**Little Heath Sixth Form**

**Mathematics** Personal Learning Checklist

**Student Name: ……………………….…………………………………..………**

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| **Unit Name:****Mathematics (Further Pure 3)** | **Unit Code:****MFP3** |
| *Minimum Target Grade:* | *Aspirational Target Grade:* |

*KEY:* ***Red =*** *with difficulty* ***Amber*** *= not sure* ***Green*** *= yes*

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| **Re-Cap (Skills and Knowledge)** | **Red** | **Amber** | **Green** |
| * Be familiar with the knowledge, skills and understanding implicit in C1,2,3,4 and FP1
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| **Series and Limits** | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * The concept of a limit
 |  |  |  |  |
| * Finding limits in simple cases
 |  |  |  |  |
| * Be able to find first, second and third derivatives of various functions including using the chain, product and quotient rule.
 |  |  |  |  |
| * Maclaurin’s Series Expansion f(x)=f(0)+f’(0)x+f’’(0)+ f’’’(0) +….+f(r)(0)+…
 |  |  |  |  |
| * Range and validity of a series expansion eg ,
 |  |  |  |  |
| * Basic series expansions for ex, sin x, cos x, ln(1+x), (1+x)n for rational values of n
 |  |  |  |  |
| * Use of series expansions to find limits
 |  |  |  |  |
| * Three important limits for any real number and when , also when when (k)
 |  |  |  |  |
| * Improper integrals
 |  |  |  |  |
| * Use series expansions to find limits eg,

 , ,  |  |  |  |  |
| **Polar Coordinates** |  |  |  |  |
| * Understand and use Cartesian and polar frames of reference
 |  |  |  |  |
| * Understand the restrictions on the values of
 |  |  |  |  |
| * Find the relationship between the Cartesian and polar coordinates
 |  |  |  |  |
| * Represent curves in polar form
 |  |  |  |  |
| * Change a polar equation into a Cartesian equation
 |  |  |  |  |
| * Sketch a curve given in polar coordinates for r 0, r = f(
 |  |  |  |  |
| * Find by integration the area bounded by a polar curve using area =
 |  |  |  |  |

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| **Differential Equations** | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Understand the concept of a differential equation, its order and linearity
 |  |  |  |  |
| * Understand the concepts of a family of solutions, boundary value, initial conditions, general solutions and particular solutions
 |  |  |  |  |
| * Find the analytical solution of the first order linear differential equations of the form , where P and Q are functions of x, using integrating factors.
 |  |  |  |  |
| * Find complementary functions and particular integrals
 |  |  |  |  |
| * Be able to transform non-linear differential equations to linear form
 |  |  |  |  |
| **Use numerical methods for the solution of differential equations of the form**  |  |  |  |  |
| * Use Euler’s formula
 |  |  |  |  |
| * Use the mid-point formula
 |  |  |  |  |
| * Use the Improved Euler formula
 |  |  |  |  |
| * Use formulae explicitly stated in questions , , , where , and
 |  |  |  |  |
| **Second Order differential equations** |  |  |  |  |
| * Be able to form second order differential equations
 |  |  |  |  |
| * Solve second order differential equations of the form using the auxiliary equation whose roots maybe real, repeated or complex
 |  |  |  |  |
| * Solve second order differential equations of the form finding the complementary function and a particular integral. Particular integrals will be of the form , , , or a polynomial of degree at most 4, or a linear combination of the above
 |  |  |  |  |
| * Solving differential equations by separating variables.
 |  |  |  |  |
| * Transform a non-linear differential equation to a linear by using a suitable substitution
 |  |  |  |  |
| * Solve second order differential equations under/using boundary/initial conditions (which may involve limits
 |  |  |  |  |
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| **REVISION****Use the information on this checklist to make revision cards and notes** |

**Grade tracking:**

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| *Grade* | *Date* | *Grade* | *Date* | *Grade* | *Date* |
|  |  |  |  |  |  |
| *Grade* | *Date* | *Grade* | *Date* | *Grade* | *Date* |
|  |  |  |  |  |  |

*Note: You should discuss this checklist regularly with your subject teacher/mentor*