**Little Heath Sixth Form**

**Mathematics** Personal Learning Checklist

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

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| **Unit Name:**  **Mathematics (Core 4)** | **Unit Code:**  **MPC4** |
| *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** |
| * Knowledge of Factor Theorem and Remainder Theorem |  |  |  |
| * Knowledge of the Binomial expansion and its validity |  |  |  |
| * Know all the differentiation and integration rules and techniques from C1, C2 and C3 |  |  |  |
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| **Skills Knowledge/Specification** | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| **ALGEBRAIC FRACTIONS** |  |  |  |  |
| * Add, subtract, multiply and divide algebraic fractions (rational functions), simplifying the answer by factorising and canelling |  |  |  |  |
| * Use algbraic division to simplify improper algebraic fractions by inspection, equating coefficients, box method or long division |  |  |  |  |
| * Work with identities containing algebraic fractions - evaluate coefficients |  |  |  |  |
| **PARTIAL FRACTIONS** |  |  |  |  |
| * Know how to split into partial fractions involving up to three linear denominators |  |  |  |  |
| * Know how to split into partial fractions when one denominator has a repeated factor |  |  |  |  |
| * Use algebraic division with improper algebraic fractions and then find partial fractions |  |  |  |  |
| * Use partial fractions when using the Remainder or Factor Theorem |  |  |  |  |
| * Simple cases of integration using partial fractions of the form dx |  |  |  |  |
| **TRIGONOMETRY** | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Use compound angle formulae [eg sin (A +/- B), cos(A +/- B) and tan(A +/- B)] to solve trig equations or to prove trig identities |  |  |  |  |
| * Prove and use the double angle formulae – learn them (inc 3 versions for cos 2x) |  |  |  |  |
| * Solve trigonometrical equations in a given interval eg 3 sin 2x = cos x, 0 < x < 4π |  |  |  |  |
| * Know how to write given trig expressions of the form acos x + bsin x in the form R sin (x +/- a) or R cos (x +/- a) |  |  |  |  |
| **THE BINOMIAL EXPANSION** |  |  |  |  |
| * Understand how to use the expansion (1 + x)n for negative and rational values of n |  |  |  |  |
| * Use |x| < 1 to identify range of validity for a given expansion eg (1 + 3/2x)-2 then |3/2x| < 1 |  |  |  |  |
| * Expand expressions such as (3-2x)1/2 using (1 + x)n appropriately |  |  |  |  |
| * Use given information to find p and n for (1 + px)n or (a + px)n |  |  |  |  |
| * Expand expressions such as (1 – 2x)(1 + 3x)-1/3 |  |  |  |  |
| * Use partial fractions and then expand appropriately |  |  |  |  |
| * Identify and substitute a small value of x into an expansion to approximate a value |  |  |  |  |
| **DIFFERENTIATION** | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Differentiate a pair of parametric equations in order to find dy/dx |  |  |  |  |
| * Obtain dy/dx for an implicit equation eg y3 – 3xy2 + 5xy – 2x2 = 50 |  |  |  |  |
| * Find equations of tangents and normals for curves defined implicitly or parametrically |  |  |  |  |
| * Differentiate functions involving ax |  |  |  |  |
| **VECTORS IN THREE DIMENSIONS** | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Find the vector for a line segment between two points and find its modulus |  |  |  |  |
| * Find and use position vectors |  |  |  |  |
| * Find the magnitude of a vector |  |  |  |  |
| * Find the vector equation for a straight line through two given points |  |  |  |  |
| * Find the vector equation for a straight line through a given point and parallel to a given line **r** = **a** + **d** |  |  |  |  |
| * Determine whether two lines intersect and find the point if they do intersect |  |  |  |  |
| * Know and use the conditions for parallel lines and skew lines |  |  |  |  |
| * Use scalar product to find the angle between the directions of two vectors |  |  |  |  |
| * Use scalar product to find the angle between two lines given in vector form |  |  |  |  |
| * Find the co-ordinates of the foot of the perpendicular from a point to a line |  |  |  |  |
| * Find the perpendicular distance from a point to a line |  |  |  |  |
| **DIFFERENTIAL EQUATIONS** | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Know how to separate the variables into the form ∫ f(x) dx = ∫ g(y) dy |  |  |  |  |
| * Know how to integrate from the form ∫ f(x) dx = ∫ g(y) dy to obtain a general solution |  |  |  |  |
| * Use given values to find the value of c and thereby find a specific solution |  |  |  |  |
| * Know how to form and solve a differential equation for exponential growth or decay |  |  |  |  |
| * Use the chain rule to form a differential equation from three related rates of change |  |  |  |  |
| **PARAMETRIC EQUATIONS** | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Eliminate the parameter to find an equation between x and y |  |  |  |  |
| * Use the chain rule to find dy/dx and then find a tangent, normal or stationary point |  |  |  |  |
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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* |
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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*