The Sutton Academy

Knowledge Rich Curriculum Plan

Year 11 Higher – Algebra 3

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Steps to Success	Prior Knowledge: *In order to know this, students need to already know that…*	Feedback
To learn how to find the nth term of a quadratic sequence	• Students will know how to continue a quadratic sequence and use the nth term to generate terms • Students will know how to find the nth term of a quadratic sequence. • Students will know how to solve problems involving the nth term of quadratic sequences	**Quadratic –** involving a squared algebraic term but no other power higher than 2	•	• Students will need to know how to find the nth term of a linear sequence • Students will need to know how to generate a sequence for a given nth term, including those in the form an^2	Exam Prep 3
To learn how to draw quadratic graphs and find roots and turning points	• Students will know how to recognise graphs of quadratic functions. • Students will know that the shape of a quadratic graph is called a parabola • Students will know how to generate points and plot graphs for quadratic functions, with and without a calculator. • Students will know how to identify the line of symmetry of a quadratic graph • Students will know how to find approximate and exact solutions to quadratic equations by identifying the roots of a graph • Students will know how to identify the turning point for a drawn quadratic graph. • Students will know how to find approximate and exact solutions to quadratic equations in the form $ax^2 + bx + c = d$ where d is an integer or decimal number by drawing a suitable horizontal straight line	**Quadratic –** An expression or equation where the highest power is 2. **Symmetry –** A shape or object has symmetry if it can be divided into 2 or more identical pieces. **Turning Point** – The point at which the gradient changes of a curve (the maximum or minimum point on a curve). **Root** – A solution to an equation where a line or curve crosses the x-axis. **Parabola –** the U or ∩ shape of a quadratic graph	•	• Students should already know how to draw quadratic graphs	
To learn how to draw and recognise quadratic, cubic and reciprocal graphs	• Students will know how to recognise and sketch simple cubic functions. • Students will know how to recognise and sketch graphs of the reciprocal function $y=1/x$ with $x \neq 0$ • Students will know how to recognise and sketch graphs of exponential functions. • Students will know how to complete a table of values and plot reciprocal graphs with and without a calculator. • Students will know how to complete a table of values and plot a cubic function.	**Cubic –** Of the third power, order, or degree. In maths a cubic function is one involving a cubed algebraic term but no other power higher than 3. **Reciprocal –** The reciprocal of a number is: 1 divided by the number **Exponential –** a relation of the form $y = a^x$ **Function –** a relation or expression involving one or more variables	•	• Students will need to know how to substitute numbers into formulae involving cubes and fractions • Students will need to know how to convert a fraction to a decimal	Not on overview!

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Steps to Success	Prior Knowledge: *In order to know this, students need to already know that…*	Feedback
	• Students will know how to interpret graphs of simple cubic functions, including finding solutions to cubic equations. • Students will know how to recognise the shape of different graphs and match equations to sketches.	**Parabola –** the U or ∩ shape of a quadratic graph			
To learn how to draw, recognise and interpret graphs of trig functions	• Students will know how to recognise and draw the graph of y = sin(x) • Students will know how to recognise and draw the graph of y = cos(x) • Students will know how to recognise and draw the graph of y = tan(x) • Students will know how to read values from a trig graph and find second, third and fourth etc. solutions for trig equations using the graphs	**Trigonometric functions-** A real functions which relate an angle of a right-angled triangle to ratios of two side lengths.	•	• Students will need to know how to read values off a graph • Students will need to know how to substitute into formulae involving the trig ratios	
To learn how to factorise and solve quadratics Boost topic	• Students will know how to factorise and solve quadratic equations in the form $ax^2 + bx + c = 0$ where a = 1 • Students will know that in order to factorise and solve quadratic equations they must be equal to zero. • Students will know how to rearrange equations to make them equal to zero before factorising and solving them • Students will know how to form and solve quadratic equations where the coefficient of x^2 is 1	**Factorise –** put back into brackets by bringing common factors outside **Quadratic –** involving a squared algebraic term but no other power higher than 2	•	• Students need to be able to factorise quadratics where the co-efficient of x^2 is 1	
To learn how to factorise and solve quadratics	• Students will know how to factorise and solve quadratic equations in the form $ax^2 + bx + c = 0$ where a > 1 • Students will know that in order to factorise and solve quadratic equations they must be equal to zero. • Students will know how to rearrange equations to make them equal to zero before factorising and solving them • Students will know how to form and solve quadratic equations by factorising where the coefficient of x^2 is >1	**Co-efficient –** a number placed before and multiplying the variable in an algebraic expression	•	• Students need to be able to factorise quadratics where the co-efficient of x^2 is greater than 1	

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To learn how to solve quadratics using the quadratic formula	• Students will know that the quadratic formula is $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ • Students will know that we use the quadratic formula when a quadratic cannot be factorised • Students will know how to identify the values for a, b and c from a quadratic equation including where the equation is not necessarily in the order $ax^2 + bx + c$ • Students will know how to substitute the values for a, b and c into the quadratic formula to solve the corresponding quadratic equation • Students will know that in order to solve quadratic equations they must be equal to zero. • Students will know how to rearrange equations to make them equal to zero before using the quadratic formula to solve them • Students will know how to form and solve quadratic equations using the quadratic formula	**Formula –** A mathematical relationship or rule expressed in symbols.	•	• Students need to be able to use a calculator efficiently • Students need to be able to substitute numbers into formulae	
To learn how to find turning points by completing the square	• Students will know that we can find the turning point of a quadratic by writing it in the form $(x \pm a)^2 \pm b$ • Students will know that the coordinates of the turning point of a quadratic written in the form $(x + a)^2 + b$ is (-a, b)	**Turning Point** – The point at which the gradient changes of a curve (the maximum or minimum point on a curve).	•	• Students need to know how to expand and simplify a squared bracket	
2 lessons on quadratic simultaneous equations	•		•	•	

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To learn how to solve quadratic inequalities	• Students will know how to solve quadratic inequalities	**Quadratic –** involving a squared algebraic term but no other power higher than 2 **Inequality –** a symbol which makes a non-equal comparison between two numbers or other mathematical expressions e.g. >, <, ≥ and ≤	•	• Students will need to know how to solve quadratic equations • Students will need to know how to sketch quadratics showing the roots	
To learn how to use iteration to estimate solutions to equations	• Students will know how to show that a solution to an equation lies between two integers • Students will know how to rearrange an existing formula to give an iteration formula • Students will know how to use iteration to find approximate solutions to equations, for simple equations in the first instance, then quadratic and cubic equations. • Students will know how to use iteration with simple converging sequences. • Students will know that converging sequences if approaches a limit.	**Iteration** – the repetition of a process	•	• Students will need to know how to substitute into formulae • Students will need to know how to rearrange formulae	