

Higher Maths Analysis Grid

	Algebra		Calculus		Trigonometry
A1	Determining a composite function given $f(x)$ and $g(x)$, where $f(x)$ and $g(x)$ can be trigonometric, logarithmic, exponential or algebraic functions – knowledge and use of the terms domain and range is expected	C1	Differentiating an algebraic function which is, or can be simplified to, an expression in powers of x	T1	Solving trigonometric equations in degrees or radians including those involving the wave function or trigonometric formulae or identities, in a given interval
A2	Completing the square in a quadratic expression where the coefficient of x^2 is non-unitary	C2	Determining the equation of a tangent to a curve at a given point by differentiation	T2	Application of the addition or double angle formulae
A3	Identifying or sketching a function after a transformation of the form $kf(x)$, $f(kx)$, $f(x+k)$, $f(x)+k$ or a combination of these	C3	Determining where a function is strictly increasing/decreasing	T3	Application of trigonometric identities
A4	Determining $f^{-1}(x)$ of functions	C4	Sketching the graph of an algebraic function by determining stationary points and their nature as well as intersections with the axes and behaviour of $f(x)$ for large positive and negative values of x	T4	Convert $a \cos x + b \sin x$ to $k \cos(x \pm \alpha)$ or $k \sin(x \pm \alpha)$, $k > 0$
A5	Sketch $f'(x)$ given the graph of $y = f(x)$	C5	Differentiating $k \sin(x)$, $k \cos(x)$		
A6	Determining a recurrence relation from given information and using it to calculate a required term	C6	Differentiating a composite function using the chain rule		Geometry
A7	Finding and interpreting the limit of a sequence, where it exists	C7	Determining the optimal solution for a given problem	G1	Finding the equation of a line parallel to and a line perpendicular to a given line
A8	Solve quadratic inequalities, $ax^2 + bx + c \geq 0$ (or ≤ 0)	C8	Solving problems using rate of change	G2	Using $m = \tan \theta$ to calculate a gradient or angle
A9	Given the nature of the roots of an equation, use the discriminant to find an unknown	C9	Integrating an algebraic function which is, or can be, simplified to an expression of powers of x	G3	Using properties of medians, altitudes and perpendicular bisectors in problems involving the equation of a line and intersection of lines
A10	Factorising a cubic or quartic polynomial expression	C10	Integrating functions of the form $f(x) = (x+q)^n$ n not equal to -1	G4	Determine whether or not two lines are perpendicular
A11	Solving a cubic or quartic polynomial equation	C11	Integrating functions of the form $f(x) = p \cos x$ and $f(x) = p \sin x$	G5	Determining and using the equation of a circle
A12	Finding the coordinates of the point(s) of the intersection of a straight line and a curve or of two curves	C12	Integrating functions of the form $f(x) = (px+q)^n$ n not equal to -1	G6	Using properties of tangency in the solution of a problem
A13	Simplifying a numerical expression using the laws of logarithms and exponents	C13	Integrating functions of the form $f(x) = p \cos(qx+r)$ and $f(x) = p \sin(qx+r)$	G7	Determining the intersection of circles or a line and a circle
A14	Using the laws of logarithms and exponents	C14	Solving differential equations of the form $\frac{dy}{dx} = f(x)$	G8	Determining the resultant of vector pathways in three dimensions
A15	Solving logarithmic and exponential equations	C15	Calculating definite integrals of functions with limits which are integers, radians, surds or fractions	G9	Working with collinearity
A16	Solve for a and b equations of the following forms, given two pairs of corresponding values of x and y : $\log y = b \log x + \log a$, $y = ax^b$ $\log y = x \log b + \log a$, $y = ab^x$	C16	Finding the area between a curve and the x -axis	G10	Determining the coordinates of an internal division point of a line
A17	Use a straight line graph to confirm relationships of the form $y = ax^b$, $y = ab^x$	C17	Finding the area between a straight line and a curve or two curves	G11	Evaluate a scalar product given suitable information and determine the angle between two vectors
A18	Model mathematically situations involving the logarithmic or exponential function	C18	Determine and use a function from a given rate of change and initial conditions	G12	Apply properties of the scalar product
A19	Sketching the inverse of a logarithmic or an exponential function			G13	Using unit vectors i, j, k as a basis

Reasoning skills

The learner will use mathematical reasoning skills (these can be used in combination or separately)

Interpreting a situation where mathematics can be used and identifying a strategy	Can be attached to any operational skills to require analysis of a situation
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Explaining a solution and, where appropriate, relating it to context	Can be attached to any operational skills to require explanation of the solution given
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