

# Curriculum Plan

Year: 12 (AS level)

Subject: Pure Mathematics P1 (WMA11/01)

| Term   | Week | Focus                               | Summary   | Learning Outcomes   | Parental Support   | Indenpendant Learning  |
|--|------|-------------------------------------|---|---|--|--|
| <b>1A:<br/>Foundations<br/>in Algebra &amp;<br/>Graphs</b> | 1    | <b>Algebraic Expressions</b>        | Review and extend knowledge of indices, surds, and algebraic manipulation, including factorisation. | Understand and apply rules of indices (zero, negative, fractional). Simplify surds and rationalise denominators. Expand and factorise quadratic expressions e.g., $ax^2+bx+c$   | Encourage practice of basic algebra drills. Help review prior GCSE knowledge of these topics.                        | Work through textbook exercises on indices and surds. Practice factorising different types of expressions.<br>P15 Ex1F1e to h,2h to k,3d to f,4. Ch Review 16,18,19,20,22,23,24.   |
|  | 2    | <b>Quadratics</b>                   | Methods for solving quadratic equations and sketching their graphs.                                 | Solve quadratic equations by factorisation, completing the square, and using the quadratic formula. Use the discriminant to determine the nature of roots. Sketch graphs, identifying roots, y-intercept, and turning points. | Discuss real-world examples where quadratic equations are used. Review concept of 'x-intercepts' and 'y-intercepts'. | Practice solving quadratics using all methods. Sketch graphs and verify features using graphing tools (e.g., Desmos).<br>P37 Ex2A 1,2,3,6,8,11<br>P23 Ex2C 1c, 2a,b,c, 3a,b,c 4, 5<br>Ex2D 1c,d, 2c,d, 3<br>P26 Ex2E<br>P30 Ex2F 1a,f, 2c,d, 3<br>P32 Ex2G 1 to 7. |
|  | 3    | <b>Equations &amp; Inequalities</b> | Solving linear and quadratic equations and inequalities,  | Solve linear and quadratic inequalities. Solve linear and   | Help check homework for accuracy. Discuss  | Practice solving varied equation and inequality types.   |

|          |                                     |  |                                   |  |   |   |
|----------|-------------------------------------|--|-----------------------------------|--|---|---|
|          |                                     |  | including simultaneous equations. | quadratic simultaneous equations (one linear, one quadratic). Represent solutions graphically.   | how inequalities represent ranges of values.  | Experiment with graphing software to visualise solutions.<br>P39 Ex3B 2a,c, 4<br>P43 Ex3C 1a,2 5,8<br>P45 Ex2D 1c,f,h, 2d,e,3b,c,d<br>P48 Ex3E 1,ab,c, 2b,c 3a,b, 6, 7<br>P53 Ex3G 1,6, 7   |
| <b>4</b> | <b>Graphs &amp; Transformations</b> | Understanding and applying transformations to various function graphs.                                 |                                   | Sketch cubic and reciprocal graphs. Solve equations graphically by finding intersections. Apply translations, stretches, and reflections to given graphs using function notation.                    | Encourage discussion about how graphs change when numbers are added/subtracted or multiplied. | Use online graphing calculators to experiment with graph transformations and observe changes.<br>P60 Ex4A 1a,b, 2,3,4a,b.<br>P63Ex4B 1,2a,b.<br>P65 Ex4C 1a,b,f, 2.<br>P69 Ex4D 1i,iii, 6,7.<br>P74 Ex4E 1i.iii. 6, 7<br>P76 Ex4F 1,2,5 |
| <b>5</b> | <b>Straight Line Graphs</b>         | Properties of straight lines, including gradients, equations, and applications in coordinate geometry. |                                   | Calculate gradient given two points. Use $y=mx+c$ , $y-y_1=m(x-x_1)$ , and $ax+by+c=0$ . Understand parallel and perpendicular gradients. Find intersection points. Calculate distance and midpoint. | Reinforce understanding of gradient as 'steepness'. Review basic coordinate geometry.         | Complete textbook exercises on all aspects of straight line graphs. Attempt problem-solving questions involving multiple concepts.<br>P98 Ex5G 9.<br>Ch Review  |
| <b>6</b> | <b>Review &amp; Assessment</b>      | Consolidation of all topics so far and   |                                   | Consolidate understanding of   | Encourage consistent revision.  | Re-attempt challenging questions  |

|  |  |  |                             |   |  |   |
|--|--|--|-----------------------------|---|--|---|
|  |  |  | preparation for assessment. | algebraic manipulation, quadratics, inequalities, graphs, and straight lines. Improve problem-solving and exam technique. | Ensure student completes practice papers under timed conditions. | from previous weeks. Work through past paper questions specifically on topics so far. |
|--|--|--|-----------------------------|---|--|---|

| Term   | Week        | Focus                       | Summary   | Learning Outcomes   | Parental Support   | Independant Learning   |
|--|-------------|-----------------------------|---|---|--|--|
| <b>1B:<br/>Calculus &amp;<br/>Trigonometry</b> | <b>7</b>    | <b>Trigonometric Ratios</b> | Apply sine rule, cosine rule, and area formula for triangles.   | Use sine rule and cosine rule to find sides and angles in 2D triangles. Calculate area of triangle using $(1/2)ab\sin C$ . Sketch and understand basic trigonometric graphs ( $y=\sin x, y=\cos x, y=\tan x$ ). | Review basic trigonometry from GCSE. Discuss practical applications of trigonometry. | Practice applying sine and cosine rules to various triangle problems. Sketch transformations of sine/cosine/tan graphs.<br>P121 Ex6E 13,14,15<br>P128 Ex6G<br>1,2,3a,b,4b,d,5a,d,6 |
|  | <b>8</b>    | <b>Radians</b>              | Introduction to radian measure and its application in geometry. | Understand radian measure and convert between degrees and radians. Calculate arc length ( $s=r\theta$ ) and area of sector/segment ( $A=1/2(r^2)\theta$ , $A=1/2(r^2)(\theta-\sin\theta)$ ).                    | Ensure the student's calculator is set to radian mode when appropriate.              | Work through problems involving circles, arcs, and sectors using radian measure.<br>P135 Ex7A 1,4,5.<br>P137 Ex7B 1c, 2,4.<br>Ex 7C 1e to f, 2, 9.                                 |
|  | <b>9-10</b> | <b>Differentiation</b>      | Understanding gradients of curves                               | Understand gradient as a limit. Differentiate $ax^n$ (for rational n).  | Discuss the concept of 'rate of change' in everyday life.                            | Practice differentiating various functions. Sketch curves to   |

|  |    |  |   |   |   |  |
|--|----|--|---|---|---|--|
|  |    |  | and basic differentiation rules.  | Find equations of tangents and normals. Locate and classify stationary points (maxima/minima). Solve simple optimisation problems.              |   | visualize tangents/normals and stationary points.<br>P156 Ex8B 1,2,6.<br>P158 Ex8C 1 h to p, 2 d to j, 3,4.<br>P160 Ex8D 1 to 6.<br>P162 Ex 8E 1,2,3,4 h to l,5b,c, 6.<br>P164 Ex8F 1c to f, 2,6<br>P166 Ex8G 1,2,3,4. |
|  | 11 | <b>Integration</b>                     | Introduction to integration as the reverse of differentiation and finding areas.    | Integrate $ax^n$ (for rational $n$ does not $=-1$ ). Find the constant of integration.  | Reinforce the idea of integration being the 'opposite' of differentiation.        | Practice indefinite integration. Work on problems involving finding the constant of integration.<br>P174 Ex9B<br>1,2,3,5,6,8a,b,c,9.<br>P177 Ex9C 1b to d, 3,5,6.  |
|  | 12 | <b>Comprehensive Review</b>            | Thorough review of all P1 syllabus content, reinforcing connections between topics. | Consolidate all P1 concepts. Strengthen problem-solving skills across various topics. Enhance understanding of mathematical language and proof. | Encourage regular, focused revision sessions. Review difficult concepts together. | Create flashcards for formulas and key concepts. Re-do challenging questions from throughout the term<br>.   |
|  | 13 | <b>Mock Exams &amp; Exam Technique</b> | Practice full P1 papers under timed conditions and refine exam strategies.          | Develop effective time management in exams. Understand how marks are awarded (mark schemes). Improve clarity of working and                     | Provide a quiet, distraction-free environment for mock exams. Discuss performance | Complete multiple full past papers under timed conditions. Analyze mark schemes to understand common   |

|  |           |                          |   |   |   |  |
|--|-----------|--------------------------|---|---|---|--|
|  |           |                          |   | presentation. Address common exam pitfalls.   | calmly and constructively.                                    | mistakes and optimal answering styles.   |
|  | <b>14</b> | <b>Targeted Revision</b> | Last-minute consolidation and addressing specific weak areas. | Confidently apply all P1 knowledge to exam-style questions. Refine last-minute revision techniques. | Offer encouragement and ensure well-being (sleep, nutrition). | Focused practice on self-identified weak areas. Review common errors and proofs. |
|  |           |                          |   |   |   |  |