Subject: A-Level Mathematics	Exam Board: AQA 7357 (for this exam it is 7356)

For this exam **https://www.aqa.org.uk/subjects/mathematics/as-and-a-level/mathematics-7356**
For the A-Level exam in 2025 https://www.aqa.org.uk/subjects/mathematics/as-and-a-level/mathematics-7357

Revision List

Two 90-minute papers – Paper 1 is on Pure and Mechanics; Paper 2 is Pure and Statistics
Attached is the AS Specification – this is the revision list. It can be linked to the AS Guidance Document, coming soon

Useful revision resources

Websites

- TLMaths (tlmaths.com)
- MathsGenie (www.mathsgenie.co.uk)

Recommended Revision Guides

CGP A-Level Mathematics Revision Guide and Workbook (Edexcel version is suitable for AQA also)
CGP Textbook for Mathematics that you have
Kerboodle Textbook for AQA Mathematics

Recommended Calculators

Casio Classwiz EX-991 CW - available on Wisepay

Maths Sets

We have a Maths Sets available on Wisepay and are priced at £2, these come in an exam-friendly transparent pencil case

Revision Tips

Revision for Mathematics is based upon practice (and more practice). You need to be confident at the skills and concepts that make up the course in order to be able to work through the more challenging problems. Revision should be interactive, not just reading notes

Students can work through guidance document to identify areas that they are good at, alongside areas they are struggling with and need to work on

A potential plan of action would be

- Work through the guidance document – RAG the topics to indicate your level of understanding
- Work through maths problems and past papers.
- Do not just read your notes/revision guides as you need to practice your Maths skills.

3 Subject content

The subject content for AS Mathematics is set out by the Department for Education (DfE) and is common across all exam boards.The content set out in this specification covers the complete AS course of study.

3.1 Overarching themes

AS specifications in mathematics must require students to demonstrate the overarching knowledge and skills contained in sections **OT1**, **OT2** and **OT3**. These must be applied, along with associated mathematical thinking and understanding, across the whole of the detailed content set out in sections **A** to **R**.

Students must understand the mathematical notation in Appendix A: mathematical notation and must be able to recall the mathematical formulae and identities set out in Appendix B: mathematical formulae and identities (page 41).

3.1.1 OT1: Mathematical argument, language and proof

	Knowledge/skill
OT1.1	Construct and present mathematical arguments through appropriate use of diagrams; sketching graphs; logical deduction; precise statements involving correct use of symbols and connecting language, including: constant, coefficient, expression, equation, function, identity, index, term, variable.
OT1.2	Understand and use mathematical language and syntax as set out in the content.
OT1.3	Understand and use language and symbols associated with set theory, as set out in the appendices. Apply to solutions of inequalities.
OT1.5	Comprehend and critique mathematical arguments, proofs and justifications of methods and formulae, including those relating to applications of mathematics.

3.1.2 OT2: Mathematical problem solving

	Knowledge/skill
OT2.1	Recognise the underlying mathematical structure in a situation and simplify and abstract appropriately to enable problems to be solved.
OT2.2	Construct extended arguments to solve problems presented in an unstructured form, including problems in context.
OT2.3	Interpret and communicate solutions in the context of the original problem.

	Knowledge/skill
OT2.5	Evaluate, including by making reasoned estimates, the accuracy or limitations of solutions.
OT2.6	Understand the concept of a mathematical problem solving cycle, including specifying the problem, collecting information, processing and representing information and interpreting results, which may identify the need to repeat the cycle.
OT2.7	Understand, interpret and extract information from diagrams and construct mathematical diagrams to solve problems, including in mechanics.

3.1.3 OT3: Mathematical modelling

	Knowledge/skill
OT3.1	Translate a situation in context into a mathematical model, making simplifying assumptions.
OT3.2	Use a mathematical model with suitable inputs to engage with and explore situations (for a given model or a model constructed or selected by the student).
OT3.3	Interpret the outputs of a mathematical model in the context of the original situation (for a given model or a model constructed or selected by the student).
OT3.4	Understand that a mathematical model can be refined by considering its outputs and simplifying assumptions; evaluate whether the model is appropriate.
OT3.5	Understand and use modelling assumptions.

3.2 A: Proof

	Content
A1	Understand and use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion; use methods of proof, including proof by deduction, proof by exhaustion. Disproof by counter example.

3.3 B: Algebra and functions

	Content
B1	Understand and use the laws of indices for all rational exponents.

	Content
B2	Use and manipulate surds, including rationalising the denominator.

	Content
B3	Work with quadratic functions and their graphs; the discriminant of a quadratic function, including the conditions for real and repeated roots; completing the square; solution of quadratic equations including solving quadratic equations in a function of the unknown.

	Content
B4	Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation.

	Content
B5	Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions. Express solutions through correct use of 'and' and 'or', or through set notation. Represent linear and quadratic inequalities such as $y > x + 1$ and $y > ax^2 + bx + c$ graphically.

	Content
B6	Manipulate polynomials algebraically, including expanding brackets and collecting like terms, factorisation and simple algebraic division; use of the factor theorem.

	Content
B7	Understand and use graphs of functions; sketch curves defined by simple equations including polynomials, $y = \frac{a}{x}$ and $y = \frac{a}{x^2}$ (including their vertical and horizontal asymptotes); interpret algebraic solution of equations graphically; use intersection points of graphs to solve equations. Understand and use proportional relationships and their graphs.

	Content
B9	Understand the effect of simple transformations on the graph of $y = \mathrm{f}(x)$ including sketching associated graphs: $y = a\mathrm{f}(x)$, $y = \mathrm{f}(x) + a$, $y = \mathrm{f}(x + a)$, $y = \mathrm{f}(ax)$

3.4 C: Coordinate geometry in the (x , y) plane

	Content
C1	Understand and use the equation of a straight line, including the forms $y - y_1 = m(x - x_1)$ and $ax + by + c = 0$; gradient conditions for two straight lines to be parallel or perpendicular. Be able to use straight line models in a variety of contexts.

	Content
C2	Understand and use the coordinate geometry of the circle including using the equation of a circle in the form $(x - a)^2 + (y - b)^2 = r^2$; completing the square to find the centre and radius of a circle; use of the following properties: • the angle in a semicircle is a right angle • the perpendicular from the centre to a chord bisects the chord • the radius of a circle at a given point on its circumference is perpendicular to the tangent to the circle at that point.

3.5 D: Sequences and series

	Content
D1	Understand and use the binomial expansion of $(a + bx)^n$ for positive integer n ; the notations $n!$, $n\text{C}r$ and $\binom{n}{r}$; link to binomial probabilities.

3.6 E: Trigonometry

	Content
E1	Understand and use the definitions of sine, cosine and tangent for all arguments; the sine and cosine rules; the area of a triangle in the form $\frac{1}{2}ab\sin C$

	Content
E3	Understand and use the sine, cosine and tangent functions; their graphs, symmetries and periodicity.

	Content
E5	Understand and use $\tan\theta \equiv \frac{\sin\theta}{\cos\theta}$ Understand and use $\sin^2\theta + \cos^2\theta \equiv 1$

	Content
E7	Solve simple trigonometric equations in a given interval, including quadratic equations in sin, cos and tan and equations involving multiples of the unknown angle.

3.7 F: Exponentials and logarithms

	Content
F1	Know and use the function a^x and its graph, where a is positive. Know and use the function e^x and its graph.

	Content
F2	Know that the gradient of e^{kx} is equal to ke^{kx} and hence understand why the exponential model is suitable in many applications.

	Content
F3	Know and use the definition of $\log_a x$ as the inverse of a^x , where a is positive and $x \geq 0$ Know and use the function $\ln x$ and its graph. Know and use $\ln x$ as the inverse function of e^x

	Content
F4	Understand and use the laws of logarithms: $\log_a x + \log_a y \equiv \log_a(xy)$; $\log_a x - \log_a y \equiv \log_a\left(\frac{x}{y}\right)$; $k\log_a x \equiv \log_a x^k$ (including, for example, $k = -1$ and $k = -\frac{1}{2}$)

	Content
F5	Solve equations of the form $a^x = b$

	Content
F6	Use logarithmic graphs to estimate parameters in relationships of the form $y = ax^n$ and $y = kb^x$, given data for x and y.

	Content
F7	Understand and use exponential growth and decay; use in modelling (examples may include the use of e in continuous compound interest, radioactive decay, drug concentration decay, exponential growth as a model for population growth); consideration of limitations and refinements of exponential models.

3.8 G: Differentiation

	Content
G1	Understand and use the derivative of $f(x)$ as the gradient of the tangent to the graph of $y = f(x)$ at a general point (x, y); the gradient of the tangent as a limit; interpretation as a rate of change; sketching the gradient function for a given curve; second derivatives; differentiation from first principles for small positive integer powers of x Understand and use the second derivative as the rate of change of gradient.

	Content
G2	Differentiate x^n, for rational values of n, and related constant multiples, sums and differences.

	Content
G3	Apply differentiation to find gradients, tangents and normals, maxima and minima and stationary points. Identify where functions are increasing or decreasing.

3.9 H: Integration

	Content
H1	Know and use the Fundamental Theorem of Calculus.

	Content
H2	Integrate x^n (excluding $n = -1$), and related sums, differences and constant multiples.

	Content
H3	Evaluate definite integrals; use a definite integral to find the area under a curve.

3.10 J: Vectors

	Content
J1	Use vectors in two dimensions.

	Content
J2	Calculate the magnitude and direction of a vector and convert between component form and magnitude/direction form.

	Content
J3	Add vectors diagrammatically and perform the algebraic operations of vector addition and multiplication by scalars, and understand their geometrical interpretations.

	Content
J4	Understand and use position vectors; calculate the distance between two points represented by position vectors.

	Content
J5	Use vectors to solve problems in pure mathematics and in context, including forces.

3.11 K: Statistical sampling

For sections K to O students must demonstrate the ability to use calculator technology to compute summary statistics and access probabilities from standard statistical distributions.

	Content
K1	Understand and use the terms ‘population’ and ‘sample’. Use samples to make informal inferences about the population. Understand and use sampling techniques, including simple random sampling and opportunity sampling. Select or critique sampling techniques in the context of solving a statistical problem, including understanding that different samples can lead to different conclusions about the population.

3.12 L: Data presentation and interpretation

	Content
L1	Interpret diagrams for single-variable data, including understanding that area in a histogram represents frequency. Connect to probability distributions.

	Content
L2	Interpret scatter diagrams and regression lines for bivariate data, including recognition of scatter diagrams which include distinct sections of the population (calculations involving regression lines are excluded). Understand informal interpretation of correlation. Understand that correlation does not imply causation.

	Content
L3	Interpret measures of central tendency and variation, extending to standard deviation. Be able to calculate standard deviation, including from summary statistics.

	Content
L4	Recognise and interpret possible outliers in data sets and statistical diagrams. Select or critique data presentation techniques in the context of a statistical problem. Be able to clean data, including dealing with missing data, errors and outliers.

3.13 M: Probability

	Content
M1	Understand and use mutually exclusive and independent events when calculating probabilities. Link to discrete and continuous distributions.

3.14 N: Statistical distributions

	Content
N1	Understand and use simple, discrete probability distributions (calculation of mean and variance of discrete random variables is excluded), including the binomial distribution, as a model; calculate probabilities using the binomial distribution.

3.15 O: Statistical hypothesis testing

	Content
O1	Understand and apply the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, p -value.

	Content
O2	Conduct a statistical hypothesis test for the proportion in the binomial distribution and interpret the results in context. Understand that a sample is being used to make an inference about the population and appreciate that the significance level is the probability of incorrectly rejecting the null hypothesis.

3.16 P: Quantities and units in mechanics

	Content
P1	Understand and use fundamental quantities and units in the SI system: length, time, mass. Understand and use derived quantities and units: velocity, acceleration, force, weight.

3.17 Q: Kinematics

	Content
Q1	Understand and use the language of kinematics: position; displacement; distance travelled; velocity; speed; acceleration.

	Content
Q2	Understand, use and interpret graphs in kinematics for motion in a straight line: displacement against time and interpretation of gradient; velocity against time and interpretation of gradient and area under the graph.

	Content
Q3	Understand, use and derive the formulae for constant acceleration for motion in a straight line.

	Content
Q4	Use calculus in kinematics for motion in a straight line: $v = \frac{dr}{dt}, a = \frac{dv}{dt} = \frac{d^2r}{dt^2}$, $r = \int v \ dt$, $v = \int a \ dt$.

3.18 R: Forces and Newton's laws

	Content
R1	Understand the concept of a force; understand and use Newton's first law.

	Content
R2	Understand and use Newton's second law for motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2D vectors).

	Content
R3	Understand and use weight and motion in a straight line under gravity; gravitational acceleration, g , and its value in SI units to varying degrees of accuracy. (The inverse square law for gravitation is not required and g may be assumed to be constant, but students should be aware that g is not a universal constant but depends on location).

	Content
R4	Understand and use Newton's third law; equilibrium of forces on a particle and motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2D vectors); application to problems involving smooth pulleys and connected particles.

3.19 Use of data in statistics

As set out in the Department for Education's *Mathematics: AS and A-level content* document, students studying AS Mathematics must:

- become familiar with one or more specific large data set(s) in advance of the final assessment (these data must be real and sufficiently rich to enable the concepts and skills of data presentation and interpretation in the specification to be explored)
- use technology such as spreadsheets or specialist statistical packages to explore the data set(s)
- interpret real data presented in summary or graphical form
- use data to investigate questions arising in real contexts.

This requirement is common to all exam boards.

3.19.1 Large data set

The dataset featured in statistics questions for exams in 2018 is an extract of a dataset that underpins DEFRA 'Family Food 2014 report' (published in 2015). The dataset contains information on purchased quantities of household food and drink by Government Office Region from 2001 until 2014. The specific extract that students need to be familiar with for the exam is only available via the AQA website.

For exams from 2019 there is a new dataset. This replacement dataset is also only available on the AQA website.

The data set must be used in teaching to allow students to perform tasks that build familiarity with the contexts, the main features of the data and the ways in which technology can help explore the data. Students should also be able to demonstrate the ability to analyse a subset or features of the data using a calculator with standard statistical functions.

For the data set that students should be familiar with and supporting resources, visit aqa.org.uk/7356