Half Term 1

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| **What will be learning?**  **Teacher 1 and 2**Pure Chapter 1 - Algebraic Expressions Pure Chapter 2 – Quadratics  Pure Chapter 3 – Equations and inequalities Pure Chapter 4 – Graphs and transformations Pure Chapter 8 – The binomial Expansion   | **Why this? Why now?**  Recap required skills from GCSE and build a confident foundation.  We complete binomial expansion in preparation for statistics  | **Key Words:**    Base Domain Range Roots Turning point Discriminant Asymptotes Rationalise  |
| **Helpful hints**  Solving with indices and surds has appeared in the AS and A Level papers all the time!   Stealth quadratics, quadratics which are not obvious quadratics, for example: $k\left(x\right)=x-7\sqrt{x}+10 $come up in the exam regularly.  These occur in question 7 Exercise 2E   |
| **What opportunities are there for wider study?**  Try these tricky questions:  1. $(\frac{1}{4})^{t-3}=8$

 1. $4^{3x-2}=\frac{1}{2\sqrt{2}}$

  1. $3^{x}-3^{2-x}=8$

 1. $\frac{8p^{3}}{\sqrt{16\sqrt{p^{3}}}}$

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| **How will I be assessed?**     Topic test 1 (Pure Chapter 1- 4)    |

Half term 2

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| **What will we be learning?**    **Teacher 1** Pure Chapter 5 – Straight Line Graphs Pure Chapter 6 – Circles  **Teacher 2** Applied Chapter 1 – Data Collection Applied Chapter 2 – Measures of location and spread  Applied Chapter 3 – Representation of data Applied Chapter 4 – Correlation   | **Why this? Why now?**  Statistics is a brilliant introduction into applied mathematics       | **Key Words:**    Normal  Tangent  Chord Population Sampling units Sampling frame Simple random sample Systematic sampling Stratified sampling Quota sampling Opportunity sampling Quantitative variables and data Qualitative variables and data Continuous variable Discrete variable Classes Mode or modal class Median Mean Lower quartile Upper quartile Range Interquartile range Interpercentile range Variance Standard deviation Bivariate data Correlation Regression line     |
| **Helpful hints**  The discriminant is key when exploring tangents to circles.  Make flash cards for the definitions in Chapter 1 applied  |
| **What opportunities are there for wider study?**    Try working in location planning: <https://amsp.org.uk/resource/sampling-and-summary-statistics>    Try being a Software Engineer:  <https://amsp.org.uk/resource/geometry-and-straight-line-graphs>    |
| **How will I be assessed?**     Topic test 2 (Pure Chapters 5, 6 and 8)  Topic test 3 (Applied Chapters 1 – 4)     |

Half term 3

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| **What will we be learning?**    **Teacher 1** Pure Chapter 12 – Differentiation  Pure Chapter 13 – Integration  Pure Chapter 11 – Vectors  **Teacher 2** Applied Chapter 5 – Probability Applied Chapter 6 –  Statistical distributions Applied Chapter 7 – Hypothesis testing  | **Why this? Why now?**  Need a solid foundation in all of vectors, differentiation and integration to start the mechanics chapters.      | **Key Words:**    Gradient Curve Tangent Increasing Decreasing Stationary point Local minimum Local maximum Point of inflection Vann diagram Mutually exclusive Independent Tree diagram Probability distribution Binomial distribution Null hypothesis Alternative hypothesis Significance level Critical region     |
| **Helpful hints**  To differentiate and integrate start by simplifying your expression to get single powers of x  Diagrams are key to Vectors  Hypothesis Testing – See Example 5 p.105 from the textbook for a great example of a test from start to finish    |
| **What opportunities are there for wider study?**     Try working for the Office of National Statistics: <https://www.ons.gov.uk/aboutus/careers>     Try being an Actuary:  <https://amsp.org.uk/resource/risk>    |
| **How will I be assessed?**     Topic test 4 (Pure Chapter 12)  Topic test 5 (Pure Chapters 11 and 13)     |

Half term 4

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| **What will we be learning?**    **Teacher 1** Applied Chapter 8 – Modelling in mechanics Applied Chapter 9 – Constant acceleration  **Teacher 2** Pure Chapter 9 – Trigonometric ratios Pure Chapter 10 – Trigonometric identities and equations   | **Why this? Why now?**  Having covered most of Year 1 Pure content you are now in a good position to tackle the challenging Mechanics side of the course and to start looking at trigonometric identities.   | **Key Words:**    Particle Lamina Uniform body Inextensible string Smooth and rough surface Friction Tension Compression Thrust Normal reaction Magnitude Scalar Rate of change Gradient Gravity Displacement Velocity Speed SUVAT Sine rule Cosine rule Area of a triangle Periodic     |
| **Helpful hints**  Diagrams are key to success at Mechanics     |
| **What opportunities are there for wider study?**  Try aspiring to be an astronaut: <https://amsp.org.uk/resource/geometry-and-equations-of-motion>  |
| **How will I be assessed?**     Topic test 6 (Applied Chapters 5, 6 and 7)  Topic test 7 (Pure Chapters 9 and 10)    |

Half term 5

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| **What will we be learning?**    **Teacher 1** Applied Chapter 10 – Forces and motion Applied Chapter 11 – Variable acceleration  **Teacher 2** Pure Chapter 14 – Exponentials and logarithms Pure Chapter 7 – Algebraic methods   | **Why this? Why now?**  Exponentials and logarithms always appear in the A Level exam, however is not revisited in Year 13 so we cover this now to keep it fresh in your minds in Year 13. Algebraic Methods and Proof work is the last topic from Year 1 / AS covered and the first topic in A Level / Year 2 covered.    | **Key Words:**    Resultant Vectors Differentiate Integrate F=ma W=mg Factor theorem Deduction Exhaustion Counter-example       |
| **Helpful hints**  Some of the trickier questions from Year 1 Proof can be best tackled using the Year 2 Proof method ‘Proof by Contradiction’   Remember the  Variable Acceleration diagram    |
| **What opportunities are there for wider study?**     Try working in Orthotics and Prosthetics:<https://amsp.org.uk/resource/angles-and-forces>  |
| **How will I be assessed?**     Topic test 8 (Applied Chapters 9 and 10)  Topic test 9 (Pure Chapters 7 and 14)    |

Half term 6

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| **What will we be learning?**    **Teacher 1 and 2** **Book 2**Pure Chapter 1 – Algebraic Methods Pure Chapter 2 – Functions and graphs Pure Chapter 3 – Sequences and series Pure Chapter 4 – Binomial expansion  | **Why this? Why now?**  We start the Year 2 Pure content in the summer of Year 12 to ensure there is time to complete the extensive SOW and still have time to revise before exams start in Year 13.    | **Key Words:**    Resultant Vectors Differentiate Integrate F=ma W=mg Factor theorem Deduction Exhaustion Counter-example     |
| **Helpful hints**  Use a sketch of the graph to determine the range and domain: Domain = Input = x Range = Output = y  Solving modulus problems? – always use a sketch to determine whether you need the positive solution, the negative solution or both.  |
| **What opportunities are there for wider study?**    Try some of these mathematical puzzles, many of which contain A Level Mathematics:<http://www.qbyte.org/puzzles/> |
| **How will I be assessed?**    Mocks Summer topic tests (Book 2 Pure Chapters 1-4)  |