

Higher Maths – Success Criteria

Skills, knowledge and understanding for the course:

- ✓ Understand and use a range of complex mathematical concepts and relationships.
- ✓ Select and apply operational skills in algebra, geometry, trigonometry, calculus and statistics within mathematical contexts.
- ✓ Select and apply skills in numeracy.
- ✓ Use mathematical reasoning skills to extract and interpret information and to use complex mathematical models.
- ✓ Use mathematical reasoning skills to think logically, provide justification or proof, and solve problems.
- ✓ Communicate mathematical information with complex features.

Skills, knowledge and understanding for the assessment:

Topic	I can...
Straight Line	<ul style="list-style-type: none"> <input type="checkbox"/> Recall National 5 Straight Line facts: <ul style="list-style-type: none"> • Distance Formula • Finding a midpoint • Calculating a gradient $y = \frac{y_2 - y_1}{x_2 - x_1}$ • Equation of a line in form $y = mx + c$ <input type="checkbox"/> Find equation of a straight line using $y - b = m(x - a)$ <input type="checkbox"/> Find gradient using $y = m \tan \theta$ <input type="checkbox"/> Recall relationship between parallel and perpendicular gradients and associated equations <input type="checkbox"/> Find the equation of a median, an altitude and a perpendicular bisector
Recurrence Relations	<ul style="list-style-type: none"> <input type="checkbox"/> Construct a recurrence relation when given relevant information <input type="checkbox"/> Explain why a recurrence relation has a limit ($-1 < a < 1$) <input type="checkbox"/> Find the limit, where it exists, for a given recurrence relation ($L = \frac{b}{1-a}$) <input type="checkbox"/> Solve problems involving recurrence relations
Functions & Graphs	<ul style="list-style-type: none"> <input type="checkbox"/> Explain the terms domain and range when related to a function <input type="checkbox"/> Find composite functions <input type="checkbox"/> Find inverse functions <input type="checkbox"/> Sketch graphs of related functions (e.g. given $f(x)$ sketch $4 - f(x)$) <input type="checkbox"/> Sketch exponential and logarithm graphs
Trigonometry (Radians & Exact Values)	<ul style="list-style-type: none"> <input type="checkbox"/> Convert between degrees and radians <input type="checkbox"/> Recall exact values of $0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$ <input type="checkbox"/> Determine exact values of other angles using quadrants or graphs <input type="checkbox"/> Sketch graphs of trigonometric functions and related functions (e.g. $f(x) = 3\sin(4x) + 2$) <input type="checkbox"/> Solve linear trigonometric equations using degrees or radians with and without a calculator <input type="checkbox"/> Solve trigonometric equations involving squared functions and quadratic functions (e.g. $\sin^2 x = \frac{1}{2}, \cos^2 x + \cos x - 2 = 0$)
Differentiation	<ul style="list-style-type: none"> <input type="checkbox"/> Differentiate functions of the form $f(x) = ax^n$ <input type="checkbox"/> Solve problems using the rate of change <input type="checkbox"/> Differentiate functions with negative and fractional powers <input type="checkbox"/> Differentiate functions with brackets and fractions (products and quotients)

	<ul style="list-style-type: none"> <input type="checkbox"/> Sketch the graph of derived functions <input type="checkbox"/> Explain that a derived function allows us to calculate the gradient of a tangent to a function at a certain point <input type="checkbox"/> Find the equation of a tangent to a curve <input type="checkbox"/> Find the stationary points of a function and determine their nature <input type="checkbox"/> Identify when a function is increasing and decreasing using differentiation <input type="checkbox"/> Use the stationary points and intersection of the axes to sketch a graph of a function <input type="checkbox"/> Calculate the maximum and minimum values of a function on a closed interval <input type="checkbox"/> Use Optimisation to calculate maximums and minimums
Circle	<ul style="list-style-type: none"> <input type="checkbox"/> Use $x^2 + y^2 = r^2$ to find the equation of a circle with radius r and centre at the origin <input type="checkbox"/> Use $(x - a)^2 + (y - b)^2 = r^2$ to find the equation of a circle with radius r and centre at (a,b) <input type="checkbox"/> Use the general equation of circle $x^2 + y^2 + 2gx + 2fy + c = 0$ <input type="checkbox"/> Find the radius and centre of a circle from the equation <input type="checkbox"/> Find the equation of a tangent to a circle <input type="checkbox"/> Use the discriminant to determine the number of points of contact between a line and a circle <input type="checkbox"/> Find the point or points of intersection between a line and a circle
ASSESSMENT 1	
Trigonometry (Addition Formulae & Double Angle Formulae)	<ul style="list-style-type: none"> <input type="checkbox"/> Find the exact value of $\cos(A \pm B)$ <input type="checkbox"/> Find the exact value of $\sin(A \pm B)$ <input type="checkbox"/> Solve equations which first have to be written in the form $\cos(A \pm B)$ or $\sin(A \pm B)$ (either using degrees or radians) <input type="checkbox"/> Find exact values of $\sin 2x$ <input type="checkbox"/> Find exact values of $\cos 2x$ <input type="checkbox"/> Use Double Angle Formulae to rewrite equations as quadratics and solve
Quadratic Functions	<ul style="list-style-type: none"> <input type="checkbox"/> Complete the square <input type="checkbox"/> Sketch graphs of quadratics after completing the square and state the maximum <input type="checkbox"/> Factorise (common factor, difference of two squares, trinomials) <input type="checkbox"/> Recall how to use the discriminant to determine nature of roots <input type="checkbox"/> Use the discriminant to prove tangency <input type="checkbox"/> Solve quadratic inequalities
Polynomials	<ul style="list-style-type: none"> <input type="checkbox"/> Use synthetic division to factorise a polynomial <input type="checkbox"/> Use synthetic division to find factors of polynomials <input type="checkbox"/> Use synthetic division to find roots of polynomials <input type="checkbox"/> Find the equation of a polynomial from its graph
Integration	<ul style="list-style-type: none"> <input type="checkbox"/> Integrate a function of the form $f(x) = ax^n$ <input type="checkbox"/> Integrate functions with negative and fractional powers <input type="checkbox"/> Integrate functions with brackets and fractions (products and quotients) <input type="checkbox"/> Evaluate a definite integral <input type="checkbox"/> Find an area between a curve and the x-axis using integration <input type="checkbox"/> Find the area between a curve and a line or two curves using integration <input type="checkbox"/> Solve differential equations

FAB 1 ASSESSMENT	
Vectors	<input type="checkbox"/> Recall vector facts from National 5 <input type="checkbox"/> Use vectors to prove collinearity of points <input type="checkbox"/> Use vectors to divide a line into a given ratio <input type="checkbox"/> Write a vector in component form and in terms of unit vectors i, j, k <input type="checkbox"/> Use the scalar product to show that vectors are perpendicular <input type="checkbox"/> Use the scalar product to find the angle between vectors <input type="checkbox"/> Use properties of the scalar product
Further Calculus	<input type="checkbox"/> Use the chain rule to differentiate a function of the form $f(x) = (ax + b)^n$ <input type="checkbox"/> Differentiate trigonometric functions of the form <input type="checkbox"/> Use the chain rule to differentiate a function of the form <input type="checkbox"/> Integrate functions of the form <input type="checkbox"/> Integrate trigonometric functions of the form
Wave Function	<input type="checkbox"/> Covert expression of the form into a given form of the wave function <input type="checkbox"/> Identity the maximum and minimum values of a function of the form <input type="checkbox"/> Use the wave function to solve trigonometric equations in either degrees or radians
Logarithms & Exponentials	<input type="checkbox"/> Convert between exponential and logarithmic forms using different bases <input type="checkbox"/> Use the rules of logarithms to solve problems <input type="checkbox"/> Solve logarithmic equations <input type="checkbox"/> Solve exponential problems in a real-life context e.g. growth of bacteria or radioactive decay <input type="checkbox"/> Use straight line graphs to model the relationships between $y = ax^b$ and $y = ab^y$
FAB 2 ASSESSMENT	

What will be taken into consideration when deciding on a teacher-estimated grade for Higher Mathematics?

- Internal Assessment 1 assessing 40% of the course.
- FAB 1 Assessment (Dec) assessing 70% of the course.
- FAB 2 Assessment (Feb/March) assessing 100% of the course.
- Commitment and Quality in class/homework.
- Attendance at Supported Study.