**Y12 Pure Further Maths Self-Assessment Sheets**

Chapter 1 – Complex Numbers

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| **Progress Descriptor** | **☺** | **☹** |
| Understand and use the definition of imaginary and complex numbers |  |  |
| Add and subtract complex numbers |  |  |
| Multiply complex numbers |  |  |
| Understand the definition of a complex conjugate |  |  |
| Divide complex numbers |  |  |
| Solve quadratic equations that have complex roots |  |  |
| Solve cubic or quartic equations that have complex roots |  |  |
| What I need to do to improve… | | |

Chapter 2 – Argand Diagrams

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| **Progress Descriptor** | **☺** | **☹** |
| Show complex numbers on an Argand diagram |  |  |
| Find the modulus and argument of a complex number |  |  |
| Write a complex number in modulus-argument form |  |  |
| Represent loci on an Argand diagram |  |  |
| Represent regions on an Argand diagram |  |  |
| What I need to do to improve… | | |

Chapter 3 – Series

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| **Progress Descriptor** | **☺** | **☹** |
| Use standard results for Σ1 and Σr |  |  |
| Use standard results for Σr2 and Σr3 |  |  |
| Evaluate and simplify series of the form Σf(r) where f(r) is linear, quadratic or cubic |  |  |
| What I need to do to improve… | | |

Chapter 4 – Roots of Polynomials

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| **Progress Descriptor** | **☺** | **☹** |
| Derive and use the relationships between the roots of a quadratic equation |  |  |
| Derive and use the relationships between the roots of a cubic equation |  |  |
| Derive and use the relationships between the roots of a quartic equation |  |  |
| Evaluate expressions relating to roots of polynomials |  |  |
| Find the equation of a polynomial whose roots are a linear transformation of the roots of a given polynomial |  |  |
| What I need to do to improve… | | |

Chapter 5 – Volumes of revolution

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| **Progress Descriptor** | **☺** | **☹** |
| Find the volume of revolution when a curve is rotated about the x-axis |  |  |
| Find the volume of revolution when a curve is rotated about the y-axis |  |  |
| Find more complicated volumes of revolution |  |  |
| Model real-life objects using volumes of revolutions |  |  |
| What I need to do to improve… | | |

Chapter 6 – Matrices

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| **Progress Descriptor** | **☺** | **☹** |
| Understand the concept of a matrix |  |  |
| Define the zero and identity matrices |  |  |
| Add and subtract matrices |  |  |
| Multiply a matrix by a scalar |  |  |
| Multiply matrices |  |  |
| Calculate the determinant of a matrix |  |  |
| Find the inverse of a matrix |  |  |
| Use matrices to solve systems of equations |  |  |
| Interpret simultaneous equations geometrically |  |  |
| What I need to do to improve… | | |

Chapter 7 – Linear Transformations

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| **Progress Descriptor** | **☺** | **☹** |
| Understand the properties of linear transformations and represent them using matrices |  |  |
| Perform reflections and rotations using matrices |  |  |
| Carry out enlargements and stretches using matrices |  |  |
| Find the coordinates of invariant points and the equations of invariant lines |  |  |
| Carry out successive transformations using matrix products |  |  |
| Understand linear transformations in three dimensions |  |  |
| Use inverse matrices to reverse linear transformations |  |  |
| What I need to do to improve… | | |

Chapter 8 – Proof by induction

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| **Progress Descriptor** | **☺** | **☹** |
| Understand the principal of mathematical proof by induction and prove results about sums of series |  |  |
| Prove results about divisibility using induction |  |  |
| Prove results about matrices using induction |  |  |
| What I need to do to improve… | | |

Chapter 9 – Vectors

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| **Progress Descriptor** | **☺** | **☹** |
| Understand and the use the vector and Cartesian forms of the equation of a straight line in three dimensions |  |  |
| Understand and the use the vector and Cartesian forms of the equation of a plane |  |  |
| Calculate the scalar product for two 3D vectors |  |  |
| Calculate the angle between two vectors, two lines, a line and a plane or two planes |  |  |
| Understand and use the scalar product form of the equation of a plane |  |  |
| Determine whether two lines meet and determine the point of intersection |  |  |
| Calculate the perpendicular distance between two lines, a point and a line or a point and a plane |  |  |
| What I need to do to improve… | | |