The Sutton Academy

# Knowledge Rich Curriculum Plan

## Year 12 Maths

## Unit 7 - Algebraic methods

| Maths<br>Year 12 | Unit: Algebraic methods | | | |
|---|---|---|---|---|
| **Lesson/Learning Sequence** | **Intended Knowledge:**<br>*Students will know that…* | **Tiered Vocabulary** | **Prior Knowledge:**<br>*In order to know this students, need to already know that…* | **Assessment** |
| **Lesson 33: Algebraic fractions/Dividing polynomial**<br>Lesson Objective: To learn how to divide polynomials. | • Students will know how to simplify algebraic fractions.<br>• Students will know that a polynomial is a finite expression with positive whole number indices.<br>• Students will know how to identify polynomials.<br>• Students will know how to use long division to divide a polynomial by a linear expression.<br>• Students will know that if you finish the dividing with a zero then the linear expression is a factor of the polynomial.<br>• Students will know that the result of the division is called the quotient. | | • *Students need to know how to factorise linear expressions.*<br>• *Students need to know how to factorise quadratic expressions.*<br>• *Students need to know how to simplify numerical fractions.*<br>• *Students need to know how to use long division.*<br>• *Students need to know how to multiply algebraic expressions.*<br>• *Students need to know how to subtract positive and negative algebraic expressions.* | |
| **Lesson 34: Dividing polynomials**<br>Lesson Objective: To learn how to how to find a remainder or factorise completely. | • Students will know that if you finish the dividing with an expression or number other than zero, then the linear expression is not a factor of the polynomial.<br>• Students will know that if you finish the dividing with an expression or number then this is called the remainder.<br>• Students will know how to factorise a polynomial completely.<br>• Students will know to use the discriminant when proving if roots are real, repeated or not real. | | • *Students need to know how to use long division.*<br>• *Students need to understand the concept of a remainder.*<br>• *Students need to know how to multiply algebraic expressions.*<br>• *Students need to know how to subtract positive and negative algebraic expressions.*<br>• *Students need to know how to factorise quadratic expressions.*<br>• *Students need to know how to find the discriminant.* | |
| **Lesson 35: The factor theorem**<br>Lesson Objective: To learn how to use the factor theorem. | • Students will know that there are two methods to show that a linear expression is a factor of a polynomial - algebraic division and the factor theorem.<br>• Students will know how to write the polynomial as a function.<br>• Students will know to substitute the value of the root into the polynomial to find if the linear expression is a factor of the polynomial.<br>• Students will know that if the result of the substitution is zero then the linear expression is a factor of the polynomial.<br>• Students will know that if the result of the substitution is not zero then the linear expression is not a factor of the polynomial. | | • *Students need to know how to divide polynomials.*<br>• *Students need to know how to rearrange formulae.*<br>• *Students need to know how to substitute into expressions.*<br>• *Students need to know how to sketch cubic functions.* | |

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| | • Students will know that getting a remainder of zero when using algebraic division means the linear expression is a factor of the polynomial.<br>• Students will know that getting a remainder that is not zero when using algebraic division means the linear expression is not a factor of the polynomial.<br>• Students will know how to use the factors of a polynomial to draw a sketch of the polynomials.<br>• Students will know how to use a factor to find unknowns in the polynomial.<br>• Students will know to write a conclusion, stating the factor of the polynomial. | | | |
| **Lesson 36: Mathematical proof**<br>Lesson Objective: To learn how to use mathematical proof. | • Students will know to proof a statement is true a logical and structured argument needs to be shown.<br>• Students will know how to state previously established mathematical facts or theorems to start a proof.<br>• Students will know how to use clear logical steps using their stated facts or theorems to proof a statement true - proof by deduction.<br>• Students will know to state any assumptions they have made in the proof.<br>• Students will know that the proof has to cover all possible cases.<br>• Students will know to write a conclusion at the end of the proof.<br>• Students will know that when proving an identity, you start with the expression of on side of the identity and manipulate the expression until it matches the other side.<br>• Students will know how to prove a statement by deduction.<br>• Students will know the identity sign and that it means 'is always equal to'.<br>• Students will know how to prove an identity. | | • *Students need to how to use the discriminant.*<br>• *Students need to know properties of numbers such as odd or even.*<br>• *Students need to know properties of triangles and quadrilaterals.*<br>• *Students need to know how to manipulate algebraic expressions.*<br>• *Students need to know how to rearrange formulae.*<br>• *Students need to know how to substitute into expressions.* | |

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| **Lesson 37: Methods of proof**<br>Lesson Objective: To learn how to use proof by exhaustion and counter-examples to proof statements true or false. | • Students will know how to use proof by exhaustion.<br>• Students will know that proof by exhaustion means breaking down the statement into smaller cases and proving each case separately.<br>• Students will know how to use a counter-example to disprove a mathematical statement.<br>• Students will know that proof by counter-example means finding one example that does not work for the statement. | | • *Students need to know properties of numbers such as odd or even.*<br>• *Students need to know properties of triangles and quadrilaterals.*<br>• *Students need to know how to rearrange formulae.*<br>• *Students need to know how to expand brackets.*<br>• *Students need to know how to factorise linear expressions.*<br>• *Students need to know how to factorise quadratic expressions.* | |