

Year 12 A level Maths Summer Assignment



Name _____

MyMaths login: www.mymaths.co.uk presdales indices

My Portal: Login _____ Password _____

Any questions about this work or Maths / Further Maths:

Email me : rugg-gunnr@presdales.herts.sch.uk

Congratulations on completing the challenging GCSE (9-1) in Maths – you are now better prepared for A level Maths studies. If you’ve enjoyed having to think deeply to be successful at the harder problems – you’ve got the right mind-set to achieve well on the new A level.

Why do I have to do Summer work? The Summer holidays is a long time – we don’t want your maths to get rusty! We need to hit the ground running in September as there’s a lot to cover / understand and master over the 2 years of A level.

How hard is this work? This doesn’t take you further than 7/8/9 grade work that you did at GCSE. It gives you a good start to the A level course – make sure you feel confident on all the key techniques.

How good do I have to get? We expect you to get each task GREEN – some people will aim for a full set of 100% scores. Try again if you get AMBER – check the lesson / email me for help.

When should I do the work? Do this after your GCSE results so that you’re all ready to start the course in September – **COMPLETING THIS IS ESSENTIAL!**

What if I’m not sure that I’m taking Maths A level?

Start on this work after GCSE Results day and see if you get satisfaction from doing it. This will give you a realistic taster to help you decide. If you haven’t done it by the time you come back in September, you must complete it in the very first few days; otherwise we question your commitment and determination to take A level Maths – it isn’t the right course for you if you’re not prepared to work hard at it!

Presdales Maths Department June 2019



Make sure you log on to your personal portal so all your scores are recorded and we can track your progress!

The full list of Online homework tasks is stored in your account
– once they're done well: you're finished!

New A Level spec:

1. Proof

Proof by deduction

2. Algebra

Algebraic Manipulation

Indices 1

Indices 2

Surds 2

Linear Inequalities

Quadratic Inequalities

3. Functions

Function Notation

Sketching Graphs

Transforming Graphs 1

Quadratic Graphs 1

4. Co-ordinate geometry

Gradients

$y=mx+c$

Equation of a line

5. Trigonometry

The cosine rule (needs sine rule too!)

Sine and Cosine graphs

6. Vectors

Vectors Introduction

7. Statistics

Addition of probabilities

The AND Rule



Amber or Red: You need to try this task again – look at the matching lesson, contact a friend or email me if stuck!

Presdales Year 12 A level Maths Induction



100% compulsory A level syllabus across all schools and all exam boards.

All exams at the end of Year 13 (the first real exam papers were set this Summer 2019 for our Y13 students)

Exam Board: Edexcel

Assessment: Three 2-hour papers, calculator required.

Paper 1 & 2: Pure Mathematics – any content on either paper.

Proof, Algebra and functions, Coordinate geometry in the (x, y) plane, Sequences and series, Trigonometry, Exponentials and logarithms, Differentiation, Integration, Numerical methods, Vectors

Paper 3: Statistics **and** Mechanics, equally weighted.

Section A: Statistics Statistical sampling, Data presentation and interpretation, Probability, Statistical distributions, Statistical hypothesis testing

Section B: Mechanics Quantities and units in mechanics, Kinematics, Forces and Newton's laws, Moments

Calculators

Calculators used must include the following features:

- summary statistics and standard statistical distributions
- for Further Maths: matrix calculations up to 3 x 3

Presdales strongly recommends and will bulk-order for students: Casio ClassWiz fx991EX at cost price of £20. This also solves simultaneous equations, quadratic and cubic equations, amongst many other features whilst having a similar design to the Casio GCSE calculator fx-83GT which we use in Years 7-11.

Large Data Set

The Statistics element of A level Maths includes handling a large data set on Weather (5 UK places and 3 in rest of the world). This is provided in the format of an Excel spreadsheet and is often used in questions.

Further Technology

Graphical calculators can be used in the course and exams (approved list).

www.desmos.com is highly useful for curve sketching and understanding graphs.

Further free online resources and websites will be recommended during the course.

Presdales Year 12 AS level Further Maths



AS Further Maths in Year 12

– all students to sit this exam.

Exam Board: Edexcel

Assessment: Two papers, each 1h 40mins, calculator required

Paper 1: Core Pure Mathematics

Proof, Complex numbers, Matrices, Further algebra and functions, Further calculus, Further vectors

Paper 2: Applied Options

Further Statistics 1 and Decision Mathematics 1

Yr 12 and 13 A level Further Maths

N.B. The whole of A level Further Maths is examined at the end of Year 13.

Exam Board: Edexcel

Assessment: Four papers, each 1h 30mins, calculator required

Papers 1 & 2: Core Pure Mathematics – any content on either paper.

Proof, Complex numbers, Matrices, Further Algebra and functions, Further calculus, Further vectors, Polar coordinates, Hyperbolic functions, Differential equations

Paper 3: Applied Options: Further Statistics 1

Discrete probability distributions, Poisson and binomial distributions, Geometric and negative binomial distributions, Hypothesis testing, Central Limit Theorem, Chi Squared Tests, Probability generating functions, Quality of tests

Paper 4: Applied Options: Decision Mathematics 1

Algorithms and graph theory, Algorithms on graphs, Algorithms on graphs II, Critical path analysis, Linear Programming

Presdales Year 12 A level Maths and Further Maths

The Course

- 6 lessons per week, split between 2 Maths teachers
- 1 double and 1 single lesson with each Maths teacher.
- Teacher A: Pure and Mechanics
- Teacher B: Pure and Statistics

Expect homework every lesson:

- Preparation tasks, Review lesson, questions – due by next lesson
- MUST keep up with work – easy to miss a whole topic very quickly.
- Requires excellent attendance and catching up from any absence.

Support provided:

- Maths drop-in surgery every week – to resolve any questions you have between lessons with Maths teacher support.
- Maths staff can arrange to see you on a 1-1 basis.
- Email for help! – You may just need a nudge or a quick explanation and we're happy to receive and reply to email.
- Team work – supporting each other gives better understanding for all
- Work together in a free period, set up a group chat.

Other opportunities:

- UKMT Senior Maths Challenge – you all take part: great for your CV!
- Other Maths challenge opportunities (Senior Team Challenge / Maths Olympiad for Girls / Problem solving conferences and courses)
- Become a Maths Prefect and help in a lower school class.
- Help 1-1 with a morning registration booster sessions for Year 7 who struggle at Maths.
- Support a Year 11 student working hard at the new GCSE

Additional AS level in Further Maths:

- Additional 6 periods per week
- 3 lessons for Pure, 3 lessons for Decision/Statistics
- Split between 2 teachers
- 2 external exams at end of Year 12 to get an official grade in AS Further Maths.

Taster problems for induction day lessons:

1. Sketch the graphs of i) $y = x^2 - 2x - 8$ ii) $y = x^2 - 4x + 5$ including axes intercepts, and the vertex

- Extend:
- What help is completing the square?
 - What is different about the second graph? – How could you tell?
 - Use calculator in Table mode to make a table of values for these
 - Use Classwiz calculator in mode $x y = 0$ to explore these Polynomials of Degree 2 (Quadratics)
 - Sketch $y = (x+1)(x-2)(x-4)$ which is a _____ polynomial

2. Add up the numbers from 1 to 100.

Carl Frederic Gauss was set this problem by his primary school teacher when he was 10 – hopefully to keep him quiet – but he came back with a clever solution from which he could generalise more results...

- Extend:
- Find the sum of the first 50 even numbers
 - Find the sum of the multiples of 3 that are less than 100, hence find the sum of the numbers less than 100 which are not multiples of 3.
 - Explore: Classwiz calculator button $\sum_1^{100} x$

3. Sketch the graph of $y = \sin x$ for x values from -360° to 720° Now consider the gradient of this graph at multiples of 90°

- Extend:
- Explore this idea with other trig graphs that you know
 - Try out www.desmos.com app/website to show you the graphs.

4. Expand $(a + b)^2$, $(a + b)^3$, $(a + b)^4$, $(a + b)^5$

- Extend:
- What patterns do you notice?
 - If you've studied GCSE Statistics: How does this relate to it?
 - Can you write the next line of coefficients?
 - Use calculator nCr button to find the coefficients...

5. Solve simultaneous equations $3x - 2y = -6$ $6x + 3y = 2$ and check this on Classwiz calculator in mode $x y = 0$

- Extend:
- Solve simultaneously $2y = 2x - 3$ and $3y = x - 1$
 - Solve simultaneously $y = x - 4$ and $y^2 = 2x^2 - 17$
 - Check with the Classwiz in $x y = 0$ mode
 - Use www.desmos.com to see the solutions graphically

Introducing: A Level Maths Calculator

CASIO fx-991EX Classwiz, cost price of £20 through school

To: All Year 11 students planning on studying Maths A level next year and their parents

For the New A level Mathematics specification, students requires a calculator that has increased features, which must include:

- summary statistics and standard statistical distributions
- iteration
- for Further Maths: matrix calculations up to 3 x 3

Presdales strongly recommends Casio ClassWiz fx-991EX. This also solves numerical simultaneous equations, quadratic and cubic equations, amongst many other features whilst having a similar design to the Casio GCSE calculator fx-83GT PLUS which we use in Years 7-11.

Students who have paid in advance of Presdales Induction (24/25th June) will receive the calculator in the Maths Induction session. We will start using the new calculator in this session and explore some of its features.

We can accept payments by cash / cheque or on WisePay. We intend to have additional stock for those who bring money on the day - but cannot guarantee availability unless we have had payment in advance. Please fill in the reply slip below with your payment or state that you have ordered and paid via WisePay

Many thanks

Mrs Rugg-Gunn
Head of Maths

rugg-gunnr@presdales.herts.sch.uk

To: The School Office

Maths A level Calculator Order

Name of Student _____ (please PRINT CLEARLY)

Please pre-order 1 A level calculator **Casio fx-991EX Classwiz**

- I enclose a cheque for £20
- I enclose £20 cash
- I have paid by WisePay

I understand that my son/daughter will receive it at the Maths Induction lesson (24th/25th June)