**Little Heath Sixth Form**

**Mathematics (Core 1)** Personal Learning Checklist

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

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| **Unit Name:**  **AS Mathematics (Core 1)** | **Unit Code:**  **MPC1** |
| *Minimum Target Grade:* | *Aspirational Target Grade:* |

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

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| **GCSE Re-Cap (Skills and Knowledge)** | **Red** | **Amber** | **Green** |
| * Know and use the rules of indices |  |  |  |
| * Factorise and solve quadratic equations |  |  |  |
| * Use the quadratic formula |  |  |  |
| * Use surds |  |  |  |
| * Solve simultaneous equations |  |  |  |
| * Sketch quadratics and cubics |  |  |  |
| * Use Pythagoras’ Theorem |  |  |  |
| * Know and use y=mx+c, gradient, mid point, parallel and perpendicular lines |  |  |  |
| * Know the transformations of graphs |  |  |  |

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| **Skills Knowledge/Specification** | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| **ALGEBRA** |  |  |  |  |
| * Factorise harder quadratics eg 3x2 + 10x – 8 and cubics with a common factor of x |  |  |  |  |
| * Simplify surds and rationalise the denominator |  |  |  |  |
| * Solve quadratic equations by factorising |  |  |  |  |
| * Complete the square for quadratics and identify min/max value and corresponding x |  |  |  |  |
| * Solve quadratics by completing the square |  |  |  |  |
| * Know and use the discriminant of a quadratic equation to include the condition for equal, distinct real and no roots |  |  |  |  |
| * Solve simultaneous equations where one is linear and one is non-linear |  |  |  |  |
| * Solve quadratic inequalities |  |  |  |  |
| * Solve a linear and quadratic inequality simultaneously |  |  |  |  |
| **FACTOR THEOREM AND REMAINDER THEOREM** |  |  |  |  |
| * Use algebraic long division to divide f(x) by a linear expression |  |  |  |  |
|  | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Use f(a) to find the remainder when f(x) is divided by (x - a) |  |  |  |  |
| * Use f(a) = 0 to show that (x - a) is a factor of f(x) |  |  |  |  |
| * Use the remainder and factor theorems to calculate unknown coefficients in f(x) |  |  |  |  |
| * Factorise a cubic expression having been given one linear factor |  |  |  |  |
| * Solve a cubic f(x) = 0 from the factorised format |  |  |  |  |
| **GRAPHS** |  |  |  |  |
| * Identify where graphs cross the axes from their equations |  |  |  |  |
| * Sketch positive and negative quadratic graphs |  |  |  |  |
| * Sketch positive and negative cubic graphs |  |  |  |  |
| * Sketch positive and negative reciprocal graphs of the form y = 12/x or y = -20/x |  |  |  |  |
| * Sketch two graphs on the same axes |  |  |  |  |
| * Know the effect of translations on graphs and their equations |  |  |  |  |
| * Form and solve an equation for points of intersection |  |  |  |  |
| **CO-ORDINATE-GEOMETRY** |  |  |  |  |
| * Write the equation of a line in the form ax + by + c = 0 |  |  |  |  |
| * Able to calculate the gradient of a line through two given points eg |  |  |  |  |
| * Able to find the equation of a line using the gradient and a point eg y – y1 = m( x – x1) |  |  |  |  |
| * Able to find the equation of a line parallel to a given line |  |  |  |  |
| * Able to find the gradient of a perpendicular line m x m’ = -1 |  |  |  |  |
| * Able to find the equation of a line perpendicular to a given line |  |  |  |  |
| * Able to find the length of a line segment between two points |  |  |  |  |
| **CIRCLES** |  |  |  |  |
| * Complete the square of a circle written in the form x2 + 4x + y2 -6y -12 =0 to find the centre and radius |  |  |  |  |
| * Find the centre and radius of a circle written in the form (x – a)2 + (y - b)2 = r2 |  |  |  |  |
| * Use the circle property angle in a semi circle is 90o |  |  |  |  |
| * Use the circle property the perpendicular from the centre to a chord bisects the chord |  |  |  |  |
| * Use the circle property the tangent to a circle is perpendicular to the radius at its point of contact |  |  |  |  |
| * Use relevant co-ordinates to find gradients |  |  |  |  |
| * Find the equation of the tangent to the circle at a given point |  |  |  |  |
| * Find the equation of the normal at a given point |  |  |  |  |
|  |  |  |  |  |
|  | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Use simultaneous equations to find solutions to a line crossing a circle |  |  |  |  |
| * Interpret the implication of equal roots, distinct roots or no real roots |  |  |  |  |
| **CALCULUS** |  |  |  |  |
| * Differentiate expressions containing powers and roots |  |  |  |  |
| * Differentiate products of brackets |  |  |  |  |
| * Differentiate quotients eg (x2 + 3x)/x1/2 |  |  |  |  |
| * Find the gradient from an equation for a point with given x value |  |  |  |  |
| * Find the co-ordinates of a point with known gradient for a given equation |  |  |  |  |
| * Identify increasing and decreasing functions |  |  |  |  |
| * Find the equation of a tangent to a curve at a given point |  |  |  |  |
| * Find the equation of a tangent to a curve at a given point |  |  |  |  |
| * Find the equation of a normal to a curve at a given point |  |  |  |  |
| * Find the second differential for a given equation |  |  |  |  |
| * Use dy/dx to identify when a function is increasing or decreasing |  |  |  |  |
| * Use dy/dx = 0 to find the coordinates of stationary points |  |  |  |  |
| * Use d2y/dx2 to determine the nature of a stationary point |  |  |  |  |
| * Solve practical maximum/minimum problems by justifying and using a stated equation |  |  |  |  |
| * Integrate products of brackets |  |  |  |  |
| * Find the constant of integration when a point is given as well as an integral |  |  |  |  |
| * Evaluate a definite integral between two limits and interpret the result as the area under the curve |  |  |  |  |

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| **REVISION**  **Use the information on this checklist to make revision cards and notes** |

**Grade tracking:**

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