

**Strathaven Academy Maths Department**

Higher Mathematics Course

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| Block 1 Applications 1.1 and Expressions & Functions 1.3 | | |
| The Straight Line | | |
| APP1.1 Applying algebraic skills to rectilinear shapes. | Finding the equation of a line parallel to and a line perpendicular to a given line |  |
| Using m = tan θ to calculate a gradient or angle |  |
| *Using properties of medians, altitudes and perpendicular bisectors in problems involving the equation of a line and intersection of lines* |  |
| Functions and graphs | | |
| EF1.3 Applying algebraic and trigonometric skills to functions | Determining a composite function given  *f* (*x*) and *g*(*x*) , where *f* (*x*) , *g*(*x*) can be  trigonometric, logarithmic, exponential or  algebraic functions |  |
| Determining f-1 (x) of linear functions |  |
| Sketching the inverse of a logarithmic or an exponential function |  |
| 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 |  |
| Work with radians & exact values.  Extend graph transformation to include trigonometric functions in radians |  |
| Block 1 Assessment - September | | |

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| Block 2 Applications 1.3 and Relationships & Calculus 1.3 | | |
| Differentiation | | |
| RC 1.3 Applying calculus skills of differentiation | Differentiating an algebraic function which is, or can be simplified to, an expression in powers of *x* |  |
| Differentiating , ksin x and kcos x |  |
| Differentiating a composite function using the chain rule |  |
| Determining the equation of a tangent to a curve at a given point by differentiation |  |
| Determining where a function is strictly increasing/decreasing |  |
| Sketching the graph of an algebraic function by determining stationary points and intersections with the axes |  |
| Sketch y = f’(x) given the graph of y = f(x) (Part of AS EF 1.3) |  |
| Recurrence Relations | | |
| APP1.3. Applying algebraic skills to sequences | Determining a recurrence relation from given information |  |
| Using a recurrence relation to calculate a required term |  |
| Finding and interpreting the limit of a sequence, where it exists |  |
| Block 2 Assessment - October | | |

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| Block 3 Expressions & Functions 1.2 and Relationships & Calculus 1.1,1.2,1.4 | | |
| Trigonometry 1 | | |
| EF 1.2 Applying trigonometric skills to manipulating expressions | Work with radians & exact values |  |
| Application of:   * the addition or double angle formulae * trigonometric identities |  |
| Convert a cos x + b sin x to or , k> 0 |  |
| Polynomials and Quadratic Theory | | |
| RC 1.1 Applying algebraic skills to solve equations | Factorising a cubic or *quartic* polynomial expression with unitary *and non unitary* *x*3 coefficient |  |
| Solving a cubic *or quartic* polynomial equation with unitary *and non unitary* x3 coefficient |  |
| Completing the square in a quadratic expression where the coefficient of x2 is non-unitary |  |
| Given the nature of the roots of an equation, use the discriminant to find an unknown |  |
| Block 3 Assessment November | | |
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| Block 4 Relationships & Calculus 1.2,1.4 | | |
| Trigonometry 2 | | |
| RC 1.2 Applying trigonometric skills to solve equations | Solving trigonometric equations in degrees *or radians* including those involving the wave function or trigonometric formulae or identities, in a given interval |  |
| Integration | | |
| RC1.4 Applying calculus skills of integration | Integrating an algebraic function which is, or can be, simplified to an expression of powers of *x* |  |
| Integrating functions of the form |  |
| Integration (cont) | | |
|  | Integrating functions of the form  and |  |
| *Integrating functions of the form* |  |
| *Integrating functions of the form f(x) = pcos(qx + r) and psin(qx + r)* |  |
| *Solving differential equations of the form* |  |
| Calculating definite integrals of functions with limits which are integers, *radians, surds or fractions* |  |
| Block 4 Assessment - December | | |

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| Block 5 Applications 1.2 and Expressions and Functions 1.1 | | |
| Vectors | | |
| EF1.4  Applying geometric skills to vectors | Determining the resultant of vector pathways in three dimensions |  |
| Working with collinearity |  |
| Determining the coordinates of an internal division point of a line |  |
| Using unit vectors **i**, **j**, **k** as a basis |  |
| I can evaluate a scalar product |  |
| The Circle | | |
| App1.2 Applying algebraic skills to circles | Determining and using the equation of a circle |  |
| Using properties of tangency in the solution of a problem |  |
| *Determining the intersection of circles or a line and a circle* |  |
| Block 5 Assessment February | | |
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| Block 6 Applications 1.4 and Expressions and Functions 1.1 | | |
| Logarithms and exponentials | | |
| EF1.1  Applying algebraic skills to logarithms and exponentials | Change from exponential to logarithmic form including use of the number e and ln x |  |
| Simplifying a numerical expression using the laws of logarithms and exponents |  |
| Solving a logarithmic or exponential equation |  |
| Work with experimental data??? |  |

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| Applications of Calculus | | |
| App1.4 Applying calculus skills to optimisation and area | Determining the optimal solution for a given problem |  |
| *Solving problems using rate of change* |  |
| Finding the area between a curve and the *x*-axis |  |
| Finding the area between two curves or a straight line and a curve |  |
| *Determine and use a function from a given rate of change and initial conditions* |  |
| Block 6 Assessment - March | | |