

| <b>Dagenham Park Subject Curriculum</b> |   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|---|---|-----------------------------|-------------------|-----------------------------------|---|----------------------------------|--------------------------|---|-----------------------------|-------------------------|-------------------------------|----------------------|-----------------------------|-------------------|-----------------------------------|---|----------------------------------|--------------------------|---|-----------------------------|
| <b>Subject</b>                          | Level 3 Advanced GCE Mathematics (9MA0)   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
| <b>Year Group</b>                       | 12/13   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
| <b>Overview</b>                         | <p><b>A level Mathematics</b><br/>We follow the Edexcel specification for A level.</p> <p>The design of this course is tailored to a Dagenham park student. It is sequenced in an interesting and challenging manner, extending methods students learn at GCSE. It includes applications of mathematics, such as Statistics and Mechanics.</p> <p>Statistics module covers collecting and analysing data and using this to make predictions about future events. At the end of the course, students understand probability and how risk is important in careers like insurance, medicine, engineering and the sciences.</p> <p>In Mechanics, we look at modelling and how to analyse the physical world around us, including the study of forces and motion. This module is particularly useful to students studying physics and engineering.</p> <p><b>Unit Assessment</b><br/>At the end of the course, students sit three exams.<br/>Each exam paper is 2 hrs and a calculator is allowed to be used in all.<br/>A breakdown of how topics are split between the three exams is listed below.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td rowspan="10" style="text-align: center; vertical-align: middle;">Paper 1: Pure Mathematics 1</td> <td>● Topic 1 – Proof</td> </tr> <tr> <td>● Topic 2 – Algebra and functions</td> </tr> <tr> <td>● Topic 3 – Coordinate geometry in the (x, y) plane</td> </tr> <tr> <td>● Topic 4 – Sequences and series</td> </tr> <tr> <td>● Topic 5 – Trigonometry</td> </tr> <tr> <td>● Topic 6 – Exponentials and logarithms</td> </tr> <tr> <td>● Topic 7 – Differentiation</td> </tr> <tr> <td>● Topic 8 – Integration</td> </tr> <tr> <td>● Topic 9 – Numerical methods</td> </tr> <tr> <td>● Topic 10 – Vectors</td> </tr> <tr> <td rowspan="7" style="text-align: center; vertical-align: middle;">Paper 2: Pure Mathematics 2</td> <td>● Topic 1 – Proof</td> </tr> <tr> <td>● Topic 2 – Algebra and functions</td> </tr> <tr> <td>● Topic 3 – Coordinate geometry in the (x, y) plane</td> </tr> <tr> <td>● Topic 4 – Sequences and series</td> </tr> <tr> <td>● Topic 5 – Trigonometry</td> </tr> <tr> <td>● Topic 6 – Exponentials and logarithms</td> </tr> <tr> <td>● Topic 7 – Differentiation</td> </tr> </tbody> </table> | Paper 1: Pure Mathematics 1 | ● Topic 1 – Proof | ● Topic 2 – Algebra and functions | ● Topic 3 – Coordinate geometry in the (x, y) plane | ● Topic 4 – Sequences and series | ● Topic 5 – Trigonometry | ● Topic 6 – Exponentials and logarithms | ● Topic 7 – Differentiation | ● Topic 8 – Integration | ● Topic 9 – Numerical methods | ● Topic 10 – Vectors | Paper 2: Pure Mathematics 2 | ● Topic 1 – Proof | ● Topic 2 – Algebra and functions | ● Topic 3 – Coordinate geometry in the (x, y) plane | ● Topic 4 – Sequences and series | ● Topic 5 – Trigonometry | ● Topic 6 – Exponentials and logarithms | ● Topic 7 – Differentiation |
| Paper 1: Pure Mathematics 1             | ● Topic 1 – Proof   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 2 – Algebra and functions   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 3 – Coordinate geometry in the (x, y) plane   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 4 – Sequences and series  |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 5 – Trigonometry  |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 6 – Exponentials and logarithms   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 7 – Differentiation   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 8 – Integration   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 9 – Numerical methods   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 10 – Vectors  |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
| Paper 2: Pure Mathematics 2             | ● Topic 1 – Proof   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 2 – Algebra and functions   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 3 – Coordinate geometry in the (x, y) plane   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 4 – Sequences and series  |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 5 – Trigonometry  |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 6 – Exponentials and logarithms   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |
|   | ● Topic 7 – Differentiation   |                             |                   |                                   |   |                                  |                          |   |                             |                         |                               |                      |                             |                   |                                   |   |                                  |                          |   |                             |

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|  |   | <ul style="list-style-type: none"> <li>● Topic 8 – Integration</li> <li>● Topic 9 – Numerical methods</li> <li>● Topic 10 – Vectors</li> </ul>   |
|  | Paper 3:<br>Statistics and<br>Mechanics | Section A: Statistics  |
|  |   | <ul style="list-style-type: none"> <li>● Topic 1 – Statistical sampling</li> <li>● Topic 2 – Data presentation and interpretation</li> <li>● Topic 3 – Probability</li> <li>● Topic 4 – Statistical distributions</li> <li>● Topic 5 – Statistical hypothesis testing</li> </ul> |
|  |   | Section B: Mechanics   |
|  |   | <ul style="list-style-type: none"> <li>● Topic 6 – Quantities and units in mechanics</li> <li>● Topic 7 – Kinematics</li> <li>● Topic 8 – Forces and Newton’s laws</li> <li>● Topic 9 – Moments</li> </ul>   |

**Term by Term**

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| <b>Autumn</b> | <p>Yea 12</p> <p><b><u>Pure</u></b></p> <p>Algebraic expressions<br/>         Quadratic function<br/>         Equations and Inequalities<br/>         Graphs and transformations<br/>         Straight-line graphs,<br/>         parallel/perpendicular, length and<br/>         area problems<br/>         Circles<br/>         Algebraic methods<br/>         The binomial Expansion<br/>         Trigonometric Ratios and graphs</p> <p><b><u>Applied</u></b></p> <p>Introduction to mathematical<br/>         modelling and standard S.I. units<br/>         Quantities in mechanics<br/>         Kinematics 1<br/>         Forces and Newtons Law</p> | <p>Year 13</p> <p><b><u>Pure</u></b></p> <p>Algebraic and Partial Fractions<br/>         Proof<br/>         Functions<br/>         Series and Sequences</p> <p>The Binomial Theorem<br/>         Radians<br/>         Trigonometric functions</p> <p><b><u>Applied</u></b></p> <p>Hypothesis testing<br/>         Regression and Correlation<br/>         Moments<br/>         Conditional Probability<br/>         Forces<br/>         Normal Distribution</p> |
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| <b>Spring</b>   | <table border="1" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>Yea 12</p> <p><b><u>Pure</u></b><br/>Trigonometric identities and equations<br/>Differentiation</p> <p><b><u>Applied</u></b><br/>Statistical sampling<br/>Data presentation and interpretation(4hrs)<br/>Probability<br/>Statistical distributions<br/>Kinematics 2 Variable Force</p> </td> <td style="width: 50%; vertical-align: top;"> <p>Year 13</p> <p><b><u>Pure</u></b><br/>Trigonometry and modelling<br/>Parametric Equations<br/>Differentiation<br/>Numerical Methods<br/>Integration</p> <p><b><u>Applied</u></b><br/>Projectiles</p> <p>Application of forces<br/>Further Kinematics</p> </td> </tr> </table> | <p>Yea 12</p> <p><b><u>Pure</u></b><br/>Trigonometric identities and equations<br/>Differentiation</p> <p><b><u>Applied</u></b><br/>Statistical sampling<br/>Data presentation and interpretation(4hrs)<br/>Probability<br/>Statistical distributions<br/>Kinematics 2 Variable Force</p> | <p>Year 13</p> <p><b><u>Pure</u></b><br/>Trigonometry and modelling<br/>Parametric Equations<br/>Differentiation<br/>Numerical Methods<br/>Integration</p> <p><b><u>Applied</u></b><br/>Projectiles</p> <p>Application of forces<br/>Further Kinematics</p> |
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| <b>Homework</b>   |   |   |   |
| <b>Additional Information</b>   | <p>Careers subject leads to –<br/>Mathematics is a versatile qualification, well-respected by employers and is both a “facilitating” subject for entry to higher education. Careers for people with good mathematics skills and qualifications are not only well paid, but they are also often interesting and rewarding. People who have studied mathematics are in the fortunate position of having an excellent choice of career. Whilst the number of young people studying A level Mathematics is increasing, there is still a huge demand from science, engineering and manufacturing employers.</p>  |   |   |
| <b>Useful Resources and links</b>   | <p>Books</p> <ul style="list-style-type: none"> <li>• Pure Mathematics Year1-AS</li> <li>• Pure Mathematics Year 2</li> <li>• Statistics and Mechanics 1-As</li> <li>• Statistics and Mechanics 2</li> </ul>  |   |   |

#### Websites

- [www.examsolutions.net](http://www.examsolutions.net)
- [mathswatch.co.uk](http://mathswatch.co.uk)
- DP6 PiXL app
- <https://www.mathsgenie.co.uk/alevel.html>

#### Wider reading

- Alex's Adventures in Numberland by Alex Bellos
- Flatland by Edwin A. Abbott
- Millions of cats by Wanda Gag
- How not to be Wrong by Jordan Ellenber
- Alan Turing: The Enigma by Andrew Hodges
- The Man Who Knew Infinity by Robert Kanigel
- The Colossal Book of Mathematics by Martin Gardner
- Euclid in the Rainforest by Joseph Mazur
- What is Mathematics Really? by Reuben Hersh
- Magical Mathematics by Persi Diaconis and Ron Graham
- The Mathematical Principles of Natural Philosophy by Isaac Newton