C1 (EDEXCEL)

Topic	Objectives	ICT Resources including Bring on the Maths (BOTM) Match Up Maths (MUM)	GlosMaths Resources	Assessment	Success For All and other resources

C1 Mindmap (link broken)

Algebra

Prior knowledge:

☺ *Use index laws to simplify and calculate the value of expressions involving multiplication and division of integer powers, zero powers, fractional and negative powers;*
☺ *Understanding that the inverse operation of raising a positive number to power n is raising the result of this operation to power 1/n*
☺ *Use surds and π in exact calculations, without a calculator;*
☺ *Rationalise a denominator such as* $1/\sqrt{3} = \sqrt{3}/3$
☺ *Generate points and plot graphs of simple quadratic functions [for example,* $y = x^2$ *;* $y = 3x^2 + 4$*] , then more general quadratic functions [for example,* $y = x^2 - 2x + 1$*] ; plot graphs of more complex quadratic and cubic functions; estimate values at specific points, including at maxima and minima*
☺ *Solve quadratic equations by factorisation, completing the square and using the quadratic formula.*
☺ *Find the exact solutions of two simultaneous linear equations in two unknowns by eliminating a variable*
☺ *Solve exactly, by elimination of an unknown, two simultaneous equations in two unknowns, one of which is linear in each unknown, and the other is linear in one unknown and quadratic in the other, or where the second is of the form* $x^2 + y^2 = r^2$
☺ *Find the intersection points of the graphs of a linear and quadratic function, knowing that these are the approximate solutions of the corresponding simultaneous equations representing the linear and quadratic functions*
☺ *Solve several linear inequalities in two variables and find the solution set*
☺ *Manipulate algebraic expressions by collecting like terms, multiplying a single term over a bracket, taking out common factors, expand the product of two linear expressions eg* $(ax \pm p)(bx \pm q)$*; factorising quadratic expressions including the difference of two squares and cancelling common factors in rational expressions*
☺ *Plot graphs of simple cubic functions, the reciprocal function* $y = 1/x$*,* $x \neq 0$*, the exponential function* $y = k^x$ *for integer values of x and simple positive values of k, the circular functions* $y = \sin x$ *and* $y = \cos x$*, using a spreadsheet of graph plotter as well as pencil and paper; recognise the characteristic shapes of all these functions*
☺ *Transform triangles and other 2-D shapes by translation, rotation and reflection and combinations of these transformations*
☺ *Apply to the graph of* $y = f(x)$ *the transformations* $y = f(x) + a$*,* $y = f(ax)$*,* $y = f(x + a)$*,* $y = a f(x)$ *for linear, quadratic, sine and cosine functions* $f(x)$

Laws of indices for all rational exponents.	Maths 2 ∞ + beyond Indices *BOTM* Algebraic Indices I Algebraic Indices II Numerical Indices I Numerical Indices II Law of Indices	*Simple exponential equations Follow on*; Teacher Notes	*On Target 1*	*N12 INDICES* RISP 35 NRich Giants Climbing Powers
Use and manipulation of surds.	*MUM* Surds BOTM Manipulation of surds			*N11 SURDS* NRich The Root of The Problem Absurdity

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Algebra	**Quadratic functions and their graphs. The discriminant of a quadratic function.**	BOTM Difference between two squares Completing the Square *Quadratic functions* Analysing Graphs	*Quadratic Sort*	Mathsnet Exam Questions	*C1 CLASSIFYING QUADRATICS* RISP10 RISP 33
	Completing the square. Solution of quadratic equations.		Song 1 *Song 2*		RISP 17 **NRich** Proof Sorter- Quadratic Equation Power Quady Quadratic Harmony
	Solution of simultaneous equations. Analytical solution by substitution.	*BOTM* Simultaneous equations			RISP 8 RISP 12 **NRich** System Speak Always Two
	Solution of linear and quadratic inequalities.	*BOTM* Inequalities			**NRich** Article: Proofs with Pictures Unit Interval Eyes Down In between

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	Algebraic manipulation of polynomials, including expanding brackets and collecting like terms, and factorisation.	*BOTM* Simplifying algebraic fractions Manipulating algebraic fractions Factorising		*On Target 2*	RISP 3 **NRich** Sums of Squares Common Divisor Root to Poly Polynomial Relations
	Graphs of functions; sketching curves defined by simple equations. Geometrical interpretation of algebraic solution of equations. Use of intersection points of graphs of functions to solve equations.	BOTM Curve Sketching	*Graph Recognition loop*	True, Never, Sometimes; Teacher Notes	RISP 6 RISP 34 **NRich** Witch of Agnesi Intersections
	Knowledge of the effect of simple transformations on the graph of y = f(x) as represented by y = af(x), y = f(x) + a, y = f(x+a), y = f(ax)	AUTOGRAPH Transforming Graphs; Teacher Notes Shoot That Goal Explore y = mx + c Explore trig functions GSP Transforming functions BOTM Transforming graphs	*Transform Loop*	*Mathsnet Exam Questions*	NRich Parabolic Patterns
	Things to make you go hmmmmmm…….				

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Topic	Objectives	ICT Resources including Bring on the Maths (BOTM) Match Up Maths (MUM)	GlosMaths Resources	Assessment	Success For All and other resources
Co-ordinate geometry in the (x,y) plane	**Prior knowledge:** ☺ *Understand that one coordinate identifies a point on a number line, that two coordinates identify a point in a plane and three coordinates identify a point in space, using the terms '1-D', '2-D' and '3-D'* ☺ *Use conventions for coordinates in the plane* ☺ *Locate points with given coordinate* ☺ *Plot points in all four quadrants* ☺ *Find the coordinates of points identified by geometrical information* ☺ *Find the coordinates of the midpoint of the line segment AB, given the points A and B, then calculate the length AB* ☺ *Recognise (when values are given for m and c) that equations of the form y = mx + c correspond to straight-line graphs in the coordinate plane; plot graphs of functions in which y is given explicitly in terms of x (as in y = 2 x + 3), or implicitly (as in x + y = 7)* ☺ *Find the gradient of lines given by equations of the form y = mx + c (when values are given for m and c)* ☺ *Understand that the form y = mx + c represents a straight line and that m is the gradient of the line, and c is the value of the y intercept* ☺ *Explore the gradients of parallel lines and lines perpendicular to these lines [for example, know that the lines represented by the equations y = -5x and y = 3 - 5 x are parallel, each having gradient (-5) and that the line with equation y = x divided by 5 is perpendicular to these lines and has gradient 1/5]*				
	Equation of a straight line in forms *y = mx + c*, *$y-y_1 = m(x-x_1)$* and …	AUTOGRAPH Linear 3 points Teacher Notes Shoot That Goal Explore y = mx + c	Why y = mx + c? *We will , we will graph you*; Teacher notes *TRIO; Teacher notes* Co-ord Loop(Grad = ½) Kung Fu	*On Target* True, Never, Sometimes; Teacher Notes	RISP 5 RISP 10
	… ax + by + c = 0	BOTM Linear Equations	*Co-ord Match*; Teacher Notes	Ivor Cocked Up	

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Topic	Objectives	ICT Resources including Bring on the Maths (BOTM) Match Up Maths (MUM)	GlosMaths Resources	Assessment	Success For All and other resources
	Conditions for two straight lines to be parallel or perpendicular to each other.	AUTOGRAPH Dog in the Fridge; Teacher Notes *BOTM* Parallel lines Perpendicular lines Unit Summary	Perpendicular Proof Teacher Notes	*Mathsnet Exam Questions* PROBING QUESTIONS	*A10 CONNECTING PERPENDICULAR LINES* NRich Parabella Enclosing Squares
Things to make you go hmmmmmm…….					

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Topic	Objectives	ICT Resources including Bring on the Maths (BOTM) Match Up Maths (MUM)	GlosMaths Resources	Assessment	Success For All and other resources
Sequences and series	**Prior Knowledge:** ☺ *Generate common integer sequences (including sequences of odd or even integers, squared integers, powers of 2, powers of 10, triangular numbers)* ☺ *Generate terms of a sequence using term-to-term and position-to-term definitions of the sequence* ☺ *Use linear expressions to describe the n^{th} term of an arithmetic sequence, justifying its form by reference to the activity or context from which it was generated*				
	Sequences, including those given by a formula for the *n*th term and those generated by a simple relation in the form $x_{n+1} = f(x_n)$	*BOTM* Recurrence relations	Introducing Sequences and Series	*On Target* True, Never, Sometimes; Teacher Notes AS Treasure Hunt Teacher Notes *Mathsnet Exam Questions* PROBING QUESTIONS	N13 ANALYSING SEQUENCES RISP 1 RISP 2 RISP 20 NRich Proof Sorter – Sum of an AP Prime AP
	Arithmetic series, including the formula for the sum of the first *n* natural numbers.	BOTM Identifying progressions Arithmetic progressions Sigma notation	*TRIO; Teacher Notes* *AS Loop* Do the AS Conga *Proof Jumble*		
	Understanding of Σ notation.				
	Things to make you go hmmmmmm…….				

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Topic	Objectives	ICT Resources including Bring on the Maths (BOTM) Match Up Maths (MUM)	GlosMaths Resources	Assessment	Success For All and other resources
Differentiation	**Prior Knowledge:** ☺ *Use index laws to simplify and calculate the value of expressions involving multiplication and division of integer powers, zero powers, fractional and negative powers* ☺ *Recognise (when values are given for m and c) that equations of the form y = mx + c correspond to straight-line graphs in the coordinate plane; plot graphs of functions in which y is given explicitly in terms of x (as in y = 2 x + 3), or implicitly (as in x + y = 7)* ☺ *Find the gradient of lines given by equations of the form y = mx + c (when values are given for m and c)* ☺ *Understand that the form y = mx + c represents a straight line and that m is the gradient of the line, and c is the value of the y intercept* *explore the gradients of parallel lines and lines perpendicular to these lines [for example, know that the lines represented by the equations y = -5x and y = 3 - 5 x are parallel, each having gradient (-5) and that the line with equation y = x divided by 5 is perpendicular to these lines and has gradient 1/5]*				
	The derivative of f(*x*) as the gradient of the tangent to the graph of *y* = f (*x*) at a point; the gradient of the tangent as a limit; interpretation as a rate of change. Second order derivatives.	AUTOGRAPH Gradient Function	*Gradient = 2?; Teacher Notes* First Principles; Teacher Notes Gradient Curve Gradient Function	*On Target*	RISP 36 NRich Slide
	Differentiation of x ^{n} and related sums and differences.	*Math 2 ∞ + beyond* BOTM Basic differentiation Harder differentiation	Differentiation Song *Match the Pairs; Teacher Notes*	True, Never, Sometimes; Teacher Notes	*C3 MATCHING FUNCTIONS AND DERIVATIVES* *C4 DIFFERENTIATING FRACTIONAL AND NEGATIVE POWERS*
	Applications of differentiation to gradients, tangents and normals.	MUM Differentiation BOTM Finding gradients Tangents and normals	*Unjumble; Teacher Notes*	*Mathsnet Exam Questions* PROBING QUESTIONS	
	Things to make you go hmmmmmm…….				

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Topic	Objectives	ICT Resources including Bring on the Maths (BOTM) Match Up Maths (MUM)	GlosMaths Resources	Assessment	Success For All and other resources
Integration	**Prior Knowledge:** ☺ *Find areas of shapes made from triangles, rectangles, parallelograms and trapezia* ☺ *Use index laws to simplify and calculate the value of expressions involving multiplication and division of integer powers, zero powers, fractional and negative powers;*				
	Indefinite integration as the reverse of differentiation.	BOTM Basic Integration MUM Integration	Fundamental Theorem of Calculus(FTC) *Matching Pairs: Teacher Notes* *Integration loop (x^4+c)*	On Target	
	Integration of x^n.	*BOTM* The 4 f's – finding f from f' Harder Integration Maths 2∞ + beyond	Partners Please: Teacher Notes Poems and Songs	True, Never, Sometimes: Teacher Notes *Mathsnet Exam Questions* PROBING QUESTIONS	*C4 INTEGRATING FRACTIONAL AND NEGATIVE POWERS*
	Things that to make you go hmmmmmm…….				

Formulae that students are expected to remember and that may not be included in formulae booklets.

Quadratic equations

$ax^2 + bx + c = 0$ has roots $\dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Differentiation

Function	Derivative
x^n	nx^{n-1}

Integration

Function	Integral
x^n	$\dfrac{1}{n+1}x^{n+1} + c,\ n \neq -1$