Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

Ormiston Victory Academy

SUBJECT: Algebra	**CURRICULUM PROGRESSION PATHWAYS**	**CL: Miss Z. Bradshaw and Miss A. Hazell**					
Year 7	**Year 8**	**Year 9**	**KS4 Foundation pathway**	**KS4 Higher pathway**	**KS5 (Level 3)**	**Further Education and training**	**Careers**
Expressions • Introduce the use of letters to represent unknowns • Simplify linear expressions by collecting unknowns • Multiply and divide algebraic terms (3a x 4b) • Form expressions from word descriptions using the four operations • Write expressions to represent function machines • Use brackets single brackets with linear terms and combine simplifying a pair of single brackets **Equations, formula and functions** • Find outputs of functions from words and symbol using functions machines • Substitute positive integers into simple formula written in words and letters	**Expressions** • Write, use and simplify expressions using powers • Expanding single brackets with non linear terms, including expanding two sets and simplifying • Factorising expressions into a single bracket with both linear and non linear terms **Equations, formula and functions** • Find an input given an output • Write and solve one and two step equations using function machines. • Solve equations using the balancing method. Equations must include the use of brackets **Graphs** • Use, plot and interpret straight line graphs	**Expressions** • Simplify algebraic expressions using index laws • Factorising more complicated expressions into a single bracket • Expand double brackets **Equations, formula and functions** • Writing and solving equations with fractions, powers and moving onto unknowns on both side • Substitute into expressions using order of operations that include powers and roots • Write and use formula • Substitute into formula and solve equations to find unknown values • Change the subject of the formula where the subject appears only once and • Write formula connecting variable in direct and indirect	**Expressions** • Factorise quadratic expressions • Square single brackets to gain a quadratic expression **Equations, formula and functions** • Solve quadratics by factorising • Solve simultaneous equations algebraically • Prove results using algebra • Change the subject of the formula where the subject appears only once and involving powers **Graphs** • Identify and intercept the gradient for real life scenarios • Sketch equations of	**Expressions** • Use and recognise the difference of two squares • Factorising quadratic expressions where the value of a is 1 moving on next year to where a is not 1 • Complete the square for quadratic expressions • Expand triple brackets • Apply the for operations to algebraic fractions • Simplify algebraic fractions • Prove a results using algebra **Equations, formula and functions** • Rearrange and solve quadratic equations • Find the roots of quadratics by factoring • Solve quadratics by using the formula • Solve quadratics by completing the square • Solve simultaneous equations	**Core Maths (Level 3)** **Graphical Methods** • Linear graphs • Graph sketching • Solving equations graphically **Rates of Change** • Equations of straight lines • Gradient of curves • Optimisation, speed and acceleration **Exponentials Functions** • Exponential growth • Exponential functions • Inverse functions • Solving exponential equations **Mathematics A level** **Graphs** • Modelling with straight lines • Find equations of circles and	• Psychology • Business-related courses • Sports • Social sciences • Natural science • Engineering	• Accountancy • Banking and Finance • Insurance and Pensions • Psychology • Business-related courses • Sports • Social sciences • Natural science • Engineering • Actuarial analyst. • Actuary. • Chartered accountant. • Chartered certified accountant. • Data analyst. • Investment analyst. • Research scientist (maths) • Secondary school teacher.

Core knowledge and skills mapped across the curriculum

Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

Ormiston Victory Academy

• Write formula using letters and symbols **Graphs** • Generate and plot coordinates from a rule • Find the midpoint of a line segment • Recognise, name and plot horizontal and vertical lines • Recognise, name and plot y=x and y=-x • Plot straight lines given a table of values • Draw graphs to represent relationships **Sequences** • Describe, continue and find missing terms for number sequences • Generate terms in a sequence using term to term rules • Find patterns and rules for pictorial sequences and describe how the progress • Write and use number sequences to mode real life problems • Recognise terms in special sequences (Fibonacci,	• Interpret and plot distance time graphs • Interpret and plot line graphs and identify trends • Draw, interpret non linear and curbed graphs • Generate coordinates for a table of values and plot a straight line graph . • Recognise when values are in direction proportion with out without a graph • Learn how to use straight line graphs to solve problems • Explore and understand what the values m and c represent in the equation y=mx+c and identify the gradient and y intercept from the equation • Find an equation of a straight line given its graph • Write an equation of a straight line given the gradient and y intercept **Sequences**	proportion and use algebra to solve **Graphs** • Explore parallel lines and find equations of parallel lines • Draw graphs with equations ax+by=c • Solve problems using simultaneous equations by plotting and solving graphically • Draw quadratic graphs, applying only vertical translations • Draw and intercept graphs showing direct and inverse proportion • Identify non linear graphs • Interpret quadratic functions in real life situations (graphically) **Sequences** • Find and use the nth term • Recognise and continue geometric and quadratic sequences **Inequalities** • Represent inequalities on a number line and find integer values that satisfy that inequality	straight lines using the gradient and y intercept • Interpret rate of change graphs • Plot graphs of all quadratic functions, reciprocal graphs and cubic graphs and interpret these graphs • Solve quadratic equations graphically in the form ax2+bx+c=0 and =k **Sequences** **Inequalities** • Read from number lines and state inequalities using correct notation Solve linear inequalities including unknowns on both sides	algebraically and form and solve these to describe real life situations • Solve simultaneous equations with a quadratic • Solve quadratic and cubic equations using iterative processes • Find equations of tangents to circles • Change the subject of the formula where the subject appears only once and involving powers • Change the subject where the subject appears twice • Change the subject where the variables are in the denominators • Solve equations with algebraic fractions • Introduce and use function notation • Find and use inverse and composite functions **Graphs** • Sketch graphs using the gradient and y intercept • Find the equation of a line given one point and a	use them to identify their centers and radius length • Find midpoints and perpendicular bisectors of chords • Find points of intersections of lines and circles • Use tangent and chord properties **Algebraic Methods** • Algebraic division to divide polynomials • Factor and remainder theorem • Methods of proof • Partial fractions inc those with repeated factors • Functions and mappings, modulus functions and problems **Binomial Expansion** • Pascals triangles and factorial notation • The binomial expression		

Core knowledge and skills mapped across the curriculum

triangular numbers etc) • Explore and recognise arithmetic and geometric sequences • Generate terms of a sequences using a position to term rule (using the nth term rue)		**Proportion** • Write formula connecting variables indirect or inverse portion Use algebra to solve direct and inverse proportion		gradient progressing onto finding the equation of a line given two points • Find the length of a line segment • Find the equation of parallel and perpendicular lines • Solve quadratic equations graphically in the form ax2+bx+c=0 and =k • Identify lines of symmetry from quadratic graphs • Draw and solve cubic equations graphically • Draw and recognise reciprocal functions • Draw the graph of a circle • Sketch quadratic graphs • Sketch cubic graphs and find its roots • Transforming graphs using function notation for translations and reflections **Sequences** • Solve problems using geometric sequences • Find terms and generate terms in	**Calculus** • Differentiating from first principles • Differentiating polynomials • Find equations of tangent and normal of curves • Determine whether a function is increasing or decreasing • Find stationary points and use second derivative to determine nature of stationary points • Sketch gradient functions • Differentiating exponentials, logarithms and trigonometric functions • Use chain rule, product rule and quotient rule • Modelling with quadratics • Parametric and implicit differentiation • Rates of change		

Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

Ormiston Victory Academy

				the Fibonacci sequence • Find the nth term of a quadratic sequence **Inequalities** • Solve and represent inequalities on a number line • Represent inequalities on graphs and interpret graphs of inequalities • Solve quadratic inequalities **Proportion** • Write and use equations to solve problems involving direct proportion including square and cube problems • Write and solve equations with inverse proportion Recognise and use graphs inverse proportion	• Integrating polynomials both definite and indefinite • Find equations of curves • Find the area under curves and between curves and lines • Using trigonometric equations • Reverse chain rule, integration by substitution and by parts • Using the trapezium rule • Solving with differential equations **Exponential and Logarithmic Functions** • Sketch exponential functions and use exponential models • Use laws of logarithms to simplify and solve equations • Solve equations with natural logarithms • Logarithms and non-linear data **Sequences and Series**		

Core knowledge and skills mapped across the curriculum

Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

					• Arithmetic sequences and series • Geometric sequences and series • Sum to infinity, sigma notation and recurrence relations		

Core knowledge and skills mapped across the curriculum

Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

Ormiston Victory Academy

Core knowledge and skills mapped across the curriculum