

**Strathaven Academy Maths Department**

Higher Mathematics Course

|  |
| --- |
| 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 betrigonometric, logarithmic, exponential oralgebraic 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 |

|  |
| --- |
| 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 |

|  |
| --- |
| 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 $kcos\left(x\mp ∝\right)$ or $ksin(x\mp ∝)$ , 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 |
|  |
| 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* $f\left(x\right)=(px+r)^{n} ,n\ne -1$ |  |
| *Integrating functions of the form f(x) = pcos(qx + r) and psin(qx + r)* |  |
| *Solving differential equations of the form* $\frac{dy}{dx}=f(x)$ |  |
| Calculating definite integrals of functions with limits which are integers, *radians, surds or fractions*  |  |
| Block 4 Assessment - December |

|  |
| --- |
| 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 |
|  |
| Block 6 Applications 1.4 and Expressions and Functions 1.1 |
| Logarithms and exponentials |
| EF1.1Applying 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??? |  |

|  |
| --- |
| 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 |