

External Examinations - A Level

This is a breakdown of the content that is examined at the end of the two year course



Paper 1: Pure Mathematics 1 (*Paper code: 9MA0/01) Paper 2: Pure Mathematics 2 (*Paper code: 9MA0/02)
Each paper is: 2-hour written examination 33.33% of the qualification 100 marks
Content overview <ul style="list-style-type: none">• 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
Assessment overview <ul style="list-style-type: none">• Paper 1 and Paper 2 may contain questions on any topics from the Pure Mathematics content.• Students must answer all questions.• Calculators can be used in the assessment.

Paper 3: Statistics and Mechanics (*Paper code: 9MA0/03)
2-hour written examination 33.33% of the qualification 100 marks
Content overview Section A: Statistics <ul style="list-style-type: none">• Topic 1 – Statistical sampling• Topic 2 – Data presentation and interpretation• Topic 3 – Probability• Topic 4 – Statistical distributions• Topic 5 – Statistical hypothesis testing Section B: Mechanics <ul style="list-style-type: none">• Topic 6 – Quantities and units in mechanics• Topic 7 – Kinematics• Topic 8 – Forces and Newton's laws• Topic 9 – Moments
Assessment overview <ul style="list-style-type: none">• Paper 3 will contain questions on topics from the Statistics content in Section A and Mechanics content in Section B.• Students must answer all questions.• Calculators can be used in the assessment.

This content is only suitable if your child is not continuing with the full A Level

External Examinations - AS Level



Paper 1: Pure Mathematics (*Paper code: 8MA0/01)
Written examination: 2 hours 62.5% of the qualification 100 marks
Content overview <ul style="list-style-type: none">• 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 – Vectors
Assessment overview <ul style="list-style-type: none">• Students must answer all questions.• Calculators can be used in the assessment.

Paper 2: Statistics and Mechanics (*Paper code: 8MA0/02)
Written examination: 1 hour 15 minutes 37.5% of the qualification 60 marks
Content overview Section A: Statistics <ul style="list-style-type: none">• Topic 1 – Statistical sampling• Topic 2 – Data presentation and interpretation• Topic 3 – Probability• Topic 4 – Statistical distributions• Topic 5 – Statistical hypothesis testing Section B: Mechanics <ul style="list-style-type: none">• Topic 6 – Quantities and units in mechanics• Topic 7 – Kinematics• Topic 8 – Forces and Newton's laws
Assessment overview <ul style="list-style-type: none">• The assessment comprises two sections: Section A – Statistics and Section B – Mechanics.• Students must answer all questions.• Calculators can be used in the assessment.



Personal Learning Checklist - Pure

Unit	Topic	Class Notes	R	A	G
Algebraic Expressions	Indices				
	Surds				
	Expanding and factorising polynomials				
Quadratics	Solving quadratics				
	Completing the square				
	Using the discriminant				
	Quadratic functions and their graphs				
Equations and Inequalities	Simultaneous equations				
	Inequalities				
	Graphs and finding regions				
Graphs and Transformations	Sketching cubics and quartics				
	Reciprocal graphs				
	Points of intersection				
	Transformations of graphs				
Straight Line Graphs	Equation of a straight line				
	Parallel, Perpendicular and Length				
	Modelling with straight lines				
Circles	Midpoints and perpendicular bisectors				
	Equation of a circle				
	Tangents and chords				
	Triangles in circles				

Algebraic Methods	Algebraic long division and factor theorem				
	Proof				
Binomial Expansion	Binomial Expansion				
Trigonometric Ratios	Sine rule, Cosine rule and area of a triangle				
	Graphs of Sin/Cos/Tan and transformations				
Trig Identities and Equations	Trigonometry of all angles including exact values				
	Solving trigonometry for the angle within a range				
	Basic trigonometric identities				
Vectors	Solving geometric problems and modelling				
Differentiation	Basic differentiation				
	Derivative or differentiation				
	Tangents and normals				
	Stationary points				
	Sketching gradient functions				
	Modelling with differentiation				
	Increasing and decreasing functions				
Integration	Basic integration				
	Definite integrals and area				
	Area between a curve and a line				
Exponentials and Logarithms	Exponentials, sketching and modelling				
	Logs laws and solving equations				
	Using logs on non-linear data				

- PLCs are provided to all students to ensure they...
- Understand the order of teaching
 - Can choose to look ahead and research topics in their own time
 - Can keep their subject files organised

Personal Learning Checklist - Applied



Students are provided with separate PLCs for Pure and Applied due having different teachers delivering the two elements of the course

Unit	Topic	Class Notes	R	A	G
Statistics					
Data Collection	Sampling				
	Types of data				
	The large data set				
Location and Spread	Averages & quartiles				
	Range, IQR & interpercentile range				
	Variance & standard deviation				
	Coding data				
Representations of Data	Finding outliers				
	Box plots & cumulative frequency graphs				
	Histograms				
	Comparing data				
Correlation and Linear Regression	Correlation & linear regression				
Probability	Sample space & frequency				
	Venn diagrams				
	Mutually exclusive & independent				
	Tree diagrams				
Statistical Distributions	Probability distributions				
	Binomial distribution				
Hypothesis Testing	Binomial hypothesis testing				

Unit	Topic	Class Notes	R	A	G
Mechanics					
Modelling in Mechanics	Models & assumptions				
	SI units & simple vectors				
Constant Acceleration	Displacement & velocity time graphs				
	Simple SUVAT				
	SUVAT using gravity				
Forces and Motion	Force diagrams & vectors				
	Force & acceleration				
	Forces in 2D				
	Connected particles & pulleys				
Variable Acceleration	Acceleration as a function of time				
	Using calculus				
	Deriving the constant acceleration formulae				



Quadratics

The binomial expansion

Circles

Equations and inequalities

Module 1 - Pure

Straight line graphs

Algebraic expressions

Algebraic methods

Trigonometric ratios

These are the Pure Maths topics which are studied in Module 1 of Year 12. This builds on knowledge from GCSE

$$y = mx + c$$

- Solving quadratic equations
- Completing the square
- Functions
- Quadratic graphs
- The discriminant
- Modelling with quadratics

- Pascal's triangle
- Factorial notation
- The binomial expansion
- Solving binomial problems
- Binomial estimation

- Midpoints and perpendicular bisectors
- Equation of a circle
- Intersections of straight lines and circles
- Use tangent and chord properties
- Circles and triangles

- Linear simultaneous equations
- Quadratic simultaneous equations
- Simultaneous equations on graphs
- Linear inequalities
- Quadratic inequalities
- Inequalities on graphs
- Regions

- Equations of straight lines
- Parallel and perpendicular lines
- Length and area
- Modelling with straight lines

- ## Vectors
- Vectors
 - Representing vectors
 - Magnitude and direction
 - Position vectors
 - Solving geometric problems
 - Modelling with vectors

- ## Graphs and transformations
- Cubic graphs
 - Quartic graphs
 - Reciprocal graphs
 - Points of intersection
 - Translating graphs
 - Stretching graphs
 - Transforming functions

- Index laws
- Expanding brackets
- Factorising
- Negative and fractional indices
- Surds
- Rationalising denominators

- Algebraic fractions
- Dividing polynomials
- The factor theorem
- Mathematical proof
- Methods of proof

- Angles in all four quadrants
- Exact values of trigonometric ratios
- Trigonometric identities
- Simple trigonometric equations
- Harder trigonometric equations
- Equations and identities



Differentiation

- Gradients of curves
- Finding the derivative
- Differentiating x^n
- Differentiating quadratics
- Differentiating functions with two or more terms
- Gradients, tangents and normal
- Increasing and decreasing functions
- Second order derivatives
- Stationary points
- Sketching gradient functions
- Modelling with differentiation

Module 2 - Pure

Integration

- Integrating x^n
- Indefinite integrals
- Finding functions
- Definite integrals
- Areas under curves
- Areas under the x -axis
- Areas between curves and lines

These are the Pure Maths topics which are studied in Module 2 of Year 12. These are seen as the more challenging topics of the course.

- Exponential functions
- $y = e^x$
- Exponential modelling
- Logarithms
- Laws of logarithms
- Solving equations using logarithms
- Working with natural logarithms
- Logarithms and non-linear data

Exponentials and logarithms



Revision

Module 3 - Pure

The Pure content of the course has been completed by Module 3.
The focus becomes revision for the end of year exams.



The Applied content is taught from Module 2 in Year 12.
These are the Applied Maths topics which are studied.
The focus for this Statistics.

Data collection

- Populations and samples
- Sampling
- Non-random sampling
- Types of data
- The large data set

- Calculating probabilities
- Venn diagrams
- Mutually exclusive and independent events
- Tree diagrams

Probability

Module 2 - Applied

Correlation

- Correlation
- Linear regression

- Probability distributions
- The binomial distribution
- Cumulative probabilities

Statistical distributions

Measures of location and spread

- Outliers
- Box plots
- Cumulative frequency
- Histograms
- Comparing data

Representations of data

- Measures of central tendency
- Other measures of location
- Measures of spread
- Variance and standard deviation
- Coding

- Hypothesis testing
- Finding critical values
- One-tailed tests
- Two-tailed tests

Hypothesis testing



The Applied content is taught from Module 2 in Year 12.
These are the Applied Maths topics which are studied.
The focus for this Module is Mechanics.

Constant acceleration

- Displacement–time graphs
- Velocity–time graphs
- Constant acceleration formulae 1
- Constant acceleration formulae 2
- Vertical motion under gravity

Module 3 - Applied

- Functions of time
- Using differentiation
- Maxima and minima problems
- Using integration
- Constant acceleration formulae

Variable acceleration

- Force diagrams
- Forces as vectors
- Forces and acceleration
- Motion in 2 dimensions
- Connected particles
- Pulleys

Forces and motion

Modelling in mechanics

- Constructing a model
- Modelling assumptions
- Quantities and units
- Working with vectors

Retrieval and Feedback



Students are provided with opportunities in lessons to...

- Access retrieval activities (blue)
- Participate in whole class feedback (yellow)
- Receive personalised feedback (green)

Lesson Number 1

Find the equation of the normal to the curve with equation $y = 3x^2 - 4x^3 + 9x - 3$ at the point where $x = 3$.

Determine whether the line with equation $y = 3x - 5$ is tangent to the circle with equation $x^2 + y^2 - 8x + 5y - 4 = 0$.

(i) Sketch the curve with equation $y = e^x$.
 (ii) State the transformations that map the curve with equation $y = e^x$ to the curve with equation $2^x = e^{x+1} = 100$.

Find the exact solutions to the equation $2^x = e^{x+1} = 100$.

Please turn over

1	Simplify expressions involving rational functions	0%	REPAIR
2	(i) Find the range of $f(x) = \frac{1}{x}$ for $x > 4$ (ii) Find the domain of $g(x) = \tan x$	0%	REPAIR
3	(i) Sketch the graph of $y = x + 1$ (ii) Solve equation $2x - 3 = x - 1$	0%	REPAIR
4	(i) Find domain of $\frac{3x^2 + 4x + 9}{(x - 1)(x + 2)}$ (ii) Write $\frac{3x^2 + 4x + 9}{(x - 1)(x + 2)}$ as partial fractions	0%	REPAIR
5	(i) Express $\sqrt{3 - 2x}$ as a function of x (ii) Range of x for which solution is valid	0%	REPAIR
6	Find rational approximation for $\sqrt{\frac{2}{3}}$	0%	REPAIR
7	Find rational approximation for $\sqrt{\frac{2}{3}}$	0%	REPAIR

Standardised Points

A* 60 A:50 B:40 C:30 D:20 E:10

Target 30

1	Simplify expressions involving rational functions	0%	REPAIR
2	(i) Find the range of $f(x) = \frac{1}{x}$ for $x > 4$ (ii) Find the domain of $g(x) = \tan x$	0%	REPAIR
3	(i) Sketch the graph of $y = x + 1$ (ii) Solve equation $2x - 3 = x - 1$	0%	REPAIR
4	(i) Find domain of $\frac{3x^2 + 4x + 9}{(x - 1)(x + 2)}$ (ii) Write $\frac{3x^2 + 4x + 9}{(x - 1)(x + 2)}$ as partial fractions	0%	REPAIR
5	(i) Express $\sqrt{3 - 2x}$ as a function of x (ii) Range of x for which solution is valid	0%	REPAIR
6	(i) Find rational approximation for $\sqrt{\frac{2}{3}}$ (ii) Find rational approximation for $\sqrt{\frac{2}{3}}$	0%	REPAIR

Total 0 out of 33

Points Conversion

A* 60 A:50 B:40 C:30 D:20 E:10

Standardised Points

A* 60 A:50 B:40 C:30 D:20 E:10

Target 35

Comment

Homework feedback

Top tip

Model solution

What went well

Class -
Module -
HW -

Recommended Calculator

Casio fx-991EX Scientific Calculator

The calculator we recommend for the course is available to purchase from the school via ParentPay



Suggested Revision Material

CGP A Level Mathematics
Edexcel
Complete Revision and Practice

The revision guide that we recommend for the course is available to purchase from the school via ParentPay

