KEVICC Key Stage 4 Curriculum Subject: Mathematics

Autumn Half-Term

Term: Year 11 Autumn Term – Block Two

Topic: Algebra: Quadratics, Rearranging Formulae, and Identities

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

	Specification content	Specification notes
A4	Simplify and manipulate algebraic expressions by: • 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	
	Students should be able to: • understand that algebra can be used to generalise the laws of arithmetic • manipulate an expression by collecting like terms • write expressions to solve problems • write expressions using squares and cubes • factorise algebraic expressions by taking out common factors • multiply two linear expressions, such as $(x \pm a)(x \pm b)$ and $(cx \pm a)(dx \pm b)$, for example $(2x + 3)(3x – 4)$ • multiply a single term over a bracket, for example, $a(b + c) = ab + ac$ • know the meaning of and be able to simplify, for example $3x – 2 + 4(x + 5)$ • know the meaning of and be able to factorise, for example $3x^2y – 9y$ or $4x^2 + 6xy$ • factorise quadratic expressions using the sum and product method, or by inspection (FOIL) • factorise quadratics of the form $x^2 + bx + c$ • factorise expressions written as the difference of two squares of the form $x^2 + a^2$ • use the index laws for multiplication and division of integer powers. • simplify algebraic expressions, for example by cancelling common factors in fractions or using index laws.	
A5	Understand and use standard mathematical formulae Rearrange formulae to change the subject	including use of formulae from other subjects in words and using symbols
	Students should be able to: • understand and use formulae from maths and other subjects expressed initially in words and then using letters and symbols. For example, formula for area of a triangle, area of a parallelogram, area of a circle, volume of a prism, conversions between measures, wage earned = hours worked × hourly rate + bonus • change the subject of a formula.	
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	
	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.	
A7	Where appropriate, interpret simple expressions as functions with inputs and outputs	
	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.	

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.

What prior learning supports understanding of this content?

- Use and interpret algebraic notation.
- Understand equality.
- Use fact families.
- Understand and use inverse operations.
- Find numbers that satisfy an equation with two unknowns
- Enumerate possibilities of combinations of two variables.
- Generate and describe linear number sequences.
- Express missing number problems algebraically.

How does this content link to future learning?

- Know the difference between $<$, $\leqslant$, $\geqslant$, $>$ and $\neq$.
- Solve linear inequalities in one or two variables and quadratic inequalities in one variable.
- Know the conventions of an open circle on a number line for a strict inequality and a closed circle for an included boundary.
- Represent the solution set on a number line, using set notation and on a graph.
- In graphical work the convention of a dashed line for strict inequalities and a solid line for an included inequality will be required.

Reading: *Where in the unit are students supported to read complex academic text?*	**Writing:** *Independent writing tasks and how they are structured*
• 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.	• 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.