**Little Heath Sixth Form**

**(Mathematics)** Personal Learning Checklist

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

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| **Unit Name:**  **Mathematics (Core 3)** | **Unit Code:**  **MPC3** |
| *Minimum Target Grade:* | *Aspirational Target Grade:* |

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

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| **C1 and 2 Re-Cap (Skills and Knowledge)** | **Red** | **Amber** | **Green** |
| * Know all the trig properties/techniques covered in C2 |  |  |  |
| * Know and apply the graph transformations covered in C2 |  |  |  |
| * Know and use the laws of logarithms and indices |  |  |  |
| * Know and use all the differentiation techniques from C1 and C2 |  |  |  |
| * Know all the integration rules and techniques from C1 and C2 |  |  |  |

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| **Skills Knowledge/Specification** | | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| **FUNCTIONS** | |  |  |  |  |
| * Understand function notation and substitution into f(x) | |  |  |  |  |
| * Identify the domain and range for a given function, possibly by using a graph sketch | |  |  |  |  |
| * Substitute into or find an expression for fg(x) or gf(x) - known as composite functions | |  |  |  |  |
| * Find an expression for the inverse function f-1(x) of a given function f(x) | |  |  |  |  |
| * Know and use the domain/range match ups between f(x) and f-1(x) | |  |  |  |  |
| * Solve equations involving f(x), g(x), fg(x), f-1(x) etc | |  |  |  |  |
| **THE EXPONENTIALS AND NATURAL LOGARITHM FUNCTIONS** | |  |  |  |  |
| * Know that ex differentiated is ex (main definition of ex) | |  |  |  |  |
| * Know and use that if y = ex then x = ln y or if f(x) = ex then f-1(x) = ln x | |  |  |  |  |
|  | |  |  |  |  |
|  | | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Know the graphs of ex, e-x and ln x and be able to transform them eg y = e3x+2 | |  |  |  |  |
| * Solve problems containing exponential or ln equations | |  |  |  |  |
| **NUMERICAL METHODS** | |  |  |  |  |
| * Know how to show that the equation f(x) = 0 has a root in a given interval by sign change | |  |  |  |  |
| * Use graph sketching to demonstrate the number and location of roots of an equation | |  |  |  |  |
| * Rearrange f(x) = 0 into the form x = g(x) to obtain an iterative equation xn+1 = g(xn) | |  |  |  |  |
| * Substitute x1, x2, x3 etc into an iterative equation to obtain successive approximations | |  |  |  |  |
| * Justify a root of f(x) = 0 to a given degree of accuracy by substituting upper and lower bounds for a sign change | |  |  |  |  |
| **TRANSFORMING GRAPHS** | |  |  |  |  |
| * Sketch the graph of y = |f(x)| (the modulus function) for a given f(x) | |  |  |  |  |
| * Sketch the graph of y = |f(x)| or y = f(|x|) from the graph of y = f(x) | |  |  |  |  |
| * Sketch two graphs of the form y = |mx + c| and determine the points of intersection | |  |  |  |  |
| * Solve inequalities involving the modulus function ie |x + 2| < 3|x| using the solutions of |x + 2| = 3|x| | |  |  |  |  |
| * Be able to identify and perform combinations of transformations of the graph of y = f(x) as represented by y = a(x), y = f(x) + a, y = f(x + a) and y = f(ax) eg y = ex onto y = ex – 1, y = ln x onto y = 2ln(x-1) or y = sec x onto y = 3 sec 2x | |  |  |  |  |
| **TRIGONOMETRY** | |  |  |  |  |
| * Know the definitions and graphs of sec x, cosec x and cot x and their relationship to sin x, cos x and tan x | |  |  |  |  |
| * Know and prove the identities tan2x + 1 = sec2x and 1 + cot2x = cosec2x | |  |  |  |  |
|  | | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Solve trig equations containing one or more of sec x, cosec x and cot x | |  |  |  |  |
| * Know the definitions and graphs of sin-1 x, cos -1 x and tan-1 x and understand their domains and graphs | |  |  |  |  |
| * Solve trig equations by using any of the above formulae/expressions | |  |  |  |  |
| * **DIFFERENTIATION** | |  |  |  |  |
| * Know and use dy/dx = 1/ (dx/dy) and dx/dy = 1/(dy/dx) | |  |  |  |  |
| * Know the differentials of sin [f(x)], cos [f(x)] and tan [f(x)] | |  |  |  |  |
| * Know the differentials of sec [f(x)], cosec [f(x)] and cot [f(x)] | |  |  |  |  |
| * Know and use the differentials of ef(x) and ln [f(x)] | |  |  |  |  |
| * Know and use the chain rule (or quick methods) to differentiate a function of a function | |  |  |  |  |
| * Know and use the product rule ie or | |  |  |  |  |
| * Know and use the quotient rule ie or | |  |  |  |  |
| * Use the formula book to differentiate standard functions | |  |  |  |  |
| **INTEGRATION** | | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Learn the integrals for the 6 trig functions of the type ∫ sin (ax + b) dx | |  |  |  |  |
| * Learn the integrals ∫ eax + b dx and ∫ (ax + b)n dx | |  |  |  |  |
| * Learn how to do integrals of the form ∫ f/(x) [f(x)]n dx | |  |  |  |  |
| * Learn how to do integrals of the form ∫ f/(x)/f(x) dx = ln f(x) + c ie | |  |  |  |  |
| * Learn how to use partial fractions to set up integrals of the form ∫ f/(x)/f(x) dx | |  |  |  |  |
| * Learn the six integrals of the squares of trig functions eg ∫ cos2x dx | |  |  |  |  |
| * Learn how to integrate simple cases by inspection ie or | |  |  |  |  |
| * Learn how to do integration by parts ie or or | |  |  |  |  |
| * Learn how to integration by substitution/change of variable ie or | |  |  |  |  |
| * Know how to evaluate definite integrals for any of the above types | |  |  |  |  |
| * Use A = ∫ y dx to find the area between a curve and the x axis | |  |  |  |  |
| * Use V = π ∫ y2 dx to find the volume of revolution around the x axis | |  |  |  |  |
| * Use V = π ∫ x2 dy to find the volume of revolution around the y axis | |  |  |  |  |
| * Use the mid-ordinate rule to find a numerical approximation to an integral giving the area under a curve | |  |  |  |  |
| * Use Simpsons Rule to find a numerical approximation to an integral giving the area under a curve | |  |  |  |  |
| **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* |
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| *Grade* | *Date* | *Grade* | *Date* | *Grade* | *Date* |
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*Note: You should discuss this checklist regularly with your subject teacher/mentor*