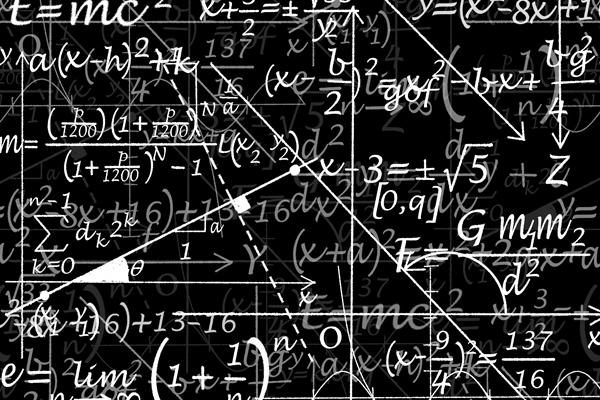
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[](https://www.youtube.com/watch?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwiKktCbufzUAhXH1RQKHYZdDXUQjRwIBw&url=https://admissions.carleton.ca/degrees/mathematics/&psig=AFQjCNHkBM67x4hYn8FR37wpjeWN04-hpg&ust=1499698077207583)

**PRE A LEVEL COURSE IN MATHEMATICS**

[](http://www.examsolutions.net)

**Course information**

The **A Level** Mathematics course is delivered in a classroom environment, with some new content being introduced by your teacher and some discovered by you. You will be required to work individually and collaboratively, and will be expected to complete a significant proportion of your study outside of class.

Completing an A Level Mathematics course will require you to use all of the skills you gained at GCSE from the start. If you don’t already have a good grasp of these, you need to remedy this before you begin. Successful completion of the pre-course work provided will prepare you well and enable you to start the course with confidence. Please bring the completed work to your first maths lesson in the week beginning Monday September 9th. There will then be an algebra test in the week beginning Monday 16th September designed to ensure you have the required skills to succeed at the course.

A large part of studying A-Level Mathematics is about learning how to solve problems, and “getting stuck” is part of the learning process. **You should expect to get stuck while working on the pre-course work, and then continue getting stuck throughout the course!** The important thing is what you do when you do get stuck. Most of the course content is new, so you will be expected to do your own research and consolidation when required. We recommend the following sites:

[https://www.mathsgenie.co.uk/gcse.html](https://amsp.org.uk/teachers/11-16-maths/transition-to-level-3-maths/where-maths-meets-the-world-of-work/)

[https://alevelmathsrevision.com/](https://www.google.co.uk/url)

[https://drfrostmaths.com](https://highcliffe.sharepoint.com/sites/LearnMaths/SitePages/Resources.aspx)

[http://www.examsolutions.net](https://www.theguardian.com/education/ng-interactive/2022/sep/24/the-guardian-university-guide-2023-the-rankings)

[http://www.physicsandmathstutor.com](https://my.integralmaths.org/course/view.php)

Once you have started the course you will also be able to seek help in the following ways:

* **Lunchtime support,** with three A Level teachers available two times a week
* **After school support,** with an A Level teacher available once a week
* **Extra Year 12 lessons** once a week which consist of review work and a chance to work on home study/consolidation with peers and an A Level teacher to support you
* The **online class textbook**
* Your **class teacher**, who will be pleased to help you **if you ask**

Integrated into the course are revision, consolidation, extension and regular testing lessons. Problem solving, modelling and exam-style questions are embedded into the course from the start.

**Course structure**

The (Edexcel) specification can be accessed here:

[https://qualifications.pearson.com/content/dam/pdf/A%20Level/Mathematics/2017/specification-and-sample-assesment/a-level-l3-mathematics-specification.pdf](https://www.mathsgenie.co.uk/gcse.html)

The course is split in to three distinct areas, Pure, Statistics and Mechanics. Two teachers will deliver the course.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Content Overview | Assessment Overview | |
| Pure | * Algebra and Functions * Geometry * Trigonometry * Calculus * Logarithms * Vectors | 2 × 2 hour examinations | of total A Level |
| Statistics | * Data Presentation and Interpretation * Hypothesis Testing * Probability * The Normal Distribution | 1 x 2 hour examination | of total A Level |
| Mechanics | * Forces and Newtons Lams * Kinematics * Moments | of total A Level |

**Textbooks**

Pearson: Edexcel A Level Mathematics **– Pure Mathematics Year 1** (+ Year 2 in Year 2)

Pearson: Edexcel A Level Mathematics **– Statistics and Mechanics Year 1/AS** (+ Year 2 in Year 2)

You will have access to the course textbook in class and will have an online account to access it in the study centre and at home. The online version includes links to various useful resources, including tutorials on the effective use of the graphical calculator. We recommend you purchase your own hard copy of the textbooks to use at home or in study periods.

Helpful video’s that link up with the textbook exercises can be found here:

[Haberdashers' Adams Maths Department - YouTube](https://alevelmathsrevision.com/)

**Graphical Calculators**

A graphical calculator (which must be the Casio FX-CG50) will be required for the course. The school purchases the calculators at a discount, and in the first couple of weeks of term you will have the opportunity to buy one through the department via Wisepay. (Payment plans are available if requ

Summer Transition Work

Hello future Highcliffe A-Level Mathematicians

We are looking forward to working with you in the sixth form and want you to achieve your full potential. In order to do this we would like you to start Year 12 with maximized understanding of the required GCSE skills.

Algebra is key to success at A-Level Mathematics and so we will be checking your algebraic fluency in September through a class test.

To prepare for this, we would like you to complete the following three tasks:

* **Task 1: Algebraic expressions**
* **Task 2: Quadratics**
* **Task 3: Equations and inequalities**

These tasks correlate to the first three topics covered in Year 12. They focus on the prerequisite skills required for each topic and completion of them will prepare you well for the algebra test.

Resources to support you with this work should you need them can be found here: [KS5 Resources (sharepoint.com)](https://www.google.co.uk/url) in 2023 Pre A Level Mathematics and Further Mathematics

**Mathematics – Task 1**

1. Simplify these expressions:
2. Simplify the following fractions fully:
3. Expand these expressions and simplify if possible:
4. Expand these expressions and simplify if possible:
5. Factorising quadratics:
6. Simplify:
7. Evaluate:
8. Given that express each of the following in the form , where and are constants.
9. Simplify:
10. Expand and simplify if possible:
11. Rationalise the denominator:

**Mathematics – Task 2**

1. Solve the following quadratic equations:
2. Solve the following quadratic equations:
3. Solve by using the formula.
4. Complete the square for the expressions:
5. Write in the form where and are integers to be found.
6. Solve the equation by completing the square.

Give your answers in surd form.

1. Solve the equation . Give your answers in surd form.
2. The functions f and g are given by and .
3. Find the values of and
4. Find the value of for which
5. The function f is defined as .
6. Write f(x) in the form .
7. Hence, or otherwise, find the roots of f(x), leaving your answers in surd form.
8. Write down the minimum value of f(x), and state the value of *x* for which it occurs.
9. Find the roots of the function .
10. Sketch the graph of , and find the coordinates of its turning point.
11. Sketch the graph of . Find the coordinates of its turning point and write down the equation of its line of symmetry.
12. Find the values of k for which has equal roots.
13. Find the range of values of *k* for which has two distinct real solutions.
14. A spear is thrown over level ground from the top of a tower

The height, in metres, of the spear above the ground after *t* seconds is modelled by the function:

1. Interpret the meaning of the constant term 12.25 in the model.
2. After how many seconds does the spear hit the ground?
3. Write h(t) in the form , where A, B and C are constants to be found.
4. Using your answer to part c or otherwise, find the maximum height of the spear above the ground, and the time at which this maximum height is reached.

**Mathematics – Task 3**

1. Solve the simultaneous equations:
2. Solve the simultaneous equations:
3. Solve the simultaneous equations:
4. Linear simultaneous equations on graphs:
5. On the same axes, draw the graphs of:
6. Use your graph to write down the solutions to the simultaneous equations.
7. Non-linear simultaneous equations on graphs:
8. On the same axes, draw the graphs of:
9. Use your graph to write down the solutions to the simultaneous equations.
10. The line with equation meets the curve with equation at exactly one point. Given that *k* is a positive constant
11. find the value of *k*
12. for this value of *k*, find the coordinates of the point of intersection.
13. Find the set of values of *x* for which:
14. Find the set of values of *x* for which:
15. and
16. or
17. Find the set of values of *x* for which:
18. Quadratic inequalities:
19. Find the set of values of *x* for which
20. Hence find the set of values for which and
21. Find the set of values for which
22. has equation .

has equation .

The diagram below shows a sketch of and on the same axes.

1. Find the coordinates of and , the points of intersection.
2. Hence write down the solution to the inequality

A picture containing line, diagram, font, plot

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1. On graph paper, shade the region that satisfies the inequalities:

, , and .

1. On graph paper, shade the region that satisfies the inequalities:

**CAREER PATHWAYS IN MATHS**

[Where maths meets... the world of work! - AMSP](https://www.youtube.com/@adamsmaths/playlists)

Follow this link to see how an A Level in Maths can lead you to become acclimate Scientist, an actuary, a software engineer or a location planner.

[Maths is your future: Visual effects artist - YouTube](https://drfrostmaths.com)

Or follow this link to watch a series of 5 videos hosted by Matt Parker looking at how having A level maths is important for the following careers:

Visual effects artist, Satellite controller, Veterinary surgeon, Mechanical engineer and Data analyst

But that is obviously not an exhaustive list…a Maths A Level closes very few doors and is also useful in careers such as…

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**University Pathway:**

The current top 5 Universities for Maths (as rated by the guardian) are:

1. St Andrews
2. Oxford
3. Cambridge
4. London School of Economics
5. Imperial College

Follow this link to see more: [The Guardian University Guide 2023 – the rankings | University guide | The Guardian](http://www.physicsandmathstutor.com)

**Entry exams:**

Many top Universities like you to sit entry exams before being accepted on to a maths related degree course. Make sure you sign up for our enrichment course on this which helps you to prepare for them. They currently consist of the STEP, the MAT and the TMUA.

|  |  |  |
| --- | --- | --- |
| **STEP** | **The MAT** | **The TMUA** |
| Summer term (June) in Year 13 | Autumn term (November) in Year 13 | Autumn term (November) in Year 13 |
| STEP II – A Level Mathematics content  STEP III – A Level Mathematics and Further Mathematics content | Content from AS Level Mathematics  + Sequences and series | Content from AS Level Mathematics  + Sequences and series |
| 3 hour exams | 2 hours 30 minutes exam | 2 hours 30 minutes exam |
| Written papers | Fully online | Fully online |
| Choice of 8 Pure and 4 Applied questions  Marks totalled for best 6 attempts | 1st section – 25 multiple choice questions of varying difficulty (worth 2,3 or 4 marks)  2nd section – 2 longer questions worth 15 marks each | Paper 1 – Applications of Mathematical Knowledge - 20 multiple choice questions  Paper 2 – Mathematical Reasoning – 20 multiple choice questions |

**What can you do now?**

We suggest you start keeping up to date with SUMS. Use this link to take you to the latest editions:

https://amsp.org.uk/sums-steps-to-university-for-mathematical-students/

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