


SUBJECT: Higher Algebra		CURRICULUM PROGRESSION PATHWAYS		CL: Miss Z. Bradshaw and Miss A. Hazell	
KS3 (Level 1)	KS4 (Level 2)	KS5 (Level 3)	Further Education and training	Careers	
					
<p>Expressions</p> <ul style="list-style-type: none"> Simplifying expressions by collecting like terms Simplify expressions involving powers and brackets Derive formulae and substitute into formulae Expand and factorise expressions <p>Equations</p> <ul style="list-style-type: none"> Solve two step equations including those with brackets Solve equations with x on both sides Solve equations with quadratics and cubic terms Use trial and improvement to find solutions Construct and solve equation <p>Sequences</p> <ul style="list-style-type: none"> Work out subsequent terms in term-to-term arithmetic sequences Find and use the nth terms of arithmetic sequences Recognise geometric sequences <p>Graphs</p> <ul style="list-style-type: none"> Use positive and negative coordinates and find midpoint coordinates of lines Draw straight line graphs Recognise lines parallel to axes Find gradients and equations of straight lines using $y = mx + c$ 	<p>Expressions</p> <ul style="list-style-type: none"> Use index laws to simplify algebraic expressions Distinguish between expressions, equations, formulae and identities Expand double brackets Factorise quadratics and recognize the difference of two squares Add, subtract, multiply, divide and simplify algebraic fractions Simplify expressions involving surds <p>Equations/Formulae/Inequalities</p> <ul style="list-style-type: none"> Solve equations involving brackets and fractions Substitute into formulae and equations Rearrange formulae Solve quadratics by factorizing, using the quadratic formula, graphically and completing the square Solve linear and non-linear simultaneous equations algebraically and graphically Solve inequalities and represent the solutions on number lines, graphs and using set notation Use iterative process to solve quadratics Use function notation, find composite functions and inverse functions <p>Sequences</p> <ul style="list-style-type: none"> Determine whether a term is in a sequences Solve problems with geometric and Fibonacci sequences Find nth term of a quadratic sequence <p>Graphs</p>	<p>Mathematics A level</p> <p>Graphs</p> <ul style="list-style-type: none"> Modelling with straight lines Find equations of circles and 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 <p>Algebraic Methods</p> <ul style="list-style-type: none"> 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 <p>Binomial Expansion</p> <ul style="list-style-type: none"> Pascals triangles and factorial notation The binomial expression <p>Calculus</p> <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Actuarial Science Aeronautical Engineering Chemical Engineering Civil Engineering Economics Electrical/Electronic Engineering Engineering (General) Mathematics Mechanical Engineering Physics Statistics 	<ul style="list-style-type: none"> Actuarial Science Aeronautical Engineering Chemical Engineering Civil Engineering Economics Electrical/Electronic Engineering Engineering (General) Mathematics Mechanical Engineering Physics Statistics 	

<ul style="list-style-type: none"> Plot non-linear graphs 	<ul style="list-style-type: none"> Rearrange equations to find gradient and y intercept and compare graphs from their equations Sketch graphs using gradient and y intercepts Find equation of line given gradient and one point and when given only two points Draw speed distance time graphs and use them to calculate average speed Understand velocity time graphs and use them to calculate distance and acceleration Find equations of parallel and perpendicular lines Use quadratic graphs to solve equations Sketch cubic, reciprocal and circle graphs and recognize them from their shapes and equations Solve direct and indirect proportion problems Sketch and recognize exponential graphs Calculate the gradient of a tangent at a point Estimate the area under a graph Translate, sketch and reflect graphs of functions 	<ul style="list-style-type: none"> 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 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 <p>Exponential and Logarithmic Functions</p> <ul style="list-style-type: none"> 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 <p>Sequences and Series</p> <ul style="list-style-type: none"> Arithmetic sequences and series Geometric sequences and series Sum to infinity, sigma notation and recurrence relations 		
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