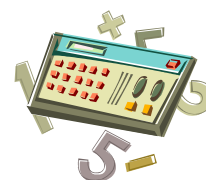
Faculty Contact

Mr C White

PT Mathematics & Numeracy

MATHEMATICS AND NUMERACY

MATHEMATICS ADVANCED HIGHER



Course/Subjects Name

Mathematics Advanced Higher

Purpose

This course is designed to enthuse, motivate, and challenge learners by enabling them to:

- Select and apply complex mathematical techniques in a variety of mathematical situations, both practical and abstract
- Extend and apply skills in problem solving and logical thinking
- Extending skills in interpreting, analysing, communicating and managing information in mathematical form, while exploring more advanced techniques
- Clarify their thinking through the process of rigorous proof

The course develops and expands a range of mathematical skills. It allows the learner to develop further skills in calculus and algebra. Areas such as number theory (which helps keep the internet secure), complex numbers (the uses of which are ubiquitous, ranging from the solution of equations to the description of electronic circuits) and matrices (used in game theory and economics) are introduced. The learner's mathematical thinking will also benefit from examples of rigorous proof.

Course Details

Learners will acquire and apply operational skills necessary for exploring more complex mathematical ideas. In addition, learners will develop mathematical reasoning skills and will gain experience in logical thinking and methods of proof.

The Advanced Higher Mathematics course has three units:

Methods in Algebra and Calculus

The general aim of the unit is to develop advanced knowledge and skills in algebra and calculus that can be used in practical and abstract situations to manage information in mathematical form. The outcomes cover partial fractions, standard procedures for both differential calculus and integral calculus, as well as methods for solving both first order and second order differential equations. The importance of logical thinking and proof is emphasised throughout.

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Applications of Algebra and Calculus

The general aim of the unit is to develop advanced knowledge and skills that involve the application of algebra and calculus to real life and mathematical situations, including applications to geometry. Learners will acquire skills in interpreting and analysing problem situations where these skills can be used. The outcomes cover the binomial theorem, the algebra of complex numbers, properties of functions, and rates of change. Aspects of sequences and series are introduced, including summations, proved by induction.

Geometry, Proof and Systems of Equations

The general aim of the unit is to develop advanced knowledge and skills that involve geometry, number and algebra, and to examine the close relationship between them. Learners will develop skills in logical thinking. The outcomes cover matrices, vectors, solving systems of equations, the geometry of complex numbers, as well as processes of rigorous proof.

Assessment

As with previous levels of study in maths, each of the three units has a Unit Assessment at the end. Having completed the course units, students are presented for an external examination set by the Scottish Qualifications Authority.

In order to gain an award, candidates must succeed in each of the course unit assessments and in the final external examination.

Homework

It is vital that learners realise right away that any new work introduced in class must be taken home, studied, understood and learned. The pace of the course is much faster than at National 5 and learners will give themselves the best chance of passing just by being organised and regularly reviewing classwork. Beyond the taught aspects of the course, it is also expected that students will complete at least a further 40 hours of independent study throughout the year.

Students will be expected to finish off classwork at home and also provide a regular exercise for marking. Homework returns will be recorded as will the level of performance.

Career Opportunities

For many Further Education courses this is a useful subject for entry and can develop a strong foundation for studying a Science, Technology, Engineering or Mathematics subject at University. Careers might include:

Engineering, Accounting, Code Breaker, Risk Management, Actuary, Architect, Statistician, Teaching, Civil Service, Scientific Research, Telecommunication.

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