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**Knowledge Rich Curriculum Plan**

Year 10 Higher+ Algebra 3

| **Lesson/Learning Sequence** | **Intended Knowledge:**  *Students will know that…* | **Tiered Vocabulary** | **Prior Knowledge:**  *In order to know this…* | **Assessment** |
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| **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 | **Sequence** - a particular order in which related things follow each other.  **Generate –** produce or create.  **Linear or Arithmetic Sequence** - A number pattern which increases (or decreases) by the same amount each time  **Geometric Sequence –** a sequence made by multiplying by the same value each time  **Nth Term –** a formula that enables us to find any term in a sequence. The ' n ' stands for the term number  **Quadratic –** An expression or equation where the highest power is 2.  **Substitute –** use or add in place of | * 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 an2 |  |
| **To learn how to draw and interpret quadratic graphs** | * Students will know how to draw quadratic graphs without a calculator * Students will know how to identify the coordinates of the turning point for a quadratic graph they have drawn * Students will know how to identify the roots for a quadratic graph that they have drawn * Students will know that the shape of a quadratic graph is called a parabola * Students will know how to find approximate and exact solutions to quadratic equations in the form ax2 + bx + c = d where d is an integer or decimal number by drawing a suitable horizontal straight line * Students will know how to identify the line of symmetry of a quadratic graph | **Quadratic –** An expression or equation where the highest power is 2.  **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 will need to know how to substitute both positive and negative numbers into expressions involving squaring * Students will need to know how to draw graphs in the form y = a, x = a |  |
| **To learn how to draw and recognise quadratic, cubic and reciprocal graphs** | * Students will know how to recognise and draw cubic functions. * Students will know how to recognise and draw graphs of reciprocal functions * Students will know how to recognise and sketch graphs of exponential functions. * Students will know how to complete a table of values and plot a cubic function. * Students will know how to recognise the shape of different graphs and match equations to sketches. | **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 = ax | * 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 |  |
| **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 ± a)2 ± 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 |  |
| **To learn how to factorise and solve quadratics** | * Students will know how to factorise and solve quadratic equations in the form  ax2 + bx + c = 0 * 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 x2 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 |  |
| **To learn how to solve quadratics using the quadratic formula** | * Students will know that the quadratic formula is * 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 ax2 + 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 form and solve quadratic equations** | * Students will know how to form and solve quadratic equations involving shape using either the quadratic formula or factorisation |  | * Students will need to know how to solve quadratic equations * Students will need to know how to form and solve linear equations |  |
| **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 solve quadratic simultaneous equations graphically** | * Students will know how to solve quadratic simultaneous equations by identifying the points of intersection between a straight line and a curve * Students will know how to solve quadratic simultaneous equations by drawing the curve and the straight line and identifying the points of intersection * Students will know how to solve a different quadratic equation to that drawn by deriving and drawing a suitable straight line on a quadratic graph | **Quadratic –** involving a squared algebraic term but no other power higher than 2  **Simultaneous –** occurring, operating, or done at the same time.  **Simultaneous equations –** equations involving two or more unknowns that are to have the same values in each equation.  **Linear Equation –** an equation between two variables that can be written in the form y=mx+c. Linear equations give a straight line when plotted on a graph. | * Students will need to know how to draw quadratic graphs * Students will need to know how to draw straight line graphs |  |
| **To learn how to solve quadratic simultaneous equations** | * Students will know how to solve quadratic simultaneous equations algebraically using substitution. |  | * Students will need to know how to solve linear simultaneous equations algebraically * Students will need to know how to solve quadratic equations |  |
| **To consolidate my understanding of solving quadratic simultaneous equations** | * Students will know how to solve quadratic simultaneous equations algebraically using substitution. |  | * Students will need to know how to solve quadratic simultaneous equations |  |