KEVICC Key Stage 4 Curriculum Subject: Mathematics

Autumn Half-Term

Term: Year 11 Autumn Term – Block Two | **Topic: Further Quadratics, Identities, Proof and Functions**

What is the essential knowledge from this unit?
What do students need to remember and understand?

	Specification content	Specification notes
A18	Solve quadratic equations **(including those that require rearrangement)** algebraically by factorising, **by completing the square and by using the quadratic formula** Solve equations using fractions/algebraic fractions	Equations with fractions could lead to solving a quadratic equation
Students should be able to: • solve quadratic equations by factorising		
A18h	Solve quadratic equations **(including those that require rearrangement)** algebraically by factorising, **by completing the square and by using the quadratic formula** Solve equations using fractions/algebraic fractions	Equations with fractions could lead to solving a quadratic equation
Students should be able to: • solve quadratic equations by factorising, completing the square or using the quadratic formula • solve geometry problems that lead to a quadratic equation that can be solved by using the quadratic formula		
A21	Translate simple situations or procedures into algebraic expressions or formulae; derive an equation and the solve the equation and interpret the solution	including solution of geometrical problems and problems set in context
Students should be able to: • set up simple linear equations • rearrange simple linear equations • set up simple linear equations to solve problems • set up a pair of simultaneous linear equations to solve problems • interpret solutions of equations in context.		
A19	Solve two simultaneous equations in two variables (linear / linear **or quadratic/linear**) algebraically	
Students should be able to: • solve simultaneous linear equations by elimination or substitution or any other valid method • find approximate solutions using the point of intersection of two straight lines.		
A19h	Solve two simultaneous equations in two variables (linear / linear **or quadratic/linear**) algebraically; find approximate solutions using a graph	
Students should be able to: • solve simultaneous equations when one is linear and the other quadratic		
A6	Know the difference between an equation and an identity Argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments **and proofs**	
Students should be able to: • recognise that, for example, $5x + 5 = 16$ is an equation, but $5x + 5 \equiv 5(x + 1)$ is an identity • show that two expressions are equivalent • use identities including equating coefficients use algebraic expressions to support an argument or verify a statement.		
A6	Know the difference between an equation and an identity Argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments **and proofs**	
Students should be able to: • construct rigorous proofs to validate a given result.		

Key Vocabulary and notation.

Expression	Unknown
Simplify	Solution
Term	FOIL
Substitute	Side
Coefficient	Form
Equivalent	Unknown
Positive	Check
Negative	Inequality
Directed	Satisfy
Substitute	Solution set
Solve	Greater/less
Simplify	than (or
Expand	equal)
Multiply out	Inequality
Bracket	Form
Identity	Balance
Product	Formula
Factor	Variable
Factorise	Subject
Factorise	Factor
fully	Identities
Common	Terms
Common	Expanding
factor	products
Make the	Surds
subject of	Quadratics
Unlike terms	$x^2 + bx + c$
Binomial	$(x \pm a)(x \pm b)$
Simplify	$ax^2 + bx + c$
Solve	$(cx \pm a)(dx \pm b)$
Equation	

Mathematical questioning should be designed to unpick the structure of the maths and deepen the student's understanding. When students talk about mathematical concepts, they should develop the vital mathematical language that helps them explain their ideas fully.

Students are expected and encouraged to use terminology during all discussions, verbal feedback and in written content.

A7	Where appropriate, interpret simple expressions as functions with inputs and outputs **Interpret the reverse process as the 'inverse function'** **Interpret the succession of two functions as a 'composite function'**	**understand and use function notation:** f(x), fg(x), f−1(x) **is expected at higher tier**

Students should be able to:
- understand and use number machines
- interpret an expression diagrammatically using a number machine
- interpret the operations in a number machine as an expression or function.

What prior learning supports understanding of this content?
- Simplify and manipulate algebraic expressions (including those involving surds) by:
  - Collecting like terms.
  - Multiplying a single term over a bracket.
  - Taking out common factors.
  - Expanding products of two binomials.
  - Factorising quadratic expressions of the form $x^2 + bx + c$ including the difference of two squares.
- Simplifying expressions involving sums, products, and powers, including the laws of indices.

How does this content link to future learning?
- Generate terms of a sequence from either a term-to-term or a position-to-term rule, including from patterns and diagrams.
- Recognise and use:
  - sequences of triangular, square and cube numbers
  - simple arithmetic progression
  - Fibonacci type sequences
  - quadratic sequences
  - and simple geometric progressions (r^n where n is an integer and r^n a rational number > 0)
  - other recursive sequences will be defined in the question
- Deduce expressions to calculate the nth term of linear and quadratic

Reading: *Where in the unit are students supported to read complex academic text?*
- Reading and understanding mathematical questions and problems' – teacher input.
- Decoding complex examination questions - explain what they are asking the student to do' – teacher input.
- Following instructions to solve problems - break down the tasks – teacher input.
- Recognising terminology, numbers, and symbols.

Writing: *Independent writing tasks and how they are structured*
- Using the correct subject specific terminology for numbers and symbols – examination papers, class books.
- Responding to questions that ask for an explanation or a reason – examination papers, class books.
- Self-evaluation, reviewing, reflecting and analysis of own work – class books, personalised learning checklists and analysis.
- Creating notes that can be used later for revision purposes - class books, revision cards, mind maps etc.

Key assessments:

How will do students review the information learned?

End of block assessments.

AQA end of block assessments provide a quick progress check at the end of each block of learning to make sure students have understood the content being covered. These are available for both foundation and higher tiers.

End of term/year assessments and mock examinations.

End of term assessments assessing the students' progress towards targets and provide diagnostic information to modify future teaching.

End of year 9 and 10 examinations assessing the students' progress towards targets and provide diagnostic information to modify future teaching.

Two mock examinations seasons take place during year 11 using previous years AQA 8300 examination papers. Students to experience the full suite of papers at both Foundation and higher tiers using Non-calculator and Calculator requirements.

All examinations will explore the three examination papers at both foundation and higher tiers using non-calculator and calculator requirements.

How will feedback be seen?

Marked end of block, term assessments and mock examinations.

Personalised learning checklists for all assessments identifying strengths and areas of development.

Written teacher feedback and marking in compliance with faculty and College Marking Policies. Student responses to marking. Students self-mark using purple pen. Verbal feedback given every lesson from teacher and peers as appropriate. Teacher and student self-assessment of presentation of class books will be completed to ensure written work is of high standard and students are achieving their potential.