**Little Heath Sixth Form**

**Mathematics (Core 2)** Personal Learning Checklist

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

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| **Unit Name:****AS Mathematics Core 2** | **Unit Code:** **MPC2** |
| *Minimum Target Grade:* | *Aspirational Target Grade:* |

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

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| **GCSE and C1 Re-Cap (Skills and Knowledge)** | **Red** | **Amber** | **Green** |
| * Factorising and solving quadratics
 |  |  |  |
| * Knowledge of the laws of indices
 |  |  |  |
| * Complete the square for a quadratic
 |  |  |  |
| * Solve a linear and quadratic simultaneous equation
 |  |  |  |
| * Use SOHCAHTOA, sine and cosine rules
 |  |  |  |
| * Know and use the coordinate geometry skills from C1
 |  |  |  |
| * Know the differentiation techniques from C1
 |  |  |  |
| * Know the integration techniques from C1
 |  |  |  |

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| **Skills/Knowledge/Specification** | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
|  |  |  |  |  |
| * Know and use the rules of indices to find a value eg 49-3/2
 |  |  |  |  |
| * Know and use the rules of indices to simplify expressions
 |  |  |  |  |
| **EXPONENTIALS AND LOGARITHMS** |  |  |  |  |
| * Know the graphs of y = ax and y = loga x
 |  |  |  |  |
| * Know and use that if y = ax then x = loga y and vice versa
 |  |  |  |  |
| * Know and use the rules of logs eg logax + logay = logaxy, logax - logay = loga$\frac{x}{y}$, klogax = logaxk
 |  |  |  |  |
| * Use logs to solve equations such as 52x-3 = 800
 |  |  |  |  |
| * Use logs to solve equations such as 8x+3 = 32x-1
 |  |  |  |  |
| * Solve equations such as 32x -5(3x+1) + 54 = 0
 |  |  |  |  |
| * Solve simple simultaneous equations involving logs and indices
 |  |  |  |  |
| **TRANSFORMATIONS** |  |  |  |  |
| * Know the transformations to graphs f(x+a) and f(x-a)
 |  |  |  |  |
| * Know the transformations to graphs f(x)+a and f(x)-a
 |  |  |  |  |
| * Know the transformations to graphs kf(x) and f(kx)
 |  |  |  |  |
| * Know the transformations to graphs –f(x) and f(-x)
 |  |  |  |  |
| * Use and identify a combination of these transformations
 |  |  |  |  |
| **THE BINOMIAL EXPANSION** |  |  |  |  |
| * Understand the link to Pascal's triangle for the expansion (a + b)n
 |  |  |  |  |
|  |  |  |  |  |
|  | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Use (a + b)n = an + nC1(a)n-1(b) + nC2(a)n-2(b)2 + .......... to obtain an expansion
 |  |  |  |  |
| * Use the formula for (1 + x)n to obtain an expansion
 |  |  |  |  |
| * Use given information to find p for (1 + px)n or (a + px)n
 |  |  |  |  |
| **SEQUENCES AND SERIES** |  |  |  |  |
| * Use a formula to generate terms of a sequence eg un = n2 + 5n – 3
 |  |  |  |  |
| * Use an iterative formula to generate terms of a sequences eg un+1 = 2un – 3, u1 = 6
 |  |  |  |  |
| * Find the limit L as n → ∞ by putting un+1 = un = L
 |  |  |  |  |
| * Know the formulas for un = a + (n – 1)d and Sn = $\frac{n}{2}$ $\left\{2a+\left(n-1\right)d\right\}$ and Sn = 1/2n(a+l) for an AP and use then with confidence
 |  |  |  |  |
| * Use the nth term to set up and solve linear equations to find a and d
 |  |  |  |  |
| * Find the sum of the first n natural numbers ie $\sum\_{1}^{\infty }\frac{n}{2}\left(n+ 1\right)$
 |  |  |  |  |
| * Solve real life problems that consist of an AP
 |  |  |  |  |
| * Understand sigma notation for series and work out prescribed values
 |  |  |  |  |
| * Use the formulas for Un = arn-1 and Sn = $\frac{a\left(1-r^{n}\right)}{1-r}$
 |  |  |  |  |
| * Understand the sum to infinity for a converging GP and how to obtain it ie S∞ = $\frac{a}{1-r}$ when $\left|r\right|$< 1
 |  |  |  |  |
| * Set up a GP identifying a, r and n for a described practical situation
 |  |  |  |  |
| * Calculate a and r given two terms of a GP
 |  |  |  |  |
| **TRIGONOMETRY** |  |  |  |  |
| * Understand and convert between degrees and radians
 |  |  |  |  |
| * Use sine and cosine rules in degrees or radians
 |  |  |  |  |
| * Use the area of a triangle is ½ absin θ
 |  |  |  |  |
| * Know and use rθ and 1/2 r2θ for arc length and area of a sector
 |  |  |  |  |
| * Calculate the area of a segment between an arc and a chord
 |  |  |  |  |
| * Know the graphs of y = sin x, y = cos x and y = tan x
 |  |  |  |  |
| * Apply transformations to the sin, cos and tan graphs eg y = 2 sin (x + 90)
 |  |  |  |  |
| * Solve trig equations eg sin (2x + 30) = -0.5 or sin 2θ = - 0.4 or 2sin θ – cos θ = 0, or 2sin2θ + 5cos θ = 4 for x in a given range
 |  |  |  |  |
| * Use tan x = sin x/cos x to simplify a trig equation
 |  |  |  |  |
| * Use sin2x + cos2x = 1 to enable quadratic trig equations to be solved
 |  |  |  |  |
| * Prove simple trig identities
 |  |  |  |  |
| **DIFFERENTIATION** |  |  |  |  |
| * Differentiate xn where n is rational eg $x^{\frac{3}{2}}$ +$\frac{3}{x^{2}}$ or x $\sqrt{x}$
 |  |  |  |  |
| * Use dy/dx to identify when a function is increasing or decreasing
 |  |  |  |  |
| * Use dy/dx = 0 to find the coordinates of stationary points
 |  |  |  |  |
|  | **Red** | **Amber** | **Green** | **To address this before the exam I will:-** |
| * Use d2y/dx2 to determine the nature of a stationary point
 |  |  |  |  |
| * Solve practical maximum/minimum problems by justifying and using a stated equation
 |  |  |  |  |
| * Find tangents and normals to the curve at a given point
 |  |  |  |  |
| **INTEGRATION** |  |  |  |  |
| * Understand the word ‘ordinate’
 |  |  |  |  |
| * Integrate expressions containing powers and roots
 |  |  |  |  |
| * Integrate products of brackets
 |  |  |  |  |
| * Integrate quotients eg (x2 + 3x)/x1/2
 |  |  |  |  |
| * Use the trapezium rule to approximate a given integral/area
 |  |  |  |  |
| * Identify whether the trapezium rule gives an over or under estimate
 |  |  |  |  |
| * Understand how to use limits in integration to find a numerical answer
 |  |  |  |  |
| * Calculate the area under a graph down to the x axis between two x values
 |  |  |  |  |
| * Calculate the area enclosed by two graphs between their points of intersection
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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*