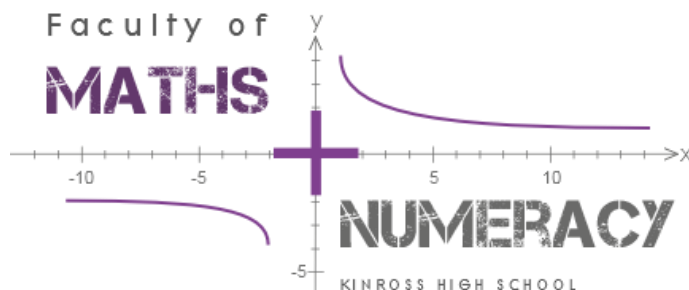




## Advanced Higher

## Mathematics (SCQF 7)



Mathematics helps us to make sense of the world around us. It is the study of relationships, patterns, proofs and the properties of numbers. Mathematics takes a reasoned approach to thinking and is characterised by order and the use of carefully designed terms and processes. Mathematics can be used to model real-life situations and can equip us with the skills we need to interpret and analyse information, simplify and solve problems, assess risk, and make informed decisions.

### **Aims of the Course**

Mathematics at Advanced Higher provides the foundation for many developments in the sciences and in technology as well as having its own intrinsic value. 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.

### **Prerequisite**

This course is suitable for learners who are secure in their attainment of the Higher Mathematics course (achieving a Grade A or B).

### **Course Structure and Conditions of award**

The learner must pass the Course assessment (external examination which is graded A – D) as per the structure below:

External Component	Marks	Duration
Question Paper	100	3 hours

Both question papers will assess operational and reasoning skills, and will include both short answer and extended response questions.

### **Homework/Self Study**

There is a considerable commitment demanded by this course. Pupils will need to show responsibility for their learning with regular independent study. They will be expected to complete given tasks including homework exercises, past papers questions and organise their time to revise topics regularly. This course is a stepping stone for first year university courses.

# Course Content

## **Methods in Algebra and Calculus**

This unit 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.

## **Applications of Algebra and Calculus**

This unit covers the binomial theorem, the algebra of complex numbers, properties of functions, rates of change and volumes of revolution. Aspects of sequences and series are introduced, including summations, proved by induction.

## **Geometry, Proof and Systems of Equations**

This unit covers matrices, vectors, solving systems of equations, the geometry of complex numbers, as well as processes of rigorous proof.